Citrix SD-WAN Orchestrator™

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What's new

September 27, 2025

September 29, 2022

Fixes

- **SDW-23725**: Citrix SD-WAN Orchestrator service failed to process the virtual path route records that did not have a static virtual path to the site.
- **SDWANHELP-2769**: The Rollback banner on the **Change Management Settings** page was not cleared after the SD-WAN appliance was up and auto corrected to the correct version.

September 15, 2022

Configuration

HTTP server configuration

Citrix SD-WAN Orchestrator service now supports Certificate-based authentication for HTTPS push notifications to the server URL. Ensure to upload the client certificate in PEM format and the secret key in PKCS8 format.

[SDW-23898]

Fixes

- **SDW-24143**: On the site level **Configuration**> **Appliance Settings** > **SNMP** page, users were unable to update multiple destination IP addresses as a semi-colon separated list.

August 23, 2022

Miscellaneous

Citrix SD-WAN 11.5 release

Citrix SD-WAN 11.5 release is supported in Citrix SD-WAN Orchestrator service. SD-WAN 11.5.0 release is available only via Citrix SD-WAN Orchestrator service and only on selected geographical POPs. Ensure to get the required approvals and guidance from Citrix Product Management / Citrix Support before deploying 11.5.0 on any production network.

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[SDW-24022]

June 30, 2022

Miscellaneous

WAN link template enhancements

When you modify a WAN link template, you now have an option copy the modified WAN link template configuration settings to the site WAN link configuration that is created using the WAN link template.

The following fields are introduced in the **WAN Link Info** section of the WAN link template page:

- Adaptive Bandwidth Detection
- Minimum acceptable bandwidth (%)

The following fields are introduced in the **Metering** section of the WAN link template page:

- Data Cap(MB)
- Disable Link If Data Cap Reached
- Approximate Data Already Used (MB)

The Eligibility field has been introduced in the **MPLS Queues** section of the **Configuration** > **Site Configuration** > **WAN Links** page.

On the **Site configuration** > **WAN links** page, the **Template Name** field is introduced. This field is displayed when a new WAN link is created using a template.

[SDW-23741]

Ethernet interface settings

Citrix SD-WAN Orchestrator service introduces the Ethernet interface settings section on the **Site Configuration** > **Appliance Settings** page of the UI. This section provides information such as connectivity status of the ethernet ports, Interface type, MAC address, auto negotiate, and the duplex setting status.

[SDW-23730]

Fixes

- **SDWANHELP-2706** - Citrix SD-WAN Orchestrator service fails to auto-correct the firmware mismatch when the SD-WAN appliance is factory reset more than once.

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June 02, 2022

Fixes

- **SDW-23687**: LTE firmware upload and validation of the uploaded firmware fails intermittently on Citrix SD-WAN Orchestrator service.
- **SDW-23768**: The Citrix SD-WAN Orchestrator service UI allows more than one WAN link to be set as primary WAN link for Intranet services.
- **SDW-23827**: The audit error EC 100 is displayed for sites that do not have the serial number registered and site names that contain more than 25 characters.

May 05, 2022

Dynamic source NAT

The Citrix SD-WAN Orchestrator service UI now displays the auto-created IPv4 outbound Internet dynamic source NAT rules when the following conditions are fulfilled:

- Internet service is enabled on the site.
- IPv4 outbound Internet dynamic source NAT rule is not configured at the site.
- At least 1 WAN link is on an untrusted interface or Internet is enabled on all routing domains.

[SDW-23553]

Minimum and Maximum value in Kbps for WAN link settings: Citrix SD-WAN Orchestrator service allows you to set minimum and maximum upload bandwidth values in Kbps for LAN to WAN as well as WAN to LAN while configuring a WAN link. The minimum/maximum kbps fields are added under the **Configuration> Site Configuration > WAN Links tab > Services** section at the site level. You must provide the value (mandatory to add the minimum value) while adding any new services or editing any existing services.

You can also set the minimum/maximum upload and download bandwidth value for Internet and Intranet services. The same fields are also added under **Configuration> Advanced Settings > Delivery Services > Internet/Intranet Services** at the site level.

[SDW-23408]

Provider-No-Access Role: With the No access role feature, initially a provider administrator can avoid giving the full access role to a newly added user. When the user with a no-access role clicked the Citrix SD-WAN Orchestrator service, the UI gets stuck on loading. The administrator can later decide whether to restrict giving access to the newly added user or add them to a specific tenant.

[SDW-22585]

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Deployment enhancements

The **Deployment** home page is enhanced with a new look and feel for a better user experience. The following changes are effective on the new **Deployment** page:

- **Deployment summary:** This section provides a summary of the most recent deployment with such as the date and time (in UTC time zone), and the status of the deployment.
- **Switch to Old Deployment View:** An option to go back to the old Deployment page is available.
- **Deployment history**: The new **Deployment history** table provides details of the past deployment. If Partial Site Upgrade is enabled, the deployment history table categorizes the details based on the software version that the appliances are configured to run. If the last activation fails, you can even view details of the failure.
- **Site View**: This table includes details about the current deployment status, Orchestrator connectivity, the software version of each appliance, and a timestamp of the running configuration. It also includes options to retry the deployment on individual sites in case of failures.
- **Default network software:** The option to select the software version to be applied to the sites across the network is now available under **Deploy Now** > **Software & Sites**.
- **Partial site upgrade**: The partial site upgrade option is now available under **Deploy Now** > **Software & Sites**.
- **Ignore Incomplete**: This check box is now available under **Deploy Now** > **Settings**.
- **Rollback Settings**: The **Rollback on error** option is renamed as **Rollback Settings**. It is now available under **Deploy Now** > **Settings**.
- The 4 main stages of the deployment process are captured in the following screens:
    - Software & Sites
    - Configuration
    - Settings
    - Summary

[SDW-16829]

Site template

Citrix SD-WAN Orchestrator service introduces the option of using a Site template to configure a site. The Site template can be created from **Configuration** > **Profiles & Templates > Templates** and a new site can be created using this Site template from **Configuration** > **Network Home.**

You can also clone a branch site in addition to site template. However, if some additional features require any modifications, verify the configuration details after cloning the site or the site template and make the changes as required.

[SDW-14694]

Mobile broadband settings - Manage firmware

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Citrix SD-WAN Orchestrator service provides an option to upload a firmware and apply it as part of the mobile broadband configuration. Currently, the firmware can be applied only on SD-WAN SE 210 LTE appliances.

[SDW-23588]

Fixes

- **SDWANHELP-2657** - Unable to invite a user as there is an interim issue with Citrix Cloud™ server.
- **SDW-23322** - The service state of an SD-WAN appliance running a software version of 11.4.2 is displayed as **BAD** on the Citrix SD-WAN Orchestrator service for On-premises UI. The error message displayed is **No Response from Orchestrator URL**. This issue occurs when a custom domain is configured in Citrix SD-WAN Orchestrator service.

March 31, 2022

Record device mismatch

Citrix SD-WAN Orchestrator service notifies users when a mismatch is identified between the platform model reported by the appliance and platform model that the users provide while configuring a site. The mismatch details of the platform model and submodel are displayed on the UI in a tabular format.

[SDW-23346]

Platform and systems

Management IP / In-band IP enhancements

The **Management IP** and the **Device Access** columns on the following UI screens are enhanced to display either the in-band IP address or the management IP address based on the type of IP address that the device is using to communicate with Citrix SD-WAN Orchestrator service:

- **Provider > Reporting > Inventory > Details**
- **Customer > Configuration > Network Home > Actions > View Details**
- **Customer > Security > Hosted Firewall > VM administration**
- **Customer > Reporting > Inventory > Deployed**
- **Site > Dashboard > Devices**

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[SDW-23353]

Mobile broadband settings and Mobile broadband status

You can now connect the Citrix SD-WAN™ appliance from your site to a network using a broadband Internet connection. This mobile broadband status and configuration support is available for Internal modems. You can also view the status of the broadband configuration of your device and the active SIM.

[SDW-10907]

Fixes

- **SDWANHELP-2619**: In the case of multi-MCN MSP, the audit log for deleting a tenant is missing. With the fix, when user deletes a tenant from the MSP an audit log entry is created.
- **SDWANHELP-2570**: Citrix SD-WAN Orchestrator service UI reflects the actual value of MTU - 1350 in Wan links.
- **SDW-23477**: Citrix SD-WAN Orchestrator service sends TCP synchronization packets to the AWS endpoint.

March 03, 2022

Citrix SD-WAN 11.4.3 release is supported in Citrix SD-WAN Orchestrator service.

[SDW-23359]

IP access list

Citrix SD-WAN Orchestrator service allows administrators to configure user IP addresses at a network level. This feature is useful when administrators want to allow the tenant access to users based on the IP address, thereby enhancing IP security. This feature is supported for users that have specific roles assigned as part of a tenant.

The **IP Access List** page is introduced in Citrix SD-WAN Orchestrator service to enable administrators to configure user IP addresses.

[SDW-21393]

Site summary table

A new **Device Status** column has been added at the network home sites summary table.

[SDW-23401]

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Fixes

- **SDWANHELP-2609**: Earlier, the user was not able to change the alternate port values after initially configuring it.
- **SDWANHELP-2482**: HA failover was triggered when activation on active and standby appliances did not happen within the predefined freeze time. To avoid unnecessary failovers, the freeze time for failover during Change Management on Citrix SD-WAN 110 appliances has been increased by 10 seconds.
- **SDW-23322**: The service state of an SD-WAN appliance running a software version of 11.4.2 is displayed as *BAD* on the Citrix SD-WAN Orchestrator service UI. The error message displayed is *No Response from Orchestrator URL*. This issue occurs when a custom domain is configured in Citrix SD-WAN Orchestrator service.
- **SDW-23399**: A missing value of 1500 bandwidth for VPX and VPXL has been added.
- **SDW-23310**: To set Access Interface and gateway IPs at WAN links, you have to change the Virtual Interface from the drop-down list > select another Virtual Interface > then back to the original.

January 27, 2022

Restore previous version

Citrix SD-WAN Orchestrator service introduces the Restore previous version functionality. When the **Restore previous version** option is selected, Citrix SD-WAN Orchestrator service initiates a network-wide activation of the previous configuration and restores the previously activated configuration(and/or software) on your network.

[SDW-22042]

QoS Policies

The QoS policies page is revamped to enhance the user experience. The options such as Custom Application Rules, Application Rules, HDX™ Rules, Application Group Rules, IP Rules, and Default IP-Protocol Rules are enhanced with a new look and feel.

[SDW-11029]

IP Rules

The Override Service option is added under **IP Rules > Virtual Path Traffic Policy** section. When the **Traffic Policy** is selected as **Override Service**, you can select the service type as Intranet, Internet, pass-through, or Discard to which the virtual path service overrides.

[SDW-22213]

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Configuration Difference

A **Config Diff** feature is newly added at the Network level under **Configuration**. The **Config Diff** capability helps you to review the difference between any two versions of configuration checkpoints. You can also have the ability to view the configurations both at the global and site levels.

[SDW-4563]

Appliance settings

Citrix SD-WAN Orchestrator service introduces an option to configure the management network priority. You can select **In-Band** or Out-of-Band as the management interface for your network. This option is available only if the SD-WAN appliance is running a software version of 11.4.2 or later.

[NSSDW-35774]

CSV Export Report

With the **Export as CSV** capability, you can download the path graph points (virtual/member path) for any time series (hourly, weekly, and so on) as an excel Comma-separated Value (CSV) file and can plot all distinct points of data for a particular site report.

[SDW-20988]

Certificate authentication

Citrix SD-WAN Orchestrator service supports appliance authentication for static and dynamic virtual paths using Public Key Infrastructure (PKI) as an additional security feature. Enabling the feature extends the existing virtual path authentication mechanism by distributing PKI certificates over the data path, by the appliance initiating the exchange. The PKI enhancement also supports Certificate Revocation List (CRL) management for centralized revocation of compromised certificates.

[SDW-19295]

View Configuration (Preview)

Citrix SD-WAN Orchestrator service introduces the **View Configuration** page at the site level. This page provides a detailed summary of a site's configuration across multiple subsystems.

[SDW-22284]

Real-time statistics

The **Firewall Connection** is now renamed to **Firewall Statistics**. NAT and Filter Policies are newly added under the statistics type drop-down list. Also, the Real-time statistic options are restructured and divided into the following categories:

- Network statistics
- Application statistics
- Route statistics

[SDW-20966]

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Fixes

- **SDW-22977**: When a serial number is added to an existing site configuration that is deployed without a serial number, the appliance gets activated with the previously staged configuration.
- **SDWANHELP-2536**: User was not able to update cc/bcc emails at **Network level > Alerts > Notification settings > Notification** profile tab.
- **SDW-10178**: On adding more than 9 subinterfaces, the diagram for the LAN segment is not clear.
- **NSSDW-37813**: In Citrix SD-WAN 11.4.2 release, uploading a signed CSR certificate from Citrix SD-WAN Orchestrator service fails for files with .der extension.

Known issues

September 27, 2025

Sep 29, 2022

Citrix SD-WAN Orchestrator service has the following known issues:

Platform and systems

In the Citrix SD-WAN™ 210 appliance, if you remove the Standard Edition (SE) add-on license, the services get disabled.

Workaround: Before removing the SE add-on license (or) moving from AE to SE license, remove the firewall policies that have the security profile, configure the appliance as out-of-band management (If In-band management is configured) and then proceed with the stage and activation process to convert the appliance to standard edition.

[SDW-18031]

License

When the pooled license's low bandwidth quota is over, the device does not consume any licenses and remains in grace license mode.

Workaround: Add more licenses into pooled licenses and then change the bandwidth in the site configuration to trigger allocation of the pooled licenses. Or, you can change the bandwidth to a higher bandwidth in the site configuration if it is available in pooled licenses.

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[SDW-22730]

Currently, there is no indication to the user that the device remains in grace license mode when there are no more licenses to be allocated from pooled licenses while saving the device serial number.

Workaround: Add more licenses into the pooled license and then change the bandwidth in the site configuration to trigger allocation of the pooled licenses.

[SDW-22709, SDW-15001]

Customer with a Secure Internet Access (SIA) entitlement while onboarding to Citrix SD-WAN Orchestrator service, is being onboarded to a different PoP. Whereas the other way, with the customer having SD-WAN entitlement and onboarding to SIA works fine.

[SDW-22672]

Appliance configuration activation fails when the appliance device model is set to Advanced Edition (AE).

[SDW-19067, SDW-15001]

Platform and systems

The GUI of one of the Citrix SD-WAN appliances is not accessible because the network statistics provider is reusing a session and this caused the HTTPD process to behave improperly (in rare cases).

[SDW-23392]

Configuration and Management

On the **Realtime VRRP Site reports** page of the Citrix SD-WAN Orchestrator service UI, the **Enable** and **Disable** operations are not working.

[SDW-24066]

The Applications and Application categories graphs are empty on the **Reports** > **Usage** > **Applications** page of the Citrix SD-WAN Orchestrator service UI.

[SDW-23817]

A mismatch is observed between the agent and appliance scripts while fetching IGMP statistics.

[SDW-23757]

The **Restore previous version** operation fails with the **Activation Failed(ER101)** error message for the sites in PSU when the partial site upgrade list is modified and a change management (stage and activate) is performed on a network.

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- **Workaround**: Perform another round of change management before applying the restore previous version action.

[SDW-23227]

Customer is not able to send push notification to their own HTTP Server.

[SDW-23134]

If a site is added to the configuration before performing staging and activation, enabling HA on the site post activation with a new serial number for the secondary appliance triggers auto-deployment of the newly added appliance. The staging fails with the error **Staging Failed (Failed to download script files)**.

Workaround: After enabling HA, do a full network stage and activate to deploy the HA appliance.

[SDW-22567]

The **WAN-OP Settings** > **SSL Profiles** > **Add** section of the UI fails to display the list of newly created WAN optimization rules in the **Service classes** drop-down list.

Workaround: Create an SSL profile without specifying service classes, and then edit the same profile. The list of WAN optimization rules is displayed.

[SDW-21734]

A change in the SSL inspection root Certificate Authority (CA) and the key will not be propagated to the SD-WAN appliance, unless another edge security-related setting is also changed. This results in the SSL inspection being performed with the previous root CA.

Workaround: Change another setting related to edge security, then stage and activate it. This triggers the download and application of the root CA and key.

[SDW-16050]

The static virtual paths that are formed between a transit node and the branch sites are not getting deleted when the transit node configuration is removed.

Workaround: Delete the static virtual paths manually when the transit node configuration is removed.

[SDW-16045]

Scheduling Information of the appliance in **Change Management Settings** might display outdated data, when the appliance reconnects to the Citrix SD-WAN Orchestrator service after a factory reset.

Workaround: In the **Change Management** settings, select the desired scheduled window and apply it. The appliance is updated and the data between the appliance and the Citrix SD-WAN Orchestrator service is synchronized.

[SDW-15169]

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Creating the transit nodes for the branches does not form virtual paths.

Workaround: Create the static virtual paths manually between the transit site and the branch nodes.

[SDW-10104]

Onboarding Citrix SD-WAN Orchestrator™

September 27, 2025

Here is an overview of the Citrix SD-WAN Orchestrator service onboarding process:

- Onboarding provider and tenants: Our customers can consume a managed SD-WAN service from Citrix partners, enabled by the multitenant Citrix SD-WAN Orchestrator service
- Onboarding "Do It Yourself"(DIY) Enterprises: Citrix SD-WAN Orchestrator service is also available as a self-managed service for enterprises.

Onboarding provider and tenants

This section describes the onboarding process for Citrix® partners and their tenants.
Here is a summary of the onboarding process:

1. A prospective partner sign-up as a Citrix Partner.
2. Citrix Partner registers as a Citrix SD-WAN™ Reseller.
3. Partner on boards Customers using one of the following two options:
   - Partner adds a customer who is new to Citrix Cloud™.
   - Partner invites an existing Citrix Cloud customer.
4. Partner and customers can now access their Citrix SD-WAN Orchestrator service accounts.

Partner signs up for a Citrix partnership program

A prospective partner would need to sign up for the Citrix Service Provider Program (CSP) - CSP sign-up.
A partner can also sign up for the Citrix SD-WAN Managed Service Provider Program, which has been specially crafted for Citrix SD-WAN partners - SD-WAN MSP Sign Up.

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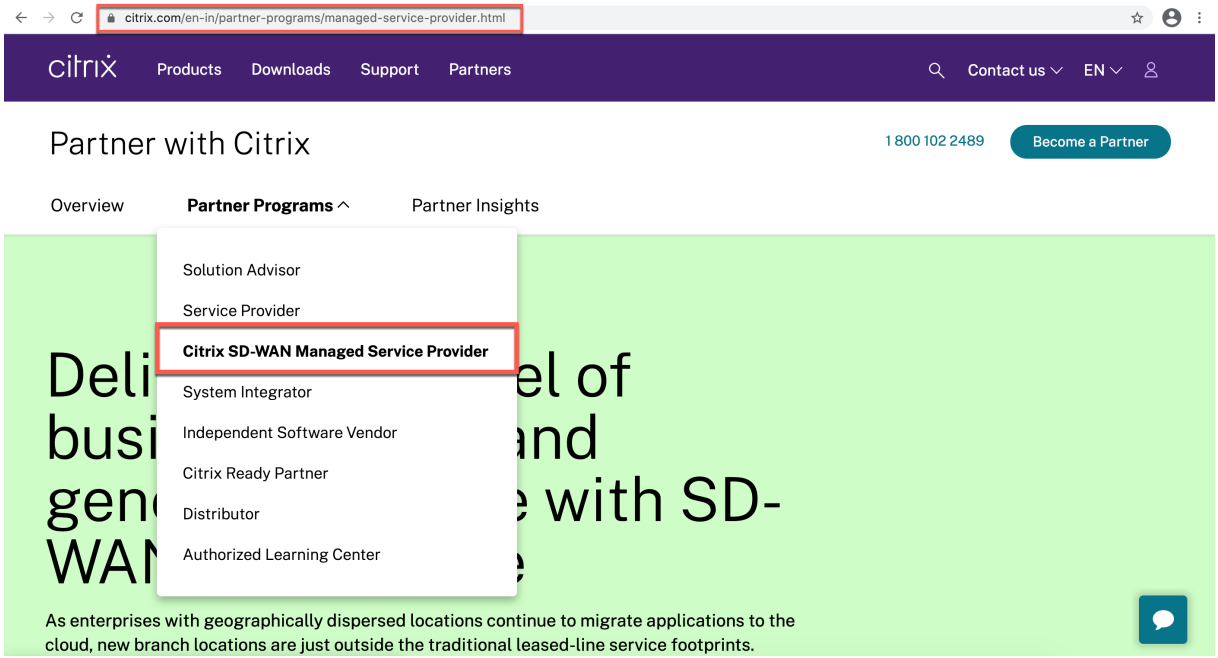
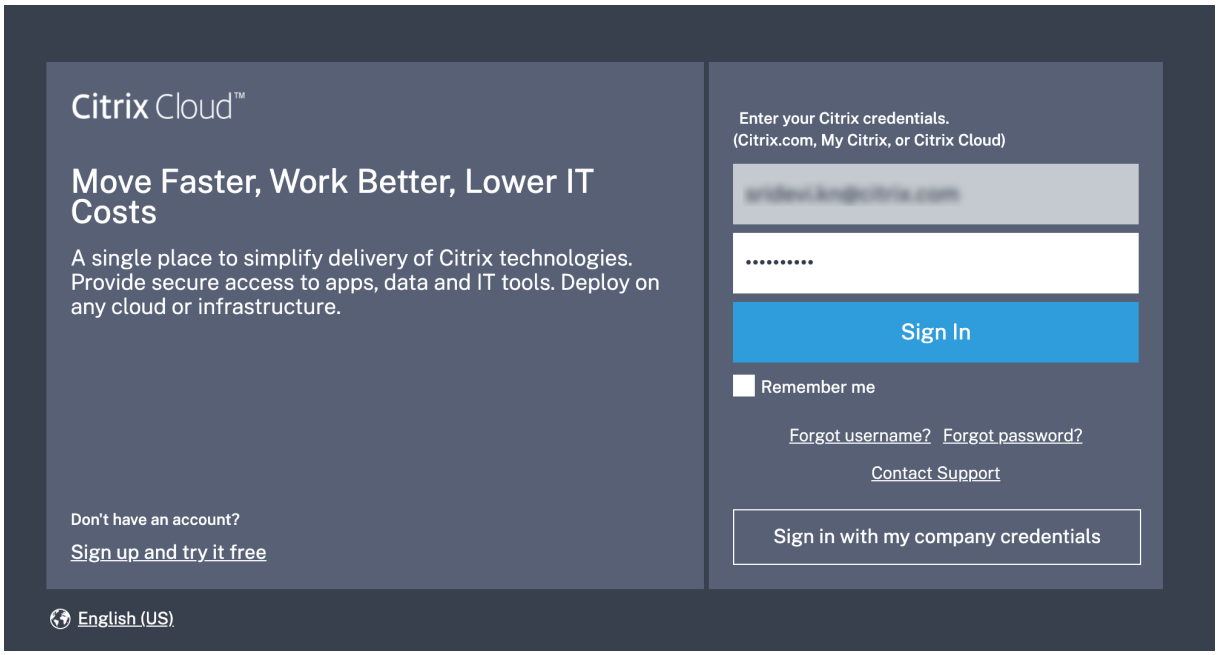


A Citrix Cloud (CC) account is created for the partner as part of the registration process. For more information, see Signing Up for Citrix Cloud.

Partner registers as a Citrix SD-WAN reseller

Partner logs into the Citrix Cloud account.



A menu of all the available services offered on Citrix Cloud is displayed on the home page. The **Citrix SD-WAN Orchestrator service** tile can be found in the **Available Services** section. The partner clicks

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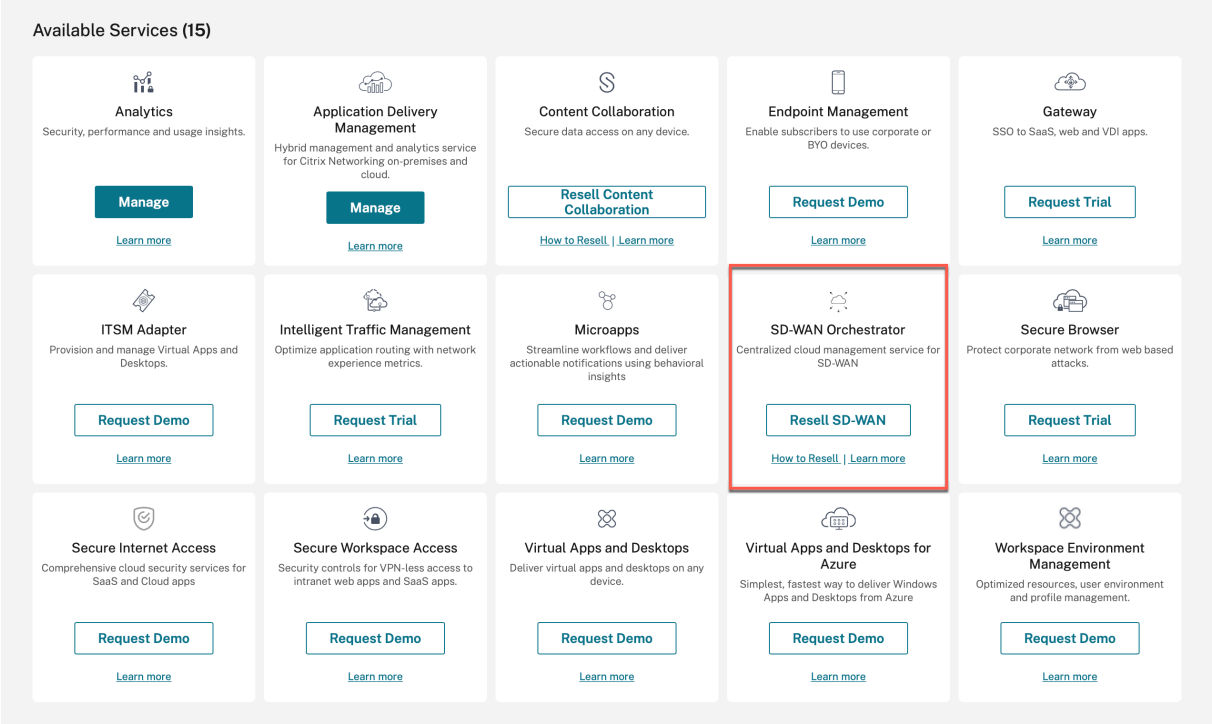
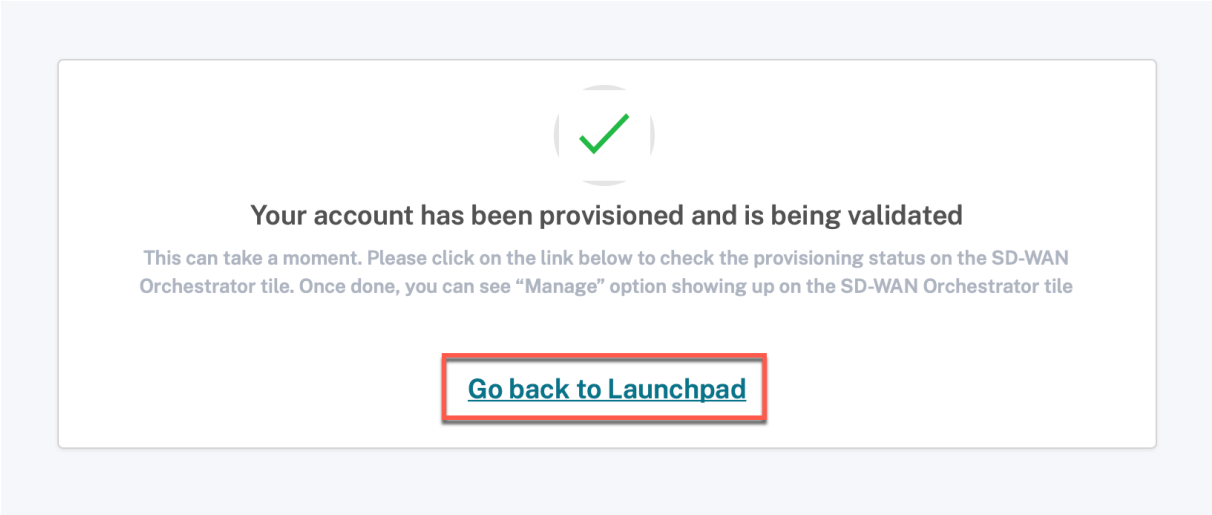
Resell SD-WAN on the tile to register themselves as a Citrix SD-WAN reseller or service provider.





Partner can now access the Citrix SD-WAN Orchestrator service. The **Citrix SD-WAN Orchestrator service** tile now shows up under **My Services**. Click **Manage** to access the Citrix SD-WAN Orchestrator service Provider Dashboard.

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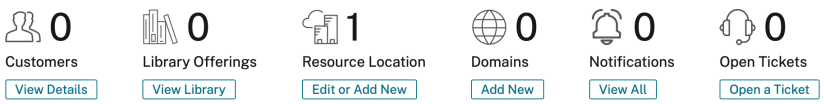
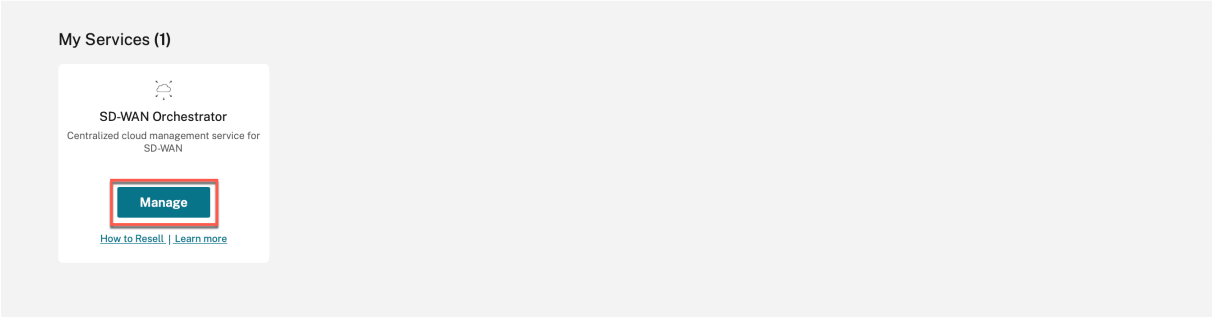
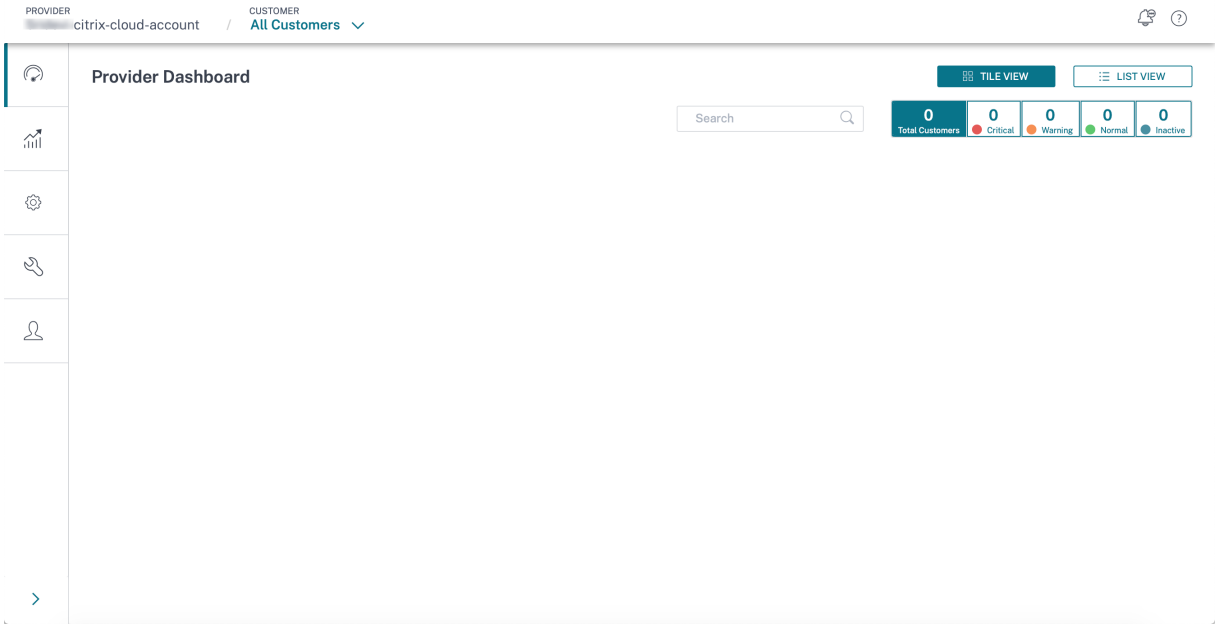




At this point, there are no SD-WAN customers. The partner navigates back to the Citrix Cloud home page to onboard customers.



Partner on-boards customers using one of the following two options:

- Add a customer who is new to Citrix Cloud.
- Invite a customer who already has a Citrix Cloud account

Partner adds a customer who is new to Citrix Cloud

1. On the Citrix Cloud home page, click **View Details** under the **Customers** icon or click **My Customers** from the hamburger menu.

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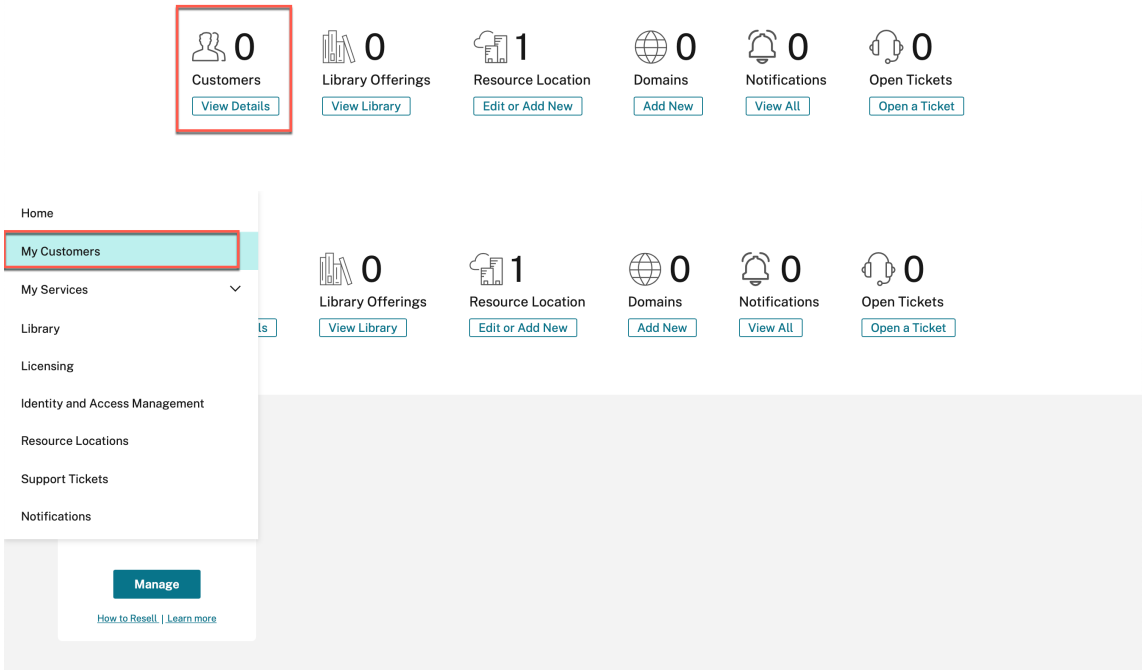
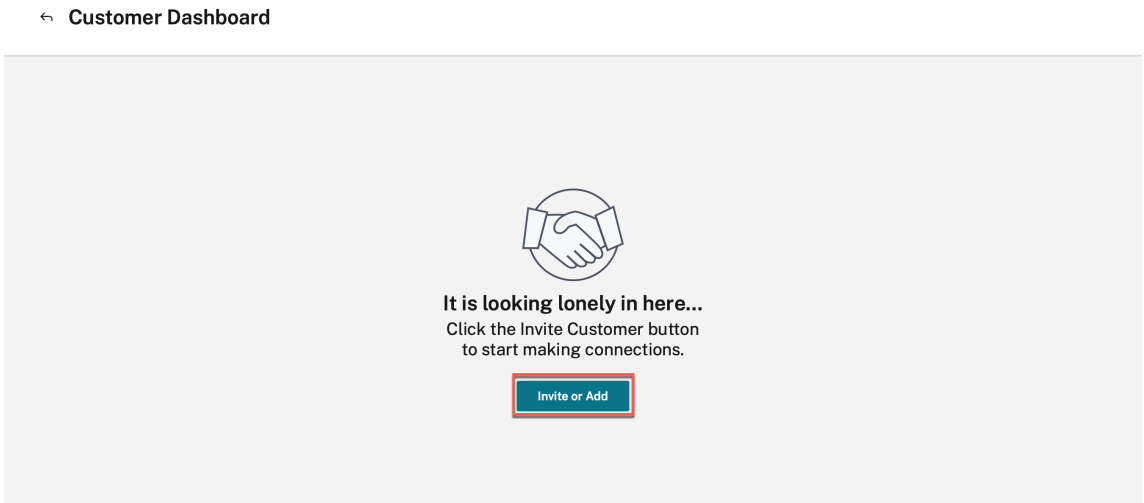


2. Click **Invite or Add**.



3. Select **Add a customer** and click **Continue**.

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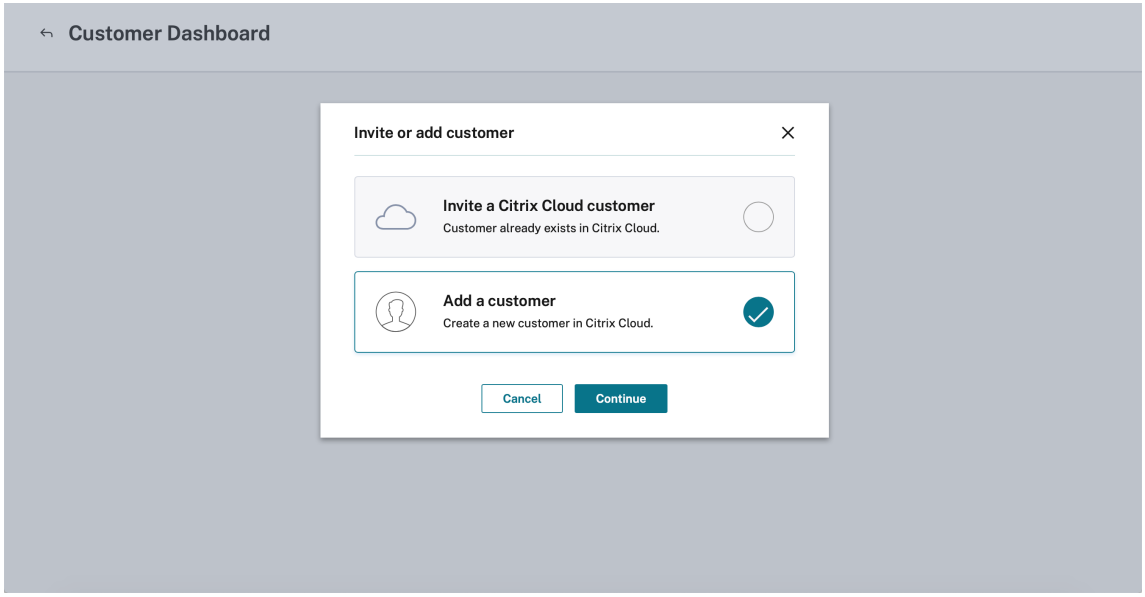

4. Enter the admin and customer details and click **Finish**.

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Add a customer

To add a customer, complete these steps below.

Add Customer Information

Enter admin and customer details. (All fields are required)

Admin Details

First Name

Last Name

Business Email Address

Business Details

Company Name

Phone Number

Address

City

USA

AA

Zip or Postal Code

I've read, understand and agree to the Terms of Service

Finish

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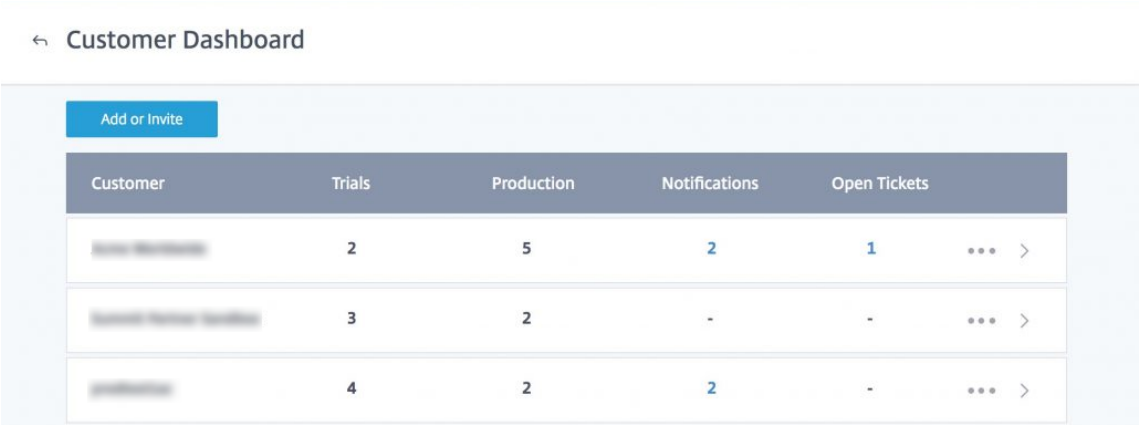
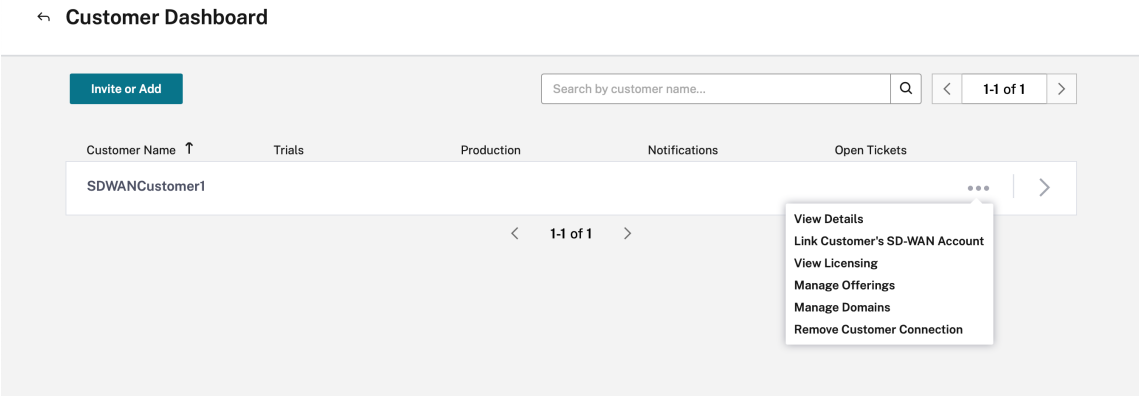
> **Note**
>
> The company name and email-id used must be associated with only one Citrix Cloud account.

The added customers are visible in the **Customer Dashboard**.



5. Partner links their SD-WAN account with the customer SD-WAN account

   In the partner's **Customer Dashboard**, the partner selects the customer and clicks **Link Customer's SD-WAN Account**.



6. Partner requests for Citrix SD-WAN Orchestrator service trial on behalf of the customer.

   In the Citrix Cloud dashboard, the partner selects the **Change Customer** option and selects the appropriate customer.

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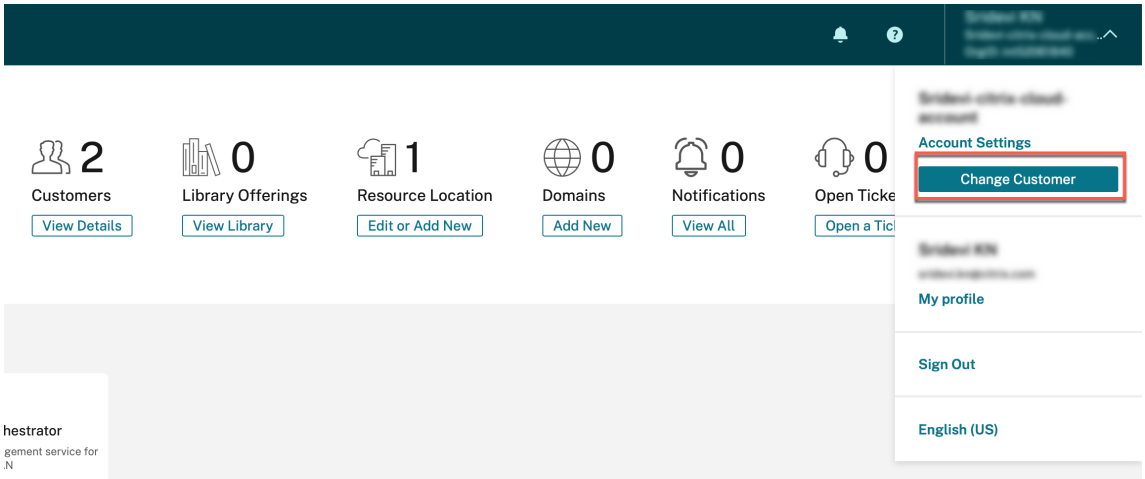

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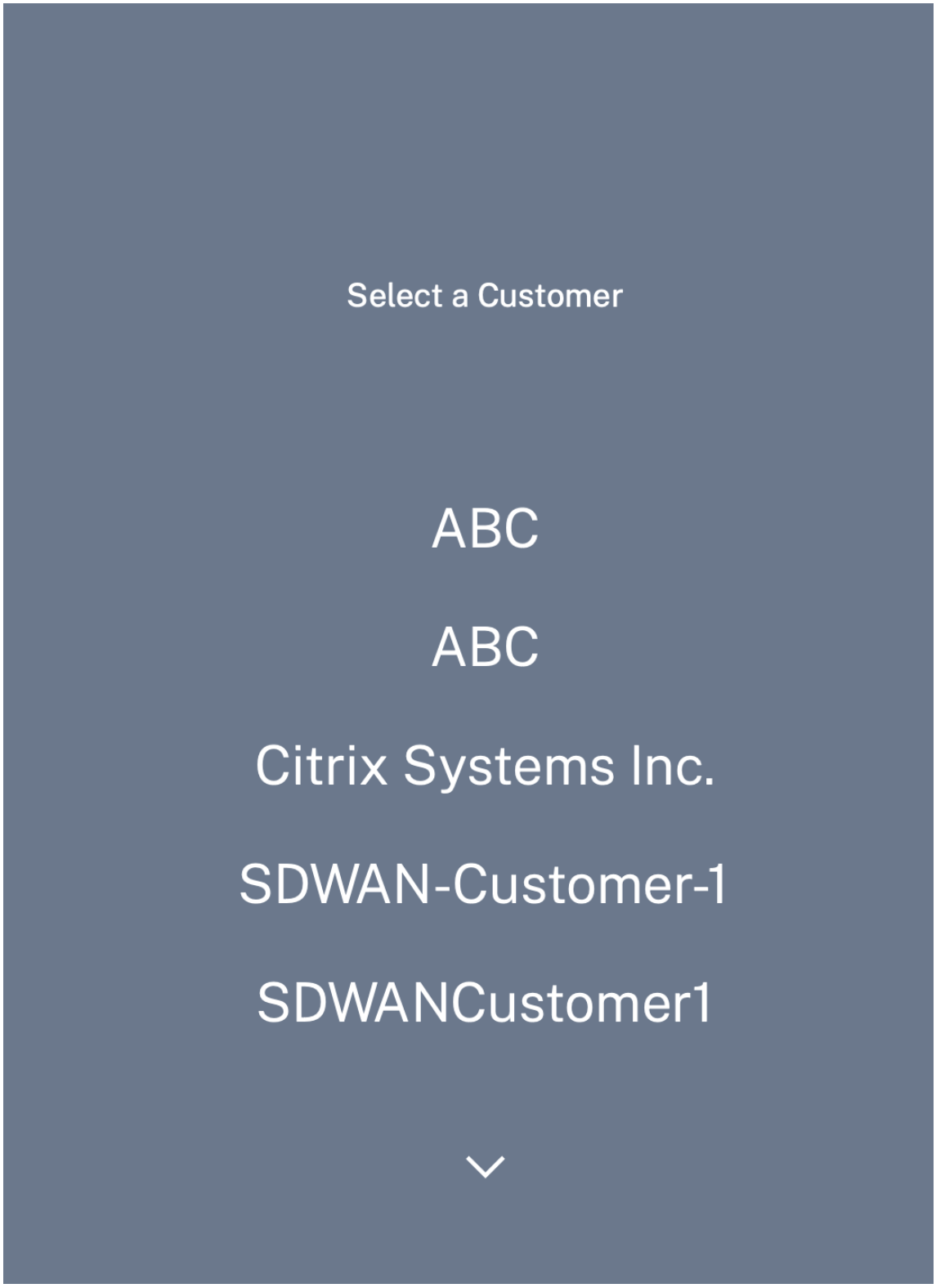

The partner navigates to the customer's Citrix Cloud home page, and clicks the Citrix SD-WAN Orchestrator service **Request Trial** button.

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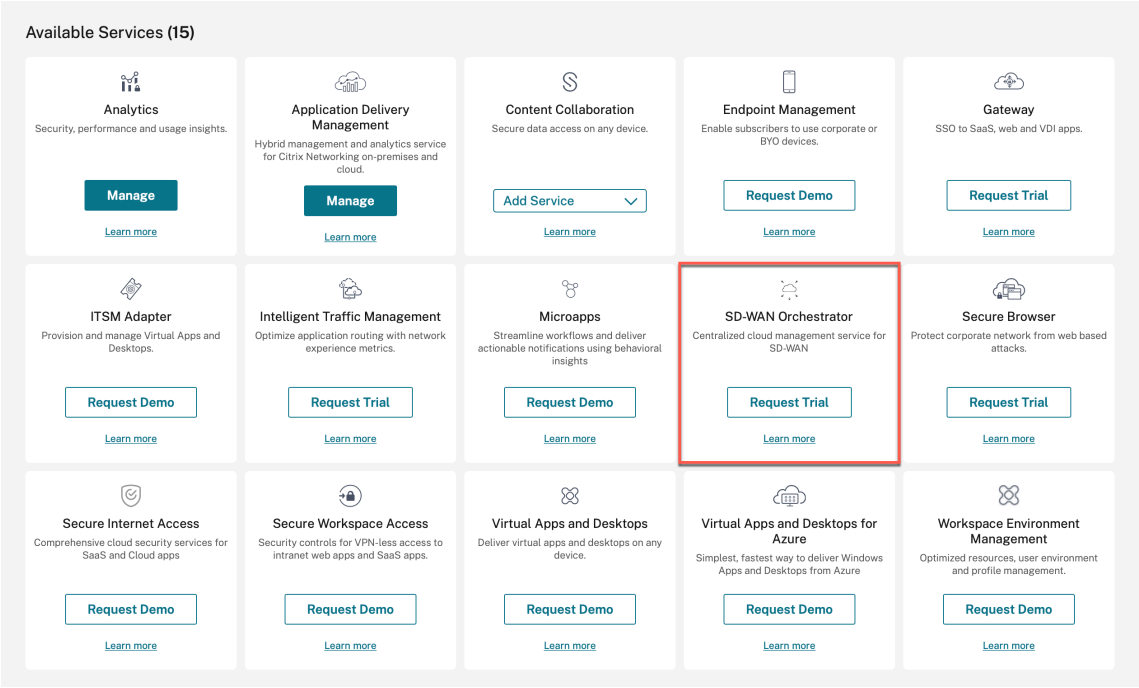
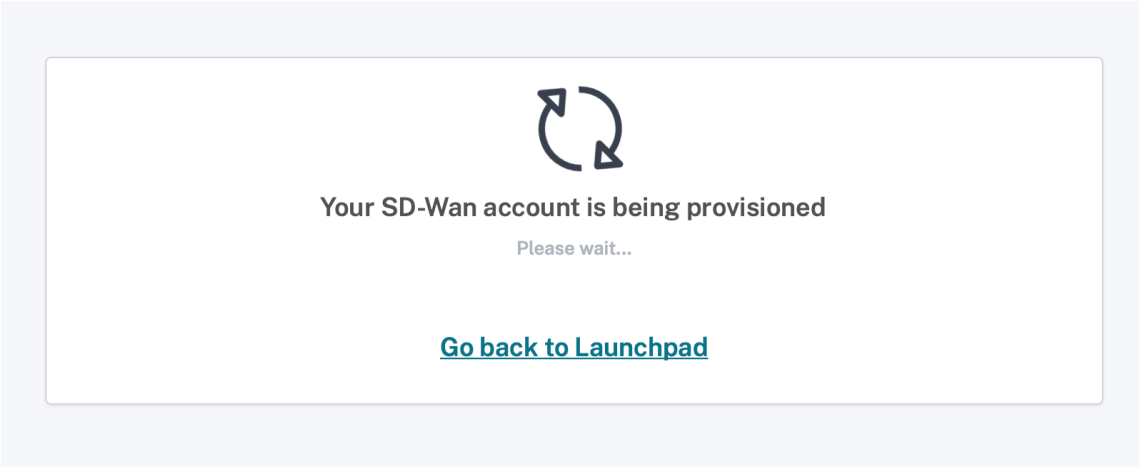
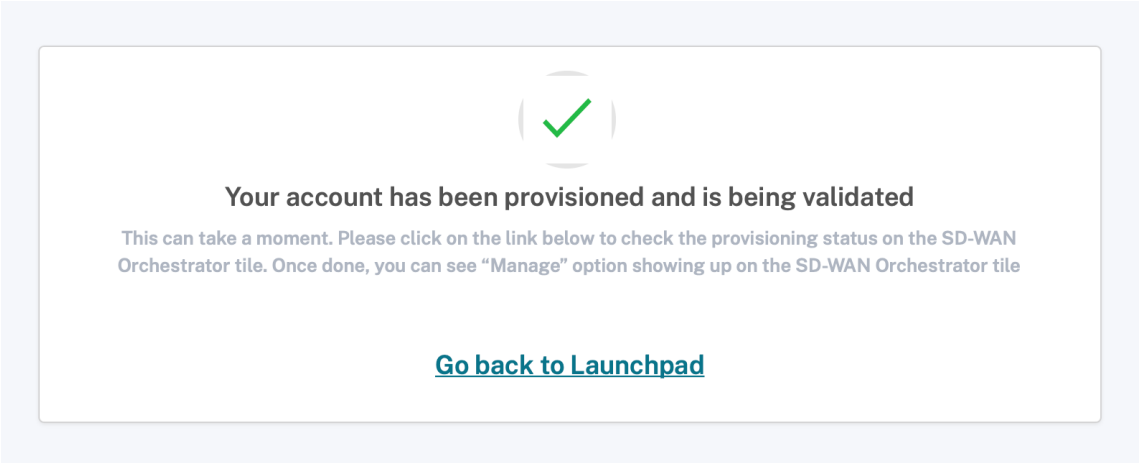


The customer's Citrix SD-WAN Orchestrator service account gets provisioned.





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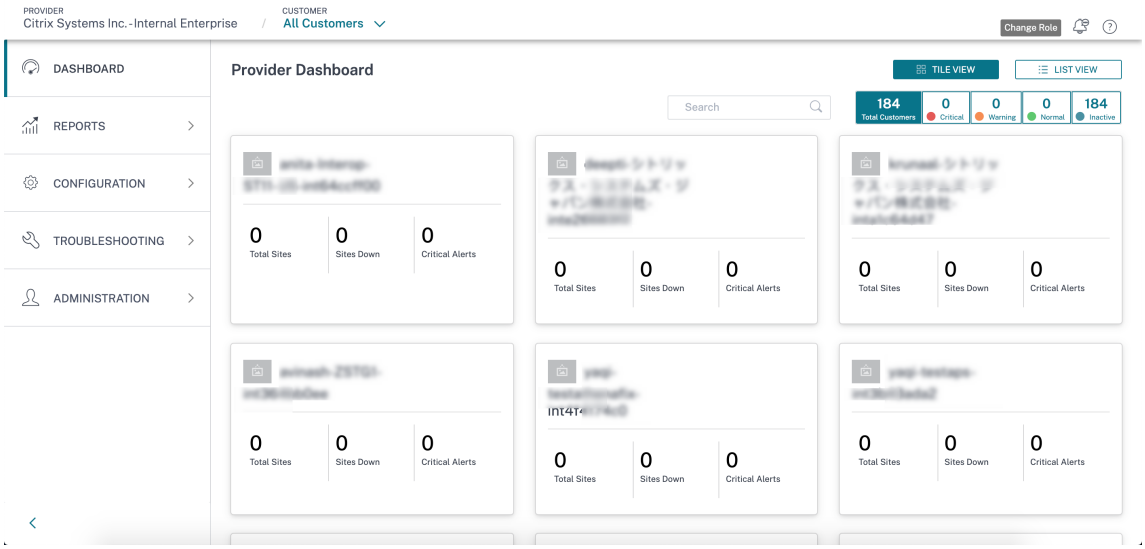
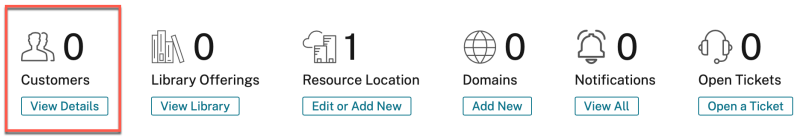
The partner can now manage the customer's Citrix SD-WAN Orchestrator service account after switching back to their account using **Change customer** option again.

Partner's dashboard on the Citrix SD-WAN Orchestrator service now reflects the new customers added. Partner can click the customer tile to drill down into the customer's network and manage it.



Partner invites an existing Citrix Cloud customer

1. On the Citrix Cloud home page, click **View Details** under the **Customers** icon or click **My Customers** from the hamburger menu.



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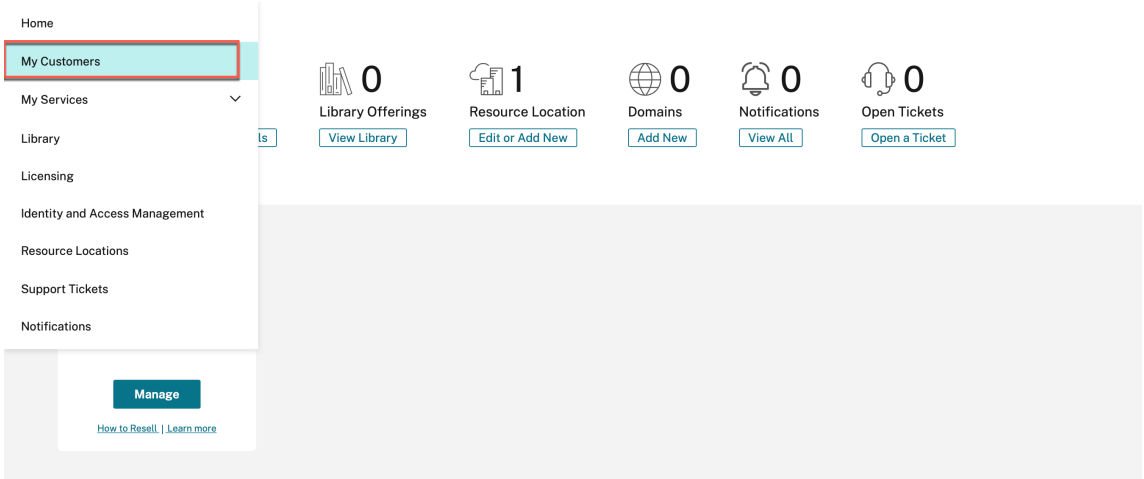
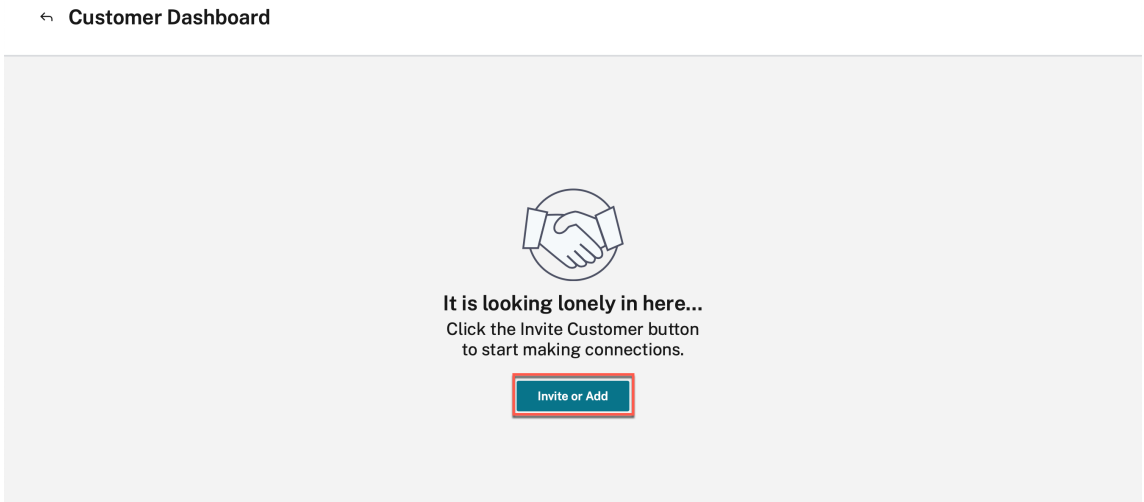


2. Click **Invite or Add**.



3. Select **Invite a Citrix Cloud customer** and click **Continue**.

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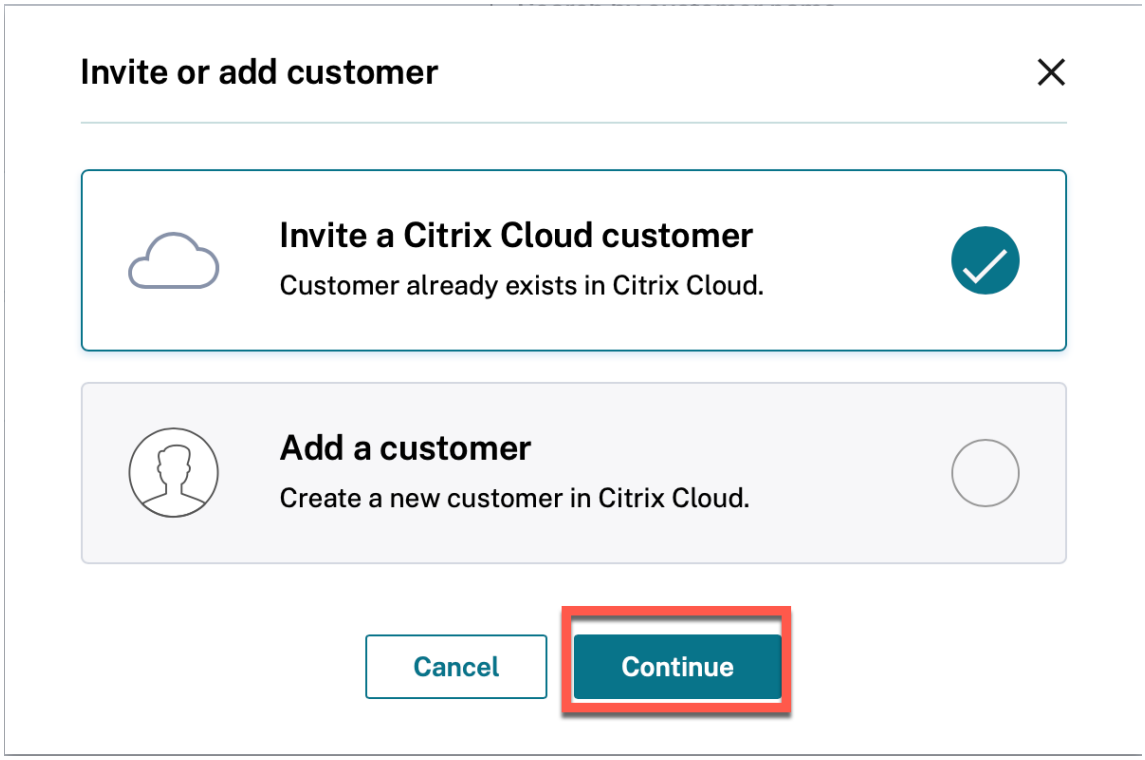
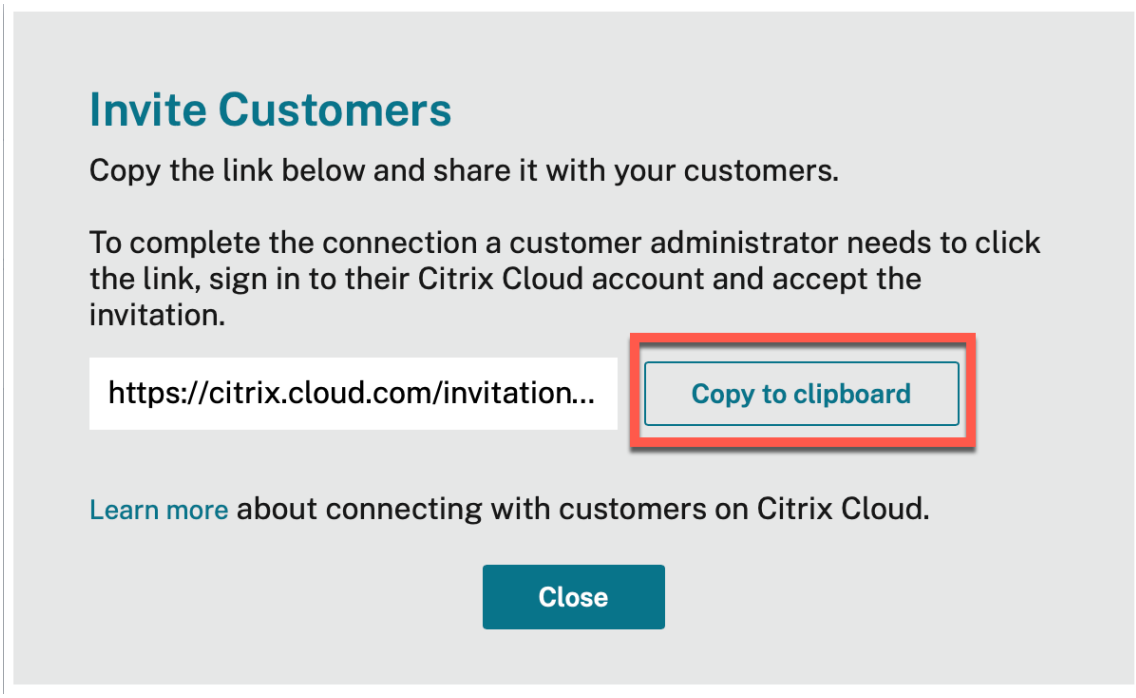


4. Copy the link and share it with the customer.



5. The customer clicks the link received and is redirected to the Citrix Cloud login page.

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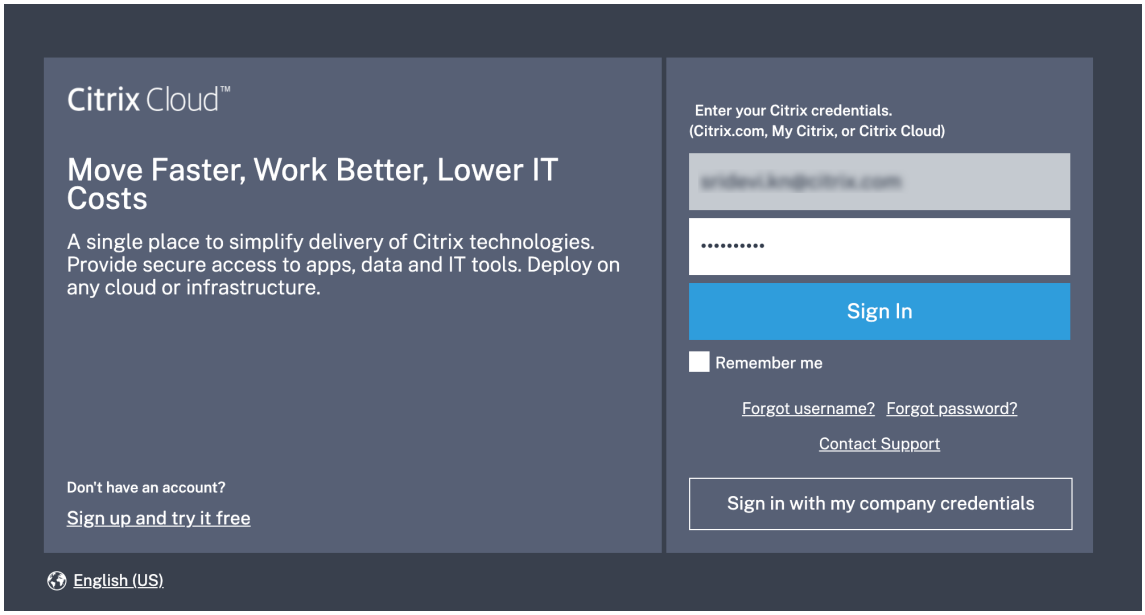
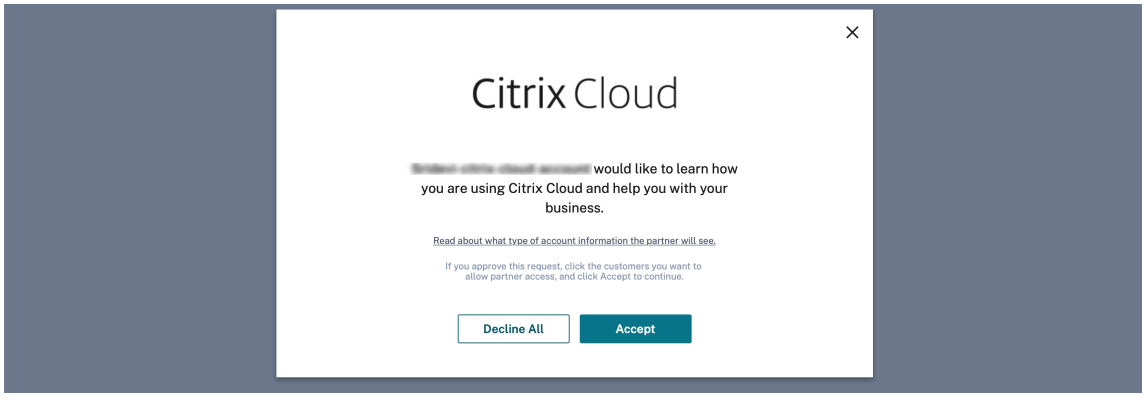


6. Customer logs in and accepts the partner's request to manage their Citrix Cloud account and services.



The partnership between the partner and the customer is established.

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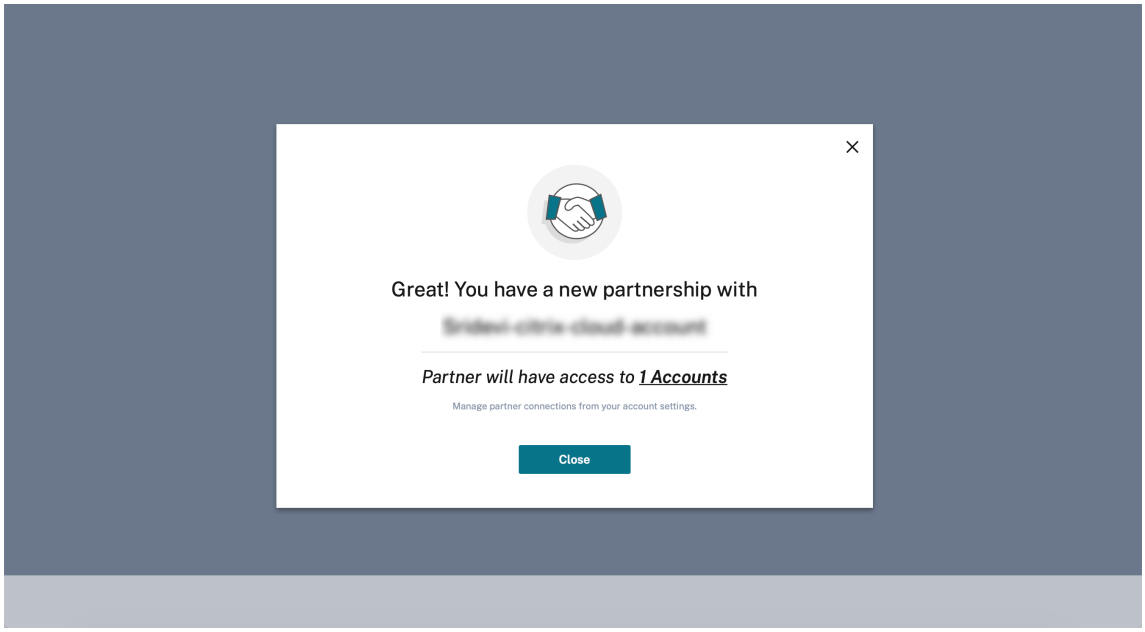
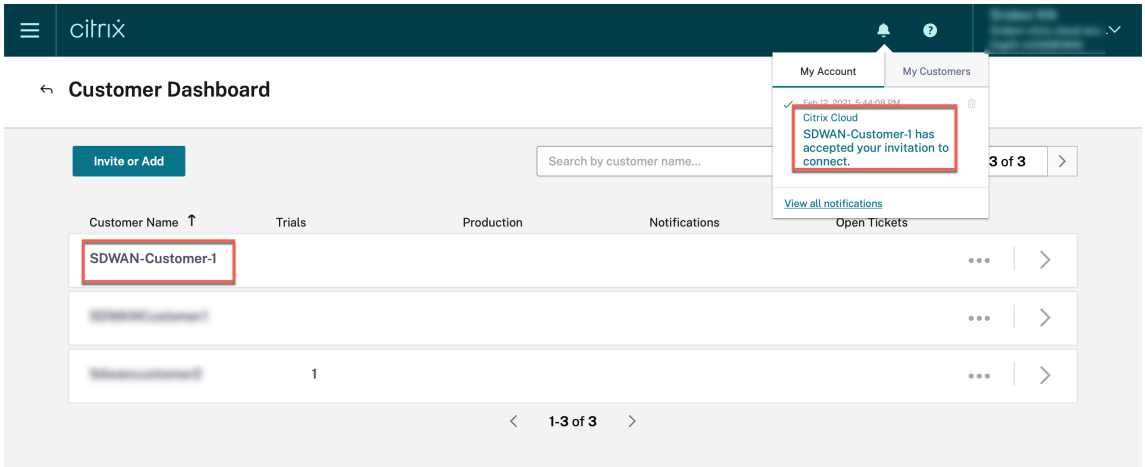


The customer details show up in the partner's customer dashboard.



7. Partner links their SD-WAN account with the customer SD-WAN account

   In the partner's **Customer Dashboard**, the partner selects the customer and clicks **Link Customer's SD-WAN Account**.

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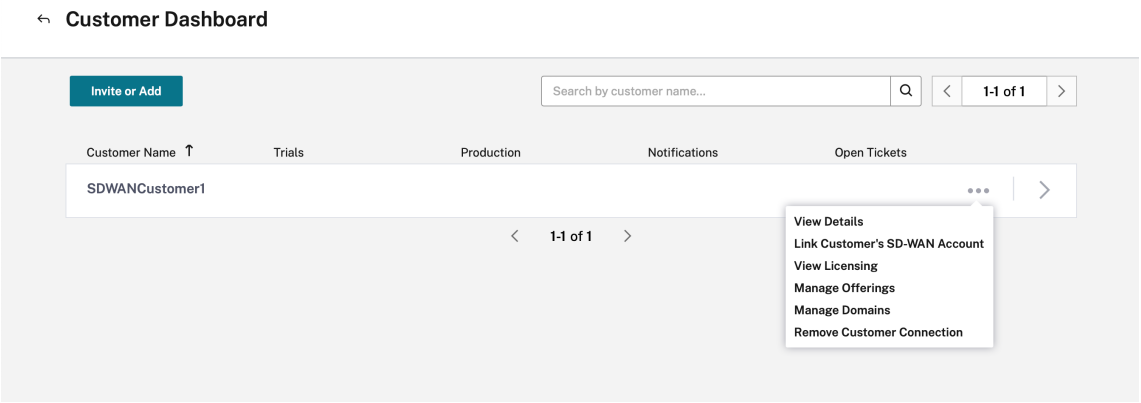
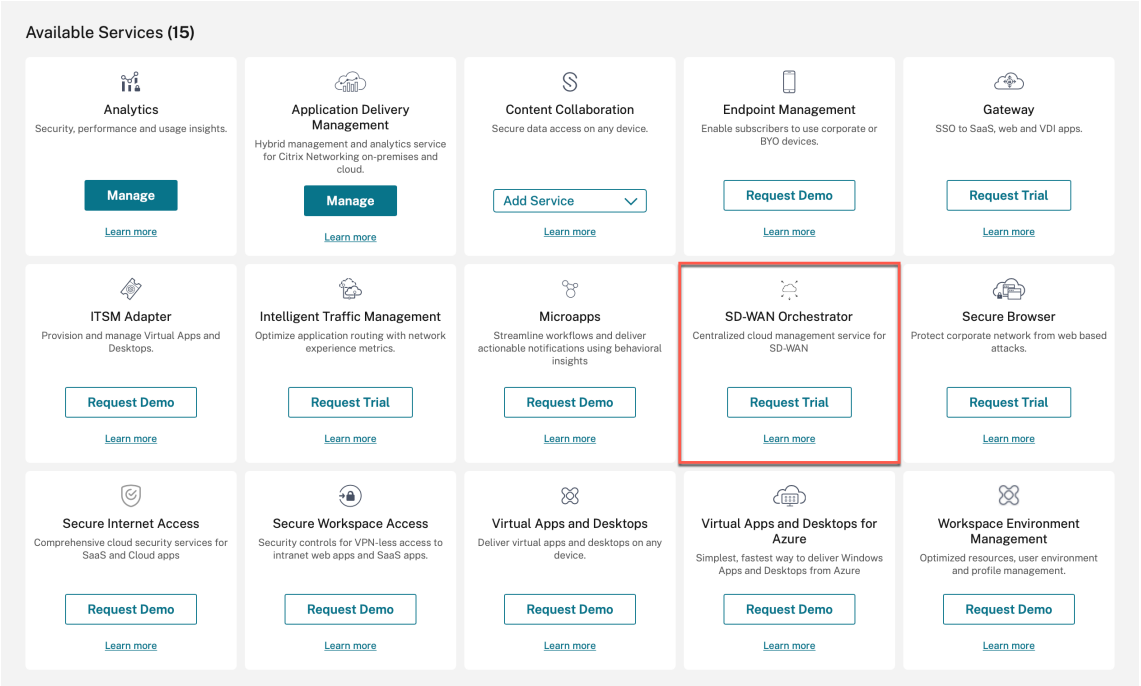


8. Customer requests for Citrix SD-WAN Orchestrator service trial

   Once the partner links the Customer's Citrix SD-WAN Orchestrator service account to their own, the partner or the customer navigates to the customer's Citrix Cloud home page, and clicks the Citrix SD-WAN Orchestrator service **Request Trial** button.



   The customer's Citrix SD-WAN Orchestrator service account gets provisioned. The partner can now manage the customer's Citrix SD-WAN Orchestrator service account from within their own account.

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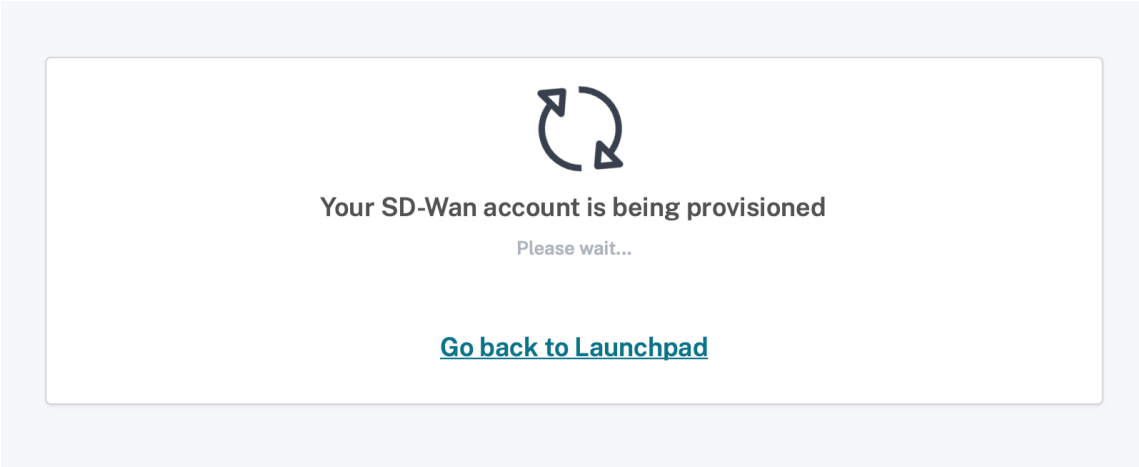

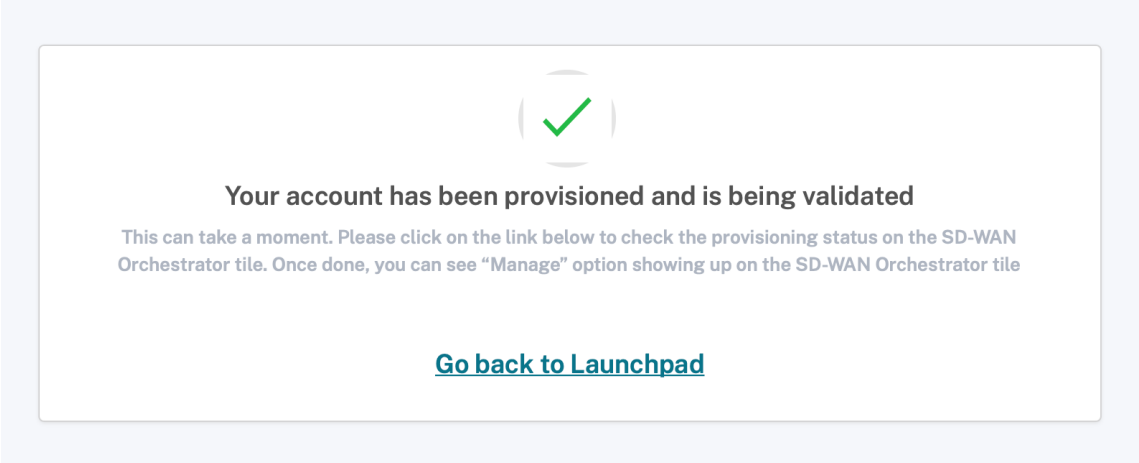

The Citrix SD-WAN Orchestrator service option is displayed in the customer's list of the Citrix Cloud services. Clicking it redirects the admin to the customer's Citrix SD-WAN Orchestrator service account.

Partner's dashboard on the Citrix SD-WAN Orchestrator service now reflects the new customers added. Partner can click the customer tile to drill down into the customer's network and manage it.

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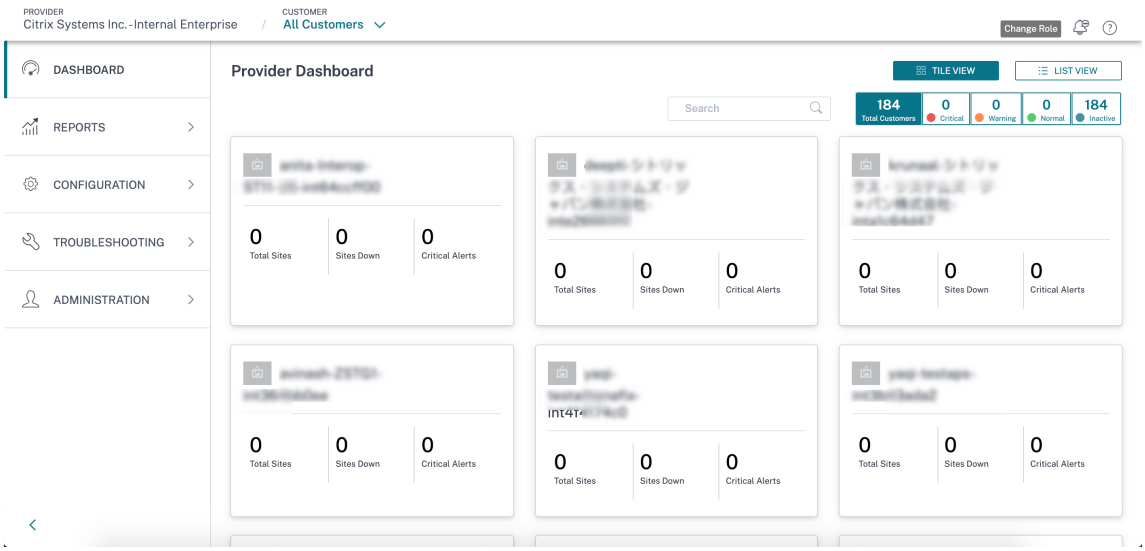
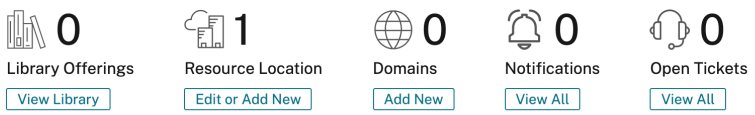
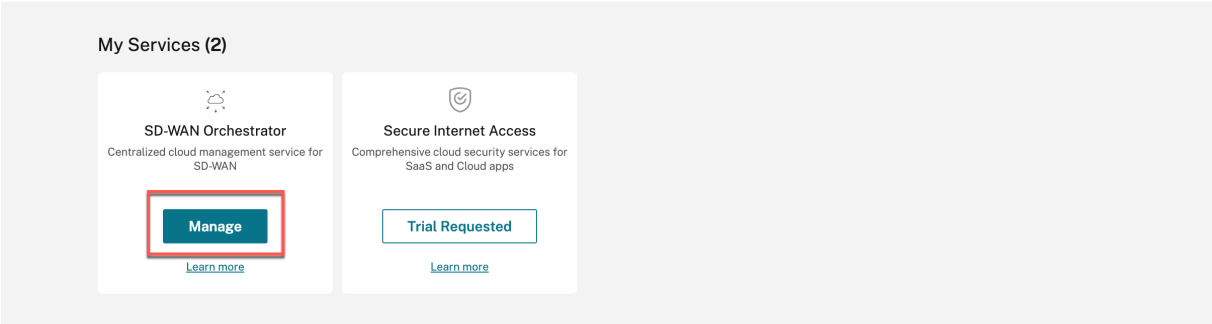


> **Note**
>
> Customers can also choose to add multiple administrators from partner organizations to manage their Citrix SD-WAN Orchestrator service account. For more information, see Add administrators to a Citrix Cloud account

Customer accesses Citrix SD-WAN Orchestrator service

At this point, the **Citrix SD-WAN Orchestrator service** tile also shows up on the customer's Citrix Cloud home page, under **My Services**, click **Manage**.





The customer can now access their Citrix SD-WAN Orchestrator service Network Dashboard. That completes the onboarding process.

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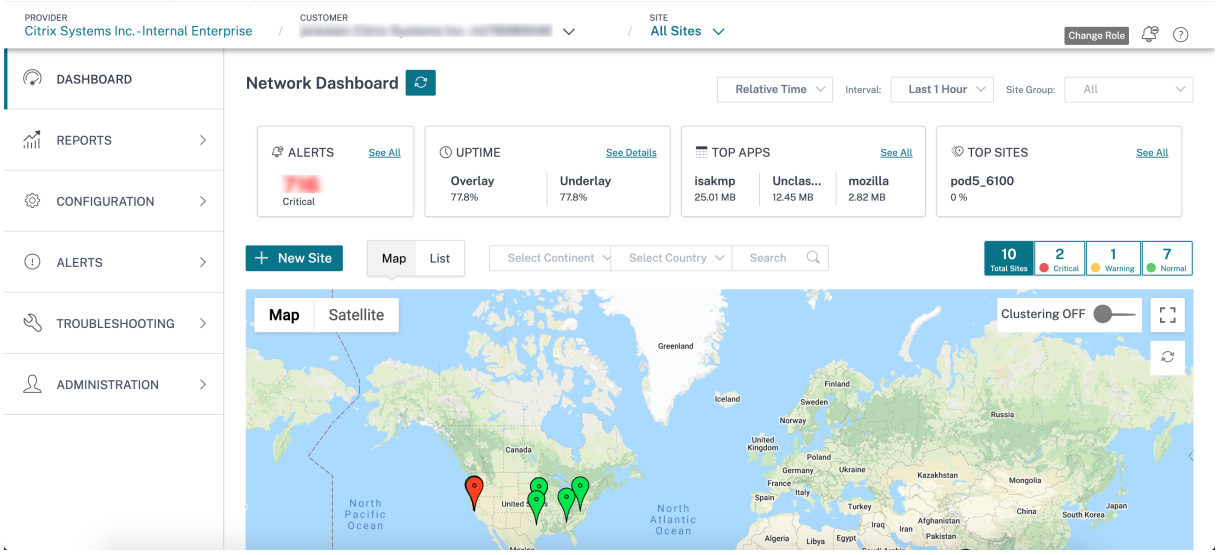

Multi-MCN providers and tenants

A multi-MCN partner network is a network in which each provider network can have multiple MCN sites. If you are a partner or a tenant, and you want to be onboarded as multi-MCN partner, you need to contact your administrator.

A multi-MCN partner can add a tenant directly through Citrix SD-WAN Orchestrator service. While adding the tenant, the partner needs to configure a domain name for each tenant. If the domain name is not configured, any user onboarded through Citrix Cloud (**Identity and Access Management** > **Administration**) is added as a provider-level admin.

The domain name is unique across tenants under that provider. A multi-MCN partner can configure only one domain for each tenant. For example, if Tenant1 is configured with @domain1, no other tenants can have @domain1 configured.

If a multi-MCN network partner grants full access to the tenants while adding them on Citrix SD-WAN Orchestrator service, then the tenant admin can add or remove users through Citrix Cloud (**Identity and Access Management** > **Administration**). If full access is not granted, the tenant admin cannot add or remove other users.

The multi-MCN partner must maintain a mapping of all the tenant names against their domain names. When a multi-MCN partner admin adds a user for a tenant, through Citrix Cloud (**Identity and Access Management** > **Administration**), Citrix SD-WAN Orchestrator service identifies the domain name from the user's email address and adds the user under that tenant.

> **Note**
>
> Domain name mapping is available only for multi-MCN network partners. It is not available for regular partners.

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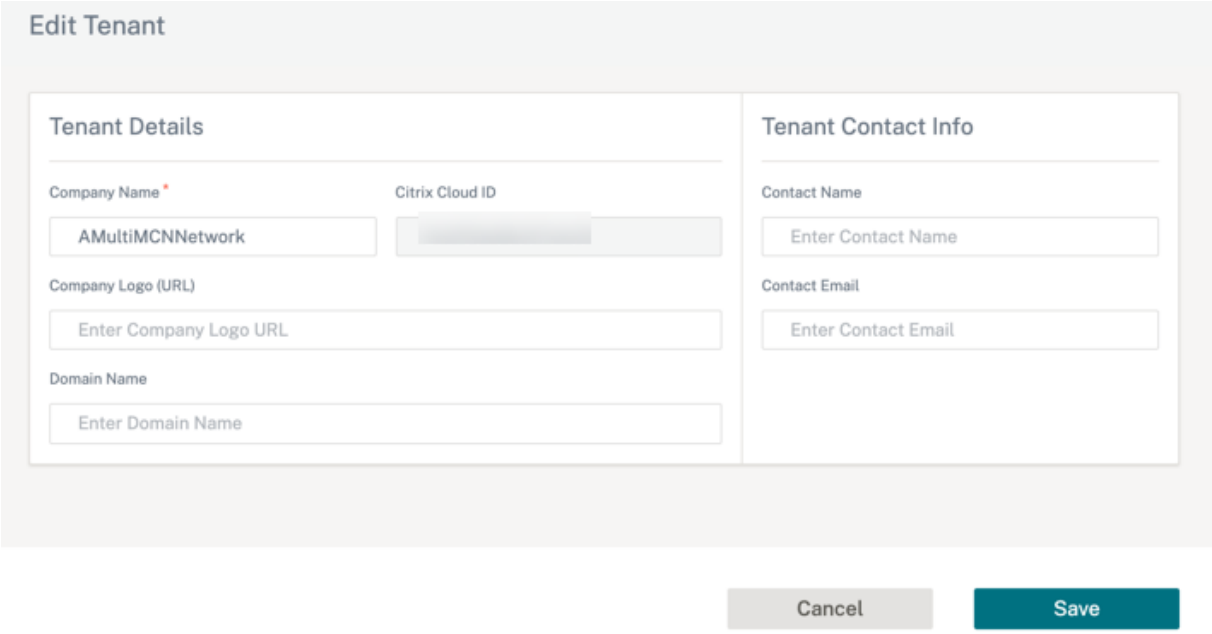
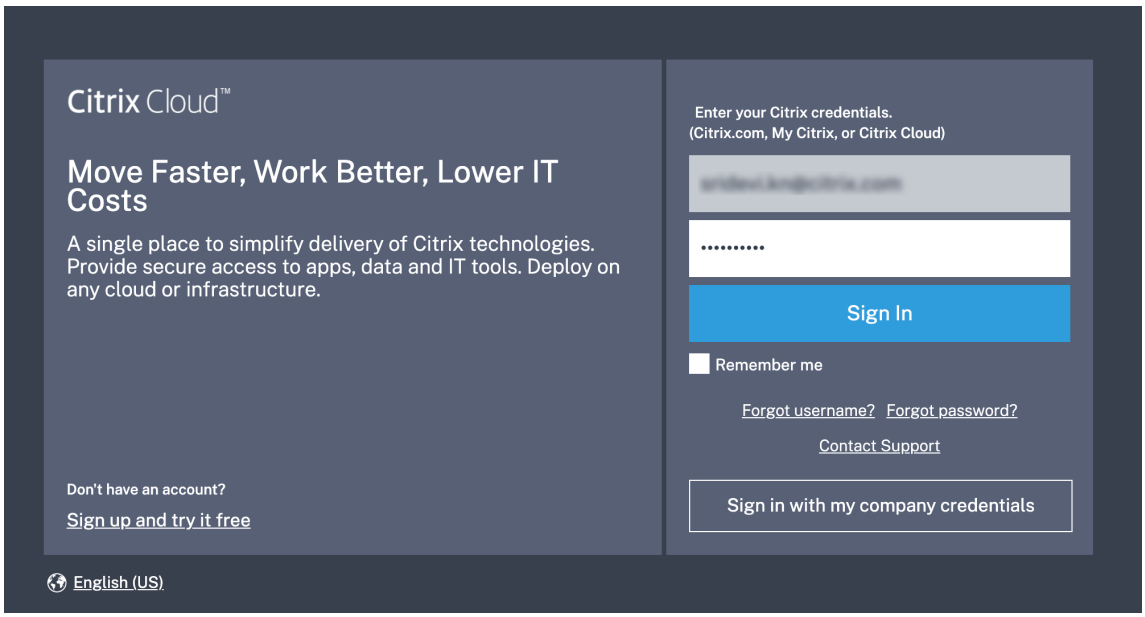


Onboarding DIY Enterprise Customers

This section describes the process to onboard DIY enterprise customers and the procedure to invite administrators to manage their SD-WAN network.

Onboarding DIY customers

1. Customer logs into Citrix Cloud account.



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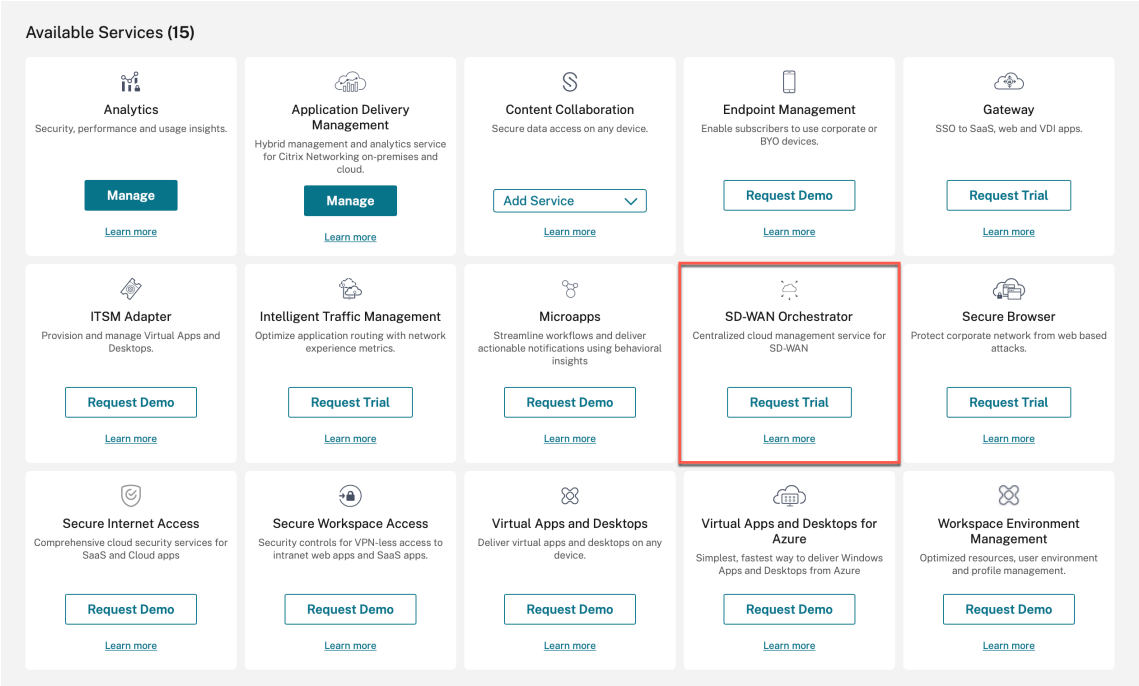
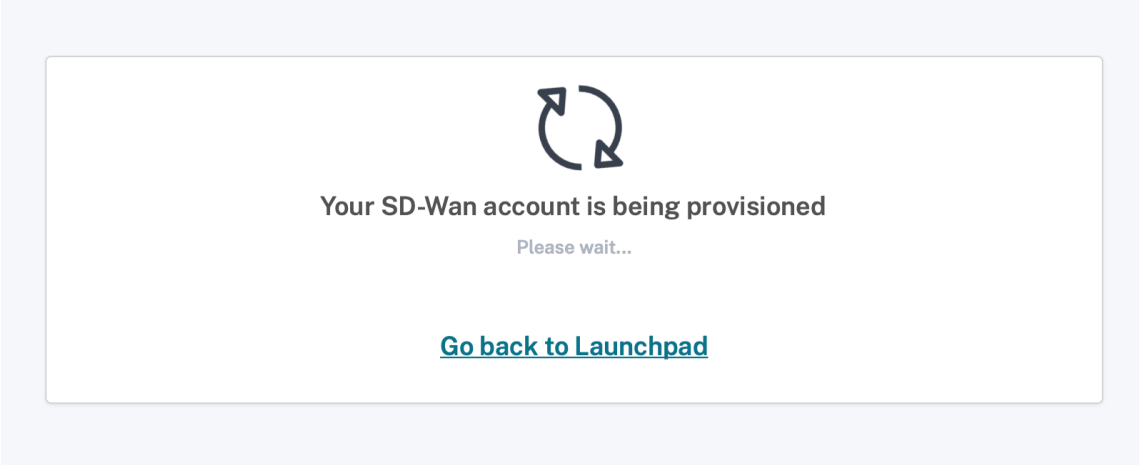
A menu of all the available services offered on Citrix Cloud is displayed on the home page. The **Citrix SD-WAN Orchestrator service** tile can be found in the **Available Services** section.

> **Note**
>
> Ensure that you sign up for Citrix Cloud using only one official account. The company name and email-id used must be associated with only one Citrix Cloud account.

2. The customer clicks **Request Trial**.



The customer's SD-WAN account gets provisioned.



3. The **Citrix SD-WAN Orchestrator service** tile now shows up under **My Services**. Click **Manage**.

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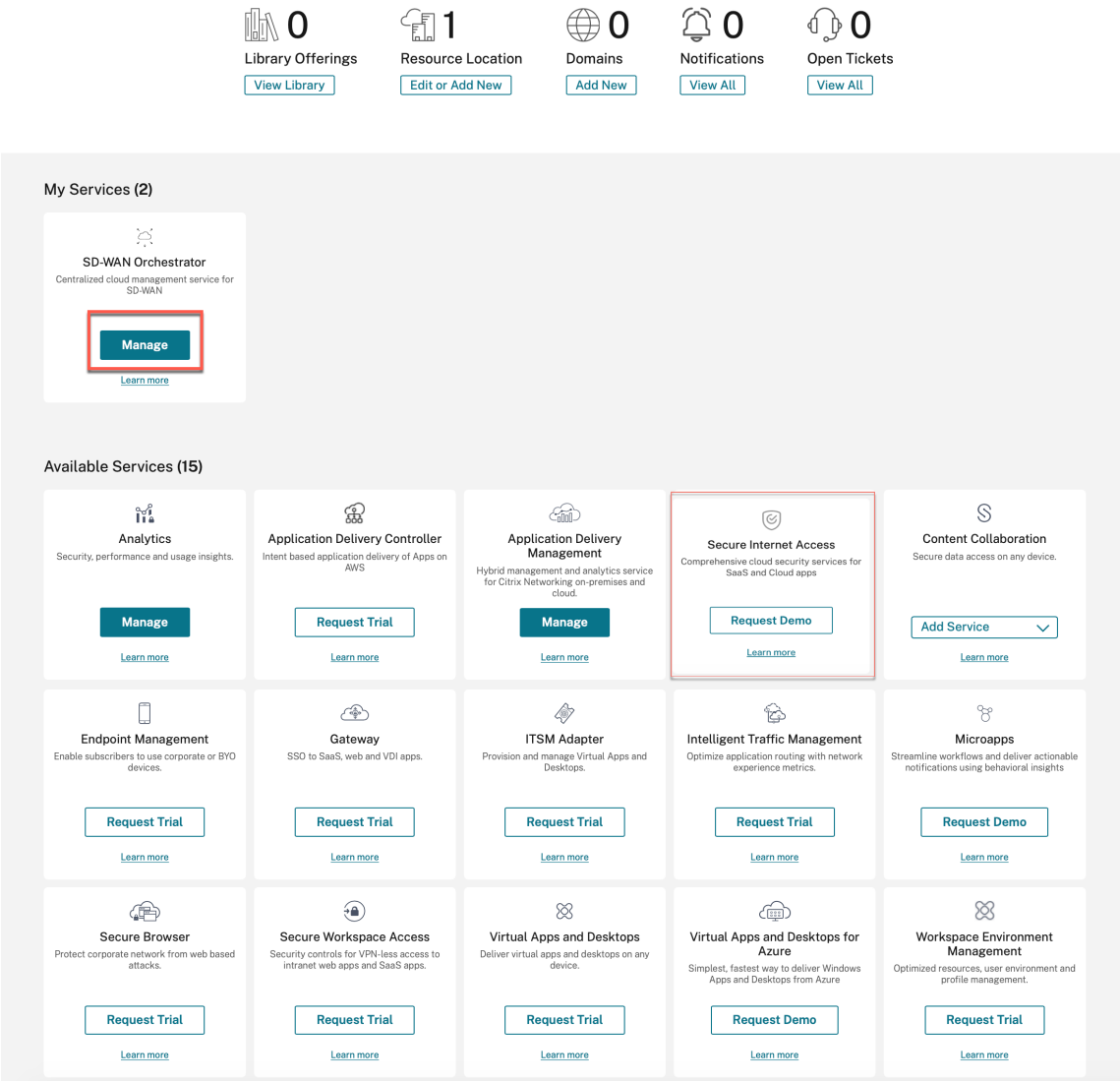

The customer can now access their Citrix SD-WAN Orchestrator service Network Dashboard. That completes the onboarding process.

> **Note**
>
> If the customer has Citrix Secure Internet Access subscription as well, then the customer can also click **Manage** on the **Secure Internet Access** tile to view the Citrix SD-WAN Orchestrator service Network dashboard. For information on onboarding Citrix Secure Internet Access, see Citrix Secure Internet Access.

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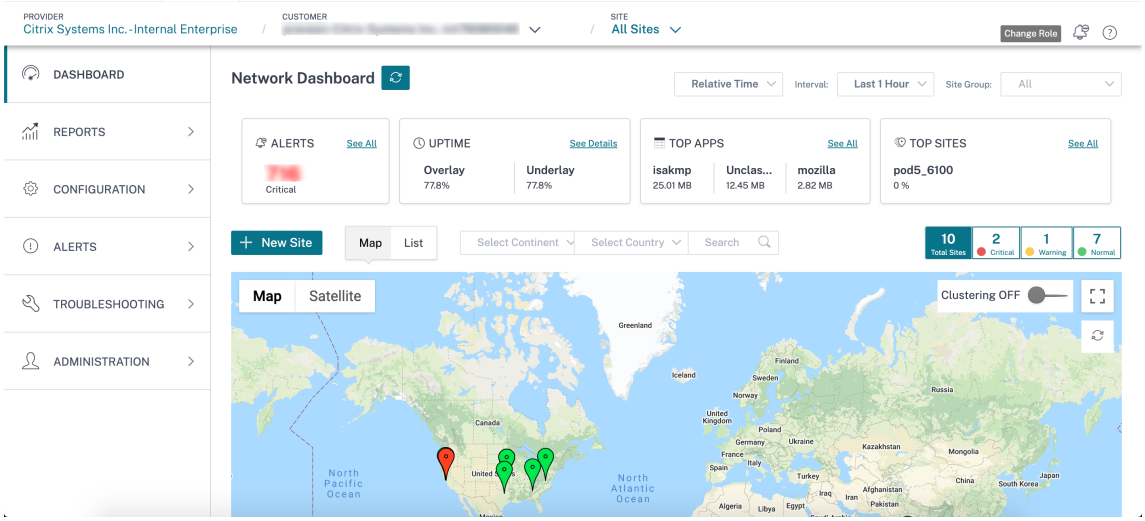
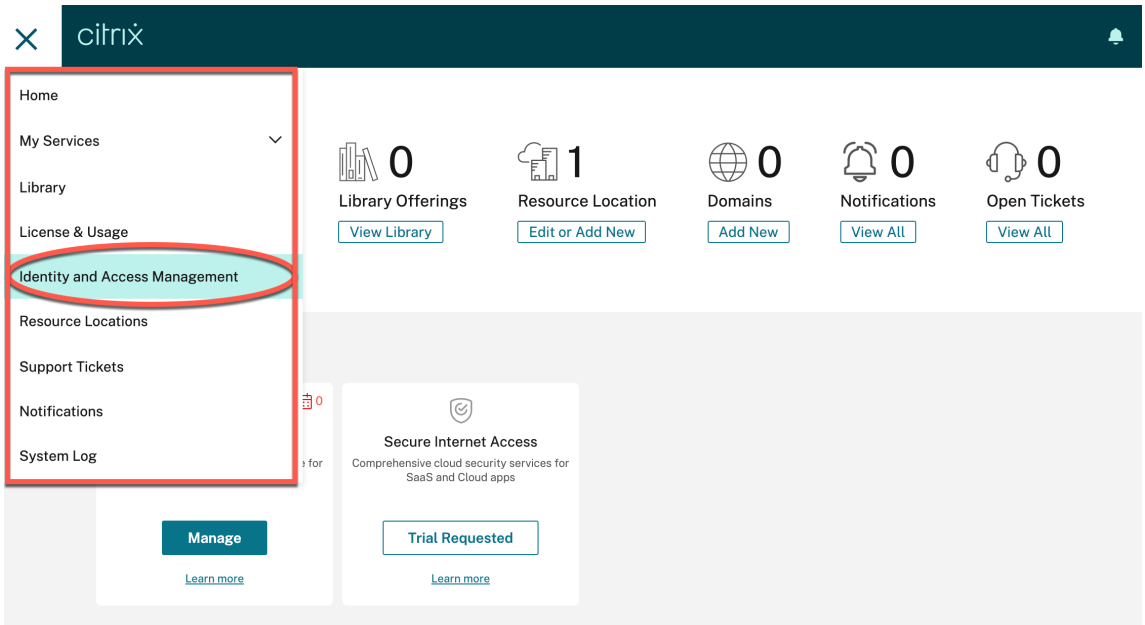


Adding Administrators

An enterprise customer can invite an administrator to manage their SD-WAN network.

1. Log into Citrix Cloud and navigate to Identity and Access Management.



2. Enter the new administrator email id and click **Invite**.

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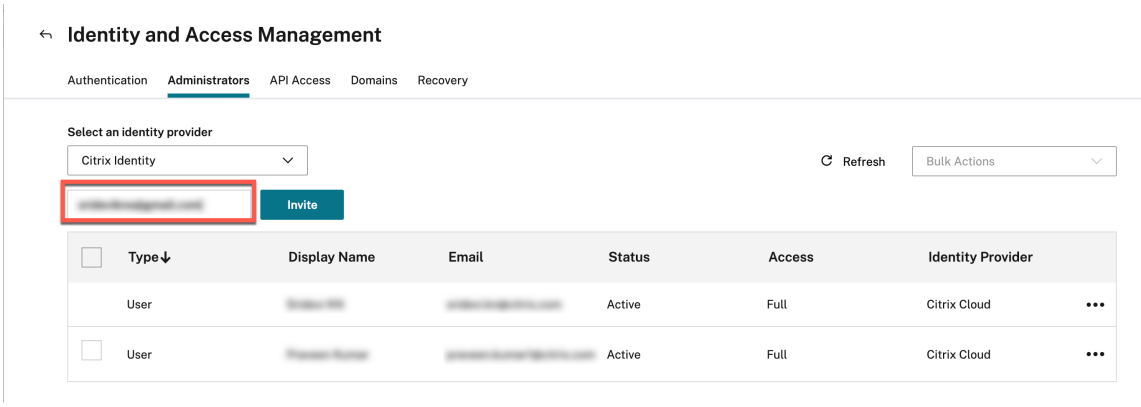
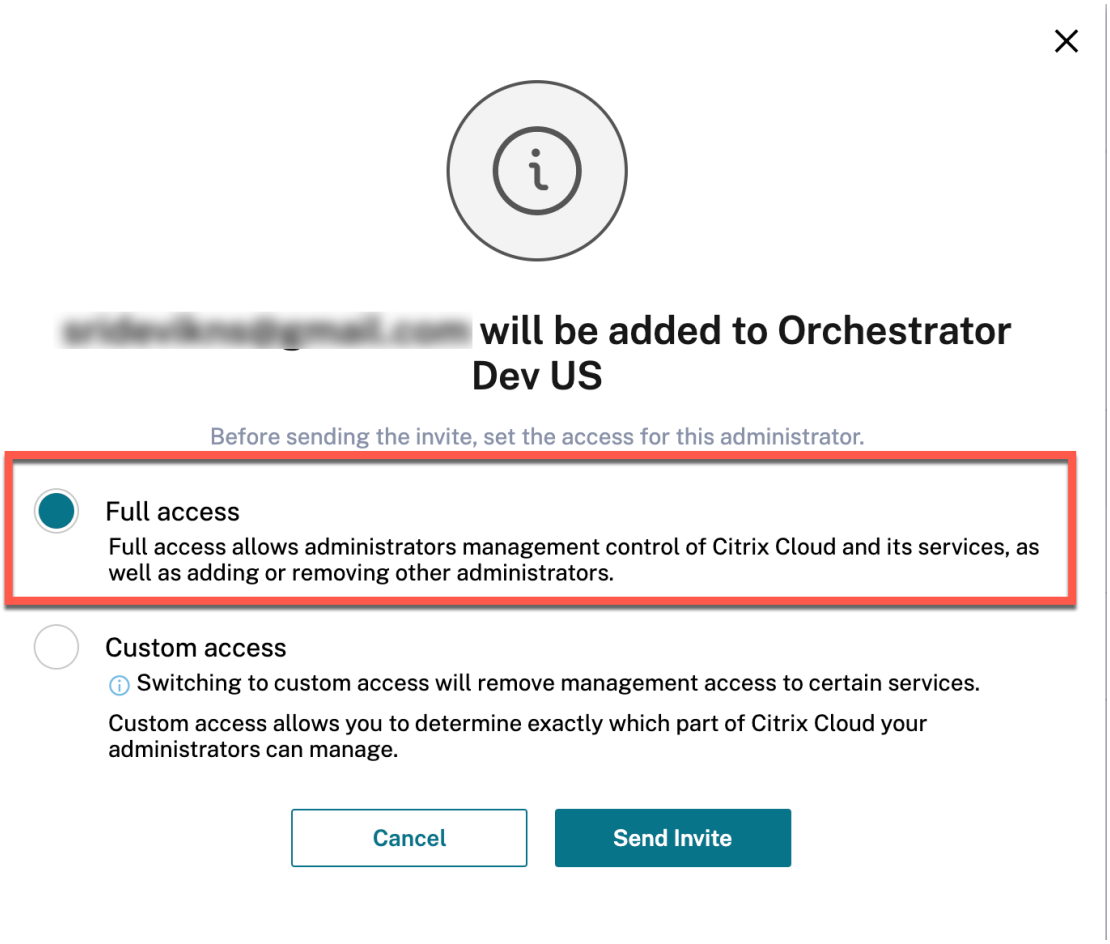


3. Select **Full access** and click **Send Invite**.



The administrator details are displayed.

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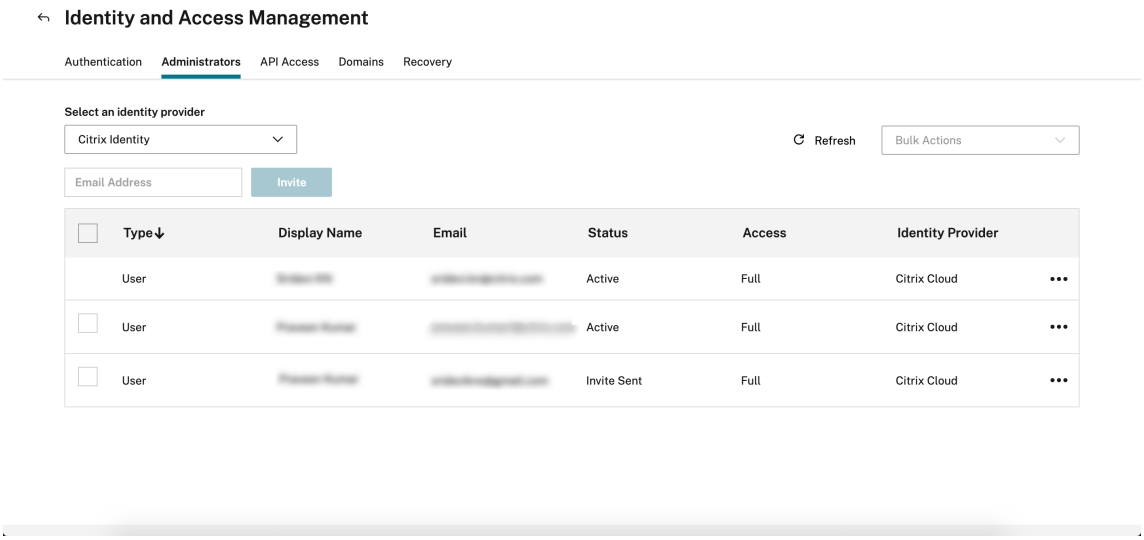
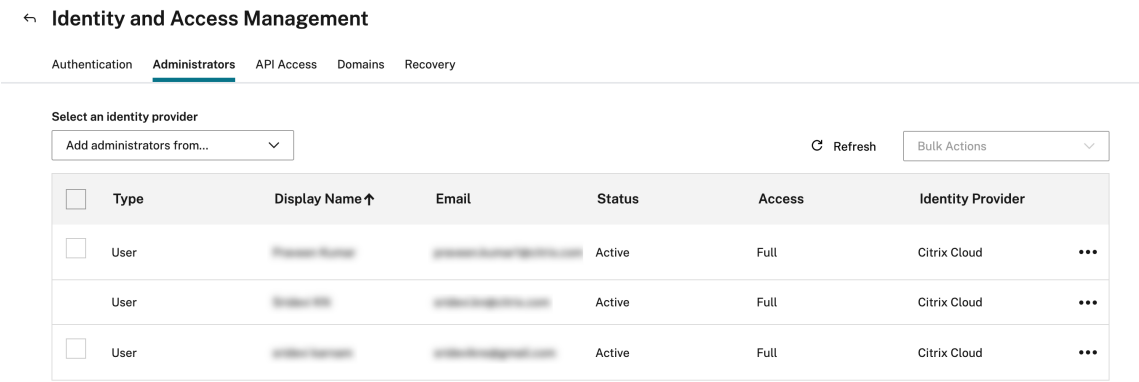


Once the administrator accepts the request, the status changes to **Active**.



No access role

There are multiple services available under Citrix Cloud including Citrix SD-WAN Orchestrator service. Customers who have a Citrix Cloud account only can access those services. To get access to Citrix Cloud, refer Sign up for Citrix Cloud.

Earlier, at a provider level, all the users had the full administrator access to the Citrix SD-WAN Orchestrator service UI. In this case, a tenant uses a public domain or where the domain is not configured for a particular tenant, any new user added can access to all the tenant accounts and the information which is a potential security risk.

Also, for multiple domains, it is difficult to add/update a user every time. For a multi-MCN setup, multiple users can be added at a time with no access role.

With the **No access role** feature, initially a provider administrator can avoid giving the full access role to a newly added user. When the user clicks the Citrix SD-WAN Orchestrator service, the UI gets stuck

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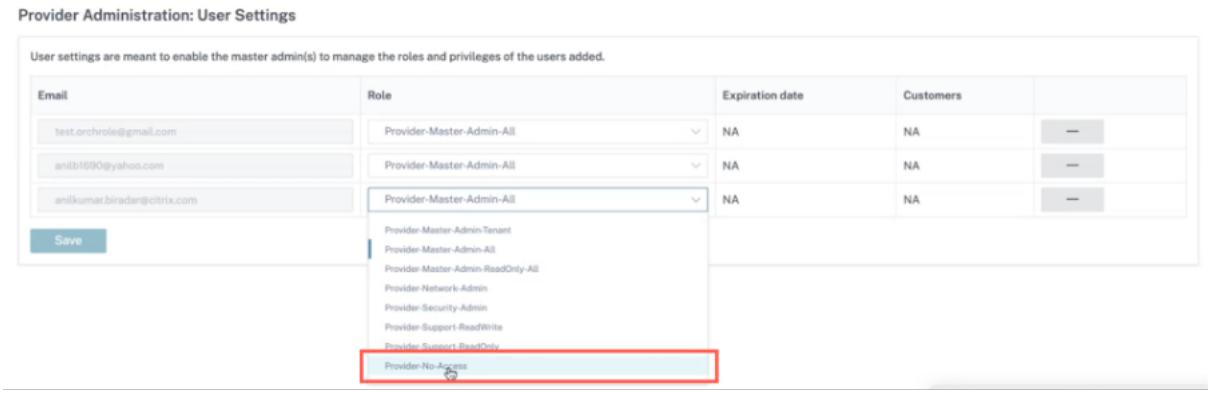
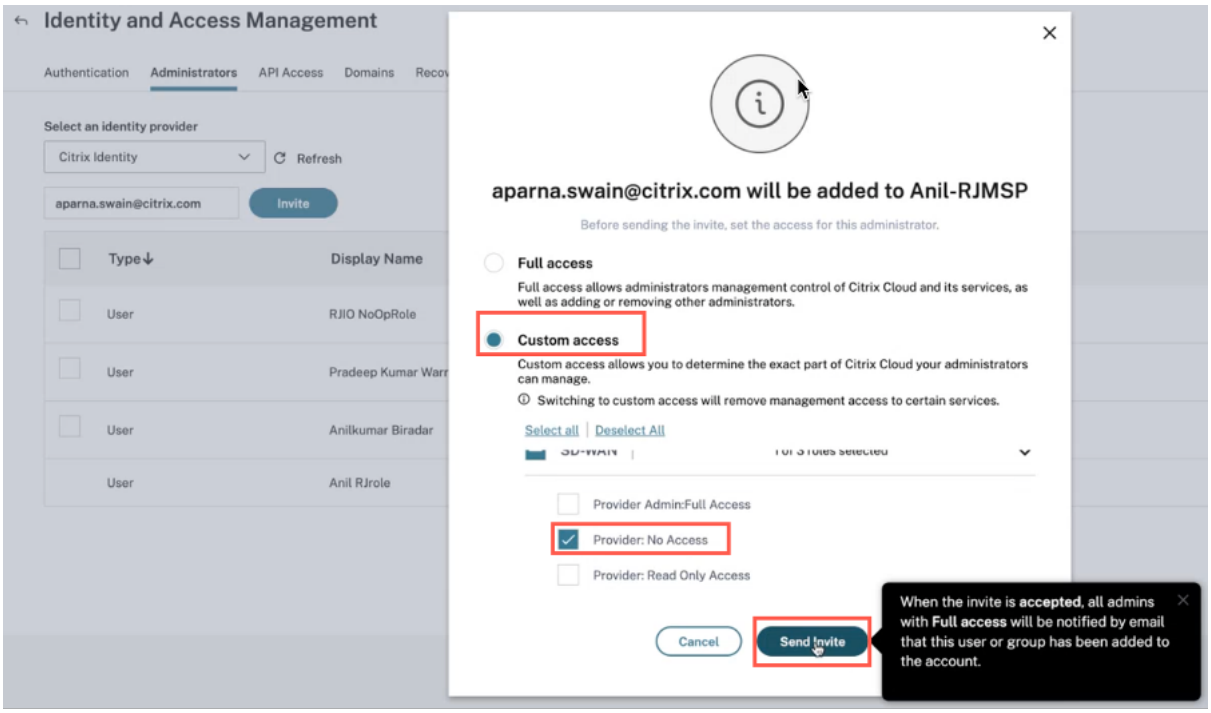
on loading, and you cannot perform any actions. The administrator can later decide whether to restrict access to the newly added user or add them to a specific tenant.

However, the details of a newly added user are available under the **User Settings** page with the **Provider-No-Access** role.



You can add a user under **Identity and Access Management > Administrators**. Select **Citrix Identity** from the drop-down list, add the user's email address, and click **Invite**.

Click the **Custom access** radio button, select the **Provider: No Access** check box, and click Send **Invite**.



At any time, the provider administrator can decide to give read only or full access to the user and by that time the user settings details can be updated to a specific MCN.

A newly added user gets an email notification to accept the invite. Once the invitation is accepted, the user details are verified from back-end and the user is added with a no operational access role under

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provider level within Citrix SD-WAN Orchestrator service.

Licensing

September 27, 2025

Citrix SD-WAN Orchestrator service provides licensing options for the following Citrix SD-WAN Orchestrator service users:

- Citrix Service Provider™ (CSP)
- Non-CSP partners:
  - Citrix Solution Advisor™ (CSA)
  - Citrix SD-WAN™ Managed Service Provider (MSP)
- Do It Yourself (DIY) customers –Direct Enterprise Customers

Citrix SD-WAN Orchestrator service billing matrix

The billing matrix provides details about the type of billing models that are available to a user.

Orchestrator Users	Prepaid Annual Subscription	Prepaid Perpetual	Post paid
Citrix Service Provider (CSP)	✓	✓	✓
Citrix Solution Advisor (CSA)	✓	✓	NA
Citrix SD-WAN Managed Service Provider (MSP)	✓	✓	NA
Do It Yourself (DIY) or Enterprise customers	✓	✓	NA

Trial Mode

Every customer begins the onboarding process by requesting a trial. The customer clicks the **Request Trial** option for Citrix SD-WAN Orchestrator service on Citrix Cloud.

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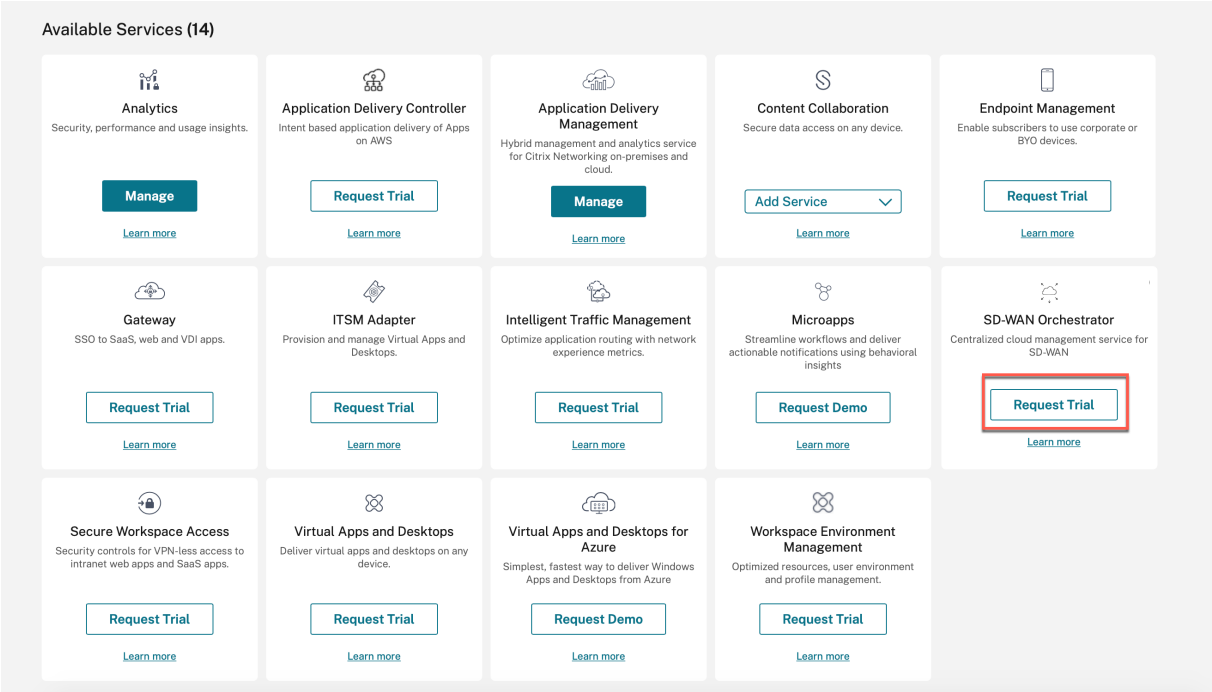

The customer Citrix SD-WAN Orchestrator service account is provisioned in trial mode. The trial mode continues for a default period of 60 days.

After the trial period expires, the behavior is as follows:

- **Prepaid Model**: When the trial mode expires the customer's data paths are brought down. Additional changes cannot be deployed until valid licenses are uploaded. The customer's Citrix Cloud entitlement for Citrix SD-WAN Orchestrator service changes from Trial to Production when the first valid license is hosted on the Citrix SD-WAN Orchestrator service. Based on the number and type of licenses uploaded, an equivalent number of sites can come up with the right bandwidth entitlements. A persistent message "Your Trial has expired. Upgrade to Production by retrieving at least one valid license entitlement on the Citrix SD-WAN Orchestrator service to restore the network functionality and continue the usage"is displayed for prepaid customers. For more information, see Retrieve and assign entitlements for prepaid billing model.
- **Postpaid Model**: Postpaid model is supported for CSP partners and their customers only, on trial expiry the partner can choose to upgrade to production. A persistent message "Your Trial has expired. Click "Upgrade to Production"to restore the network functionality and continue the usage"is displayed. Click **Upgrade to Production** to upgrade licenses for all sites and the license details for the same can be viewed under License Usage Insights

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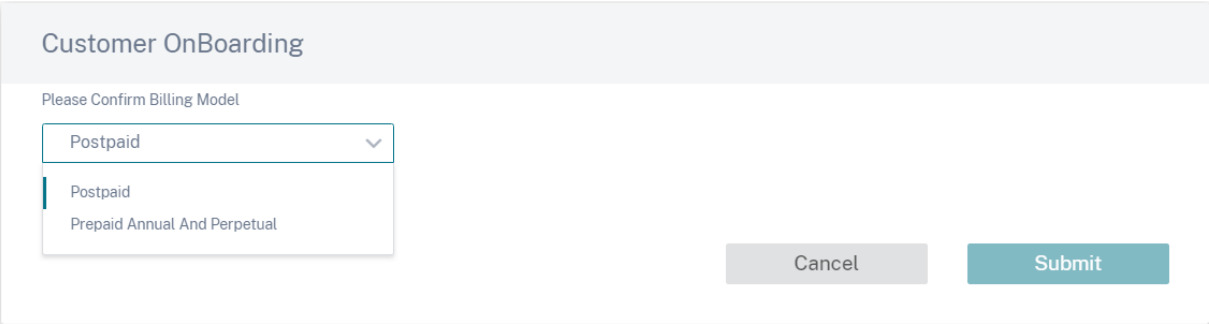
Billing Models

Postpaid Billing Model

The postpaid billing model is available for customers of CSP partners. The customer can choose **Postpaid** as the default-billing model for their network. The selected billing model is applied by default to all the appliances in the customer's network.

To select a postpaid billing model, in the Citrix SD-WAN Orchestrator service, at the network level navigate to **Administration** > **Licensing**.

Click **Select Billing Model**, select **Postpaid** billing model, and click **Submit**.



> **Note**
>
> If a customer wants to have their postpaid billing model changed to prepaid billing model, a support ticket has to be raised.

In the postpaid billing model, there is no need to upload licenses to the individual sites in the customer network. Each customer's network must be configured with the desired device models and bandwidth tiers. The CSP is billed accordingly for each customer, every month.

Prepaid Billing Model

The prepaid billing model is available for tenants of CSP and non-CSP partners, and DIY - Enterprise customers. The following three types of prepaid billing models are available:

- **Prepaid Annual Subscription**: The prepaid subscription has a 1-year and a 3-year plan. The subscription expires on the expiry date. The Citrix SD-WAN Orchestrator service and the maintenance license are included in the same license and no need to purchase them separately. All the appliances in the customer network have a prepaid annual subscription.
- **Prepaid Perpetual**: With prepaid perpetual the licenses have no time limit, restricted duration, or expiration. However, the Citrix SD-WAN Orchestrator service entitlements and hardware maintenance (SD-WAN entitlements) license must be purchased separately. All the appliances in the customer network have a prepaid perpetual subscription.

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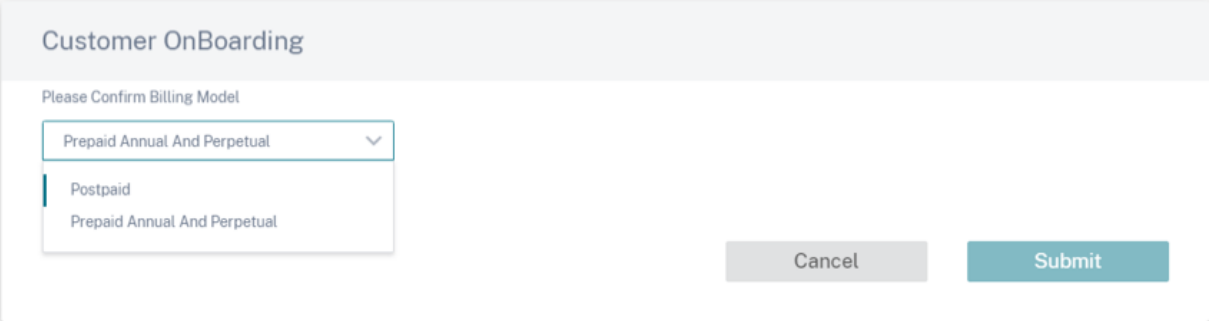
- **Hybrid**: With the hybrid billing model, a customer's network can support both perpetual and annual subscription licenses. The appliances on the customer network can have either a prepaid annual subscription or a prepaid perpetual license.

To select a prepaid billing model, in the Citrix SD-WAN Orchestrator service, at the network level navigate to **Administration** > **Licensing**

For a CSP customer, click Select **Billing Model**, select the **Prepaid Annual and Perpetual** billing model, and click **Submit**.



For a non-CSP customer, you can directly retrieve and allocate license entitlements. For more information, see Retrieve and assign entitlements for prepaid billing model.

All prepaid customers, need to upload licenses to Citrix SD-WAN Orchestrator service. These Licenses must be uploaded for every customer site. For more information, see Retrieve and assign entitlements for prepaid billing model.

Retrieve and assign entitlements for prepaid billing model

You need both Citrix SD-WAN appliance entitlements and Citrix SD-WAN Orchestrator™ service entitlements to perform any configuration changes. You can retrieve the license entitlements using the License Access Code provided by Citrix® through email. License Access Code can be specific Citrix SD-WAN Orchestrator service only or Citrix SD-WAN appliance only or both.

Alternatively, the customer can also view the Access Code in the license management portal within Citrix Cloud. The customer can have either **Prepaid Perpetual**, **Prepaid Annual Subscription**, or **Hybrid** billing model in the network.

Prerequisite: Ensure that the Citrix SD-WAN Orchestrator service licenses are not allocated by logging into the license management portal. If the licenses are allocated, release/de-allocate the licenses before using the License Access Codes in Citrix SD-WAN Orchestrator service.

1. In the Citrix SD-WAN Orchestrator service UI navigate to **Administration** > **Licensing** and click **Select Billing Model**. Select a billing model and click **Submit**.

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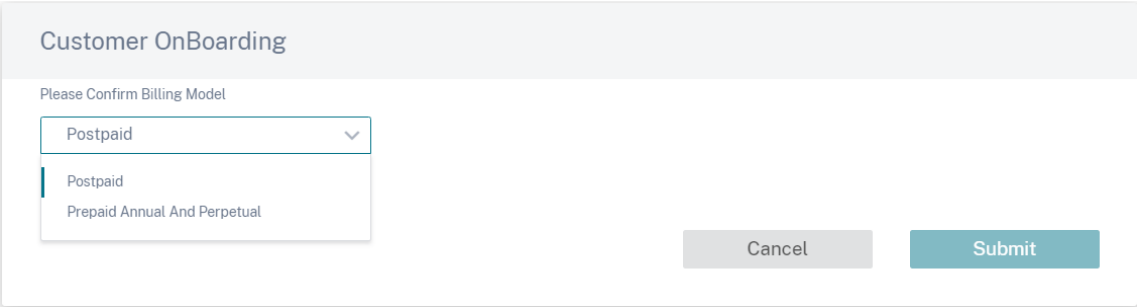
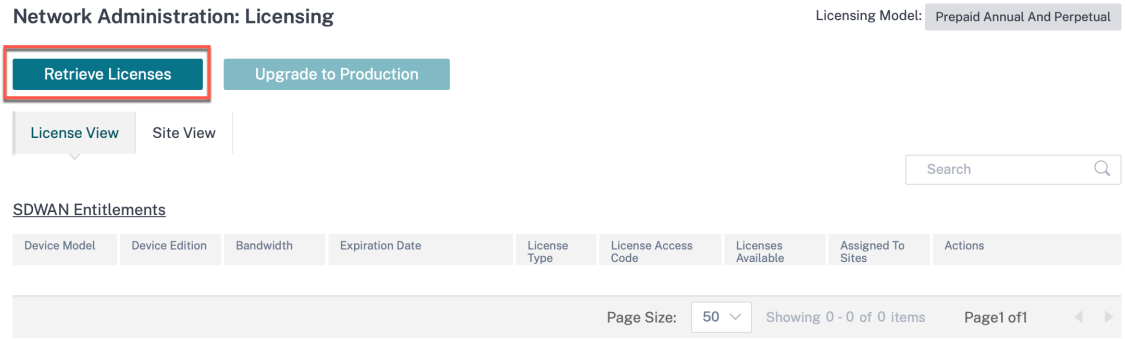
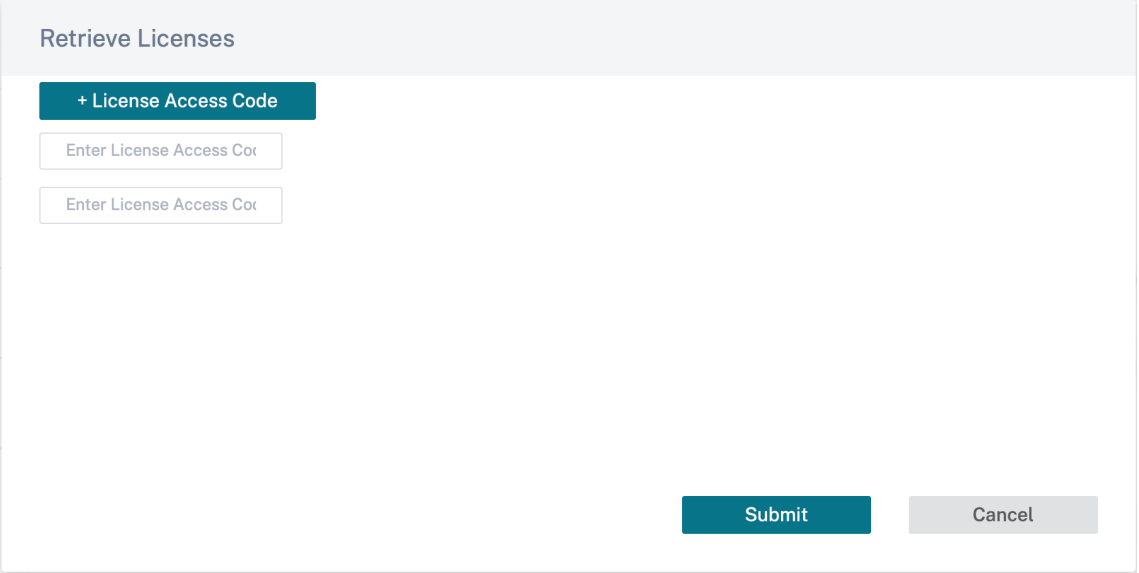


2. Click **Retrieve Licenses**.



3. Click **+ License Access Code**, enter the required number of access codes to retrieve the entitlements and click **Submit**.



The Citrix SD-WAN Orchestrator service retrieves the entitlements and populates the license table.

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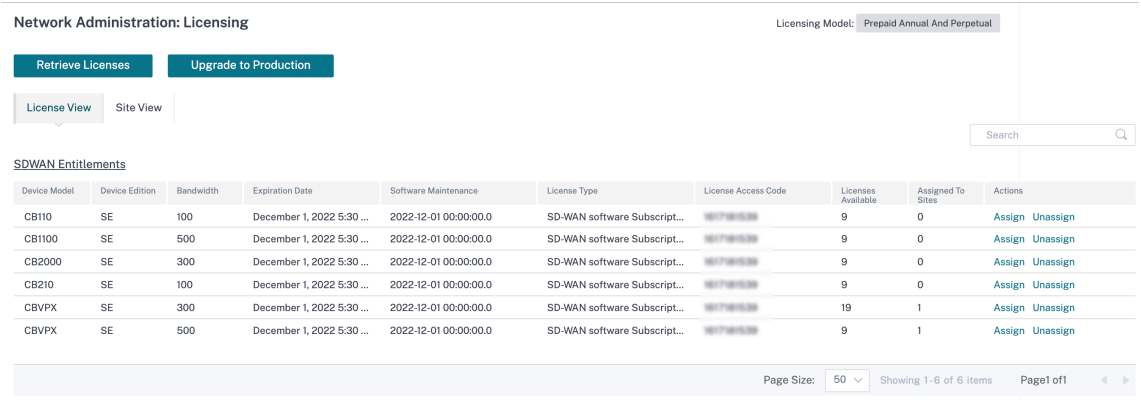
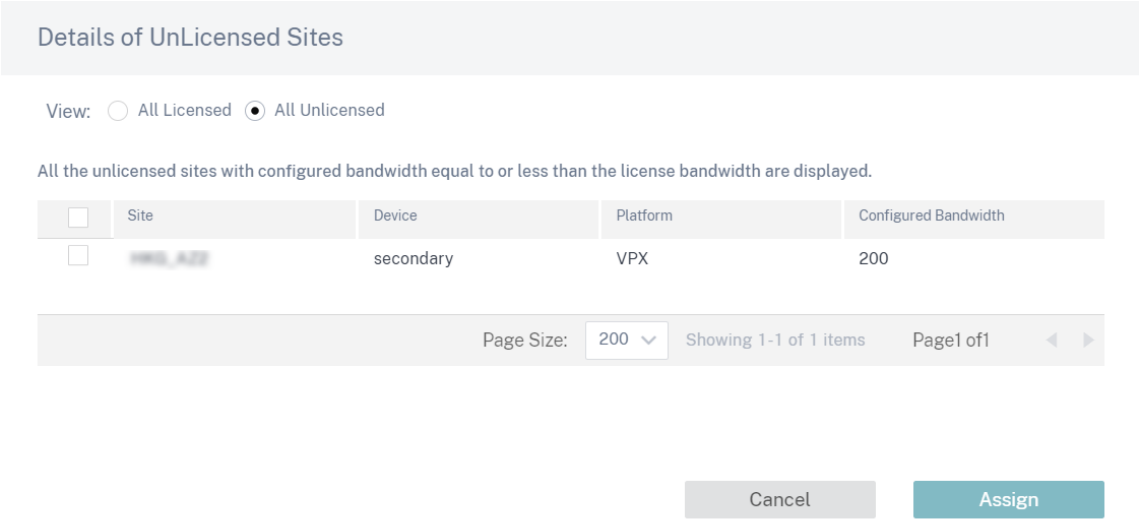


Device Model	Device Edition	Bandwidth	Expiration Date	Software Maintenance	License Type	License Access Code	Licenses Available	Assigned To Sites	Actions
CB110	SE	100	December 1, 2022 5:30 ...	2022-12-01 00:00:00.0	SD-WAN software Subscript...	[illegible]	9	0	Assign Unassign
CB1100	SE	500	December 1, 2022 5:30 ...	2022-12-01 00:00:00.0	SD-WAN software Subscript...	[illegible]	9	0	Assign Unassign
CB2000	SE	300	December 1, 2022 5:30 ...	2022-12-01 00:00:00.0	SD-WAN software Subscript...	[illegible]	9	0	Assign Unassign
CB210	SE	100	December 1, 2022 5:30 ...	2022-12-01 00:00:00.0	SD-WAN software Subscript...	[illegible]	9	0	Assign Unassign
CBVPX	SE	300	December 1, 2022 5:30 ...	2022-12-01 00:00:00.0	SD-WAN software Subscript...	[illegible]	19	1	Assign Unassign
CBVPX	SE	500	December 1, 2022 5:30 ...	2022-12-01 00:00:00.0	SD-WAN software Subscript...	[illegible]	9	1	Assign Unassign

4. The licenses get automatically assigned when a new site is added, or when the bandwidth, platform, or software edition of an existing site is modified. Licenses are automatically assigned only when a new site is added and there are unused licenses in the Citrix SD-WAN Orchestrator service. Automatic license assignment does not work on existing sites that were added before the licenses were retrieved.

5. Optionally, you can assign licenses manually for each site. To assign licenses manually, click **Assign/Unassign** and select **All Unlicensed**. All the unlicensed sites with configured bandwidth equal to or less than the license bandwidth is displayed.



6. Select a site, click **Assign**, and then click **Upgrade to Production**.

> **Note**
>
> While assigning licenses manually, you can select only one site at a time.

In the **All Licensed** view, a list of licensed sites is displayed. You can choose to unassign the licenses and release it back to the pool.

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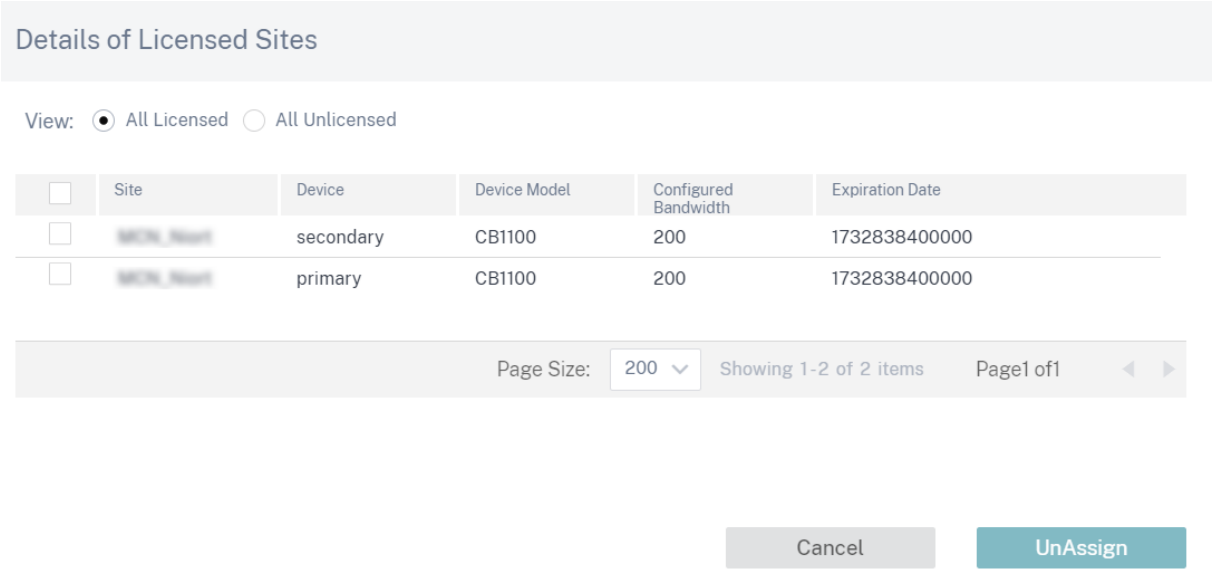

Under **Site View**, the sites are automatically matched with licenses based on the configured bandwidth and license bandwidth, enabling you to allocate licenses quickly.

> **Note**
>
> To assign a license to the appliance, an appliance must have a verified serial number.

Customers with perpetual billing models have Citrix SD-WAN Orchestrator service entitlements displayed under the **License View** table:

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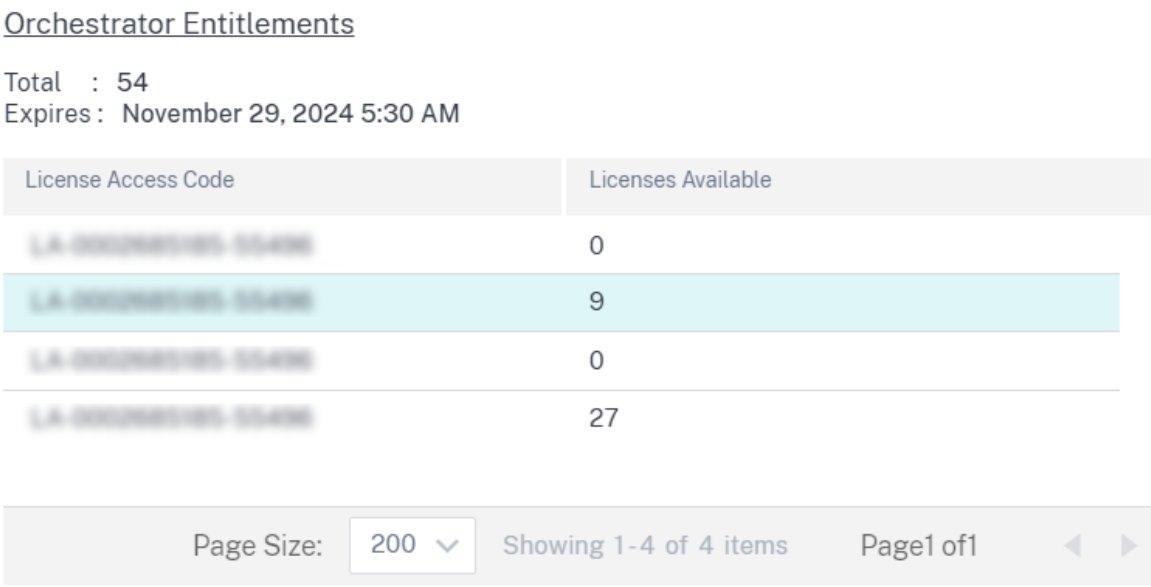
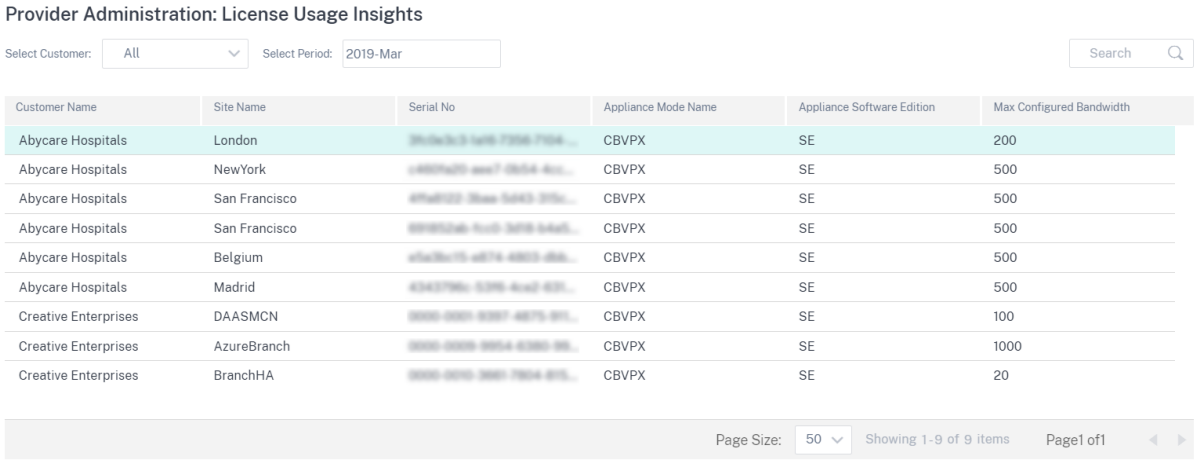


License Usage Insight

A partner can view the license usage of all the customers under partner level, **Administration** > **License Usage Insights**. Select the customer and period for which you want to view license usage insight.



An individual customer can view the license usage details under network level, **Administration** > **License Usage Insights**. Select the period for which you want to view license usage insight.

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Site Name	Serial No	Appliance Mode Name	Appliance Software Edition	Max Configured Bandwidth
London	[illegible]	CBVPX	SE	500
NewYork	[illegible]	CBVPX	SE	500
San Francisco	[illegible]	CBVPX	SE	1000
San Francisco	[illegible]	CBVPX	SE	1000
Belgium	[illegible]	CBVPX	SE	500
Madrid	[illegible]	CBVPX	SE	500

Page Size: 50 Showing 1-6 of 6 items Page1 of1

License Expiry

When the license expires, a grace period of 30 days is granted. The partner/customer is expected to renew their licenses during this time. After the grace period expires, the virtual paths associated with the sites are brought down.

Email notifications are sent to all the administrators every day before the licenses are about to expire.

For customers with a prepaid annual and perpetual license billing model and upgraded to production, license expiry email notifications are sent 90 days before the license expiry. The license expiry notification contains information about the license access code, details of affected sites, expiry date, and number of days remaining for license expiry. Email notifications are stopped once the licenses are renewed and reassigned to sites.

For customers with a prepaid annual and perpetual license billing model and upgraded to production, grace expiry email notifications are sent 30 days before the expiry of grace licensed appliances. The grace expiry notification contains information about site name, grace period expiry date, and number of days remaining for grace expiry. Email notifications are stopped once the licenses are renewed and reassigned to sites.

For trial customers, email notifications are sent 30 days before trial period expiry. Trial expiry email notifications are stopped once licenses are retrieved, assigned to sites, and upgraded to production.

Provider level configuration

September 27, 2025

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Profiles

A profile is a **live configuration template**. A regular template is meant to aid the creation of a new entity. But once the template is created, subsequent changes in the template do not apply to the new entities created using the base template. A profile serves as the live central master entity, which all child entities inherit from, not only during creation but also throughout the life of a profile. All the children entities associated with the profile, automatically inherit any changes made in a profile.

For example, An admin creates a site configuration profile called **the small retail store** and applies it to all the small retail stores owned by a company. Now, any changes made to the small retail store profile at any given time would be applied automatically to all the stores inheriting this profile. Based on what's common across all the entities, and what's not, certain parameters in the profile configuration can be left unset. Such parameters would be customizable and can vary across the entities inheriting the same profile.

Profile templates for service providers

Partners can create profile templates, which their customers can use while creating profiles.

For example, a provider can create four site profile templates –Small Branch, Medium Branch, Large Branch, and Data Center. These templates are automatically made available to the customer accounts associated with the partner. Customers can use these templates while creating profiles.

For instance, let's say a customer decides to create a profile for small branch configuration. The customer can select one of the templates shared by the partner, made available through a drop-down list as part of the profile configuration. The customer can customize it to their network needs before saving the profile. The profile template is not a live entity. It just aids the creation of profiles at the customer level. Profiles can be created only at a customer level, and are meant to be live entities serving as master configuration records.

The provider can create configuration profiles, which can be shared with some or all customers, as needed. Site and WAN profiles are supported currently.

Site profile templates

Site profile templates are site configuration templates created by service providers, to enable the creation of site profiles at a customer level.

To create profile templates, navigate to **Configuration** > **Site Profile Templates** and click **+ Site Profile Template**.

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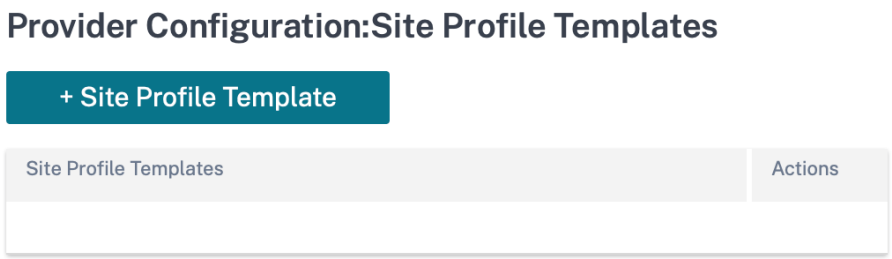

To create a site profile template, you need to configure the **Site Details**, **Interfaces**, and **WAN Links**. For detailed description of configuring sites, see Site details.

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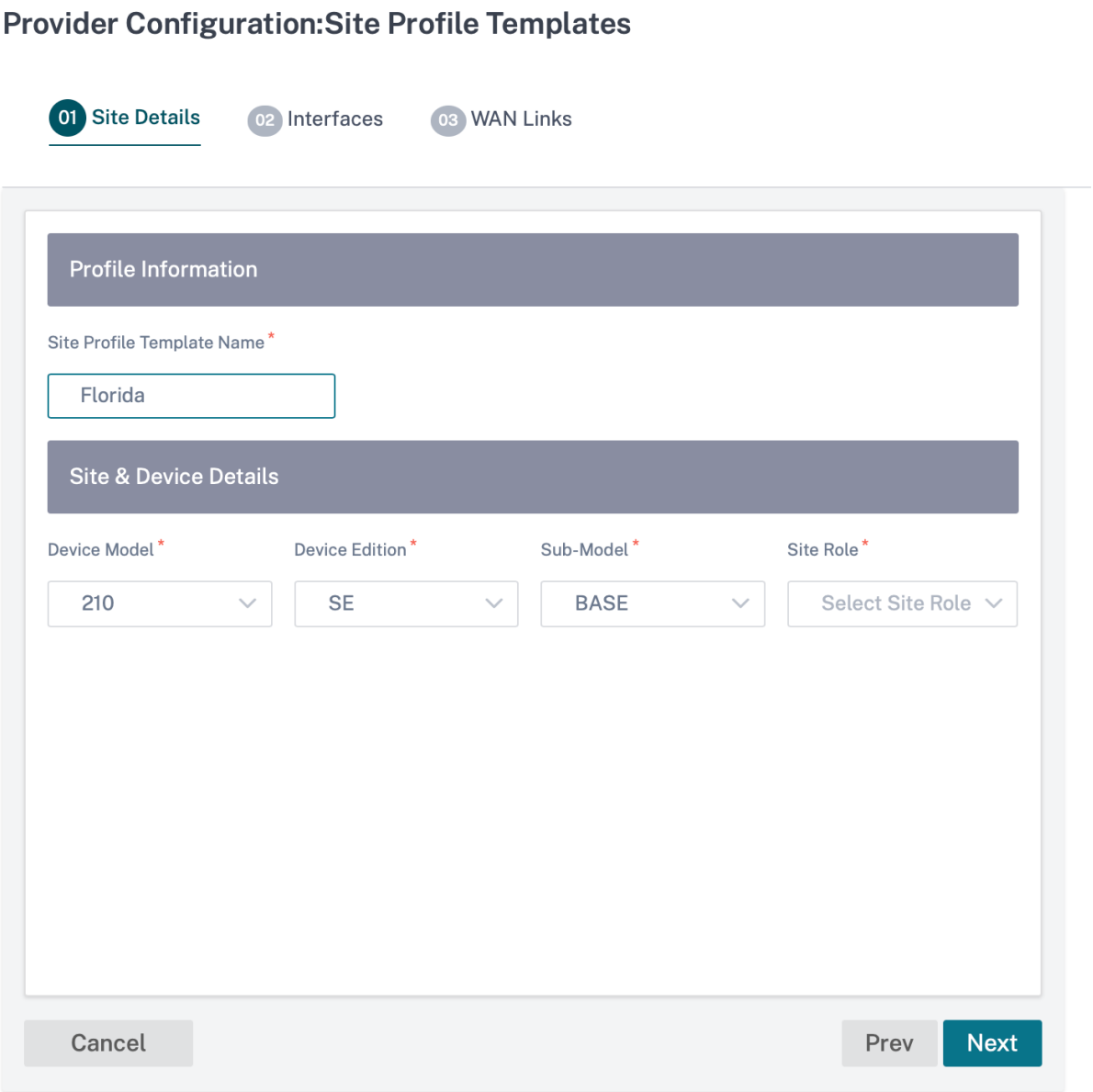

Assign an interface for the site by clicking the **+ Interface** option. To add an interface, you need to fill the **Interface Attributes**, **Physical Interface**, and **Virtual Interfaces** fields. For detailed description of configuring interfaces, see Interfaces.

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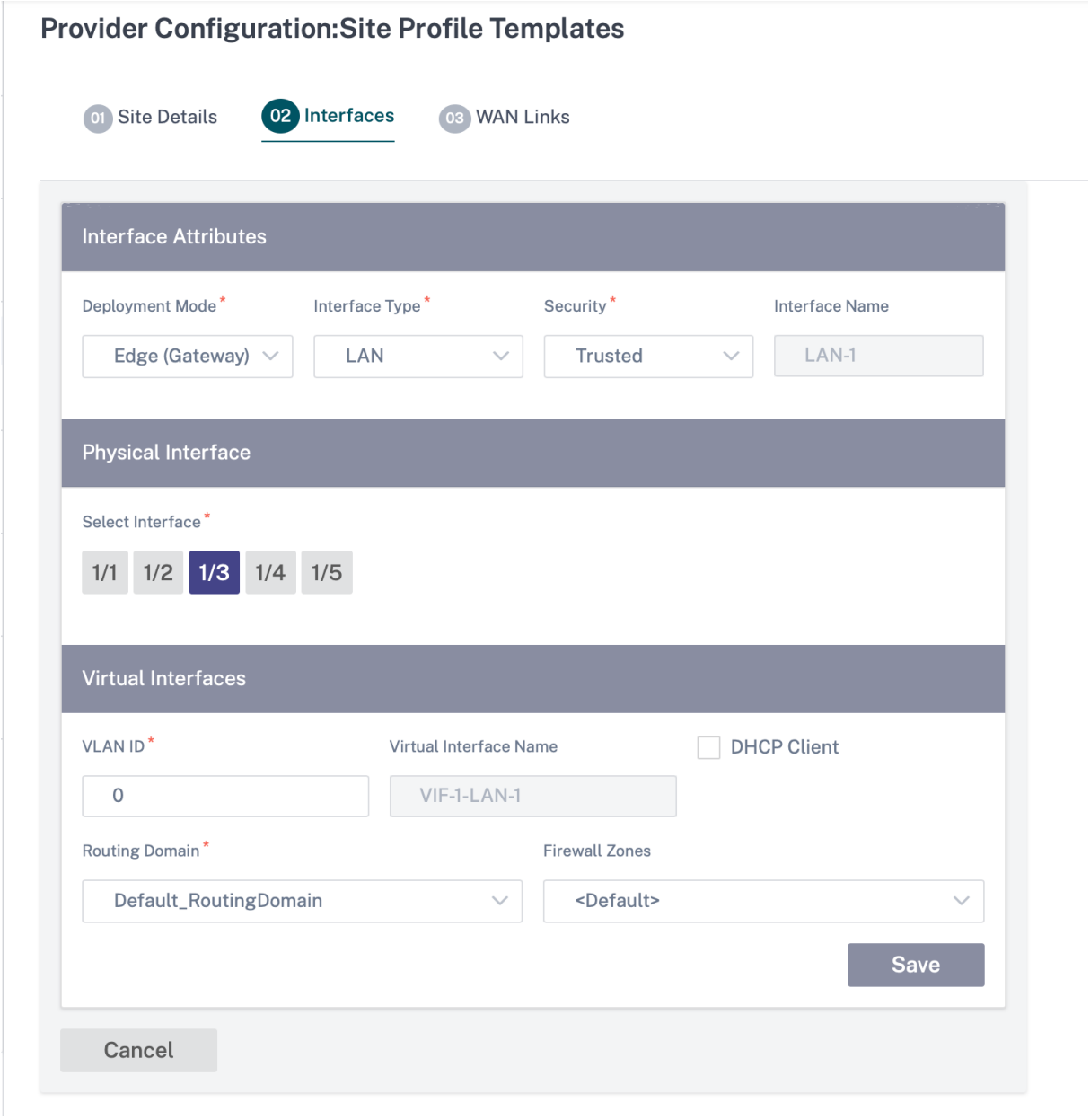

Provide **WAN Link Attributes**, **Access Interfaces**, and **Services** with **Advanced Options**. For detailed description of configuring WAN links, see WAN Links.

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Provider Configuration:Site Profile Templates

01 Site Details 02 Interfaces 03 WAN Links

WAN Link Attributes

Access Type * Public Internet

ISP Name * Verizon Comm

Custom

Internet Category Broadband

Link Name * Broadband-Verizon_Comm-1

Public IP Address Auto Detect

Egress

Speed * 100 Mbps

Ingress

Speed * 100 Mbps

Access Interfaces

Access Interface Name AIF-1

Virtual Interface * VIF-1-LAN-1

Virtual Path Mode * Primary

Save

Advanced WAN Options

Enable Metering

Congestion Threshold (µs) 20000

Provider ID

Frame Cost (Bytes) 1

Standby Mode Disabled

MTU (Bytes) 1350

Cancel

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WAN link templates

WAN profile templates are WAN link configuration templates created by service providers, to enable the creation of WAN link profiles at a customer level.

To create a WAN link template, click **+ WAN Link Template**. You need to fill the WAN link information such as **Profile Name**, **Access Type**, **Internet Category**, **LAN to WAN Rate** and so on. For detailed description of configuring WAN links, see WAN Links.

Network home

September 27, 2025

The **Network Home** page acts as an anchor for network configuration, offers enterprise network level configuration capabilities, and serves as the starting point for configuring the SD-WAN network of an enterprise.

The **Network Home** page displays the total sites within the network and also segregates the sites based on their connectivity status. Select the numbered links to view the sites based on the following status categories:

- **Critical** –Sites that have all the associated virtual paths down.
- **Warning** - Sites that have at least one virtual path down.
- **Normal** - All virtual paths and associated member paths of the site are up.
- **Inactive** - Sites are in the undeployed and inactive state.
- **Unknown** - Status of the site is unknown.

Clicking the status filters the sites based on their status and displays the details. You can also use the **Search** bar to view the details of a site based on the site name, role, overlay connectivity, model, bandwidth tier, and the serial number parameters.

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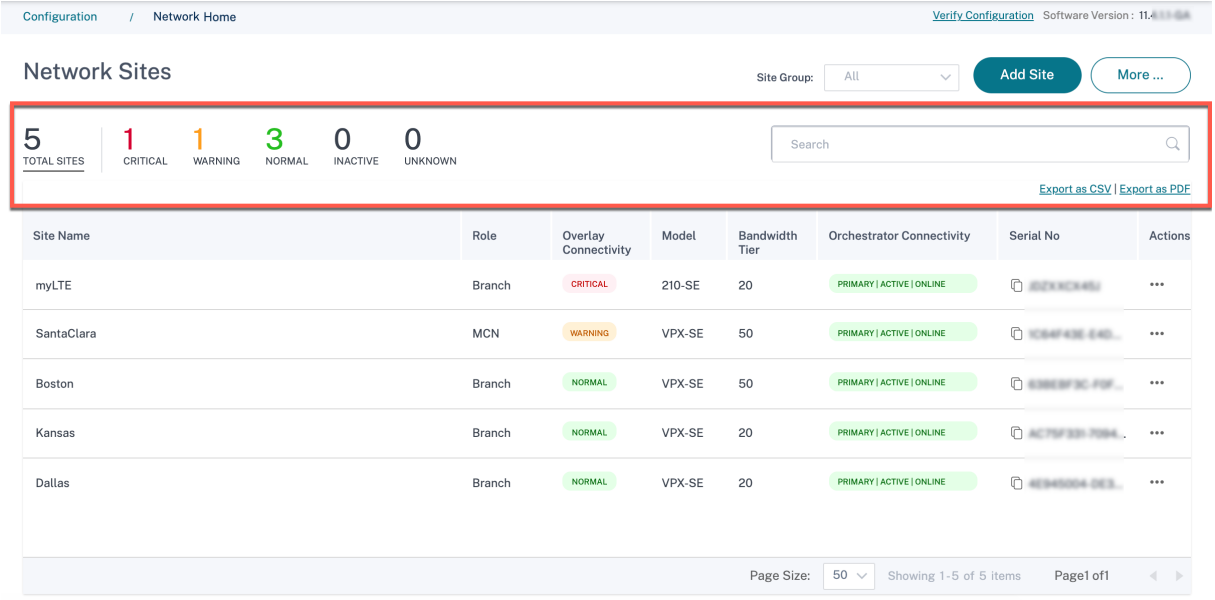
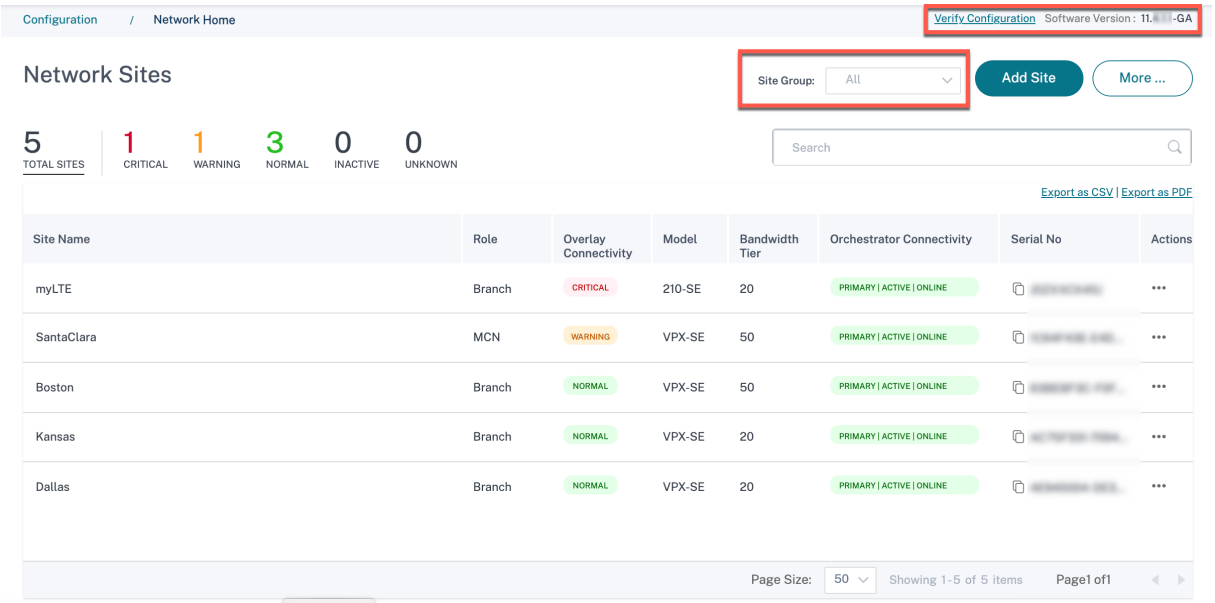
You can export the filtered results in to a CSV or PDF file by using the **Export as CSV** and **Export as PDF** options. The CSV and PDF file name is prefixed with **SiteList** followed by the date and time when the file is exported.



On the top right corner of the screen, you can view the current software version. Click **Verify Configuration** to validate any audit errors. For more details, see Verify Configuration.

You can filter the sites based on the group/region to which they belong by using the **Site Group** drop-down list.



Clicking the site name in the filtered result takes you to the **Site Configuration** screen. If the site is in a high availability setup, then the **Orchestrator Connectivity** column displays the status of both primary and secondary appliances. The **Serial No** column displays the serial number of the appliance.

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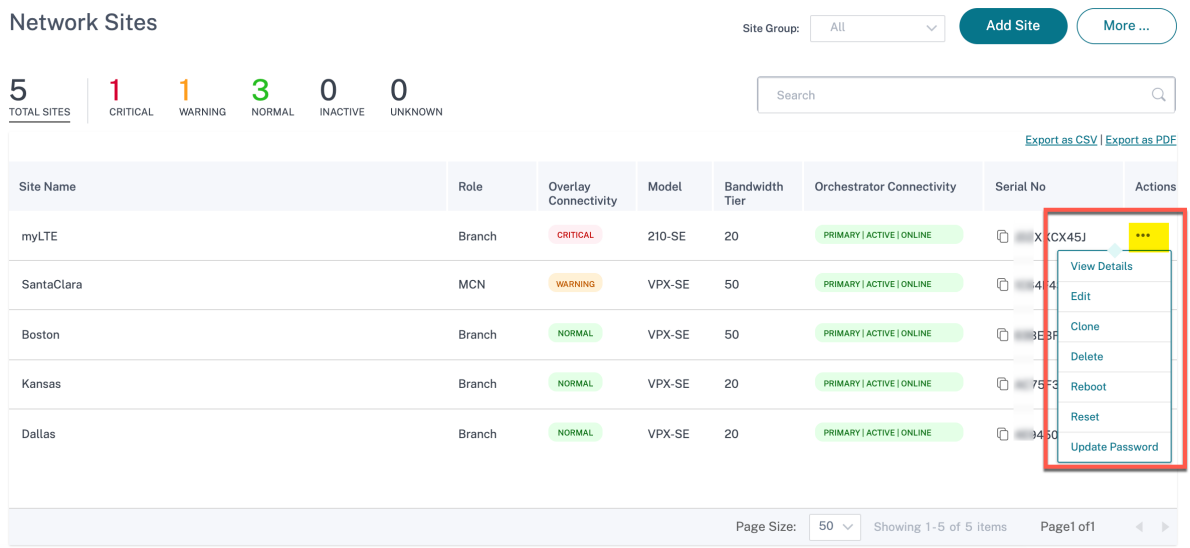
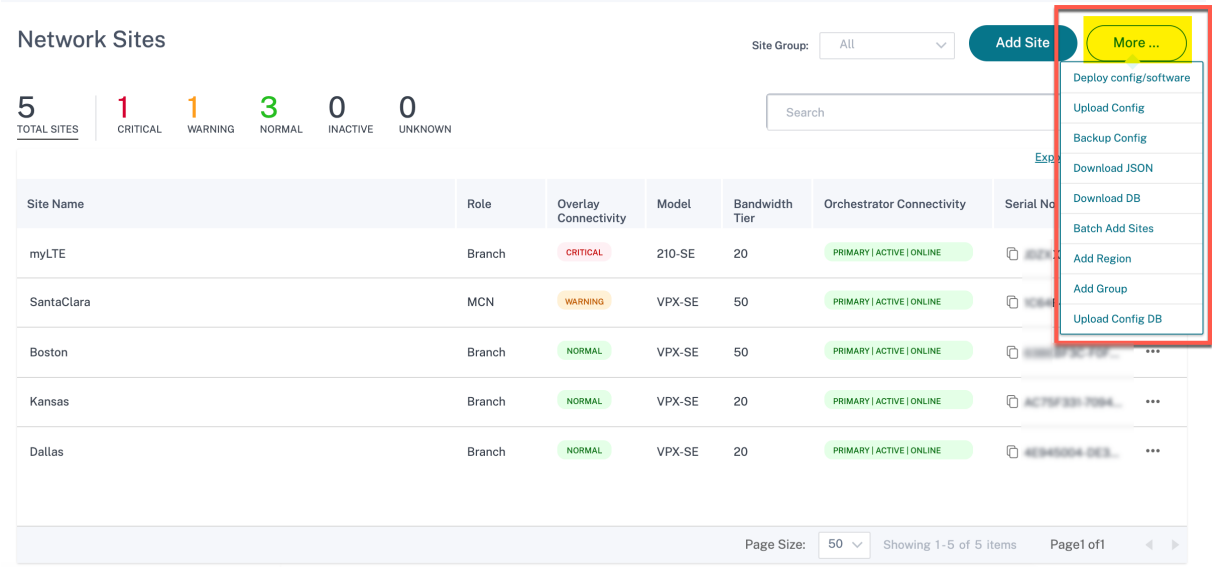
In a high availability setup, both primary and secondary appliance serial numbers are displayed. You can copy the serial number of the appliance using the copy icon.

Using the **Actions** column, you can view details, edit, clone, delete, reset, and update the password of the site. You can also reboot the devices associated with a site.



You can perform other actions such as upload configuration, add sites in a batch, download JSON, and so on using the **More ...** option.



Add sites

To add a single site, navigate to the **Add Sites** drop-down list and click **Add single site**. To add a site using a site template, select **Add New Site Using Template** from the drop-down list.

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For more information on site configuration workflow, see Site Configuration.

Clone sites

Citrix SD-WAN Orchestrator service allows you to clone a branch site. Cloning a site streamlines the process of adding and configuring more branch nodes. When a site is cloned, a set of site configurations that require changes are copied and displayed in a single form page. You can then modify the settings according to the requirements of the new site. Some of the original settings can be retained, where applicable. However, most of the settings on the single form page must be unique for each site.

> **Note**
>
> The Virtual WAN appliance models must be the same for both the original and the cloned sites. You cannot change the specified appliance model for a clone. If the appliance model is different for a site, you must manually add the site.

To clone a site, select Clone from the Actions column in the Network Sites section. However, if some features require any modifications, verify the configuration details after cloning the site and make the changes as required.

Deploy configuration and software

The **More > Deploy Config/Software** option takes you to the **Deployment** section that helps verify, stage, and activate the configuration across the network. For more information on deploying configuration and software, see Deployment.

Upload Configuration

The **More > Upload Configuration** option allows you to browse and upload one of the previously saved configurations. The newly uploaded configuration serves as the active configuration for the network.

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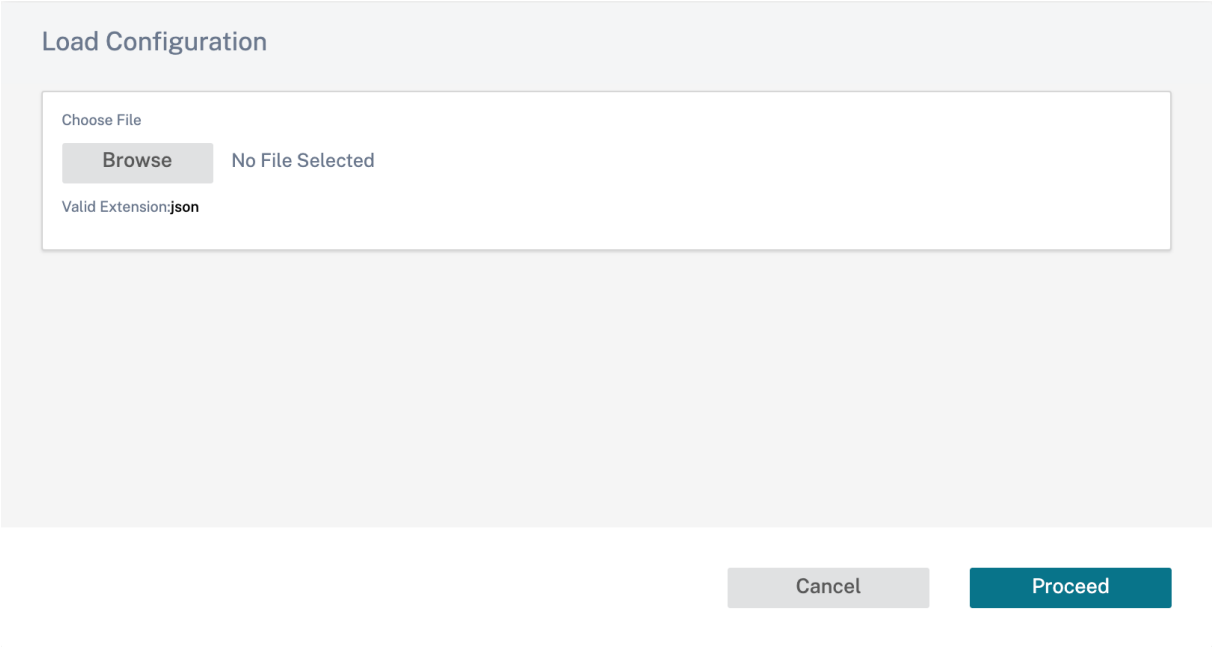
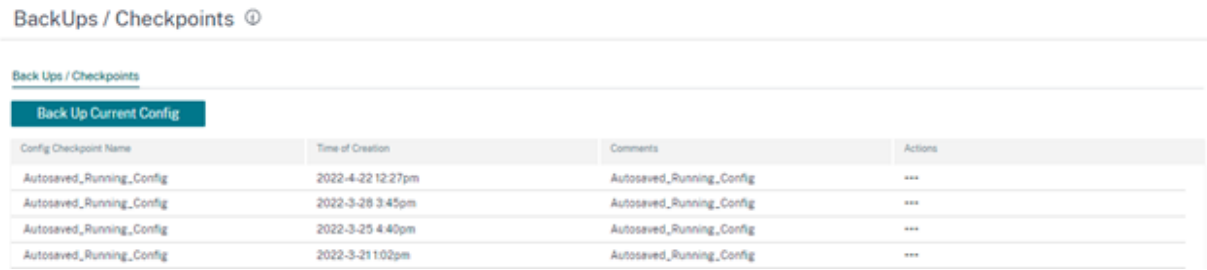


Back Ups/Checkpoints

The **More > Backup Config** option takes you to the **Back Ups / Checkpoints** page and provides the ability to back-up and restore the configuration, or review the saved checkpoints.



Click **Verify Configuration** to validate any audit error.

Click **Back Up Current Config** to back up the current configuration as a checkpoint for future use.

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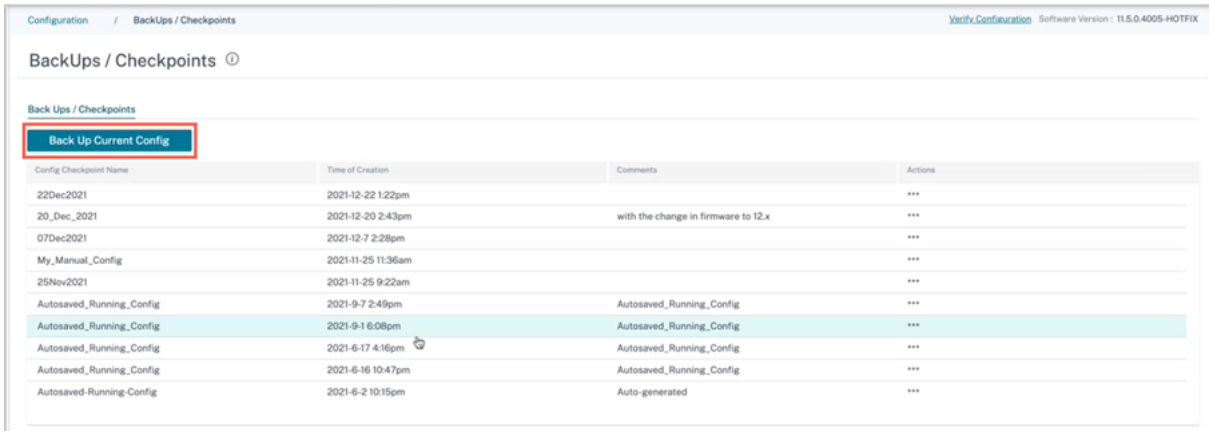
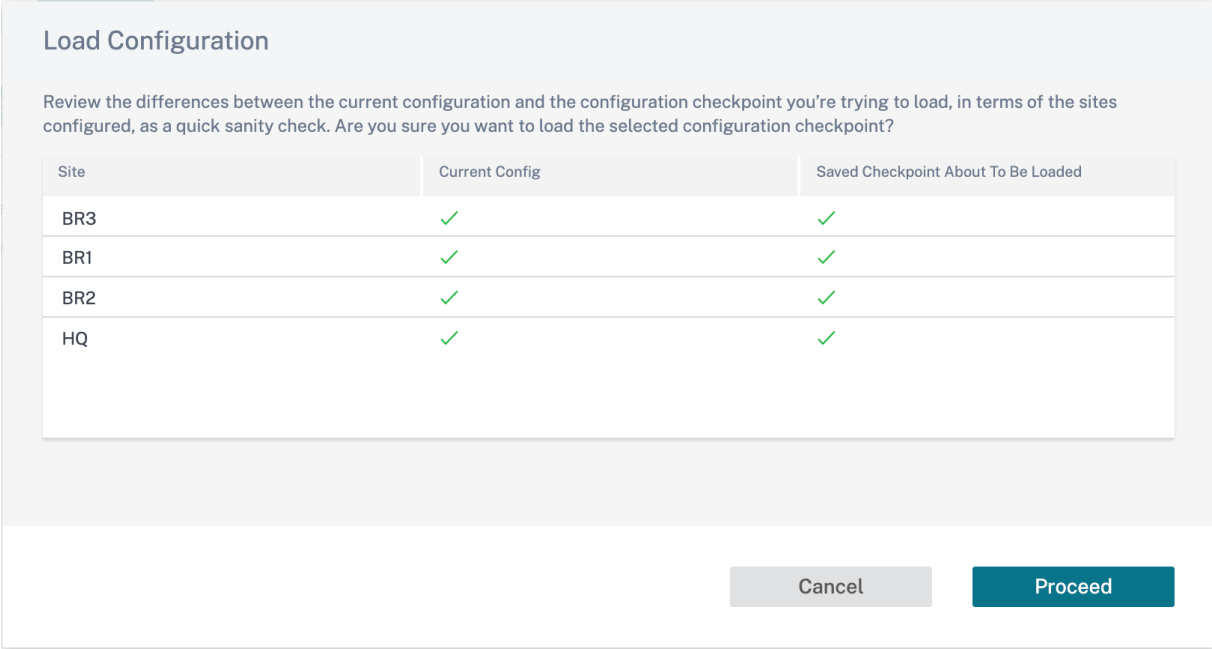


Click **Load Config** (under **Actions**) to load a saved configuration. Click **Proceed**.



Click **Copy** (under **Actions**) to create a similar copy of an existing configuration. You can also download, edit, and delete the saved configuration checkpoints. These operations are available under **Actions**.

Download JSON

The **More > Download JSON** option allows you to download and export the current configuration in JSON format, for offline review.

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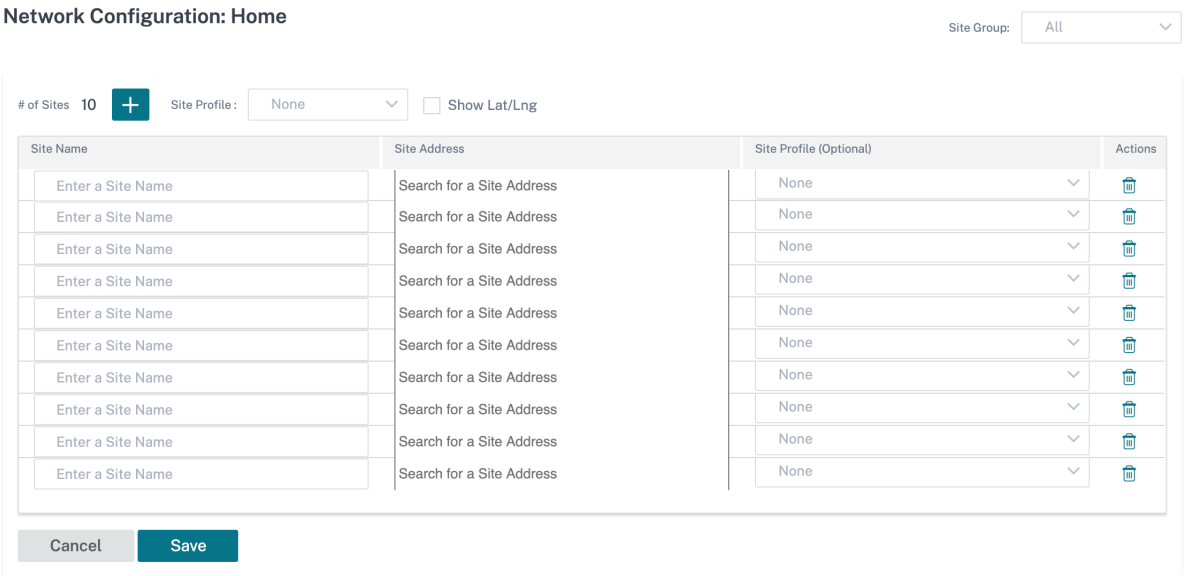
Download DB

The **More > Download DB** option allows you to download and export the current configuration in DB format.

Add sites in a batch

The **More > Batch Add Sites** option allows you to quickly add several sites in a batch. You can also select a site profile to be used for each site, leaving you only with unique parameters such as IP addresses that remain to be configured for each site.



Add Region

The **More > Add Region** option allows you to create a region and takes you to the **Site & IP Groups > Regions** page. For more information, see Regions.

Add Group

The **More > Add Group** option takes you to the **Site & IP Groups > Custom Groups** page where you can create a region. For more information, see Custom Groups.

Update password

You can change the password of the SD-WAN appliances at different sites, across the network, through the Citrix SD-WAN Orchestrator service.

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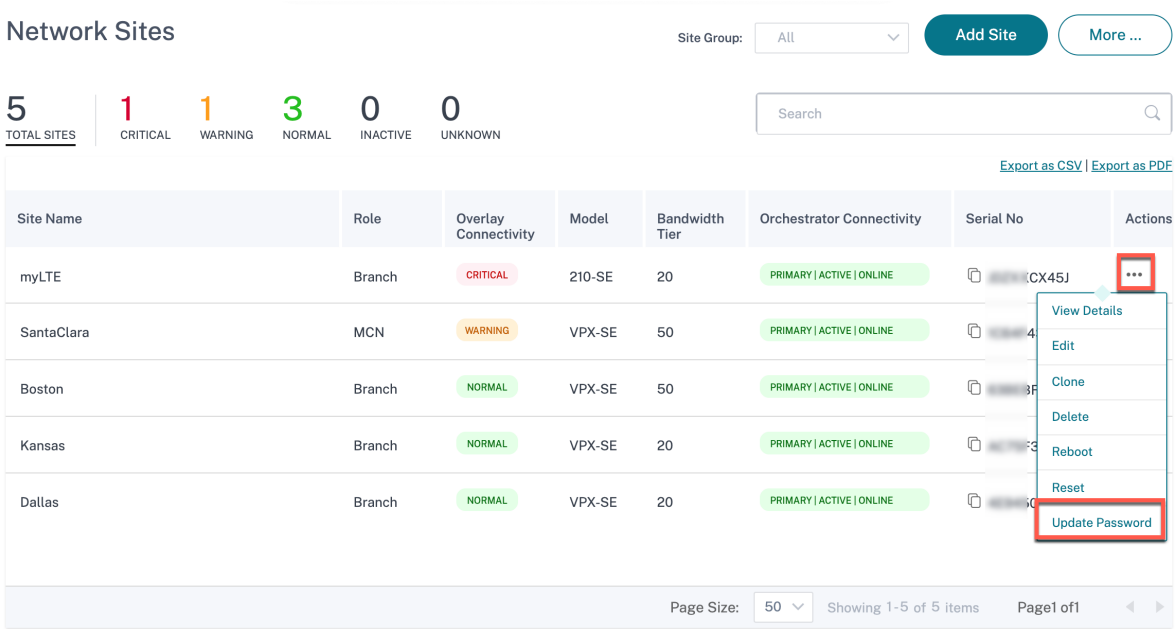
To change the password, for an appliance that is online click the more icon and select **Update Password**.



Provide the values for the following fields:

- **User Name**: Select a user name for which you want to change the password from the list of users configured at the site.
- **Current Password**: Enter the current password. This field is optional for admin users.
- **New Password**: Enter a new password of your choice.
- **Confirm Password**: Reenter the password for confirmation.

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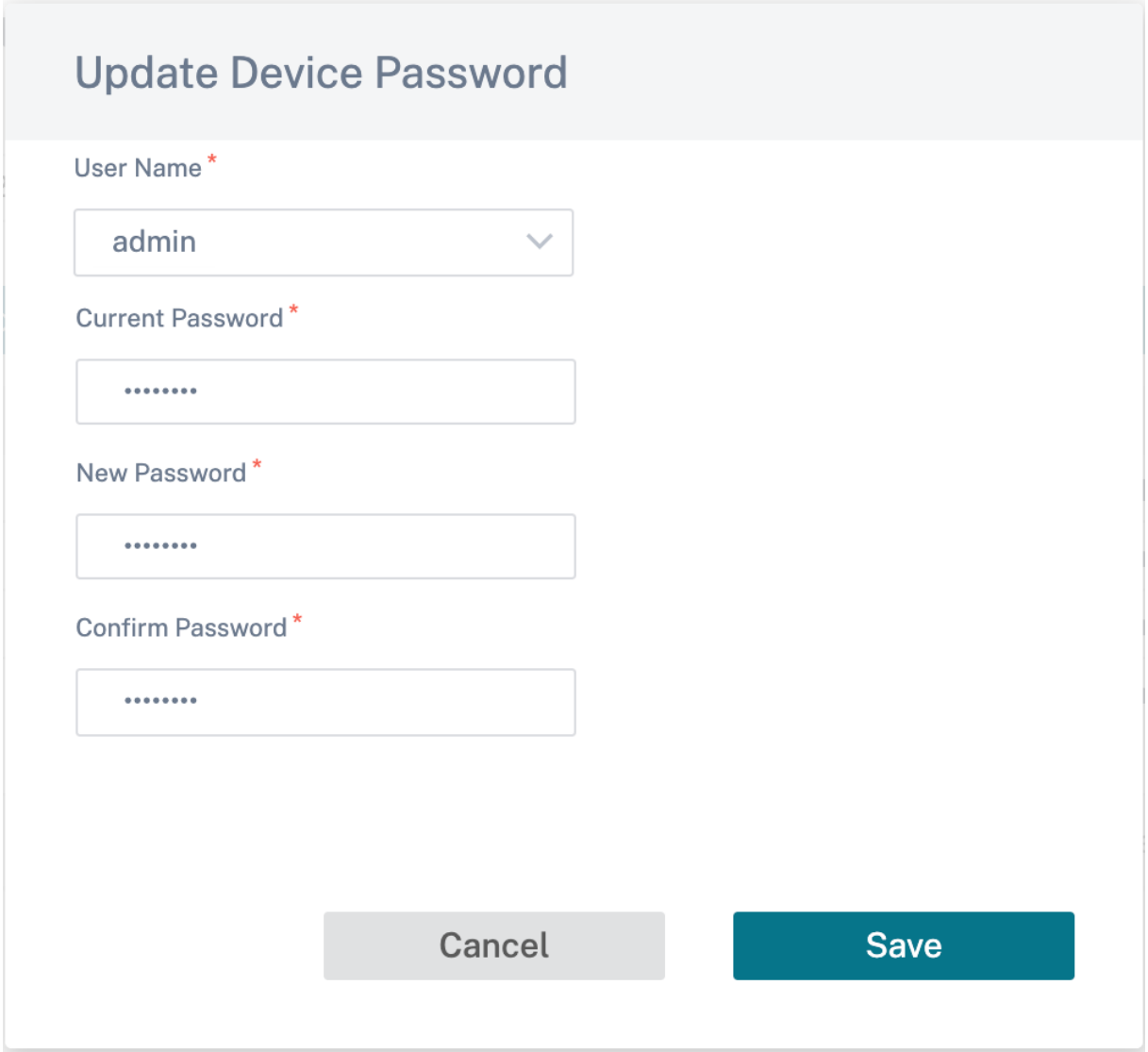

Configuration difference

January 27, 2022

The **Config Diff** capability helps you to review the difference between any two versions of configuration checkpoints. The **Config Diff** option is available at the Network level, under **Configuration** > **Config Diff**.

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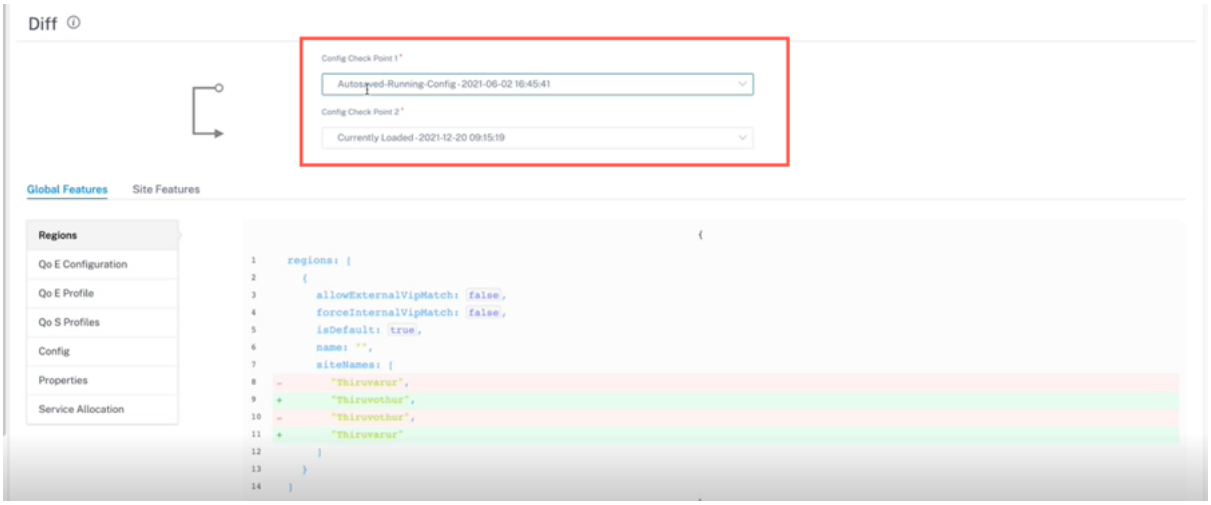
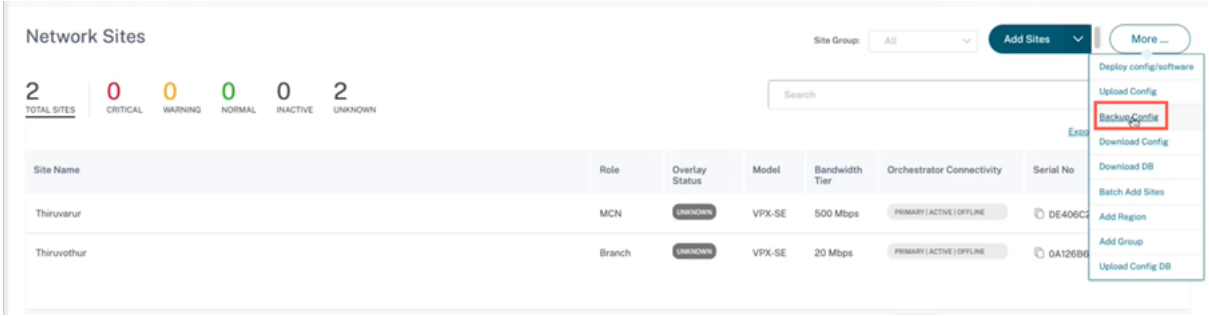
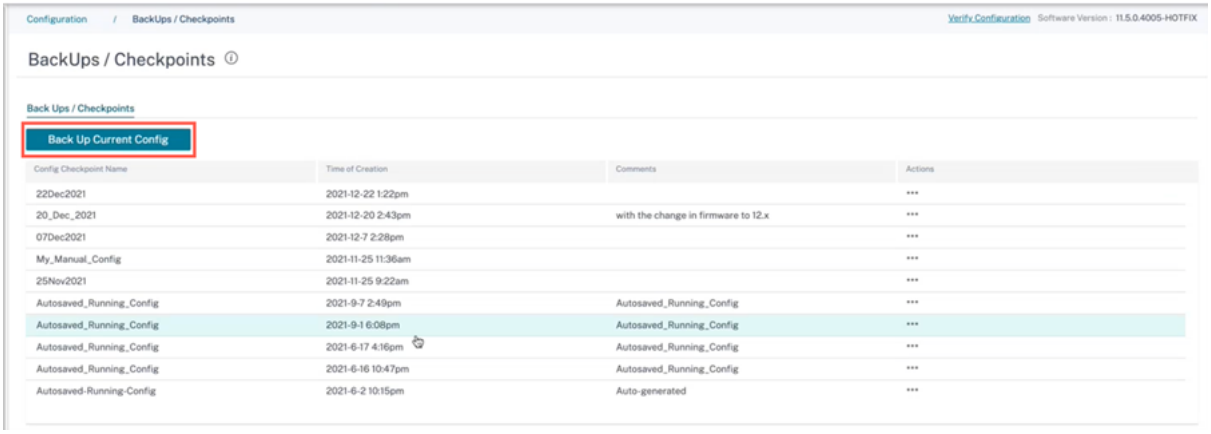


During deployment, you can save a configuration with a suitable name. The saved configurations are known as checkpoints. While comparing the difference between the two configurations, you need to select the required configurations from the **Config Check Point 1/2** drop-down lists.

You can view the list of saved configurations backups/check points under **Configuration** > **Network Home** > select **Backup Config** from the **More** drop-down list.



When a deployment happens, the configuration is backed up automatically every time. You can also backup the current configuration manually. To do that, click the **Back Up Current Config** option.



Provide a name to save your configuration along with comments (optional). Click **Save**.

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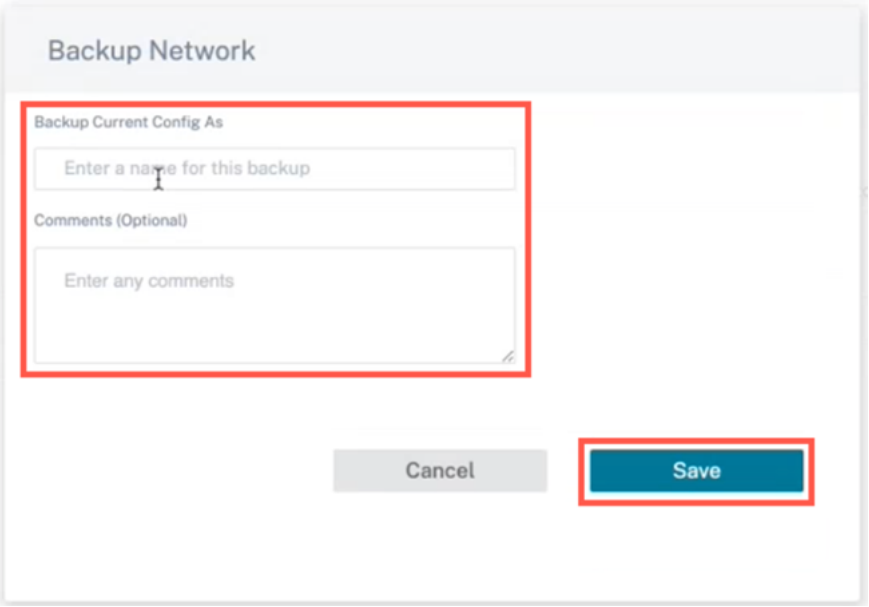
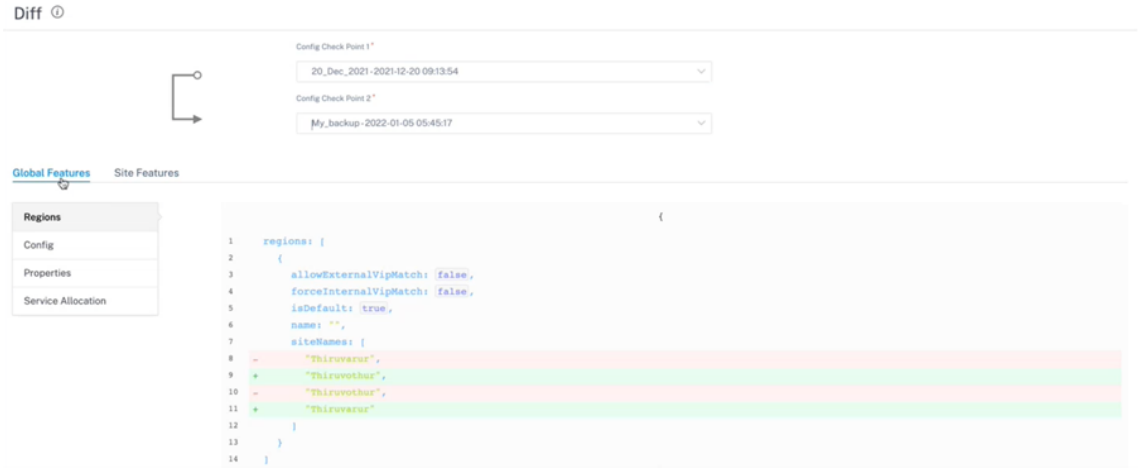


> **Note**
>
> You can save/create a maximum of five configuration backups. Creating a new backup automatically deletes the oldest backup configuration.

There are two types of configurations available:

- **Global level**: Under global category, you can view a list of global features updated such as Regions, Properties, and Configuration.



- **Site level**: Under site category, you can select the site from the drop-down list and view the modified details such as Site, WAN Links, and DNS Services.

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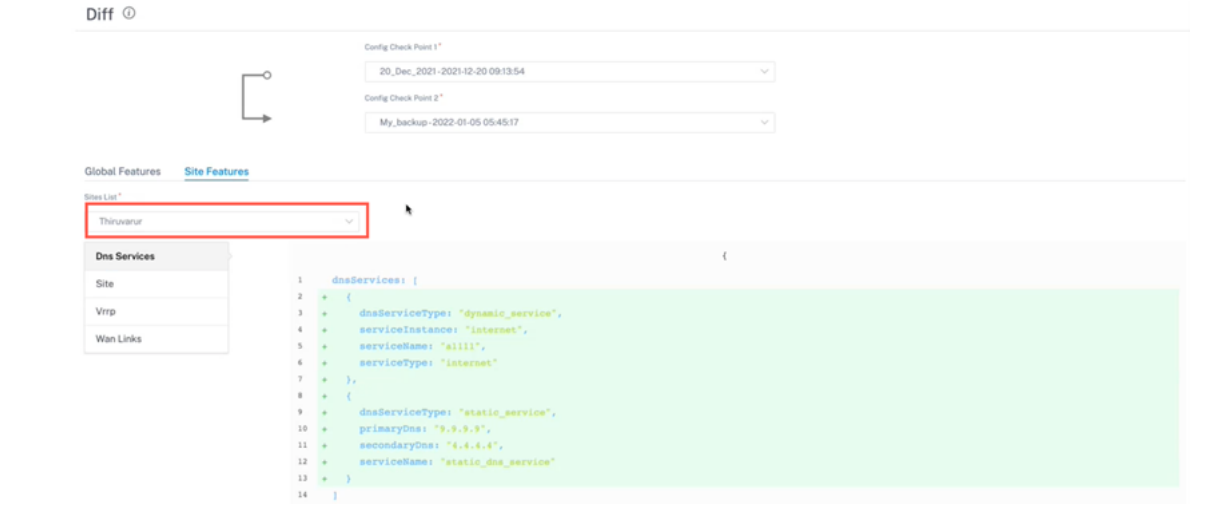

A deleted value appears in red background with minus symbol and the updated/added value appears in green back ground with plus symbol.

Deployment

September 27, 2025

The **Deployment** page allows you to change the software version, stage, and deploy the configuration across your network after the sites are configured. You can upgrade the SD-WAN software version on all the appliances and sites across the network.

The **Deployment** page contains the following sections:

- Switch to old deployment view
- Settings
- Deploy now
- Software and Configuration Deployment

The following sections on the **Deployment** page provide details of the deployment status:

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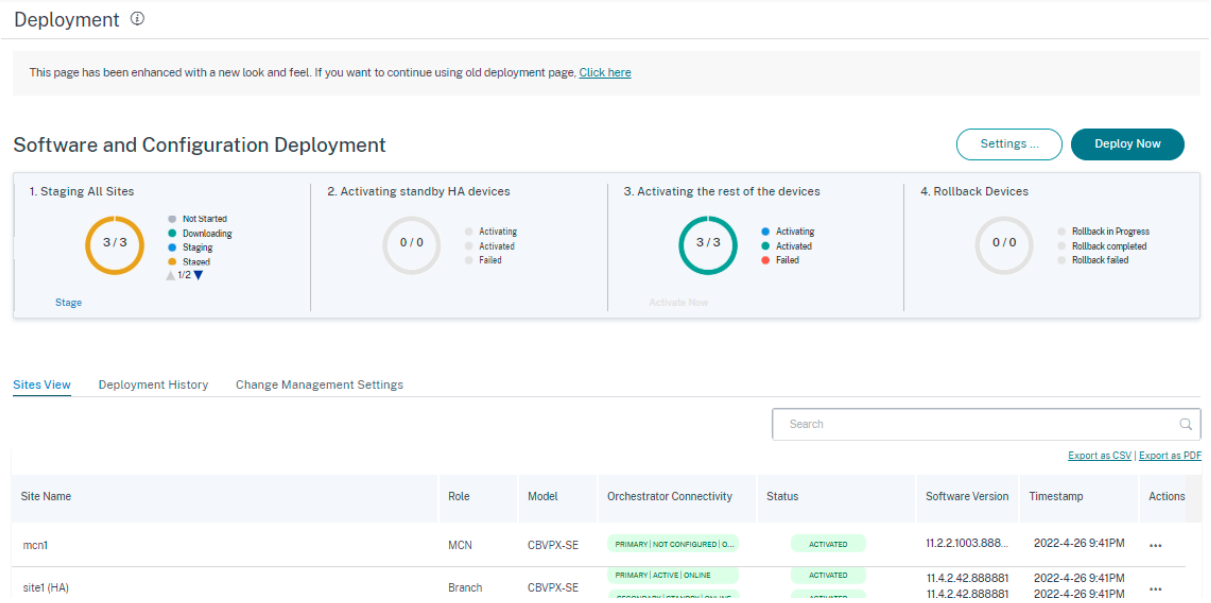
- Sites View
- Deployment History
- Change management settings



Switch to old deployment view

Select this option if you want to switch to the old Deployment page. For more information about the old Deployment page, see Old Deployment View.

Settings

The **Stage All Failed Sites** and **Restore Previous Version** options are available under the **Settings...** menu.

Stage All Failed Sites

When some sites are not staged successfully, select the **Stage All Failed Sites** option to reinitiate the staging process. This option is enabled only when staging fails.

Restore previous version

When you restore the previous version, Citrix SD-WAN Orchestrator service initiates a network-wide activation of the previous configuration and restores the previously activated configuration (and/or

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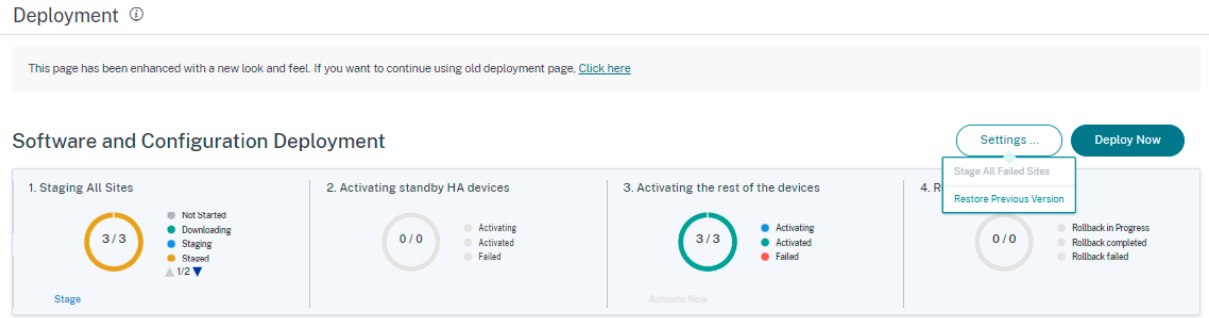
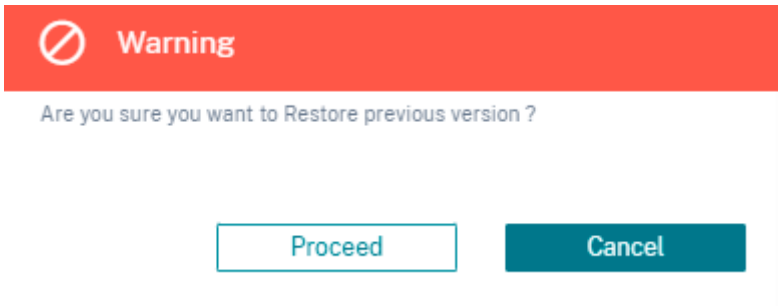
software) on your network. To restore the previous version, on the **Deployment** page, navigate to **Settings** and select **Restore Previous Version**.



A confirmation message is displayed. Click **Proceed** to continue.



> **Note**
>
> The Restore previous version action can be performed when the network is not in the staged state. This option is disabled for staged networks.

Deploy now

To initiate the software deployment process on your network, click the **Deploy Now** icon. For detailed information about the deployment workflow see Deployment workflow.

Software and configuration deployment

This section provides a summary of the most recent deployment:

- **Last Deployment Summary**: Displays the date and time (in UTC time zone) of the last deployment.
- **Software version**: Displays the configured software version and the number of sites running the software version.
- **Configuration changes**: Provides information such as the number of global and site-specific features to which changes were made, and the number of sites that were added and deleted. This column is displayed only if the network contains more than 100 sites.

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- **Settings**: Displays the status of other deployment settings such as Ignore incomplete and Rollback.

Important information about Citrix SD-WAN 11.5

Note the following points before you upgrade to Citrix SD-WAN 11.5:

- SD-WAN 11.5.0 release is available only via Citrix SD-WAN Orchestrator service and only on selected geographical POPs.
- SD-WAN Configuration Editor and SD-WAN Center are superseded by Citrix SD-WAN Orchestrator service. Citrix SD-WAN Orchestrator service supports all configurations that are currently done through SD-WAN Configuration Editor.
- Citrix SD-WAN 11.5 is a Limited Availability release, recommended and supported only for specific customers/ deployments.
- SD-WAN 11.5.0 release does not support Advanced Edition(AE), Premium Edition(PE), WAN Optimization deployments
- SD-WAN 11.5.0 supports only the platforms mentioned in SD-WAN platform models and software packages.
- SD-WAN 11.5.0 does not support Citrix SD-WAN Center or Citrix SD-WAN Orchestrator for on-premises.
- SD-WAN 11.5.0 firmware is not available on the Citrix Downloads page.
- Ensure to get the required approvals and guidance from Citrix Product Management / Citrix Support before deploying 11.5.0 on any production network.

Auto-correction for configuration and software upgrade

In Citrix SD-WAN Orchestrator service, the auto-correction feature is implemented as part of the change management workflow.
When the staging fails for a site, and if the site is a control node, you need to restage the site after getting the staging failure message. The **Activate now** option will not be enabled if the staging fails for the control nodes. If the site that has failed staging is a branch node, you are still allowed to proceed with the activation. But to bring that branch in sync with the network, perform another round of change management.

> **Note**
>
> - The auto-correction check starts only after the **Activate now** button has been clicked and stops once the next stage is issued from the Citrix SD-WAN Orchestrator service UI.

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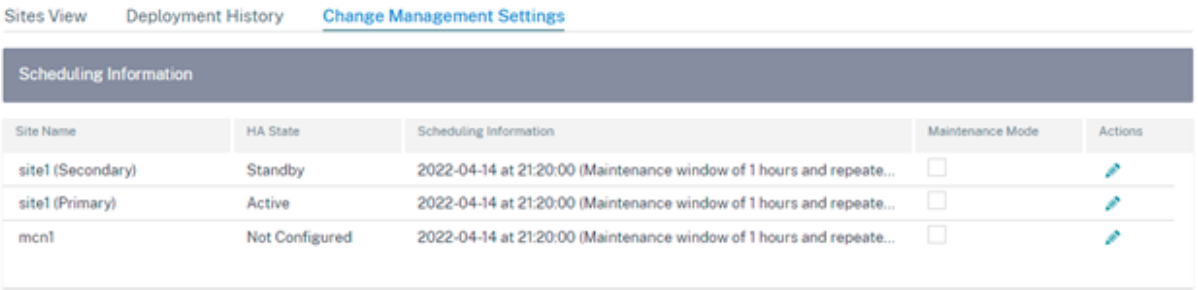
> - The maintenance mode functionality is only applicable for the auto-correction feature. If you initiate a **Staging** and **Activation**, the appliance with the maintenance mode enabled also gets updated with the software and configuration changes.

With the auto-correction feature enhancement, when a staging failure happens, the auto-correction mechanism pushes the expected software and configuration version to the failed branch and tries to bring it up in sync with the current network. The auto-correction feature is applicable for staging failure on the branch node and activation failure on any node.

The following are the two trigger points when the auto-correction starts:

- On the Citrix SD-WAN Orchestrator service Deployment page, once you get a **Staging Failed** or **Activation Failed** message, the auto-correction starts running in the background. The auto-correction check starts once the activation is completed.
- In the case of a software and configuration mismatch, where the appliance did not come up with the expected software and configuration version, the Citrix SD-WAN Orchestrator service starts pushing the actual required software and configuration copy down to the appliance for activation.

To troubleshoot an appliance manually, enable the **Maintenance Mode** check box under **Change Management Settings**. This check box is used to control if the device needs to be checked for auto-correction or not. Once the maintenance mode check box is cleared, auto-correction brings the appliance in sync with the network software and configuration version.



HA near-hitless software upgrade

During software upgrade (11.0.x and earlier versions), the staging, and activation of all the appliances in the network are done at the same time. This includes the High Availability (HA) pair, leading to network downtime. With the HA near-hitless software upgrade feature, the Citrix SD-WAN Orchestrator service ensures that the downtime during the software upgrade (11.1.x and above) process is not more than the HA switch over time.

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> **Note**
>
> The HA near-hitless software upgrade is applicable in the following scenarios:
>
> - The sites that are deployed in High Availability (HA) mode. It is not applicable for non-HA sites.
> - Citrix SD-WAN Orchestrator service-based deployments only and not for the networks that are managed using the SD-WAN Center or MCN.
> - Software upgrade only and not configuration updates. If there is configuration change along with the software as part of the upgrade, the Citrix SD-WAN Orchestrator service does not perform HA near-hitless software upgrade and continues to upgrade in the earlier fashion (single-step upgrade). All the sites get rebooted at the same time (if a reboot is required) as part of the single-step upgrade.

The upgrade sequence summary is as follows:

1. Citrix SD-WAN Orchestrator service checks for the HA state of all the appliances in the network.
2. Upgrades all the secondary appliances that are in the Standby state.
3. HA switch-over is triggered, and the state of the Active and Standby appliances are switched.
4. Upgrades the primary appliances that are now in Standby state.

The HA near-hitless software upgrade is a two-step upgrade process:

Step-1: During software upgrade, after the SD-WAN 11.1 release, the Citrix SD-WAN Orchestrator service first performs software upgrade on all the appliances that are in the **Standby** state across the network. The network is still up and running with the **Active appliances** in place.

After all the **Standby** appliances are upgraded to the latest software, the HA switch-over is triggered across the network. The **Standby** appliances (with the latest software) become **Active**.

Step-2: The current **Standby** appliances with an old software version are upgraded to the latest software and will continue to run in **Standby** mode.

During this software upgrade process, all other non-HA sites will also be activated with the latest software.

For more information, see the FAQs.

You can view the upgrade status by navigating to **Sites View**.

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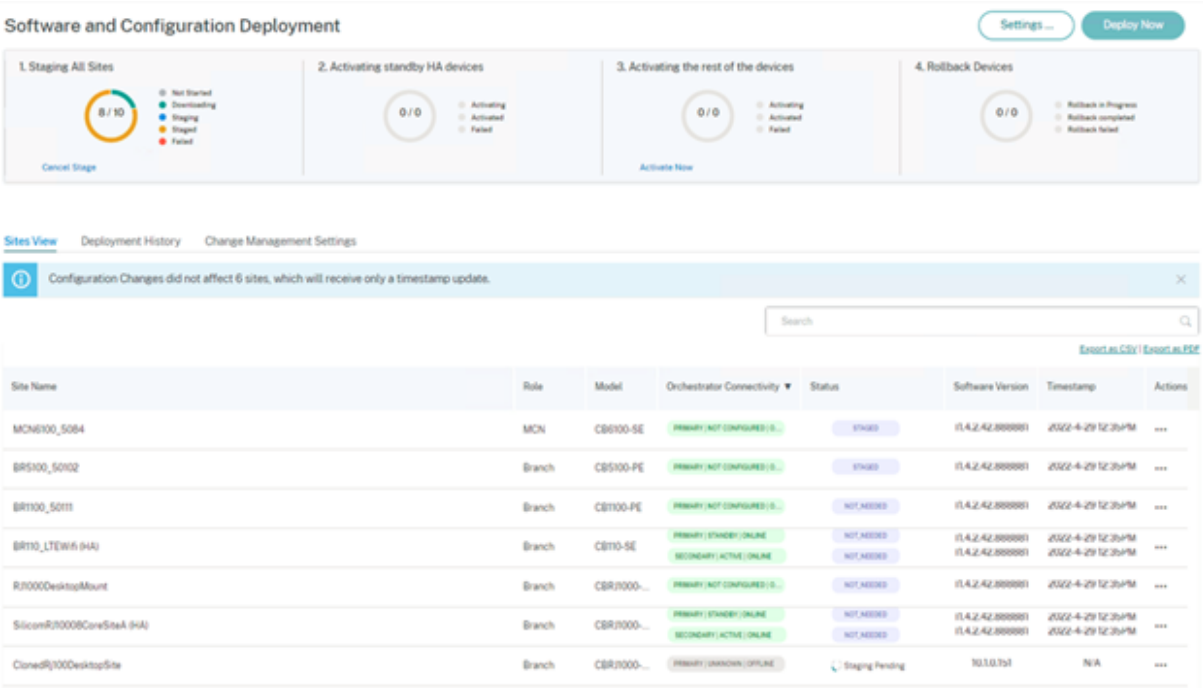

In the case of a configuration-only update, only the sites that have configuration changes are staged and activated. For the remaining sites, the timestamp is updated and processed. The control nodes will get a package staged even if there is no change to the site configuration.

If the software version is being changed, both configuration and software package are staged and activated on all the sites in the network.

Sites view

The **Sites View** section provides details about all the devices in the network. The table contains the role of each site, the appliance details, deployment status, Citrix SD-WAN Orchestrator service connectivity status, software version of each appliance, and a timestamp of the running configuration. If the staging process fails at any site, use the **Retry Staging (Primary Device)** option, under the **Actions** column, to reinitiate the staging process. For HA appliances, both the options **Retry staging (Primary device)** and **Retry staging (Secondary device)** are available.

You can export the site view details into a CSV or PDF file by using the **Export as CSV** and **Export as PDF** options. The downloaded CSV and PDF file name is prefixed with **Site List** followed by the date and time of the file export.

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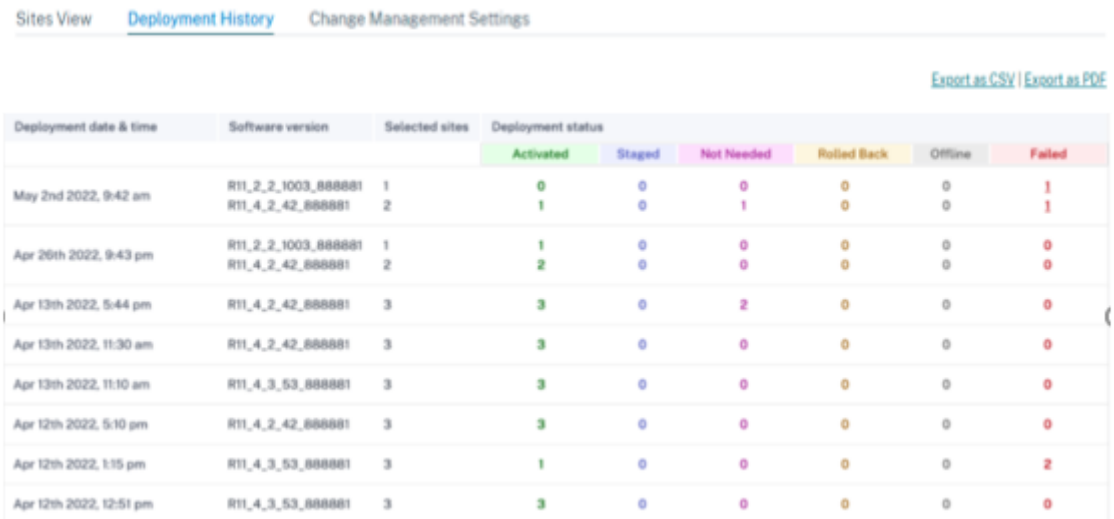
Deployment history

The **Deployment History** section provides the status of the previous deployment operations and results. If a partial site upgrade is enabled, the section categorizes the sites based on the software version that the appliances are configured to run. If the last activation fails, you can even view details of the failure by clicking the number link on the **Failed** column.

> **Note**
>
> The reason for failed sites details can be viewed only for the most recent activation. It is not available for the older entries in the **Deployment History** table.



Once you click the number link in the Failed column, the **Reason for Failed Sites** page is displayed. This page provides details such as site name, software version, appliance edition, and an error message mentioning the reason for the failure.

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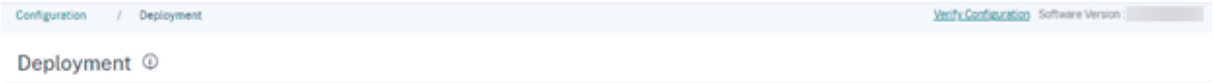
You can export the deployment history details into a CSV or PDF file by using the **Export as CSV** and **Export as PDF** options. The downloaded CSV and PDF file name is prefixed with **Deployment History** followed by the date and time of the file is export.

Change management settings

The **Change Management Settings View** section helps to troubleshoot an appliance manually. Enable the **Maintenance Mode** check box. This check box is used to control if the device needs to be checked for auto-correction or not. Once the maintenance mode check box is cleared, auto-correction brings the appliance in sync with the network software and configuration version.

Verify configuration

Click **Verify Configuration** at the top right corner of the Deployment page to validate the network configuration and check for any audit error or warning. The **Configuration results** page is displayed.



The configuration results display the total number of audit errors and warnings. The results are also filtered based on the audit type (error or warning) and displayed with different color codes. You can click the numbers links to view the filtered results.

The **Type** column displays an icon to indicate whether it is an error or a warning. The **Audit Scope** column specifies if the error or warning is for a site or at the network level. If the error or warning is specific to a site, then the name of the site is displayed. If the error or warning is at the global level,

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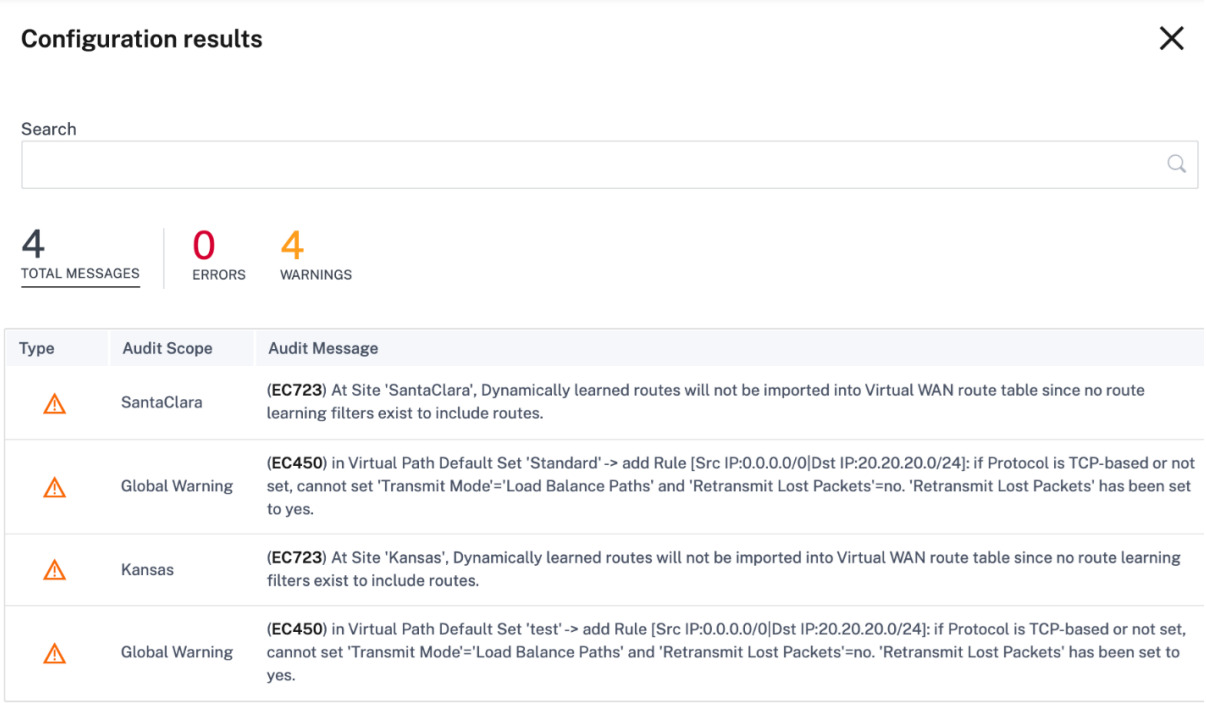
then a global error or a global warning is displayed. The **Audit Message** column contains the error code and the error message.

You can use the search bar to search for any specific errors or warnings based on the type, error code, site name, or error message.



When you click **Verify Configuration** for the second time, the **Configuration results** page displays the same results of the previously verified configuration along with the date and time details. If necessary, you can click **Verify Again** to rerun the validation.

> **Note**
>
> The **Verify Configuration** button does not display the audit information of site templates.

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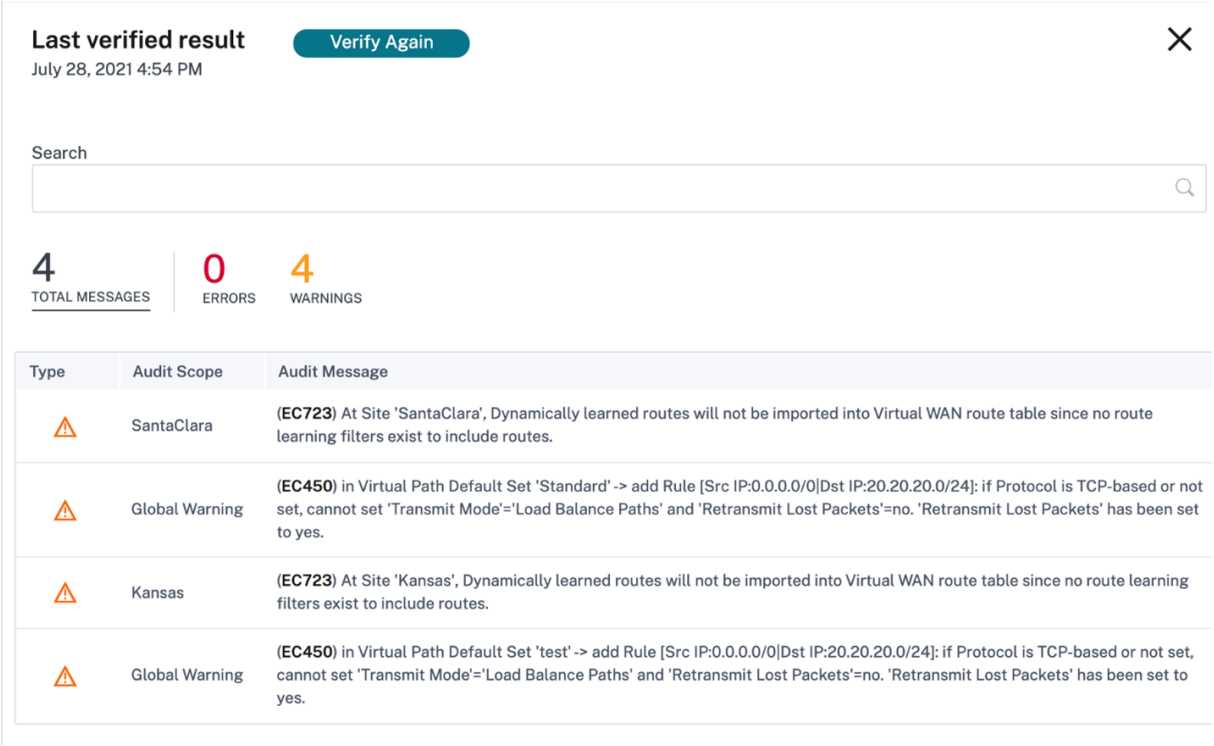

Deployment workflow

The deployment process involves the following stages:

1. Software & Sites
2. Configuration
3. Settings
4. Summary
5. Stage
6. Activate Now

Software and sites

When you click **Deploy Now**, the **Start deployment** > **Software & Sites** page is displayed. Select the default software version that you want to apply to all the sites across the network. To upgrade or downgrade selected sites, use the **Partial site upgrade** option.

Default network software Select the software version for the sites across the network. The software version that you select in the **Default network software** drop-down list gets applied to all the sites unless there are specific overrides configured.

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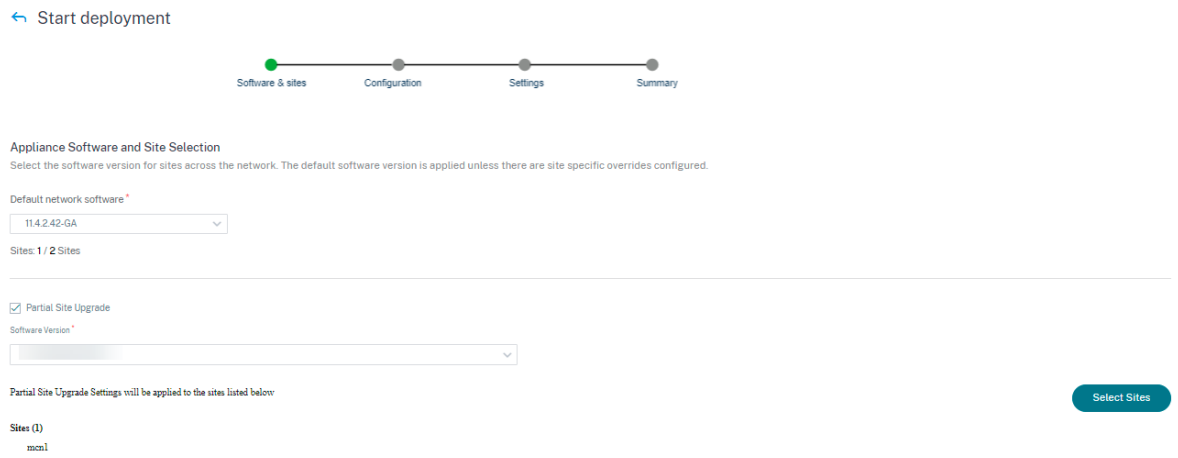

Partial site upgrade The **Partial Site Upgrade** option is used to upgrade or downgrade the selected sites with a different version. This option provides the ability to test a new software version on a site before deploying it across the entire network.

With the **Partial Site Upgrade** feature, upgrades can be staggered and thereby reducing the impact of software upgrades during business hours.

> **Note**
>
> Partial Site Upgrade can be performed only when all the sites in the network are running Citrix SD-WAN 11.2.2 software version or above.

Any configuration changes for the Partial Site Upgrade need a change management for the changes to take effect. The Partial Site Upgrade picks the lower version and generates the configuration for the same. Any new features cannot be tested while the network is in the Partial Site Upgrade mode.

When you are downgrading from a newer to older version using the Partial Site Upgrade, if a feature which is supported only in the newer version (with the similar configuration present both in the new and older version), audit errors occur. For example, if a new appliance that only supports a newer version is selected, then audit errors are displayed.

To perform the partial site upgrade:

1. Navigate to **Software and Configuration Deployment** > **Deploy Now**. The **Start deployment** page is displayed.
2. Select the **Partial Site Upgrade** check box, choose the software version on the **Software Version** drop-down list, and click **Select Sites** to add new sites.

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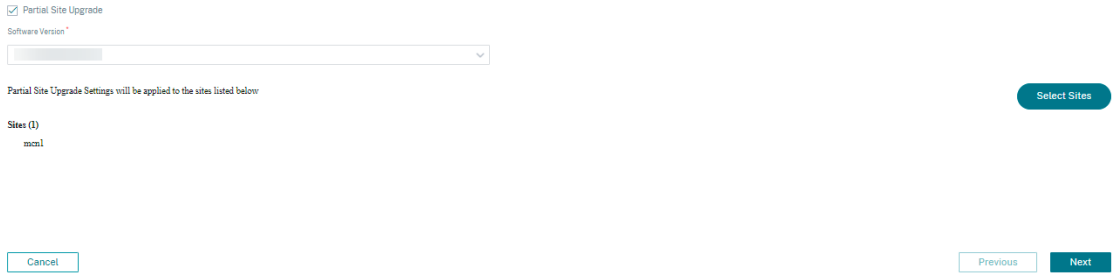
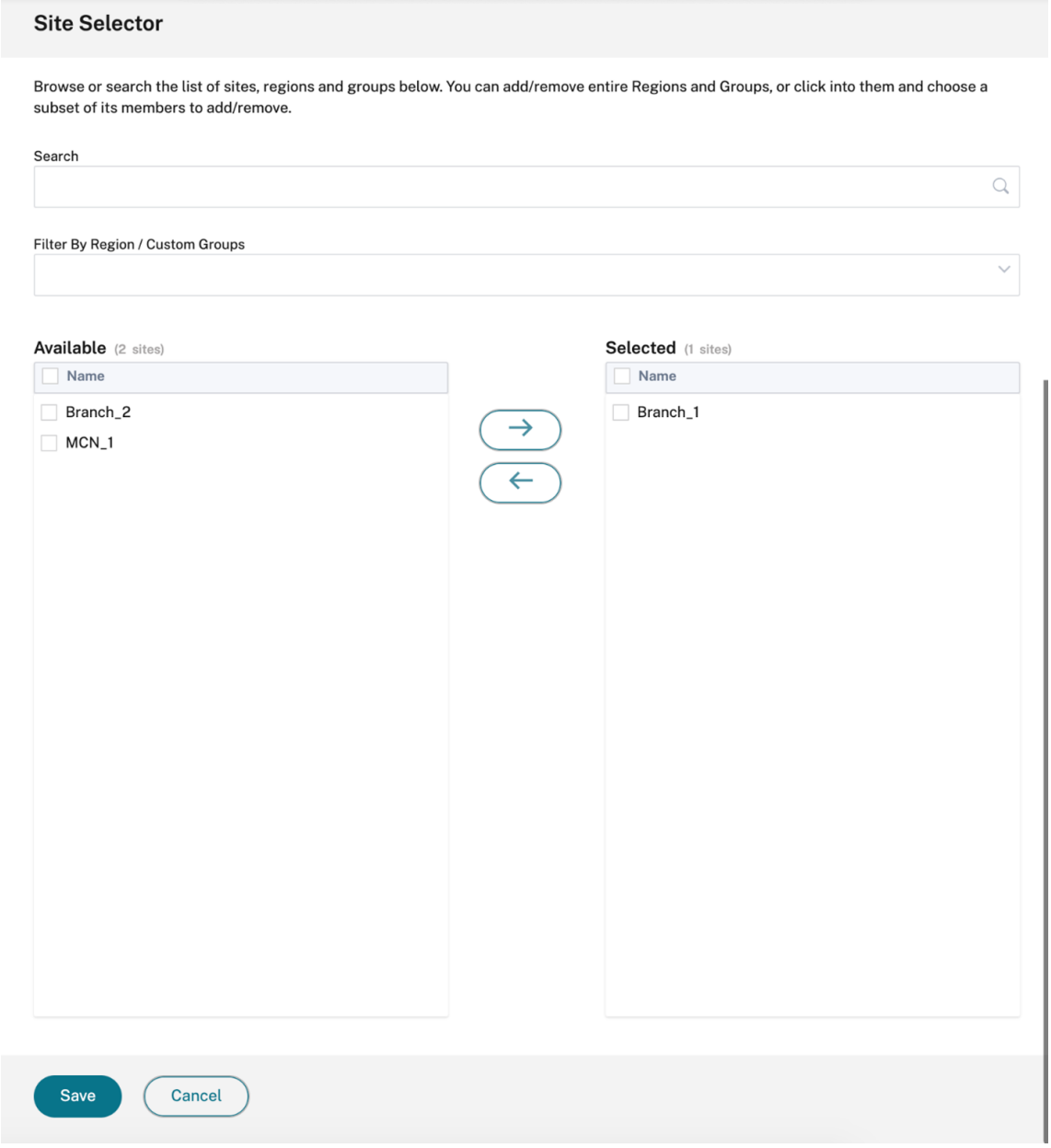


3. Select the sites and click **Save**.



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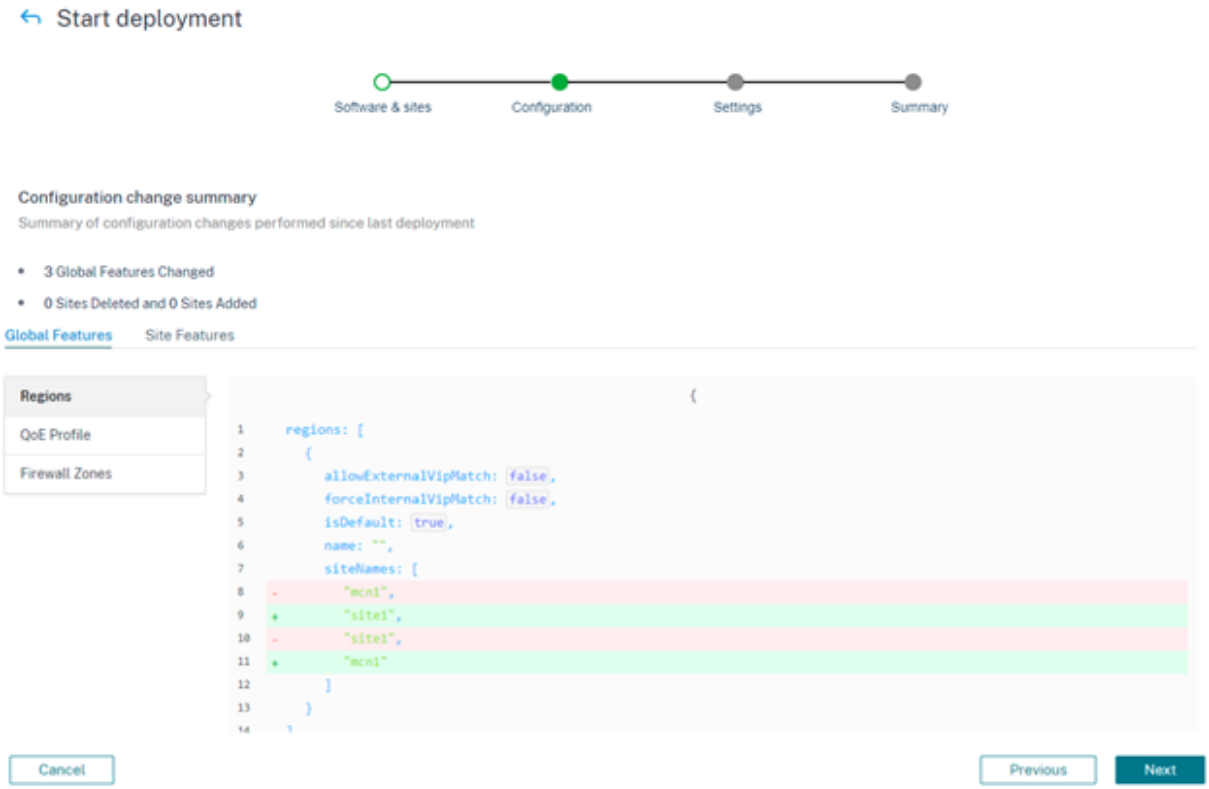
Configuration

The **Configuration change summary** page provides a diff in between the previously activated configuration and the configuration that you want to deploy now. The diff is displayed in JSON format. This change summary displays both global features and site-specific features.

The previous configuration value appears in red background with a minus symbol and the current configuration value appears in green background with a plus symbol.

> **Note**
>
> The **Configuration change summary** page is displayed only if the network contains more than 100 sites.

When you are done validating the details on the **Configuration** page, click **Next**.



Settings

This page offers the following additional deployment options such as Ignore incomplete and Rollback settings.

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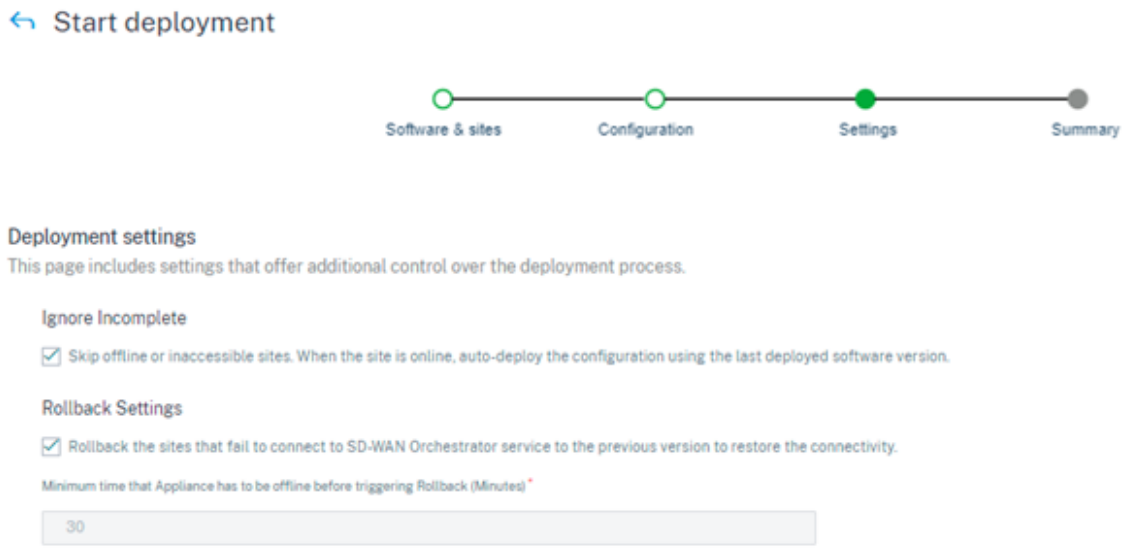
Ignore Incomplete When the **Ignore Incomplete** checkbox is selected, the offline and the inaccessible sites are skipped during the deployment. The **Activate now** button is enabled immediately after all the online control nodes (MCN, RCN, Geo MCN, Geo RCN) are staged. If the user chooses to activate at this state, the remaining appliances are activated once they complete staging.

The online branch appliances that fail to get staged are ignored. To enable the Ignore incomplete feature, navigate to **Deploy Now** > **Settings** and select the **Ignore Incomplete** check box.

> **Note**
>
> The Ignore incomplete feature can be only enabled or disabled before you start with the deployment. The configuration cannot be changed after the deployment process has started.



Rollback Settings With the **Rollback Settings** feature enabled, sites that fail to connect to Citrix SD-WAN Orchestrator service post performing network activation (as part of deployment), triggers an automatic rollback to the previous version (last staged package) to restore connectivity.

> **Note**
>
> The automatic rollback is only for the site that failed to connect to Citrix SD-WAN Orchestrator service and not for the entire network.

The rollback feature is triggered only when the appliance loses Citrix SD-WAN Orchestrator service connectivity. It is not triggered in scenarios when the virtual path status goes down and so on.

If at least one site in the network initiates a rollback, a warning message displaying a list of sites that are trying to rollback and an option to initiate a network-wide rollback of all the online sites is shown. You can check the progress of these sites and apply the appropriate action.

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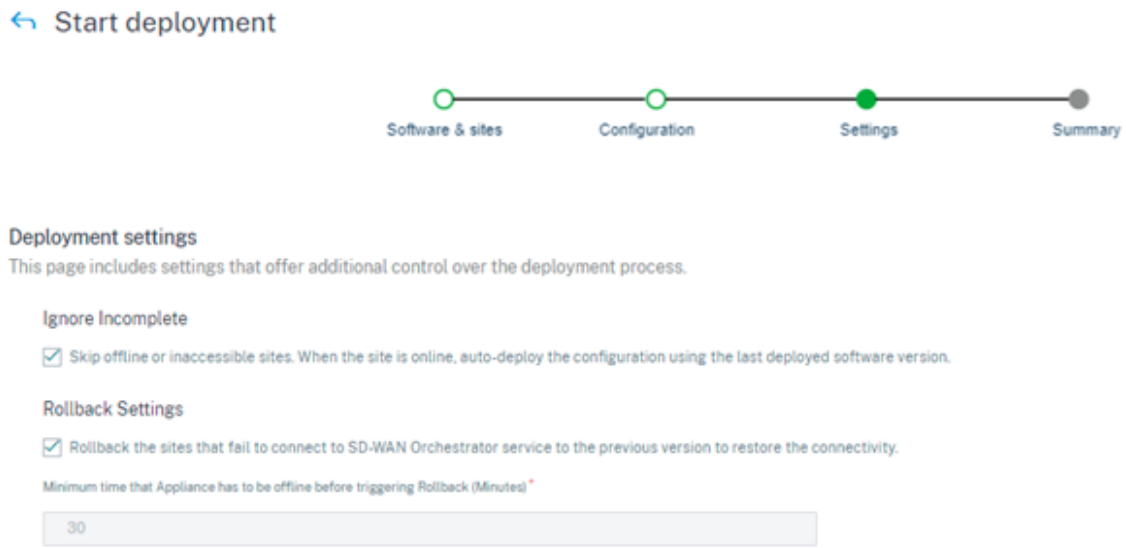
To enable the rollback on error feature, navigate to **Deploy Now** > **Start Deployment** > **Settings** and select the **Rollback Settings** check box.



Select the **Rollback Settings** check box to enable automatic rollback of sites that have failed to connect to Citrix SD-WAN Orchestrator service post activation. Rollback settings can be enabled or disabled before you start the deployment.

When the Rollback setting is enabled, the **Rollback Devices** section with details about the status of the rollback devices is displayed.

For a site to trigger automatic rollback, it must stay offline for at least 30 minutes (currently non-changeable) post activation. If the site can connect to Citrix SD-WAN Orchestrator service within 30 minutes, then rollback does not get triggered.

> **Note**
>
> Rollback on sites is only performed when the site loses connectivity after activation. Rollback is not triggered in cases where site is online, and activation has failed.

Click **Next** once you set the Rollback settings enabled.

Use case 1: Non-hitless Upgrade A site waits for activation to complete for a specified time with the status as **Activating**.

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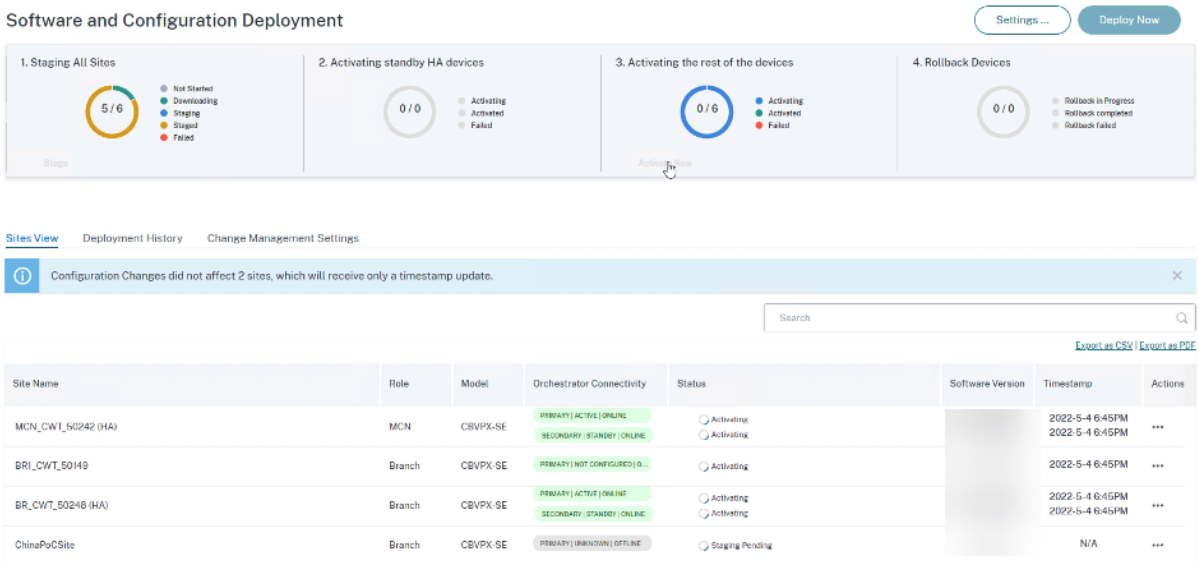
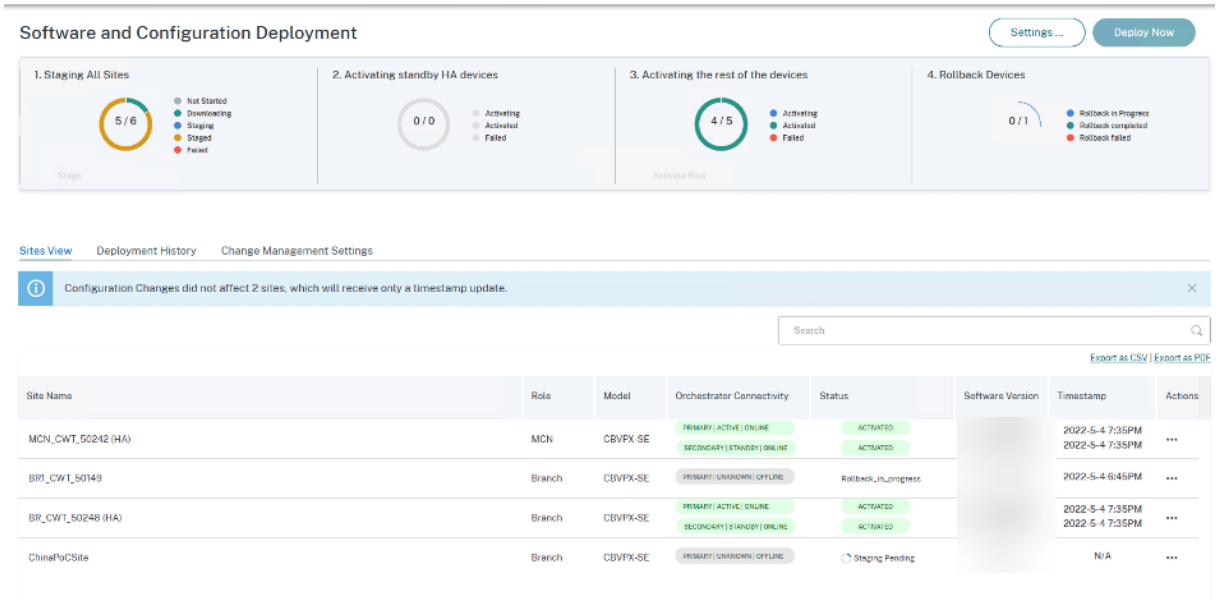


When the appliance is offline, Citrix SD-WAN Orchestrator service waits for another 30 mins (rollback initiation timeout) to give a chance to the site to connect back. At this stage, the status shows as **Activation Timeout, Waiting to Initiate Rollback (remaining time in minutes)**.

Post the 30 minutes waiting period, the appliance triggers an automatic rollback to the previous configuration or (and) software to try to restore Citrix SD-WAN Orchestrator service connectivity. Citrix SD-WAN Orchestrator service waits for 20 mins (non-configurable setting) for the appliance to connect to Citrix SD-WAN Orchestrator service and during this period, status is shown as **Rollback in progress**.



If the appliance fails to connect back, in this 20 minute, Citrix SD-WAN Orchestrator service marks the rollback operation as failed and status is shown as **Activation Failed** or **Device Rollback Failed**.

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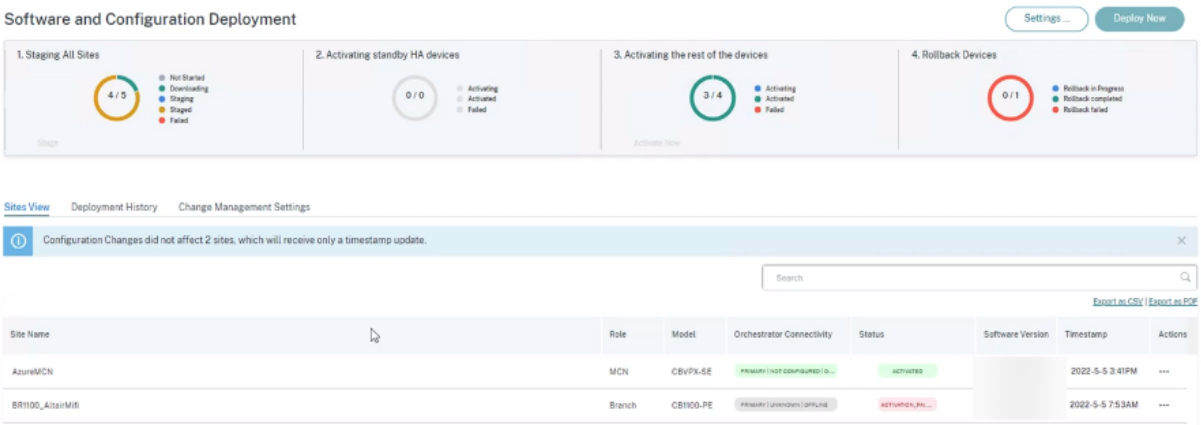
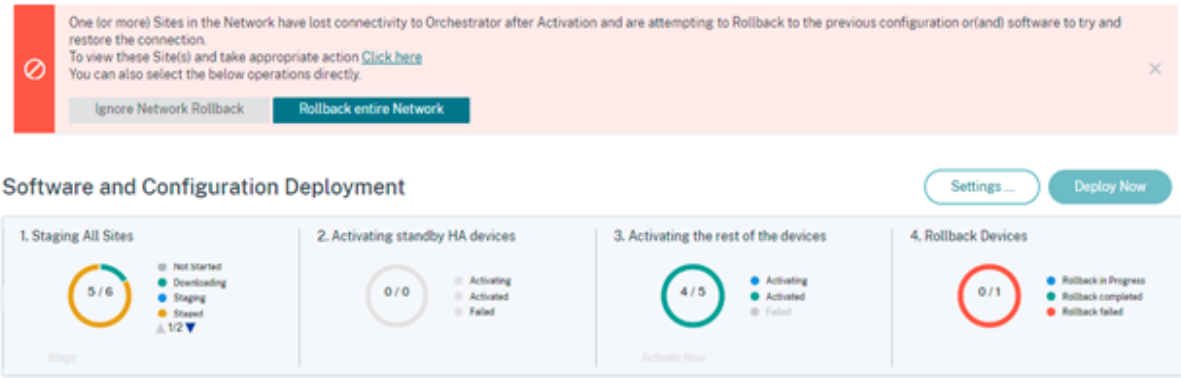


In the network, if at least one device has initiated the automatic rollback, a banner is presented to the user as follows:



Based on the status of the network Activation, the options displayed perform the following operations:

- Ignore Network Rollback
  - **For non-Hitless upgrade scenario**: Ends the current deployment.
- Rollback entire Network
  - **For non-Hitless upgrade scenario**: Triggers rollback on all the online sites of the network.

You can select the **Click Here** hyperlink to view the list of sites for which rollback is in progress or completed and take the above actions for that page.

You can also wait until the sites that have triggered rollback to either succeed or fail before deciding on triggering the network-wide rollback.

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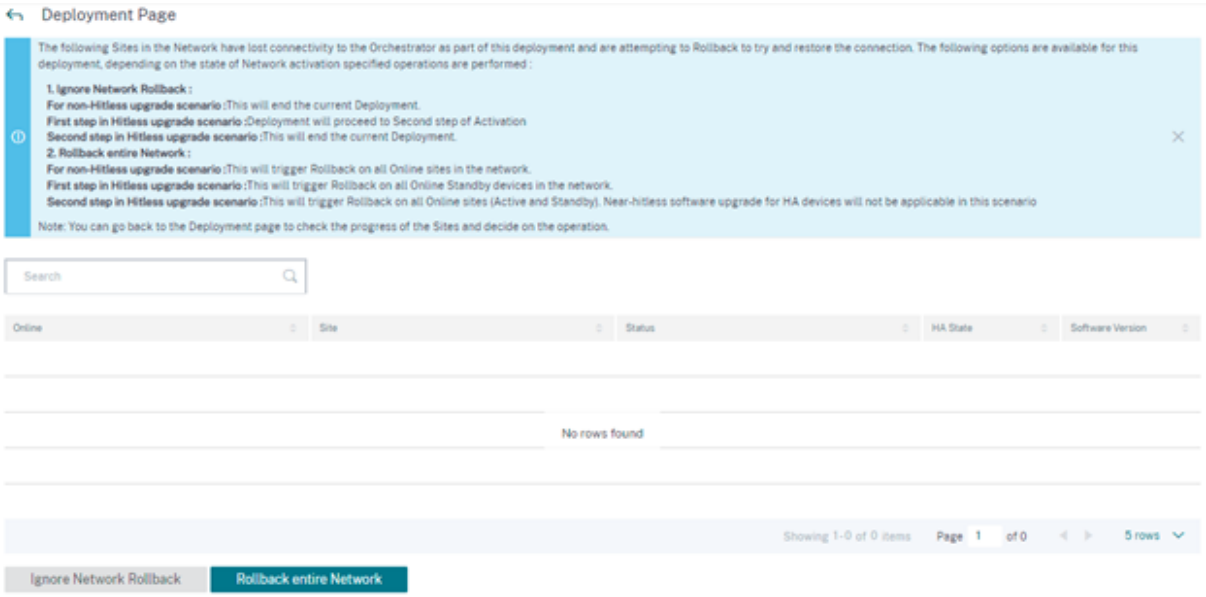
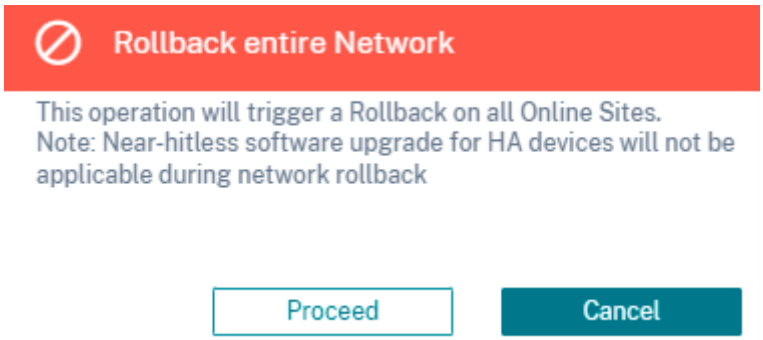


If you select the **Rollback entire Network** option, the following confirmation message is displayed.



> **Note**
>
> The Near-hitless software upgrade for high availability appliance is not applicable in this scenario. That is, if there are any high availability sites in the network, triggering a network-wide rollback activates both the high availability appliances of that site at once which can cause some network downtime.

Click **Proceed** to start the network-wide rollback on all the online sites.

Use case 2: Hitless Upgrade In the case of Hitless upgrade, the standby appliances would be activated first followed by the active and non-high availability appliances.

As part of the first step if the standby appliance goes offline post activation and initiates a rollback, the following options are available:

- Ignore Network Rollback

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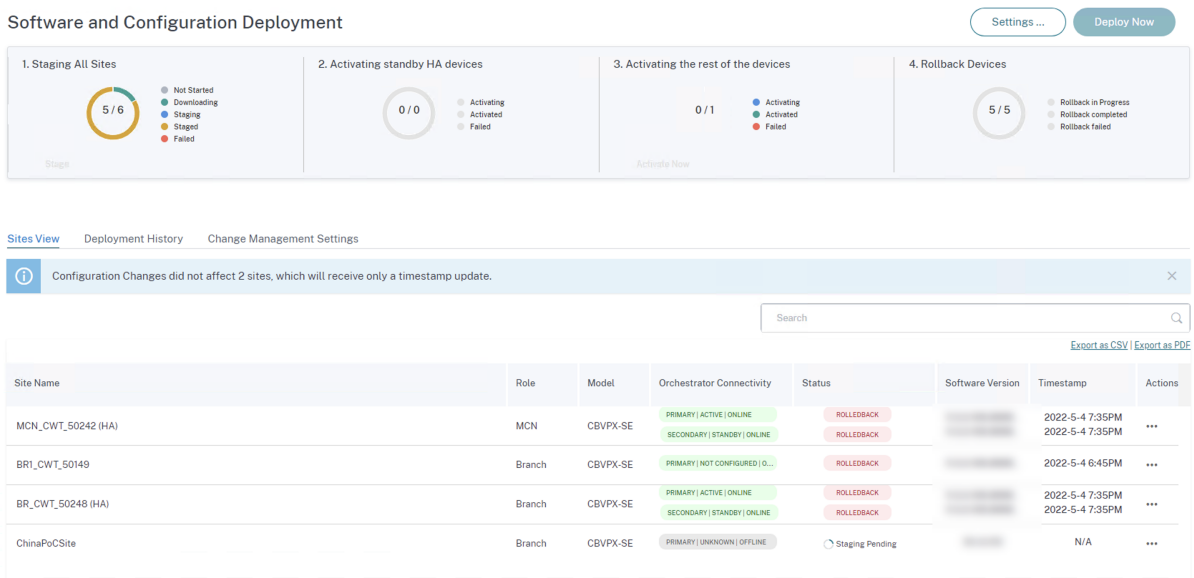
- **For Hitless upgrade scenario**: Ignore the standby appliances which are offline and proceed with the activation of the active appliances.
- **First step in Hitless upgrade scenario**: Deployment proceeds to second step of Activation.
- **Second step in Hitless upgrade scenario**: Ends the current deployment.

- Rollback entire Network
  - **For Hitless upgrade scenario**: Rollback all the online standby appliances which have completed the activation and end the ongoing deployment. No activation of active and non-high availability appliance is done in this case.
  - **First step in Hitless upgrade scenario**: Triggers rollback on all online standby devices in the network.
  - **Second step in Hitless upgrade scenario**: Trigger rollback on all online sites (active and standby). Near-hitless software upgrade for high availability devices is not applicable in this scenario.

The next step of the hitless upgrade that is activation of active and non-high availability appliance, the same rollback on error workflow is followed as mentioned in Use case 1: Non-hitless Upgrade. In this scenario, if you choose **Rollback entire Network**, the rollback triggers for all the (both active and standby) appliance.

Once the site completes rollback and connects back to Citrix SD-WAN Orchestrator service, the status for that site shows **Rolledback** and the sites are online.



Limitation Autocorrection for rolling back or rolled back appliances and network is not supported.

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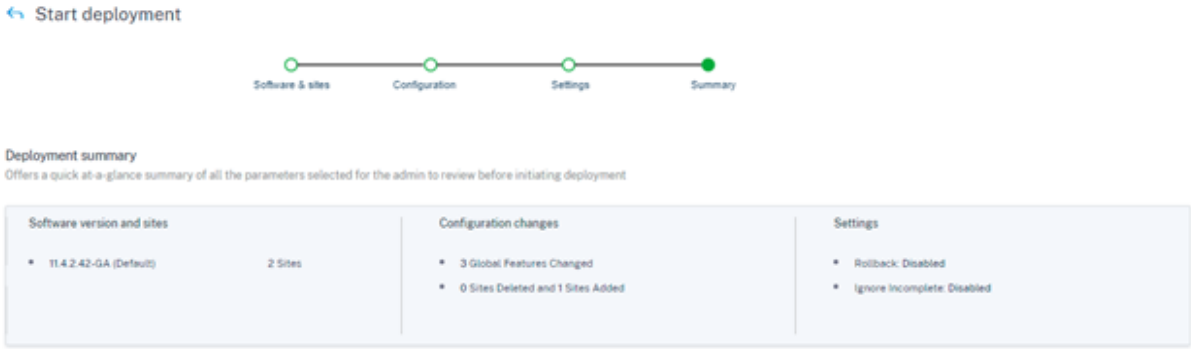
> **Note**
>
> Automatic site rollback is only a backup mechanism to try and restore the lost connectivity to Citrix SD-WAN Orchestrator service. If the appliance still fails to connect to Citrix SD-WAN Orchestrator service, check the network configuration of this appliance.

Summary

The **Summary** section provides details of the deployment settings applied on the **Software & Sites**, **Configuration**, and **Settings** pages. When you are done validating the details on the **Summary** page, click **Deploy**. You are redirected to the **Software and Configuration Deployment** section.



Stage

Once the verification is successful and you click **Deploy** on the **Summary** page, the staging process where the configuration files are distributed to all the appliances and sites on your network is automatically triggered. By default, Citrix SD-WAN Orchestrator service waits for all the Control nodes (MCN, RCN, Geo MCN, Geo RCN) and the online branch appliances to get staged before allowing the user to activate them. In the **Staging All Sites** section, you can view the progress of the staging. The phases of the staging displayed in this section are **Not started**, **Downloading**, **Staging**, **Staged**, and **Failed**. Each phase is represented with a unique color code. The donut chart provides a real-time update about the status of the staging.

If the staging process fails at any site, use the **Retry Staging (Primary Device)** option, under the **Sites View** > **Actions** and reinitiate the staging process. For HA appliances, both the options **Retry staging (Primary device)** and **Retry staging (Secondary device)** are available.

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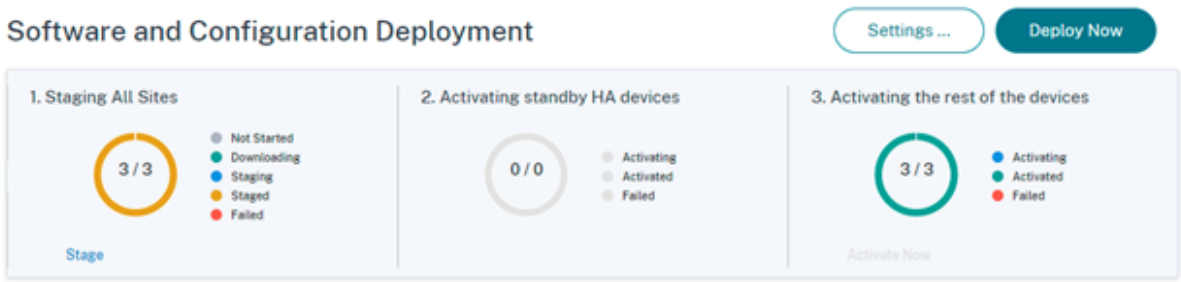


Activate now

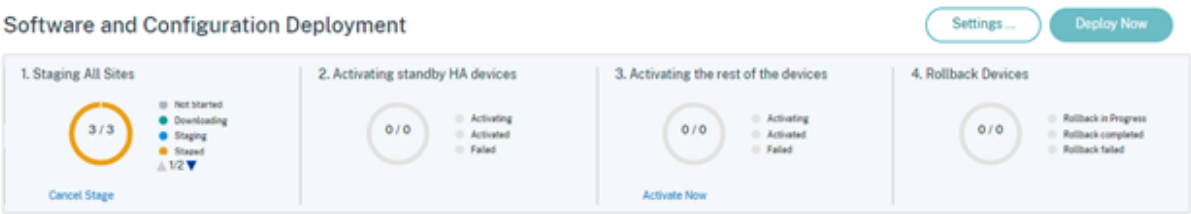
Click **Activate Now** in the **Activating the rest of the devices** section to activate the staged configuration on all the sites across the network.

Each phase of activation is represented with a unique color code.

- **Activating standby HA devices**: This chart provides a real-time update about the standby appliances for SD-WAN devices that are deployed in High Availability mode. To guard against software failure of the SD-WAN instance, you might choose to deploy the instance in high availability mode which deploys two SD-WAN instances in active standby mode. Citrix® recommends deploying instances in high availability mode for production networks.
- **Activate the rest of the devices**: This chart provides a real-time update about the SD-WAN standalone appliances and the previously active appliances that have switched over to standby mode. In Standalone mode, a single SD-WAN instance is deployed. If the SD-WAN instance fails due to either an issue with the SD-WAN firmware or the underlying Azure infra you cannot reach out to the resources deployed behind the SD-WAN instance in Azure. In other words, the instance behaves in a fail to block mode.

For more information about Standalone and High Availability modes, see Deployment use cases.

When the Rollback settings feature is enabled, an extra section **Rollback Devices** is displayed. For more information on Rollback, see Rollback Settings.



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Inter-link communication

September 27, 2025

Inter-link communication settings are used for auto-path creation between compatible WAN links. You can override these settings under **Site Configuration** and **Virtual Paths**, wherein you can select or unselect individual member paths for a given virtual path.

Currently, the following two settings are available:

- Rules to automate the creation of paths between compatible WAN links.
- Global defaults for Dynamic Virtual Paths

These settings are inherited by all WAN links in the customer network.

Click **Verify Config** to validate any audit error.

Default inter-link communication groups

Default inter-link communication groups are intended at automating the creation of paths between:

- Any two internet links
- Any two MPLS links that share a service provider, and
- Any two Private Intranet links that share a service provider

Custom inter-link communication groups

Custom inter-link communication groups enable private Intranet, public Internet, or MPLS links to automatically create paths with other private Intranet, public Internet, or MPLS links across varying service providers.

For example, consider this scenario - A company has offices in the US and India. The US offices use AT&T MPLS links, while the India offices use Airtel MPLS links. Let's say AT&T and Airtel MPLS links are compatible in terms of DSCP tags and related parameters and are amenable for the creation of paths with each other. Custom inter-link communication rules allow you to select an ISP pair (for example ATT –Airtel in this case) and enable auto-creation of paths among the links belonging to these ISPs.

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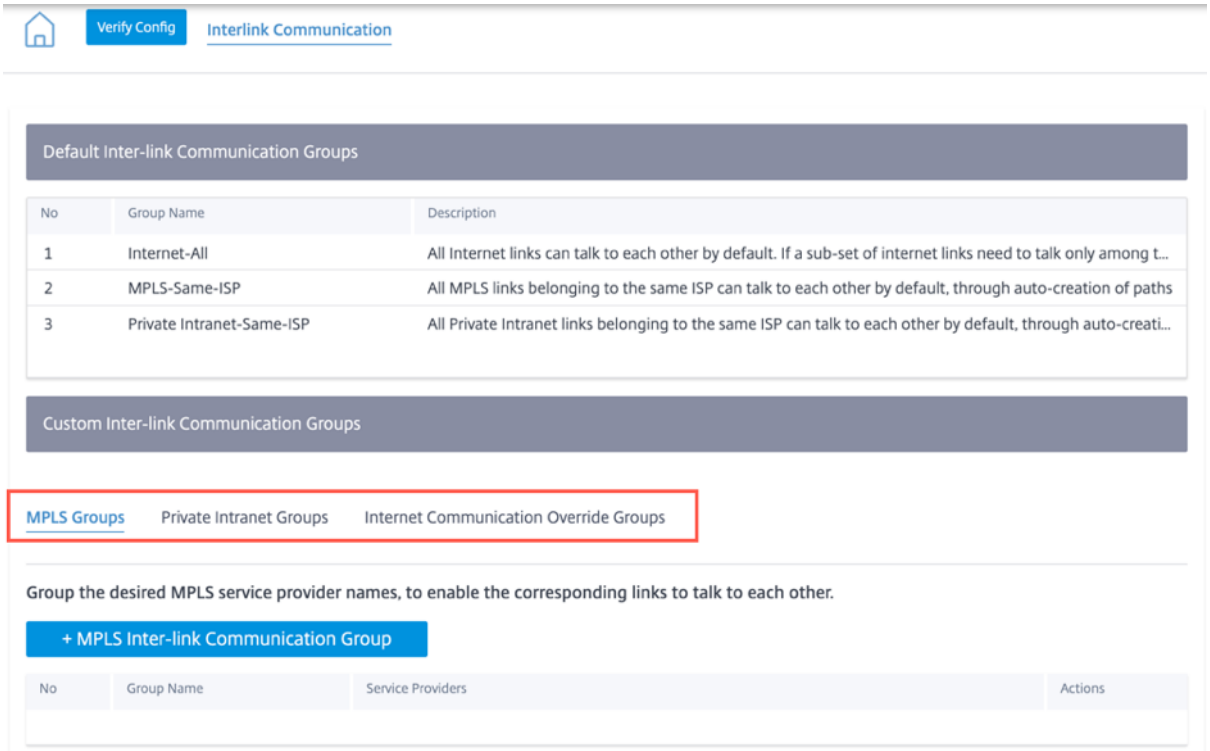

- **MPLS Groups**: You can group the desired MPLS service provider names to enable the corresponding links to communicate with each other. Click **+ MPLS Inter-link Communication Group** and provide an MPLS group name. Select the DSCP tag from the drop-down list. You can also add the MPLS provider by selecting the ISP name from the drop-down list. The **Enable Encryption** check box helps to enable the encryption for every custom MPLS Inter-Link Communication Group. In rare cases, to eliminate the overhead of encryption, you can disable this option.
- **Private Intranet Groups**: You can group the desired Intranet service provider names to enable the corresponding links to communicate with each other. Click **+ Private Intranet Inter-link Communication Group** and provide the private intranet group name. Select the DSCP tag from the drop-down list. You can also add the private intranet provider by selecting the ISP name from the drop-down list. The **Enable Encryption** check box helps to enable/disable the encryption for every custom private Intranet Inter-Link Communication Group.
- **Internet Communication Override Groups**: If a subset of Internet links must talk only among themselves and not with the rest of the Internet links, then you can group the corresponding ISP names to enable exclusion from the default group.

The rest of the Internet links can still communicate with each other. Click **+ Public Internet Inter-link Communication Group** and provide a public internet group name. Select the DSCP tag from the drop-down list. You can also add the public Internet provider by selecting the ISP name from the drop-down list. The **Enable Encryption** option ensures that the packets of the Inter-Link Communication

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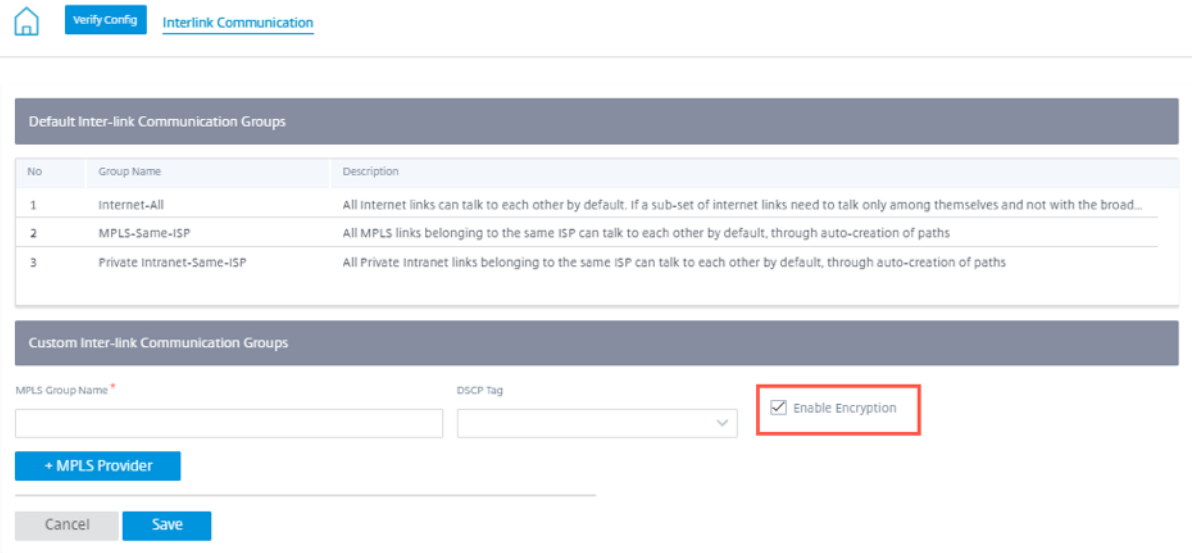
Group which are sent on the virtual paths are encrypted.



DNS and DHCP

September 27, 2025

This section enables you to configure DNS and DHCP settings.

DNS servers

You can configure specific DNS servers to which the DNS requests are routed.

Enter a name for the DNS server and choose **Type** as **Static** (for IPv4 addresses) or **StaticV6** (for IPv6 addresses). Specify the Primary and Secondary DNS server IP addresses. You can create an internal, ISP, google or any other open source DNS service.

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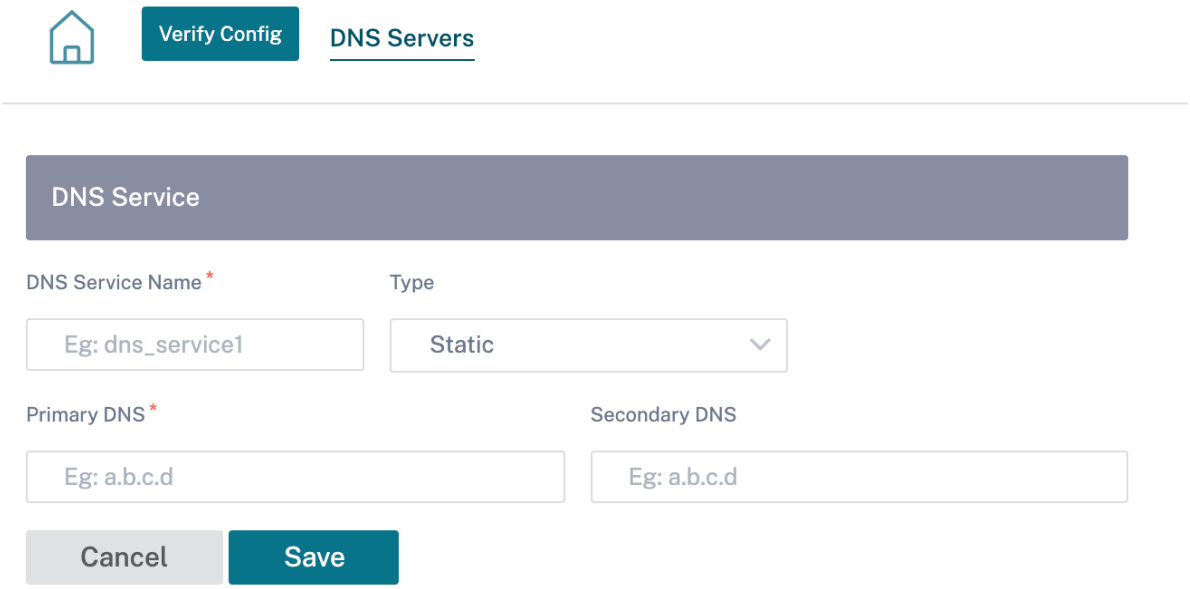
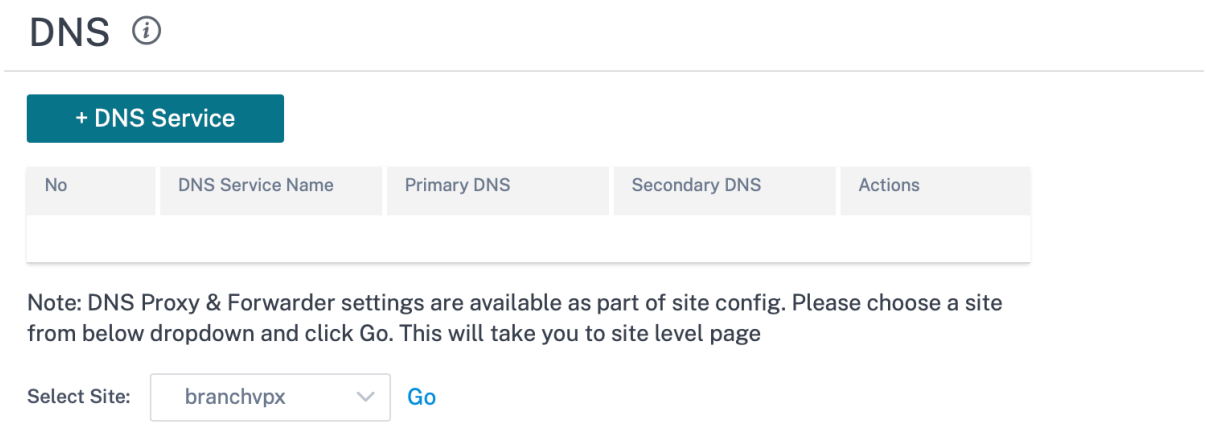


Click **Verify Config** to validate any audit error.

You can also configure DNS server settings for a site. Select a site from the **Select Site** drop-down list and click **Go**. This takes you to the site level DNS server settings page.



DHCP

You can configure dynamic host control protocol (DHCP) settings for a site by selecting the required site from the drop-down list and clicking **GO**. This takes you to the site level DHCP configuration page. For detailed information on configuring DHCP, see DHCP.

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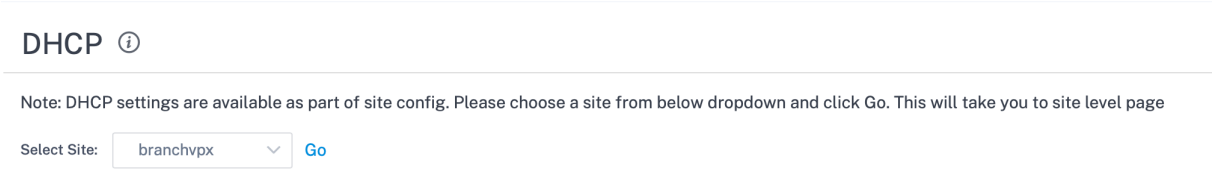

Site and IP Groups

November 24, 2021

Administrators can group sites or IP addresses to simplify common application policies across multiple sites or network addresses, and also serve as filters for reports.

To view Regions, Site and IP Groups, navigate to **Configuration** > **Site & IP Groups**.

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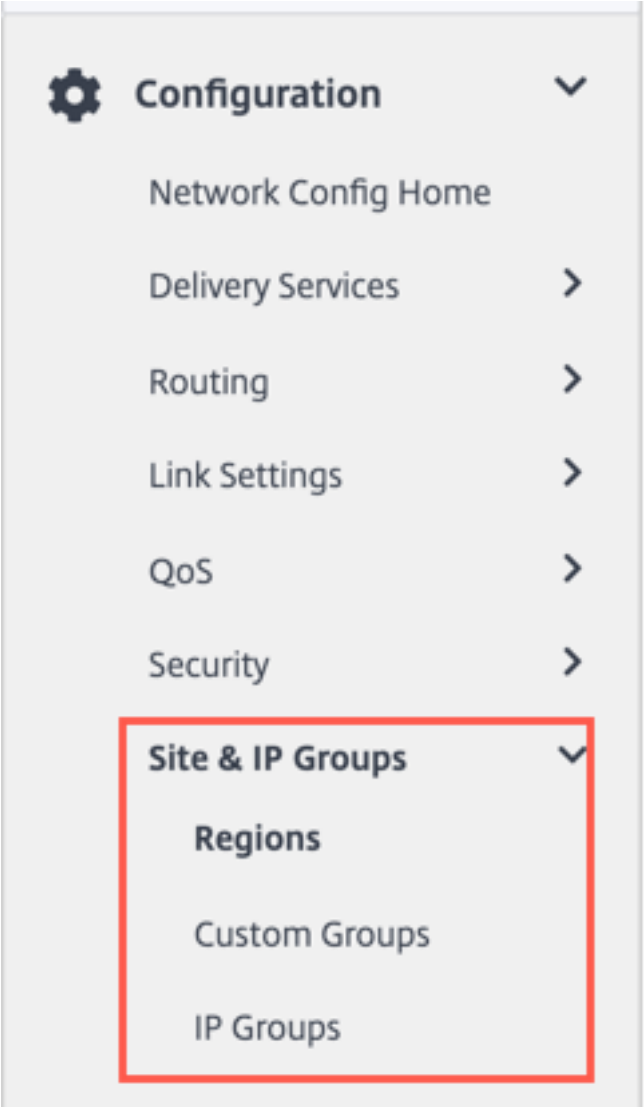

Regions

Regions help to create administrative boundaries within large networks spanning hundreds to thousands of sites. If your organization has a large network spanning multiple administrative (or geographical) boundaries, you can consider creating regions to segment the network.

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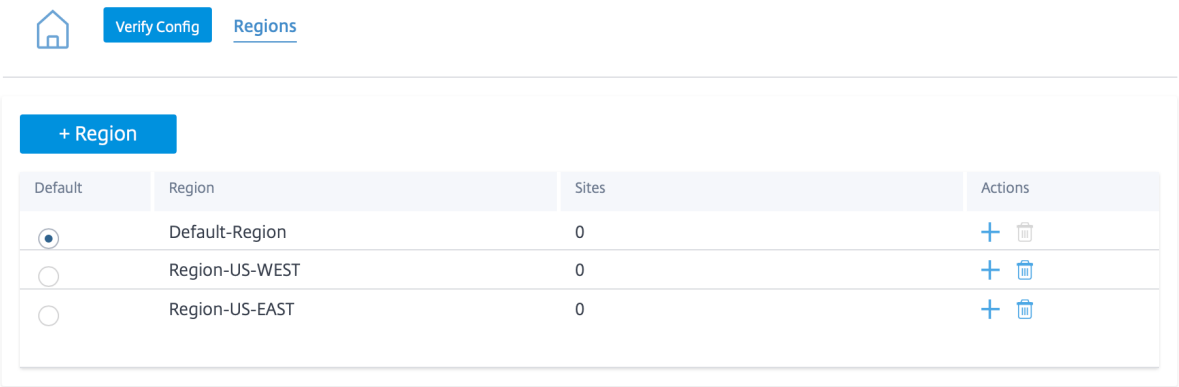

Currently, a maximum of 1000 sites are supported per region. Each region is expected to have a Regional Control Node (RCN), which serves as the hub and controller for the region. So, you would typically consider a multi-region deployment if your network has more than 500 sites. By default, all networks are single region networks, where the Master Control Node (MCN) serves as the hub and the control node for all the sites. On adding one or more regions, the network becomes a multi-region network. The region associated with the MCN is called the **default region**.

A multi-region network supports a hierarchical architecture with an MCN controlling multiple RCNs. Each RCN, in turn, controls multiple branch sites. Even in a multi-region deployment, you can have the MCN double up as the direct hub node for a subset of the sites while having the rest of the sites use their respective RCNs as hub nodes.

The sites being managed directly by the MCN that is, the RCNs and potentially some other sites directly managed by the MCN are said to be in the **default** region. The **default region** would be the only region for a network before other regions are added. After adding other regions, you can select the **Default** option to use a desired region as the default region.

To create a region:

1. Click **+ Region**. Provide a region name and description.
2. Enable Interval VIP matching based on whether you want **Forced Internal VIP Matching** or **Allow External VIP Matching**.
    - Forced Internal VIP Matching: When enabled, all non-private Virtual IP addresses in the Region are forced to match the configured subnets.
    - Allowed External VIP Matching: When enabled, non-private Virtual IP addresses from other regions are allowed to match the configured subnets.
3. Click **+ Subnets** to add subnets. Enter a **Network** address. The network address is the IP address and mask for the subnet.
4. Select the sites.

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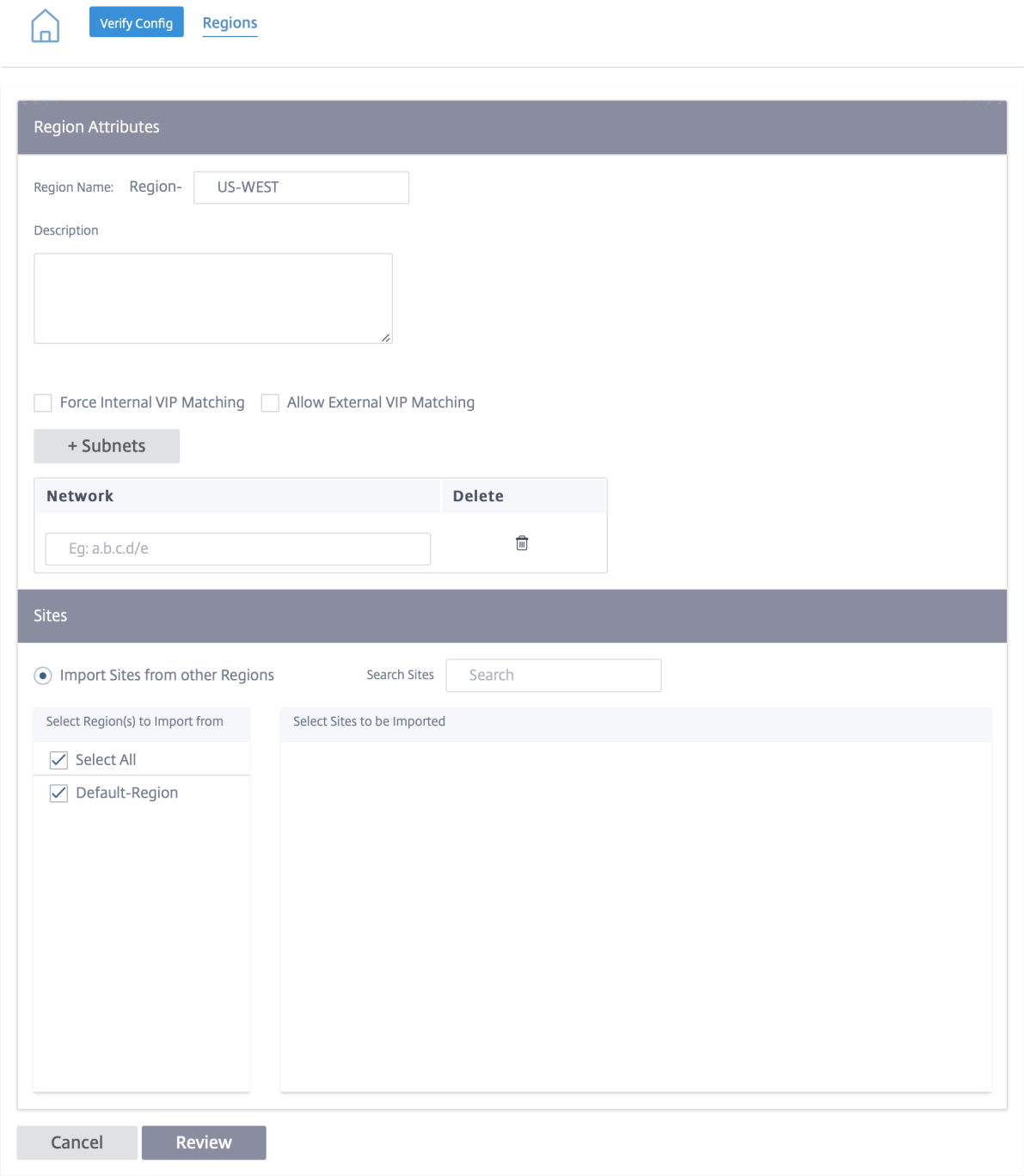
5. Click **Review** and then **Save**. The newly created region is added to the existing list of regions.

> **Note**
>
> A customer can only have Static or Dynamic Virtual paths within a Region.



You can place sites under the region once a Region is created successfully.

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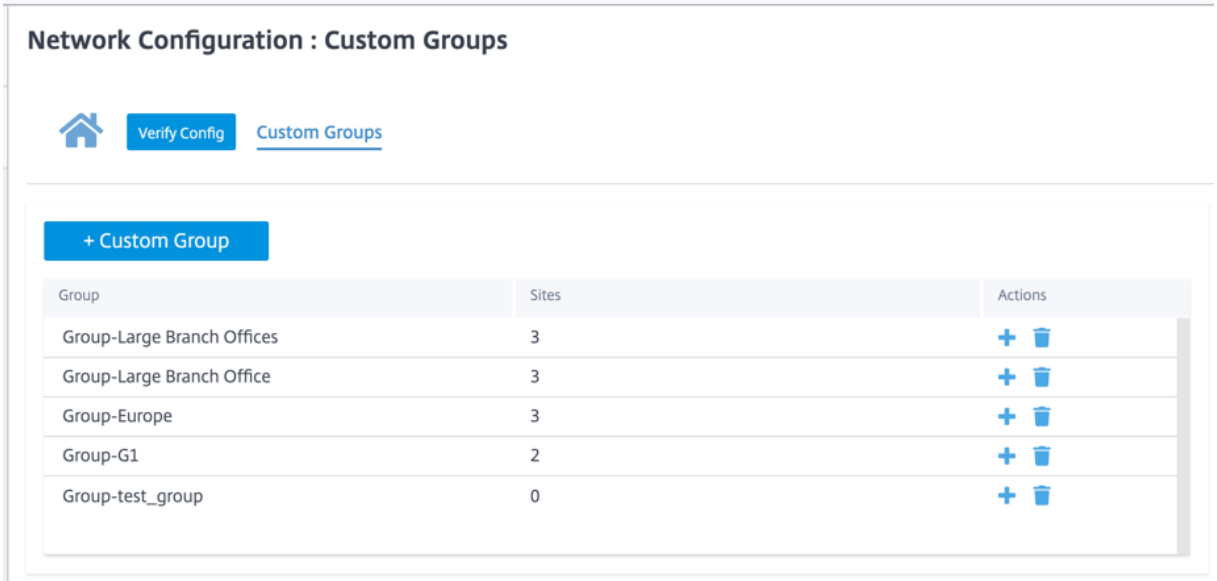
> **Note**
>
> Dynamic virtual paths cannot be established between branches in different regions.

Click **Verify Config** to validate any audit error.

Custom groups

Custom Groups provide users the flexibility to group sites as needed. Users can apply policies for groups of sites at once, without necessarily having to deal with each site individually. Groups can also serve as filters for dashboards, reports, or network configuration. Unlike Regions, groups can overlap in terms of sites. In other words, the same sites can be part of multiple groups.



For example, a user can create a group named **Business Critical Sites** to configure common policies for all your business-critical sites. The user can also monitor their health and performance separately as a group. Some of those sites can also be a part of a **Large Branch Office** group, for instance.

Custom Site Groups provide a way to logically group sites together for reporting purposes. You can create custom groups and add sites to each custom group. To create a custom group click **+ Custom Group**. Provide a group name and select or add sites. Click **Review** and then **Save**.

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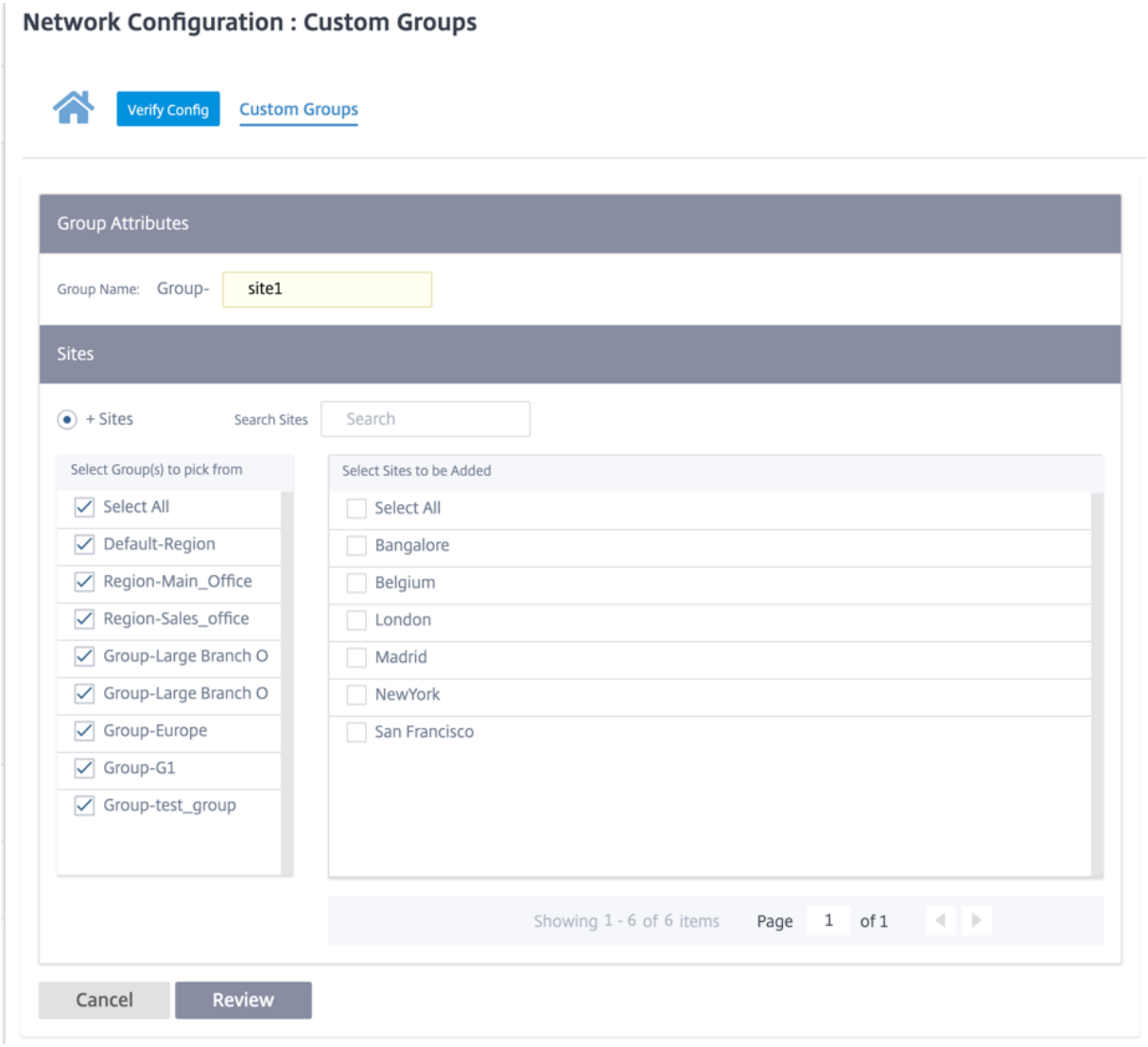

Click **Verify Config** to validate any audit error.

IP groups

Citrix SD-WAN Orchestrator service introduces the option of adding IP groups (network objects). With this option, you can group IP and network addresses by using **IP Groups** while defining a route filter rather than creating a filter for each subnet. These groups can be used in configuration and policies as needed, without necessarily having to key in individual IP addresses each time.

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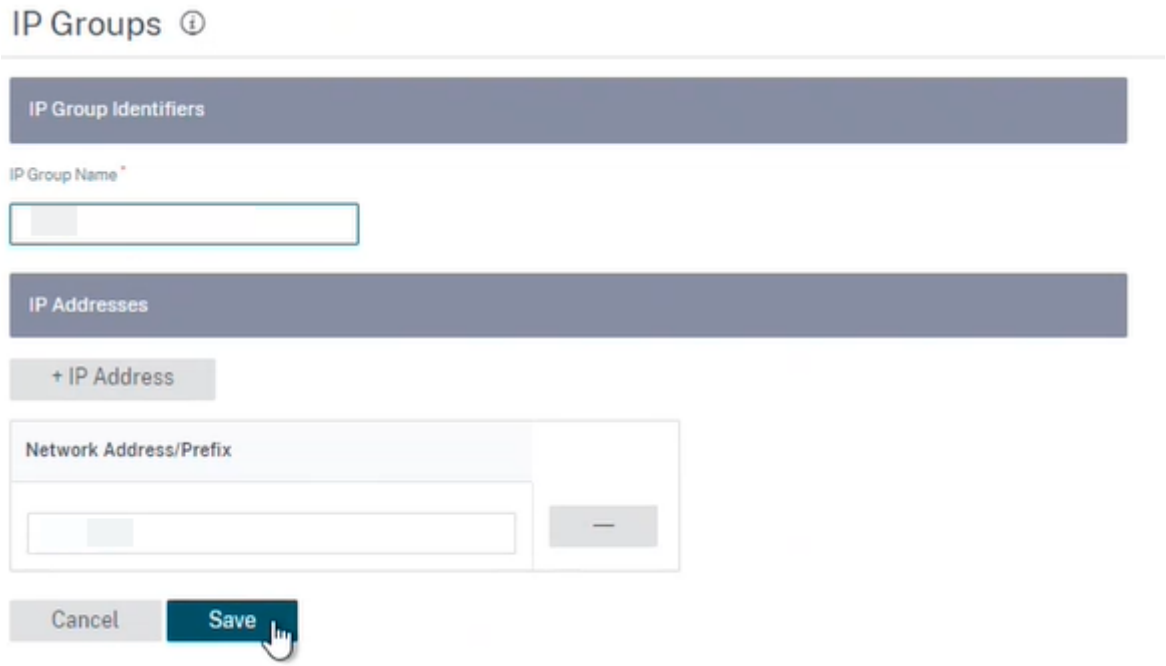
You can create IP groups and add network addresses and prefixes. To create an IP group, select **IP Groups** and click **+ IP Group**. Provide a group name. Click **+ IP Address** and enter **IP addresses** to be added to the IP group.



Click **Verify Config** to validate any audit error

The following features utilize the IP groups:

- **Creating an IP route**: You can add a destination network or enable the **Use IP Group** check box to select an existing IP group. For more information, see IP groups.

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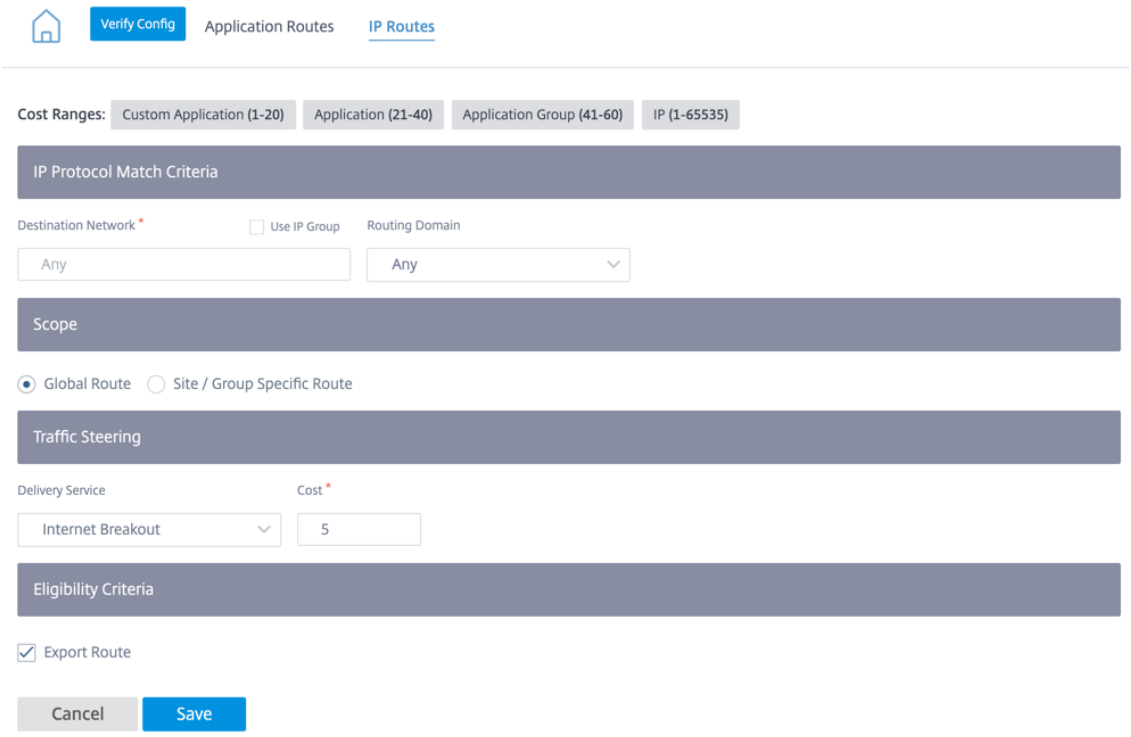

- **Import route profiles**: While creating an import filter profile, you can choose from the list of IP groups available on your network.

  You can add a destination network or enable the **Use IP Group** check box to select an existing IP group.

  For more information, see Import route profiles.

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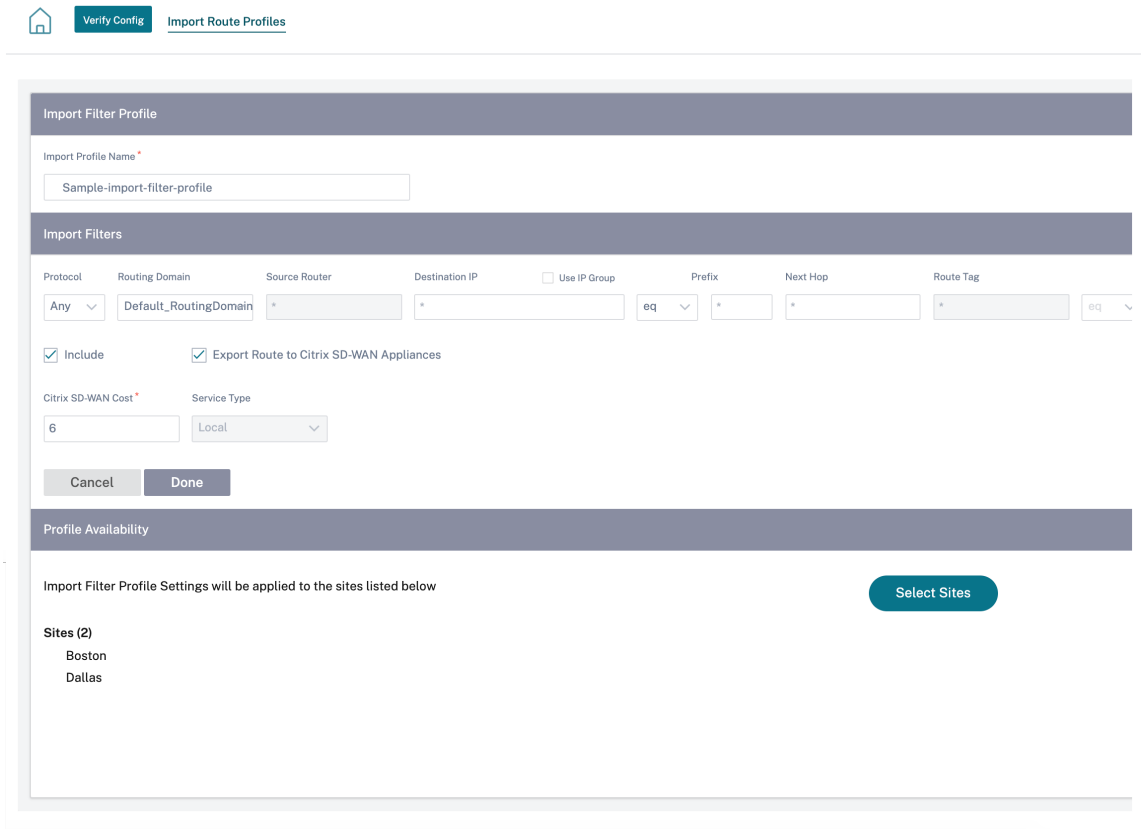

- **Export route profiles**: While creating an export filter profile, you can add a network address mask or enable the **Use IP Group** check box to select an existing IP group.

  For more information, see Export route profiles.

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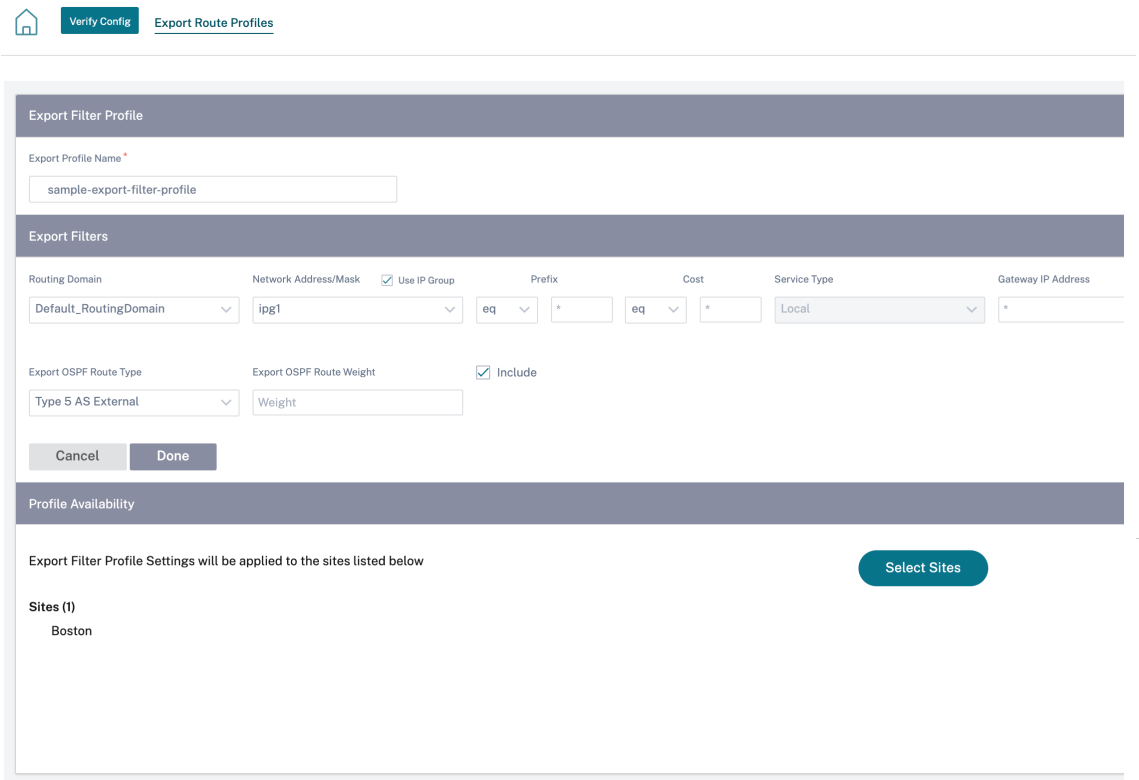

- **BGP neighbor policies**: While adding a configured BGP policy for neighboring routers, you can add a network address or enable the **Use IP Group** check box to select an existing IP group.

  For more information, see BGP.

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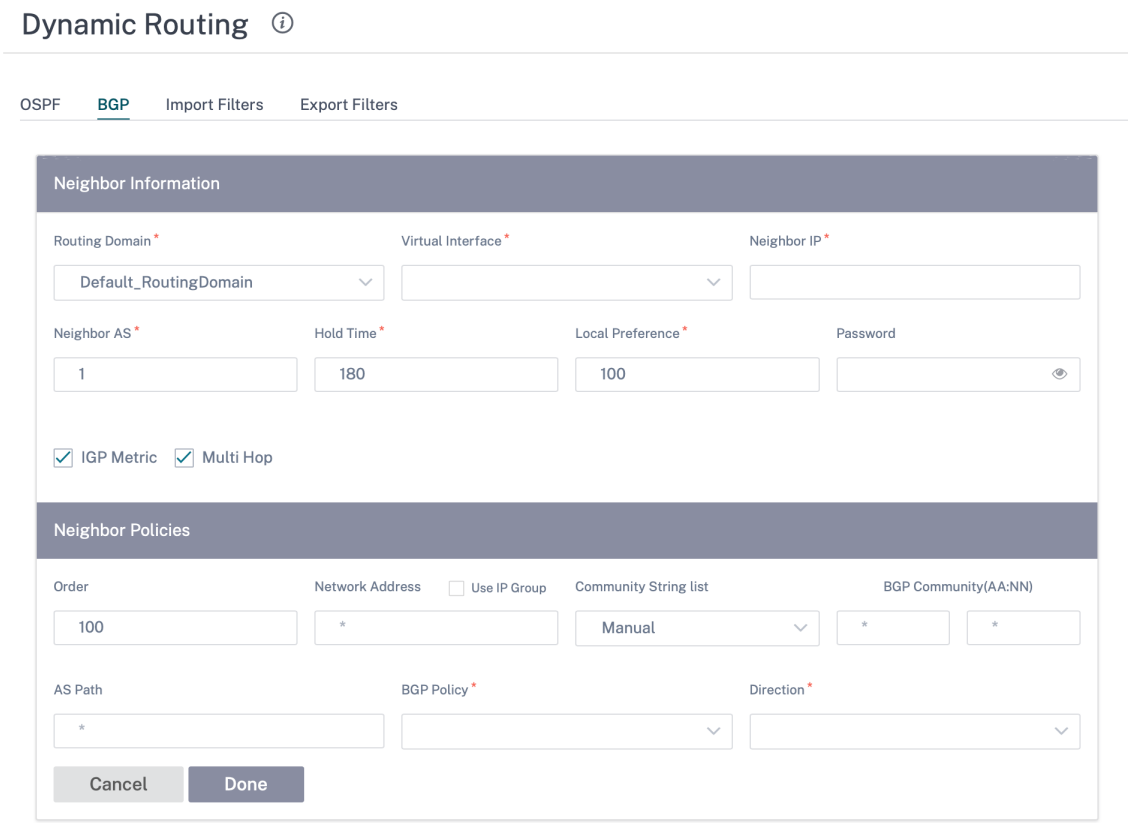

Application settings and groups

September 27, 2025

This section enables users to custom define applications, group applications for use in policies, QoS Profiles, and also DNS settings.

You can define an **Application Group** for both predefined and custom applications. An **Application Group** contains applications that need similar treatment when defining a security policy.

You can reuse the **Application Groups** frequently when defining policies such as application steering or firewall rules. It eliminates the need to create multiple entries for each individual application. Similarly, while using any application services, Application Groups supports common applications with a unique name for simplified and consistent reuse.

To view **Application Groups**, navigate to **Configuration > App Settings & Groups**.

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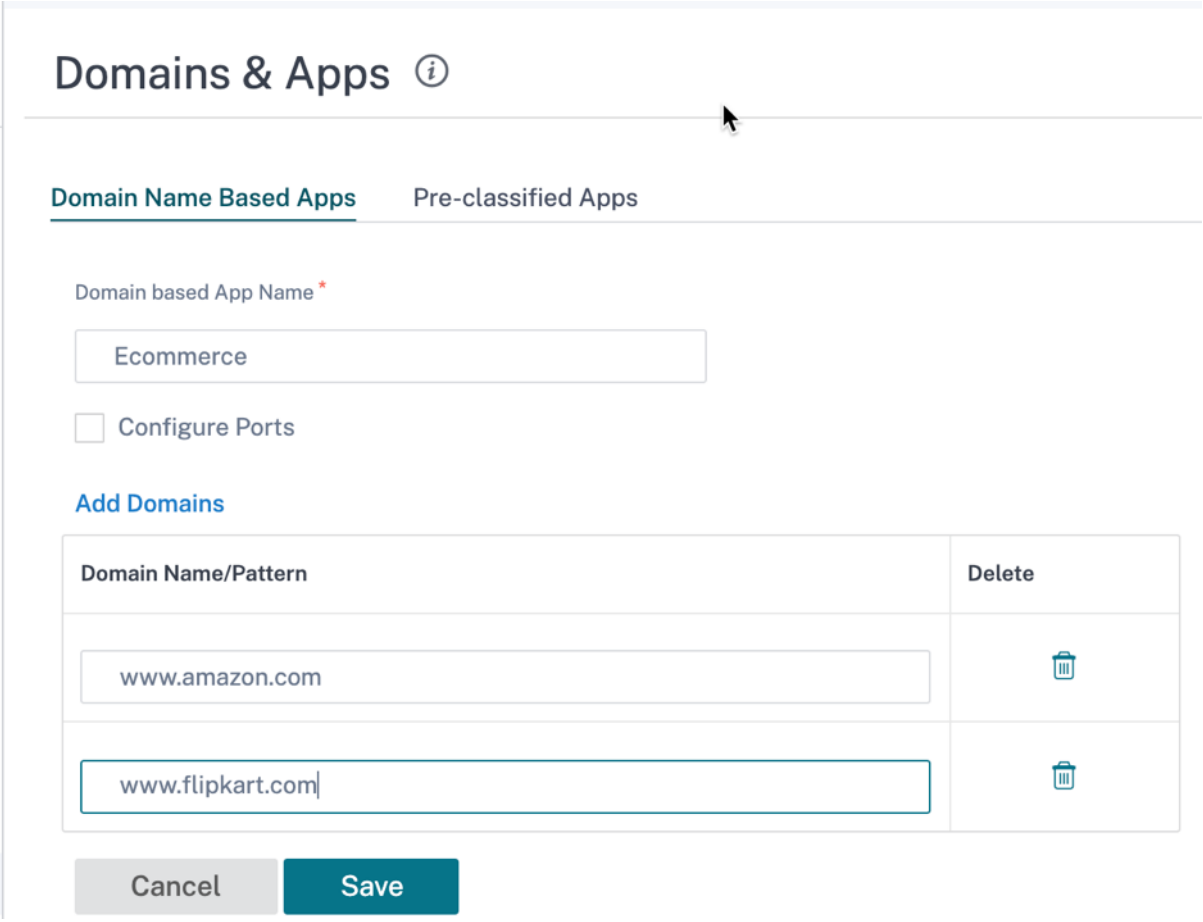
Domains and applications

You can create internal applications based on domain names which are not available in the list of published applications from the **Domains & Apps** page. To create applications based on domain name, at the network level, navigate to **App Settings & Groups > Domains & Apps > Domain Name Based Apps** tab, and click **New Domain Name Based Application**. Enter the application name and add the domain names or patterns. You can either enter the full domain name or use wild cards at the beginning.



All the domain name based applications are visible in **Application Routing**, **Application Rule**, and **Firewall Policies**.

From Citrix SD-WAN 11.4.2 release onwards, the **Configure Ports** check box option is made available under **Domain Name Based Applications**. When the **Configure Ports** check box is enabled, it presents the flexibility to configure a group of multiple ports, port-ranges, and a protocol (TCP/UDP/Any) for the domain-based application.

Previously, ports **80** and **443**, and protocol **Any** were supported for domains grouped under an application. You can see the same behavior if the **Configure Ports** check box is cleared. By default, the **Configure Ports** check box is disabled.

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When you select the **Configure Port** check box, you can edit, add, or delete any port or the port range as required along with the protocol selection as TCP, UDP, or Any. By default, the protocol value is set to **Any** and the ports are set to **80** and **443**.

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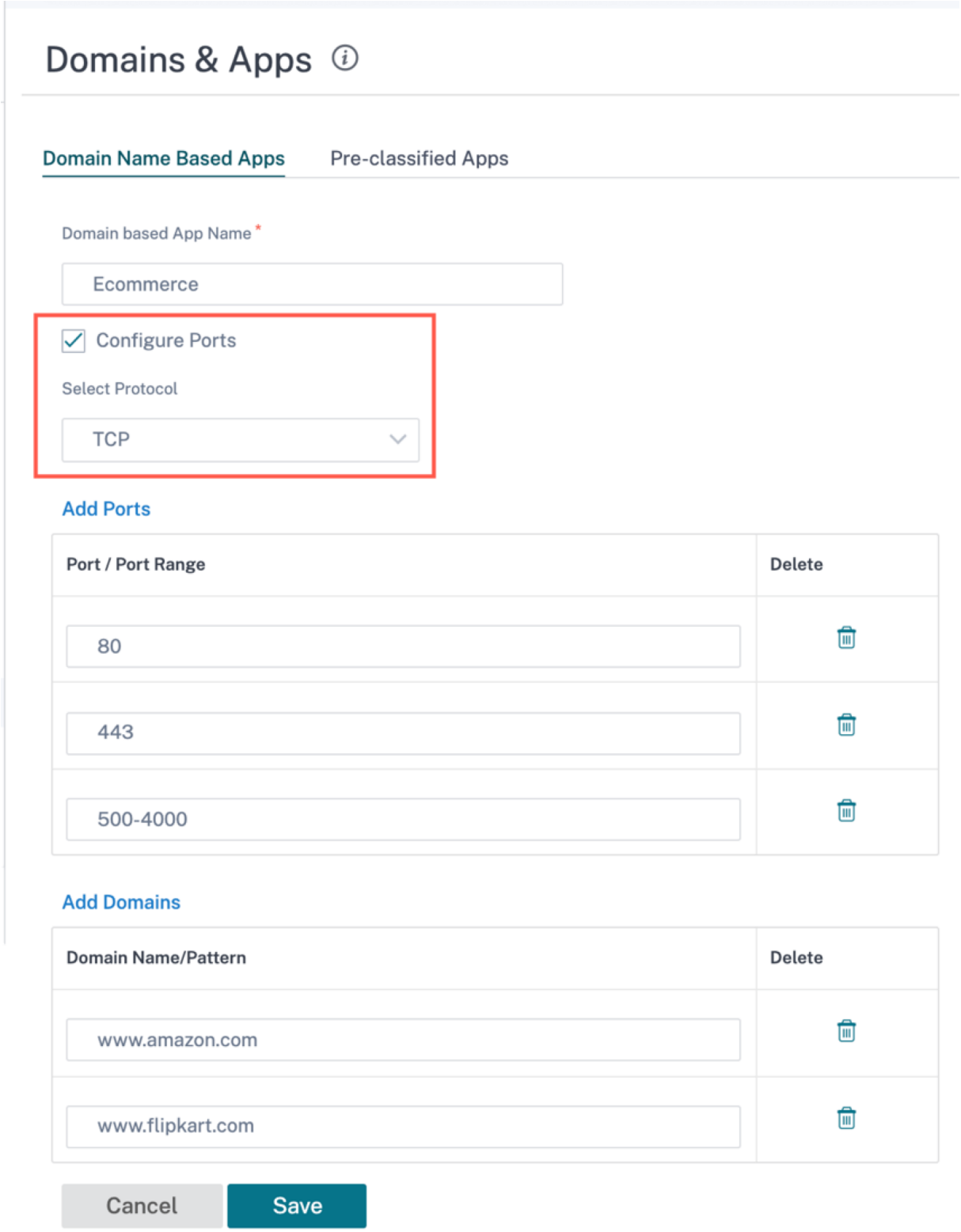

You can also view the list of pre-defined applications under the **Pre-classified Apps** tab. You can

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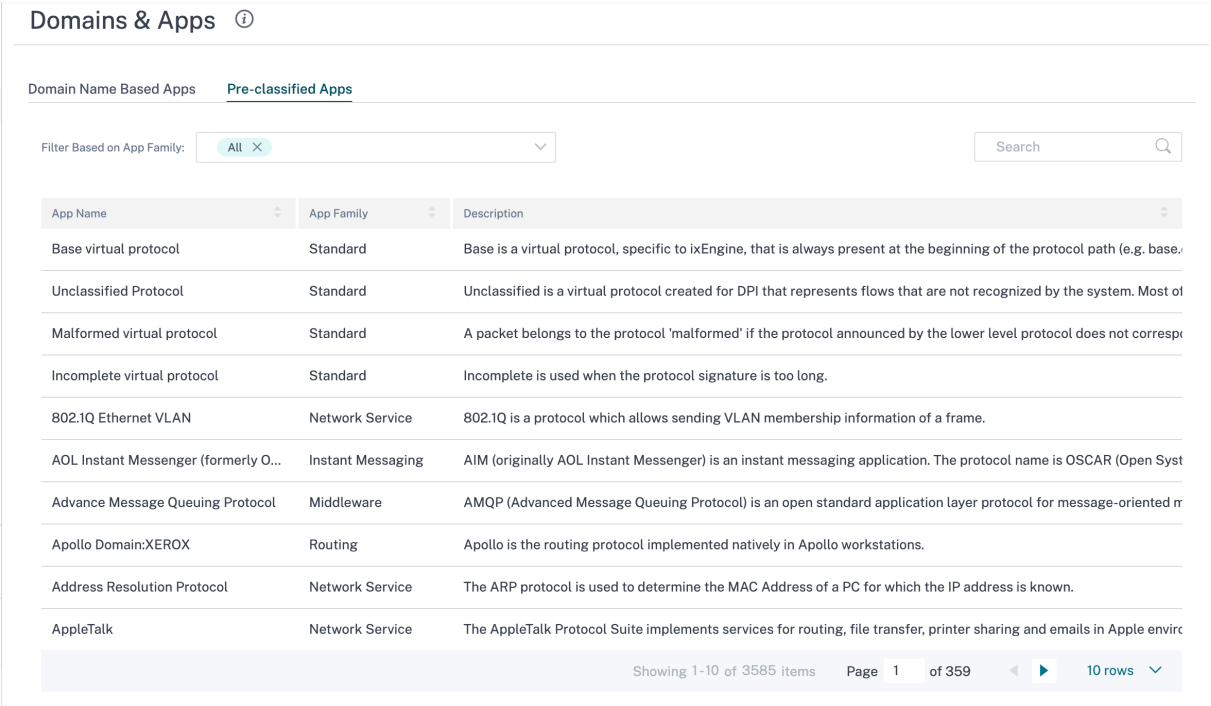
search for a specific application using the **Search** bar or filter the list based on the application family.



Custom application

The **Custom Applications** are used to create internal applications or IP-port combinations which are not available in the list of published applications. The administrator needs to define a custom application based on the IP protocol that can be used in multiple policies as needed, without referring the IP address and port number details each time.

To create a custom application, at the network level, navigate to **App Settings & Groups > Custom Apps**, click **+ Custom Application** and provide a name for the custom application. Specify the match criteria such as IP protocol, network IP address, port number, and, DSCP tag. The data flow matching this criteria is grouped as the custom application.

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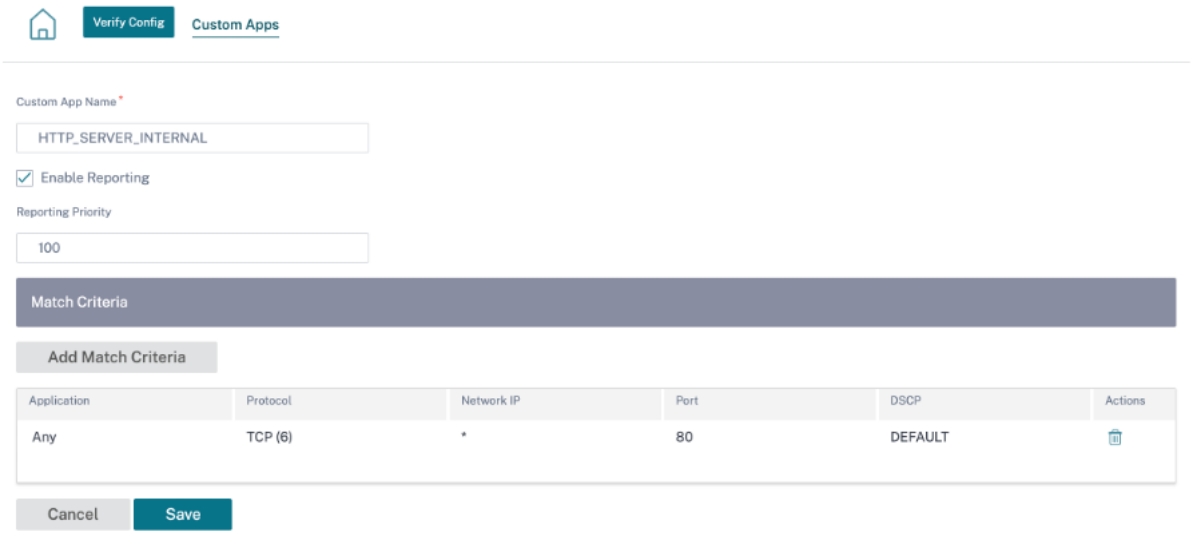

Once saved, the custom applications show up in a list and can be edited or deleted, as required.

The **Enable Reporting** check box is added for the IP Protocol-based custom applications and application groups. You must select the **Enable Reporting** check box and provide the reporting priority.

When the **Enable Reporting** check box is selected, you can view the IP custom application traffic under **Reports** > **Usage**.

Reporting priority is the order in which IP protocol-based custom applications or application groups are selected for the reporting. It helps to choose the high-priority custom application or application group for reporting, when there are multiple matches with reporting enabled. For example, if the reporting priority of a custom application is set to 1, it means that the custom application gets the highest priority in reporting. Whereas if the reporting priority is set to 100, the custom application takes a much lesser precedence in reporting.

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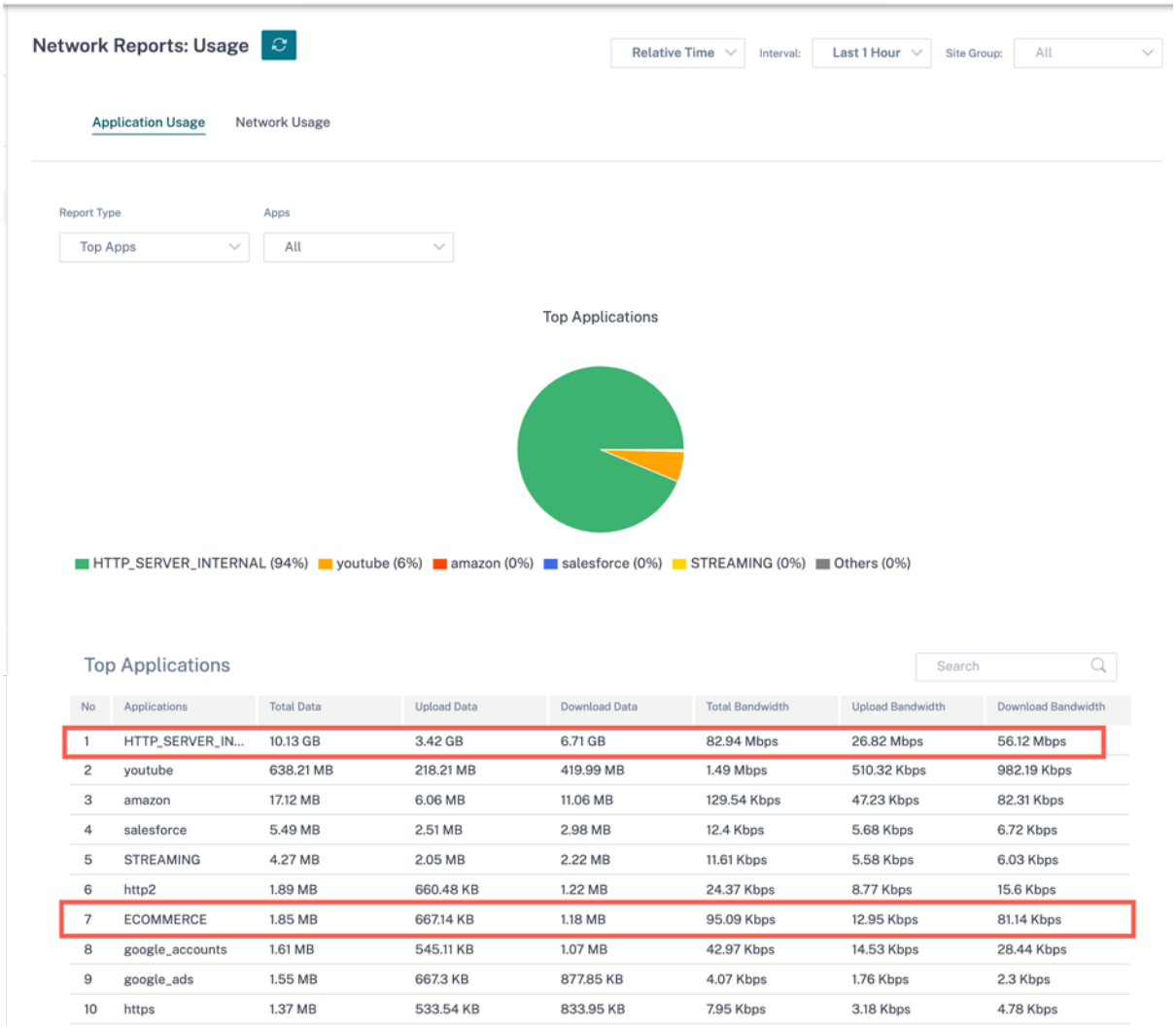

No	Applications	Total Data	Upload Data	Download Data	Total Bandwidth	Upload Bandwidth	Download Bandwidth
1	HTTP_SERVER_IN...	10.13 GB	3.42 GB	6.71 GB	82.94 Mbps	26.82 Mbps	56.12 Mbps
2	youtube	638.21 MB	218.21 MB	419.99 MB	1.49 Mbps	510.32 Kbps	982.19 Kbps
3	amazon	17.12 MB	6.06 MB	11.06 MB	129.54 Kbps	47.23 Kbps	82.31 Kbps
4	salesforce	5.49 MB	2.51 MB	2.98 MB	12.4 Kbps	5.68 Kbps	6.72 Kbps
5	STREAMING	4.27 MB	2.05 MB	2.22 MB	11.61 Kbps	5.58 Kbps	6.03 Kbps
6	http2	1.89 MB	660.48 KB	1.22 MB	24.37 Kbps	8.77 Kbps	15.6 Kbps
7	ECOMMERCE	1.85 MB	667.14 KB	1.18 MB	95.09 Kbps	12.95 Kbps	81.14 Kbps
8	google_accounts	1.61 MB	545.11 KB	1.07 MB	42.97 Kbps	14.53 Kbps	28.44 Kbps
9	google_ads	1.55 MB	667.3 KB	877.85 KB	4.07 Kbps	1.76 Kbps	2.3 Kbps
10	https	1.37 MB	533.54 KB	833.95 KB	7.95 Kbps	3.18 Kbps	4.78 Kbps

Note

- For you to use a domain name-based application, **Apps & Domains** must be listed as the match criteria while creating the Application Route, QoS policy, and firewall policy.
- For you to use a custom application, **Custom Application** must be listed as the match criteria while creating the Application Route, QoS policy, and firewall policy.

Once you have created the custom application, to perform the application routing, navigate to **Routing > Routing Policies > + Application Route**, select **Custom Application** from the **Match Type** drop-down list. Similarly for the domain name-based application, select **Apps & Domains** from the **Match Type** drop-down list.

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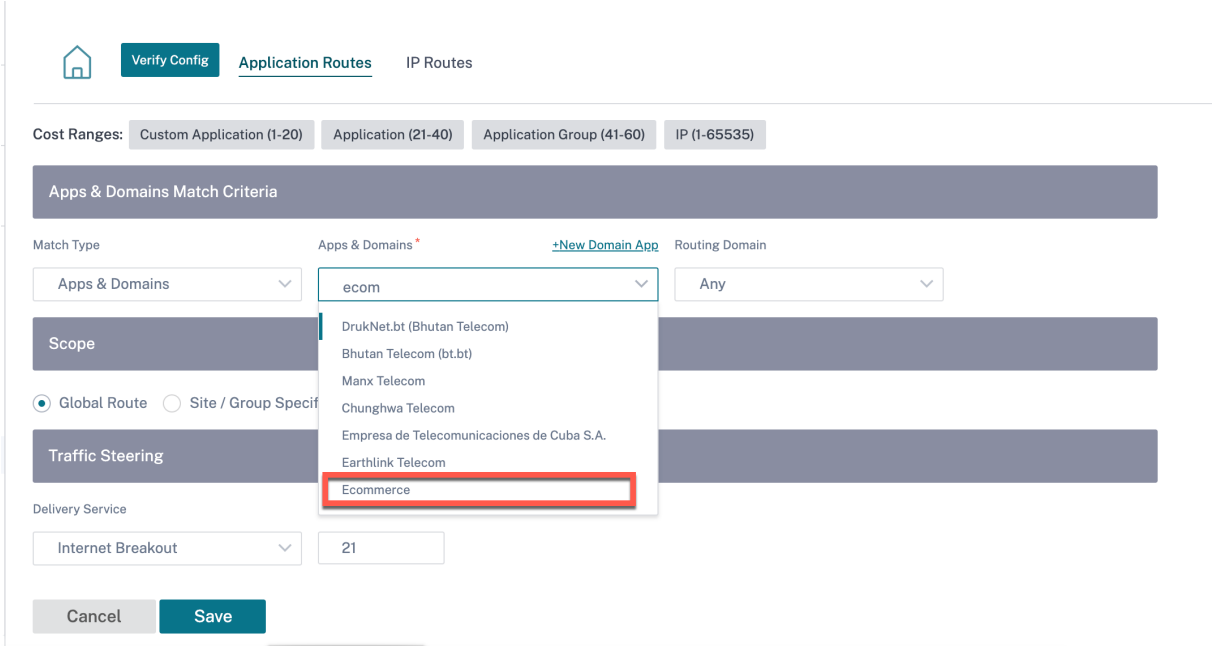

You can also select a domain name-based application under the match criteria while creating an **IP Protocol** custom application.

Similarly, to view the custom application under the **Firewall Policies**, navigate to **Security > Firewall Policies**. The application can be used for any type of policy (Global override/Site Specific/Global Policies). Click **Create New Rule** and under **Match Criteria**, select **Custom Application** from the **Match Type** drop-down list. To view the domain name-based application, select **Apps & Domains** from the **Match Type** drop-down list.

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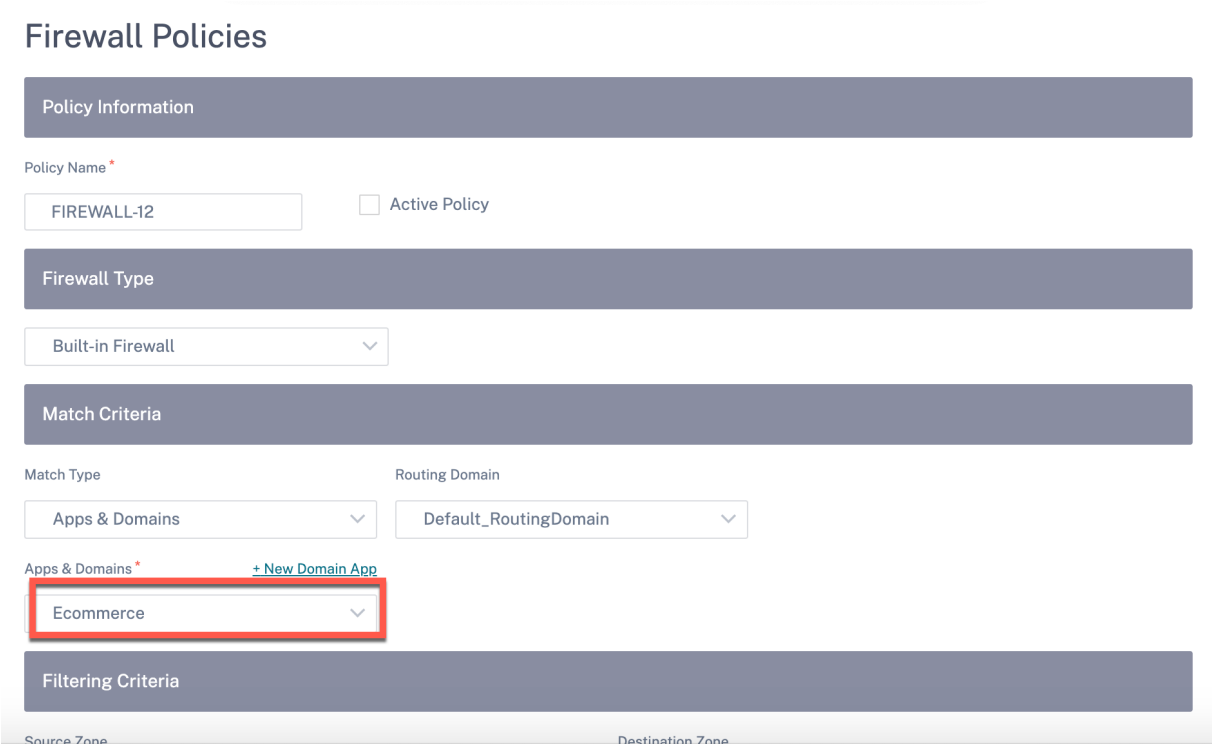

You can view the domain name-based custom applications both under **Global or Site/Group Specific Rule**. To view the domain name-based applications, navigate to **QoS > QoS Policies > Global Rules > Application Rule > + Application Rule**, and select the required domain name-based application from the **Apps & Domains** drop-down list. To view custom applications, navigate to **QoS > QoS Policies > Global Rules > Custom Application Rules > + Custom Application Rule**, and select the required custom application from the **Custom Application** drop-down list.

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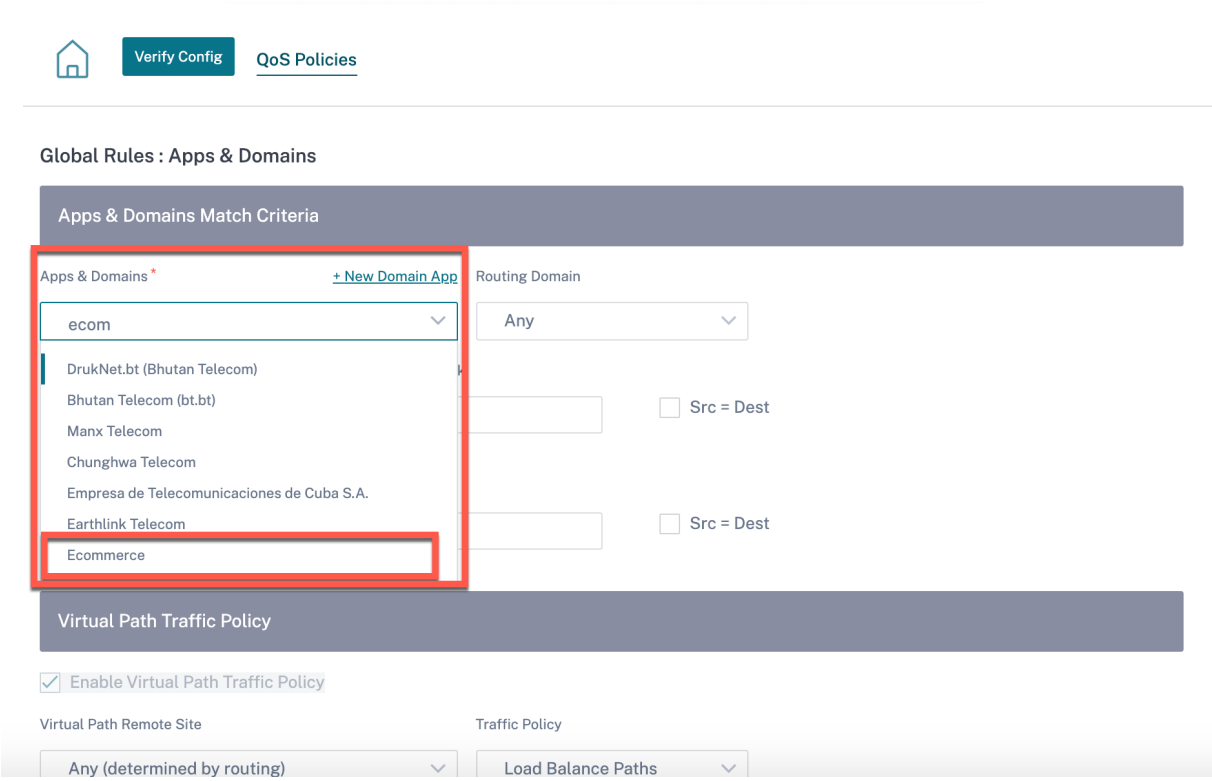
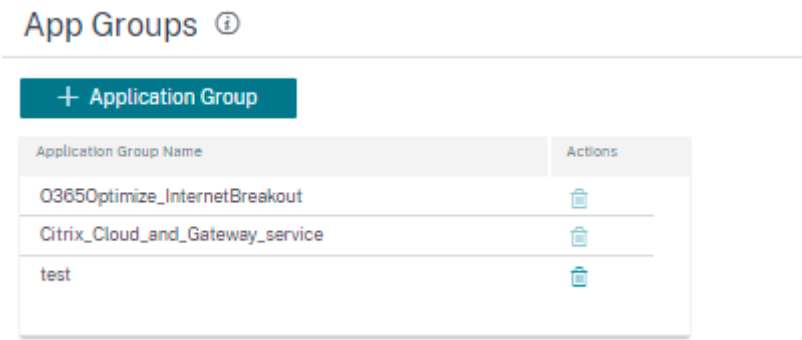


Click **Verify Config** to validate any audit error.

Application groups

An **Application Group** helps administrators group similar applications together for use in common policies, without necessarily having to create a policy for each individual application.



You can create an **Application Group** by using the **Add Application Groups** option. You can refer the same Application Group while creating a policy as per the application role. The policy that is defined for the particular group is applied to each application that matches to the specific category.

For example, you can create an **Application Group** as **Social Networking** and add social networks such as Facebook, LinkedIn, and Twitter to the group to define certain policies for social networking

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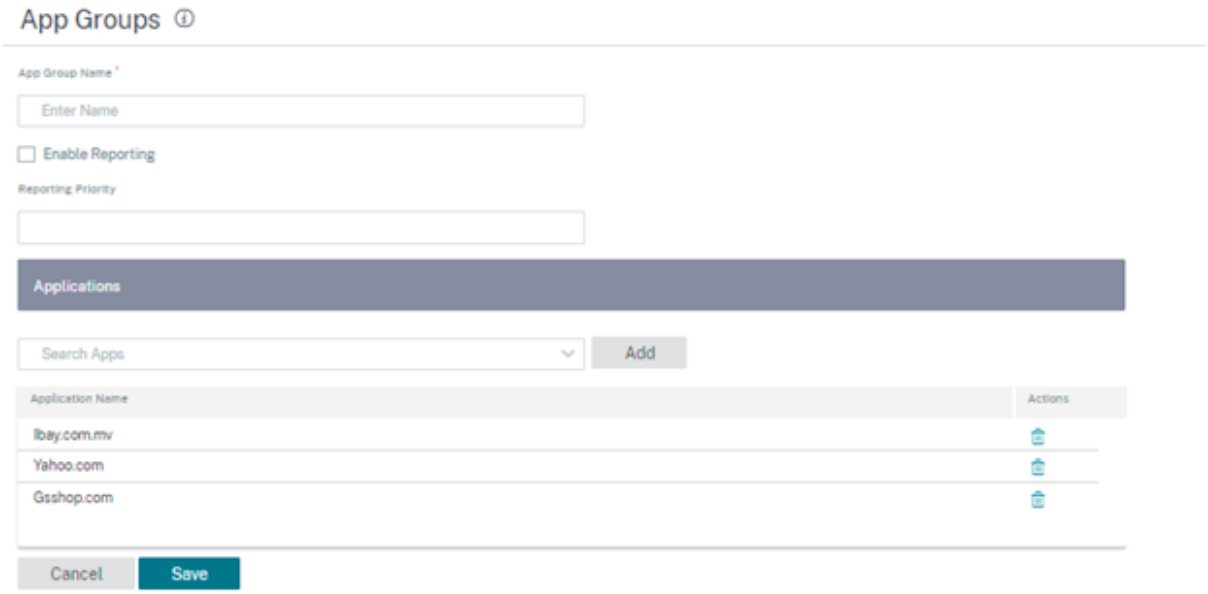
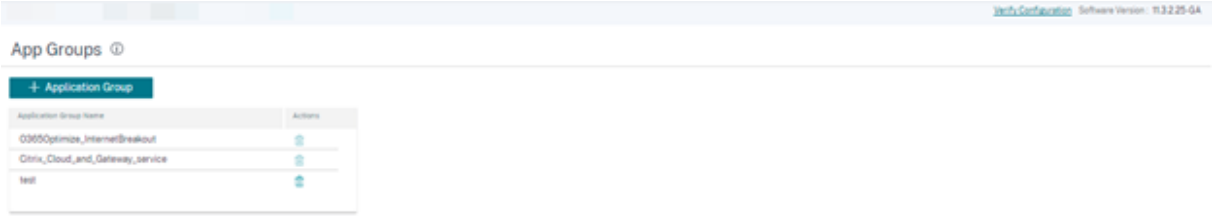
applications.

To create an **Application Group**, specify a group name, search, and add apps from the **Applications** list.
You can always go back and edit your settings or delete **Application Group** as needed.



Click **Verify Configuration** on the **Configuration** > **App Settings and Groups** > **App Groups** page to validate any audit error.



Application quality profiles

This section enables you to view and create application quality profiles.

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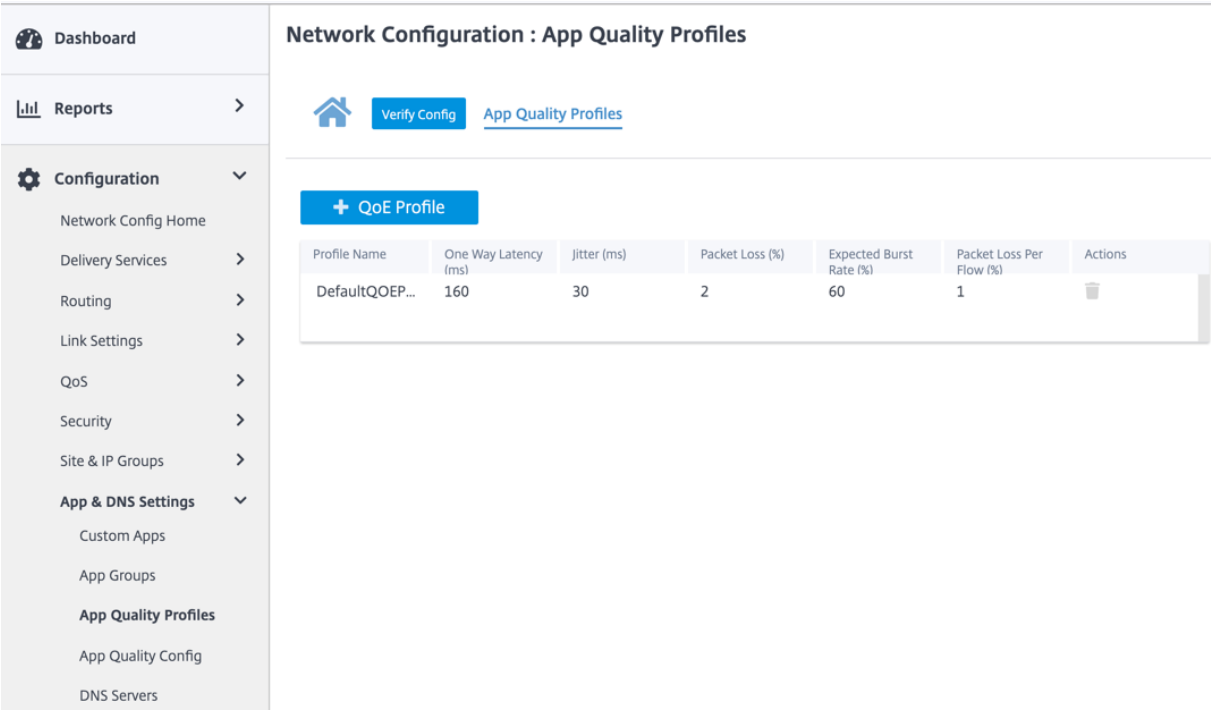

Application QoE is a measure of Quality of Experience of applications in the SD-WAN network. It measures the quality of applications that flow through the virtual paths between two SD-WAN appliances.

The Application QoE score is a value between 0 and 10. The score range that it falls in determines the quality of an application.

Quality	Range
Good	8–10
Fair	4–8
Poor	0–4

Application QoE score can be used to measure the quality of applications and identify problematic trends.

Profile configuration

Click **+ QoE Profile** to create a QoE profile, specify a profile name, and select a traffic type from the drop-down list.

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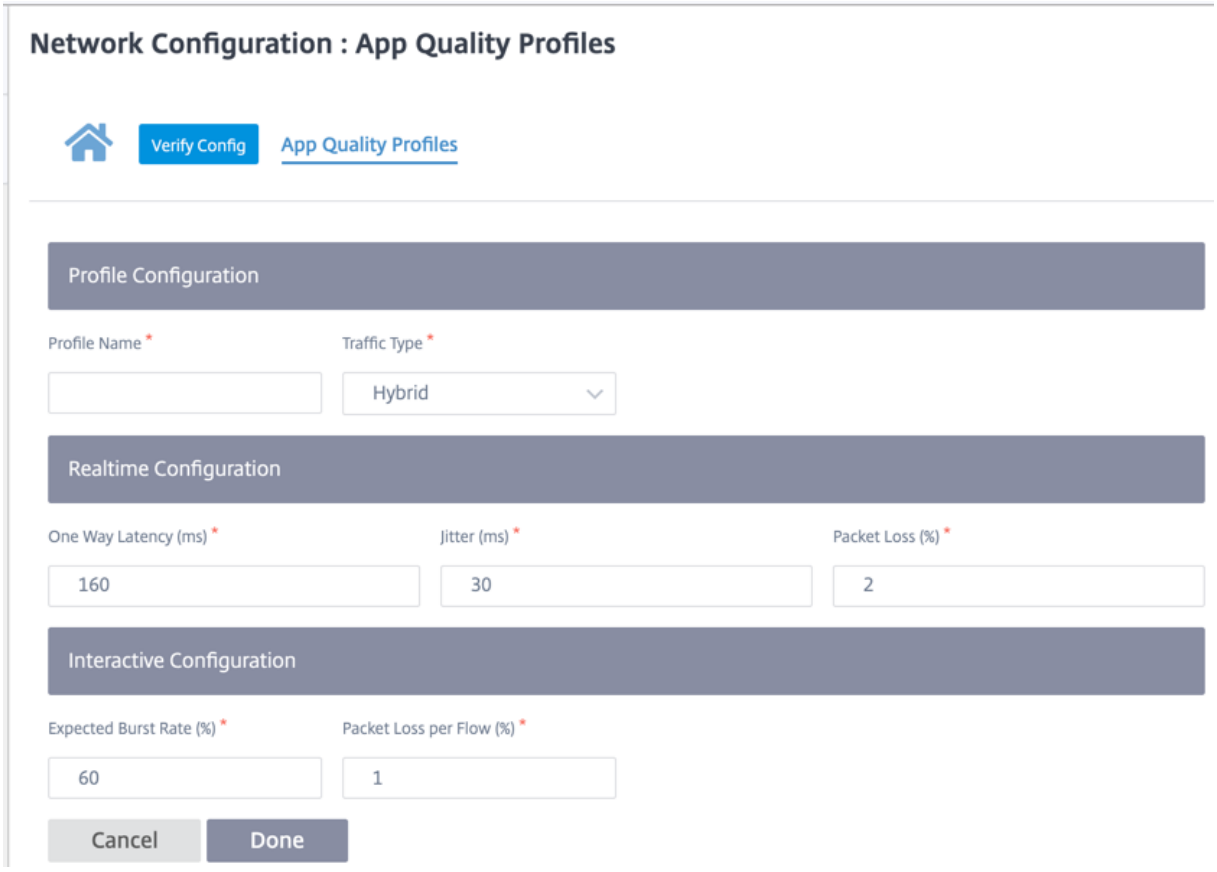

Real-time configuration

You can define the quality thresholds for real-time and interactive appliances using QoE profiles, and map these profiles to applications or applications objects.

The Application QoE calculation for real-time applications uses a Citrix® innovative technique, which is derived from the MOS score.

The default threshold values are:

- Latency threshold (ms): 160
- Jitter Threshold (ms): 30
- Packet loss threshold (%): 2

A flow of a real-time application that meets the thresholds for latency, loss, and jitter is considered to be of good quality.

QoE for Real-time applications is determined from the percentage of flows that meet the threshold divided by the total number of flow samples.

QoE for Real-time = (No of flow samples that meet the threshold / Total no of flow samples) * 100

It is represented as QoE score ranging from 0 to 10.

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Interactive configuration

The Application QoE for interactive applications uses a Citrix innovative technique based on packet loss and burst rate thresholds.

Interactive applications are sensitive to packet loss and throughput. Therefore, we measure the packet loss percentage, and the burst rate of ingress and egress traffic in a flow.

The configurable thresholds are:

- Packet loss percentage.
- Percentage of expected egress burst rate in comparison to the ingress burst rate.

The default threshold values are:

- Packet loss threshold: 1%
- Burst rate: 60%

A flow is of good quality if the following conditions are met:

- The percentage loss for a flow is less that the configured threshold.
- The egress burst rate is at least the configured percentage of ingress burst rate.

Application quality configuration

Map application or application objects to default or custom QoE profiles. You can create custom QoE profiles for real-time and interactive traffic.

Click **+QoE Configuration** to create custom QoE profiles:

- **Type**: Select the DPI application or an application object (Application, Custom Apps, and Application Groups).
- **Application**: Search and select an application or application object based on the selected Type.
- **QoE Profile**: Select a QoE profile to map to the application or application object.

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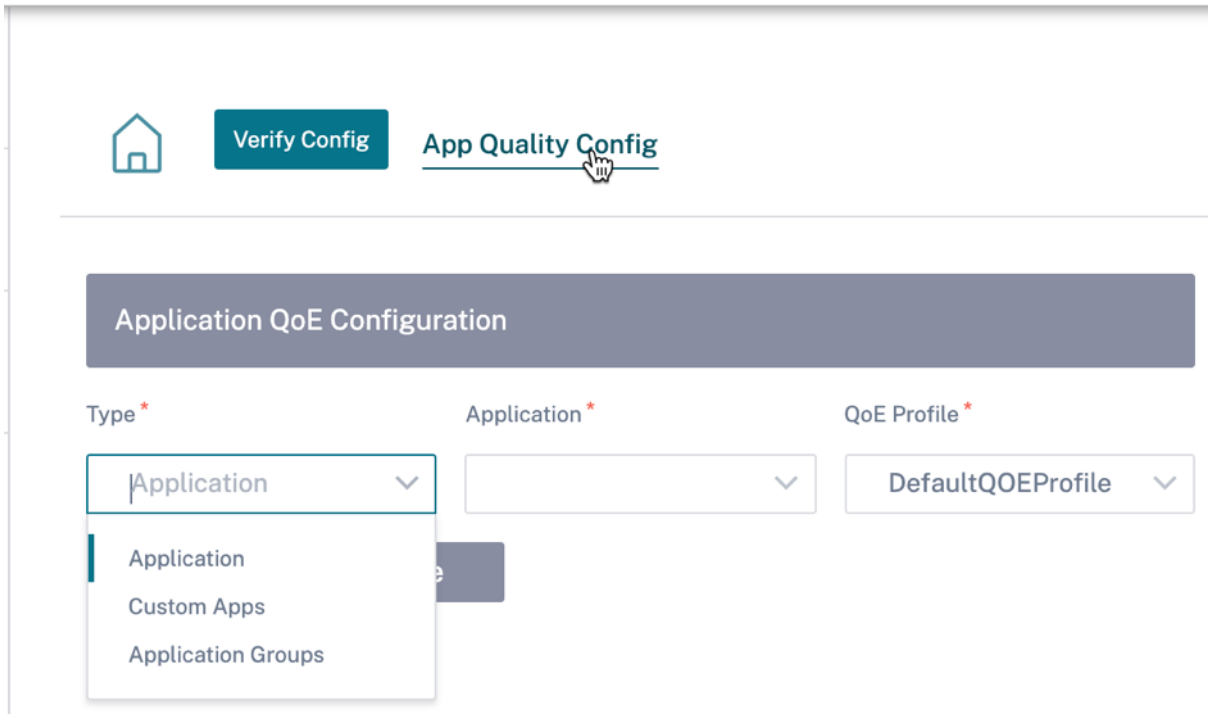
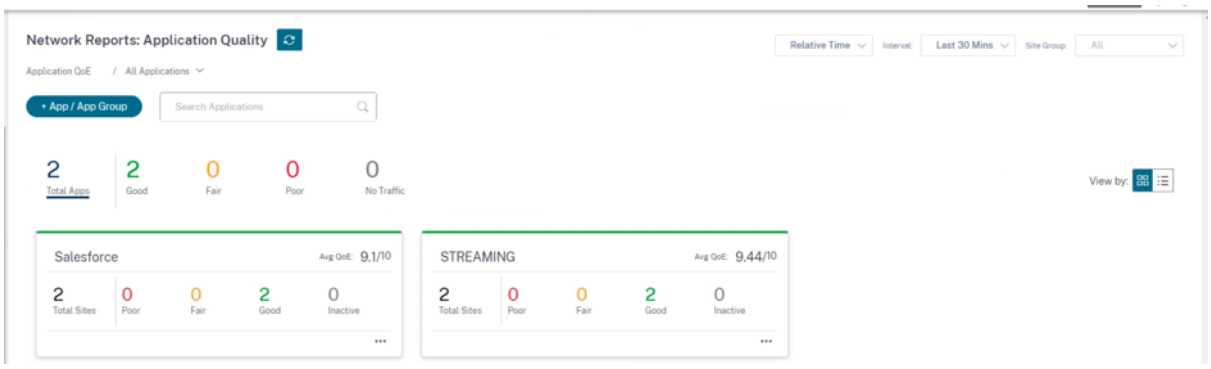


Click **Done**.

Click **Verify Config** to validate any audit error.

Once you configure the application QoE with the custom application type, a relevant application report tile is auto generated under the **Reports > Application Quality**. Any traffic that is matching with the selected application goes over the virtual path for the custom application.



Proxy Auto Config

With the increase in enterprise adoption of mission-critical SaaS applications and distributed workforce, it becomes highly critical to reduce latency and congestion. Latency and congestion are inherent in traditional methods of backhauling traffic through the Data Center. Citrix SD-WAN allows direct internet break out of SaaS applications such as Office 365. For more information, see Office 365 Optimization.

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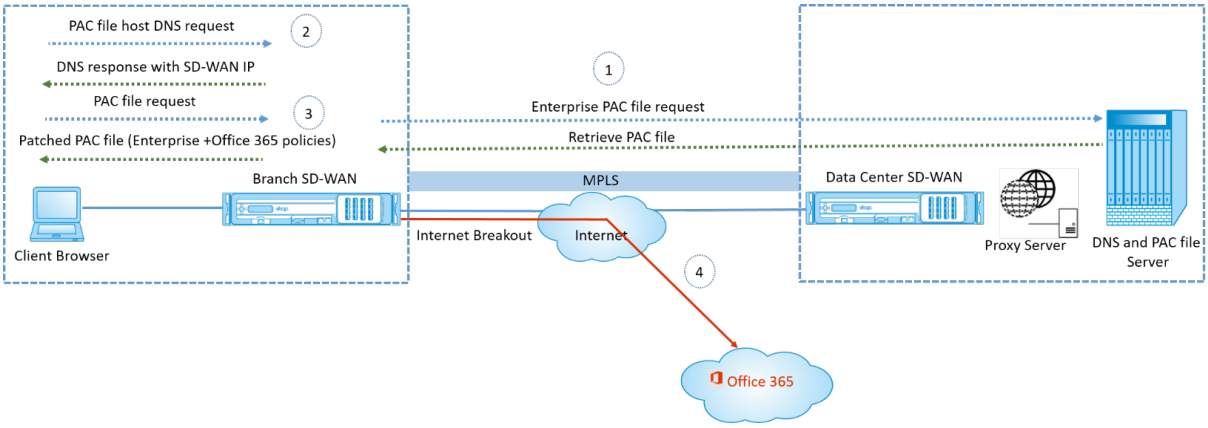
If there are explicit web proxies configured on the enterprise deployment all traffic are steered to the web proxy making it difficult for classification and direct internet breakout. The solution is to exclude SaaS application traffic from getting proxied by customizing the enterprise PAC (Proxy Auto-Config) file.

Citrix SD-WAN 11.0 allows proxy bypass and local Internet breakout for Office 365 application traffic by dynamically generating and serving a custom PAC file. PAC file is a JavaScript function that defines whether web browser requests go directly to the destination or to a web proxy server.

How PAC file customization works

Ideally, the enterprise network host PAC file on the internal web server, these proxy settings are distributed via group policy. The Client browser requests for PAC files from the enterprise web server. The Citrix SD-WAN™ appliance serves the customized PAC files for sites where Office 365 breakout is enabled.



1. Citrix SD-WAN periodically requests and retrieves the latest copy of the enterprise PAC file from the enterprise web server. The Citrix SD-WAN appliance patches office 365 URLs to the enterprise PAC file. The enterprise PAC file is expected to have a placeholder (SD-WAN specific tag) where the Office 365 URLs are seamlessly patched.
2. The Client browser raises a DNS request for the enterprise PAC file host. Citrix SD-WAN intercepts the request for the proxy configuration file FQDN and responds with the Citrix SD-WAN VIP.
3. The Client browser requests for the PAC file. Citrix SD-WAN appliance serves the patched PAC file locally. The PAC file includes enterprise proxy configuration and Office 365 URL exclusion policies.
4. On receiving a request for the Office 365 application, the Citrix SD-WAN appliance performs a direct internet breakout.

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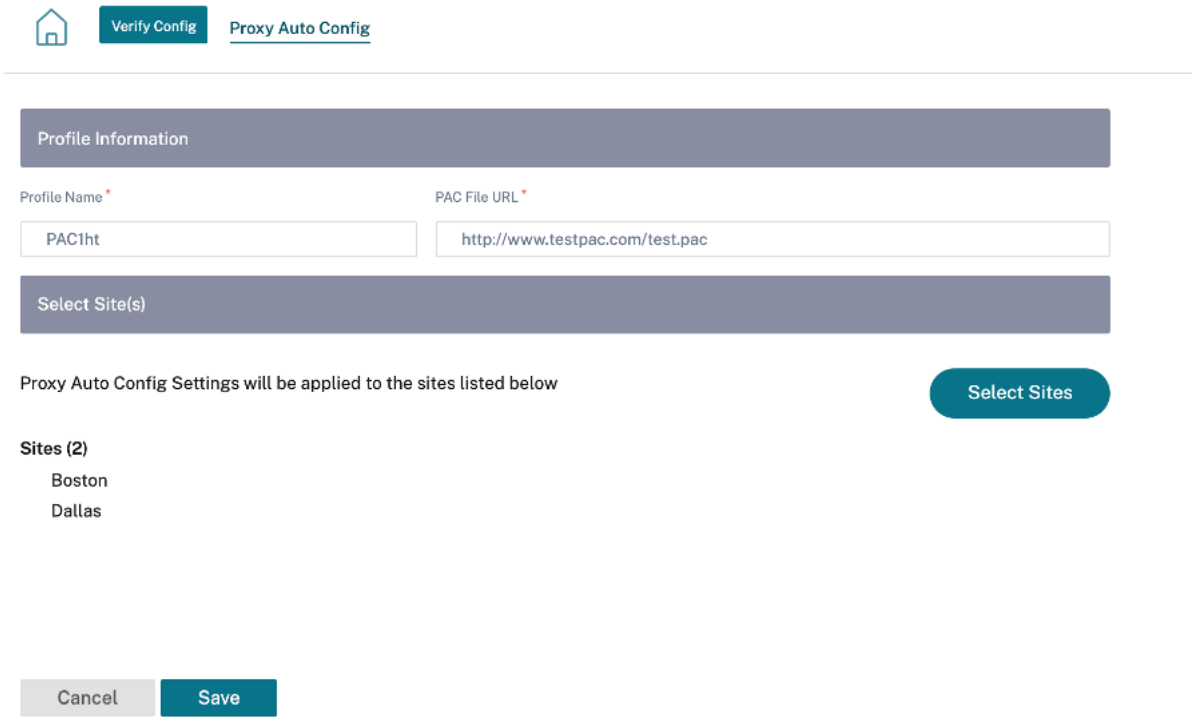
Prerequisites

1. The enterprises must have a PAC file hosted.
2. The PAC file must have a placeholder *SDWAN_TAG* or one occurrence of the `findproxyforurl` function for patching Office 365 URLs.
3. The PAC file URL must be domain based and not IP based.
4. The PAC file is served only over the trusted identity VIPs.
5. Citrix SD-WAN appliance must be able to download the enterprise PAC file over its management interface.

Configure Proxy Auto Config

In the Citrix SD-WAN Orchestrator service UI, at the network level, navigate to **Configuration** > **App Setting & Groups** > **Proxy Auto Config** and click **+ PAC file profile**.



Enter a name for the PAC file profile, provide the URL of the enterprise PAC file server. The Office 365 breakout rules are dynamically patched to the enterprise PAC file.

Select the sites to which the PAC file profile is applied. If there are different URLs for each site, create a different profile per site.

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Limitations

- HTTPS PAC file server requests are not supported.
- Multiple PAC files in a network are not supported, including PAC files for routing domains or security zones.
- Generating a PAC file on Citrix SD-WAN from scratch is not supported.
- WPAD through DHCP is not supported.

DPI Settings

The Citrix SD-WAN appliances perform Deep Packet Inspection (DPI) to identify and classify applications. The DPI library recognizes thousands of commercial applications. It enables real-time discovery and classification of applications. Using the DPI technology, the SD-WAN appliance analyses the incoming packets and classifies the traffic as belonging to a particular application or application family.

DPI is enabled globally, by default, for all the sites in your network. Disabling DPI stops DPI classification capability on the appliance. You can no longer use DPI classified application / application categories to configure firewall, QoS, and routing policies. You will also not be able to view the top applications and application categories report.

To disable global DPI, at the Network level, navigate to **Configuration > App Settings & Groups > DPI Settings** and clear the **Enable Global DPI** check box option.

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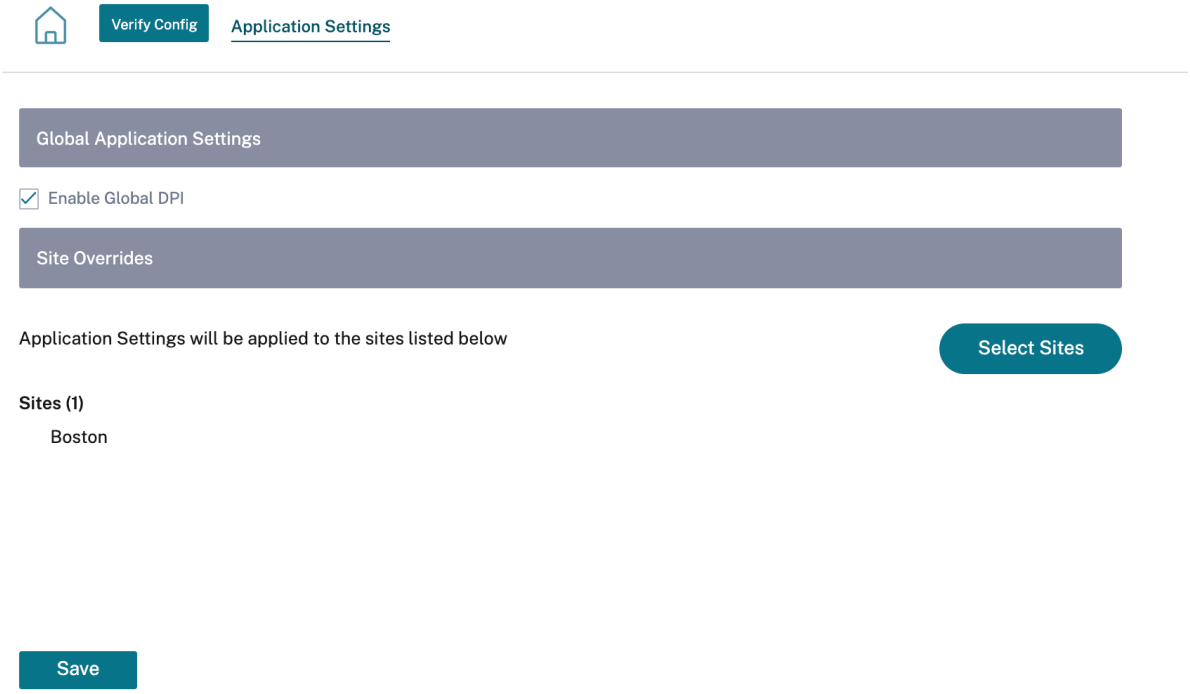

You can also choose to disable DPI for certain sites only by overriding the global DPI settings. To disable DPI for selected sites, add the sites to the **Site Overrides** list.

Profiles and Templates

September 27, 2025

A profile is a live configuration template. A regular template aids the creation of a new entity. But once the template is created, subsequent changes in the template do not apply to the existing entities created using the base template. A profile serves as the live central master entity. The all child entities inherit from the profile, not only during creation but also throughout the life of a profile. All the child entities associated with the profile, automatically inherit any changes made in a profile.

For example, an admin creates a site configuration profile called the small retail store and applies it to all the small retail stores owned by a company. Now, any changes made to the small retail store profile at any given time would be applied automatically to all the stores inheriting this profile. Based on what's common across all the entities, and what's not, certain parameters in the profile configuration can be left unset. Such parameters would be customizable and can vary across the entities inheriting the same profile.

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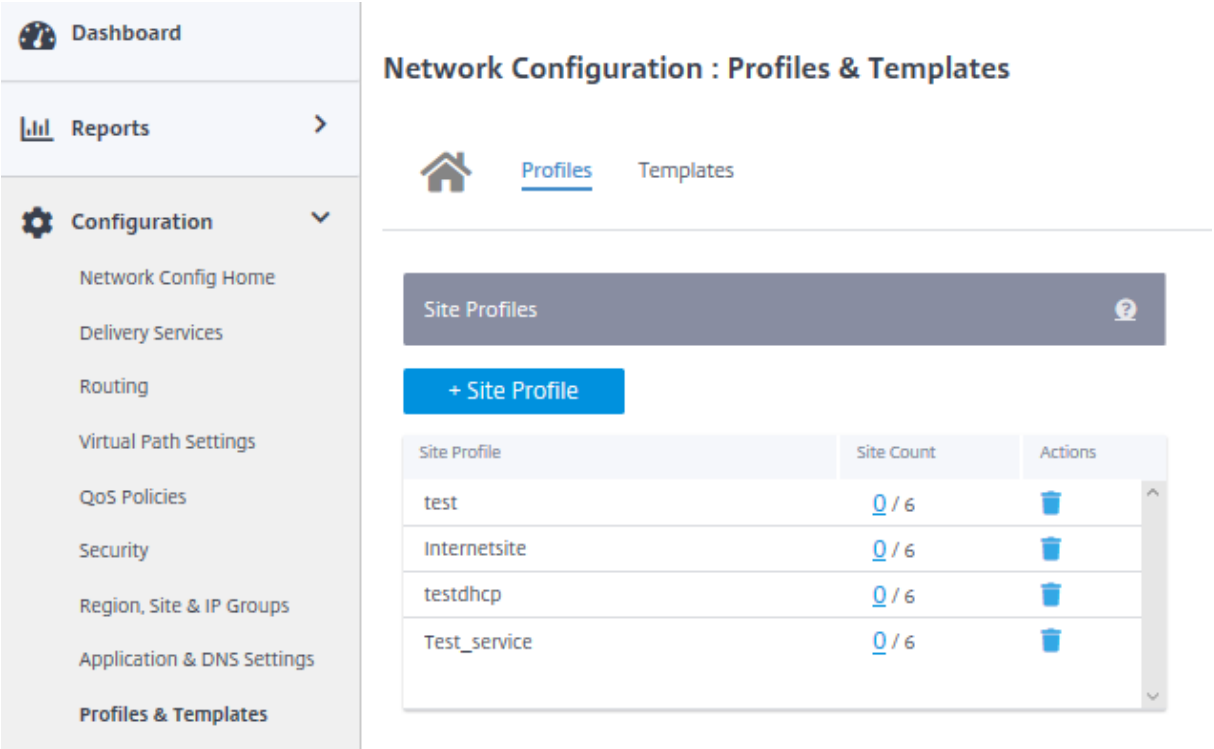
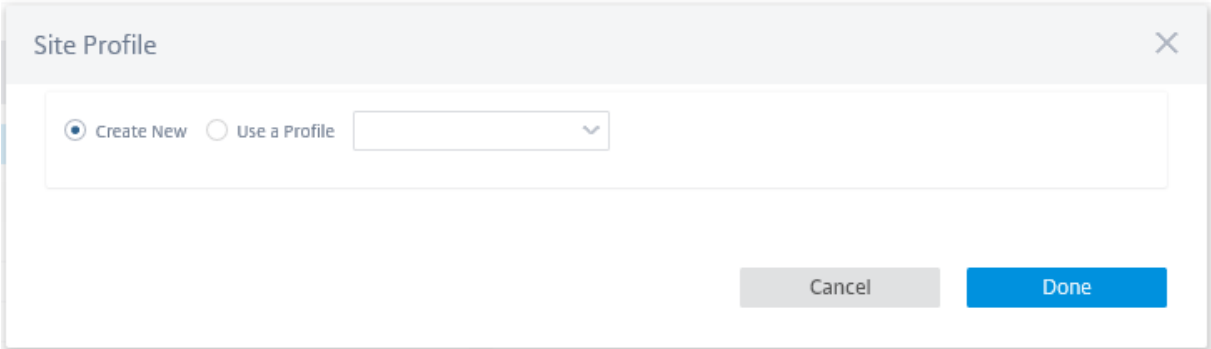
Site profiles

Site profiles help you to easily and quickly configure sites. You can create a site profile once and reuse it multiple times while creating sites.



To create a site profile, click **+ Site Profile**. You can create a profile from scratch or edit an existing site profile and save it as a new profile.



To create a site profile, you need to configure the **Site Details**, **Interfaces**, and **WAN Links**. For detailed description of configuring sites, see Site details.

Provide the device details.

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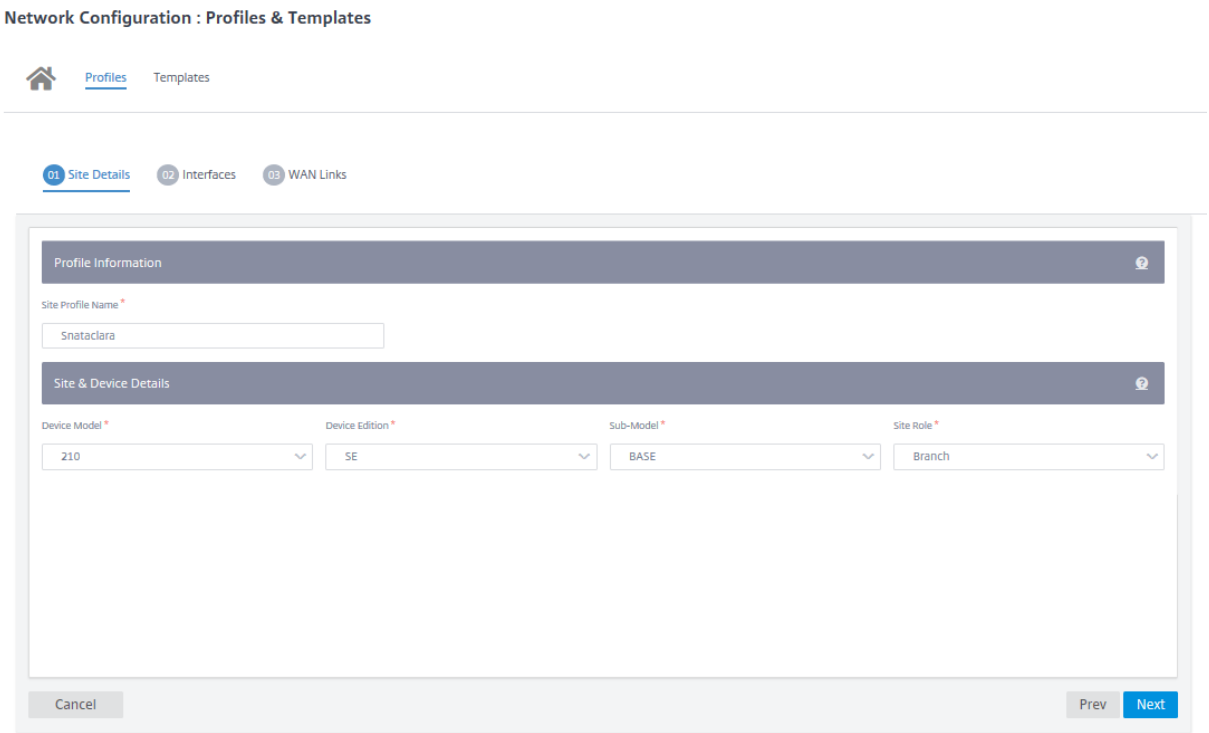

Assign an interface for the site by clicking the **+ Interface** option. To add an interface, you need to fill the **Interface Attributes**, **Physical Interface**, and **Virtual Interfaces** fields. For detailed description of configuring interfaces, see Interfaces.

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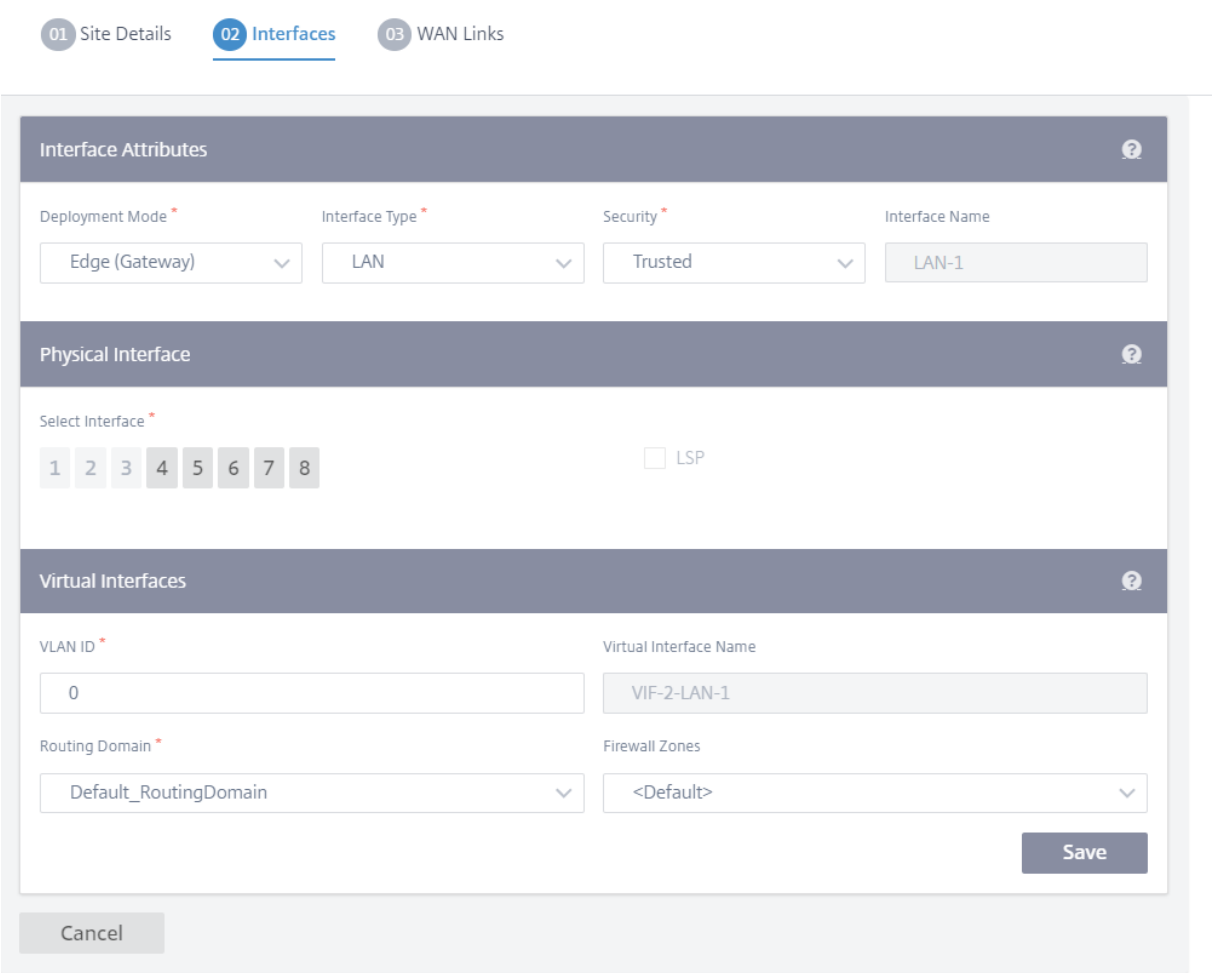

Fill **WAN Link Attributes**, **Access Interfaces**, and **Services** with **Advanced Options**.

For detailed description of configuring WAN links, see WAN links.

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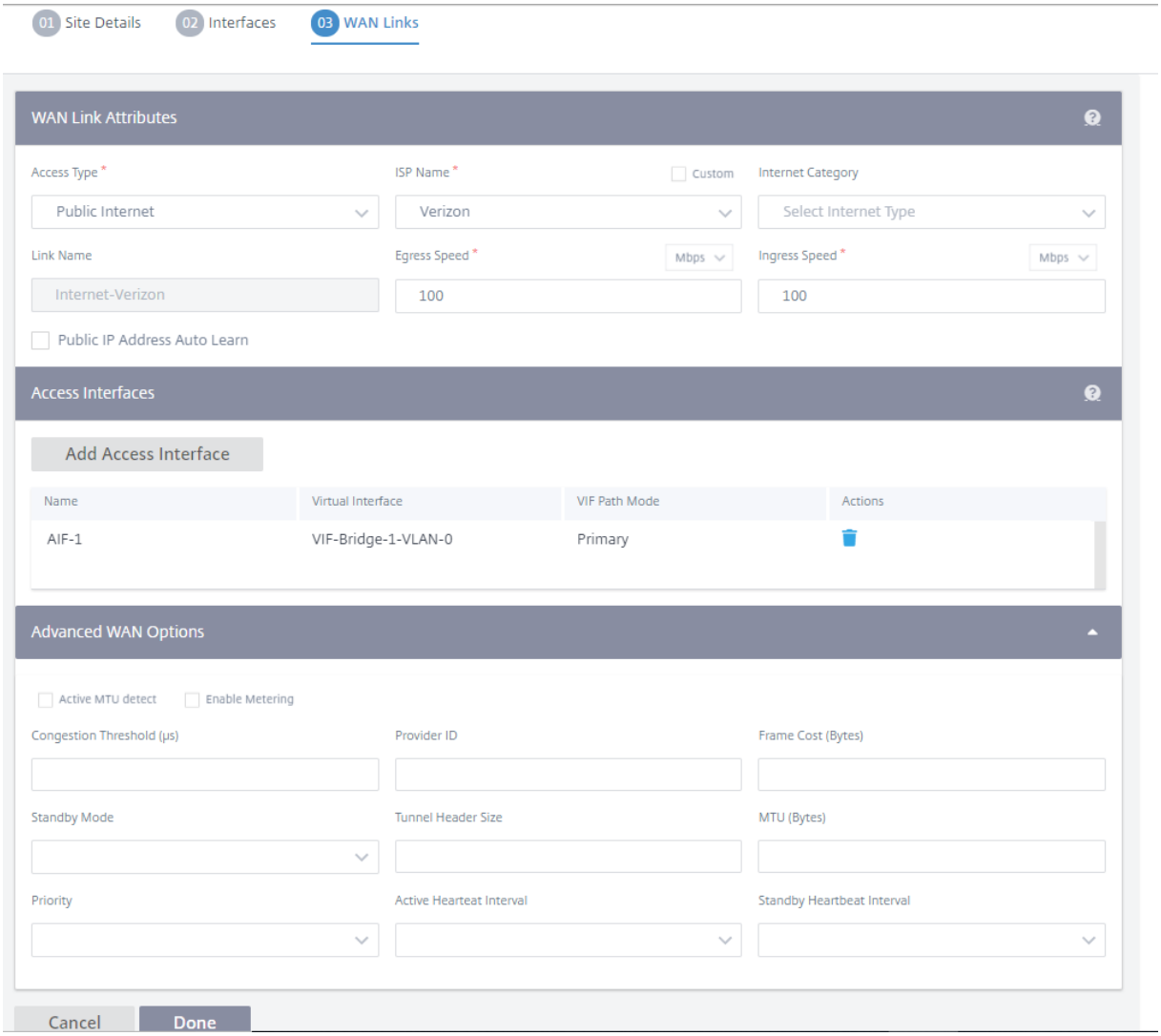

Templates

Citrix SD-WAN Orchestrator service allows you to use templates as a predefined set of fields to configure a new site or a WAN link.

Site template

A site template is a predefined template used for site creation. To configure a site using a predefined site template, at the customer level, navigate to **Configuration** > **Profiles & Templates** > **Templates**. In the **Site Template** section, click **Add Site Template**.

On the **New Site Template** screen that is displayed, provide the details as required and click **Next**.

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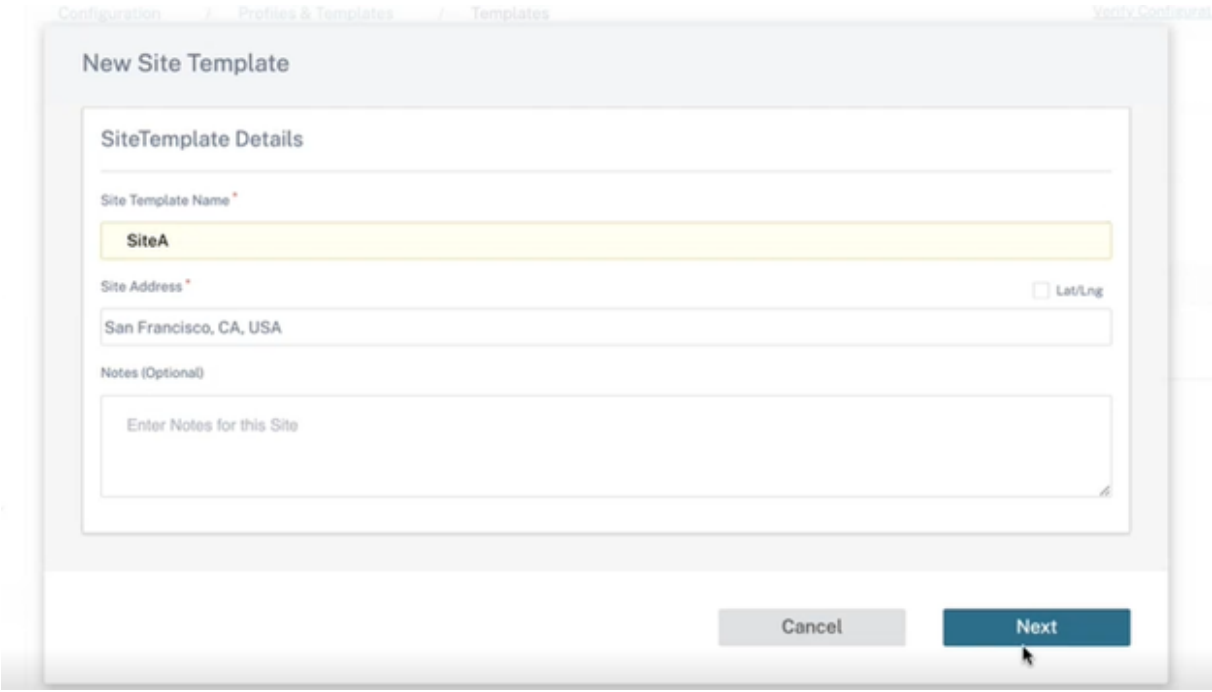
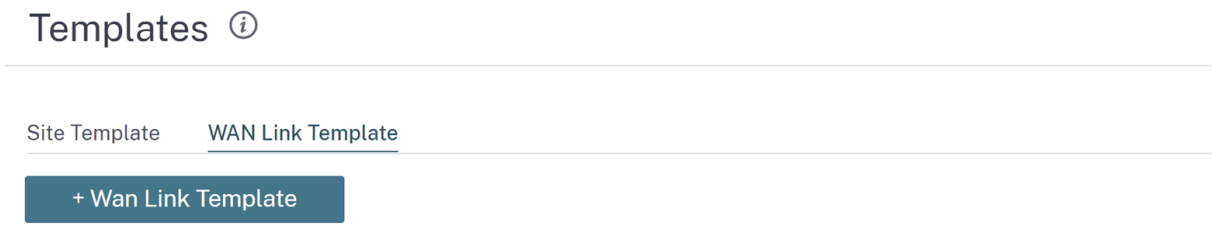
> **Note**
>
> When you clone a site or create a site using a site template and the source has Wi-Fi configured, the Wi-Fi settings do not get copied to the new site.



WAN link template

WAN link templates help you to configure WAN links easily and quickly. You can create a WAN link template once and reuse it multiple times while configuring WAN links. You can even copy the modified WAN link template configurations to the site WAN link configurations created using the WAN link template.



To create a WAN link template, click **+ WAN Link Template**. You can create a template from scratch or edit an existing WAN link template and save it as a new template.

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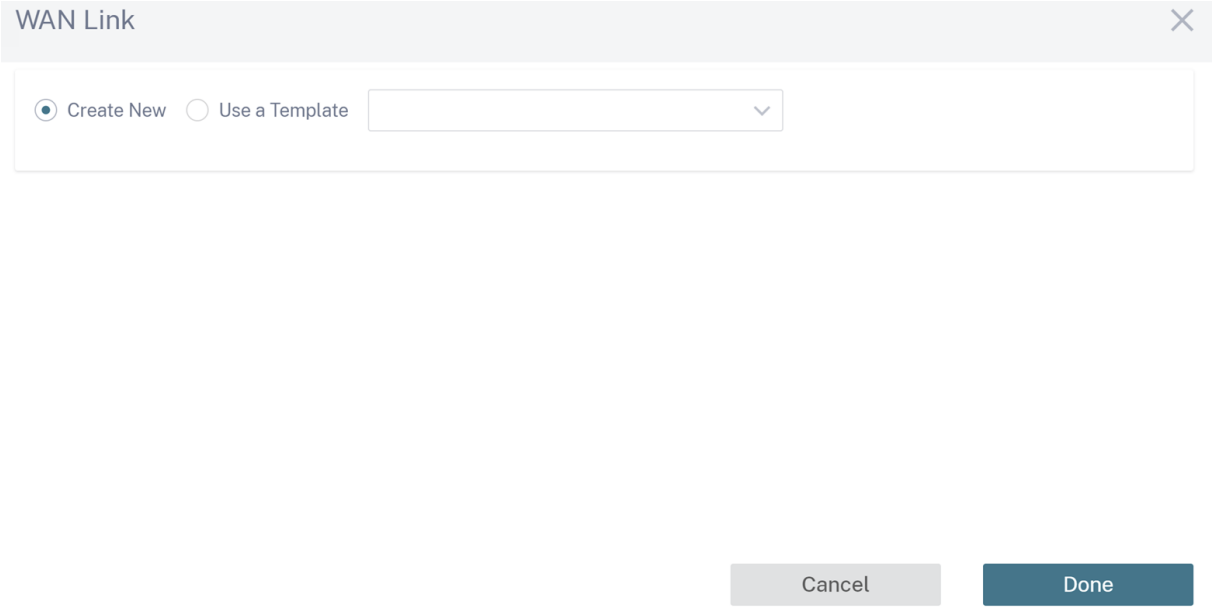
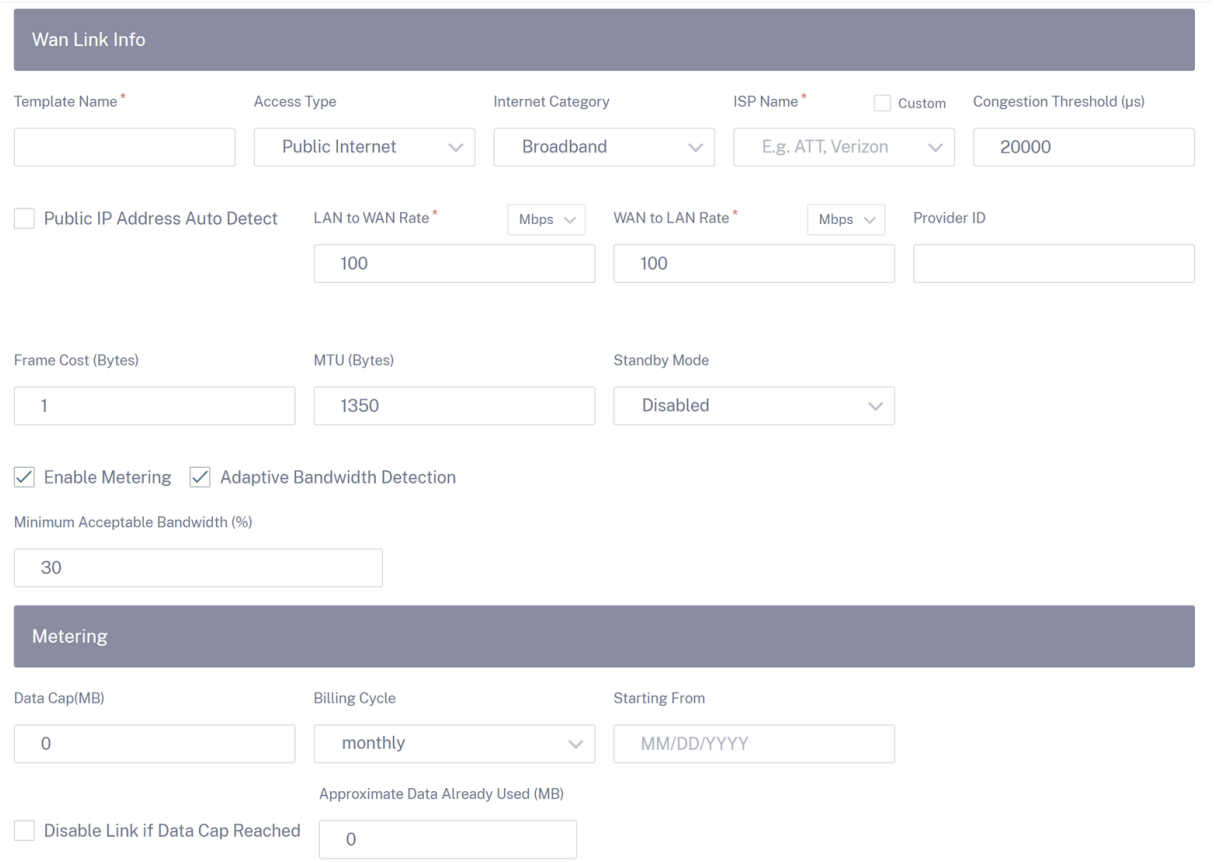


Provide the WAN link information such as **Profile Name**, **Access Type**, **Internet Category**, **LAN to WAN Rate** (Mbps) and so on to create a WAN profile. For detailed description of configuring WAN links, see WAN links.



Previously, the option to copy the modified WAN link template configurations to site WAN link config-

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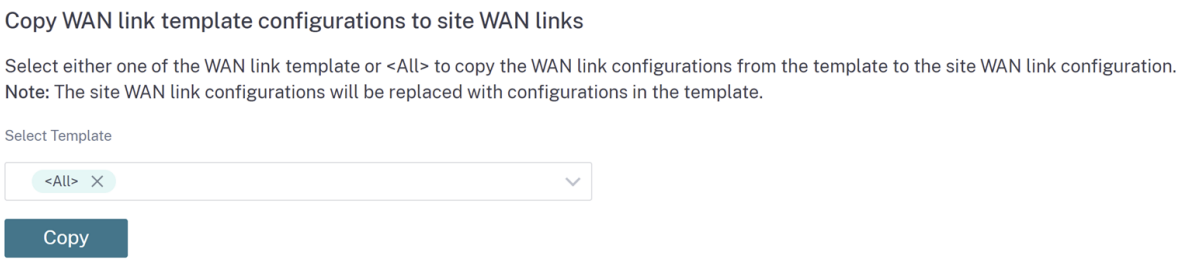
urations was not available. For example, if a user had already created multiple site WAN links using a WAN link template and had to modify a particular configuration (For example, congestion threshold setting), the user had to do it on every site WAN link individually. From now on, the user can update the WAN link template with the new congestion threshold setting and copy the latest WAN link template configurations to all the site WAN links created using the WAN link template.

When you select one or more WAN link templates and click copy, the updates that you make on the WAN link template get copied to the site WAN link configuration created using the selected templates.

> **Note**
>
> The WAN link site configurations that are created using the Site profile feature do not get updated.



ECMP load balancing

September 27, 2025

Equal Cost Multi-Path (ECMP) groups allow you to group multiple paths with the same cost, destination, and service. The connections or session data is load balanced across all the paths in the ECMP group depending on the type of ECMP group. For example, consider a network with two WAN links between a branch and a data center having the same route cost. Traditionally, one of the WAN links would be active and the other remains dormant acting as a fallback link. With ECMP Groups, you can group these WAN links together and allow traffic to be load balanced through both the WAN links. ECMP load balancing ensures:

- Distribution of traffic over multiple equal-cost paths.
- Optimal usage of available bandwidth.
- Dynamic transfer of traffic to other ECMP member path, if a route becomes unreachable.

ECMP load balancing is supported on the following services:

- Virtual Paths
- Citrix Secure Internet Access™

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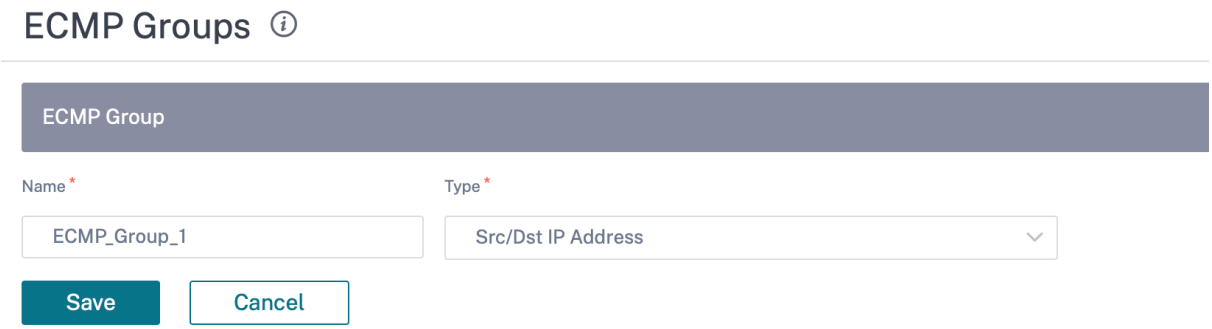
- Zscaler
- IPsec
- GRE

You can define a maximum of 254 ECMP groups in your network. The maximum number of ECMP eligible routes in an ECMP group depend on your appliance and license type. The following two types of ECMP groups are supported on Citrix SD-WAN™:

- Source/destination IP address: Networks where multiple clients try to connect to the same destination, the connections are load balanced across equal cost WAN links.
- Session: Networks where a single client is connected to a destination and multiple sessions are spawned. The session data is load balanced across equal cost WAN links.

To configure an ECMP group, at the Network level, navigate to **Configuration > Routing > ECMP Groups**. Provide a name for the ECMP group and select the type as **Src/Dest IP address** or **Session** as required.



You can associate the ECMP groups to the following services:

- Virtual Paths (at site level)
- Citrix Secure Internet Access
- Zscaler
- IPsec
- GRE

To enable ECMP configuration on Intranet services, at the Network *level, navigate to **Configuration > Delivery Channels > Bandwidth allocation > Intranet + Service** and select the **Service Type** as **Intranet**. Select the ECMP group while configuring the Intranet service.

> **Note**
>
> Selecting **None** will not enable ECMP configuration on the service.

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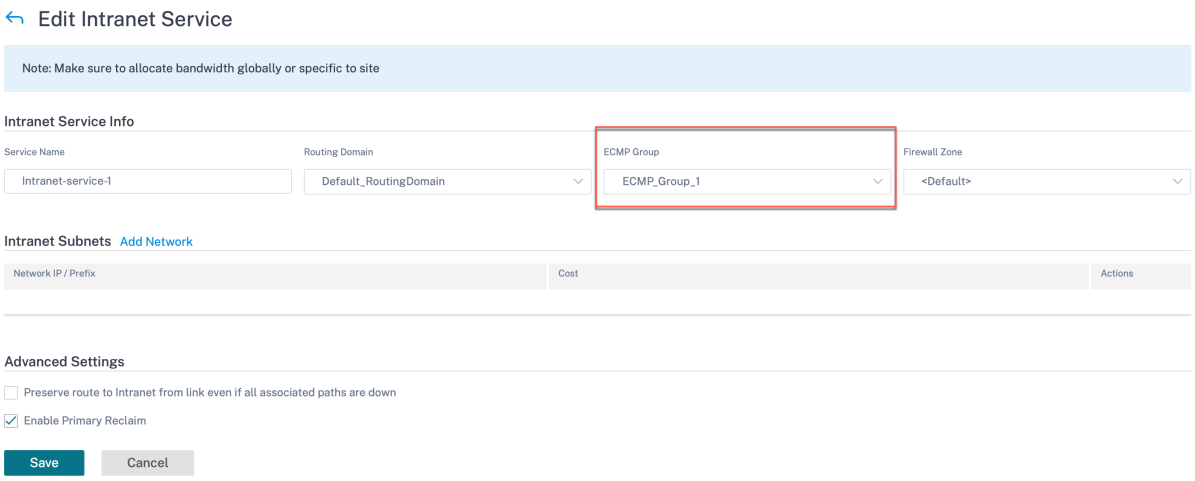
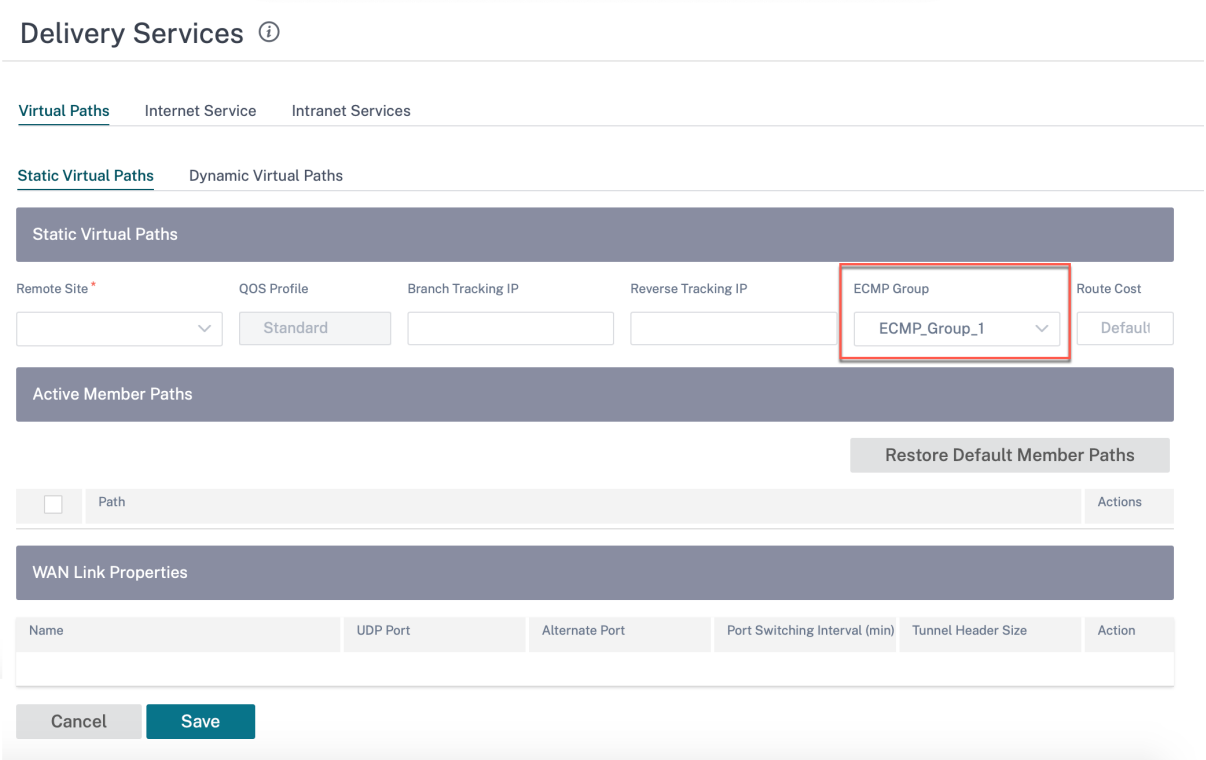


To enable ECMP configuration on Virtual paths, at the Site level, navigate to **Configuration** > **Advanced Settings** > **Delivery Services** > **Virtual Paths** > **Static Virtual paths** > **+ Virtual paths**. Select the ECMP group while configuring the Static Virtual paths.

> **Note**
>
> Selecting **None** will not enable ECMP configuration on the service.



To enable ECMP configuration on Zscaler services, at the Network level, navigate to **Configuration > Services & Bandwidth**. Click the **Settings** icon next to Zscaler listed under the **Delivery Services** column. Authenticate and click **+ Site**. Select the **Enable ECMP** check box while adding sites.

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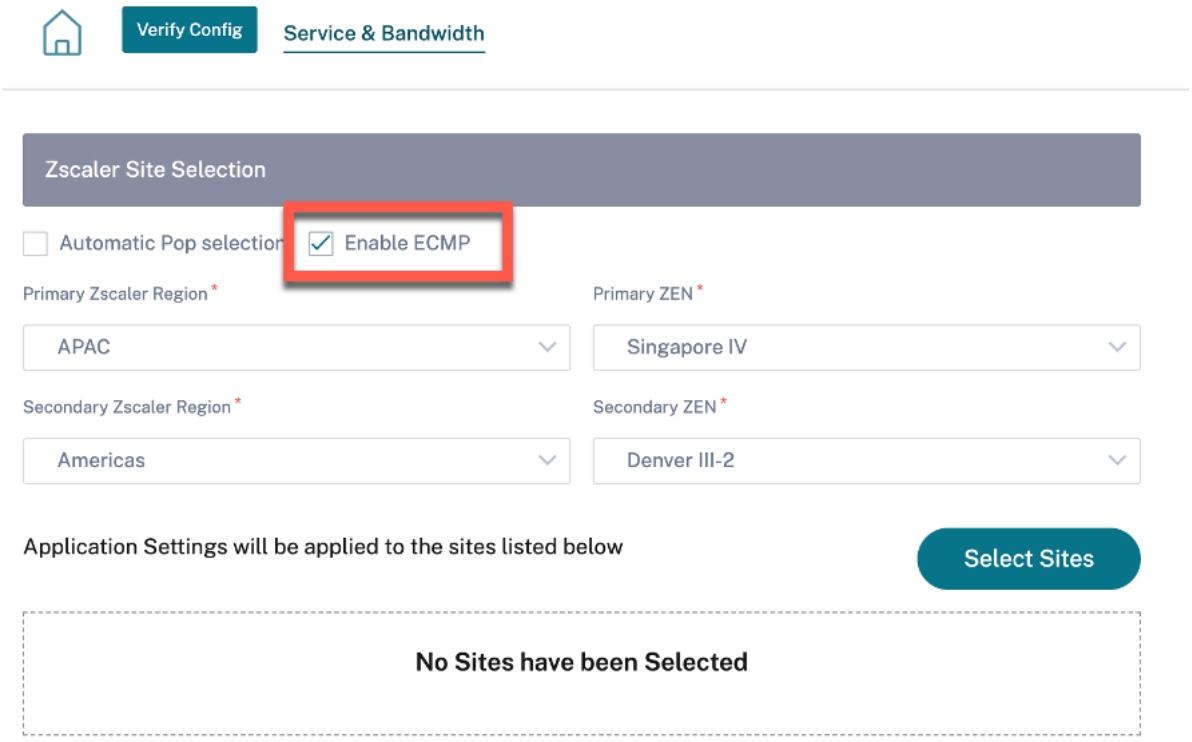
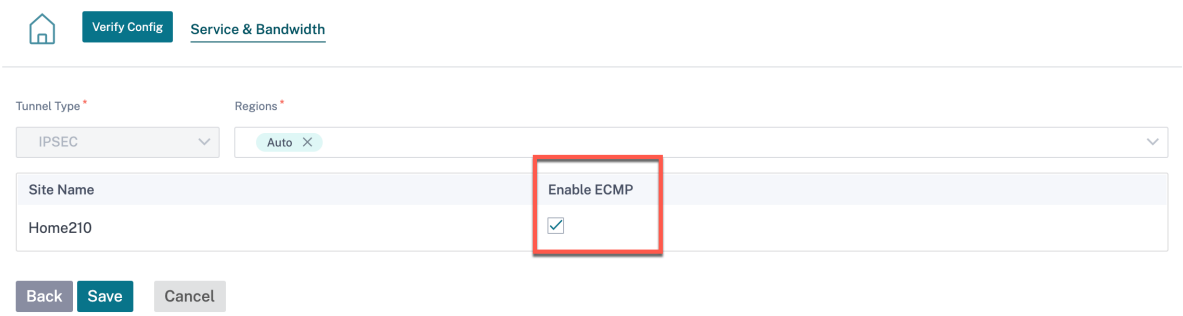
> **NOTE**
>
> Zscaler service supports only session-based ECMP load balancing.



To enable ECMP configuration on Citrix Secure Internet Access service, at the Network level, navigate to **Configuration > Services & Bandwidth**. Click the **Settings** icon next to **Secure Internet Access Service** and click **+ Site**. Select the **Enable ECMP** check box after selecting the sites.

> **NOTE**
>
> Citrix Secure Internet Access service supports only session-based ECMP load balancing.



To enable ECMP configuration on fixed IPsec tunnels with third-party peers on the LAN or WAN side,

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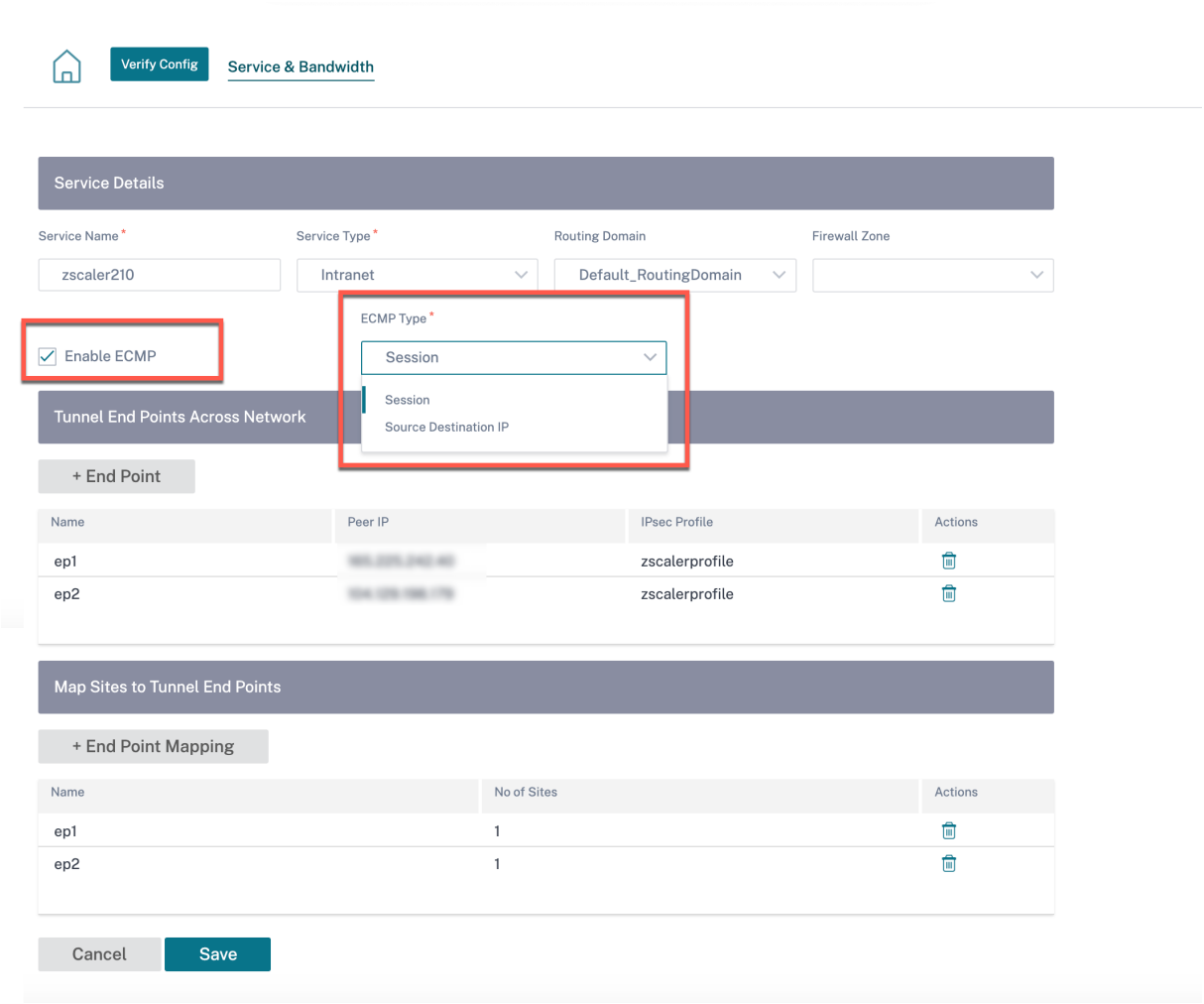
navigate to **Configuration > Services & Bandwidth > Intranet + Service** and select the **Service Type** as **IPsec**. Select the **Enable ECMP** check box and choose a type from the **ECMP Type** drop-down list.



Notification settings

September 27, 2025

You can configure Citrix SD-WAN Orchestrator service to identify alert conditions based on your network and priorities, generate alerts, and receive notifications via email.

Alert configuration

An alert for an event type is triggered by the trigger and clear state or severity.

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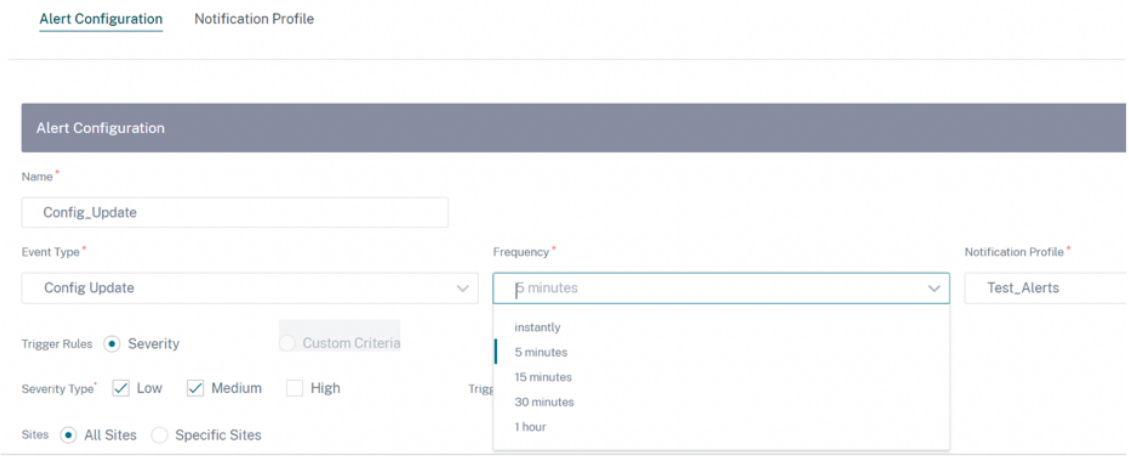
To configure alerts at the network level, navigate to **Alerts** > **Notification Settings** > **Alert Configuration** and click **Add**. Provide a name for the alert and enter values for the following parameters:

- **Event Type**: The SD-WAN appliance can trigger alarms for particular subsystems or objects in the network, these are called event types. The available event types are SERVICE, VIRTUAL_PATH, WANLINK, PATH, DYNAMIC_VIRTUAL_PATH, WAN_LINK_CONGESTION, USAGE_CONGESTION, FAN, POWER_SUPPLY, PROXY_ARP, ETHERNET, DISCOVERED_MTU, GRE_TUNNEL, and IPSEC_TUNNEL.
- **Frequency**: The frequency with which the alert notifications are sent. The selected frequency is the time interval between two alert notifications. All the alerts occurring within the interval are cumulatively sent as a single notification.
- **Notification profile**: Defines the notification mechanism to send the alert notification. For more detail, see Notification profile.

Trigger rules

- **Severity**: Select the severity level about which you have to be notified. You can choose multiple severity levels.
    - **Trigger Duration**: The duration in seconds, this determines how quickly the appliance triggers an alarm. Enter a value between 0-600 seconds. By default, the trigger duration is set to 10 seconds. Alarms are not triggered, if more events occur on the same object within the trigger duration period. More alarms are triggered only if an event persists longer than the trigger duration period.



- **Custom Criteria**: Trigger rule, provide the following details.
    - **Trigger State**: The event state that triggers an alarm for an Event Type. The available Trigger State options depend on the chosen event type.
    - **Trigger Duration**: The duration in seconds, this determines how quickly the appliance triggers an alarm. Enter a value between 0-600 seconds. By default, the trigger duration is

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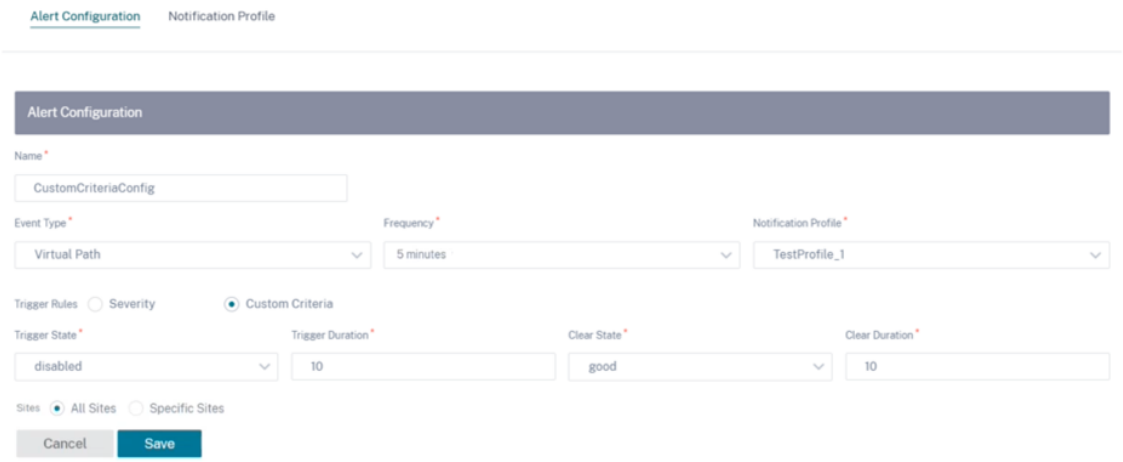
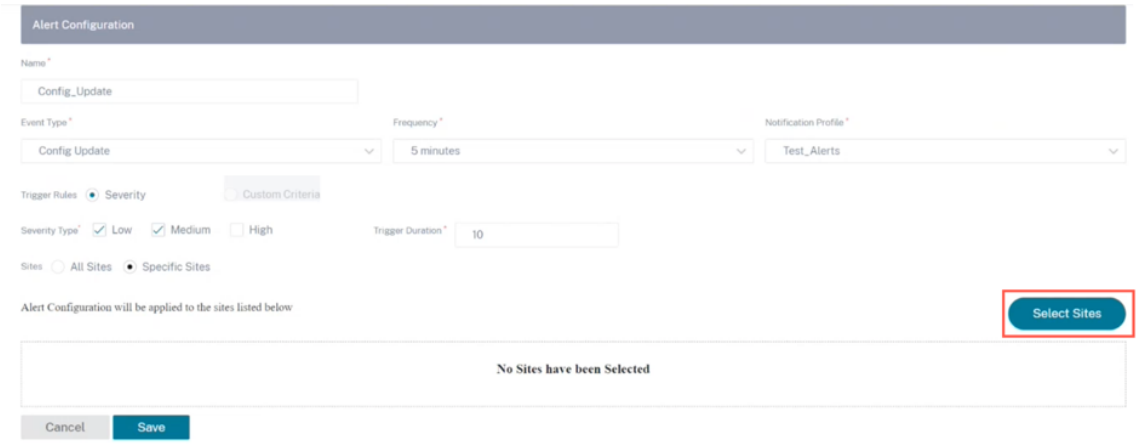
set to 10 seconds. Alarms are not triggered, if more events occur on the same object within the trigger duration period. More alarms are triggered only if an event persists longer than the trigger duration period.

- **Clear State**: The event state that clears an alarm for an Event Type after the alarm is triggered. The available Clear State options depend on the chosen Trigger State.
- **Clear Duration**: The duration in seconds, this determines how long to wait before clearing an alarm. Enter a value between 0-600 seconds. By default, the clear duration is set to 10 seconds. The alarm is not cleared, if another clear state event occurs on the same object within the specified time.



Sites

- **All Sites**: The event is by default set for all sites (global level).
- **Specific Sites**: You can set the event for specific sites. Select the Specific Sites radio button and click **Select Sites**.



You can search for a site by name or can select sites by region/custom groups from the drop down list.

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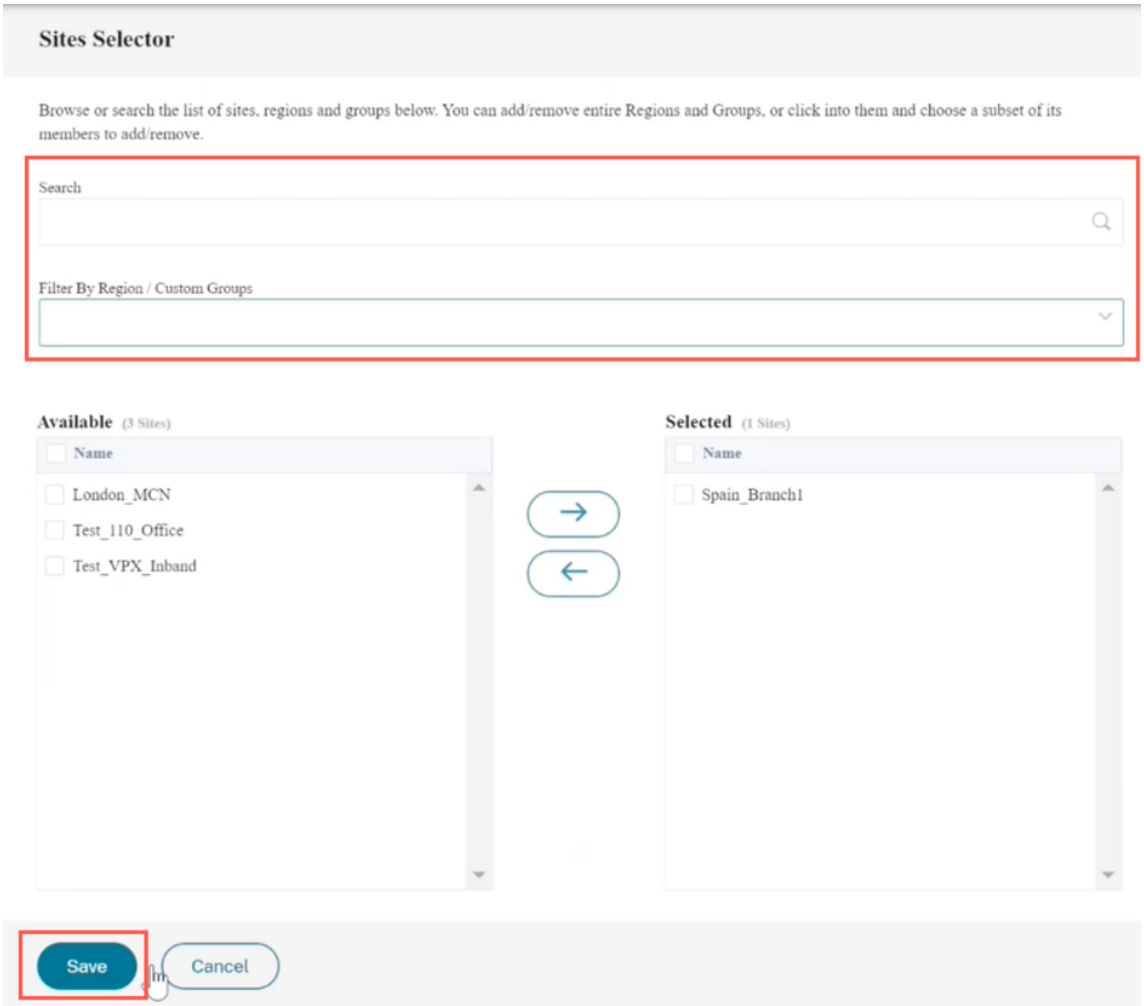
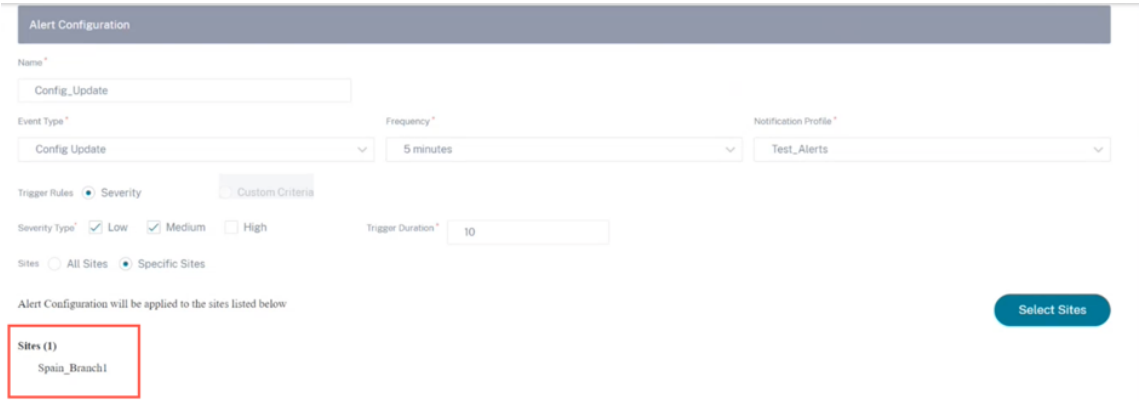


Click **Save**. The selected site reflects under **Site**.



The created alert configurations are listed under **Alert Configuration**. Click to view more details.

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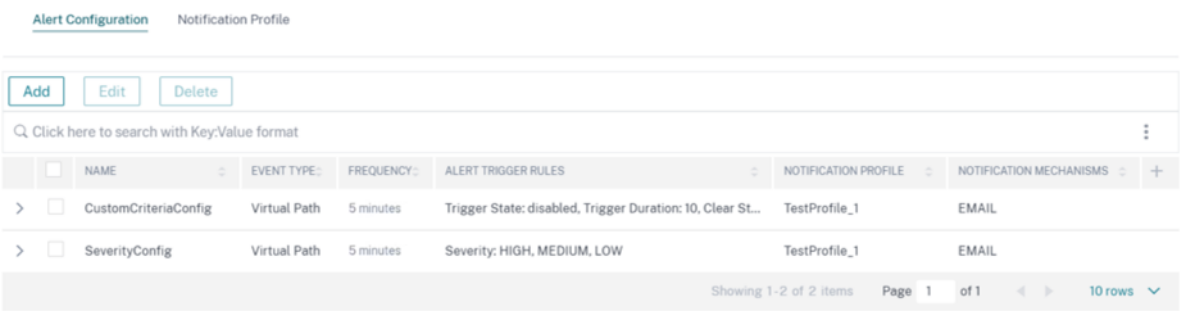

Notification profile

You can create a notification profile and set-up the email notifications. The notification profiles are further used to create alert configuration. For more details, see Alert configuration.

To create a notification profile, at the network level, navigate to **Alerts** > **Notification Settings** > **Notification Profile** and click **Add**. Provide a name for the notification profile.

You can receive the Citrix SD-WAN alerts to your email address. You can use the default SMTP server provided by Citrix SD-WAN Orchestrator™ service or use a custom SMTP server to send email notifications.

Click **Enable email Alerts** and provide the email ids to which notifications have to be sent in the **To**, **Cc**, and **Bcc** fields. You can enter multiple email ids separated by a comma. The **To** field is mandatory, the **Cc** and **Bcc** fields are optional.

You can enter custom text which is appended at the end of the email notification. The custom text limit is 200 characters. Custom text can be used to filter and search specific alert emails.

Customize email notifications settings by providing your SMTP server details. You can also secure messaging by enabling HTTPS messages. Provide the HTTPS server URL and credentials, the server is used as a secure base server to transport messages. The HTTPS server uses the SSL certificate for security.

You can send push notifications to the HTTPS server by either using the username and password or uploading the secret certificate and key files. Ensure to upload the client certificate in PEM format and upload the secret key file in PKCS8 format.

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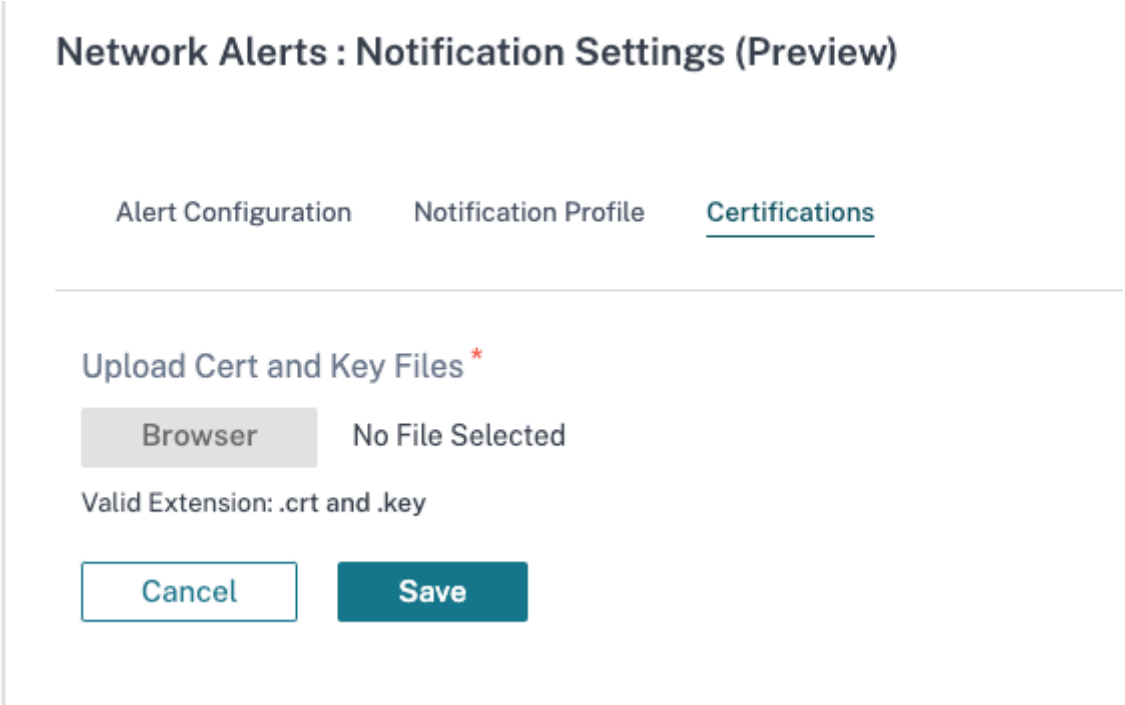
To upload the client certificate and secret key files, navigate to the Certifications tab. In the Upload Cert and Key Files section, upload the files.



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Network location service

September 27, 2025

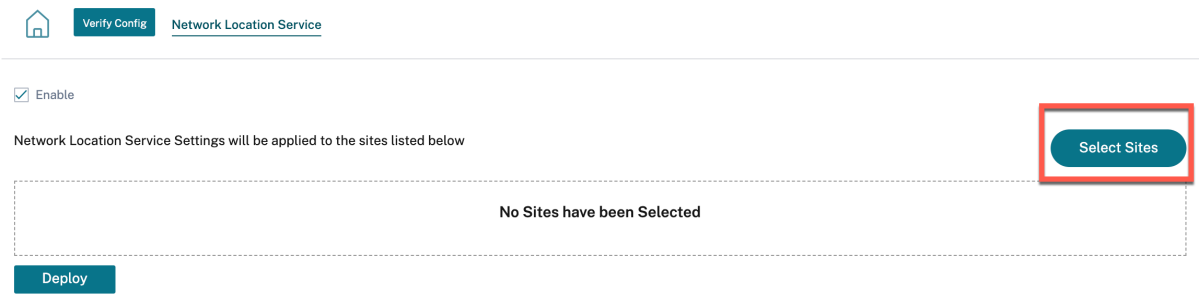
> **Important update:**
>
> This feature is deprecated in the Citrix SD-WAN Orchestrator service deployment. However, you can still enable NLS using Citrix Cloud. For details, see Optimize connectivity to workspaces with Direct Workload Connection.

Network location service (NLS) is a Citrix Cloud service that determines if the user connecting to Citrix Virtual Apps and Desktops is from the internal network. Using NLS, you can avoid manually configuring IP addresses of Citrix SD-WAN deployed locations through the PowerShell script. For detailed information on NLS, see Citrix Workspace Network Location Service.

You can enable NLS for all sites within the network or specific sites. The site enabled for NLS shares the Public IP address of all its internet WAN links along with other site details such as geographical location, time zone with the NLS database. With these details, the network location service determines if the user connecting to Citrix Virtual Apps and Desktops™ is on a network front ended by Citrix SD-WAN.

If a user request is coming from a network front ended by Citrix SD-WAN, the user is connected directly to Citrix Virtual Apps and Desktops Virtual Delivery Agent bypassing the Citrix® Gateway service.

To enable NLS, at the customer level, navigate to **Configuration > Network Location Service**.



Select **Enable** if you want to enable NLS for all sites in the network. To enable NLS for specific sites, click **Select Sites**. Choose the **Region** and select the sites accordingly. Click **Save** and then **Deploy**.

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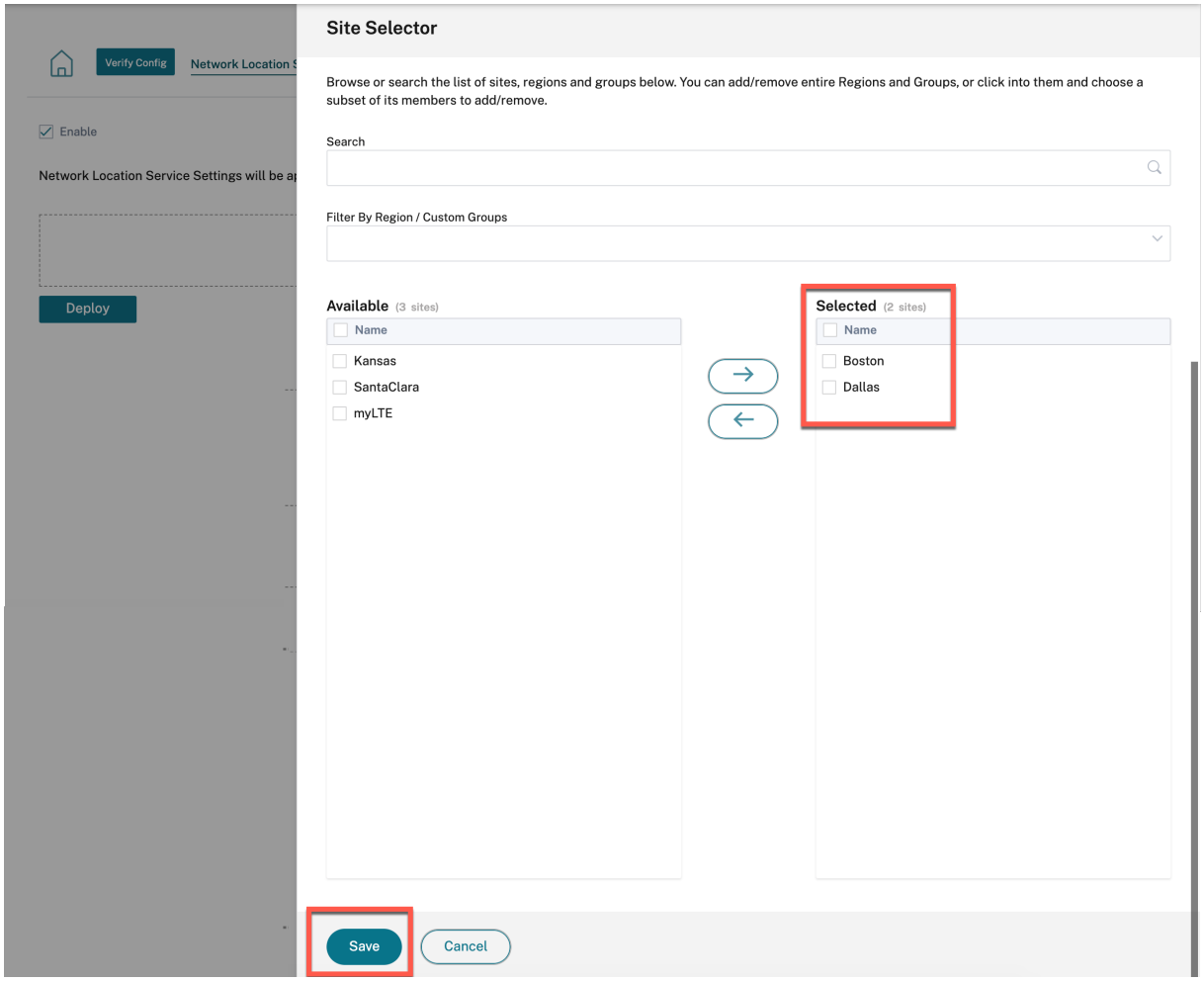

Site configuration

September 27, 2025

You can add new sites from the **Network Home** page or from the **Profiles & Templates** section to configure your SD-WAN network.

To create a site, click **+ New site** on the Network Dashboard. Provide a name and location for the site.

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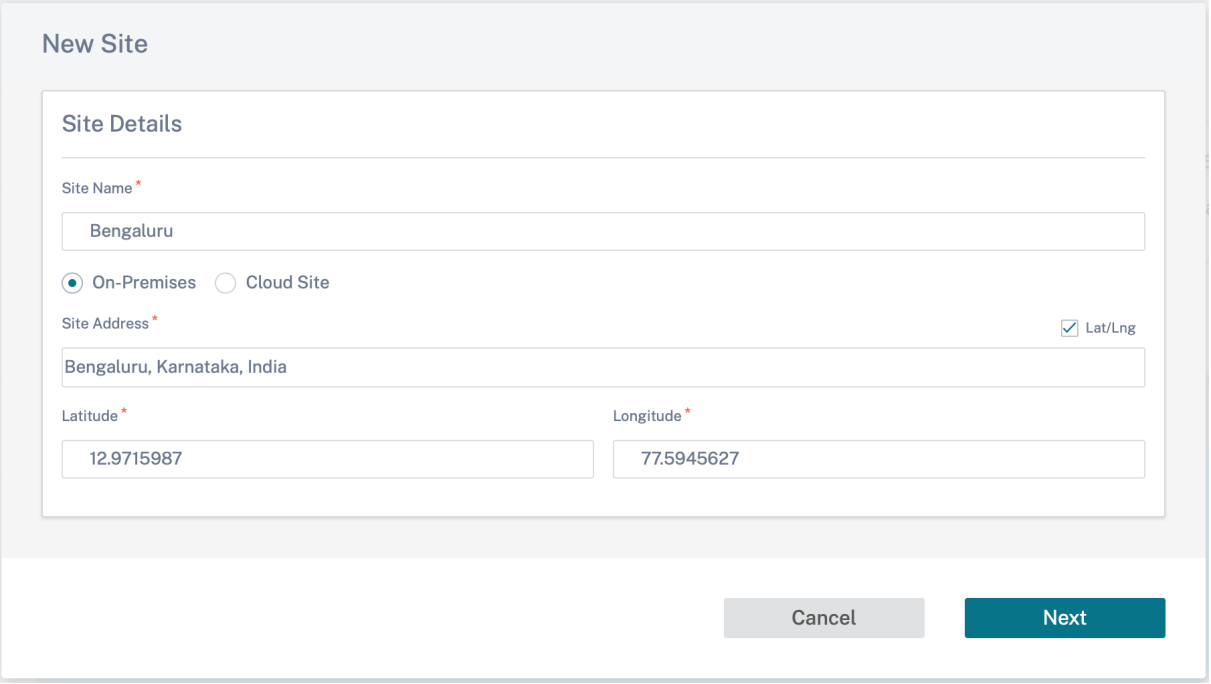

You can create a site from scratch, or use a site profile to configure a site quickly.

A graphical display to the right of the screen provides a dynamic topology diagram as you proceed with the configuration.

To view site configuration, select site and navigate to **Configuration > Site Configuration**.

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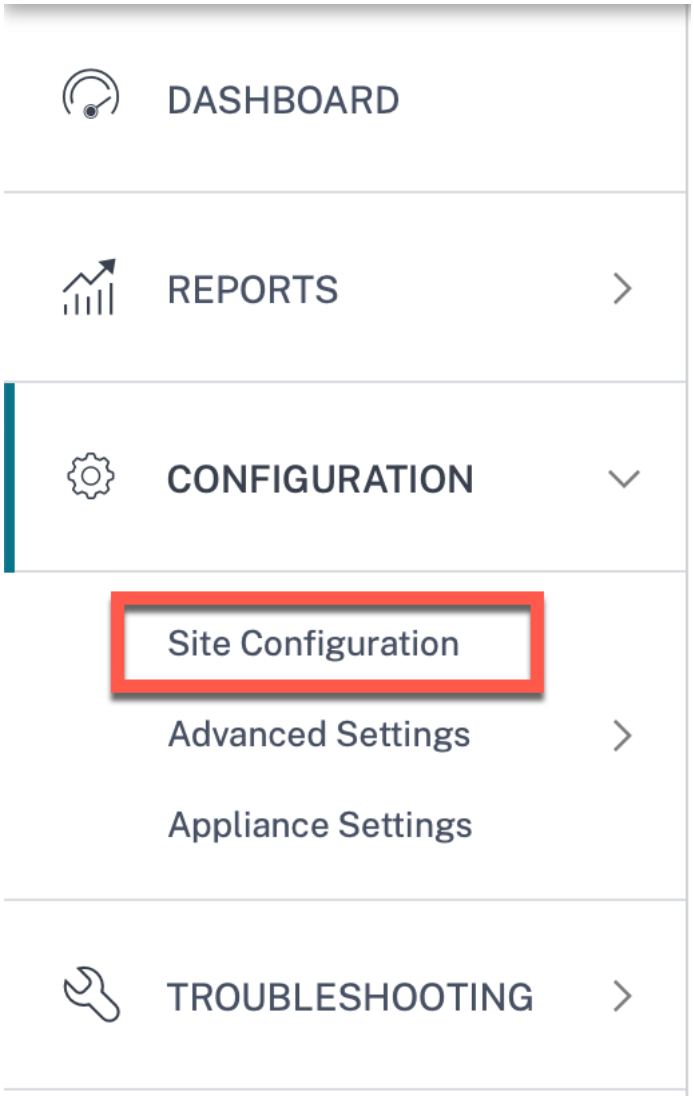

Site details

The first step involves entering the site, device, advanced settings, and site contact details.

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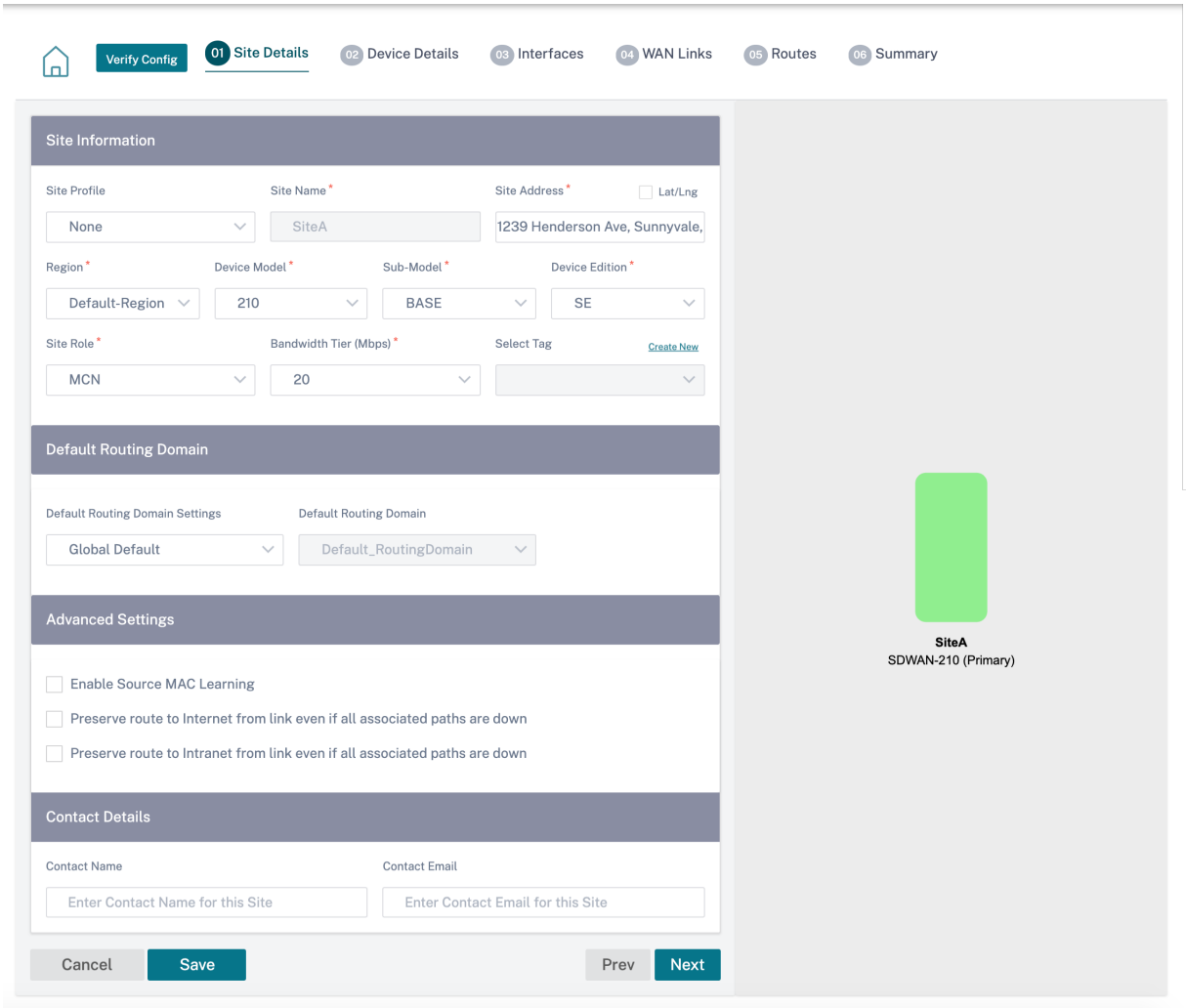

When you configure sites using a site template, the following screen is displayed.

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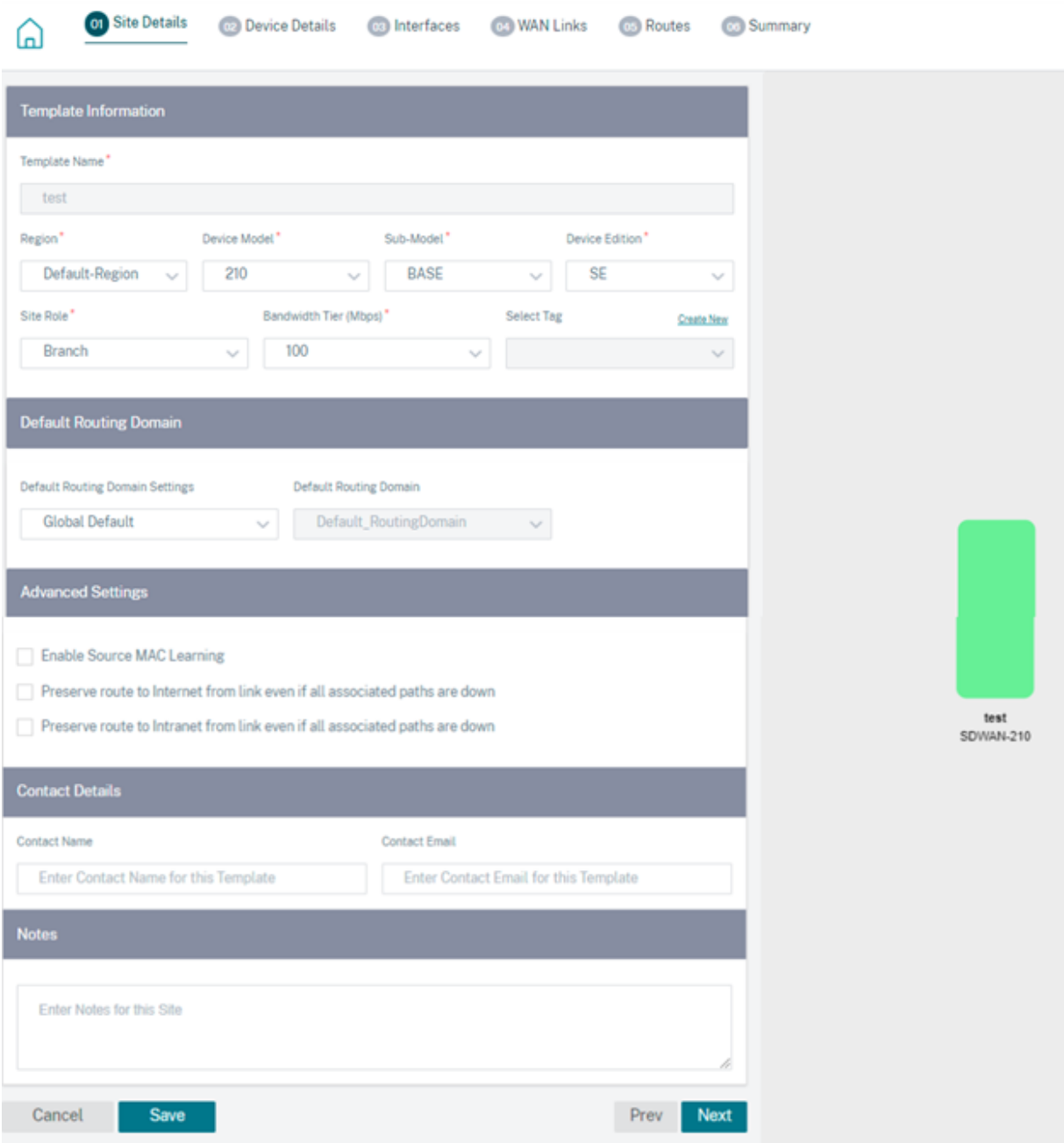

Site/Template information

- Choosing a **Site Profile** auto-populates the site, interface, and WAN links parameters based on the site profile configuration.
- **Site Address** and **Site Name** are auto-populated based on the details provided in the previous step.
- Enable the **Lat/Lng** check box to get the latitude and longitude of a site.

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- Select the **Region** from the drop-down list.
- **Device Model** and **Sub-Model** can be picked based on the hardware model or virtual appliance used at a given site.
- **Device Edition** reflects automatically based on the selected device model. Currently, Premium Edition (PE), Advanced Edition (AE), and Standard Edition (SE) are supported. The PE model is only supported on 1100, 2100, 5100, and 6100 platforms. The AE model is supported on 210 and 1100 platforms.

  > **Note**
  >
  > Citrix SD-WAN Orchestrator service does not support Advanced Edition and Premium Edition platforms.

- **Site Role** defines the role of the device. You can assign one of the following roles to a site:
  - **MCN**: Master Control Node (MCN) serves as the controller of the network, and only one active device in a network can be designated as the MCN.
  - **Branch**: Appliances at the branch sites that receive configuration from the MCN and participate in establishing virtual WAN functionalities to the branch offices. There can be multiple branch sites.
  - **RCN**: Regional Control Node (RCN) supports hierarchical network architecture, enabling multi-region network deployment. MCN controls multiple RCNs and each RCN, in turn, controls multiple branch sites.
  - **Geo-redundant MCN**: A site in a different location, that takes over the management functions of the MCN, if it is not available, ensuring disaster recovery. The geo-redundant MCN does not provide High Availability or failover capabilities for the MCN.
  - **Geo-Redundant RCN**: A site in a different location, that takes over the management functions of the RCN, if it is not available, ensuring disaster recovery. The geo-redundant RCN does not provide High Availability or failover capabilities for the RCN.
- **Bandwidth Tier** is the billable bandwidth capacity you can configure on any device, depending on the device model. For instance, the SD-WAN 410 Standard Edition (SE) appliance supports 20, 50, 100, 150, and 200 Mbps bandwidth tiers. Depending on your bandwidth needs for a given site, you can select the desired tier. Each site is billed for the configured bandwidth tier.

Routing domain

The **Routing Domain** section allows you to select the default routing domain for the site. **Routing Domain** settings can either be global or site specific. If you select **Global Defaults**, the default routing domain that is applicable globally is auto-selected. If you select **Site Specific**, you can select the default routing domain from the **Routing Domain** drop-down list.

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Routing support for LAN segmentation

The SD-WAN Standard and Enterprise Edition (SE/PE) appliances implement LAN segmentation across distinct sites where either appliance is deployed. The appliances recognize and maintain a record of the LAN side VLANs available, and configure rules around what other LAN segments (VLANs) can connect to at a remote location with another SD-WAN SE/PE appliance.

The above capability is implemented by using a Virtual Routing and Forwarding (VRF) table that is maintained in the SD-WAN SE/PE appliance, which keeps track of the remote IP address ranges accessible to a local LAN segment. This VLAN-to-VLAN traffic would still traverse the WAN through the same pre-established Virtual Path between the two appliances (no new paths need to be created).

An example use case for this functionality is that a WAN administrator might be able to segment local branch networking environment through a VLAN, and provide some of those segments (VLANs) access to DC-side LAN segments that have access to the internet, while others might not obtain such access. The configuration of the VLAN-to-VLAN associations is achieved through the Citrix SD-WAN Orchestrator service web interface.

Advanced settings

- **Enable Source MAC Learning**: Stores the source MAC address of received packets so that outgoing packets to the same destination can be sent to the same port.
- **Preserve route to Internet from link even if all associated paths are down**: When enabled, the packets destined for the internet service continue to choose the internet service even if all WAN Links for the internet service are unavailable.
- **Preserve route to Intranet from link even if all associated paths are down**: When enabled, the packets destined for the intranet service continue to choose the intranet service even if all WAN Links for the intranet service are unavailable.
- Contact details of the admin available at the site.

A dynamic network diagram to the right of the configuration panel, provides visual feedback on an ongoing basis, as you go through the configuration process.

Device details

The device details section allows you to configure and enable High Availability (HA) at a site. With HA, two appliances can be deployed at a site as an active primary and a passive secondary. The secondary appliance takes over when the primary fails. For more information, see High Availability.

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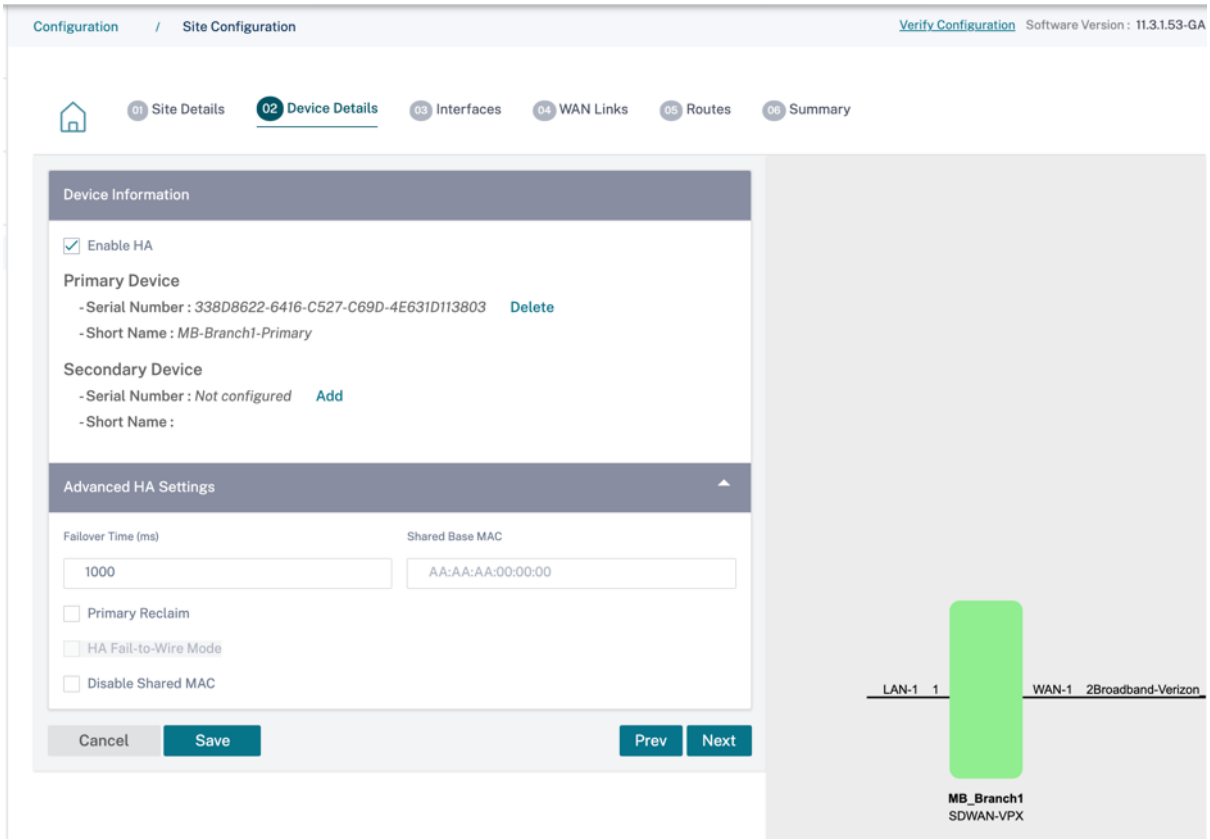

> **Note**
>
> Serial numbers are not configurable using the site templates.

Device information

Enable HA and enter the serial number and a short name for the primary and the secondary appliances. Click **Add** and provide the serial number along with the site short name.

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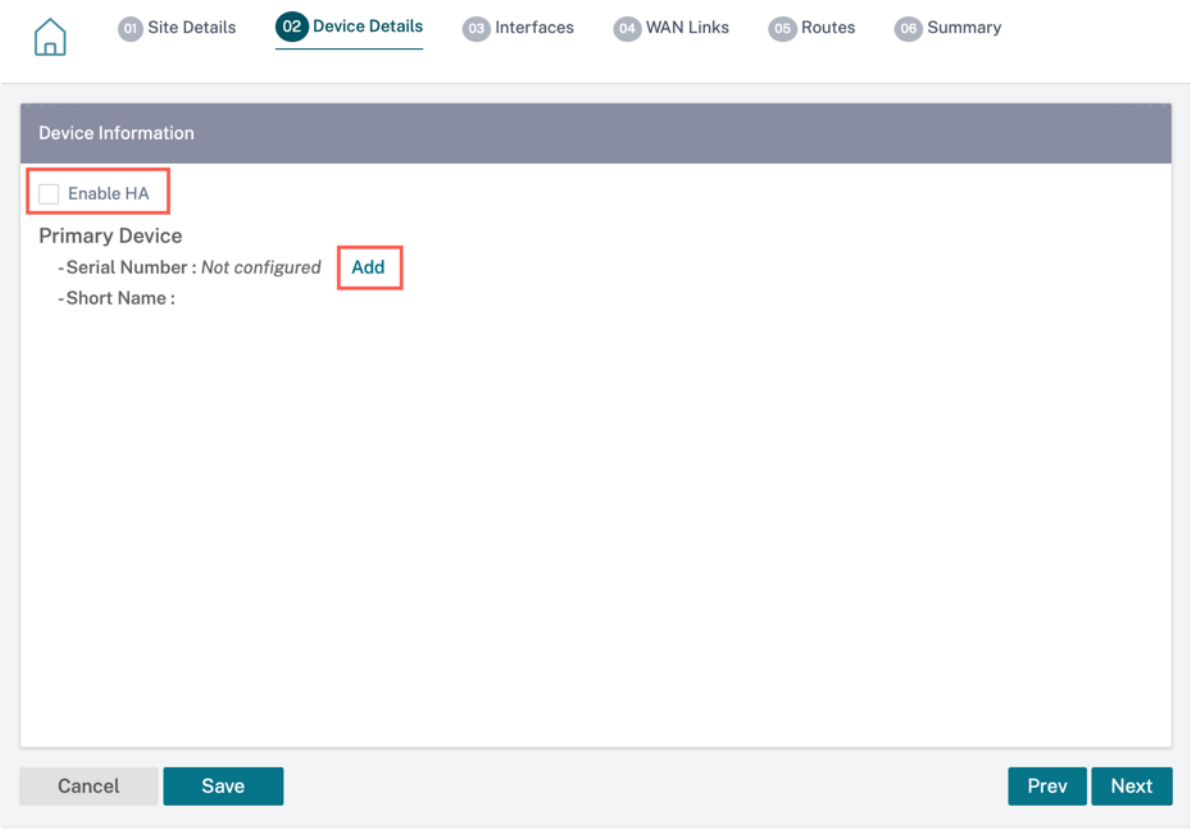
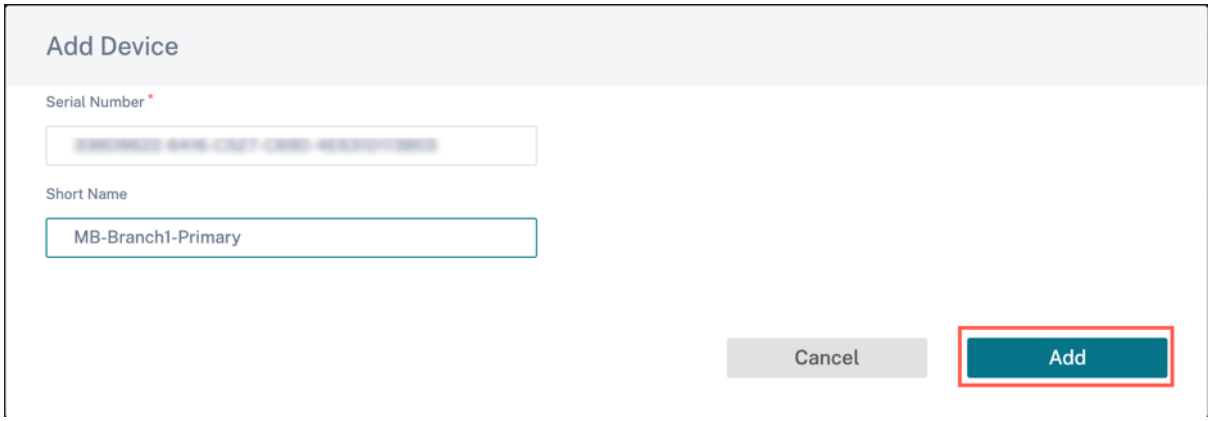


Click **Add**.



- **Serial Number**: The **Serial Number** of a virtual SD-WAN instance (VPX) can be accessed from the VPX web console, as highlighted in the following screen shot. A serial number of a hardware appliance can be found on the device label too.

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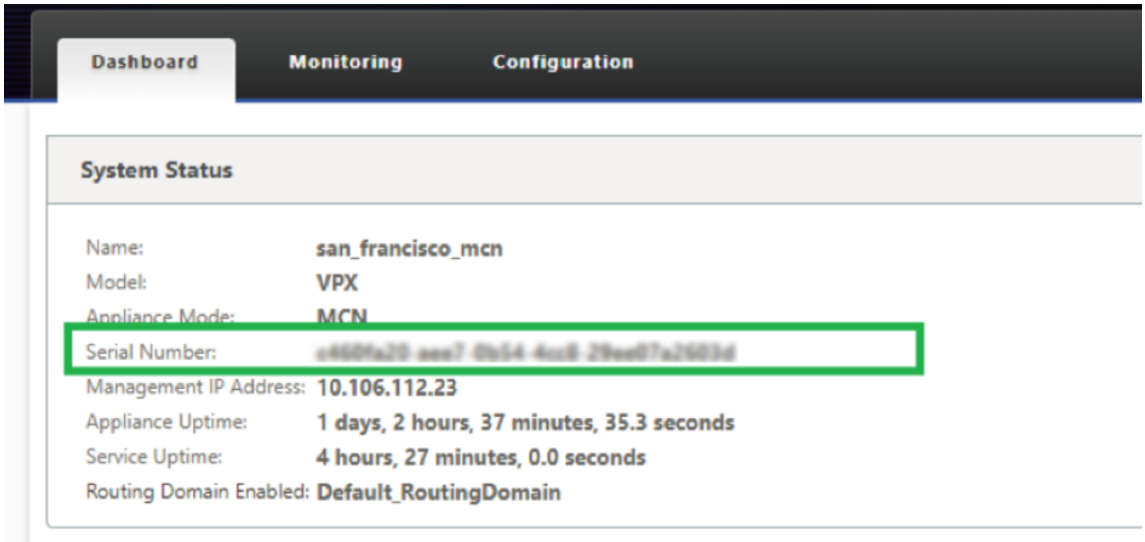
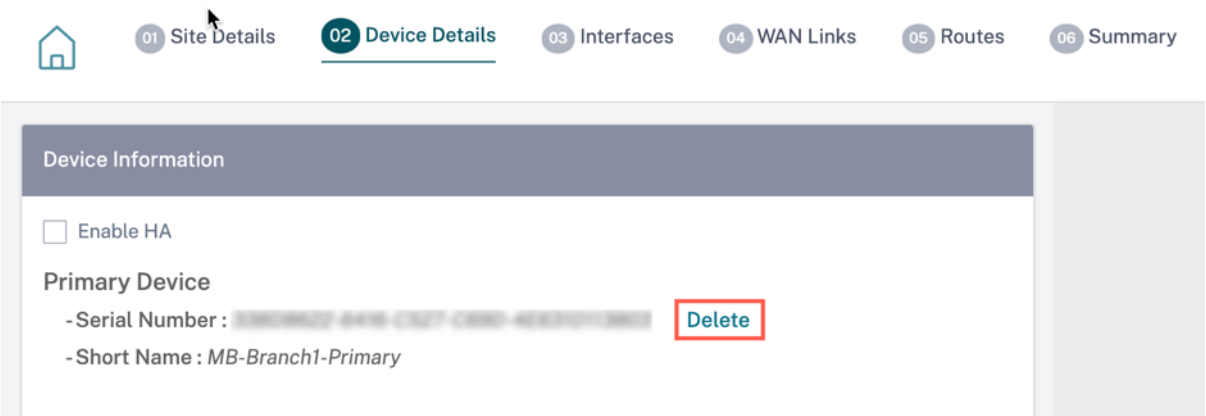


- **Short Name**: The **Short Name** field is used to specify an easily identifiable short name for a site or to tag a site if desired.

Click the **Delete** option if you want to delete the serial number.

> **Note**
> Updating serial number requires deleting the existing serial number and readding a new one.



On clicking the **Delete** option, a pop-up appears to confirm if you want to delete the serial number or not.

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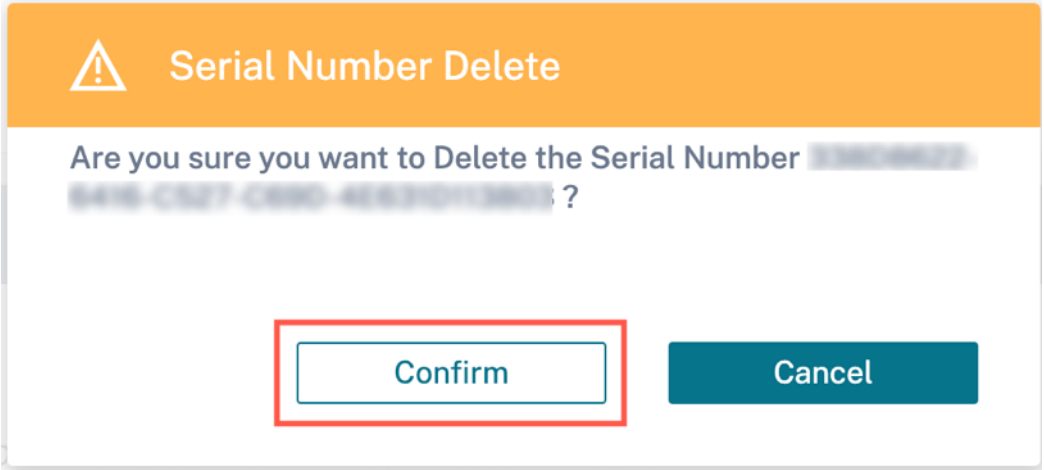

Advanced HA settings

- **Failover Time (ms)**: The wait time after contact with the primary appliance is lost, before the standby appliance becomes active.
- **Shared base MAC**: The shared MAC address for the high availability pair appliances. When a failover occurs, the secondary appliance has the same virtual MAC addresses as the failed primary appliance.
- **Disable Shared Base MAC**: This option is available on hypervisor and cloud-based platforms only. Choose this option to disable the shared virtual MAC address.
- **Primary Reclaim**: The designated primary appliance reclaims control upon restart after a failover event.
- **HA Fail-to-Wire Mode**: The HA Fail-to-wire mode is enabled. For more details, see HA deployment modes.
- **Enable Y-Cable Support**: The Small Form-factor Pluggable (SFP) ports can be used with a fiber optic Y-Cable to enable the high availability feature for Edge Mode deployment. This option is available on Citrix SD-WAN 1100 SE/PE appliances only. For more information, see Enable Edge Mode High Availability Using Fiber Optic Y-Cable.

Wi-Fi details

You can configure a Citrix SD-WAN™ appliance that supports Wi-Fi as a Wi-Fi Access Point.

The following two variants of Citrix SD-WAN 110 platform support Wi-Fi and can be configured as a Wi-Fi access point:

- Citrix SD-WAN 110-WiFi-SE
- Citrix SD-WAN 110-LTE-WiFi

For more details on Wi-Fi configuration, see Wi-Fi Access Point

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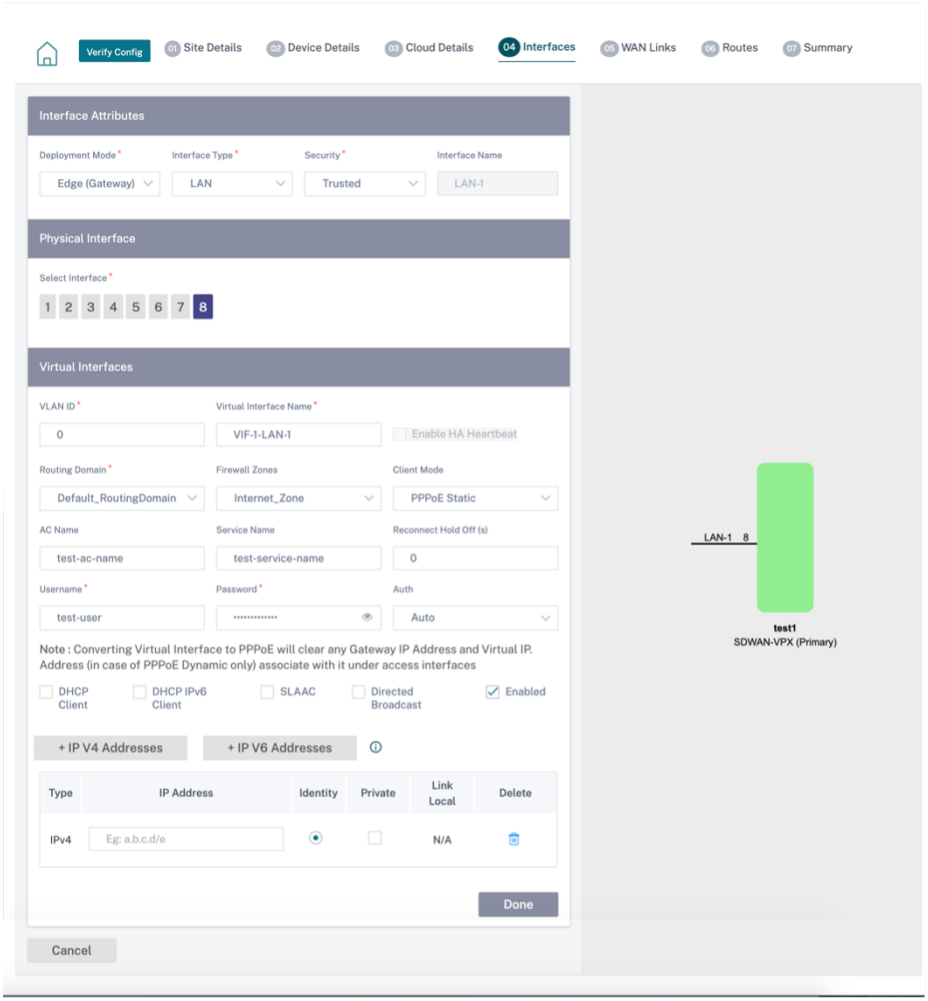
Interfaces

The next step is to add and configure the interfaces. Click **+ Interface** to start configuring the interface. Click **+ HA Interface** to start configuring HA interface. The **+ HA Interface** option is available only if you have configured a secondary appliance for high availability.

Interface configuration involves selecting the deployment mode and setting the interface level attributes. This configuration is applicable to both LAN and WAN links.



In-band management

In-band management allows you to use the SD-WAN data ports for management. It carries both data and management traffic, without having to configure an extra management path. In-band management allows virtual IP addresses to connect to management services such as web UI and SSH. You can access the web UI and SSH using the management IP and in-band virtual IPs.

To enable in-band management, choose an IPv4 address from the **InBand Management IP** drop-

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down list or an IPv6 address from the **InBand Management IPv6** drop-down list. Select the **DNS proxy** to which all DNS requests over the in-band and backup management plane is forwarded to from the **InBand Management DNS** or **InBand Management DNS V6** drop-down list.

For more information on in-band management, see In-band management.

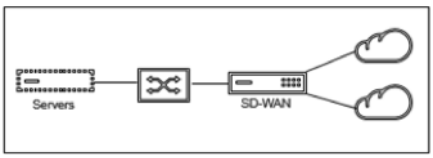
The IP addresses configured for interfaces get listed under the **InBand Management IP** drop-down list. The DNS proxy services configured under **Advanced Settings > DNS** get listed in the **InBand Management DNS** drop-down list.

Interface attributes

The following deployment modes are supported:

1. Edge (Gateway)
2. Inline –Fail-to-wire, Fail-to-block, and Virtual inline.

- **Deployment Mode**: Select one of the following deployment modes.
  - **Edge (Gateway)**:

    Gateway Mode implies SD-WAN serves as the “gateway”to the WAN for all the LAN traffic. The **Gateway Mode** is the default mode. You can deploy the appliance as a gateway on the LAN side or the WAN side.

  - **Inline**:

    When SD-WAN is deployed in-line between a LAN switch and a WAN router, SD-WAN is expected to “bridge”LAN and WAN.

    All the Citrix SD-WAN appliances have pre-defined bridge-paired interfaces. With the Bridge option enabled, selection of any interface on the LAN end automatically highlights the paired interface that is reserved for the WAN end of the bridge. For example, physical interfaces 1 and 2 are a bridged pair.

    - **Fail-To-Wire**: Enables a physical connection between the bridged pair of interfaces, allowing traffic to bypass SD-WAN and flow directly across the bridge in the event of appliance restart or failure.

    Earlier, the DHCP client was only supported on Fail-to-block port. With the Citrix SD-WAN 11.2.0 release, the DHCP client capability is extended on fail-to-wire port for the branch site with serial High Availability (HA) deployments. This enhancement:

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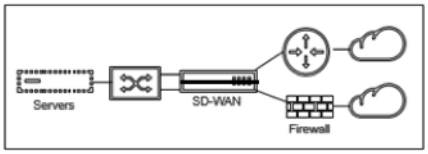
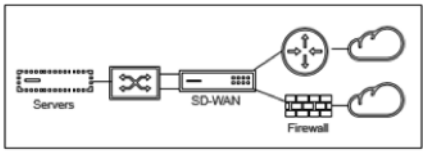
- Allows the DHCP client configuration on untrusted interface group that has fail-to-wire bridge pair and serial HA deployments.
- Allows DHCP interfaces to be selected as part of Private Intranet WAN links.

> **Notes**
>
> - Inline (Fail-to-Wire) option is available only on hardware appliances and not on virtual appliances (VPX / VPXL).
> - DHCP client is now supported on the private intranet link.
> - A LAN interface must not be connected into the fail-to-wire pair as packets might be bridged between the interfaces.

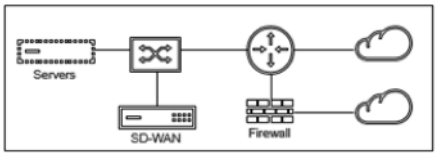


- **Fail-to-Block**: This option disables the physical connection between the bridged pair of interfaces on hardware appliances, preventing traffic from flowing across the bridge in the event of appliance restart or failure.

> **Note**
>
> Inline (Fail-to-Block) is the only bridge mode option available on virtual appliances (VPX / VPXL).



- **Virtual Inline (One-Arm)**:



When SD-WAN is deployed in this mode, it has a **single arm** connecting it to the WAN router, LAN, and WAN sharing the same interface on SD-WAN. Therefore, the interface settings are shared between the LAN and WAN links.

- **Interface Type:** Select the interface type from the drop-down list.
- **Security (Trusted / Untrusted)**: Specifies the security level of the interface. Trusted segments are protected by a Firewall.

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- **Interface Name:** Based on the selected deployment mode, the **Interface Name** field is auto filled.

Physical interface

- **Select Interface:** Select the configurable Ethernet port that is available on the appliance.

Virtual interface

- **VLAN ID**: The ID for identifying and marking traffic to and from the interface.
- **Virtual Interface Name:** Based on the selected deployment mode, the **Virtual Interface Name** field is auto filled.
- **Enable HA Heartbeat**: Enable syncing of HA heartbeats over this interface. This option is enabled if you have configured a secondary appliance for HA. Select this option to allow primary and secondary appliances to synchronize the HA heartbeats over this interface. Specify the IP address of the primary and secondary appliance.
- **Routing Domain**: The routing domain that provides a single point of administration of the branch office network, or a data center network.
- **Firewall Zones**: The firewall zone to which the interface belongs. Firewall zones secure and control the interfaces in the logical zone.
- **Client Mode:** Select **Client Mode** from the drop-down list. On selection of PPPoE Static displays more settings.

  > **Note**
  >
  > When the Site mode (under Site Details tab) is selected as **Branch** and the **Security field** (under **Interface** tab) is selected as **Untrusted**, the **PPPoE Dynamic** option is available under **Client Mode**.

  Citrix SD-WAN acts as a PPPoE client. For IPv4, SD-WAN obtains the dynamic IPv4 address or uses the static IPv4 address. For IPv6, it obtains the link local address from the PPPoE server. For the IPv6 unicast address, Static IP, DHCP, or SLAAC can be used.
- **DHCP Client**: When enabled on the virtual interfaces, the DHCP Server assigns dynamically IPv4 addresses to the connected client.
- **DHCP IPv6 Client**: When enabled on the virtual interfaces, the DHCP Server dynamically assigns IPv6 addresses to the connected client.
- **SLAAC**: This option is available only for IPv6 addresses. When selected, the interface obtains IPv6 addresses through Stateless Address Auto-configuration (SLAAC).

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- **Directed Broadcast**: When the **Directed Broadcast** check box is selected, the directed broadcasts are sent to the virtual IP subnets on the virtual interface.
- **Enabled**: By default, the **Enabled** check box is selected for all virtual interfaces. If you want to disable the virtual interface, clear the **Enabled** check box.

  > **Note**
  >
  > - The **Enabled** check box is available only from Citrix SD-WAN release 11.3.1 onwards.
  > - The option to disable a virtual interface is only available when it is not used by a WAN Link Access Interface. If the virtual interface is used by a WAN Link Access Interface, then the check box is read-only and selected by default.
  > - While configuring other features, along with enabled virtual interfaces, the disabled virtual interfaces also get listed, except under **Access Interfaces** for a **WAN Link**. Even if you select a disabled virtual interface, the virtual interface is not considered and does not impact the network configuration.

- **+ IPv4 Address**: The virtual IPv4 address and netmask of the interface.
- **+ IPv6 Address**: The virtual IPv6 address and prefix of the interface.
- **Identity**: Choose an identity to be used for IP services. For example, **Identity** is used as the Source IP Address to communicate with BGP neighbors.
- **Private**: When enabled, the Virtual IP Address is only routable on the local appliance.

> **Note**
>
> - LTE ports do not support static IP addresses (IPv4 and IPv6).
> - LTE ports support both DHCP and SLAAC. Configuring DHCPv4 or DHCPv6 is mandatory. SLAAC is optional.
> - In LTE ports, Link-Local addresses can be configured for IPv6 or SLAAC.

PPPoE credentials

Point-to-Point Protocol over Ethernet (PPPoE) connects multiple computer users on an Ethernet LAN to a remote site through common customer premises appliances, for example; Citrix SD-WAN. PPPoE allows users to share a common Digital Subscriber Line (DSL), cable modem, or wireless connection to the Internet. PPPoE combines the Point-to-Point Protocol (PPP), commonly used in dialup connections, with the Ethernet protocol, which supports multiple users in a LAN. The PPP protocol information is encapsulated within an Ethernet frame.

Citrix SD-WAN appliances use PPPoE to support ISP to have ongoing and continuous DSL and cable modem connections unlike dialup connections. PPPoE provides each user-remote site session

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to learn each other's network addresses through an initial exchange called "discovery". After a session is established between an individual user and the remote site, for example, an ISP provider, the session can be monitored. Corporations use shared Internet access over DSL lines using Ethernet and PPPoE.

Citrix SD-WAN acts as a PPPoE client. For IPv4, SD-WAN obtains the dynamic IPv4 address or uses the static IPv4 address. For IPv6, it obtains the link local address from the PPPoE server. For the IPv6 unicast address, Static IP, DHCP, or SLAAC can be used.

The following is required to establish successful PPPoE sessions:

- Configure virtual network interface (VNI).
- Unique credentials for creating PPPoE session.
- Configure WAN link. Each VNI can have only one WAN link configured.
- Configure Virtual IP address. Each session obtains a unique IP address, dynamic, or static, based on the provided configuration.
- Deploy the appliance in bridge mode to use PPPoE with static IP address and configure the interface as "trusted."
- Static IP is preferred to have a configuration to force the server proposed IP; if different from the configured static IP, an error can occur.
- Deploy the appliance as an Edge device to use PPPoE with dynamic IP and configure the interface as "untrusted."
- Authentication protocols supported are, PAP, CHAP, EAP-MD5, EAP-SRP.
- Maximum number of multiple sessions depends on the number of VNIs configured.
- Create multiple VNIs to support Multiple PPPoE sessions per interface group.

> **Note**
>
> Multiple VNIs are allowed to create with the same 802.1Q VLAN tag.

Limitations for PPPoE configuration:

- 802.1q VLAN tagging is not supported.
- EAP-TLS authentication is not supported.
- Address/Control compression.
- Deflate Compression.
- Protocol field compression negotiation.
- Compression Control Protocol.
- BSD Compress Compression.
- IPX protocols.
- PPP Multi Link.
- Van Jacobson style TCP/IP header compression.
- Connection-ID compression option in Van Jacobson style TCP/IP header compression.

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- PPPoE is not supported on LTE interfaces.

From Citrix SD-WAN 11.3.1 release, an extra 8 bytes PPPoE header is considered for adjusting TCP Maximum Segment Size (MSS). The extra 8 bytes PPPoE header adjusts the MSS in the synchronize packets based on the MTU. The supported MTU ranges from 1280 bytes to 1492 bytes.

PPPoE configuration On an MCN, you can configure only PPPoE static. On a branch, you can configure either PPPoE static or PPPoE dynamic.

To configure PPPoE, at the site level configuration, navigate to **Configuration > Site Configuration > Interfaces** tab. In the **Virtual Interfaces** section, select the appropriate PPPoE option from the **Client Mode** drop-down list.

> **Note**
>
> - A VNI configured with multiple interfaces can have only one interface used for PPPoE connectivity.
> - If a VNI configured with multiple interfaces and a PPPoE connectivity is changed to a different interface, then the **Reports > Real Time > PPPoE** page can be used to stop the existing session and start a new session. The new session can then be established over the new interface.
> - If PPPoE Dynamic is selected, the VNI is required to be “Untrusted.”

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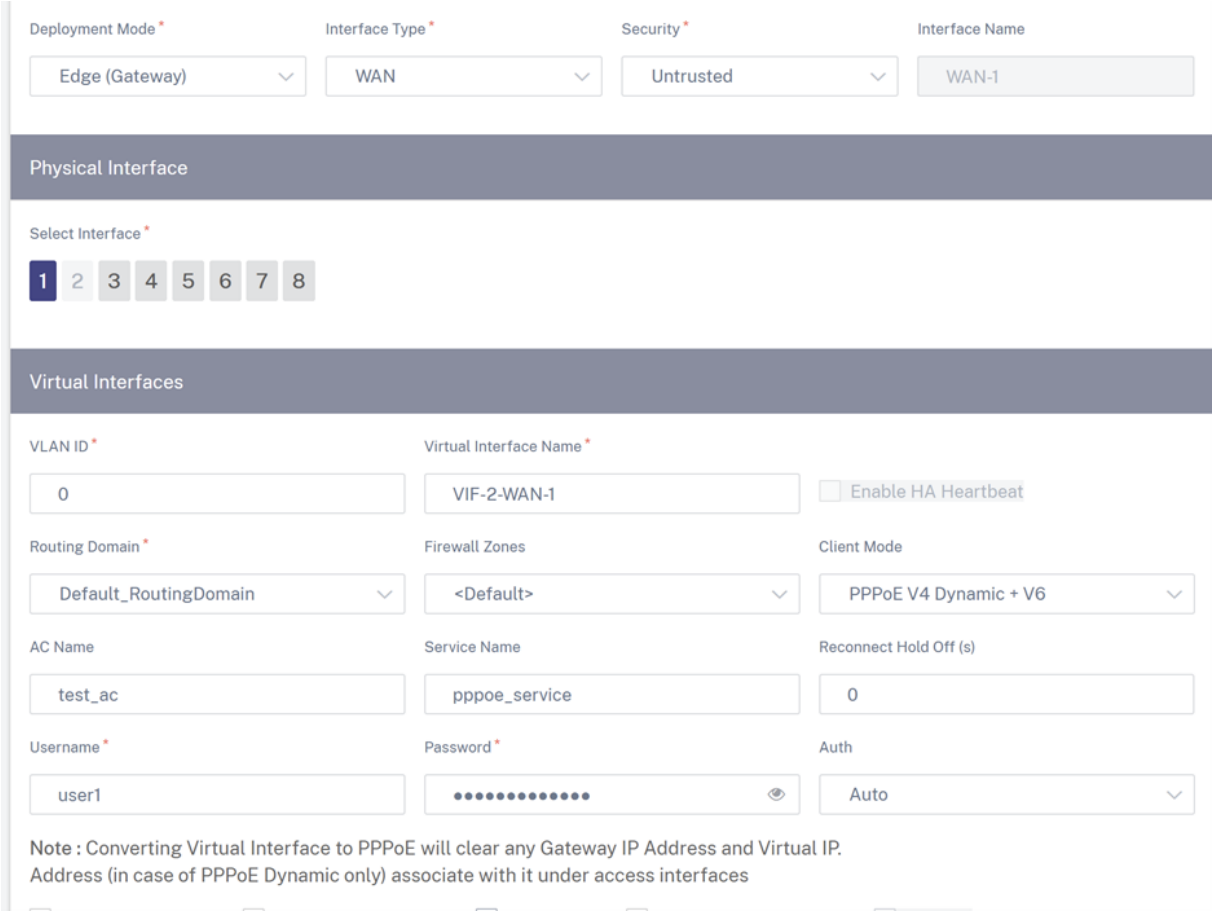

- **AC Name:** Provide the Access Concentrator (AC) name for the PPPoE configuration.
- **Service Name:** Enter a service name.
- **Reconnect Hold Off (s):** Enter the reconnect attempt hold off time.
- **User Name:** Enter the user name for the PPPoE configuration.
- **Password:** Enter the password for the PPPoE configuration.
- **Auth:** Select the authorization protocol from the drop-down list.
    - When the **Auth** option is set to Auto, the SD-WAN appliance honors the supported authentication protocol request received from the server.
    - When the **Auth** option is set to PAP/CHAP/EAP, then only specific authentication protocols are honored. If PAP is in the configuration and the server sends an authentication request with CHAP, the connection request is rejected. If the server does not negotiate with PAP, an authentication failure occurs.

Only one WAN link creation is allowed per PPPoE static or dynamic VNI. The WAN link configuration varies depending on the VNI selection of the Client Mode.

If the VNI is configured with PPPoE dynamic client mode:

- IP address and Gateway IP address fields become inactive.

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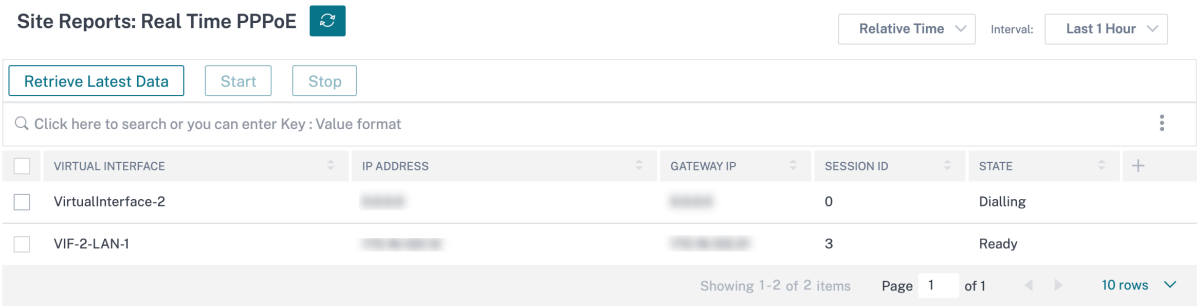
- Virtual path mode is set to “Primary.”
- Proxy ARP cannot be configured.

By default, Gateway MAC Address Binding is selected.

If the VNI is configured with PPPoE static client mode, then configure the IP address.

> **Note**
>
> If the server does not honor the configured static IP address and offers a different IP address, an error occurs. The PPPoE session tries to re-establish connection periodically, until the server accepts the configured IP address.

PPPoE Monitoring and Troubleshooting At the site level, navigate the **Reports > Real Time > PPPoE** section to view information about the configured VNIs with the PPPoE static or dynamic client mode. It allows you to manually start or stop the sessions for troubleshooting purposes.



When there is a problem in establishing a PPPoE session:

- Hovering the mouse over the failed status shows the reason for the recent failure.
- To establish a fresh session or for troubleshooting an active PPPoE session, restart the session.
- If a PPPoE session is stopped manually, it cannot be started until either it is manually started and a configuration change is activated, or the service is restarted.

A PPPoE session might fail due to the following reasons:

- When SD-WAN fails to authenticate itself to the peer due to an incorrect username/password in the configuration.
- PPP negotiation fails - negotiation does not reach the point where at least one network protocol is running.
- System memory or system resource issue.
- Invalid/bad configuration (wrong AC name or service name).
- Failed to open serial port due to operating system error.
- No response received for the echo packets (link is bad or the server is not responding).
- There were several continuous unsuccessful dialing sessions with in a minute.

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After 10 consecutive failures, the reason for the failure is observed.

- If the failure is normal, it restarts immediately.
- If the failure is an error then restart reverts for 10 seconds.
- If the failure is fatal the restart reverts for 30 seconds before restarting.

LCP Echo request packets are generated from SD-WAN for every 60 seconds and failure to receive 5 echo responses is considered as link failure and it re-establishes the session.

- If the VNI is up and ready, the IP and Gateway IP columns shows the current values in the session. It indicates that these are recently received values.
- If the VNI is stopped or is in failed state, the values are the last received values.
- Hovering the mouse over the Gateway IP column shows the MAC address of the PPPoE Access Concentrator from where the Session and IP is received.
- Hovering the mouse over the "state"value shows a message, which is more useful for a "Failed" state.

PPPoE session type	Status Color	Description
Configured	Yellow	A VNI is configured with PPPoE. This is an initial state.
Dialing	Yellow	After a VNI is configured, the PPPoE session state moves to dialing state by starting the PPPoE discovery. Packet information is captured.
Session	Yellow	VNI is moved from Discovery state to Session state, waiting to receive IP, if dynamic or waiting for acknowledgment from the server for the advertised IP, if static.
Ready	Green	IP packets are received and the VNI and associated WAN link is ready for use.
Failed	Red	PPP/PPPoE session is terminated. The reason for the failure can be due to invalid configuration or fatal error. The session attempts to reconnect after 30 seconds.

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PPPoE session type	Status Color	Description
Stopped	Yellow	PPP/PPPoE session is manually stopped.
Terminating	Yellow	An intermediate state terminating due to a reason. This state automatically starts after certain duration (5 seconds for normal error or 30 secs for a fatal error).
Disabled	Yellow	The SD-WAN service is disabled.

The *SDWAN_ip_learned.log* file contains logs related to PPPoE. Navigate to **Troubleshooting > Device Logs** to view or download the *SDWAN_ip_learned.log* file.

Wired 802.1X configuration

Wired 802.1X is an authentication mechanism that requires clients to authenticate before being able to access the LAN resources. Citrix SD-WAN Orchestrator service supports configuring wired 802.1X authentication on LAN interfaces.

In the Citrix SD-WAN network, the clients send authentication requests to the Citrix SD-WAN appliance to access the LAN resources. The Citrix SD-WAN appliance acts as an authenticator and sends the authentication requests to the authentication server. Citrix SD-WAN Orchestrator service supports only RADIUS servers to be configured as authentication servers.

When authenticating for the first time, only EAPOL packets can be processed or DHCP packets that can initialize the 802.1X authentication from the default virtual LAN. A newly connected client must be authenticated within 90 seconds. If the authentication is successful, it gets access to the LAN resources.

If the authentication fails, the client is not granted network access and all packets are dropped. The clients that are directly connected to the Citrix SD-WAN appliance can retry authentication by unplugging the Ethernet cable and reinserting it. Optionally, you can define a specific virtual LAN to grant access to limited LAN resources for the failed authentication requests. In such cases, the failed authentication requests get access to the specified virtual LAN. You can restrict access to the authenticated traffic using different routing domains or firewall zones while creating the virtual LAN.

> **Note**
>
> - The default virtual LAN must always have 802.1X enabled.

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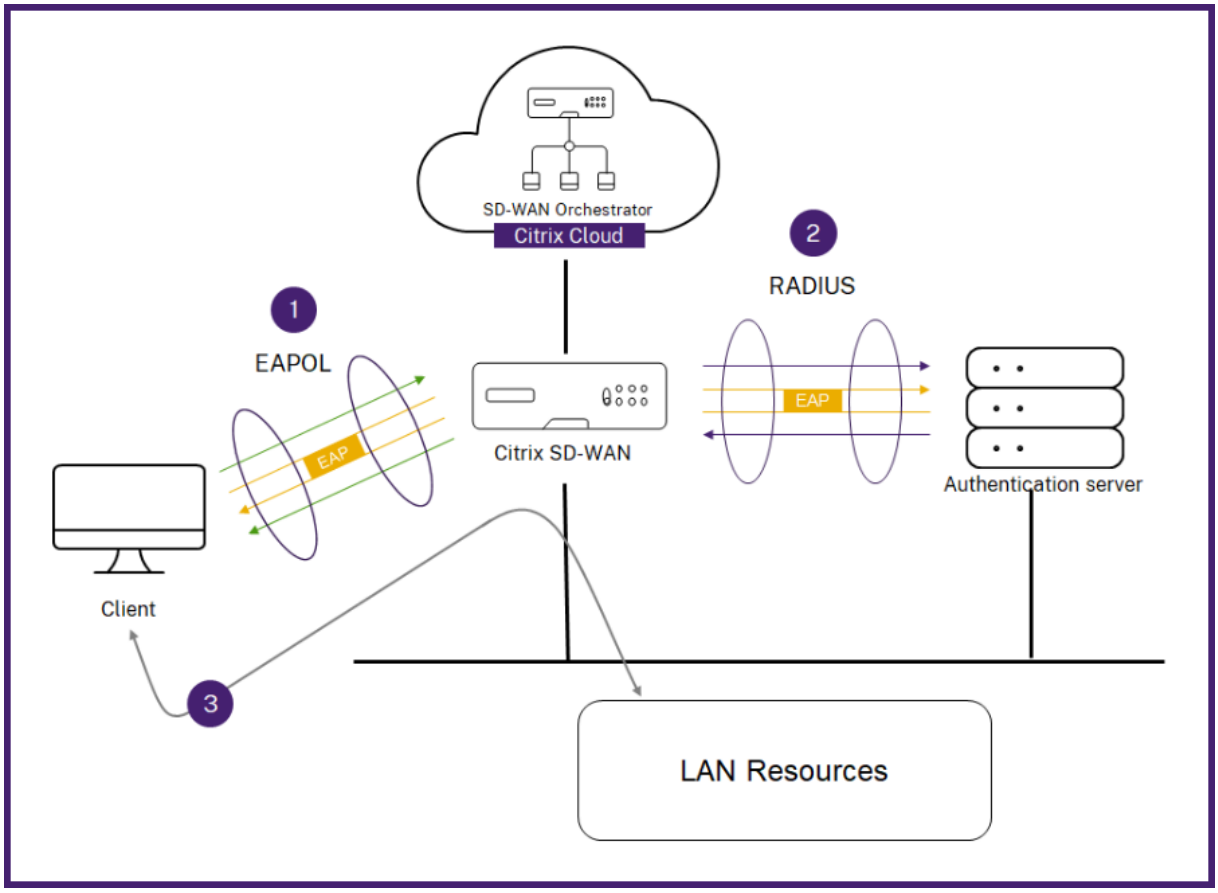
> • Dynamic virtual LANs are not supported.



The Citrix SD-WAN appliance expects to receive packets without an 802.1Q tag (untagged packets). If the Citrix SD-WAN appliance receives a packet with an 802.1Q tag set to the assigned virtual LAN, then all the packets originated from the MAC must be tagged. If a packet is received with no 802.1Q tag in the header or with a tag other than the virtual LAN that the MAC address belongs to, then the packet is dropped.

When multiple clients connected to a switch try to authenticate at the same time over a single port, each client is authenticated individually, before it can gain access to the LAN resources. The clients that fail to authenticate can retry authentication by unplugging the Ethernet cable, waiting for 3 minutes, and reinserting the Ethernet cable. Citrix SD-WAN 110, 210, and 410 platforms support a maximum of 32 clients (both authenticated and unauthenticated). All other platforms support a maximum of 64 clients (both authenticated and unauthenticated).

To configure 802.1X authentication, navigate to **Site Configuration > Interfaces** and turn on the **Enable 802.1x** toggle button. Select an existing RADIUS profile or click **Create RADIUS Profile** to create a RADIUS profile. For details on creating a RADIUS profile, see RADIUS server profiles. You can use the same RADIUS profiles for wired 802.1x and wireless WPA2-enterprise authentication, provided your appliance supports wireless WPA2-enterprise.

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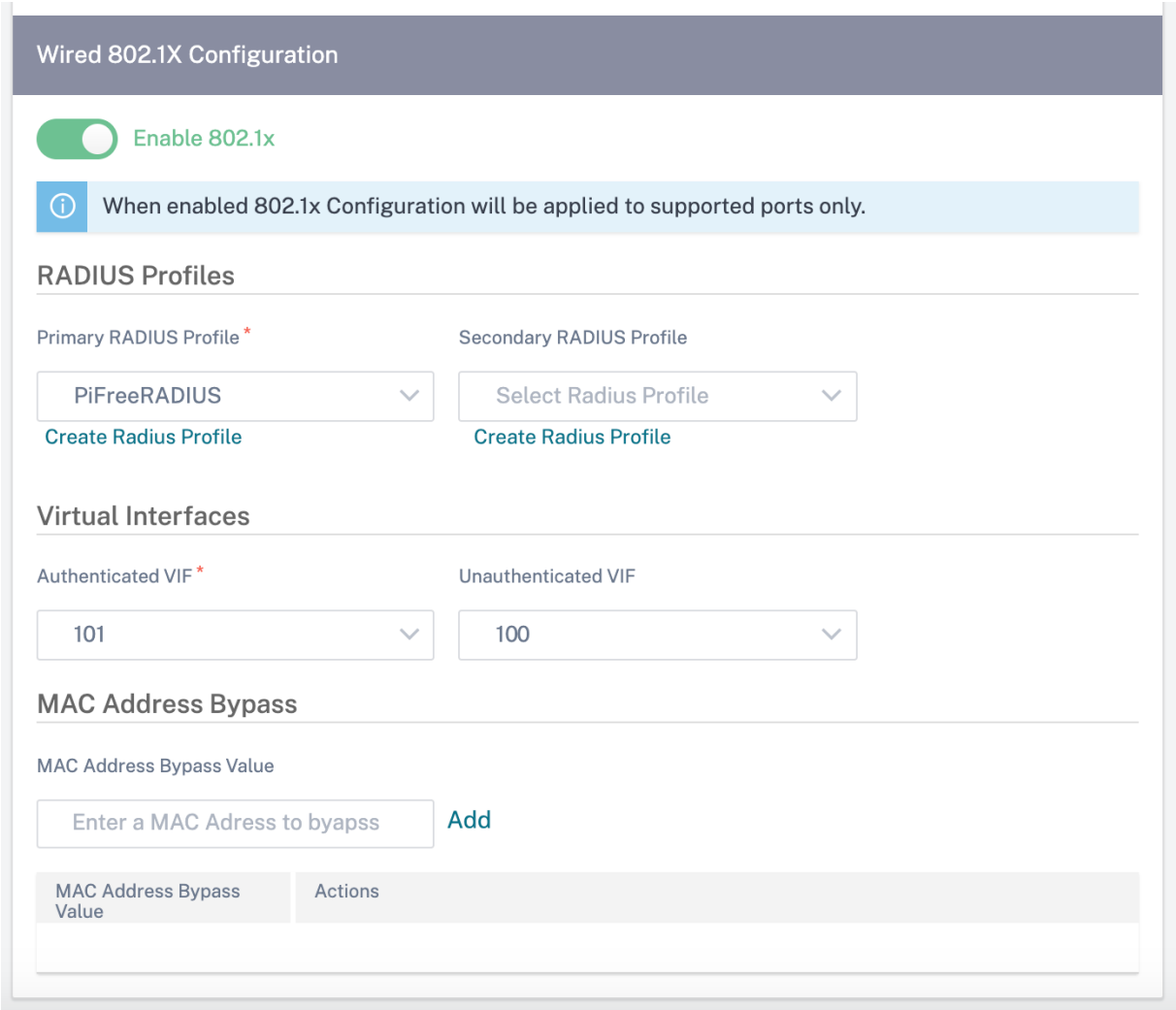
Select a virtual interface from the **Authenticated VIF** drop-down list. The selected virtual interface grants access to the LAN resources for successful authentication requests.

Optionally, you can select an interface from the **Unauthenticated VIF** drop-down list. The selected virtual interface grants access to a specific LAN resource for the failed authenticated requests.

You can add a list of MAC addresses which bypasses the authentication process. Traffic from these MAC addresses will be implicitly treated as authenticated. These MAC addresses are susceptible to malicious attacks. So, use this capability only in physically secure environments and for legacy hardware that does not support wired 802.1x authentication.



You can view the alerts associated with wired 802.1x authentication requests under **Reports > Alerts**. For more information, see Alerts.

WAN links

The next step is to configure WAN links. Click **+ WAN Link** to start configuring a WAN link.

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WAN link configuration involves setting up the WAN link access type and access interface attributes.

You can configure the **WAN link** attribute from scratch, or use a WAN link template to configure WAN link attributes quickly. If you have already used a site profile, the **WAN link** attributes auto-populate.

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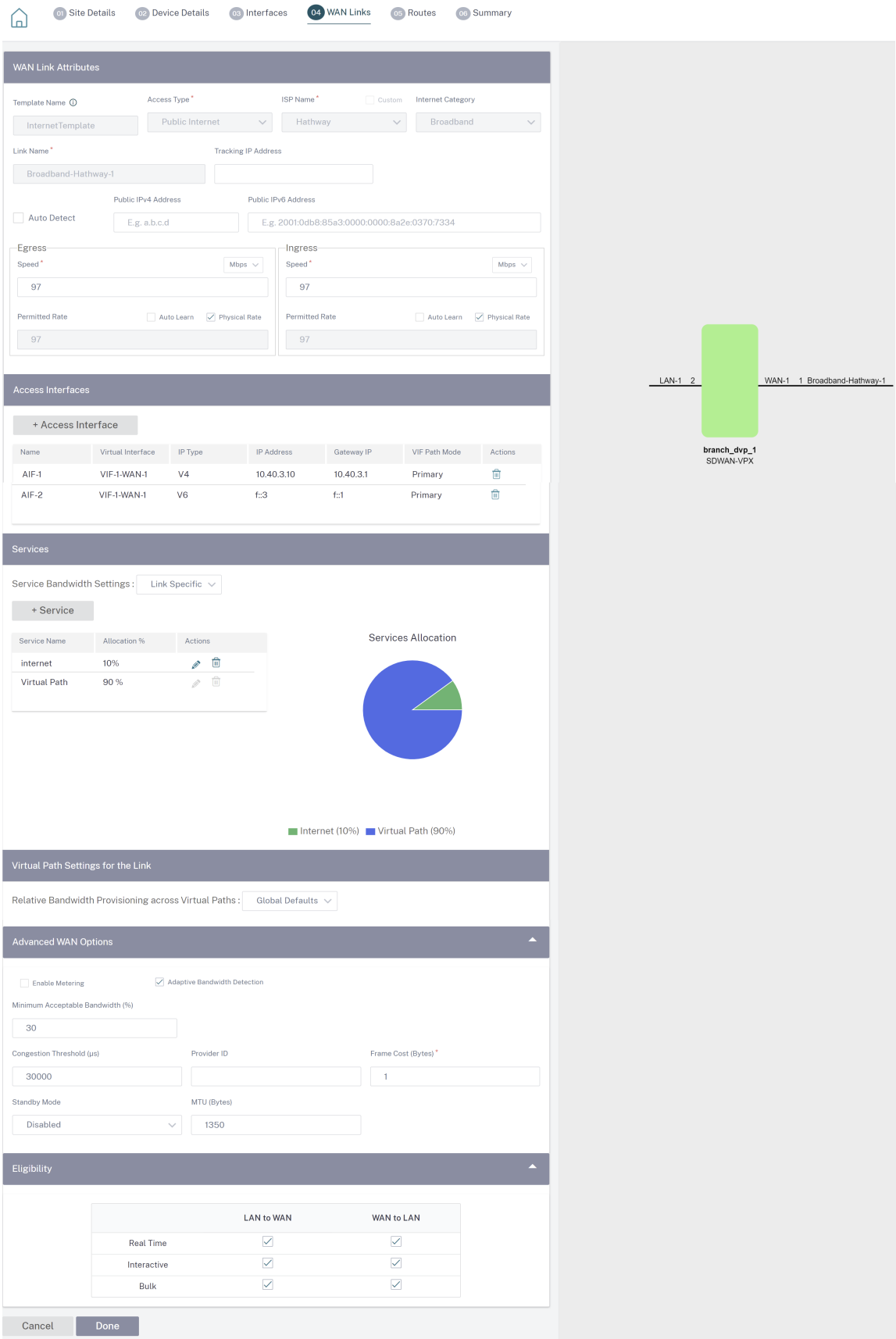
WAN link attributes



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- **Template Name**: The name of the WAN link template used to create the WAN link. The WAN link template name cannot be modified after the creation of WAN links. Once WAN links are created using a WAN link template, you cannot edit the Access Type, ISP Name, or Internet Category.
- **Access Type**: Specifies the WAN connection type of the link.
  - **Public Internet**: Indicates that the link is connected to the Internet through an ISP.
  - **Private Intranet**: Indicates that the link is connected to one or more sites within the SD-WAN network and cannot connect to locations outside the SD-WAN network.
  - **MPLS**: Specialized variant of Private Intranet. Indicates the link uses one or more DSCP tags to control the Quality of Service between two or more points on an Intranet and cannot connect to locations outside of the SD-WAN network.
- **ISP Name**: The name of the service provider.
- **Internet category**: The type of WAN link Internet access technology service (Broadband, Satellite, Fiber, LTE, and so on) enabled on the WAN link.
- **Link Name**: Auto-populated based on the previous inputs.
- **Tracking IP Address**: The Virtual IP Address on the Virtual Path that can be pinged to determine the state of the path.
- **Public IPv4 Address** and **Public IPv6 Address**: The IP address of the NAT or DNS Server. This address is applicable and exposed, only when the WAN link access type is Public Internet or Private Intranet in Serial HA deployment. Public IP can either be manually configured or auto-learned using the Auto Learn option.
- **Auto Detect**: When enabled, the SD-WAN appliance automatically detects the public IP address. This option is available only when the device role is a **branch** and not the **Master Control Node (MCN)**.
- **Egress Speed**: The WAN to LAN speed.
  - **Speed**: The available or allowed speed of the WAN to LAN traffic in Kbps or Mbps.
  - **Permitted Rate**: In cases where the entire WAN link capacity is not supposed to be used by the SD-WAN appliance, change the permitted rate accordingly.
  - **Auto Learn**: When you are unsure of the bandwidth and if the links are non-reliable, you can enable the Auto Learn feature. The Auto Learn feature learns the underlying link capacity only, and uses the same value in the future.
  - **Physical Rate**: The actual bandwidth capacity of the WAN link.
- **Ingress Speed**: The LAN to WAN speed.
  - **Speed**: The available or allowed speed of the LAN to WAN traffic in Kbps or Mbps.
  - **Permitted Rate**: In cases where the entire LAN link capacity is not supposed to be used by the SD-WAN appliance, change the permitted rate accordingly.
  - **Auto Learn**: When you are unsure of the bandwidth and if the links are non-reliable, you can enable the Auto Learn feature. The Auto Learn feature learns the underlying link capacity only, and uses the same value in the future.

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- **Physical Rate**: The actual bandwidth capacity of the LAN link.

MPLS Queues

The **MPLS queue** settings are available for WAN link access type MPLS only. This option is meant to enable definition of queues corresponding to the Service Provider MPLS queues, on the MPLS WAN Link. For information about adding MPLS queues, see MPLS queues.

Access Interface

An Access Interface defines the IP Address and Gateway IP Address for a WAN Link. At least one Access Interface is required for each WAN Link. The following are the access interface parameters:

- **Access Interface Name**: The name by which Access interface is referenced. The default uses the following naming convention: WAN_link_name-AI-number: Where WAN_link_name is the name of the WAN link you are associating with this interface, and number is the number of Access Interfaces currently configured for this link, incremented by 1.
- **Virtual Interface**: The Virtual Interface that the Access Interface uses. Select an entry from the drop-down menu of Virtual Interfaces configured for the current branch site.
- **Virtual Path Mode**: Specifies the priority for Virtual Path traffic on the current WAN link. The options are: Primary, Secondary, or Exclude. If set to Exclude, the Access Interface is used for Internet and Intranet traffic, only.
- **IP Address**: The IP Address for the Access Interface endpoint from the appliance to the WAN. Select V4 (IPv4) or V6 (IPv6) as required.
- **Gateway IP Address**: The IP Address for the gateway router.
- **Bind Access Interface to Gateway MAC**: If enabled, the source MAC address of packets received on Internet or Intranet services must match the gateway MAC addressWANK links > Advances WAN Options.
- **Enable Proxy ARP**: If enabled, the Virtual WAN Appliance replies to ARP requests for the Gateway IP Address, when the gateway is unreachable.
- **Enable Internet Access on Routing Domain(s)**: Auto-creates a DEFAULT route (0.0.0.0/0) in all the routing tables of the respective routing domains. You can enable for ALL routing domains or NONE. It avoids the need for creating exclusive static route across all the routing domains if they needed internet access.

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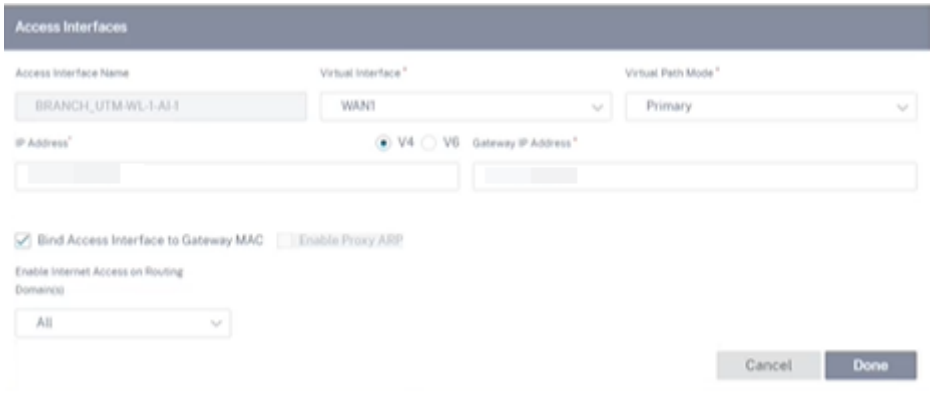

Services

The **Services** section allows you to add service types and allocate the percentage of bandwidth to be used for each service type. You can define the service types and configure attributes for it from the Delivery services section. You can choose to use these global defaults or configure link specific service bandwidth settings from the **Service Bandwidth Settings** drop-down list. If you choose link specific, enter the following details:

- **Service Name**: The name of the WAN link service.
- **Allocation %**: The guaranteed fair share of bandwidth allocated to the service from the link's total capacity.
- **Mode**: The operation mode of the WAN Link, based on the service selected. For Internet, there is one of Primary, Secondary, and Balance and for Intranet there is Primary and Secondary.
- **Tunnel Header Size**: The size of the tunnel header, in bytes.
- **LAN to WAN Tag**: The DHCP tag to apply to LAN to WAN packets on the service.
- **LAN to WAN Delay**: The maximum time, to buffer packets when the WAN Links bandwidth is exceeded.
- **LAN to WAN Min Kbps**: The minimum upload bandwidth value that is reserved for the service. The **Min Kbps** is a mandatory field.
- **LAN to WAN Max Kbps**: The maximum upload bandwidth value that is reserved for the service. The **Max Kbps** field is optional and the value cannot be lesser than the configured minimum upload bandwidth value. The value must be greater than or equal to the minimum upload bandwidth value.
- **WAN to LAN Tag**: The DHCP tag to apply to WAN to LAN packets on the service.
- **WAN to LAN Match**: The match criteria for Internet WAN to LAN packets to get assigned to the service.
- **WAN to LAN Min Kbps**: The minimum download bandwidth value that is reserved for the service. The **Min Kbps** is a mandatory field.
- **WAN to LAN Max Kbps**: The maximum download bandwidth value that is reserved for the service. The **Max Kbps** field is optional and the value cannot be lesser than the configured min-

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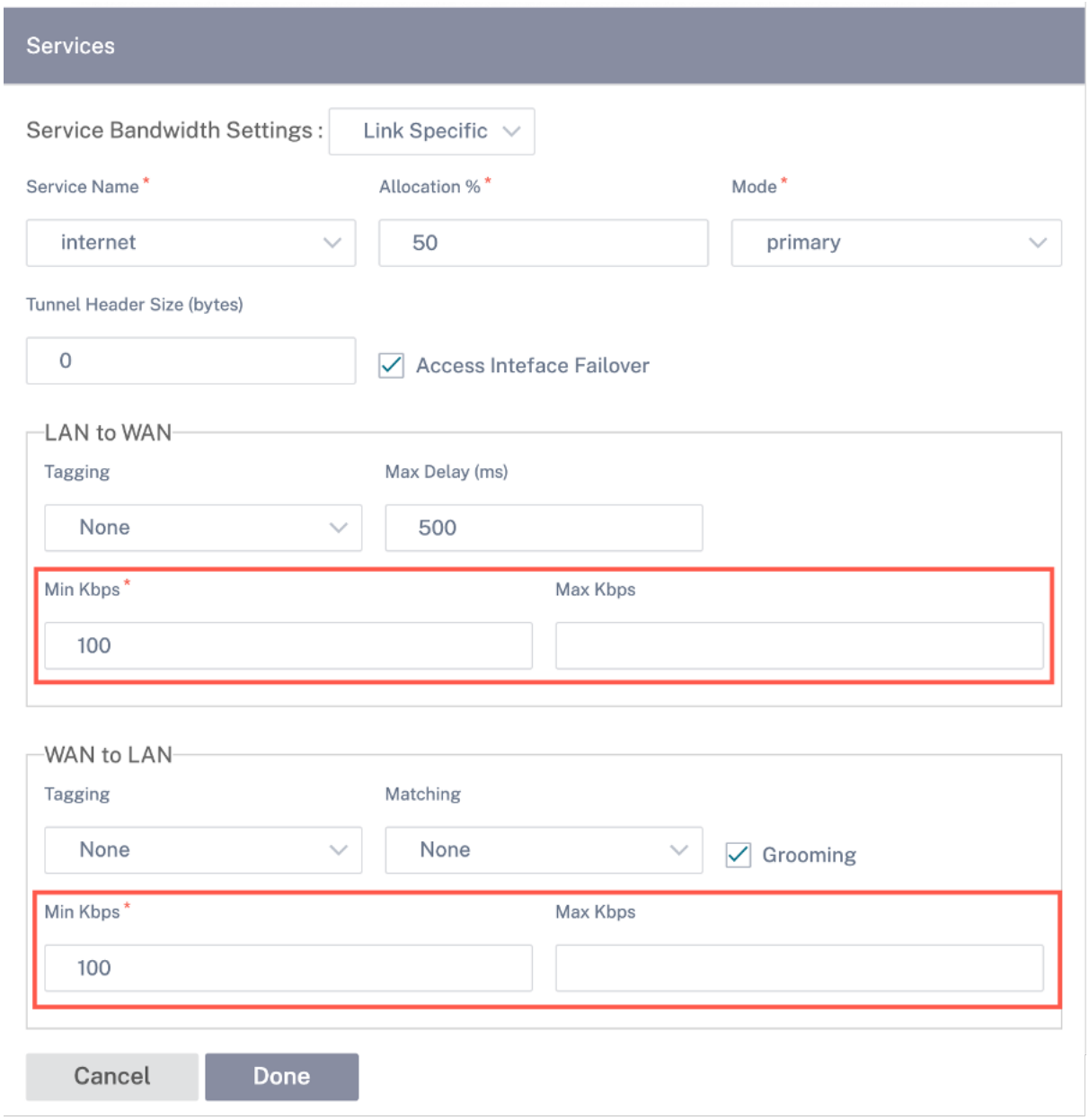
imum download bandwidth value. The value must be greater than or equal to the minimum download bandwidth value.

- **WAN to LAN Grooming**: If enabled, packets are randomly discarded to prevent WAN to LAN traffic from exceeded the Service's provisioned bandwidth.

> **Note**
>
> The minimum and maximum Kbps fields are not available for the Virtual Path.



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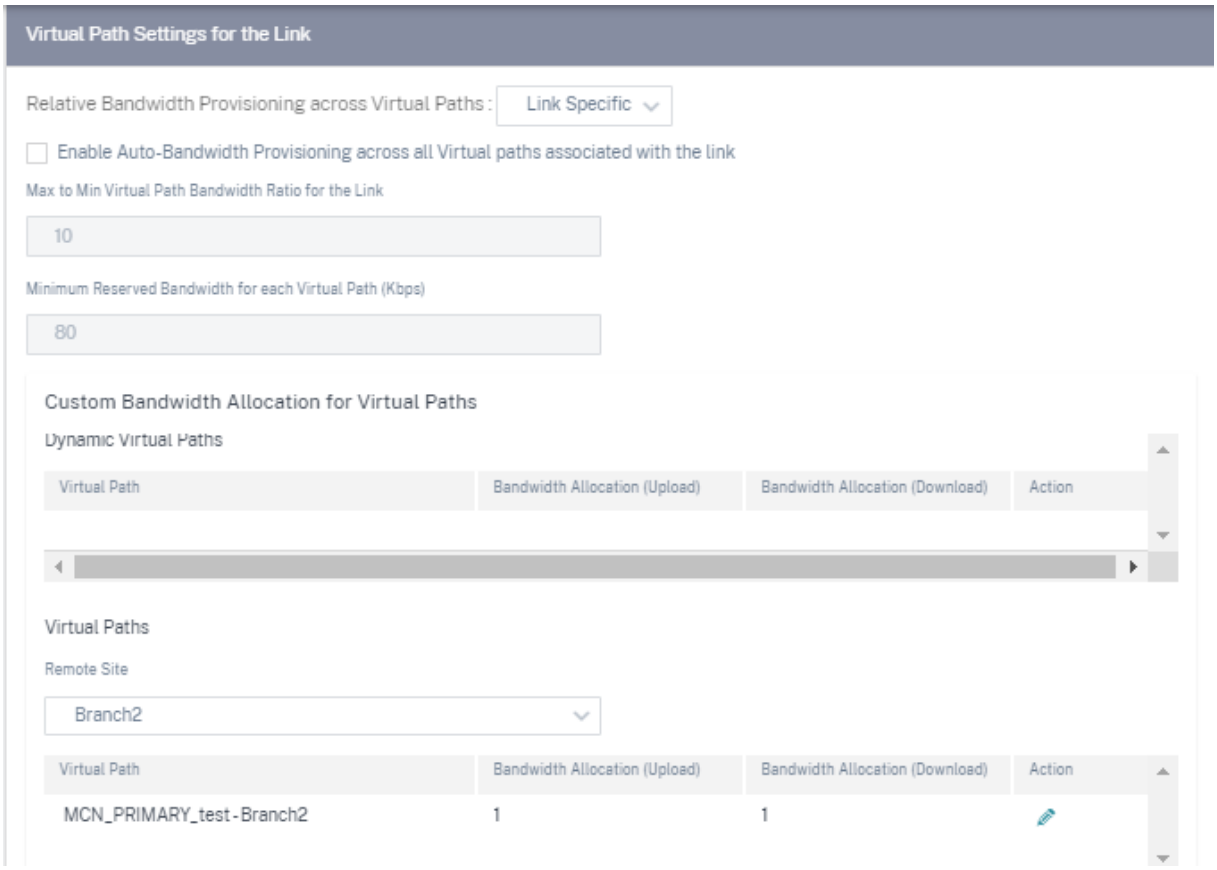
Virtual Path settings for the link

Select the relative bandwidth provisioning across virtual paths as **Global Default** or **Link Specific** as required. On selecting **Link Specific**, when you enable the auto-bandwidth provisioning, the share of the bandwidth for the virtual path service is automatically calculated and applied accordingly to the magnitude of bandwidth that might be consumed by remote sites.

- **Max to Min Virtual Path Bandwidth Ratio for the Link**: You can set the maximum to minimum virtual path ratio that can be applied to the selected WAN link.
- **Minimum Reserved Bandwidth for each Virtual Path (Kbps)**: You can set the minimum reserved bandwidth value in Kbps for each virtual path.



To customize the bandwidths for the virtual paths associated with a WAN link:

1. Clear the **Enable Auto-Bandwidth Provisioning across all virtual paths associated with the link** check box.
2. In the **Custom Bandwidth Allocation for Virtual Paths** section, select a remote site. You can provision bandwidths for the virtual paths to the remote site.
    - **Minimum Bandwidth (Kbps)**: The minimum bandwidth reserved for the virtual path. The minimum bandwidth that you can set for a virtual path is 80 Kbps.

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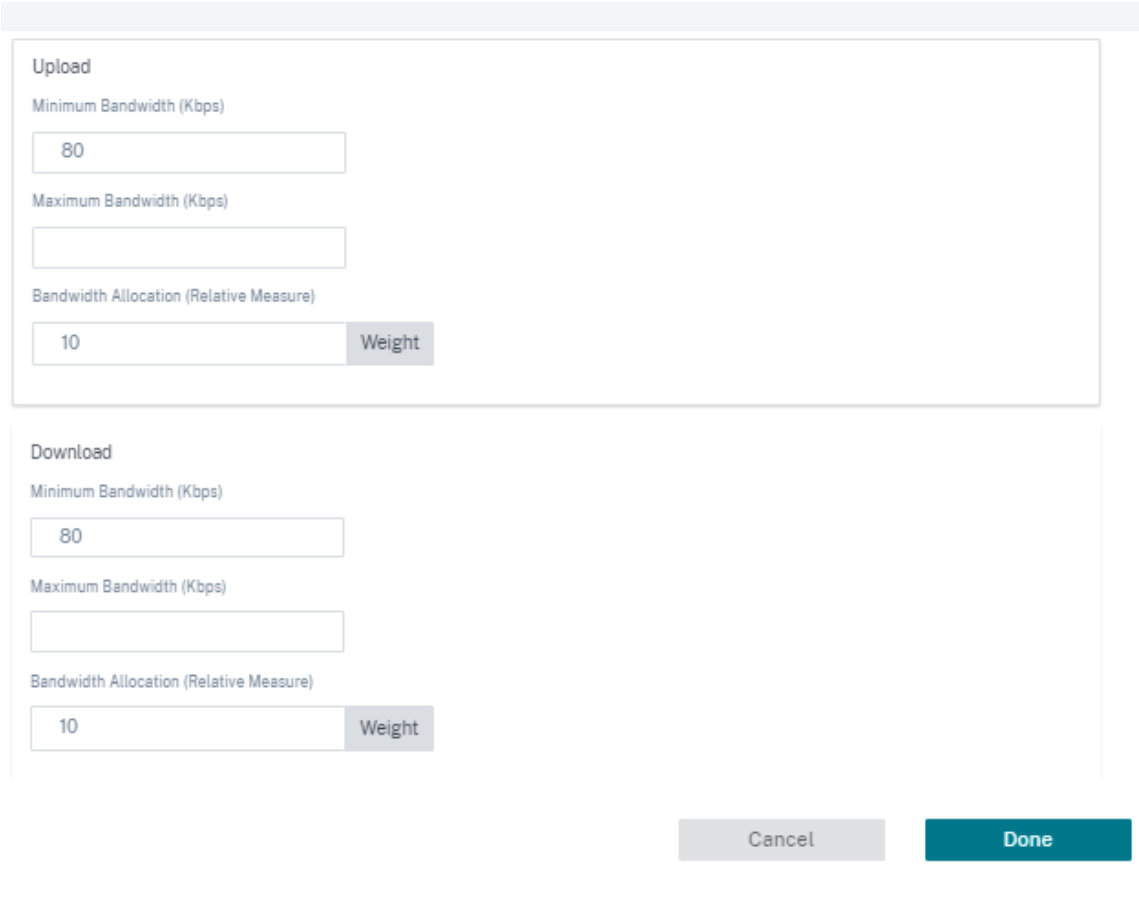
- **Maximum Bandwidth (Kbps)**: The maximum bandwidth that the virtual path can utilize from the WAN link. If the maximum bandwidth is not set, the site utilizes all of the available bandwidth.
- **Bandwidth Allocation (Relative Measure)**: The bandwidth share allocated to a virtual path out of its group's eligible bandwidth. For example, if a WAN link group of 3 virtual paths is eligible for 30 Mbps bandwidth and you want to allocate equal bandwidth for each virtual path, update 10 as the bandwidth allocation on the remote site.



3. Click **Done**.

> **Note**
>
> Citrix SD-WAN Orchestrator service retains the previously configured custom bandwidth settings even after the previously configured dynamic virtual paths are disabled between two sites. Ensure to update the custom bandwidth settings manually when you reconfigure the dynamic virtual paths.

Points to consider for bandwidth provisioning

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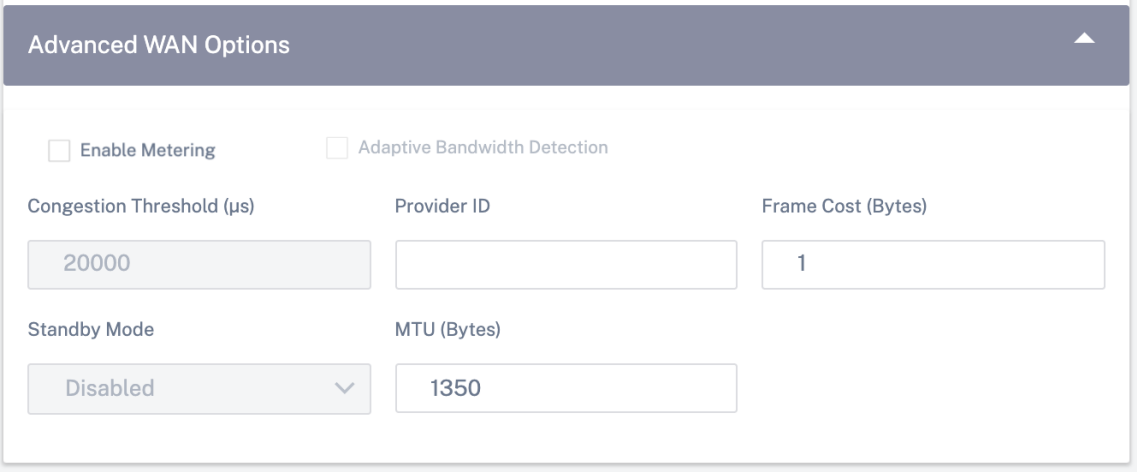
- By default, all branches and WAN services (Virtual Path/Internet/Intranet) receive a weightage of 1 each.
- Bandwidth customization is required when there is a high disparity in terms of bandwidth requirement.
- When dynamic virtual paths are enabled between the available sites, the WAN link capacity is shared between the static virtual path to the data center and the dynamic virtual paths.

Advanced WAN options

The WAN Link Advanced Settings allows the configuration of the **ISP specific** attributes.

- **Congestion Threshold**: The amount of congestion after which the WAN link throttles packet transmission to avoid further congestion.
- **Provider ID**: Unique Identifier for the provider to differentiate paths when sending duplicate packets.
- **Frame Cost (Bytes)**: Extra header/trailer bytes added to every packet, such as for Ethernet IPG or AAL5 trailers.
- **MTU (Bytes)**: The largest raw packet size in bytes, not including the Frame Cost.
- **Standby Mode**: A standby link is not used to carry user traffic unless it becomes active. The standby mode of a WAN link is disabled by default. For more information on standby mode, see Standby mode.



- **Enable Metering**: Tracks usage on a WAN link and alerts the user when the link usage exceeds the configured data cap. For detailed information on metering, see Metering and Standby WAN Links.

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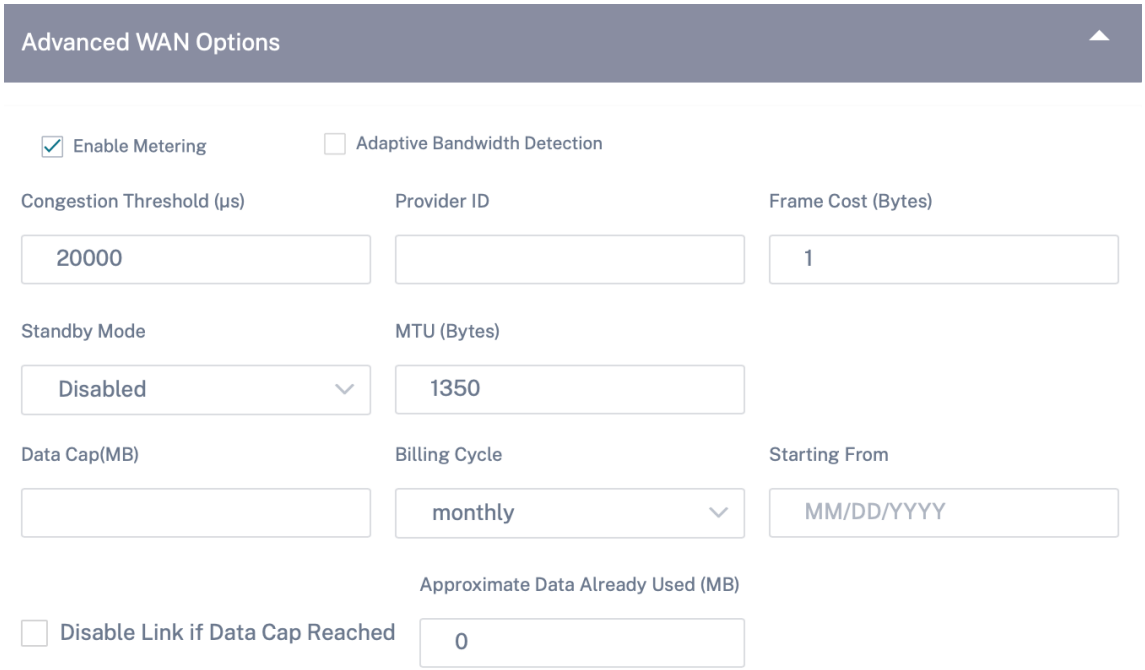

- **Adaptive Bandwidth Detection**: Uses the WAN link at a reduced bandwidth rate when a loss is detected. When the available bandwidth is below the configured **Minimum Acceptable Bandwidth**, then the path marked as BAD. Use Custom Bad Loss Sensitivity under Path or Autopath group with Adaptive Bandwidth Detection.

  > **Note**
  >
  > Adaptive Bandwidth Detection is available only for Client and not for MCN.

  - **Minimum Acceptable Bandwidth**: When there is varying bandwidth rate, the percentage of WAN to LAN permitted rate below which the path is marked as BAD. The minimum kbps is different on each side of a virtual path. The value can be in the range 10%-50% and the default being 30%.

For more information, see Adaptive bandwidth detection

Routes

The next step in the site configuration workflow is to create routes. You can create application and IP routes based on your site requirements.

> **NOTE**
>
> The routes that were added before introducing the **Application Route** and **IP Route** tabs are listed under the **IP Routes** tab with **Delivery Service** as Internet.

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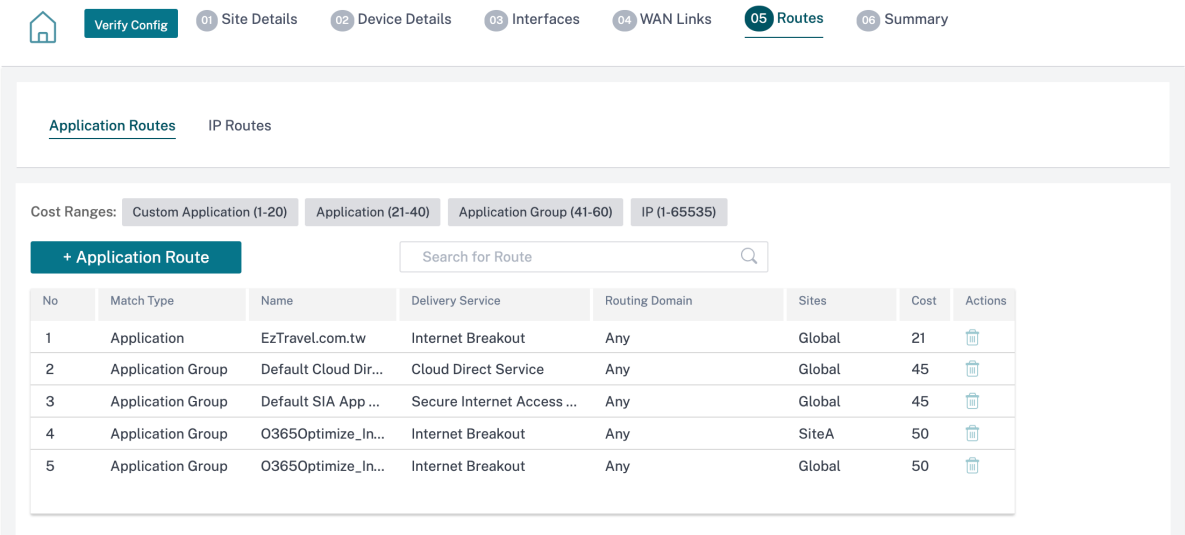
The global routes and site-specific routes that are created at the network level automatically get listed under **Routes > Application Routes** and **Routes > IP routes** tabs. You can only view the global routes at the site level. To edit or delete a global route, navigate to network level configurations.

You can also create, edit, or delete routes at the site level.



Application routes

Click **+ Application Route** to create an application route.

- **Custom Application Match Criteria**:
  - **Match Type**: Select the match type as **Application**/**Custom Application**/**Application Group** from the drop-down list.
  - **Application**: Choose one application from the drop-down list.
  - **Routing Domain**: Select a routing domain.
- **Traffic Steering**
  - **Delivery Service**: Choose one delivery service from the list.
  - **Cost**: Reflects the relative priority of each route. Lower the cost, the higher the priority.
- **Eligibility Based on Path**:
  - **Add Path**: Choose a site and WAN links, both to and from. If the added path goes down, then the application route does not receive any traffic.

If a new application route gets added, then the route cost must be in the following range:

- Custom application: 1–20
- Application: 21–40

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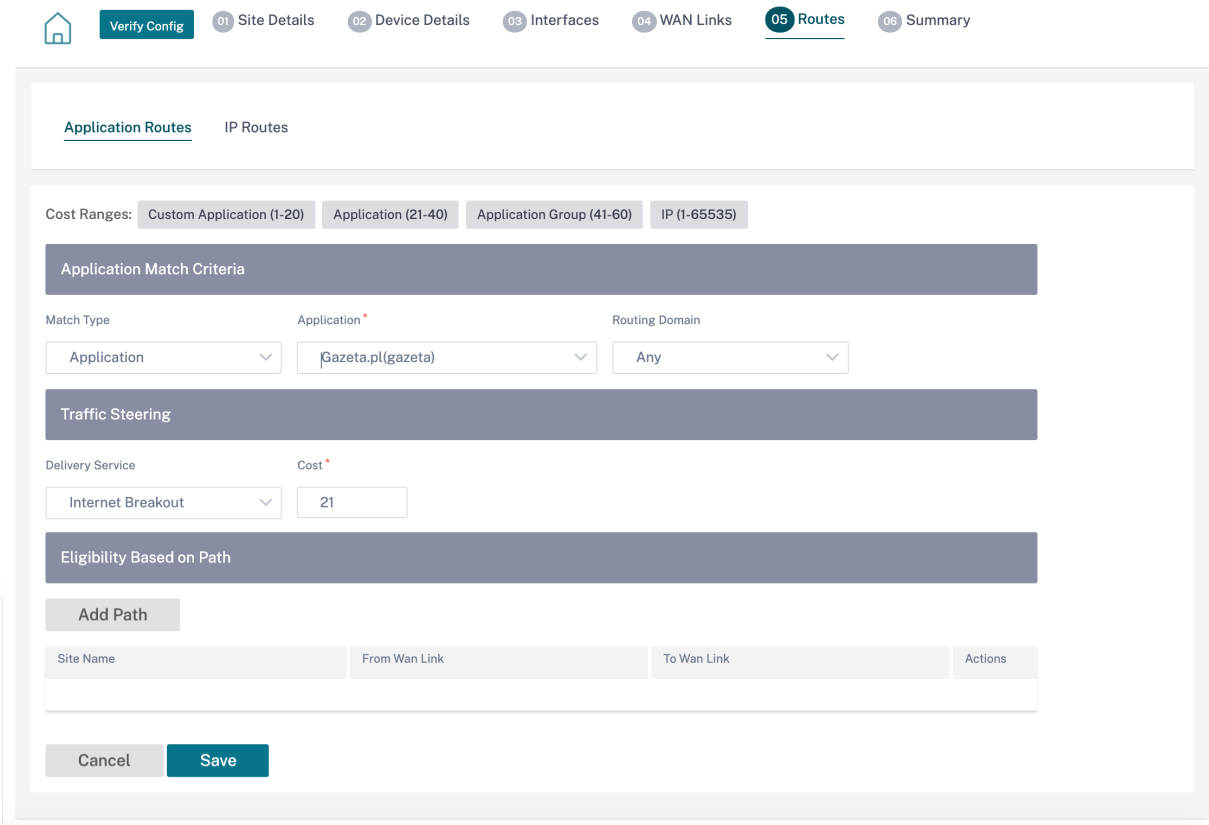
- Application group: 41–60



IP routes

Go to **IP Routes** tab and click **+ IP Route** to create the IP Route policy to steer traffic.

- **IP Protocol Match Criteria**:
  - **Destination Network**: Add the destination network that helps to forward the packets.
  - **Use IP Group**: You can add a destination network or enable the Use IP Group check box to select any IP group from the drop-down list.
  - **Routing Domain**: Select a routing domain from the drop-down list.
- **Traffic Steering**
  - **Delivery Service**: Choose one delivery service from the drop-down list.
  - **Cost**: Reflects the relative priority of each route. Lower the cost, the higher the priority.
- **Eligibility Criteria**:
  - **Export Route**: If the Export Route check box is selected and if the route is a local route, then the route is eligible to be exported by default. If the route is an INTRANET/INTERNET based route, then for the export to work, WAN to WAN forwarding has to be enabled. If

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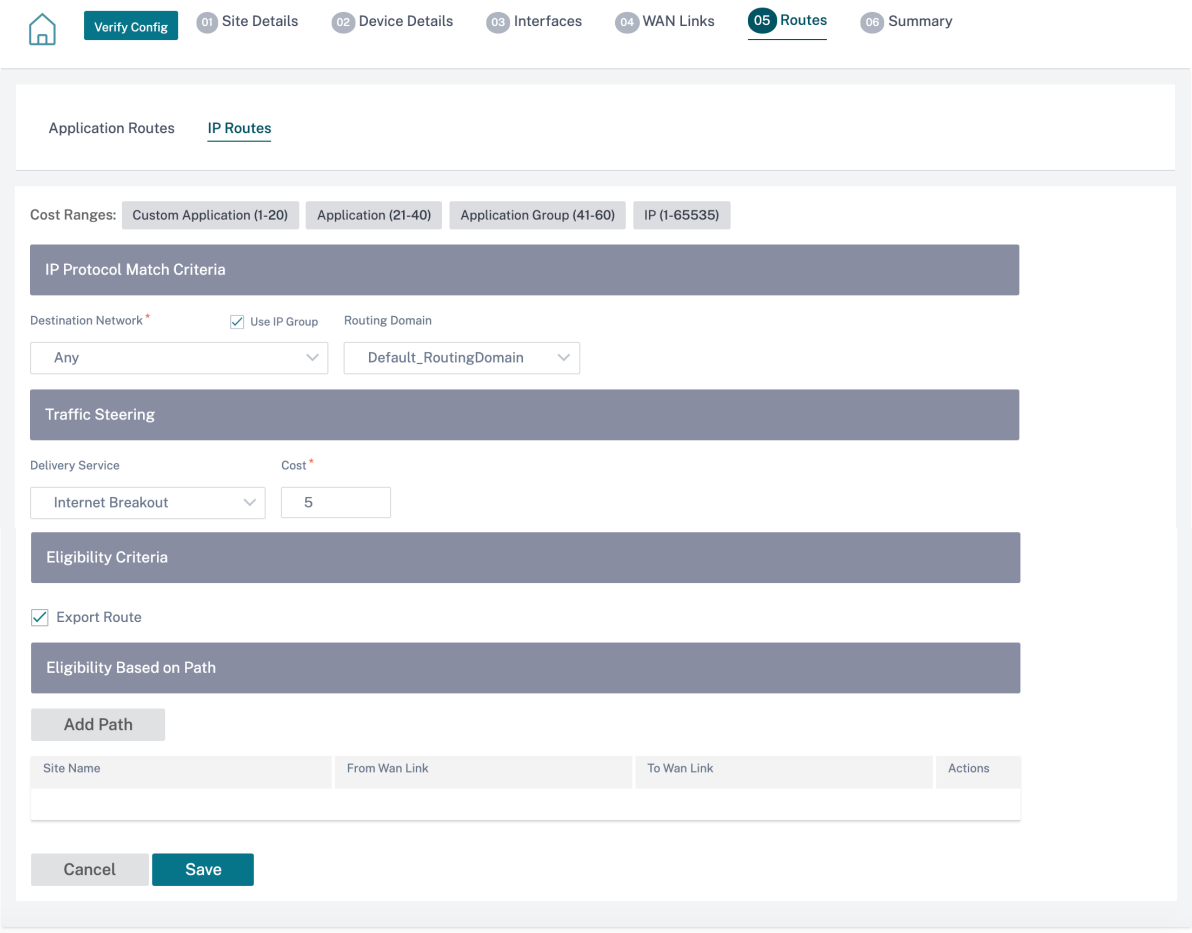
the Export Route check box is cleared, then the local route is not eligible to be exported to other SD-WAN and has local significance.

- **Eligibility based on Path**:
  - **Add Path**: Choose a site and WAN links, both to and from. If the added path goes down, then the IP route does not receive any traffic.

If a new IP route gets added, then the route cost must be in the 1–20 range.



Summary

This section provides a summary of the site configuration to enable a quick review before submitting the same.

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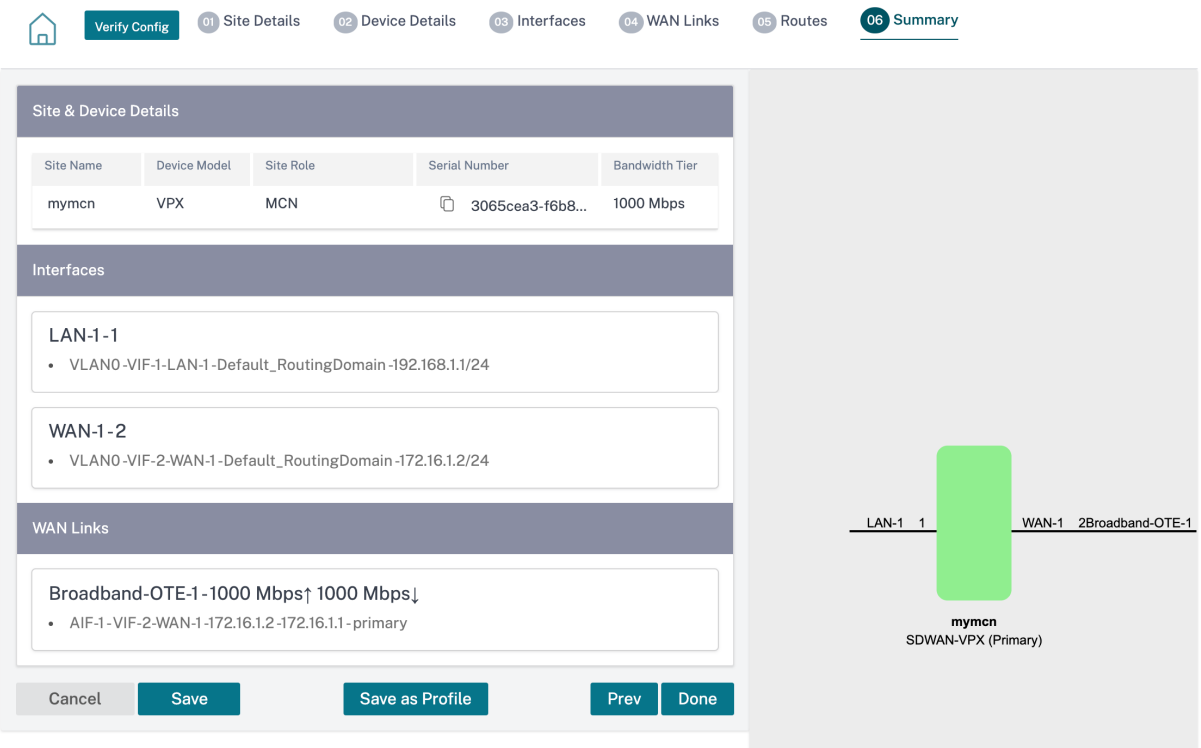

Use the **Save as Template** option to save the site configuration as a template for reuse across other sites. Clicking **Done** marks completion of site configuration, and takes you to the **Network Configuration –Home** page to review all the sites configured. For more information, see Network Configuration.

Wi-Fi Access Point

September 27, 2025

You can configure a Citrix SD-WAN™ appliance that supports Wi-Fi as a Wi-Fi Access Point. Citrix SD-WAN appliance configured as a Wi-Fi access point eliminates the need to maintain an extra access point appliance to create a WLAN. The devices on your LAN can connect to Citrix SD-WAN appliance through Wi-Fi.

> **Note**
>
> Ensure that a DHCP server is available on the network to assign IP addresses to the host machines. If another DHCP server is not available on the network, you can configure the SD-WAN appliance as a DHCP server. For instructions, see DHCP server.

The following two variants of Citrix SD-WAN 110 platform support Wi-Fi and can be configured as a Wi-Fi access point:

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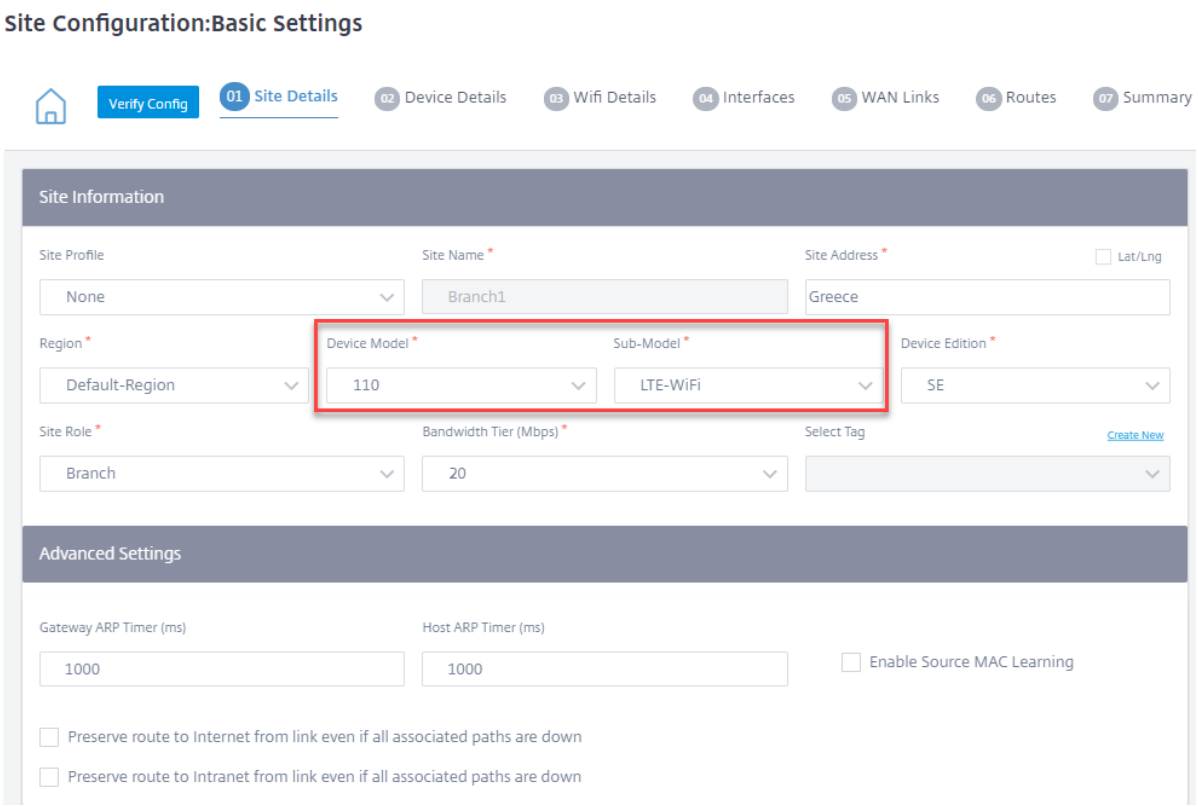
- Citrix SD-WAN 110-WiFi-SE
- Citrix SD-WAN 110-LTE-WiFi

For more information about the platforms, see Citrix SD-WAN 110 SE.

> **Note**
>
> Wi-Fi feature does not support High Availability (HA) in Citrix SD-WAN 11.3 release.

You can configure and manage Citrix SD-WAN appliances that are configured as Access Points through Citrix SD-WAN Orchestrator service.

To configure Wi-Fi capabilities on a Citrix SD-WAN 110 appliance, ensure that the appropriate device model and submodel are selected on the **Configuration** > **Site Configuration** page.



Select **Enable Wi-Fi** on the **Wi-Fi Details** page, to make the Citrix SD-WAN 110 appliance act as a Wi-Fi Access Point.

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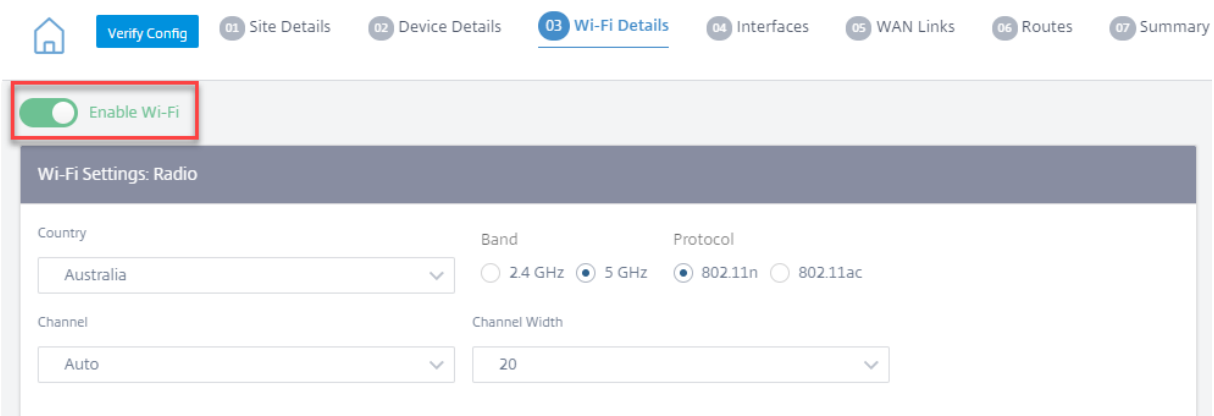

Configure Wi-Fi radio settings

Configure the Wi-Fi radio settings by providing the following details.

- **Country**: The country where the appliance is deployed. The country determines the allowed wireless radio settings for that country.

  > **Note**
  >
  > The **Country** field is locked to **USA and Canada** for appliances sold to USA and Canada. For appliances sold to other countries, the **Country** field is set to **Worldwide** by default, allowing you to choose the appropriate country.

- **Band**: The Citrix SD-WAN 110 appliance supports 2.4 GHz and 5 GHz frequency bands. The 5 GHz band provides greater performance than the 2.4 GHz band, but is not compatible with all wireless devices. Select the band and protocol based on the devices that connect to the Citrix SD-WAN appliance. The Citrix SD-WAN 110 appliance does not support dual band, you can only choose one band at a time.

- **Protocol**: Select the protocol based on the selected band. The 2.4 GHz band supports 802.11n protocol, whereas the 5 GHz band supports both 802.11n and 802.11ac protocol.

  > **Note**
  >
  > The 802.11ac protocol is backwards compatible to 802.11n. It is recommended to use 802.11ac protocol, if 5 GHz band is selected.

- **Channel**: The available channels depend on the selected country and wireless protocol. By default, the channel is set to **Auto**. The Citrix SD-WAN appliance selects a channel with the least interference from the list available for the band. While not recommended, you can also manually select a channel, if necessary.

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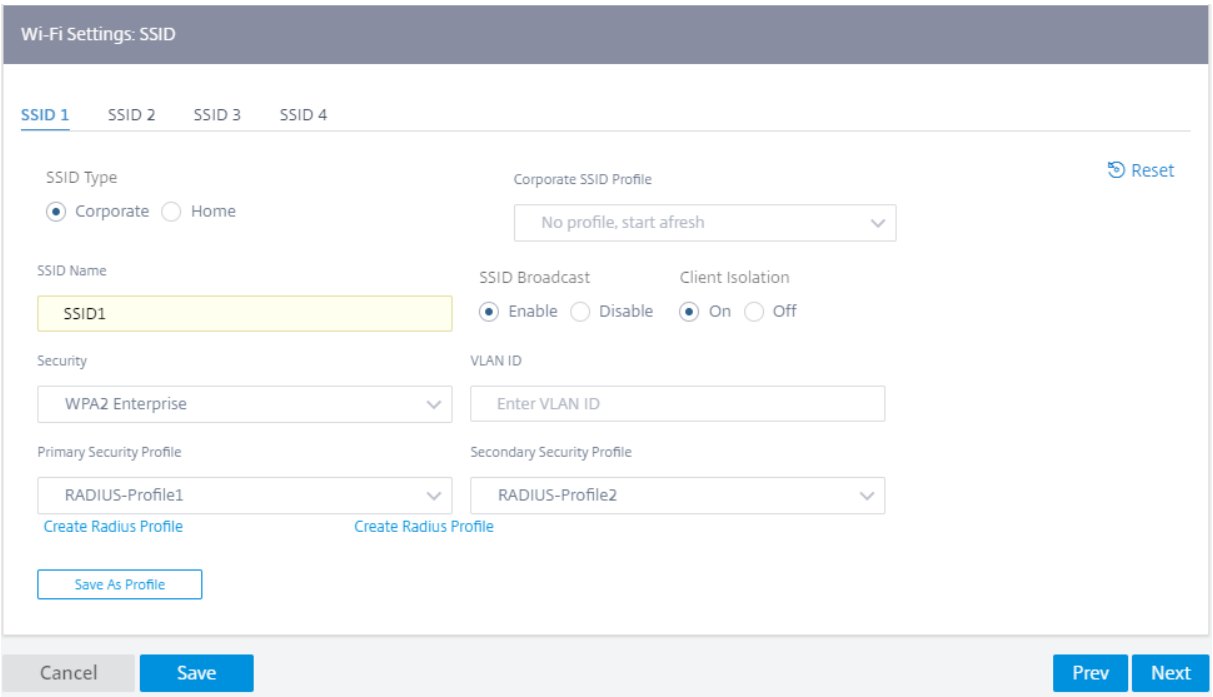
- **Channel Width**: You can configure the channel to use a channel width of 20 MHz, 40 MHz, or 80 MHz (for certain 5 GHz channels only). By default, the channel width is set to the maximum available channel width for the band and channel selected.

Configure SSID

The Service set identifier (SSID) is used to identify a wireless network profile to establish and maintain wireless connectivity. You can configure up to four SSIDs on the Citrix SD-WAN appliance. SSIDs help you to configure your wireless network with different security levels, serving different type of users such as corporate users, home users, or guests.

> **Note**
>
> The Wi-Fi radio settings are common to all the SSIDs.



To configure SSIDs, provide the following details:

- **SSID Type**: Citrix SD-WAN Orchestrator™ allows you to configure two types of SSID **Corporate** and **Home**. For a Corporate SSID it is recommended to create and use a Corporate SSID profile. For more details, see SSID profiles.
- **SSID Name**: A unique identifier for the wireless network profile. The SSID names are case sensitive and can contain up to 32 alphanumeric characters. Do not include leading or trailing spaces in your SSID name.

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- **SSID Broadcast**: Enabling SSID broadcast makes the SSID name visible to all the devices in your network, allowing them to easily identify and connect to the Wi-Fi network. Disabling SSID broadcast makes the SSID name invisible to other devices. However, it only hides the name, not the network itself. Users that know the SSID name can still connect to your Wi-Fi network.
- **Client Isolation**: Client isolation prevents clients connected to the same SSID from communicating with each other. For open authentication, where untrusted clients may connect, it is recommended to set **Client Isolation** to **On**.
- **Security**: Citrix SD-WAN supports the following types of Wi-Fi security protocols:
  - **Open**: The Wi-Fi network is unsecure and anybody can connect to the wireless network. It is recommended to isolate open SSIDs to their own routing domain, to prevent untrusted clients from compromising personal (home) or corporate networks.
  - **WPA2 Personal**: The Wi-Fi Protected Access (WPA) 2 protocol, pre-shared key mode, commonly referred to as "personal", is used to secure the Wi-Fi network. With this protocol, you can configure a passphrase as a pre-shared key (PSK). Anybody that knows the SSID and passphrase can connect to your Wi-Fi network. This is typically used for home networks. It is recommended to isolate home SSIDs to their own routing domain, to prevent untrusted clients from compromising the corporate network.
  - **WPA2 Enterprise**: The Wi-Fi Protected Access (WPA) 2 protocol, enterprise version is used to provide enterprise-grade authentication to access your Wi-Fi network. A user name and password is required to log in. A RADIUS server authenticates the user name and password. You can select the Primary and Secondary RADIUS profiles, which point to a primary and secondary RADIUS server respectively. If the primary RADIUS server is down, the secondary server is used for authentication. For more information on creating RADIUS profiles, see RADIUS server profiles.

    > **Note**
    >
    > Each site can have up to two RADIUS server profiles assigned on each WPA2 enterprise SSID.

  - **WPA3 Personal**: Similar to WPA2 Personal, you use a PSK to connect to the network. It uses the latest version of the Wi-Fi Protected Access protocol. Only the devices that support WPA3 can connect to this network.
  - **WPA3 Transition**: Allows WPA3 capable devices to connect using the new WPA3 security protocol, and the unsupported devices to continue to use the WPA2 security protocol. Devices that use WPA3 or WPA2 Personal version can use the same PSK to connect to this network.
  - **VLAN ID**: Associates the SSID with a VLAN identifier. The VLAN identifier can be reused

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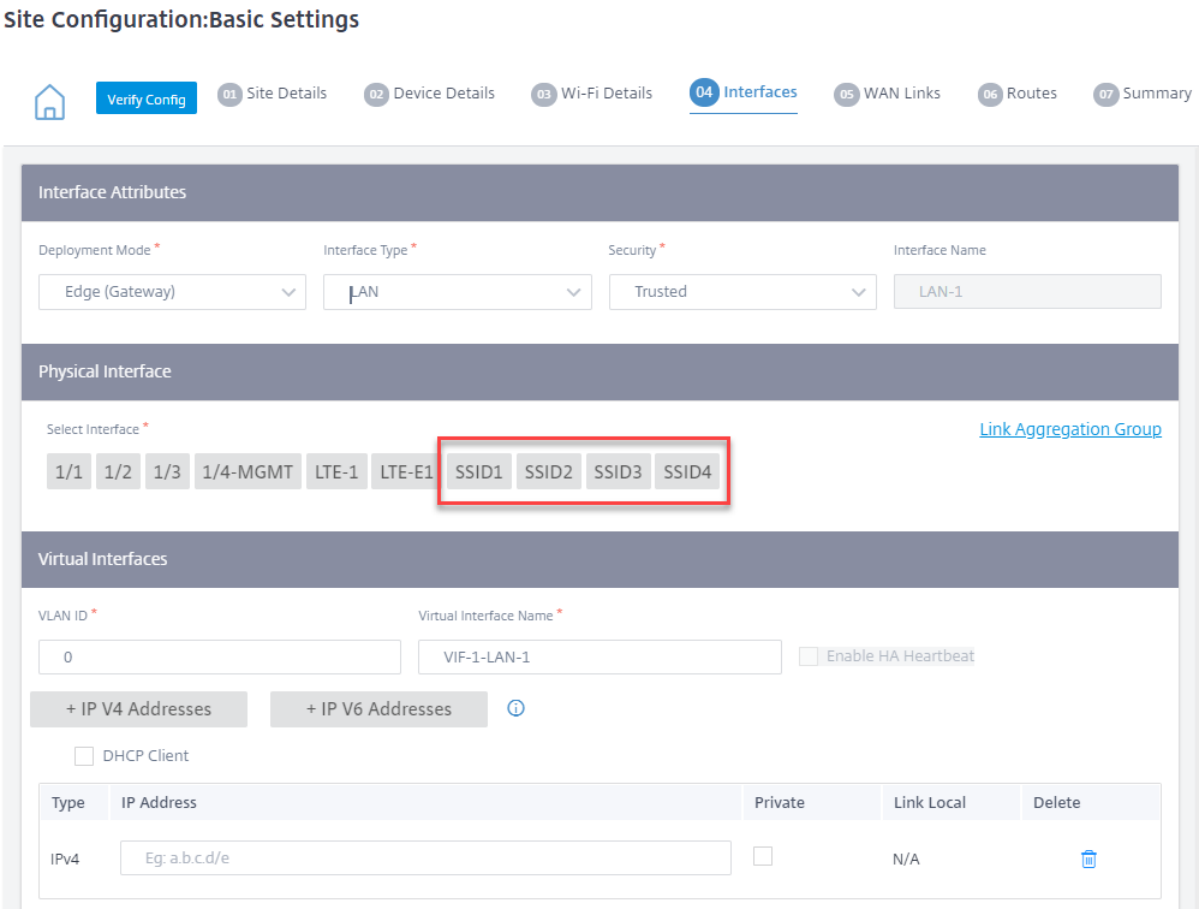
when the SSID is assigned to a virtual interface, to associate it with an external VLAN or associate it with a distinct routing domain.

You can also save the Corporate SSID configuration as an SSID profile. It allows you to easily reuse and manage SSID configuration across multiple sites. For more details, see SSID profiles.

The SSIDs configured are reflected as virtual interfaces while configuring Interfaces. It further allows you to use the SSIDs in your SD-WAN configuration or enhance network security. For example, you can have a configuration to mark all the traffic over a particular SSID to belong to a particular routing domain or assigned to a specific VLAN. This routing domain can further be configured to have access to specific network and resources. If a combination of corporate, home, and guest wireless networks are configured, it is critical to associate them with different routing domains, to ensure tenant isolation and prevent rogue or compromised clients in one network from compromising the others.



RADIUS server profiles

The WPA2 Enterprise protocol provides enterprise-grade authentication to your wireless network. A user name and password is required to log in into the wireless network using the WPA2 enterprise protocol. The user name and password is authenticated by a RADIUS server, which is configured using

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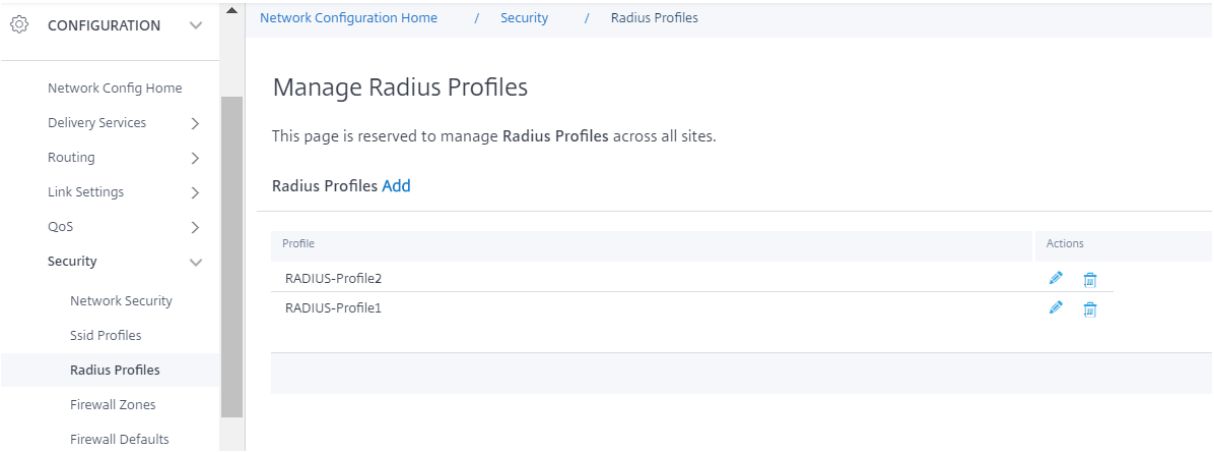
RADIUS profiles. The RADIUS profiles can be applied to multiple sites while configuring SSIDs. For more details, see Configure SSIDs.

The RADIUS profiles are dynamic in nature. Any changes made to the RADIUS profile, will reflect across all the different sites where the RADIUS profile is used. Each WPA2 enterprise SSID can have up to two RADIUS server profiles assigned to it.
To manage RADIUS profiles, at the network level, navigate to **Configuration** > **Security** > **RADIUS Profiles**. A list of all the available RADIUS profiles are listed, you can edit or delete the profiles.



To create a RADIUS profile click **Add** and provide the following details:

- **Radius Profile Name**: A unique name to identify the RADIUS server profile.
- **Auth Server IP**: The IP address of the RADIUS authentication server. The authentication server might be located at the Data Center, accessible through the management interface or in-band management.
- **Auth Server Port**: The port number of the RADIUS authentication server. The default port number is 1812.
- **Auth Server Secret**: The secret passphrase to connect to the authentication server. Only the authorized clients that know the secret key can connect to the authentication server and send authentication requests.
- **NAS-identifier**: Configure the same Network Access Server (NAS) identifier on the RADIUS server and Citrix SD-WAN appliance. It allows the RADIUS server to identify the correct RADIUS client and perform the authentication. It is a Fully Qualified Domain Name. A special tag {SITENAME} is used. The tag is replaced in the NAS identifier with the respective site name for each site.

The RADIUS accounting server optionally collects network monitoring and statistics data. The accounting process starts when access to the RADIUS server is granted and if the Acct-Interim-Interval AVP is present in the RADIUS Access-Accept message. In this case, the Citrix SD-WAN RADIUS client reports session details such as total time, total data and packets transferred for every Acct-Interim-Interval seconds. The accounting server can be the same as the authentication server or a different

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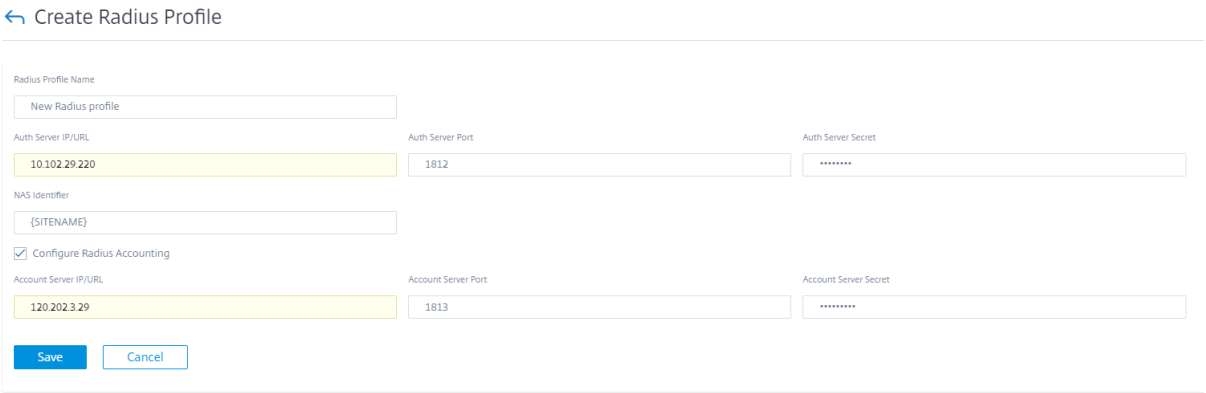
server. To enable the optional RADIUS accounting capability select **Configure RADIUS accounting** and provide the following details.

- **Account Server IP**: The IP address of the accounting server.
- **Account Server Port**: The port number of the accounting server. The default port number is 1813.
- **Account Server Secret**: The secret passphrase to connect to the accounting server. Only the authorized clients that know the secret key can connect to the accounting server and send accounting requests.



You can also create a RADIUS profile directly from the **Wi-Fi details** page, while configuring sites. You can also perform operations such as edit, clone, and delete.

SSID profiles

The Service set identifier (SSID) is used to identify a wireless network profile to establish and maintain wireless connectivity. You can configure up to four SSIDs on the Citrix SD-WAN appliance. SSIDs help you to configure your wireless network with different security levels, serving different type of users such as corporate users, home users, or guests.

In large deployments, that uses corporate SSIDs, it is expected that the same SSID settings be replicated across numerous appliances. The commonly used settings can be stored as an SSID profile. The SSID profiles are dynamic in nature. Any changes made to an SSID profile, reflects across all the different sites where this SSID profile is used.

To manage SSID profiles, at the network level, navigate to **Configurations** > **Security** > **SSID Profiles**. A list of all the available SSID profiles are listed.

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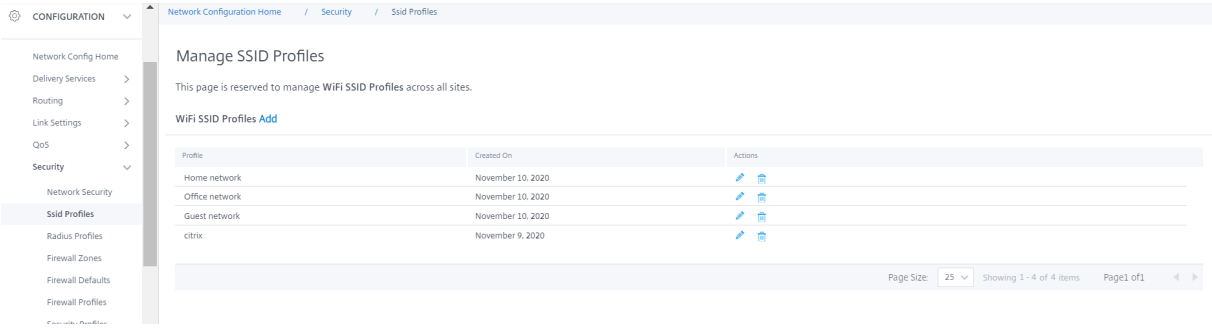

To create a new SSID profile click **Add**. For more details on configuring SSID, see Configure SSIDs.

You can also perform operations such as edit, clone, and delete.

Wi-Fi diagnostics

To capture Wi-Fi traffic details, at the network level, navigate to **Troubleshooting > Diagnostics** and select the **Packet Capture** check box. Choose the appropriate Wi-Fi interface.

> **NOTE**
>
> Traffic between wireless clients is isolated from the data path in Citrix SD-WAN 110 platform and therefore is not part of the packet capture.

For detailed information on packet capture, see Diagnostics.

LTE firmware upgrade

September 27, 2025

Citrix SD-WAN Orchestrator service allows you to configure and manage all the LTE sites in your network. It includes appliances connected through an internal LTE modem or external USB LTE modem.

To configure the LTE sites in your network:

1. At the site level, navigate to **Configuration > Site Configuration**.

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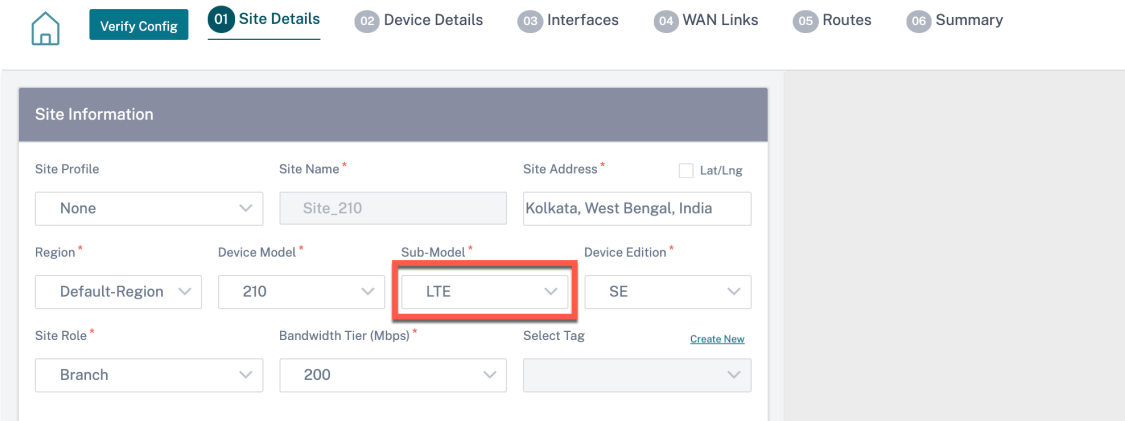
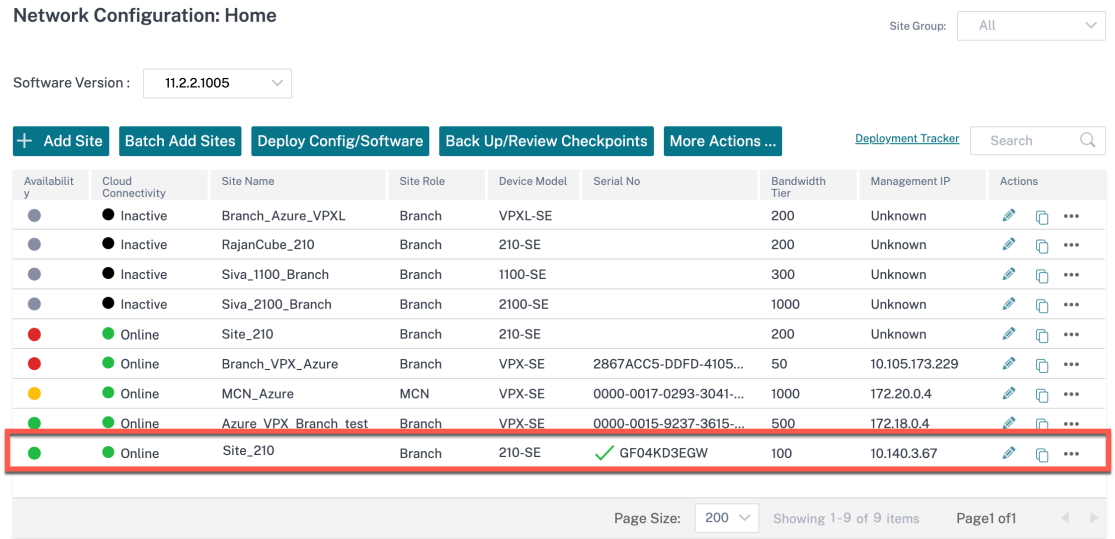


2. Select the submodel as **LTE** along with other necessary details and click Save. For more information on site configuration, see Site configuration.

3. Once the site is created, navigate to the **Network Configuration Home** page and click **Deploy Config/Software** button.



> C
>
> **Note**
>
> Currently, the LTE support is available on Citrix SD-WAN™ 210 appliances.

4. The **Software Version** field is auto filled with the latest software version package and the filed is non-editable. Once you click **Stage**, it downloads all the appropriate LTE firmware for the selected software version.

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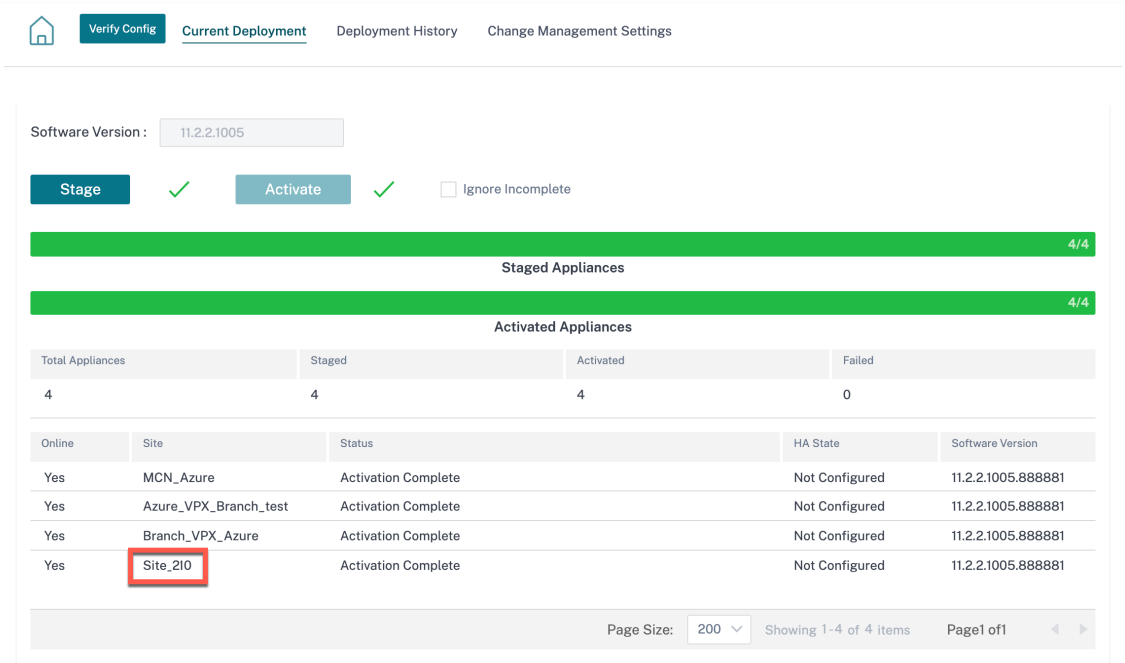
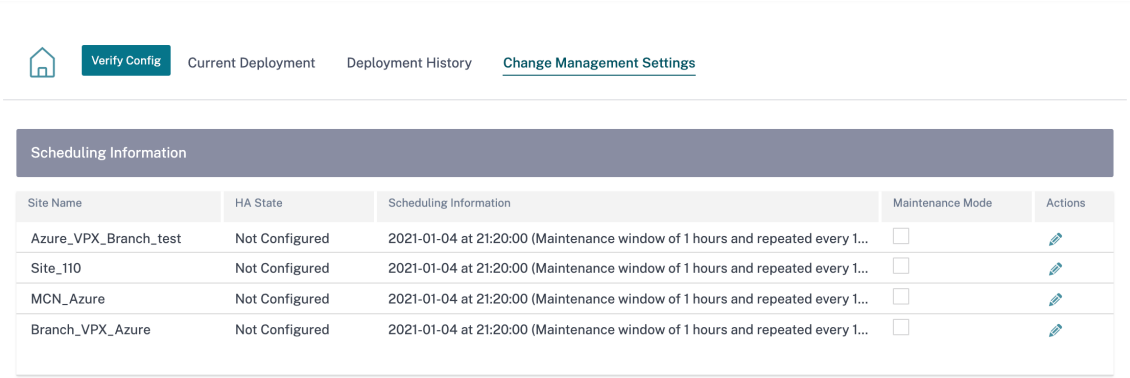


It takes few minutes to complete the staging. You can view the status to track the staging progress. Initially the status shows **Staging Pending**, then **Downloading Appliance Software**, and finally **Staging Complete**. You can cancel the staging anytime by clicking **Cancel Stage** button.

5. Once the staging is completed, click **Activate** button to activate the software.
6. The LTE software activation is part of the scheduling window. To upgrade the LTE software, navigate to **Change Management Settings** tab. You can see a list of site names with scheduling information and an action option.



In the scheduling window, a specific time frame is specified to complete the LTE software upgrade.

7. Click the action symbol and provide the scheduling information - date with time, maintenance window duration in hours, repeat window with unit as days/weeks/months. Click **Save**.

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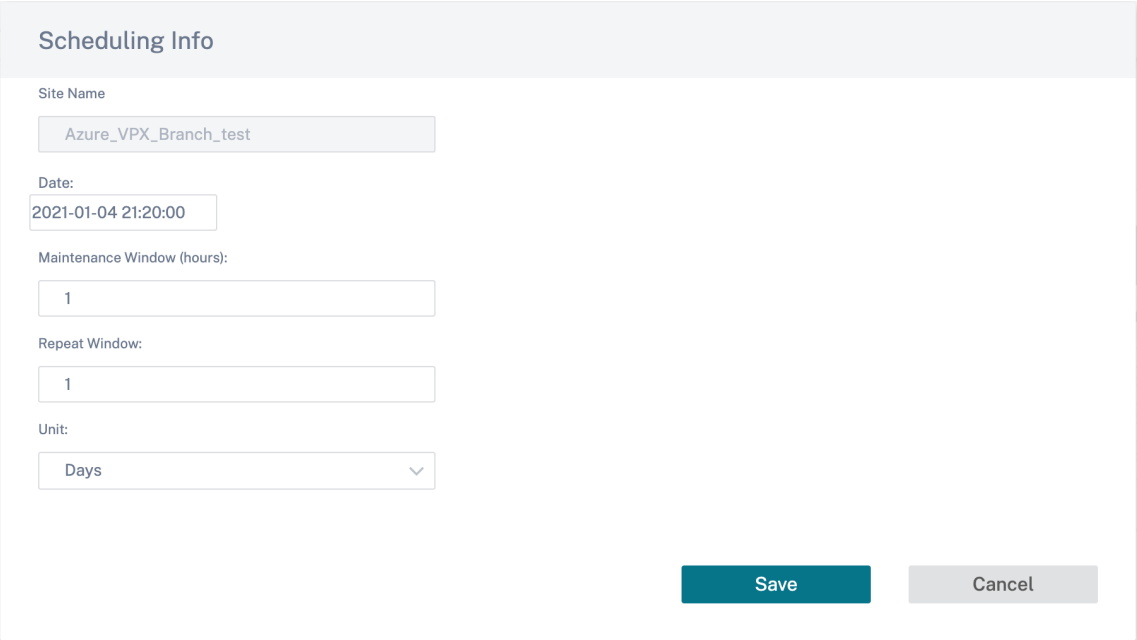

Once the timing is set, it propagates the information to the appliance. LTE firmware upgrades when the time in the appliance matches with the time set in the schedule window. The schedule window lets you configure a specific time to upgrade LTE firmware. LTE firmware upgrade will not start immediately when you set the schedule window.

> **Note**
>
> For all the appliances, the following are the default scheduling information that is already set:
>
> - **Schedule window** - 21:20:00
> - **Maintenance window** - 1 hour
> - **Repeated window** - 1 day
>
> So if you don't configure the change management settings, the scheduling window processes the update automatically. Also, when you set the value of **Maintenance Window (hours)** to **0**, the LTE firmware upgrade happens immediately.

Starting 11.1.0, a new configuration knob is added for in-band management configuration on the site interface group page. This is a mandatory configuration for any appliance that needs to be managed through an inband IP. Missing this configuration in the Citrix SD-WAN Orchestrator service can cause the appliance to go offline (especially important when the 210 s and 110 s that were managed over LTE upgrade to 11.1.0).

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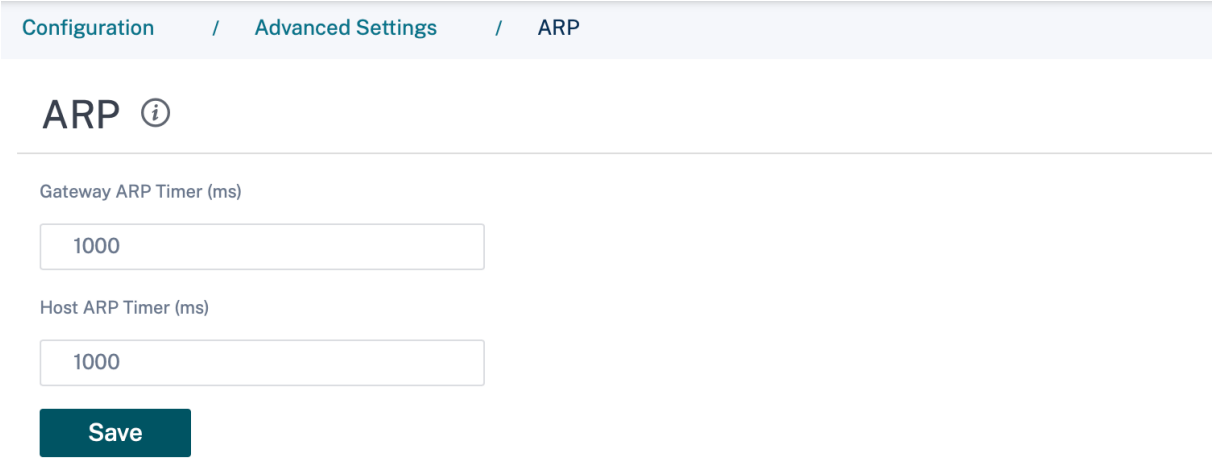
Address resolution protocol

September 27, 2025

In Citrix SD-WAN™ deployments such as Gateway and One-arm, when the Address Resolution Protocol (ARP) requests are received frequently, the access points become overloaded affecting traffic flow. To overcome the traffic overload, you can configure the following ARP timers to send the ARP requests with specific interval times.

- **Gateway ARP Timer (ms)**: The time, (range: 100–20000 milliseconds), between ARP requests for configured Gateway IP addresses.
- **Host ARP Timer (ms)**: The time, (range: 1000–180000 milliseconds), between ARP requests for configured Host IP addresses.



Neighbor discovery protocol

September 27, 2025

In an IPv6 network, Citrix SD-WAN™ appliances periodically multicast router advertisement messages to announce their availability and convey information to the neighboring appliances in the SD-WAN network. The router advertisements include the IPv6 prefix information. Neighbor Discovery protocol (NDP) running on Citrix SD-WAN appliances use these router advertisements to determine the neighboring devices on the same link. NDP also determines each other's link-layer addresses, finds neighbors, and maintains active neighbors reachability information.

To configure the NDP router advertisement, navigate to **Configuration > Advanced Settings > NDP** and click **+ NDP**.

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Choose one of the configured virtual interfaces from the **Virtual Interface** drop-down list. Select **Enable Advertisement** to enable sending periodic router advertisements and responding to Router Solicitations for the selected virtual interface.

Specify the maximum, minimum, and router lifetime intervals.

- **Max Interval**: The maximum time (in seconds) allowed between sending periodic unsolicited multicast router advertisements.
- **Min Interval**: The minimum time (in seconds) allowed between sending periodic unsolicited multicast router advertisements.
- **Router Lifetime**: The time (in seconds) the router is considered valid by the hosts. 0 indicates the router cannot be used as the default router

Select **Managed Flag** if IP addresses are available through the DHCPv6 protocol. Select **Other Flag** if the configuration information (other than the IP addresses) is available through the DHCPv6 protocol.

Specify the following values for the selected interface.

- **Link MTU**: The recommended Maximum Transmission Unit (MTU) for the interface.
- **Reachable Time**: The time (in milliseconds) the NDP protocol stays in the **Reachable** state.
- **Retransmit Timer**: The time (in milliseconds) between retransmission of Neighbor Solicitation messages when resolving an IP address or probing a neighbor.
- **Hop Limit**: The maximum number of hops to be included in the router advertisement.

Click +Prefix List and enter the following values:

- **Prefix**: The prefix and prefix length in Classless Inter-Domain Routing (CIDR) notation.
- **Valid Lifetime**: The time in seconds up to which the prefix is valid. -1 represents infinity which means the prefix remains forever.
- **On-link**: When selected the prefix is considered as local to the network.
- **Autonomous Flag**: When enabled the prefix is used by the host's Stateless Address Autoconfiguration (SLAAC) to generate the IP address.
- **Prefix Lifetime**: The time (in seconds) up to which the prefix is considered as preferred.

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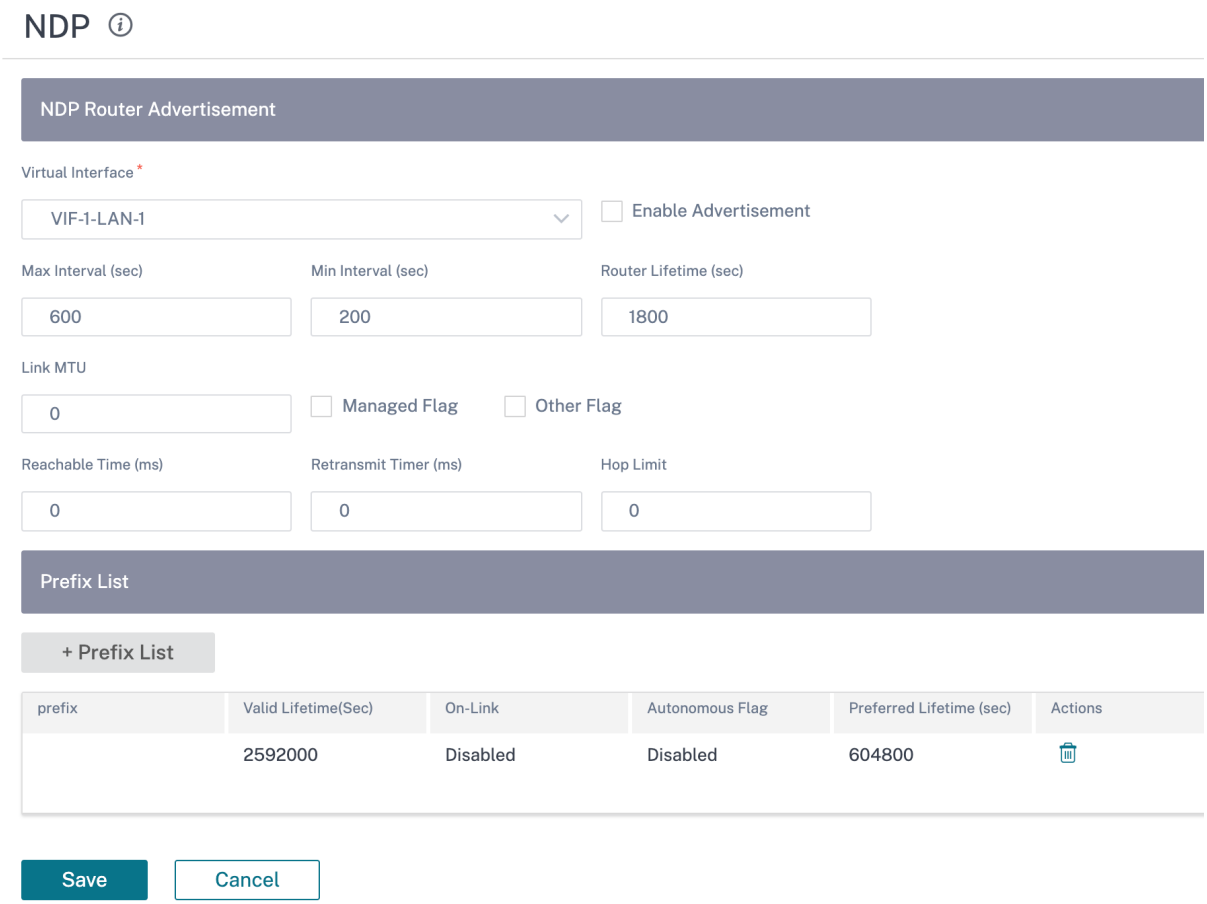

Delivery Services

September 27, 2025

Delivery Services are delivery mechanisms available on Citrix SD-WAN™ to steer different applications or traffic profiles using the right delivery methods based on the business intent. The delivery services are defined globally and applied to WAN links at individual sites, as applicable.

Citrix SD-WAN Orchestrator service offers the following delivery Services at the site-level:

- Virtual paths
- Internet services
- Intranet services

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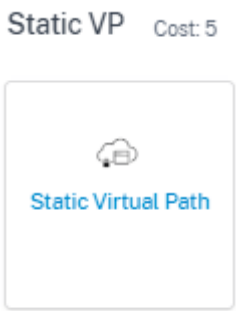
Virtual paths

A virtual path is a logical link between two WAN links. It comprises a collection of WAN paths combined to provide high service-level communication between two SD-WAN nodes. This is done by constantly measuring and adapting to changing application demand and WAN conditions. The SD-WAN appliances measure the network on a per-path basis. A virtual path can be static (always exists) or dynamic (exists only when traffic between two SD-WAN appliances reaches a configured threshold).

Static virtual paths

The virtual path settings are inherited from the global wan link auto-path settings. You can override these configurations and add or remove the member path. You can also filter the virtual paths based on the site and the applied QoS profile. Specify a tracking IP address for the WAN Link that can be pinged to determine the state of the WAN Link. You can also specify a reverse tracking IP for the reverse path that can be pinged to determine the state of the reverse path.

To configure static virtual paths, from the site level, navigate to **Configuration** > **Advanced Settings** > > **Delivery Services** > **Virtual Paths** > **Static Virtual Paths**.



You can assign a route cost to the virtual path, for more information, see Virtual Path Route Cost

The active member paths are listed in the **Active Member Paths** section, you can view or edit the member path settings.

- **IP DSCP Tagging**: A tag for the external IP header of the Virtual Path Control Protocol (VPCP) frame.
- **Loss Sensitive**: If enabled, a path might be marked as BAD due to loss and incurs a latency penalty in a path score. Set the percentage of loss over the time required to mark the path as BAD. Disable this option if loss of bandwidth is intolerable.
- **Percent Loss (%)**: This specifies the percentage of loss threshold before a path is marked BAD, as measured over the specified time. By default, the percentage is based on the last 200 packets received. When the packet loss exceeds the set percentage over the configured time, the GOOD Path state changes to BAD.

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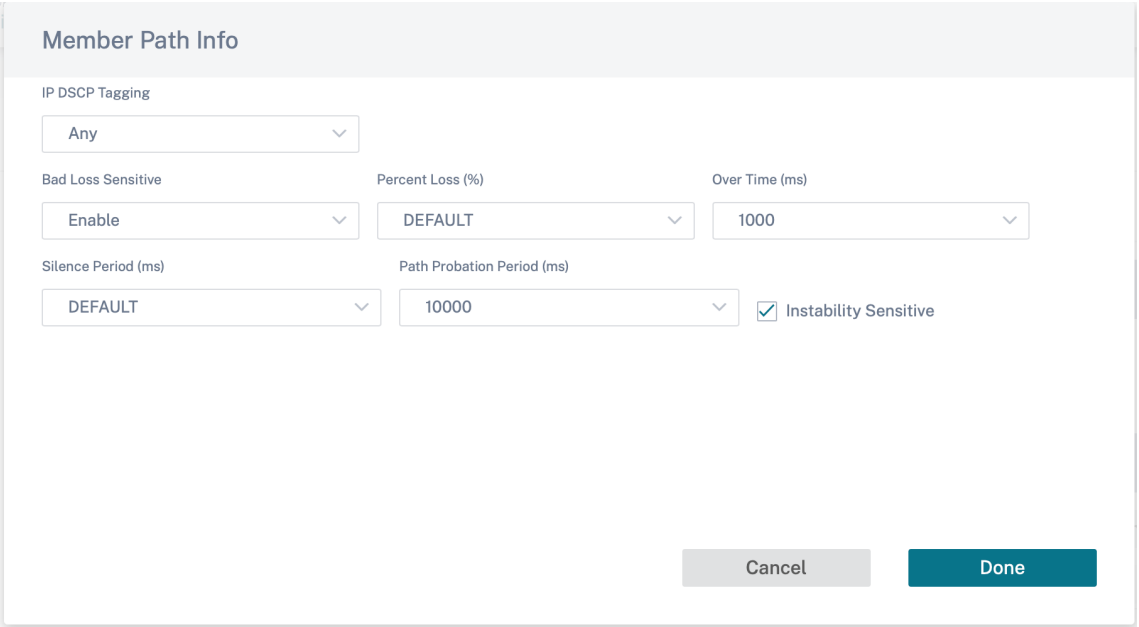
- **Over Time (ms)**: When the packet loss exceeds the set percentage over this configured time, the path state is marked as BAD.
- **Silence Period (ms)**: This specifies the duration (in milliseconds) before the path state transitions from GOOD to BAD. The default is 150 milliseconds. The path state transitions from GOOD to BAD when no packets are received within the specified amount of time.
- **Path Probation Period (ms)**: The period to wait before changing the path state from BAD to GOOD. The default is 10000 milliseconds.
- **Instability Sensitive**: Latency penalties due to BAD state and other spikes in latency are considered.



The WAN link details for the selected active member paths are listed, you can change the settings as required. The **UDP port** settings can be configured for both IPv4 and IPv6.

- **UDP Port**: The port used for LAN to WAN and WAN to LAN packet transfer. You can also specify.
- **Alternate Port**: The alternate UDP Port to be used when UDP port switching is enabled.
- **Port Switch Interval**: The interval, in minutes, that the WAN Link alternates its UDP Port.
- **Tunnel Header Size in Bytes**: The size of the tunnel header, in bytes, if applicable.
- **Active MTU Detect**: The LAN to WAN paths for dynamic virtual paths is actively probed for MTU.
- **Enable UDP Hole Punching**: The MCN assists UDP connectivity between compatible NAT-protected client sites.

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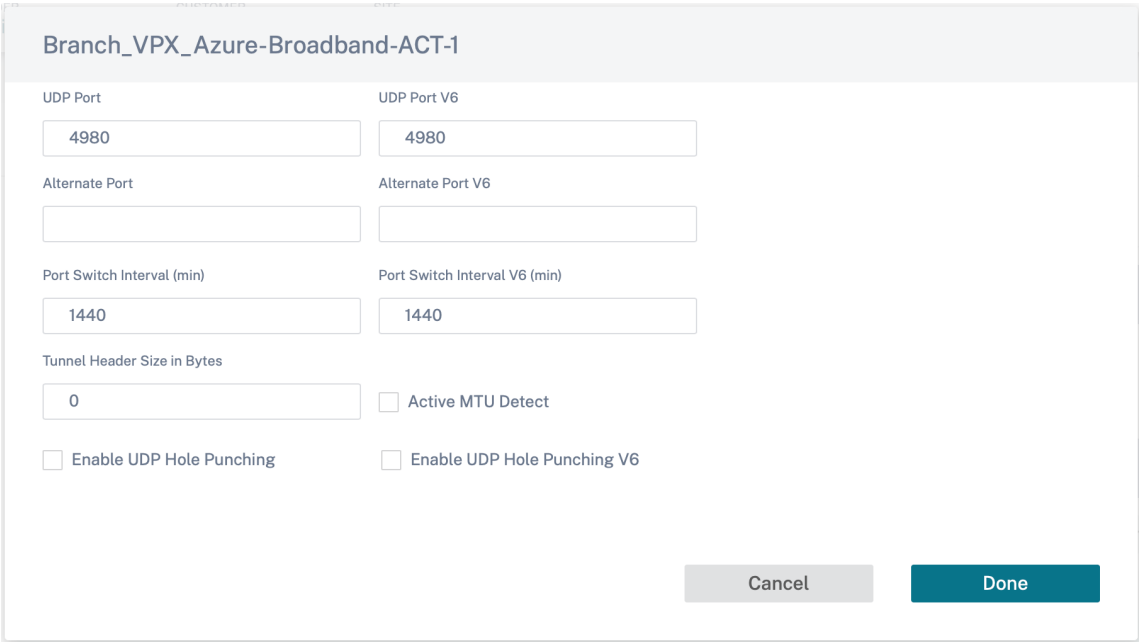

Dynamic virtual paths

With demand for VoIP and video conferencing, the traffic between offices has increased. Setting up full mesh connections through data centers is time consuming and inefficient. With Citrix SD-WAN, you can automatically create paths between offices on demand using the Dynamic Virtual Path feature. The session initially uses an existing fixed path. As the bandwidth and time threshold is met, a new path is created dynamically if that new path has better performance characteristics than the fixed path. The session traffic is transmitted through the new path resulting in efficient usage of resources. The dynamic virtual paths exist only when they are needed and reduce the amount of traffic transmitted to and from the data center.

To configure dynamic virtual paths, from the site level, navigate to **Configuration** > **Advanced Settings** >**Delivery Services**> **Virtual Paths** > **Dynamic Virtual Paths**.

Select **Site Specific Override** to override the virtual path settings inherited from the global wan link auto-path settings. The **Site Specific Override** option only allows you to enable or disable the dynamic virtual paths. You cannot create, remove, or configure the dynamic virtual paths from the site level.

Select **Enable Dynamic Virtual Paths** to allow the dynamic virtual paths between the configured site and other sites connected through an intermediate node. Using this option, you can enable both, dynamic virtual paths and member paths. Set the maximum allowable dynamic virtual paths for the site.

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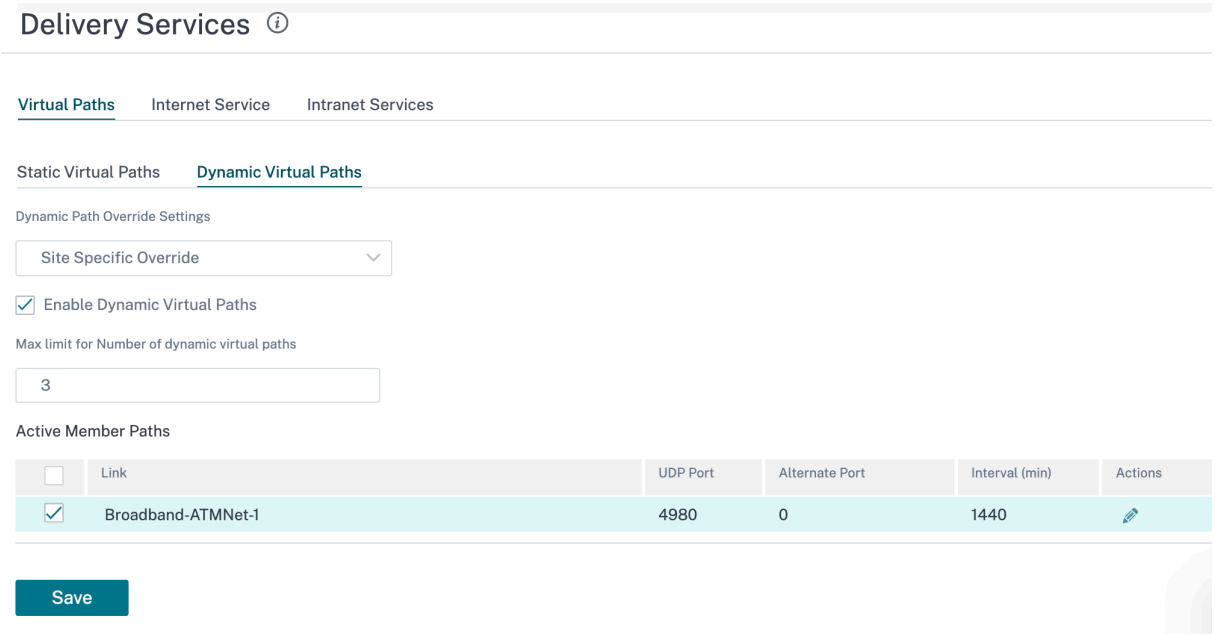
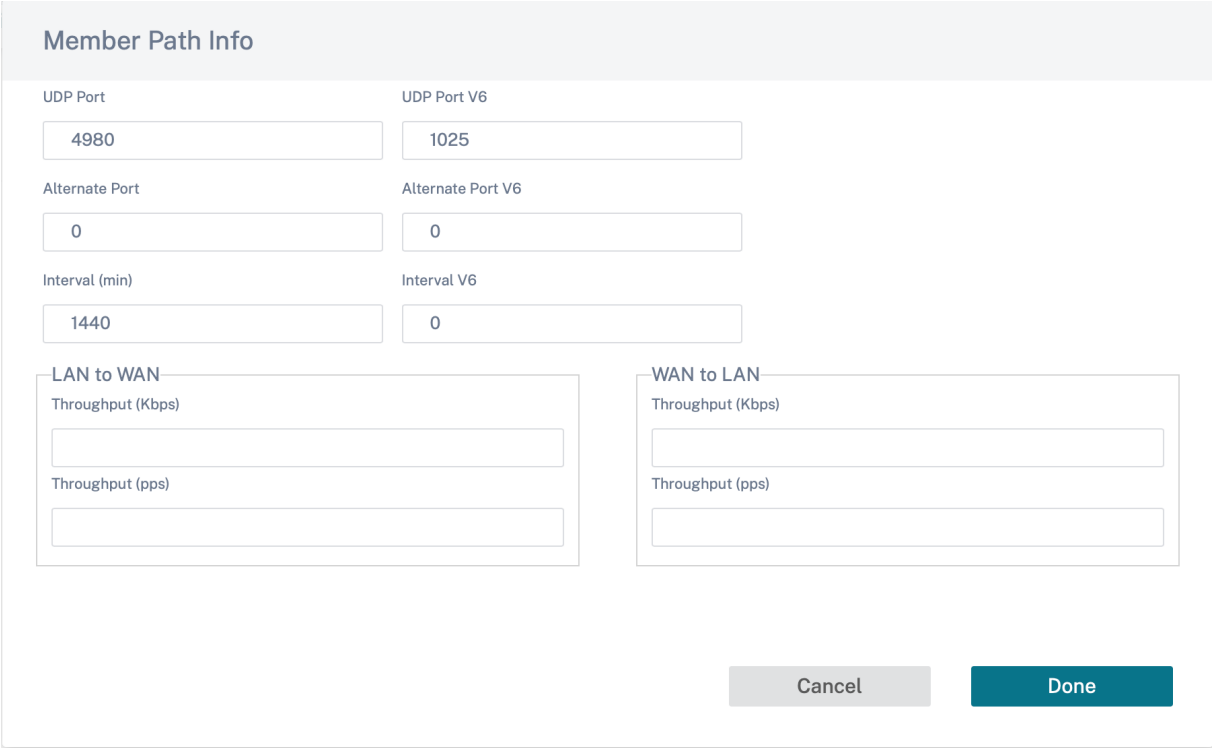


Set the UDP port and dynamic virtual path threshold. Specify the throughput threshold, in kbps or packets per second, on the intermediate site at which the dynamic virtual paths are triggered on LAN to WAN or WAN to LAN.



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Internet Service

An Internet service provides a direct channel between an SD-WAN site and public Internet, with no SD-WAN encapsulation involved. Citrix SD-WAN supports session-load-balancing capability for Internet-bound traffic across multiple Internet links. You can set up only one Internet service for a site.

To configure Internet settings, from the site-level, navigate to **Configuration** > **Advanced Settings** > **Delivery Services** > **Internet Service**.

You can configure the Internet service globally for all the sites in the network, or specific to individual sites. By default, every site inherits the global Internet service settings and the **Internet Override Settings** drop-down list displays the **Global Default** option. If you want to override the global settings with site-specific settings, select the **Site Specific Override** option from the drop-down list. This option overrides the global Internet settings for a specific site by keeping the network with the default global configurations intact.

To configure site-specific Internet service settings, select **Enable** from the **Internet Service** drop-down list. You can further choose between global defaults and site-specific override settings for the following services:

- **Override cost**: Flag to override the Internet cost.
- **Internet cost**: The route cost used for the default Internet route added to the appliance. The route cost ranges from 1 to 65534.
- **Override Preserve Route**: Flags to override the Internet preserve route.
- **Internet Preserve Route**: When enabled, packets destined for the Internet service choose this service even if all the WAN links for this service are unavailable.
- **Override Primary Reclaim**: When enabled, the usage associated with the Internet service on a WAN link forcefully reclaims status as the active service on that WAN link.

You can configure the following ICMP services at site level and at network level:

- Determine Internet reachability from link using ICMP probes
- IPv4 ICMP endpoint address
- Probe interval (in seconds)
- Retries

For more information about ICMP probing, see Internet service.

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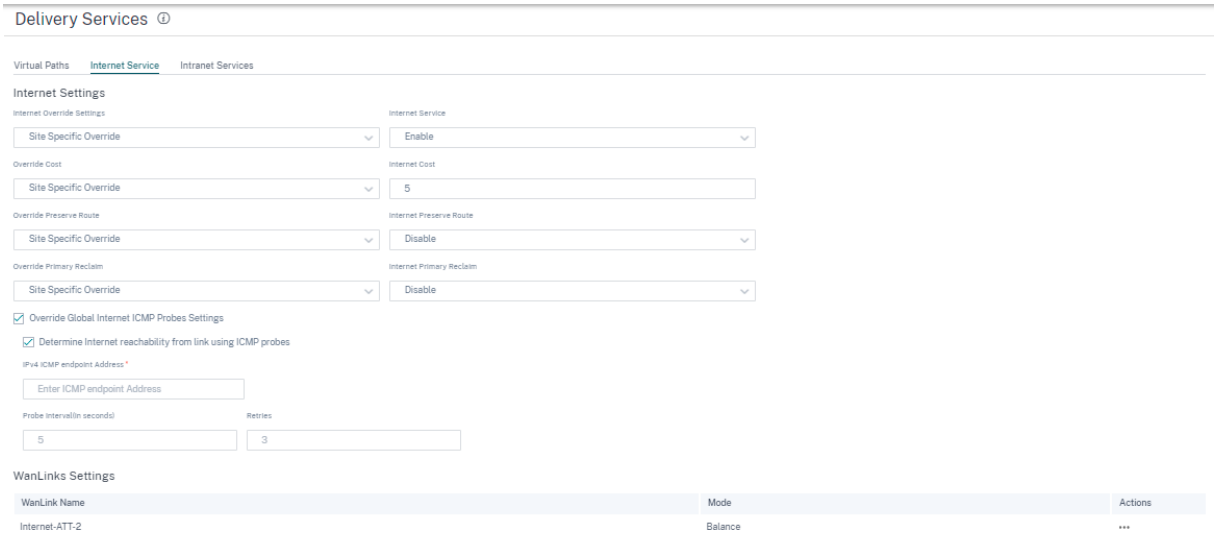

WAN link settings

To update the **WAN link** settings for an Internet service:

1. In the **WanLinks Settings** section, navigate to **Actions** > **Edit**. The **Update Wan Link Settings** page is displayed.
2. Update the fields as required. This page provides a complete list of services and the bandwidth allocation of the services configured for the site. You can modify the bandwidth allocation of the Internet service by updating the **Allocation%** column. The total allocation percentage of all the services put together cannot exceed 100%.
3. You can set the minimum/maximum upload and download bandwidth value for Internet services. The **Min Kbps** is a mandatory field. The **Max Kbps** field is optional and the value cannot be lesser than the configured minimum download/upload bandwidth value. The value must be greater than or equal to the minimum download/upload bandwidth value.
4. Click **Done**.

> **Note**
>
> If an Internet WAN link is in the **Global Default** mode, you cannot update the service allocation. This allocation is applicable only if the WAN link is in the **Site Specific Override** mode.

Intranet Service

An Intranet service provides an underlay link-based connectivity from an SD-WAN site to any non-SD-WAN site. The traffic is unencapsulated or you can use any non-virtual path encapsulation such as IPsec, GRE. You can set up multiple Intranet services for a site.

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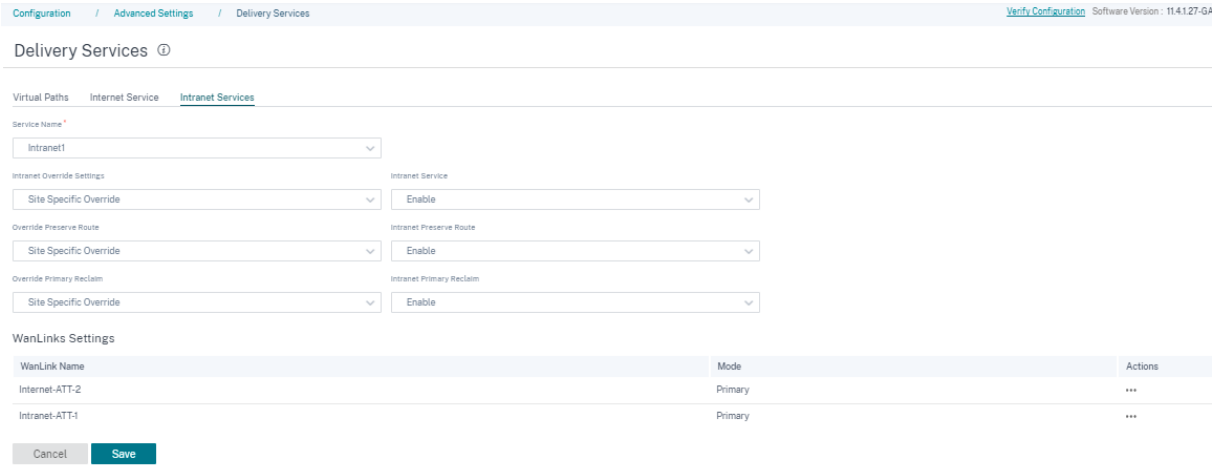
To configure the **Intranet** settings, from the site-level, navigate to **Configuration** > **Advanced Settings** > **Delivery Services** > **Intranet Service**.

You can configure Intranet settings for a specific site. The **Site Specific Override** option on the **Intranet Override Settings** drop-down list configures Intranet settings for a specific site.

When you enable the **Intranet Service** option for a specific site, you can further choose between global defaults and site-specific override settings for the following services:

- **Override Preserve Route**: Flags to override the Intranet preserve route.
- **Intranet Preserve Route**: When enabled, packets destined for the Intranet service choose this service even if all the WAN links for this service are unavailable.
- **Override Primary Reclaim**: Flag to override primary reclaim.
- **Intranet Primary Reclaim**: When enabled, the usage associated with the Intranet service on a WAN link forcefully reclaims status as the active service on that WAN link.



WAN link settings

To update the **WAN link** settings for an Intranet service:

1. Navigate to the **WANLinks Settings** section.
2. Select an Intranet service and click **Actions** > **Edit**. The **Update Wan Link Settings** page is displayed.
3. Update the fields as required. This page provides a complete list of services and the bandwidth allocation of all the services configured for the site. You can modify the bandwidth allocation of the Intranet service by updating the **Allocation%** column. The total allocation percentage of all the services put together cannot exceed 100%.
4. You can set the minimum/maximum upload and download bandwidth value for Intranet services. The **Min Kbps** is a mandatory field. The **Max Kbps** field is optional and the value cannot

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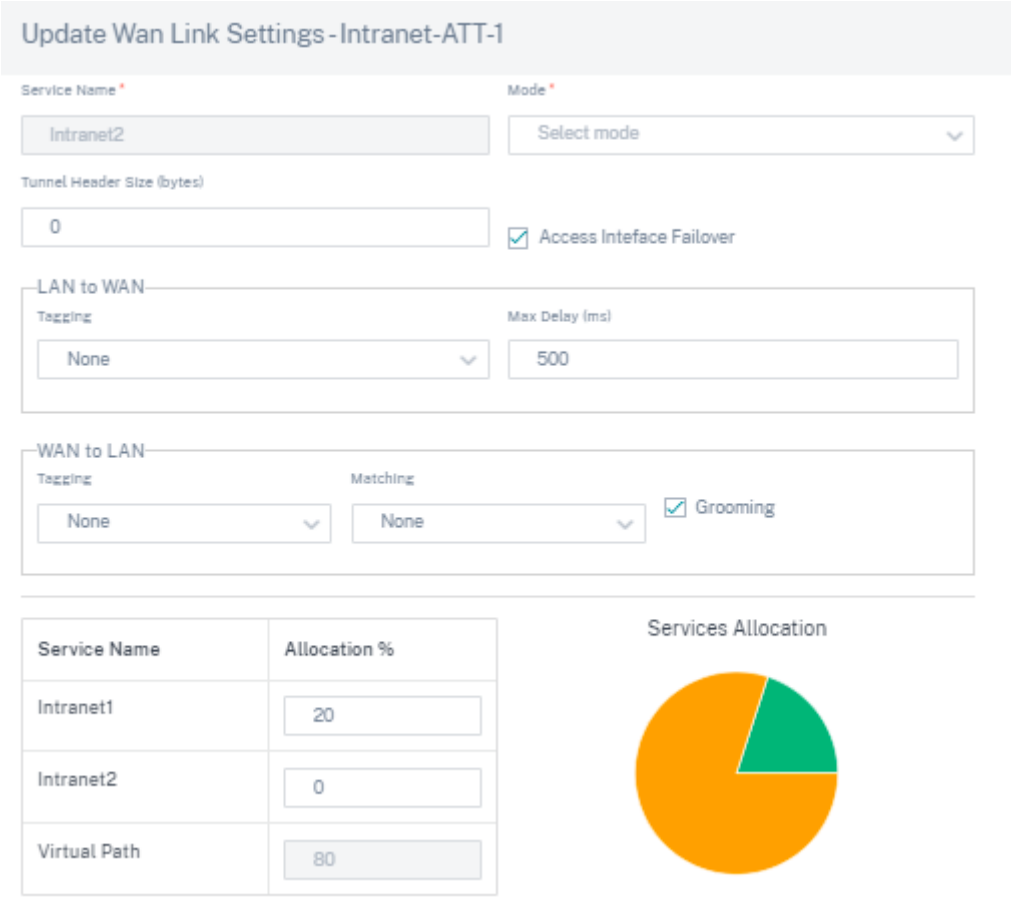
be lesser than the configured minimum download/upload bandwidth value. The value must be greater than or equal to the minimum download/upload bandwidth value.

5. Click **Done**.

> **Note**
>
> - The **WanLinks Settings** section under **Intranet Services** displays both, Internet and Intranet service settings configured for a specific site. It does not display just the Intranet settings.
> - If an Intranet WAN link is in the **Global Default** mode, you do not have an option to update the service allocation. This allocation is applicable only if the WAN link is in the **Site Specific Override** mode.



Prefix delegation groups

September 27, 2025

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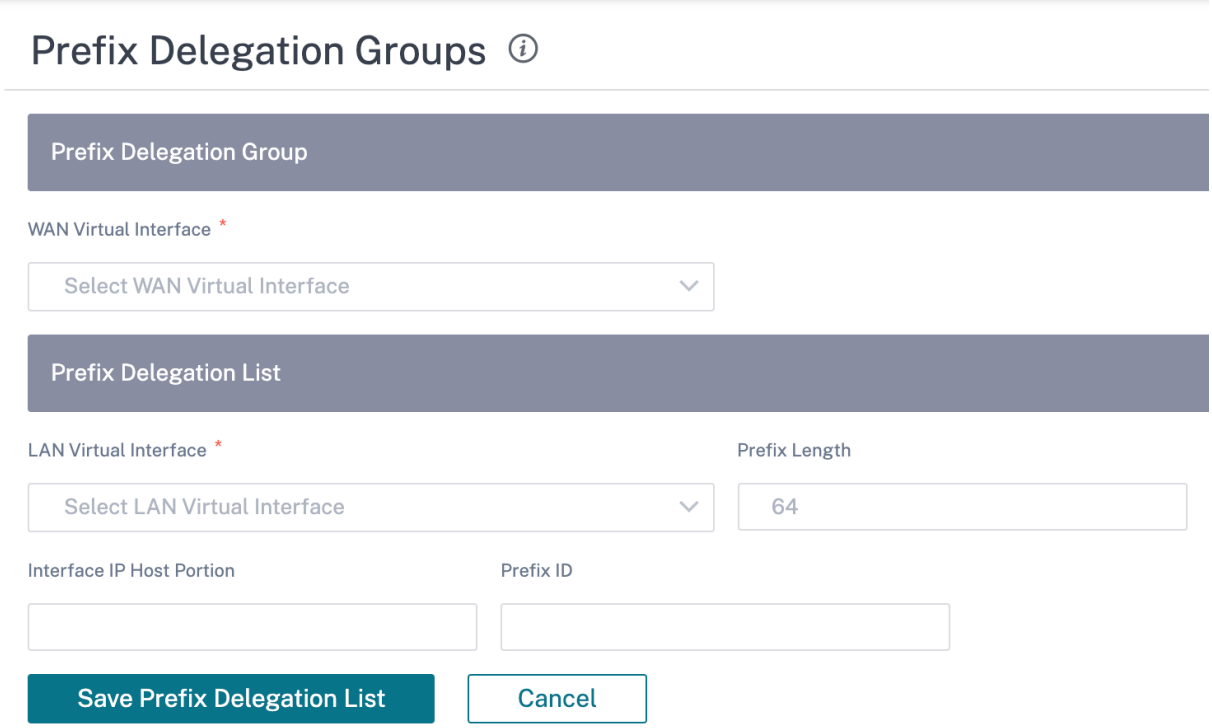
Citrix SD-WAN™ appliances can be configured as a DHCPv6 client to request a prefix from the ISP using the configured WAN port. Once the Citrix SD-WAN appliance receives the prefix, it uses the prefix to create a pool of IP addresses to cater to the LAN clients. The Citrix SD-WAN appliance then behaves as a DHCP server and advertise the prefix on the LAN ports to the LAN side clients.

To configure prefix delegation, navigate to **Configuration > Advanced Settings > Prefix Delegation Groups** and click **+ Prefix Delegation Groups**.

Choose a configured WAN Virtual Interface on which the prefix is requested from the ISP and provide the following details:

- **LAN Virtual Interface**: Select one of the configured LAN virtual interfaces for which the prefix is requested.
- **Prefix Length**: The number of bits of a Global Unicast IPv6 address that are part of the prefix.
- **Interface IP Host Portion**: The host portion to be used for the interface IP address.
- **Prefix ID**: A unique identifier to identify the prefix delegation requests for the LAN interface.



Appliance settings

September 27, 2025

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Citrix SD-WAN Orchestrator service allows you to configure the appliance settings, at the site level and push it to the remote appliances.

You can configure the user, network adapters, NetFlow, AppFlow®, SNMP, Fallback configuration, and Purge flow settings.

> **Note**
>
> The option to configure appliance settings is not available while creating or editing a site template.

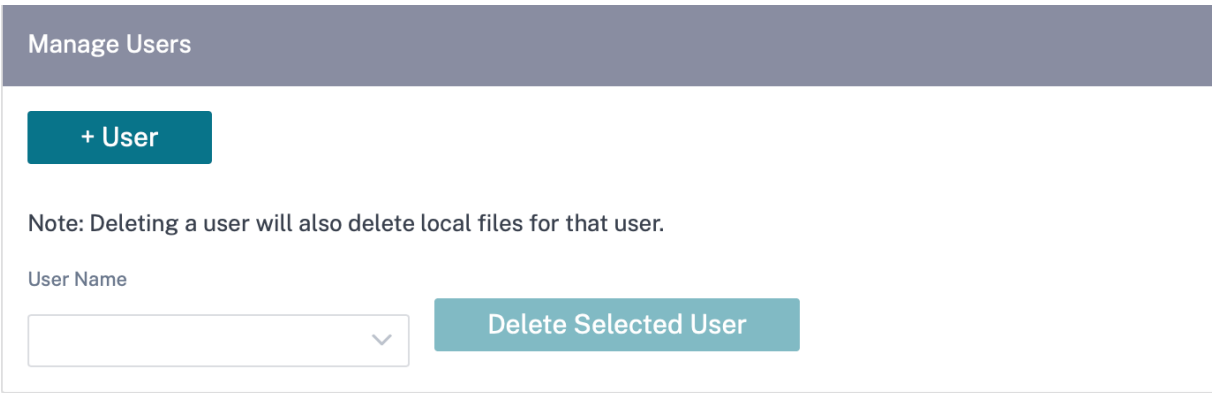
If HA is configured, select the primary or secondary appliance for which you want to change the appliance settings.

Administrative interface

The administrative interface allows you to add and manage the local and remote user accounts. The remote user accounts are authenticated through the RADIUS or TACACS+ authentication servers.

Manage users

You can add new user accounts for the site. To add a new user, navigate to **Configuration** > **Appliance Settings** > **Administrator Interface** > **Manage Users**, and click **+User**.



Provide the following details:

- **User Name**: The user name for the user account.

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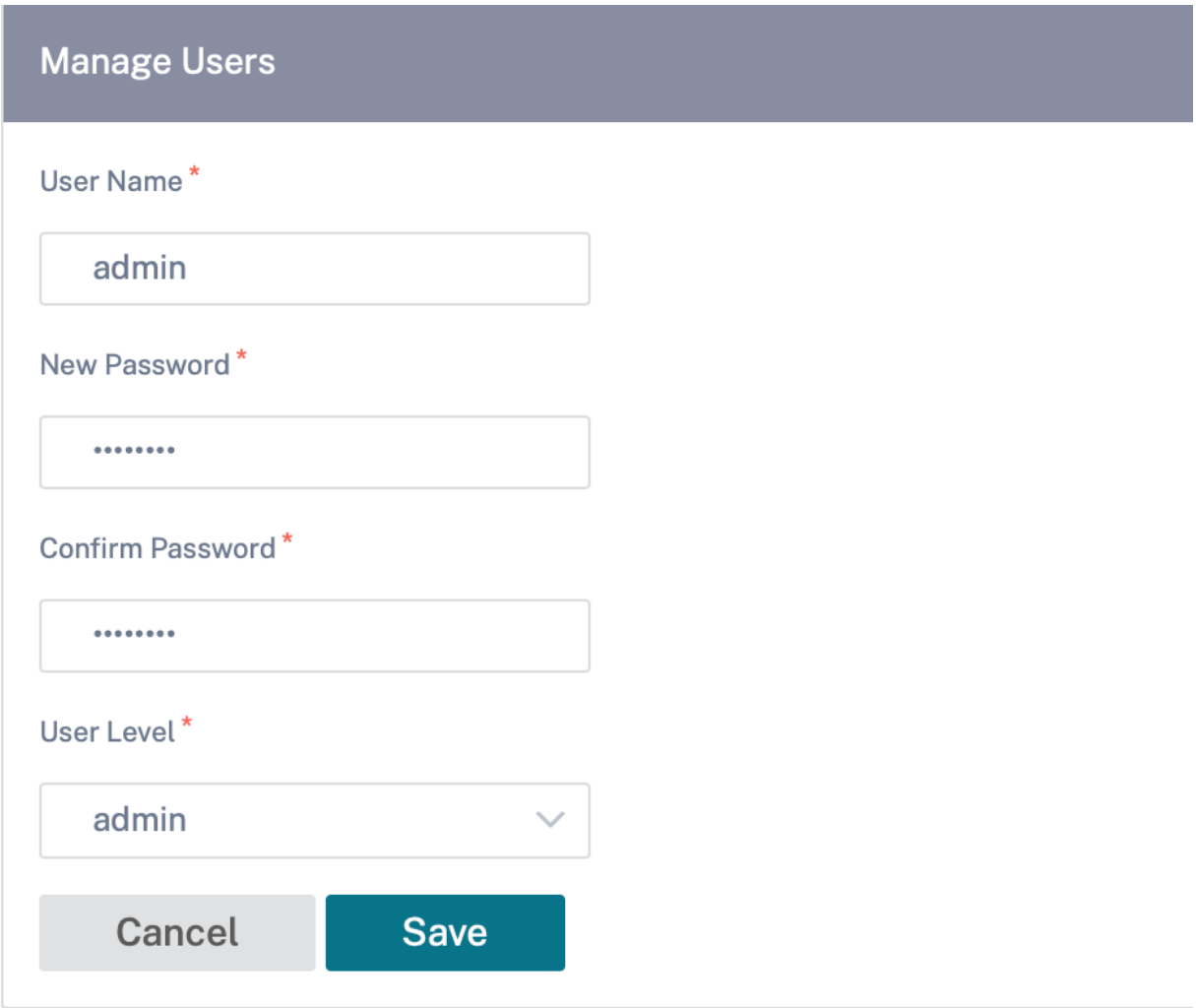
- **New Password**: The password for the user account.
- **Confirm Password**: Reenter the password to confirm it.
- **User level**: Select one of the following account privileges:
  - **Admin**: An Admin account has read-write access to all the settings. An admin can perform configuration and software update to the network.
  - **Viewer**: A Viewer account is a read-only account with access to Dashboard, Reporting, and Monitoring sections.
  - **Network Admin**: A Network Administrator has read-write access to the Network setting and read-only access for other settings.
  - **Security Admin**: A Security Administrator has read-write access for the Firewall / Security related settings read-only access for other settings.

    > **Note**
    > Security administrator has the authority to disable the write access to the firewall for other users (Admin/Viewer).



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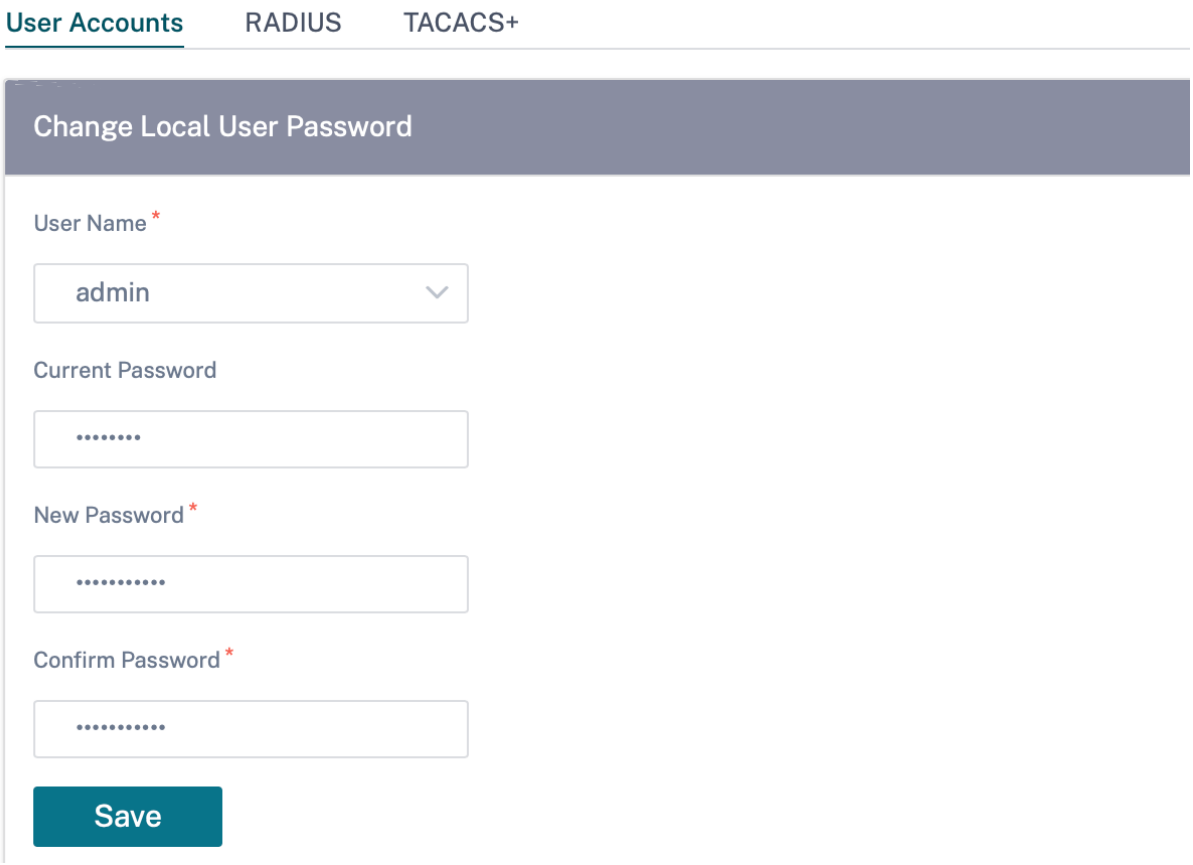
To delete a user, select a user name and click **Delete Selected User**. The user account and the local files are deleted.

Change local user password

To change the local user password, navigate to **Configuration** > **Appliance Settings** > **Administrative Interface** > **User Accounts** > **Change Local User Password** and provide the following values:

- **User Name**: Select a user name for which you want to change the password from the list of users configured at the site.
- **Current Password**: Enter the current password. This field is optional for admin users.
- **New Password**: Enter a new password of your choice.
- **Confirm Password**: Reenter the password to confirm it.



RADIUS authentication server

RADIUS enables remote user authentication on the appliance. To use RADIUS authentication, you must specify and configure at least one RADIUS server. Optionally, you can configure redundant

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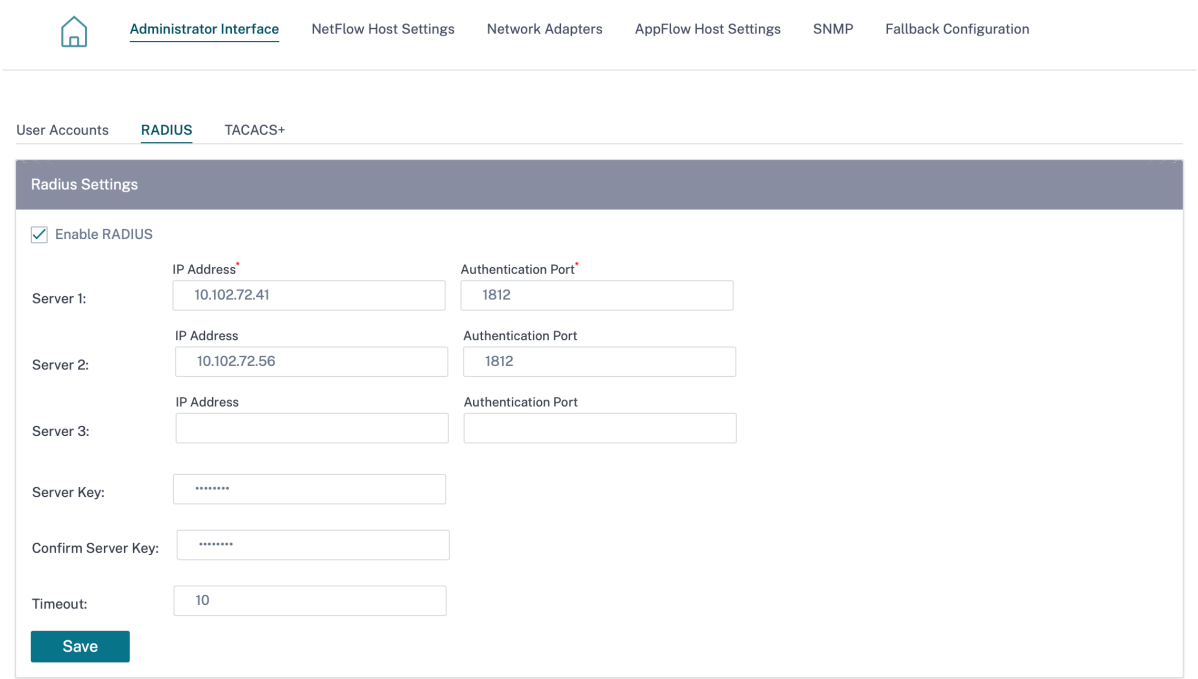
backup RADIUS servers, up to a maximum of three. The servers are checked sequentially. Ensure that the required user accounts are created on the RADIUS authentication server.

To configure RADIUS authentication, navigate to **Configuration** > **Appliance Settings** > **Administrative Interface** > **RADIUS**, and click **Enable RADIUS**.

> **Note**
>
> You can either enable RADIUS or TACACS+ authentication on a site. You cannot enable both at the same time.

Provide the host IP address of the RADIUS server and the authentication port number. The default port number is 1812. Enter a Server key and confirm it, it is a secret key used to connect to the RADIUS server. Specify the time interval to wait for an authentication response from the RADIUS server. The timeout value must be less than or equal to 60 seconds.

> **Note**
>
> The **Server Key** and **Timeout** settings are applied to all the configured servers.



TACACS+ authentication server

TACACS+ enables remote user authentication on the appliance. To use TACACS+ authentication, you must specify and configure at least one TACACS+ server. Optionally, you can configure redundant

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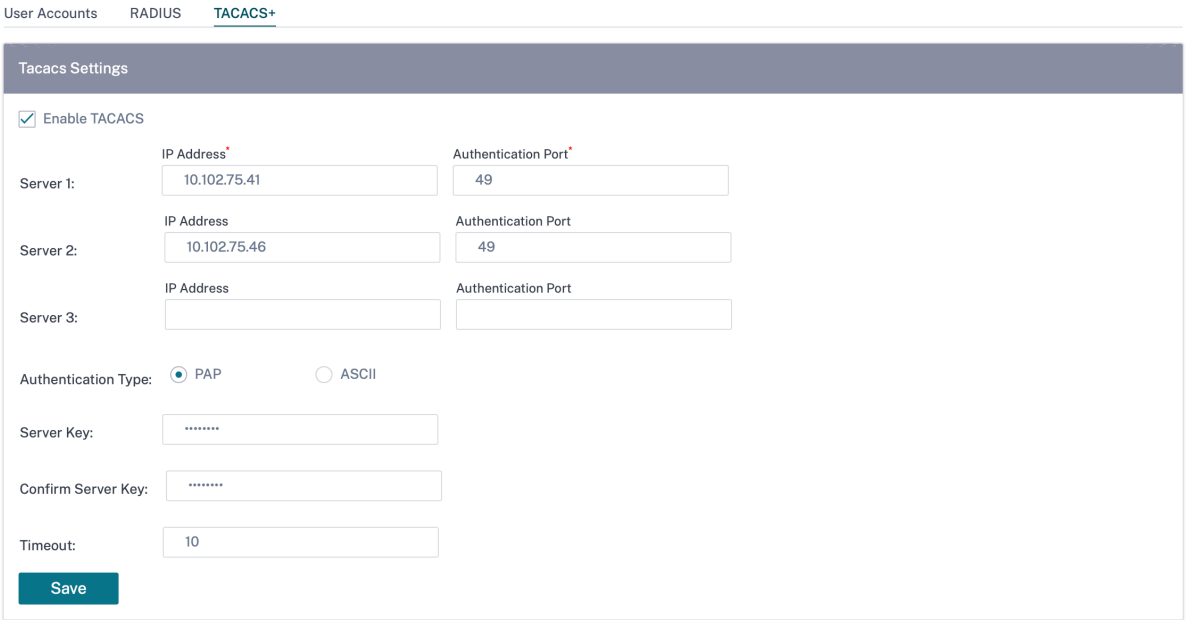
backup TACACS+ servers, up to a maximum of three. The servers are checked sequentially. Ensure that the required user accounts are created on the TACACS+ authentication server.

To configure TACACS+ authentication, navigate to **Configuration** > **Appliance Settings** > **Administrative Interface** > **TACACS+** and click **Enable TACACS+**.

> **Note**
>
> You can either enable RADIUS or TACACS+ authentication on a site. You cannot enable both at the same time.

1. Select the encryption method to send the user name and password to the TACACS+ server.
2. Provide the host IP address of the TACACS+ server and the authentication port number. The default port number is 49.
3. Enter a Server key and confirm it. It is a secret key used to connect to the TACACS+ server.
4. Specify the time interval to wait for an authentication response from the TACACS+ server. The timeout value must be less than or equal to 60 seconds.

> **Note**
>
> The **Authentication type**, **Server Key**, and **Timeout settings** are applied to all the configured servers.



NetFlow host settings

NetFlow Collectors collect IP network traffic as it enters or exits an SD-WAN interface. You can determine the source and destination of traffic, class of service, and the causes for traffic congestion using NetFlow data. For more information, see Multiple NetFlow Collector.

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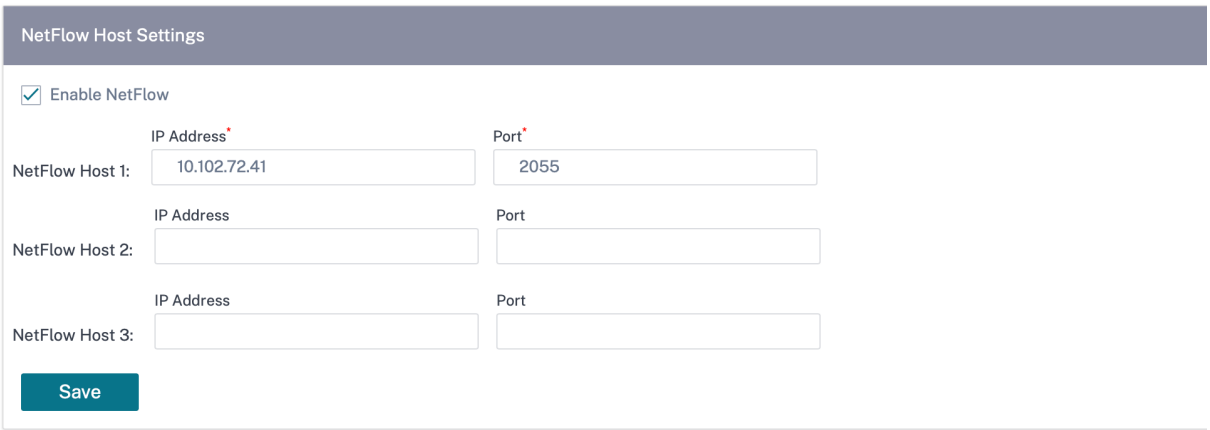
You can configure up to three NetFlow hosts. To configure NetFlow host settings, navigate to **Configuration** > **Appliance Settings** > **NetFlow Host Settings**. Select **Enable NetFlow** and provide the IP Address, and Port number of the NetFlow host.



Network adapters

For Citrix SD-WAN appliances, you can manually change the management network preference, management IP address and other network parameters. You can change the IPv4 address, subnet mask, gateway IP address, IPv6 address, and prefix of the appliance or obtain the IP address automatically by enabling DHCP or SLAAC (only for IPv6 addresses). For more information, see Dynamic host configuration protocol.

> **Note**
>
> - You cannot change the IP address, if the interface is used for in-band management. For more information on in-band management, see In-band management.
> - The In-band option works only if you have configured a data port as the In-band management port and Internet service is configured. Ensure that you have the configuration to support In-band management for the SD-WAN appliance, prior to setting the management preference.
> - The Management Network Preference (In-band and Out-of-band) section is visible if the appliance is running a software version of 11.4.2 or later.

To configure the network adapter settings, navigate to **Configuration** > **Appliance Settings** > **Network Adapter**.

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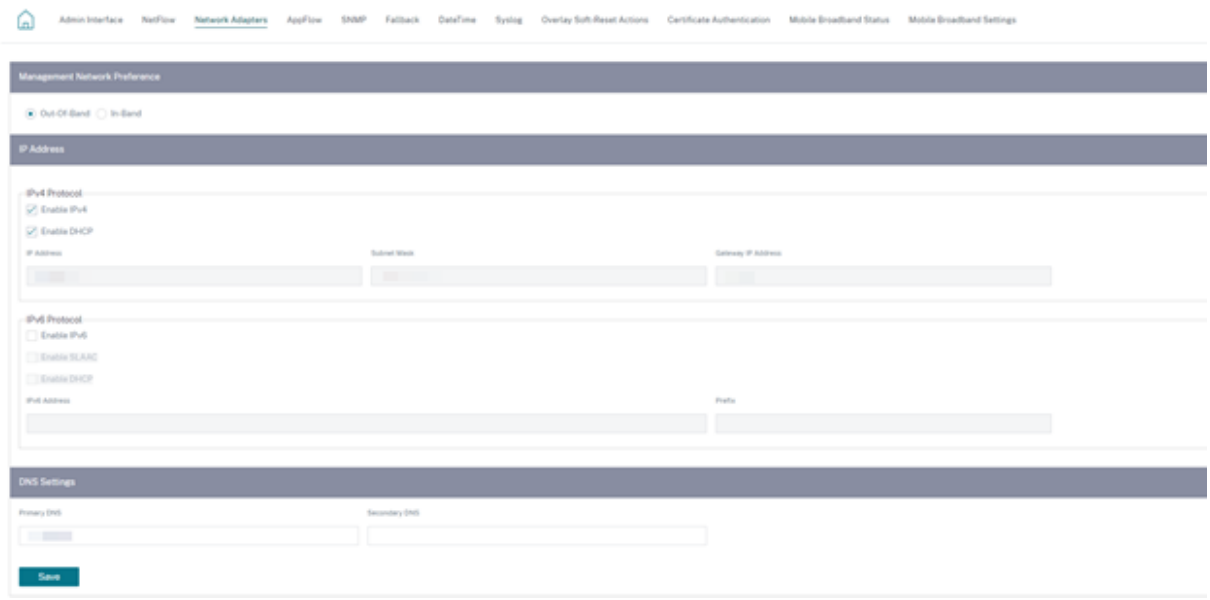

AppFlow host settings

AppFlow and IPFIX are flow export standards used to identify and collect application and transaction data in the network infrastructure. This data gives better visibility into application traffic utilization and performance.

The collected data, called flow records are transmitted to one or more IPv4 collectors. The collectors aggregate the flow records and generate real-time or historical reports. For more information, see AppFlow and IPFIX.

SNMP

SNMP is used for exchanging management information between network devices. SNMPv1 is the first version of the SNMP protocol. SNMPv2 is the revised protocol, which includes enhancements in protocol packet types, transport mappings and MIB structure elements. SNMPv3 defines the secure version of the SNMP. SNMPv3 protocol also facilitates remote configuration of the SNMP entities.

The SNMP agent collects the management information from the appliance locally and sends it to the SNMP manager whenever it is queried. If the agent detects an emergency event on the appliance, it sends out a warning message to the manager without waiting to be queried for data. This emergency message is called a trap. Enable the required SNMP version agents, the corresponding traps, and provide the required information. For more details see, SNMP.

To configure SNMP settings, navigate to **Configuration** > **Appliance Settings** > **SNMP**

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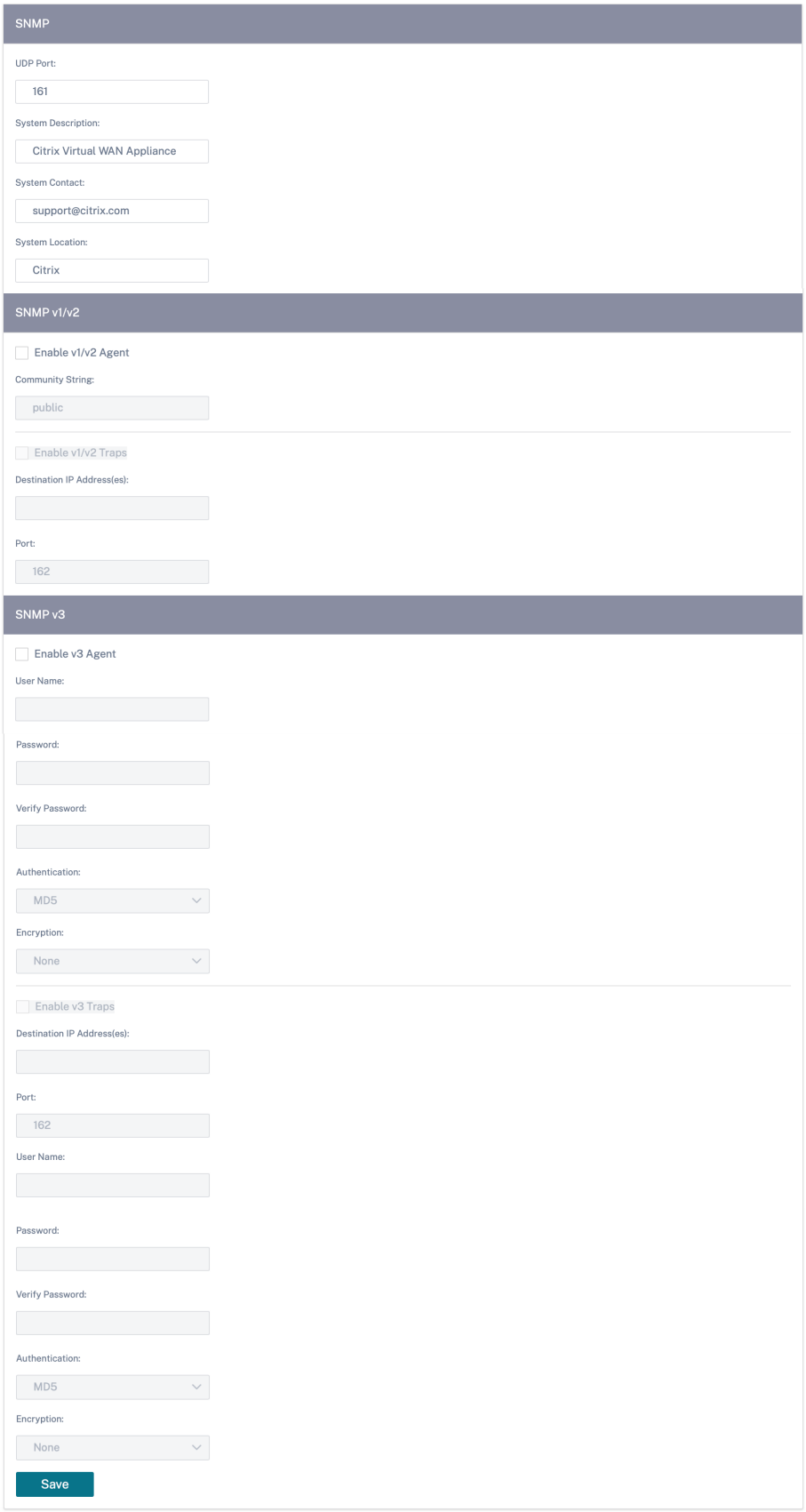

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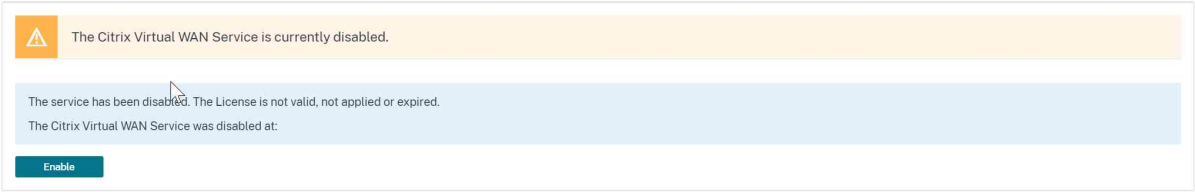
Fallback configuration

Fallback configuration ensures that the appliance remains connected to the zero-touch deployment service if there is a link failure, configuration mismatch, or software mismatch. Fallback configuration is enabled by default on the appliances that have a default configuration profile. You can also edit the fallback configuration as per your existing LAN network settings. For more information, see Fallback configuration.

Flows

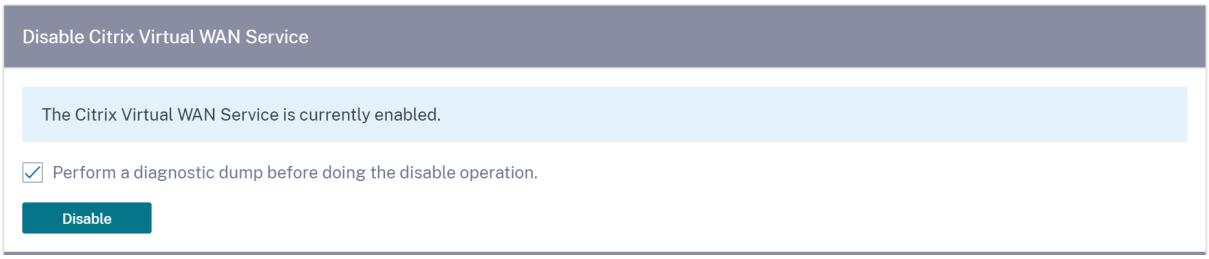
The flows section allows you to enable or disable Citrix® Virtual WAN service on the appliance. Enabling the service enables and starts the Virtual WAN daemon. An option to enable Citrix Virtual Wan Service is available if the service is disabled.



Disable Citrix Virtual WAN service

The **Disable Citrix Virtual WAN Service** option is available if the service is enabled. Disabling the service stops the Virtual WAN daemon on the appliance.

You can choose to collect a diagnostic dump of the Virtual WAN network before disabling the Citrix Virtual WAN service.



Restart dynamic routing

You can restart the dynamic route learning process through OSPF and BGP routing protocols. The restart dynamic routing option is provided for troubleshooting only.

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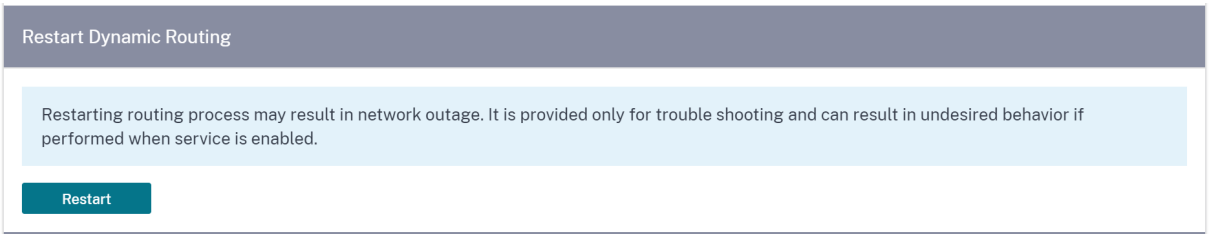
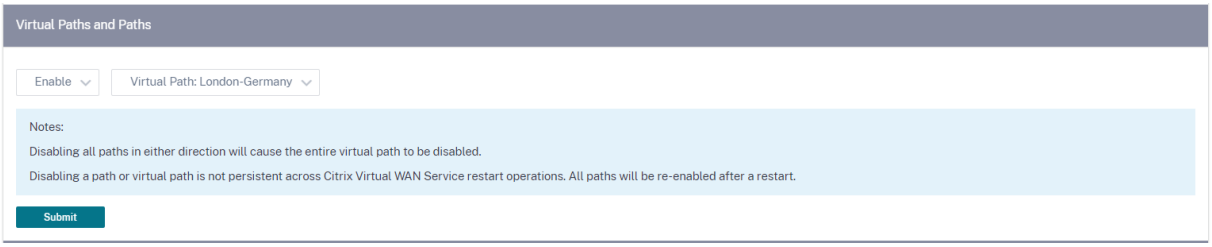
> **Warning**
>
> Restarting dynamic routing might result in network outage.



Virtual paths

You can choose to enable or disable the virtual path between 2 sites. You can either choose the underlying individual paths, in either directions, or the overlay virtual path. Disabling individual paths, disables the entire virtual path.

> **Note**
>
> All paths are re-enabled after restarting the Citrix Virtual WAN Service.



All paths on WAN link

You can choose to enable or disable WAN links between 2 sites Disabling all WAN links, disables the Virtual path.

> **Note**
>
> All the WAN links are re-enabled after restarting the Citrix Virtual WAN Service.

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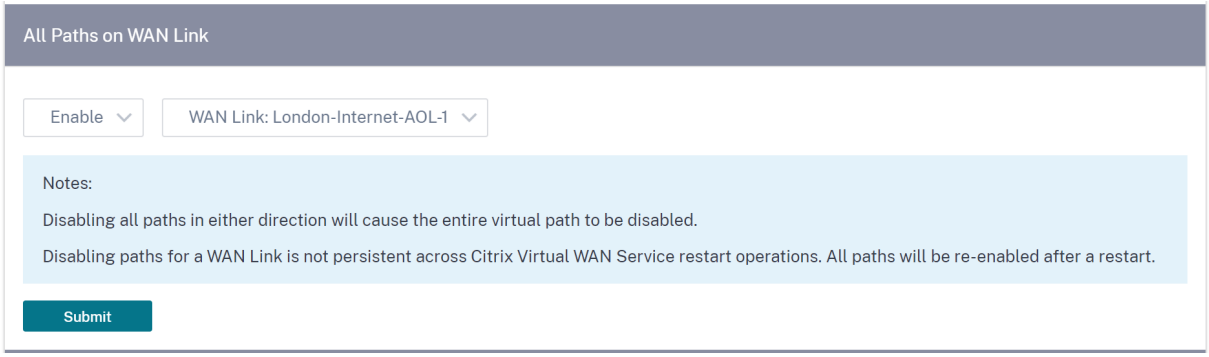
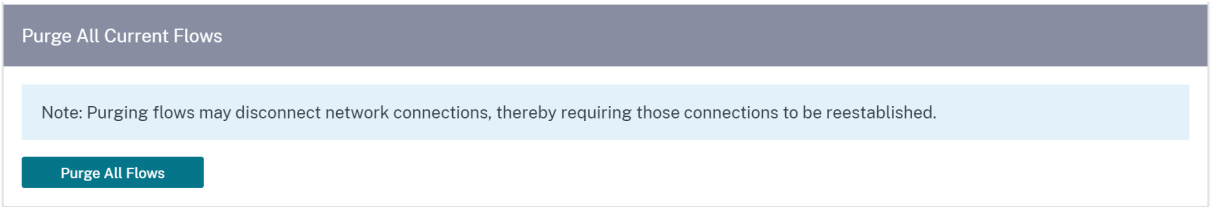


Purge all current flows

Purging flows ends all the current flows, clears the flow tables, re-establishes flow connections, and repopulates the flow table.



Date and time

You can change the date and time of the appliance either manually or by using an NTP server. To configure date and time manually, ensure that the **Use NTP server** option is not selected and provide the date and time.

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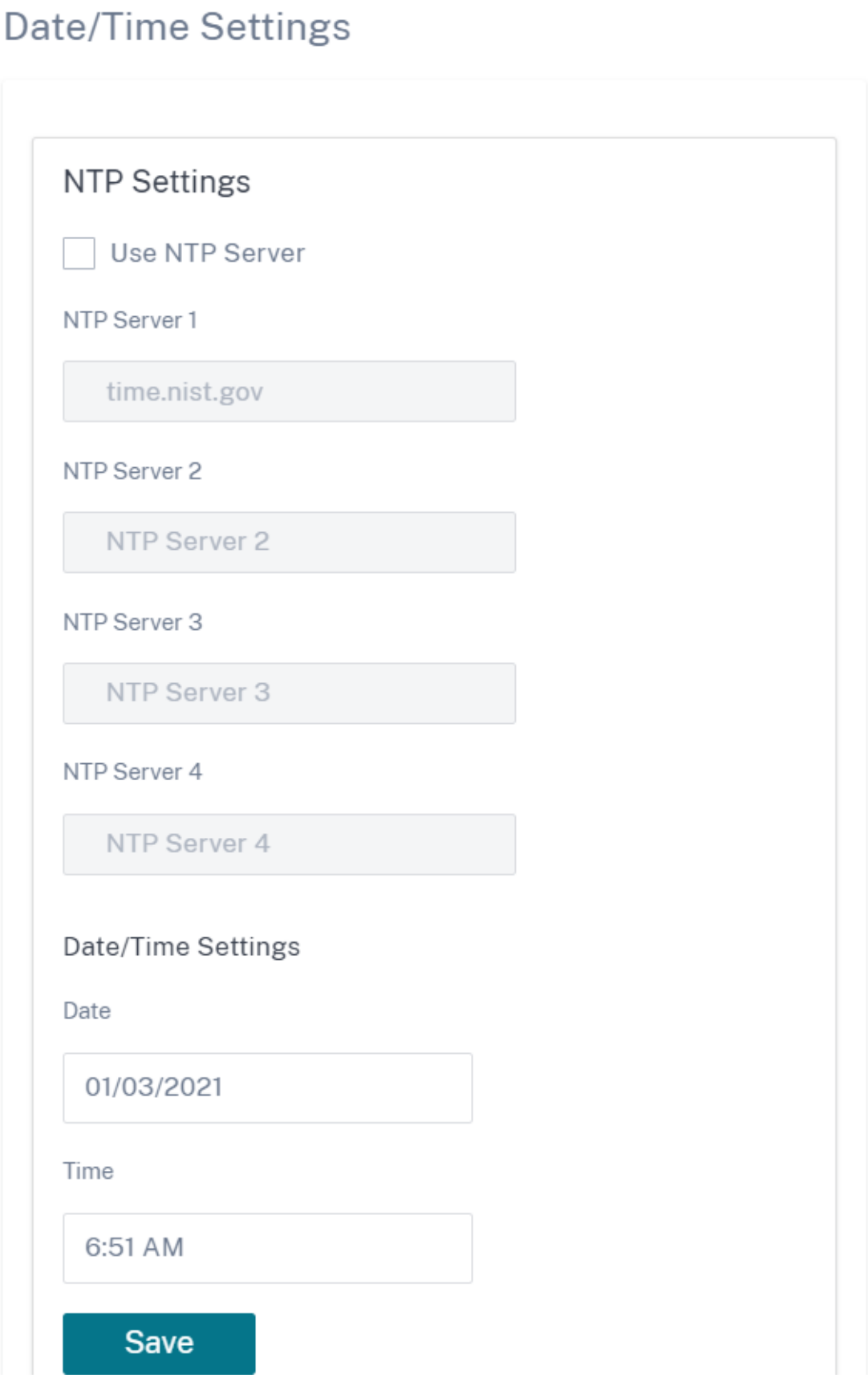

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If you select the **Use NTP server** option, then you cannot manually enter a current date and time. You can specify up to 4 NTP servers, but you must specify at least one. These act as backup NTP servers, if one server is down the appliance automatically synchronizes with the other NTP server. If you specify a domain name for an NTP server, you must also configure a DNS server unless you have already done so.

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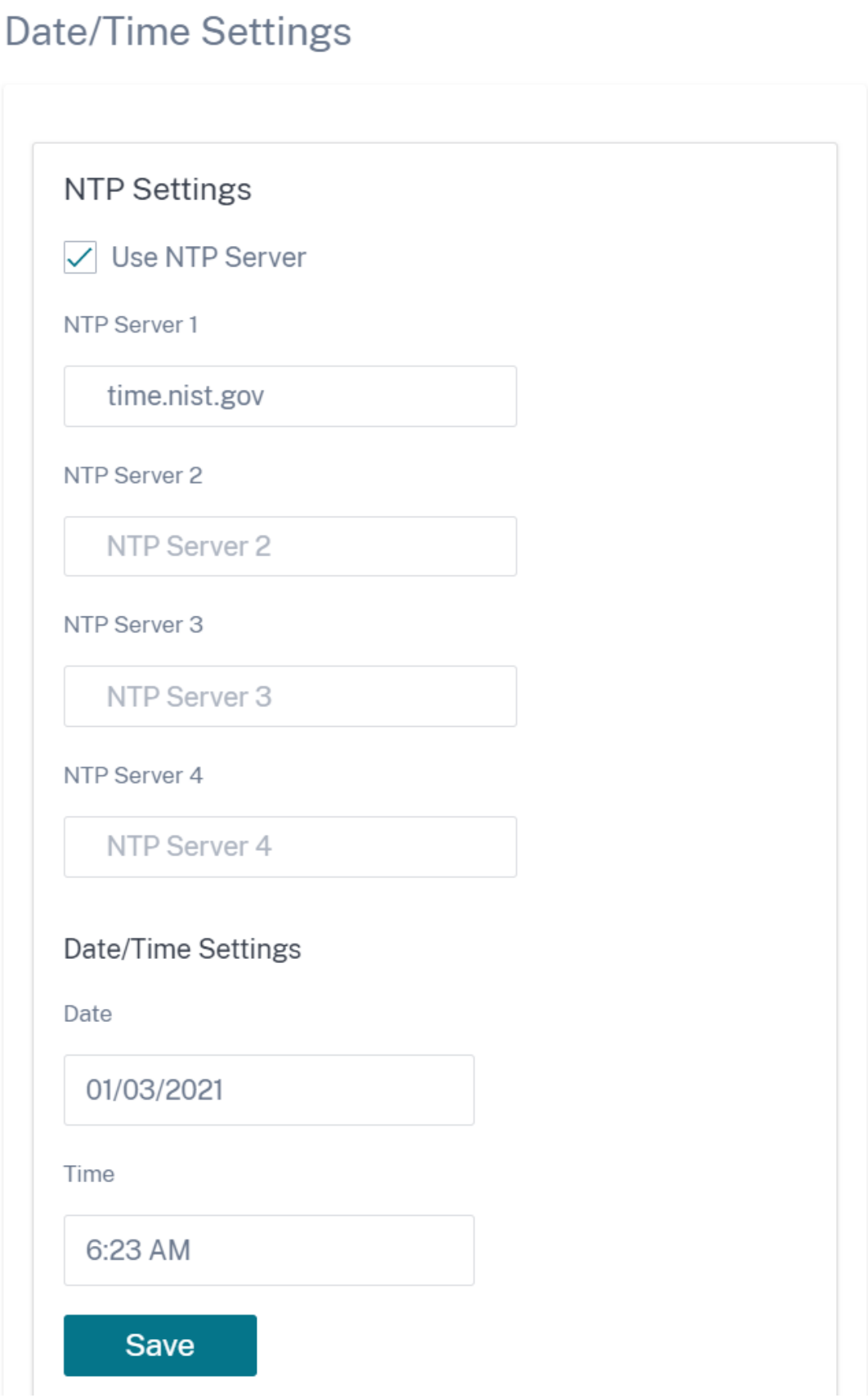

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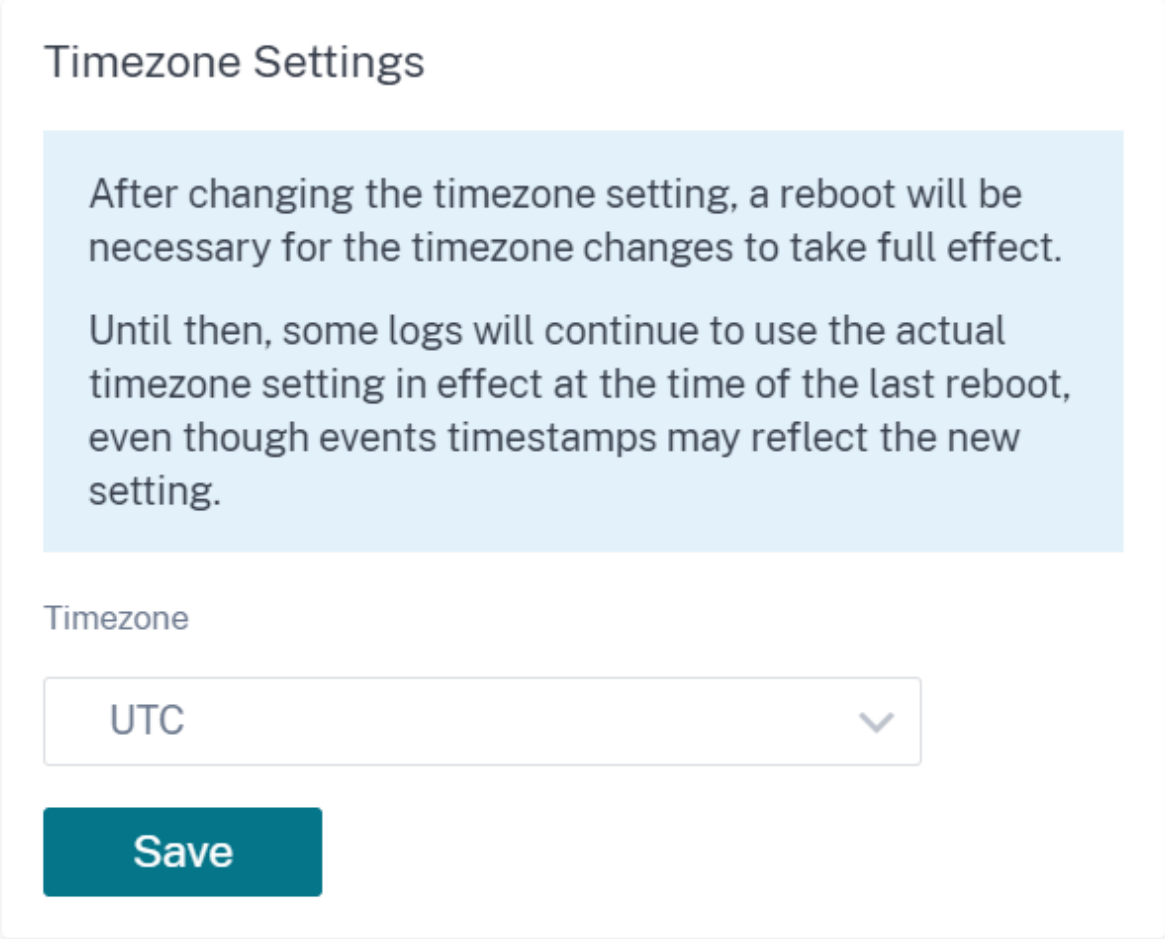
If the time zone has to be changed, change it before setting the date and time, or else your settings do not persist. Reboot the appliance after changing the time zone.



Syslog server settings

You can configure Syslog server settings of SD-WAN appliances using Citrix SD-WAN Orchestrator service. By enabling Syslog settings, you can send system alerts and event details of SD-WAN appliances to an external Syslog server. However, you must select the event type on the SD-WAN appliance UI by navigating to **Configuration** > **Appliance Settings** > **Logging/Monitoring** > **Alarm Options**. For more information, see Configure Alarms.

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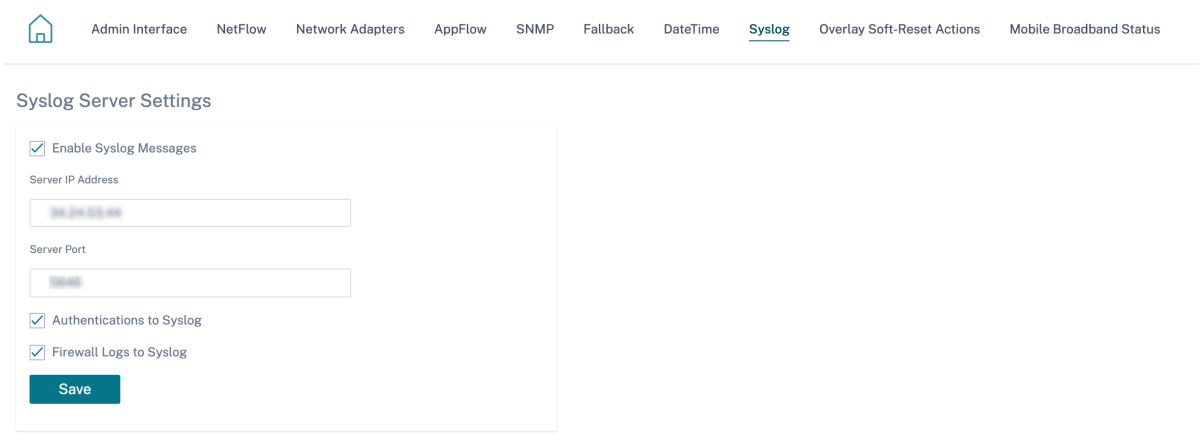

The following Syslog server settings are configurable through Citrix SD-WAN Orchestrator service:

- **Enable Syslog Messages**: Enable or disable sending logs or event messages to Syslog server.
- **Server IP Address**: IP address of the Syslog server.
- **Server Port**: Port number of the Syslog server.
- **Authentication to Syslog**: Enable or disable sending authentication logs or event messages to the Syslog server.
- **Firewall Logs to Syslog**: Enable or disable sending firewall logs to the Syslog server.

Certificate authentication

Citrix SD-WAN Orchestrator service ensures that secure paths are established between appliances in the SD-WAN network by using security techniques such as network encryption and virtual path IPsec tunnels. In addition to the existing security measures, certificate based authentication is introduced in Citrix SD-WAN Orchestrator service.

Certificate authentication allows organizations to use certificates issued by their private Certificate Authority (CA) to authenticate appliances. The appliances are authenticated before establishing the virtual paths. For example, if a branch appliance tries to connect to the data center and the certificate from the branch does not match with the certificate that the data center expects, the virtual path is not established.

The certificate issued by the CA binds a public key to the name of the appliance. The public key works with the corresponding private key possessed by the appliance identified by the certificate.

To enable appliance authentication, at network level, navigate to **Configuration** > **Security** > **Network Security** and select **Enable Appliance Authentication**. Click **Save**.

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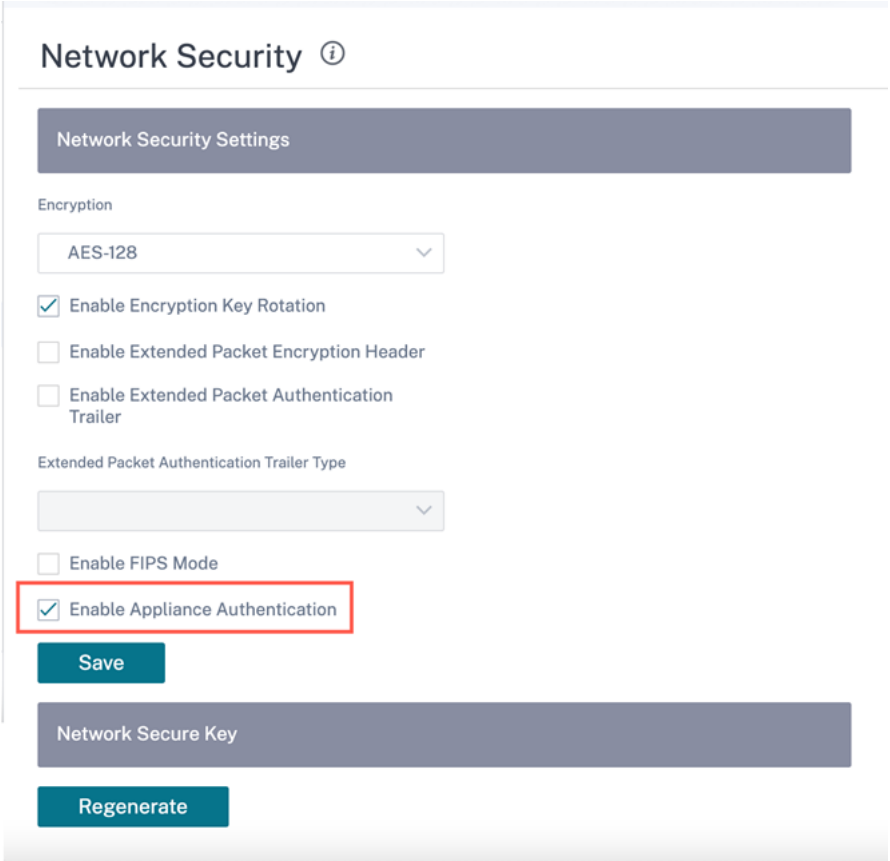
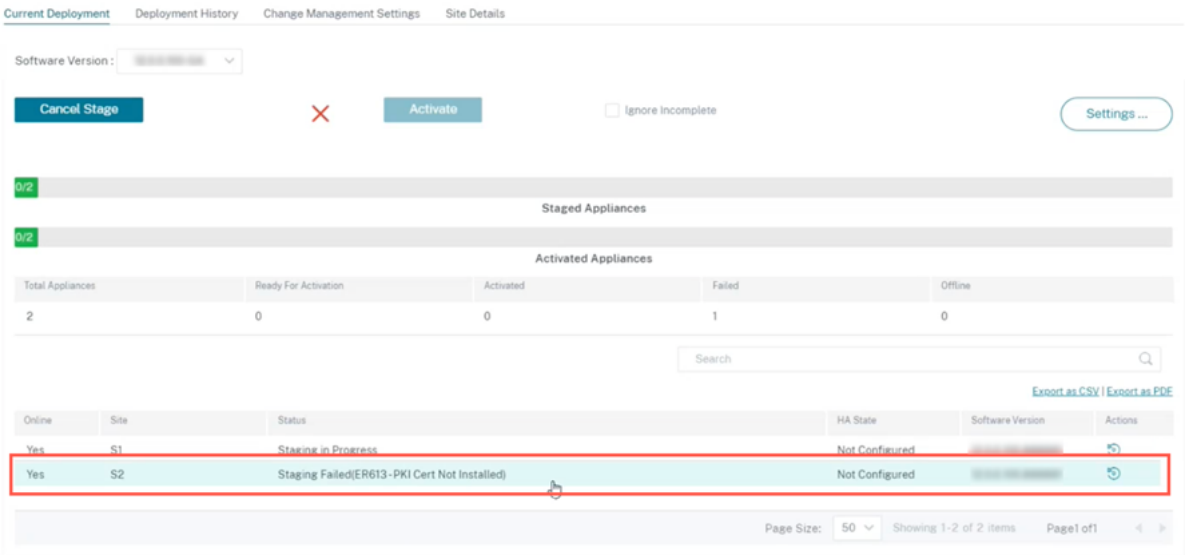


During deployment, if the appliance authentication is enabled but a PKI certificate is not installed in the appliance, then the staging shows failed status.



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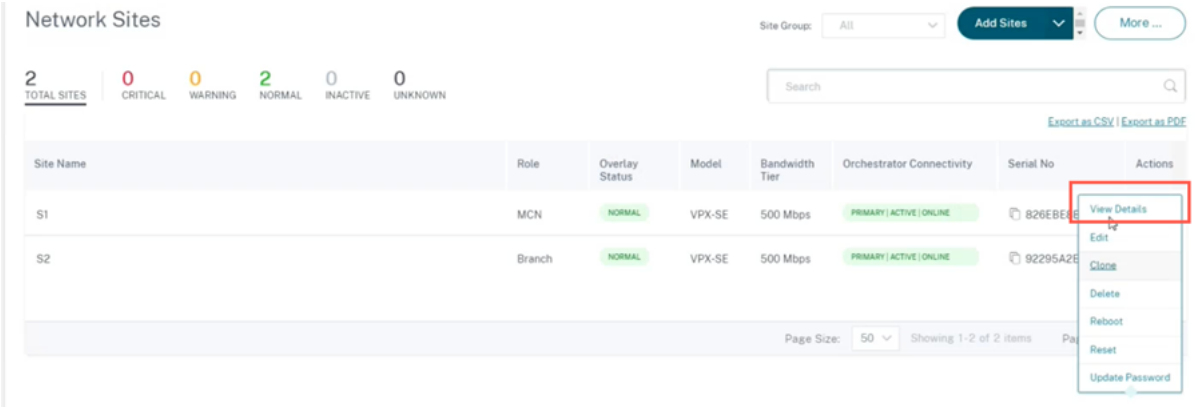
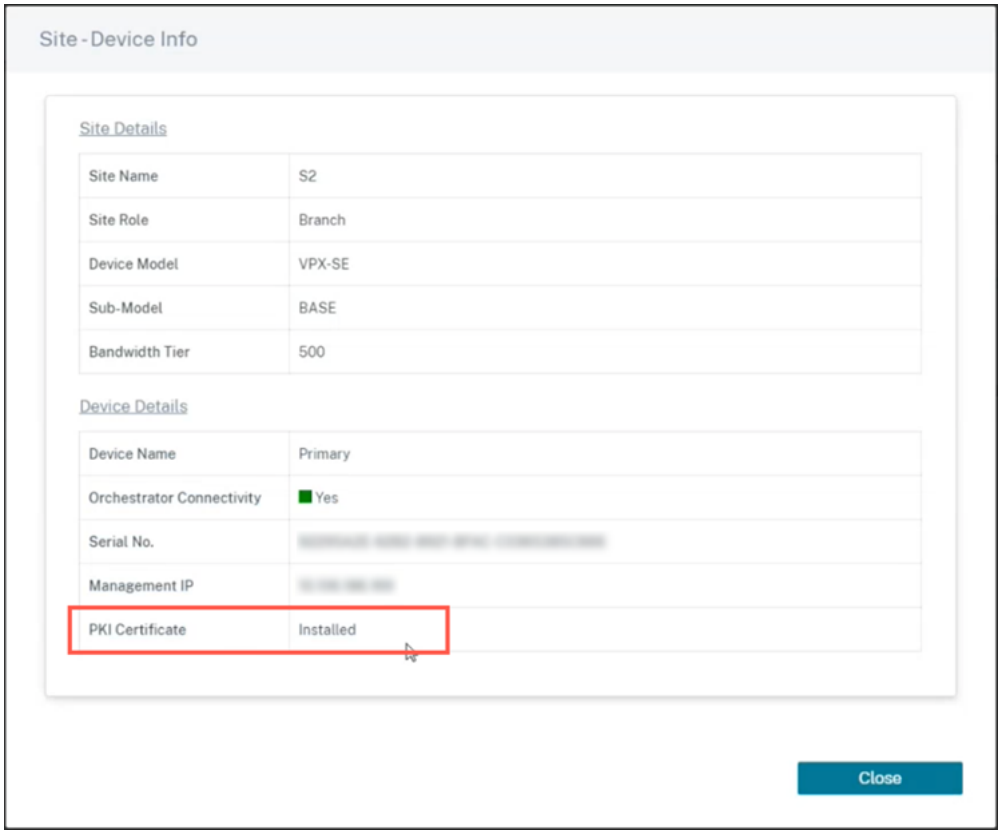
View certificate

You can go to the device detail page to verify if the PKI Certificate is installed or not. To do that, navigate to **Configuration** > **Network Home** > click the **Action** symbol for the site you want to verify the certificate > click **View Details**.



The following screen populates with the site and device details:



Under the **Device Details** section, you can view the PKI certificate installation status.

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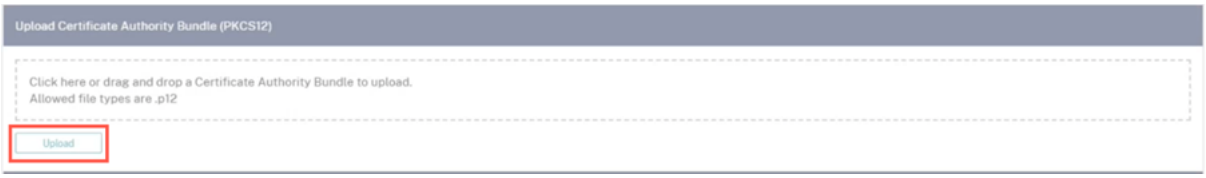
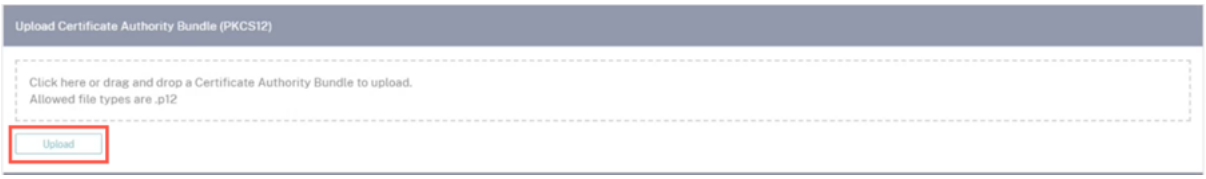
Upload identity bundle

The Identity bundle includes a private key and the certificate associated with the private key. You can upload the appliance certificate issued by the CA into the appliance. The certificate bundle is a PKCS12 file, with .p12 extension. You can choose to protect it with a password. Drag and drop the PKCS12 file, enter a password and click **Upload**. If you leave the password field blank, it is treated as no password protection.



Upload certificate authority bundle

Upload the PKCS12 bundle that corresponds to the certificate signing authority. The certificate authority bundle includes the complete chain of signatures, the root, and all the intermediate signatory authority. Drag the PKCS12 bundle and click **Upload**.



Create certification signing request

The appliance can generate an unsigned certificate and create a Certificate Signing Request (CSR). To create a CSR for an appliance, provide the organization name, unit, town/city, province/region/-county/city, country, and email address. The appliance common name is the site name that is auto populated and non-editable. Click **Create CSR**.

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Manage certificate signing request

Once the CSR is generated successfully from the back end, you need to download the CSR from the appliance and get it signed by its CA, upload it back to the appliance in PEM or DER formats. This is used as an Identity certificate for the appliance. First upload the CA to sign the certificate.

Once the CA is uploaded, upload the signed CSR.

Certificate revocation list manager

A Certificate Revocation List (CRL) is a published list of certificate serial numbers that are no longer valid in the network. The CRL file is periodically downloaded and stored locally on all the appliance. When a certificate is being authenticated the responder examines the CRL to see if the initiators certificate was revoked already. Citrix SD-WAN™ currently supports version 1 CRLs in PEM and DER format.

To enable CRL, select the CRL enabled check box. Provide the location where the CRL file is maintained. HTTP, HTTPS, and FTP locations are supported. Specify the time interval to check and download the CRL file, the range is 1–1440 minutes. Click **Upload Settings**.

> **Note**
>
> The reauthentication period for a virtua1 path can be between 10–15 minutes, if the CRL update interval is set to a shorter duration, the updated CRL list might include a currently active serial

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> number. Make an actively revoked certificate available in your network for a short duration.

Mobile broadband settings

Citrix SD-WAN Orchestrator service allows you to connect a Citrix SD-WAN appliance from your branch site to a network using a mobile broadband connection.

To configure the mobile broadband settings, at the site level, navigate to **Configuration** > **Appliance Settings** > **Mobile Broadband Settings**.

Currently, the mobile broadband settings can be configured on Citrix SD-WAN 110 and Citrix SD-WAN-210 appliances.

You can configure the following mobile broadband settings on Citrix SD-WAN Orchestrator service.

SIM PIN status

If you have inserted a SIM card that is locked with a PIN, the SIM state is **Enabled**. You cannot use the SIM card until it is verified using the SIM PIN. You can obtain the SIM PIN from the carrier. Click **Verify**.

Enter the SIM PIN provided by the carrier and click **Verify**.

Disable SIM PIN You can disable SIM PIN functionality for a SIM for which SIM PIN is enabled and verified. Click **Disable**. Enter the SIM PIN and click **Disable**.

Enable SIM PIN To enable the SIM PIN, click **Enable**. Enter the SIM PIN provided by the carrier and click **Enable**.

If the SIM PIN state changes to **Enabled and Not Verified**, it means that the PIN is not verified, and you cannot perform any operations until the PIN is verified.

Click **Verify PIN**. Enter the SIM PIN provided by the carrier and click **Verify PIN**.

Modify SIM PIN Once the PIN is in **Enabled and Verified** state you can choose to change the PIN.

Click **Modify**. Enter the SIM PIN provided by the carrier. Enter the new SIM PIN and confirm it. Click **Modify**.

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Unblock SIM If you forget the SIM PIN, you can reset the SIM PIN using the SIM PUK obtained from the carrier.

To unblock a SIM, click **Unblock**. Enter the SIM PIN and SIM PUK obtained from the carrier and click **Unblock**.

> **Note**
>
> The SIM card gets permanently blocked with 10 unsuccessful attempts of PUK, while unblocking the SIM. Contact the carrier service provider for a new SIM card.

APN settings

To configure the APN settings, enter the APN, username, password, and authentication provided by the carrier. You can choose from **PAP**, **CHAP**, or **PAPCHAP** authentication protocols. If the carrier has not provided any authentication type, set it to **None**.

Network settings

You can select the mobile network on Citrix SD-WAN appliances that support internal modems.

Roaming

The roaming option is enabled by default on your devices. You can choose to disable it.

Manage Firmware

Every appliance that has LTE enabled will have a set of available firmware. You can select from the existing list of firmware or upload a firmware and apply it. If you are unsure of which firmware to use, select the AUTO-SIM option to allow the LTE modem to choose the most matching firmware based on the SIM card inserted in the appliance.

> **Note**
>
> Currently, the firmware can be applied only on SD-WAN SE 210 LTE appliances.

Enable/Disable modem

Enable or disable the modem depending on your intent to use the broadband functionality. By default, the modem is enabled.

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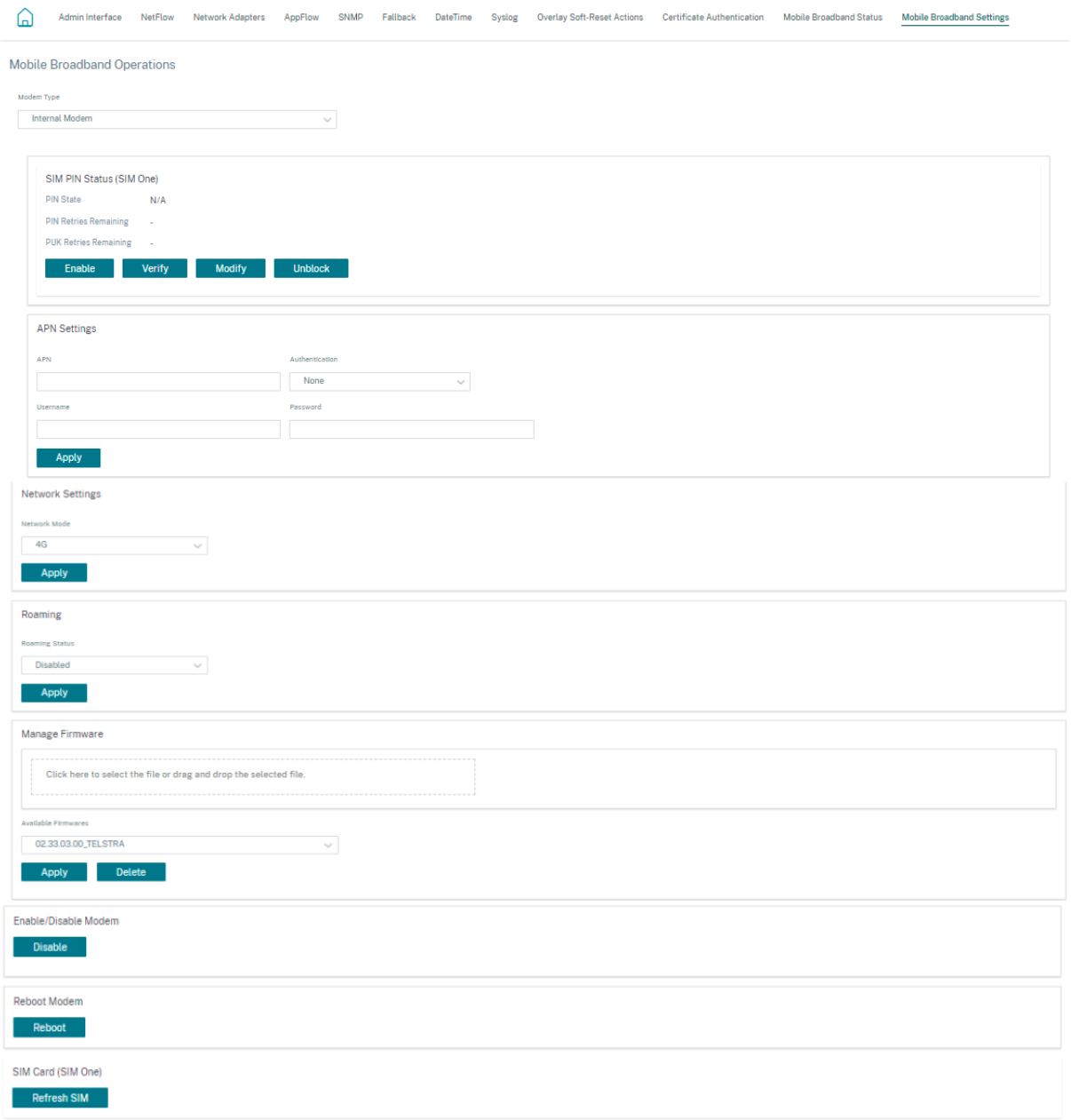
Reboot modem

Reboots the modem. This process can take up to 3-5 minutes for the reboot operation to complete.

Refresh SIM

Use this option when you hot swap the SIM card to detect a new SIM card.



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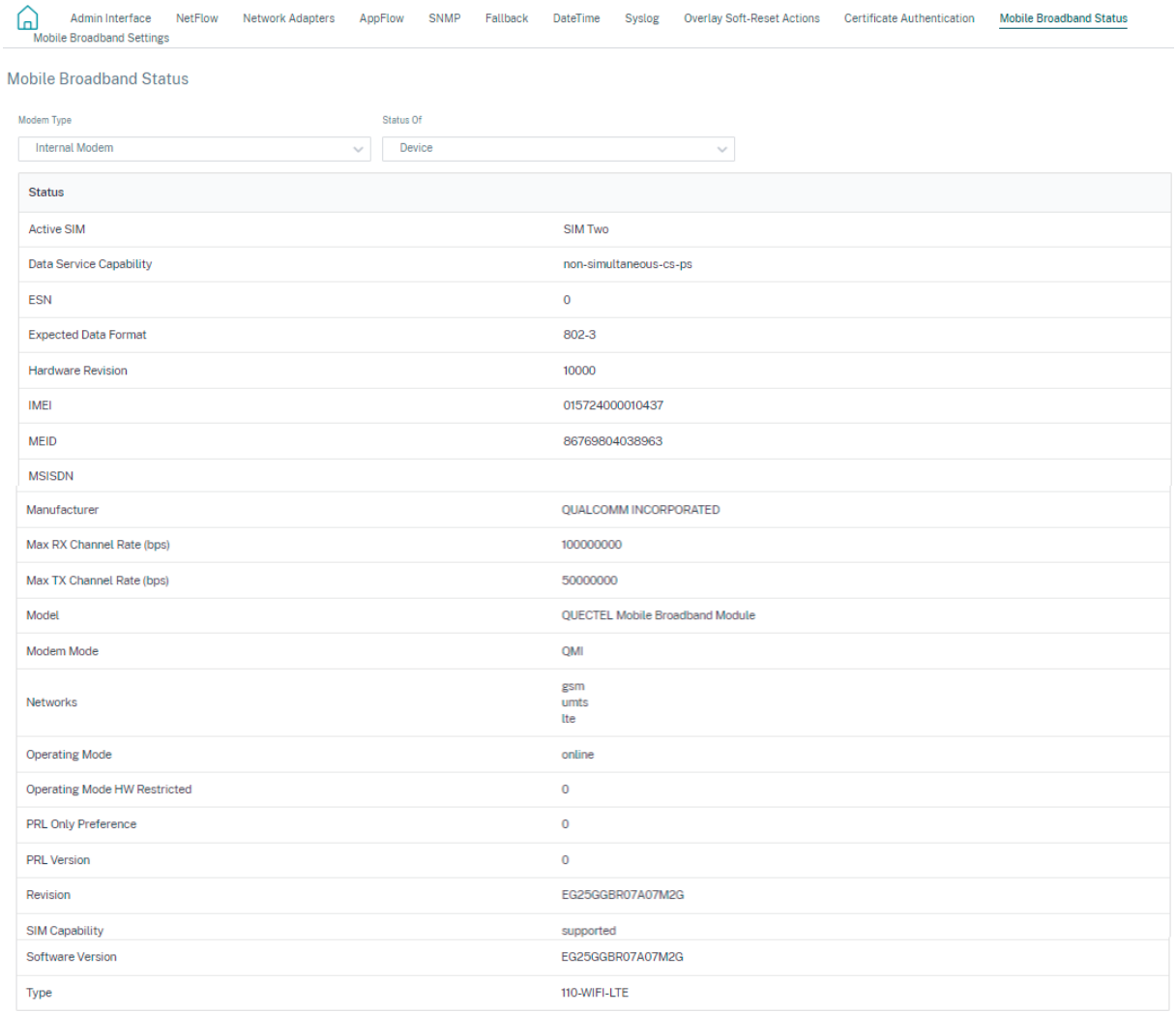
Mobile broadband status

The Mobile broadband status section displays the status of your broadband configuration settings. To view the mobile broadband status, at the site level, navigate to **Configuration** > **Appliance Settings** > **Mobile Broadband Status**. You can view the status of your device and the active SIM.



Ethernet Interface Settings

The Ethernet Interface status section displays the connectivity status of the ethernet ports, Interface type, MAC address, auto negotiate, and the duplex setting information. To view the ethernet interface settings, at the site level, navigate to **Configuration** > **Appliance Settings** > **Ethernet Interface Settings**. The ports that are administratively down are indicated in red color.

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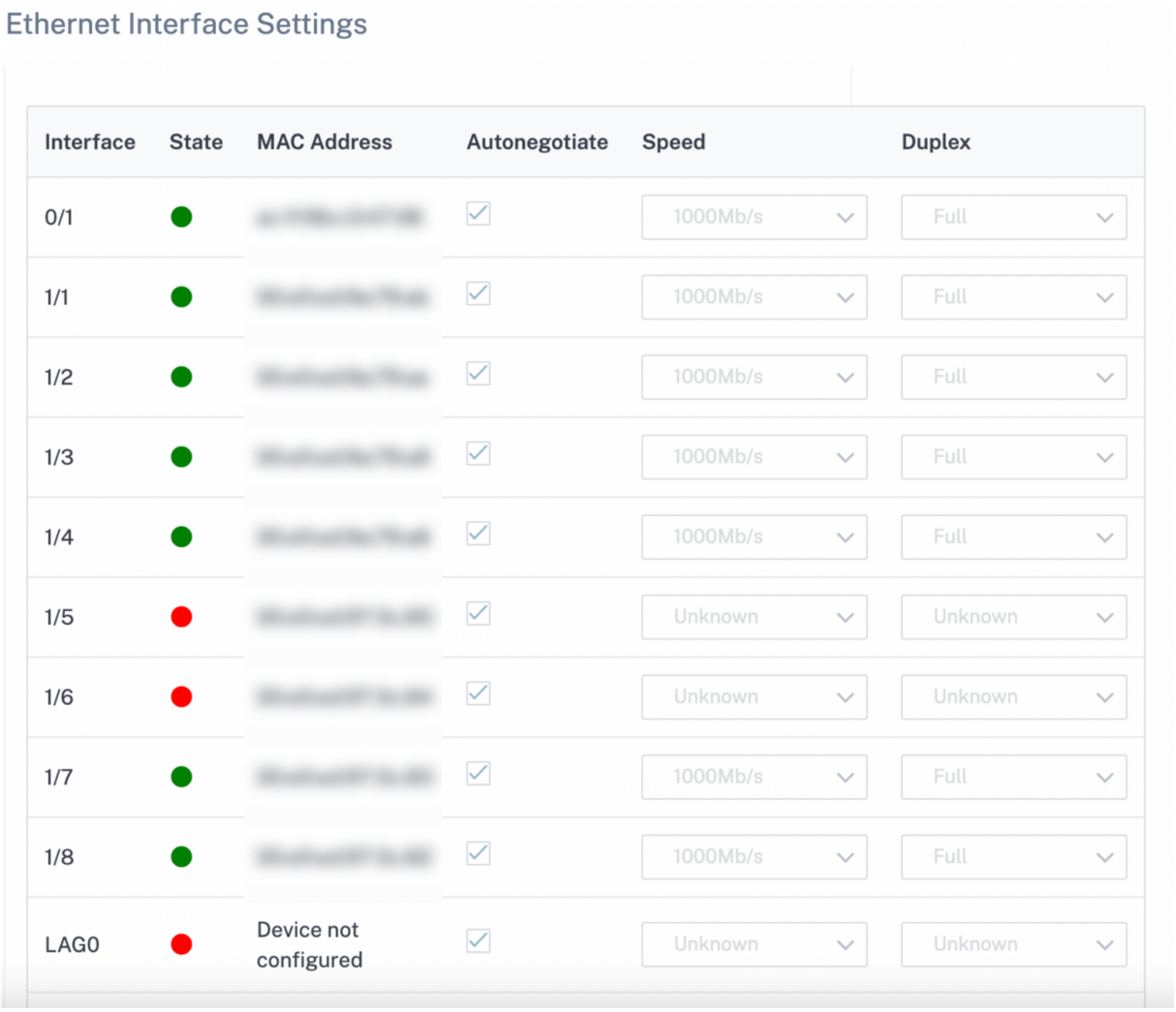
> **Note**
>
> This setting is currently available in read-only mode on the Citrix SD-WAN Orchestrator service UI. If you want to modify the Ethernet Interface settings, you can do so by using the new user interface for SD-WAN appliances.



In-band management

September 27, 2025

Citrix SD-WAN Orchestrator service allows you to manage the SD-WAN appliance in two ways, out-of-band management and in-band management. Out-of-band management allows you to create a management IP using a port reserved for management, which carries management traffic only. In-

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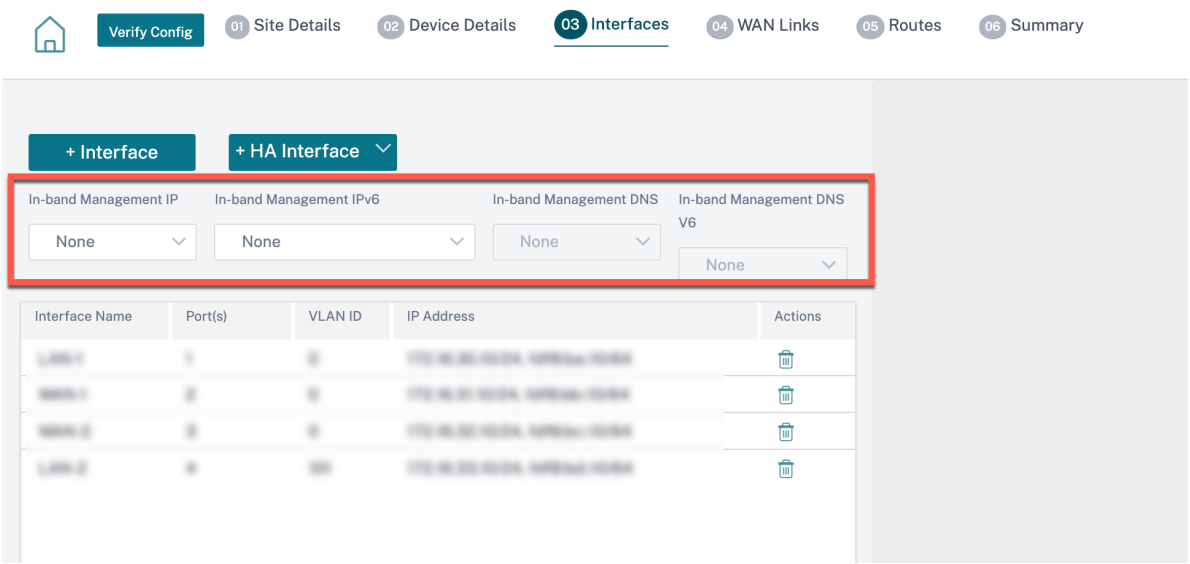
band management allows you to use the SD-WAN data ports for management. It carries both data and management traffic, without having to configure an addition management path.

In-band management allows virtual IP addresses to connect to management services such as web UI and SSH. You can enable in-band management on a trusted interface that is enabled to be used for IP services. You can access the web UI and SSH using the management IP and in-band virtual IPs.

> **Note**
>
> In-band management in Citrix SD-WAN Orchestrator service is supported for Citrix SD-WAN 11.1.1 and higher.

To enable in-band management on a virtual IP, at the site level, navigate to **Configuration** > **Site Configuration** > **Interfaces**. Select the virtual IP to be used as the In-band management port. You can use the **InBand Management IP** or **InBand Management IPv6** to access the web UI and SSH.

> **Note**
>
> In-band management is supported on LAN ports only.



For detailed procedure on configuring a virtual IP address, see Interfaces.

The In-band management IP also acts as a back-up management IP. It is used as the management IP address if the management port is not configured with a default gateway. Select the **DNS proxy** to which all DNS requests over the in-band management plane is forwarded to. For information on configuring DNS proxy, see DNS proxy.

For use cases where the appliance connectivity to Citrix SD-WAN Orchestrator service toggles between management and in-band ports, configure **InBand Management DNS** or **InBand Management DNS V6** to ensure uninterrupted Citrix SD-WAN Orchestrator service connectivity.

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In-band provisioning

The need to deploy SD-WAN appliances in simpler environments like home or small branches has increased significantly. Configuring separate management access for simpler deployments is an added overhead. Zero-touch deployment along with the in-band management feature enables provisioning and configuration management through designated data ports. Zero-touch deployment is supported on the designated data ports and there is no need to use a separate management port for Zero-touch deployment.

You can provision an appliance in the factory shipped state, that supports in-band provisioning by connecting the data or management port to the internet. The appliances that support in-band provisioning have specific ports for LAN and WAN. The appliance in the factory reset state has a default configuration that allows to establish a connection with the zero-touch deployment service. The LAN port acts as the DHCP server and assigns a dynamic IP to the WAN port that acts as a DHCP client. The WAN links monitor the Quad 9 DNS service to determine WAN connectivity.

Once the IP address is obtained and a connection is established with the zero-touch deployment service the configuration packages are downloaded and installed on the appliance. For information on zero-touch deployment through the Citrix SD-WAN Orchestrator service, see Zero Touch Deployment.

> **Note**
>
> - In-band provisioning is applicable to all the platforms. However, default configuration is enabled only on Citrix SD-WAN™ 110 and VPX platforms because the other platforms are shipped with an older software version.
> - For day-0 provisioning of SD-WAN appliances through the data ports, the appliance software version must be Citrix SD-WAN 11.1.1 or higher.

The default configuration of an appliance in factory reset state includes the following configurations:

- DHCP Server on LAN port
- DHCP client on WAN port
- QUAD9 configuration for DNS
- Default LAN IP is 192.168.101.1/24 for Citrix SD-WAN appliances with factory image 11.1.1.39.
- Default LAN IP is 192.168.0.1/24 for Citrix SD-WAN 110 appliance with factory image 11.0.4.
- Grace License of 35 days.

Once the appliance is provisioned, the default configuration is disabled and overridden by the configuration received from the zero-touch deployment service. If an appliance license or grace license expires, the default configuration is activated, ensuring that the appliance remains connected to the zero-touch deployment service and receives the license managed service.

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Fallback configuration

Fallback configuration ensures that the appliance remains connected to the zero-touch deployment service if there is a link failure, configuration mismatch, or software mismatch. Fallback configuration is enabled by default on the appliances that have a default configuration profile. You can also edit the fallback configuration as per your existing LAN network settings.

The fallback configuration retains the connectivity to appliance through the appliance in-band management IP and Citrix SD-WAN Orchestrator™ service in the following scenarios:

- Where the t2_app crashes
- you attempt to perform the configuration reset

In a scenario, where an appliance has in-band management configured and you perform manual configuration reset or the t2_app crashes more than four times in 120 seconds due to user configuration. In such framework, the service gets disabled and hence you lose connectivity to Citrix SD-WAN Orchestrator service and the appliance.

But if you had fallback configuration enabled, then you get below features:

- Basic in-band access to management features (Web UI/SSH/SNMP)
- Ability for appliance connects to outside services over an in-band port (Citrix SD-WAN Orchestrator service/ZTD)

For such scenarios, instead of disabling the service appliance comes back with fallback configuration with service enabled. The connectivity to Citrix SD-WAN Orchestrator service and the appliance through the in-band management IP remains intact as long as the link has internet connectivity.

> **Note**
>
> After the initial appliance provisioning, ensure that the fallback configuration is enabled for zero-touch deployment service connectivity.

If the fallback configuration is disabled, you can enable it through Citrix SD-WAN Orchestrator service at the site level by navigating to **Configuration** > **Appliance Settings** > **Fallback** and click **Enable Fallback** Configuration.

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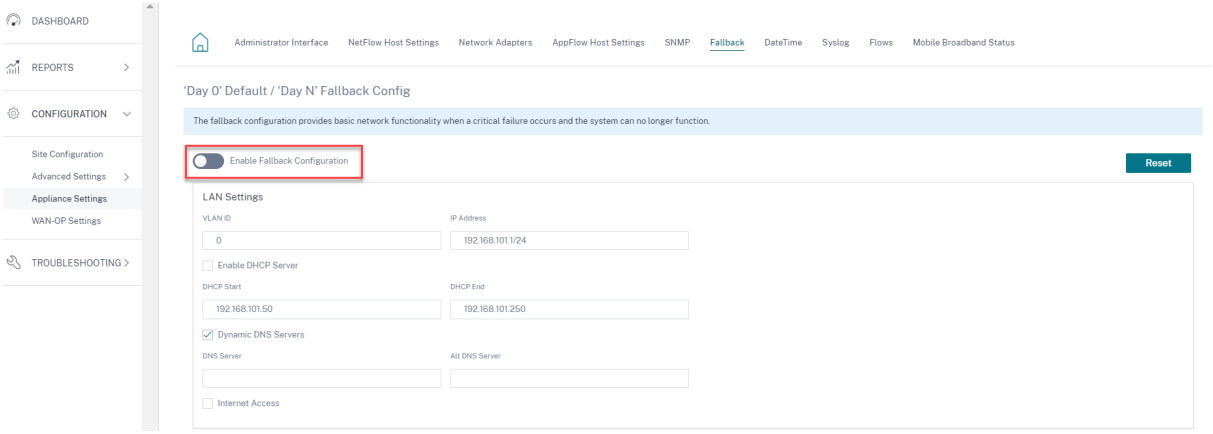
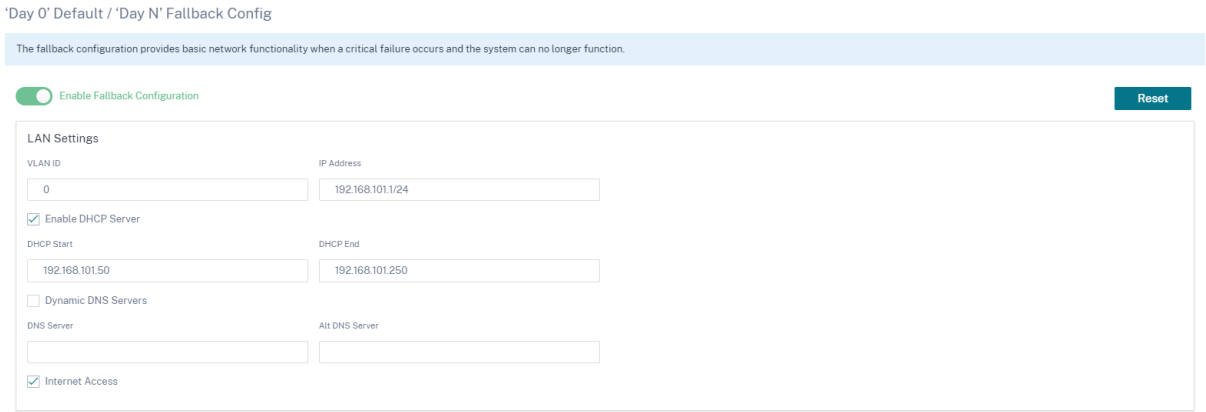


To customize the fallback configuration as per your LAN network, edit the values for the following LAN settings as per your network requirements. This is the minimum configuration required to establish a connection with the zero-touch deployment service.

- **VLAN ID**: The VLAN ID to which the LAN port must be grouped.
- **IP Address**: The virtual IP address assigned to the LAN port.
- **Enable DHCP Server**: Enables the LAN port as the DHCP server. The DHCP server assigns dynamic IP addresses to the WAN port.
- **DHCP Start and DHCP End**: The range of IP addresses which DHCP uses to assign an IP to the WAN port dynamically.
- **Dynamic DNS Server**: Enables the LAN port as the domain name server.
- **DNS Server**: The IP address of the primary DNS server.
- **Alt DNS Server**: The IP address of the secondary DNS server.
- **Internet Access**: Permit internet access to all LAN clients without other filtering.



Configure the mode for each port. The port can be a LAN port or a WAN port or can be disabled. The ports displayed depend on the appliance model. Also, set the port bypass mode to **Fail-to-Block** or **Fail-to-wire**.

The following table provides the details of pre-designated WAN and LAN ports for fallback configuration on different platforms:

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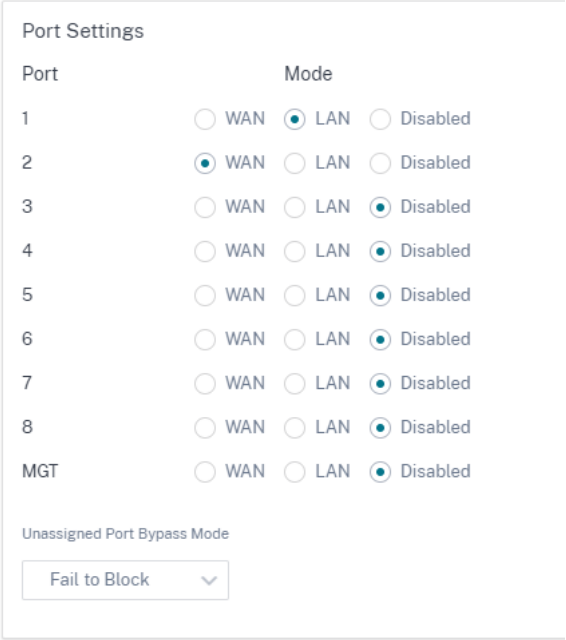
Platform	WAN Ports	LAN Ports
110	1/2	1/1
110-LTE	1/2, LTE-1	1/1
210	1/4, 1/5	1/3
210-LTE	1/4, 1/5, LTE-1	1/3
VPX	2	1
410	1/4, 1/5, 1/6	1/3 (FTB)
1100	1/4, 1/5, 1/6	1/3 (FTB)



The WAN ports can be configured as independent WAN Links using the DHCP client and monitor the Quad9 DNS service to determine WAN connectivity. You can configure WAN IPs/static IPs for the WAN ports in the absence of DHCP to use In-band management for initial provisioning.

> **Note**
>
> You can only configure the Ethernet ports with the static IPs. The static IPs are not configurable with LTE-1 and LTE-E1 ports. Though you can add the LTE-1 and LTE-E1 port as WAN, the configuration fields remain non-editable.

When you add a WAN port, it is added under the **WAN Settings (Port: 2)** section with the **Enable DHCP** check box selected by default. If the **DHCP Mode** check box is selected, the **IP Address**, **Gateway IP Address**, and the **VLAN ID** text fields are grayed out. Clear the **Enable DHCP** check box, if you want to

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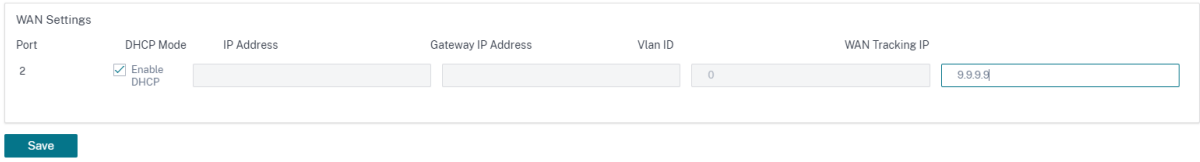
configure static IP.



By default, the **WAN Tracking IP Address** field is auto filled with the 9.9.9.9. You can change the address as needed.

> **Note**
>
> If you are selecting the **Dynamic DNS Servers** check box, ensure to add/configure at least one WAN port with the **DHCP Mode** selected.

To reset the fallback configuration to default configuration at any time, click **Reset**.

> **Note**
>
> It is recommended to enable fallback configuration on all appliances that are connected to Orchestrator through the In-band/Management Port connected to LAN subnet. Ensure that the default fall-back configuration is set up as per your network subnet requirements.

Port failover

Citrix SD-WAN Orchestrator service also allows to fail over management traffic seamlessly to the management port when the data port goes down and conversely. If an appliance can connect to the internet through both the management and in-band ports, the management port is chosen for zero-touch deployment.

On rebooting the appliance, if internet is available over the in-band port and not the management port, the appliance is connected to the Citrix SD-WAN Orchestrator service immediately.

Once the connection is established, a service agent running on the appliance sends the heartbeat information to the Citrix SD-WAN Orchestrator service every 10 seconds. If the Citrix SD-WAN Orchestrator service does not receive the heartbeat for 5 minutes, the In-band port failover is activated. Citrix SD-WAN Orchestrator service reports the appliance as offline during this period.

On rebooting the appliance, if internet is not available over both the management and in-band port and once internet connection is re-established, the service agent takes about 5 minutes to restart and establish a connection.

Ensure that the **Preserve route to internet from link even if all associated paths are down** option is enabled at the network level, **Configuration** > **Delivery Services** > **Internet**. Ensuring that the connectivity to the Citrix SD-WAN Orchestrator service is maintained even if the virtual path is down.

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Configurable management or data port

In-band management allows the data ports to carry both data and management traffic, eliminating the need for a dedicated management port. It leaves the management port unused on the low end appliances, which already have low port density. Citrix SD-WAN allows you to configure the management port to operate as either a data port or a management port.

> **Note**
>
> You can convert the management port to data port only on the following platforms.
>
> - Citrix SD-WAN 110 SE/LTE
> - Citrix SD-WAN 210 SE/LTE

While configuring a site, use the management port in your configuration. After the configuration is activated, the management port is converted to a data port.

> **Note**
>
> You can configure a management port only when in-band management is enabled on other trusted interfaces on the appliance.

To configure a management interface, at the site level, navigate to **Configuration** > **Site Configuration** > **Interfaces** and select the MGMT interface. For more information on configuring interface groups, see Interfaces.

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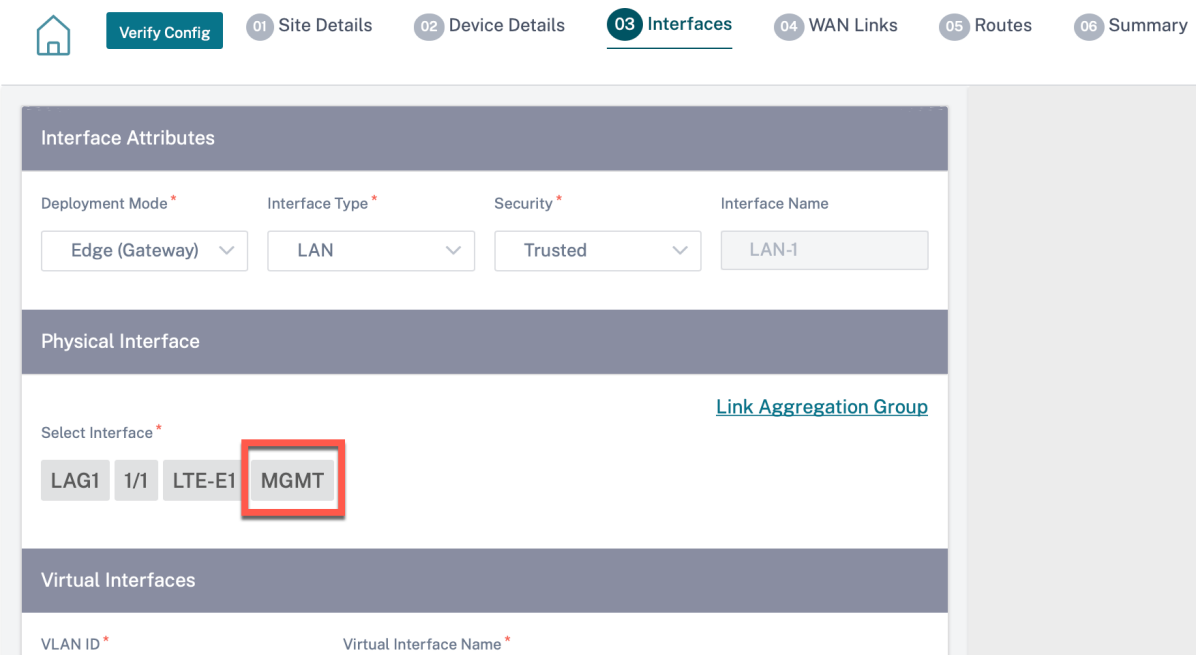

To reconfigure the management port to perform management functionality, remove the configuration. Create a configuration without using the management port and activate it.

View configuration (Preview)

June 14, 2022

The **View configuration** page provides a consolidated summary of a site's configuration settings. To view the configurations, at the site level, navigate to **Configuration** > **View Configuration**. For more information about site configuration, see Site configuration.

Sites

The **Sites** page displays a summary of the site details. The site summary includes network properties, site properties, and WAN link status. To view the site configuration details, navigate to **Configuration** > **View Configuration** > **Site**.

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View Configuration (Preview)

Site | Interfaces | WAN Links | Routes | Application Routes | Dynamic Routing

Network Properties

Encryption Mode is: aes128

Encryption Rekey is: Enabled

Site Properties

WAN to WAN forwarding is: Enabled

Device Model: cbvpx

Sub-Modal: BASE

Device Edition: SE

Site Role: client

Bandwidth Tier (Mbps): 20

Gateway ARP Timer (ms): 1000

Primary Device Serial Number: [redacted]

Max dynamic virtual paths configured is: 4

WAN Links

Broadband-ACT-1

Interfaces

The **Interfaces** page displays a summary of the configured interfaces. To view the configuration details of the virtual interfaces, navigate to **Configuration** > **View Configuration** > **Interfaces**.

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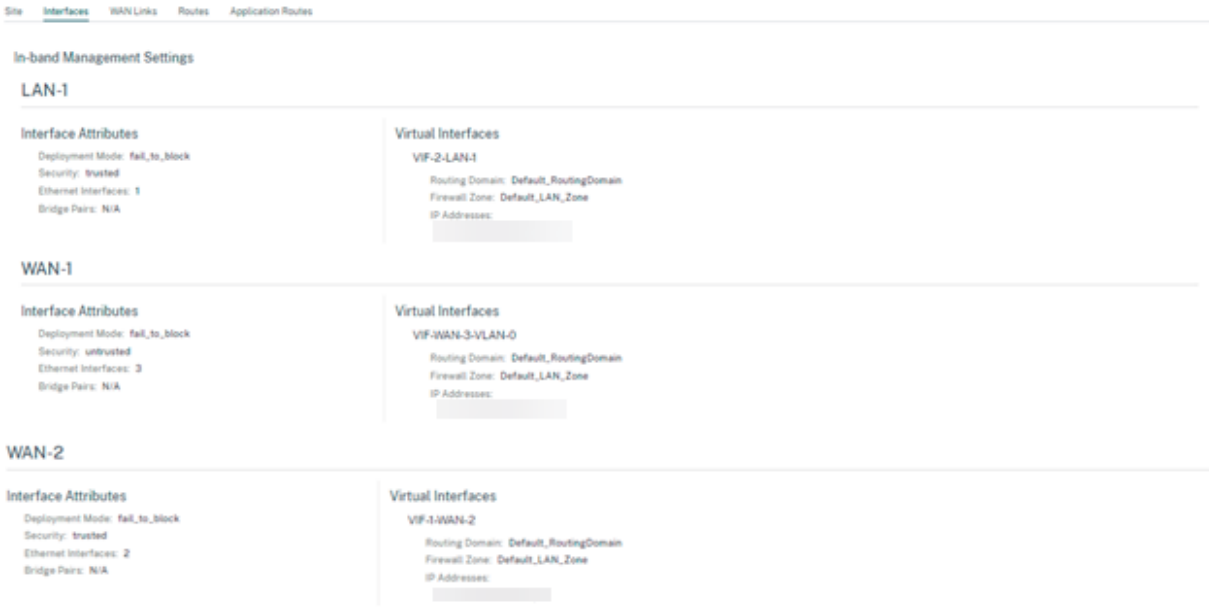
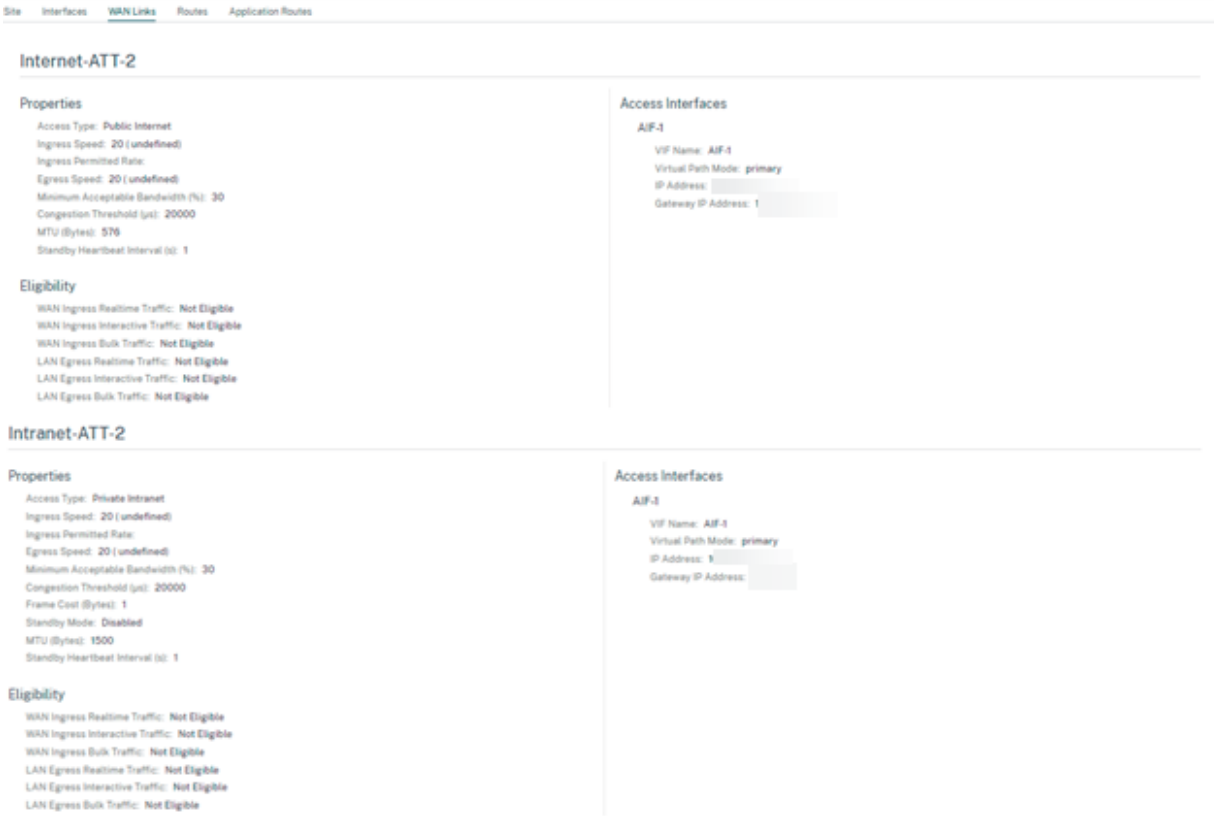


WAN links

To view the configuration details of the configured WAN links, navigate to **Configuration** > **View Configuration** > **WAN Links**.



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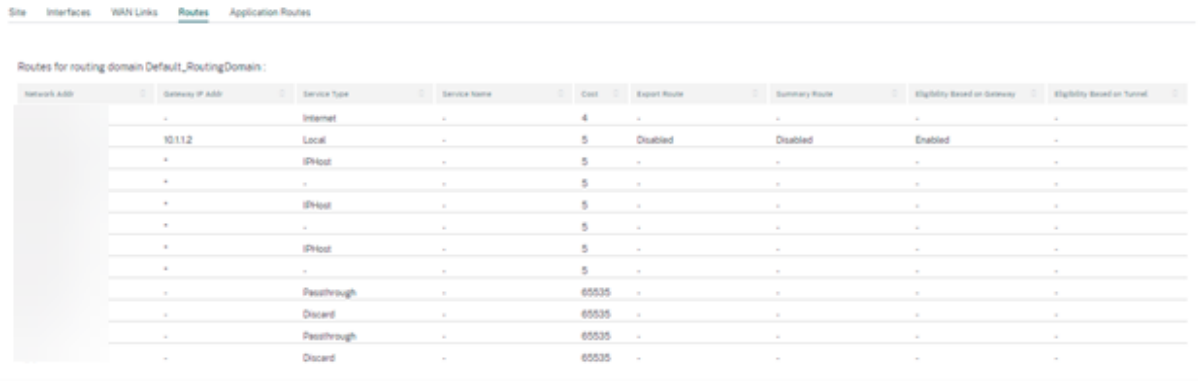
Routes

To view the route information of the IP routes created, navigate to **Configuration** > **View Configuration** > **Routes**.



Application routes

To view a summary about the specific application routes, navigate to **Configuration** > **View Configuration** > **Application Routes**.

View Configuration

Site | Interfaces | WAN Links | Routes | Application Routes | Dynamic Routing

Routes for routing domain RD1 :

Application Object	Service Type	Service Name	Cost	Eligibility Based on Gateway	Eligibility Based on Tunnel
cutom_app_test	Internet Breakout	-	8	-	-
Default_SIA_Connector_App	Internet Breakout	-	20	-	-
Incomplete virtual protocol	Internet Breakout	-	21	-	-
Distributed Computing Envir...	Zscaler	zscalerService	21	-	Enabled
Advance Message Queuing P...	IPSec Tunnel	ipsec2	21	-	Enabled
Netware Core Protocol	Cloud Direct Service	-	45	-	-
Malformed virtual protocol	Secure Internet Access Servi...	citrixSIAService	45	-	Enabled
custom1_IP	Secure Internet Access Servi...	citrixSIAService	45	-	Enabled
O365Optimize_InternetBrea...	Internet Breakout	-	50	-	-
Citrix_Cloud_and_Gateway_...	Internet Breakout	-	50	-	-

Routes for routing domain RD2 :

Application Object	Service Type	Service Name	Cost	Eligibility Based on Gateway	Eligibility Based on Tunnel
app23	IPSec Tunnel	ipsec1	3	-	Enabled

Dynamic routing

To view a summary of the OSPF, BGP, import filter, and export filter configurations, navigate to **Configuration** > **View Configuration** > **Dynamic Routing**.

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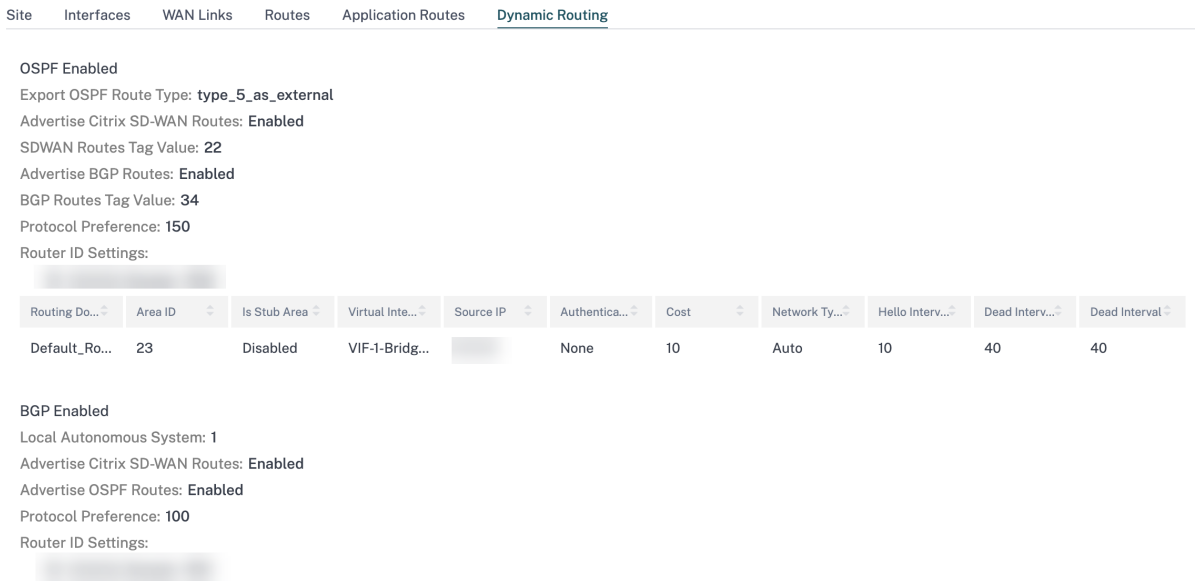

Office 365 optimization

September 27, 2025

The **Office 365 Optimization** features adhere to the Microsoft Office 365 Network Connectivity Principles, to optimize Office 365. Office 365 is provided as a service through several service endpoints (front doors) located globally.

To achieve optimal user experience for Office 365 traffic, Microsoft recommends redirecting Office365 traffic directly to the Internet from branch environments. Avoid practices such as backhauling to a central proxy. Office 365 traffic such as Outlook, Word are sensitive to latency and backhauling traffic introduces more latency resulting in poor user experience. Citrix SD-WAN™ allows you to configure policies to break out Office 365 traffic to the Internet.

The Office 365 traffic is directed to the nearest Office 365 service endpoint, which exists at the edges of Microsoft Office 365 infrastructure worldwide. Once traffic reaches a front door, it goes over Microsoft network and reaches the actual destination. It minimizes latency as the round trip time from the customer network to the Office 365 endpoint reduces.

How Office 365 optimization works

The Microsoft endpoint signatures are updated at most once a day. Agent on the appliance polls the Citrix service (sdwan-app-routing.citrixnetworkapi.net), every day to obtain the latest set of end-point

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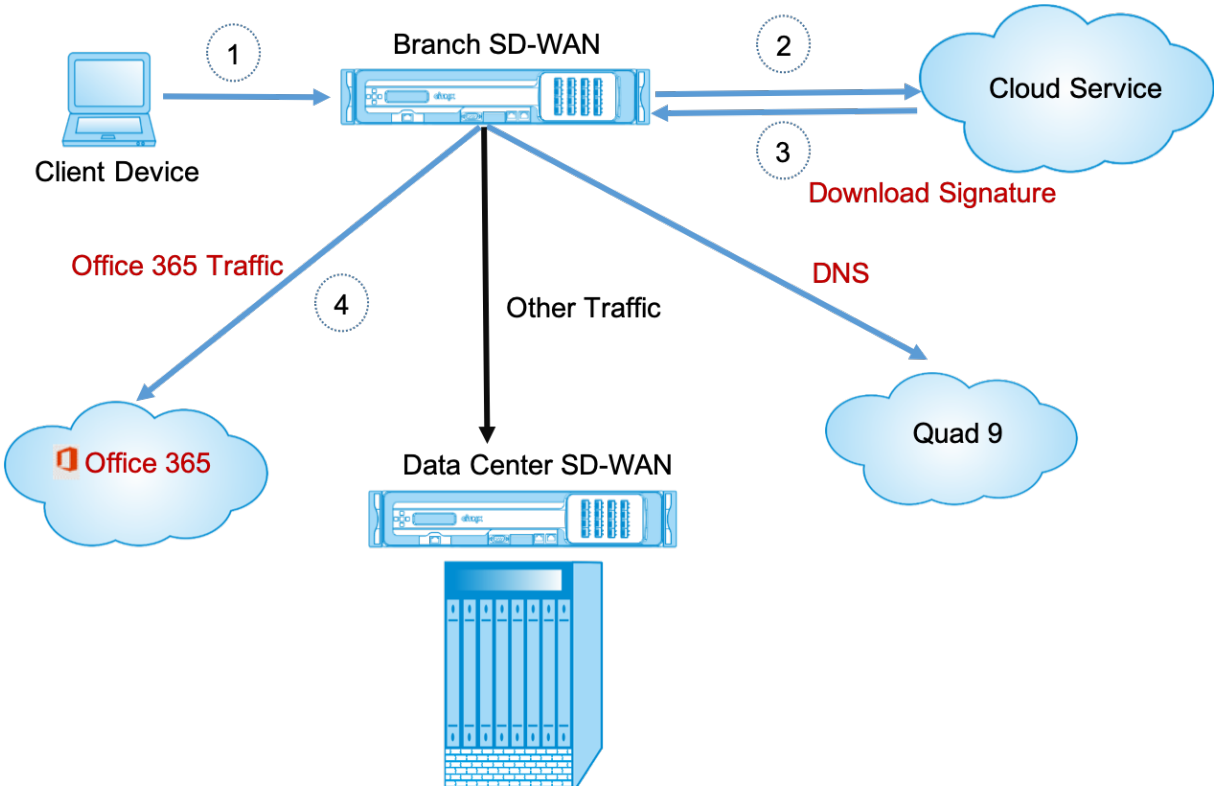
signatures. The SD-WAN appliance polls the Citrix service (sdwan-app-routing.citrixnetworkapi.net), once every day, when the appliance is turned on.

If there are new signatures available, the appliance downloads it and stores it in the database. The signatures are essentially a list of URLs and IPs used to detect Office 365 traffic based on which traffic steering policies can be configured.

> **Note**
>
> Except for the Office 365 Default category, first packet detection and classification of Office 365 traffic is performed by default, irrespective of whether the Office 365 breakout feature is enabled or not.

When a request for the Office 365 application arrives, the application classifier, does a first packet classifier database lookup, identifies, and marks Office 365 traffic. Once the Office 365 traffic is classified, the auto created application route and firewall policies take effect and breaks out the traffic directly to the Internet. The Office 365 DNS requests are forwarded to specific DNS services like Quad9.



The signatures are downloaded from Cloud Service (sdwan-app-routing.citrixnetworkapi.net).

Configure Office 365 breakout

The Office 365 breakout policy allows you to specify which category of Office 365 traffic you can directly break out from the branch. On enabling Office 365 breakout and compiling the configuration, a

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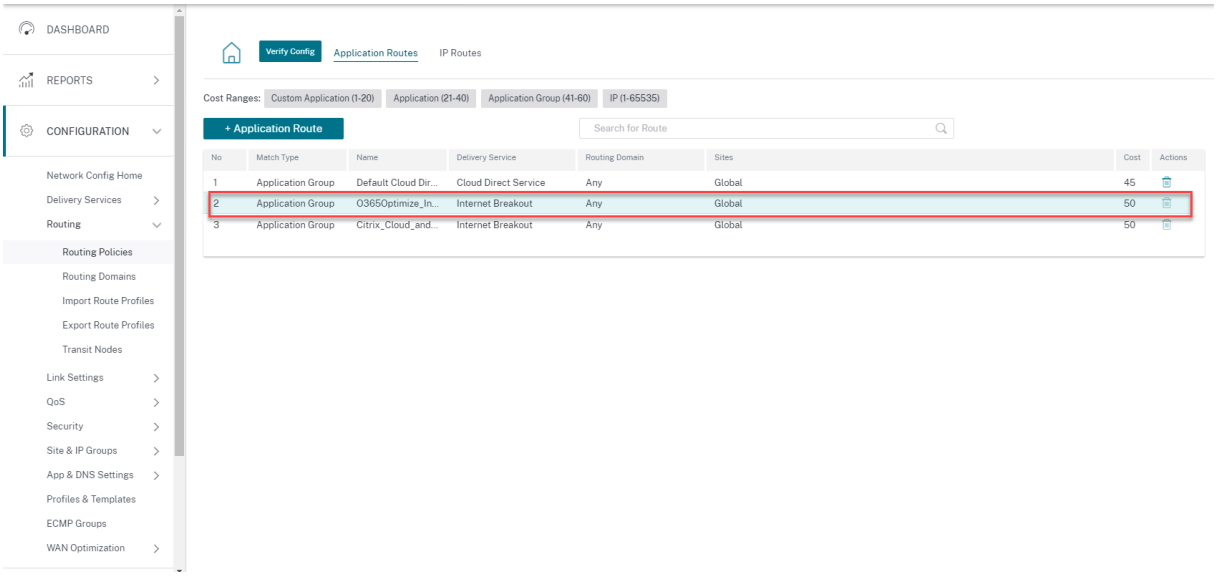
DNS object, application object, application route, and a firewall policy template is auto-created and applied to branch sites with the Internet service.

Prerequisites

Ensure that you have the following:

1. To perform Office 365 breakout, an internet service has to be configured on the appliance.
2. Ensure that the Management interface has internet connectivity.
3. Ensure that the management DNS is configured.

In Citrix SD-WAN Orchestrator service, by-default every network have the office 365 rule under **Application Group**. To navigate, go to **Network Configuration > Routing > Routing Policies > Application Routes**.



You cannot delete the rule but can configure the settings as required.

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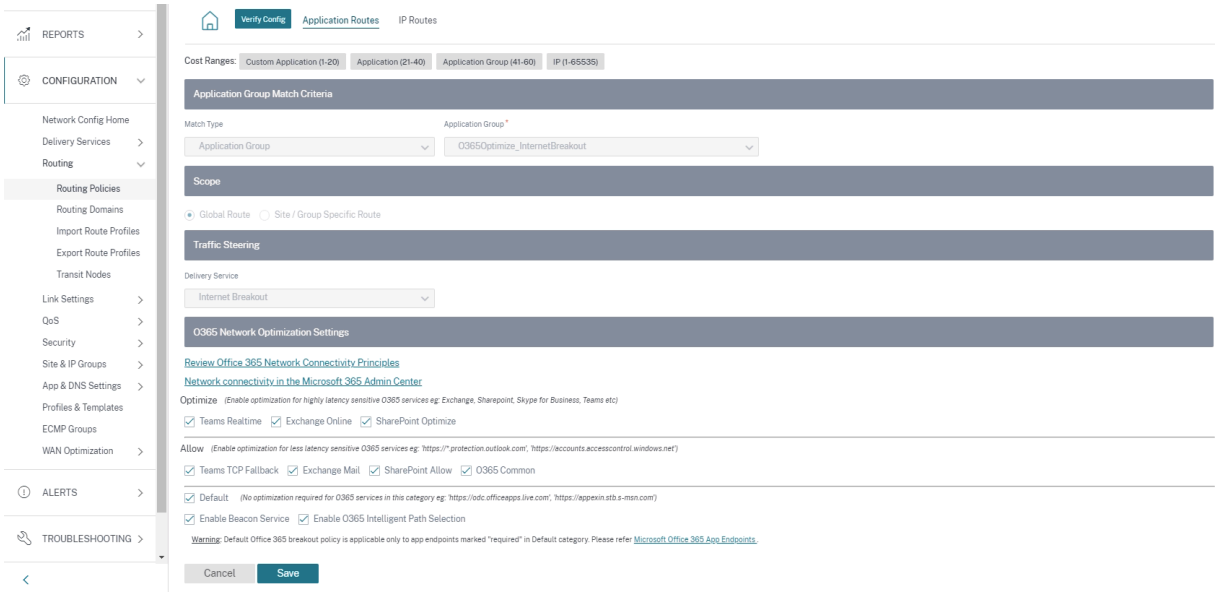

Click the office 365 rule to view the default settings **Match Type, Application Group, Delivery Service,** and so on. You cannot modify these default settings.

Office 365 endpoints are a set of network addresses and subnets. From Citrix SD-WAN 11.4.0 onwards, Office 365 endpoints are classified into **Optimize**, **Allow**, and **Default** categories. Citrix SD-WAN provides a more granular classification of the **Optimize** and **Allow** categories, enabling selective bookending to improve the performance of network-sensitive Office 365 traffic. Directing network-sensitive traffic to SD-WAN in the cloud (Cloud Direct or an SD-WAN VPX on Azure), or from an at-home SD-WAN device to an SD-WAN at a nearby location with more reliable Internet connectivity, enables QoS and superior connection resilience compared to simply steering the traffic to the nearest Office 365 front door, at the cost of an increase in latency. A bookended SD-WAN solution with QoS reduces VoIP dropouts and disconnects, reduces jitter and improves media-quality mean opinion scores for Microsoft Teams. Endpoints are segregated into the following three categories:

- **Optimize** - These endpoints provide connectivity to every Office 365 service and feature, and are sensitive to availability, performance, and latency. It represents over 75% of Office 365 bandwidth, connections, and volume of data. All the Optimize endpoints are hosted in Microsoft data centers. Service requests to these endpoints must be breakout from the branch to the Internet and must not go through the data center.

  The **Optimize** category is classified into the following subcategories:

  - Microsoft Teams Realtime
  - Exchange Online
  - SharePoint Optimize

- **Allow** - These endpoints provide connectivity to specific Office 365 services and features only, and are not so sensitive to network performance and latency. The representation of Office 365

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bandwidth and connection count is also lower. These endpoints are hosted in Microsoft data centers. Service requests to these endpoints might be breakout from the branch to the Internet or might go through the data center.

The **Allow** category is classified into the following subcategories:

- Teams TCP Fallback
- Exchange Mail
- SharePoint Allow
- O365 Common

> **NOTE**
>
> The **Teams Realtime** subcategory uses the UDP real-time transport protocol to manage Microsoft Teams traffic, whereas the **Teams TCP Fallback** subcategory uses the TCP transport layer protocol. As media traffic is highly latency sensitive, you might prefer this traffic to take the most direct path possible and to use UDP instead of TCP as the transport layer protocol (most preferred transport for interactive real-time media in terms of quality). While UDP is a preferred protocol for Teams media traffic, it requires certain ports to be allowed in the firewall. If the ports are not allowed, Teams traffic uses TCP as a fallback, and enabling optimization for Teams TCP Fallback ensures better delivery of the Teams application in this scenario. For more information, see Microsoft Teams call flows.

- **Default** - These endpoints provide Office 365 services that do not require any optimization, and can be treated as normal Internet traffic. Some of these endpoints might not be hosted in Microsoft data centers. The traffic in this category is not susceptible to variations in latency. Therefore, direct breaking out of this type of traffic does not cause any performance improvement when compared to Internet breakout. In addition, the traffic in this category may not always be Office 365 traffic, hence it is recommended to disable this option when enabling the Office 365 breakout in your network.

> **NOTE**
>
> By default, options of the Default category and the Optimize and Allow subcategories are disabled. You cannot delete these settings but can enable as needed.

- **Enable Beacon Service** - Citrix SD-WAN allows you to perform beacon probing and determines the latency to reach Office 365 endpoints through each WAN link. Office 365 Beacon services are enabled by default. You can disable it by clearing this option. For more information, see Office 365 Beacon service.
- **Enable O365 Intelligent Path Selection** - Citrix SD-WAN allows you to choose the best available WAN link to manage Office 365 traffic. For example, if there are 2 WAN links configured for an Internet service, out of which one WAN link has a higher latency and the other WAN link has

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a lower latency, enabling intelligent path selection would select the WAN link with the lowest latency provided, the probes from the WAN link are not lossy.

You can view details about the WAN links with lowest latency and the total decisions taken at O365 Metrics.

> **Note**
>
> If probes are lossy, Citrix SD-WAN uses the default Internet load-balancing logic to select the best WAN link although intelligent path selection is enabled.

Transparent forwarder for Office 365

The branch breaks out for Office 365 begins with a DNS request. The DNS request going through Office 365 domains have to be steered locally. If Office 365 Internet break out is enabled, the internal DNS routes are determined and the transparent forwarders list is auto populated. Office 365 DNS requests are forwarded to open source DNS service Quad 9 by default. Quad 9 DNS service is secure, scalable, and has multi pop presence. You can change the DNS service if necessary.

Transparent forwarders for Office 365 applications are created at every branch that has Internet service and office 365 breakout enabled.

If you are using another DNS proxy or if SD-WAN is configured as the DNS proxy, the forwarder list is auto populated with forwarders for Office 365 applications.

Important considerations for upgrade

Optimize and Allow categories

If you have enabled the Internet breakout policy for the **Optimize** and **Allow** Office 365 categories, Citrix SD-WAN automatically enables the Internet breakout policy for the corresponding subcategories upon upgrade to Citrix SD-WAN 11.4.0.

When you downgrade to a software version older than Citrix SD-WAN 11.4.0, you must manually enable Internet breakout for the **Optimize** or **Allow** Office 365 category irrespective of whether you enabled the corresponding subcategories in the Citrix SD-WAN 11.4.0 version or not.

Office 365 application objects

If you have created rules/routes using the **O365Optimize_InternetBreakout** and **O365Allow_InternetBreakout** auto-generated application objects, ensure to delete the rules/routes before upgrading to Citrix SD-WAN 11.4.0. After the upgrade, you can create rules/ routes using the corresponding new application objects.

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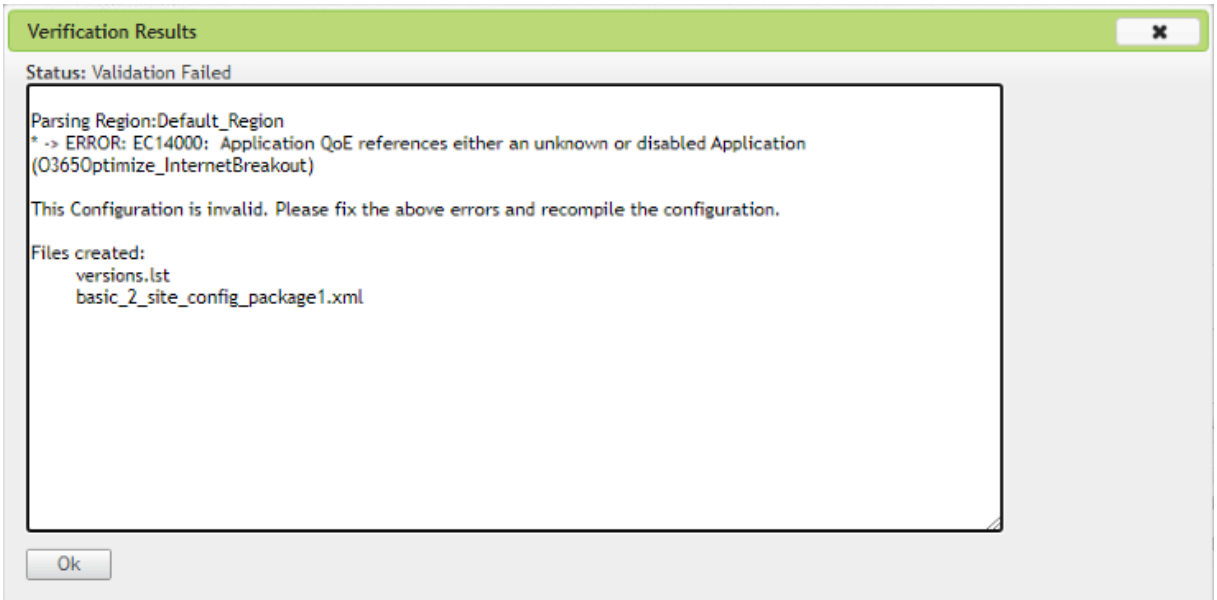
If you proceed with Citrix SD-WAN 11.4.0 upgrade without deleting the rules/routes, you see an error and thus, the upgrade becomes unsuccessful. In the below example, a user has configured an Application QoE profile and is seeing an error while trying to upgrade to Citrix SD-WAN 11.4.0 without deleting the rules/routes:



> **Note**
>
> This upgrade is not required for auto-created rules/routes. It applies only to rules/ routes that you have created.

DNS

If you have created DNS Proxy rules or DNS transparent forwarder rules using the **Office 365 Optimize** and **Office 365 Allow** applications, ensure to delete the rules before upgrading to Citrix SD-WAN 11.4.0. After the upgrade, you can create the rules again using the corresponding new applications.

If you proceed with Citrix SD-WAN 11.4.0 upgrade without deleting the old DNS proxy or transparent forwarder rules, you do not see any error and upgrade becomes successful too. However, the DNS proxy rules and transparent forwarding rules do not take effect in Citrix SD-WAN 11.4.0.

> **Note**
>
> This activity does not apply to the auto-created DNS rules. It applies only to DNS rules that you have created.

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Limitations

- If the Office 365 breakout policy is configured, deep packet inspection is not performed on connections destined to the configured category of IP addresses.
- The auto created firewall policy and application routes are uneditable.
- The auto created firewall policy has the lowest priority and is uneditable.
- The route cost for the auto created application route is five. You can override it with a lower cost route.

Office 365 beacon service

Microsoft provides the Office 365 beacon service to measure the Office 365 reachability through the WAN links. The beacon service is basically a URL - sdwan.measure.office.com/apc/trans.png, which is probed at regular intervals. Probing is done on each appliance for every internet enabled WAN link. With each probe, an HTTP request is sent to the beacon service and an HTTP response is expected. The HTTP response confirms the availability and reachability of the Office 365 service.

Citrix SD-WAN allows you to not only perform beacon probing, but also determines the latency to reach Office 365 endpoints through each WAN link. The latency is the round trip time taken to send a request and get a response from the Office 365 beacon service over a WAN link. This enables network administrators to view the beacon service latency report and manually choose the best internet link for direct Office 365 breakout. Beacon probing is enabled only through Citrix SD-WAN Orchestrator. By default, beacon probing is enabled on all Internet enabled WAN links when Office 365 break-out is enabled through Citrix SD-WAN Orchestrator.

> **Note**
>
> Office 365 beacon probing is not enabled on metered links.

To disable Office 365 beacon service, in SD-WAN Orchestrator, at network level navigate to **Configuration** > **Routing** > **Routing Policies** > **O365 Network Optimization Settings** and clear **Enable Beacon Service**.

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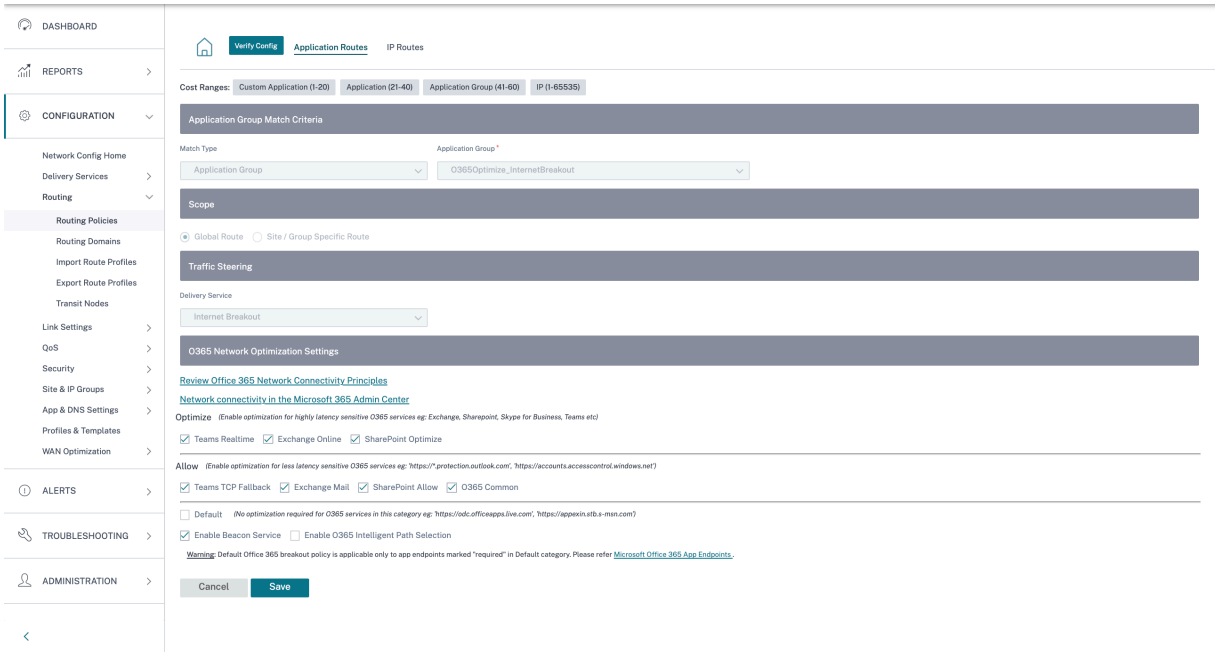
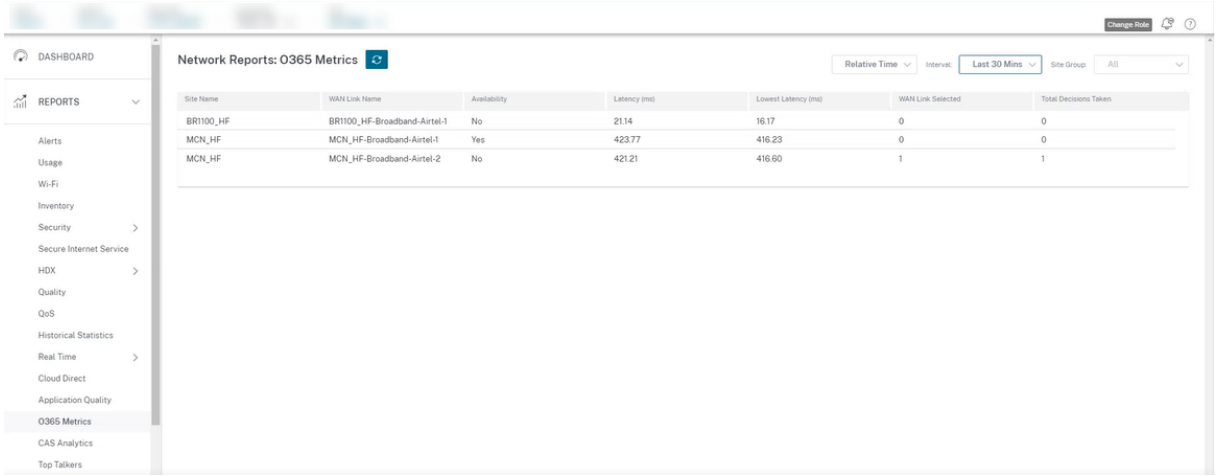


To view the beacon probing availability and latency reports, in Citrix SD-WAN Orchestrator, at network level navigate to **Reports** > **O365 Metrics**.



To view a detailed site level report of beacon service, in SD-WAN Orchestrator, at site level navigate to **Reports** > **O365 Metrics**.

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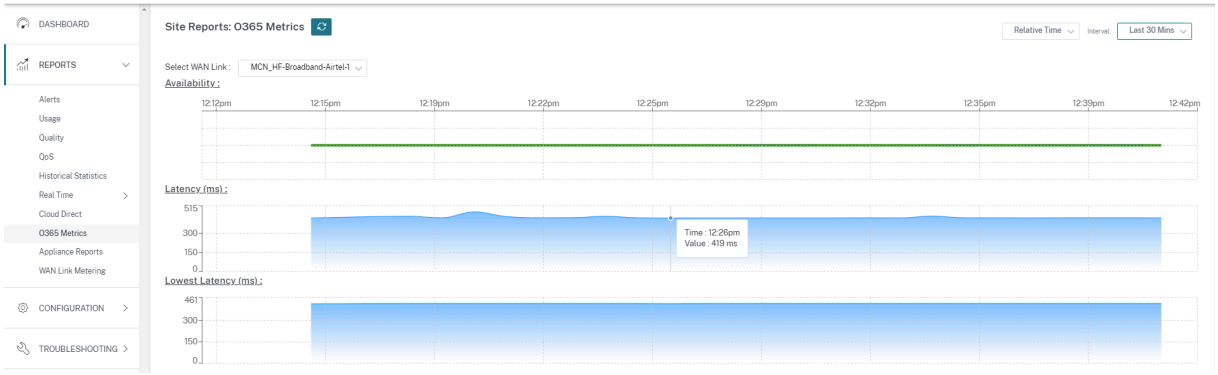

Metering and Standby WAN Links

September 27, 2025

Citrix SD-WAN Orchestrator service supports enabling metered links, which can be configured such that user traffic is only transmitted on a specific Internet WAN Link when all other available WAN Links are disabled.

Metered links conserve bandwidth on links that are billed based on usage. With the metered links you can configure the links as the Last Resort link, which disallows the usage of the link until all other non-metered links are down or degraded. Last Resort is typically enabled when there are three WAN Links to a site (that is, MPLS, Broadband Internet, 4G/LTE) and one of the WAN links is 4G/LTE and might be too costly for a business to allow usage unless it is necessary. Metering is not enabled by default and can be enabled on a WAN link of any access type (Public Internet / Private MPLS / Private Intranet). If metering is enabled, you can optionally configure the following:

- Data Cap
- Billing Cycle (weekly/monthly)
- Start Date
- Standby Mode
- Priority
- Active heartbeat interval - Interval at which a heartbeat message is sent by an appliance to its peer on the other end of the virtual path when there has been no traffic (user/control) on the path for at least a heartbeat interval

A metered path can be formed with 1 or 2 metered links. If a path is formed between two metered links, the active heartbeat interval used on the metered path is the larger of the two configured active heartbeat intervals on the links.

A metered path is a non-standby path and is always eligible for user traffic. When there is at least one non-metered path that is in GOOD state, a metered path carries the reduced amount of control traffic

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and is avoided when the forwarding plane searches for a path for a duplicate packet.

When a metered link is enabled, you can view the WAN link metering information under **Reports > WAN Link Metering**.

Prerequisites to configure metering and standby WAN links

- A metered link might be of any access type.
- All links at a site can be configured with metering enabled.
- A standby link might be of Public Internet or Private Intranet access type. A WAN link of Private MPLS access type cannot be configured as a standby link.
- At least one non-standby link must be configured per site. A maximum of 3 standby links per site is supported.
- Internet/Intranet services might not be configured on on-demand standby links. On-demand standby links support Virtual Path service only.
- Internet service might be configured on a last-resort standby link, but only load balance mode is supported.
- Intranet service might be configured on a last-resort standby link, but only secondary mode is supported and primary reclaim must be enabled.

Configure metering

To configure a metered link, at the site level configuration, navigate to **Configuration > Site Configuration > WAN Links** tab. In the **Advanced WAN Options** section, select the **Enable Metering** check box and enter the details in the following fields:

- **Data Cap (MB)**: The maximum data threshold in MB.
- **Billing Cycle**: The billing frequency, weekly or monthly.
- **Starting From**: The date from which the billing cycle starts.
- **Approximate Data Already Used**: The approximate data already used in MB for the metered link. This is applicable only for the first cycle. To track the proper metered link usage, specify the approximate metered link usage, if the link has already been used for few days in the current billing cycle.
- **Disable link if Data Cap Reached**: If the data usage reaches the specified data cap, the metered link and all its related paths are disabled until the next billing cycle. If this option is not selected, the metered link remains in the current state, after the data cap is reached, until the next billing cycle.

If the **Disable Link if Data Cap Reached** check box is selected, then the metered link and all its related paths will be disabled until the next billing cycle, if the data usage reaches the data cap.

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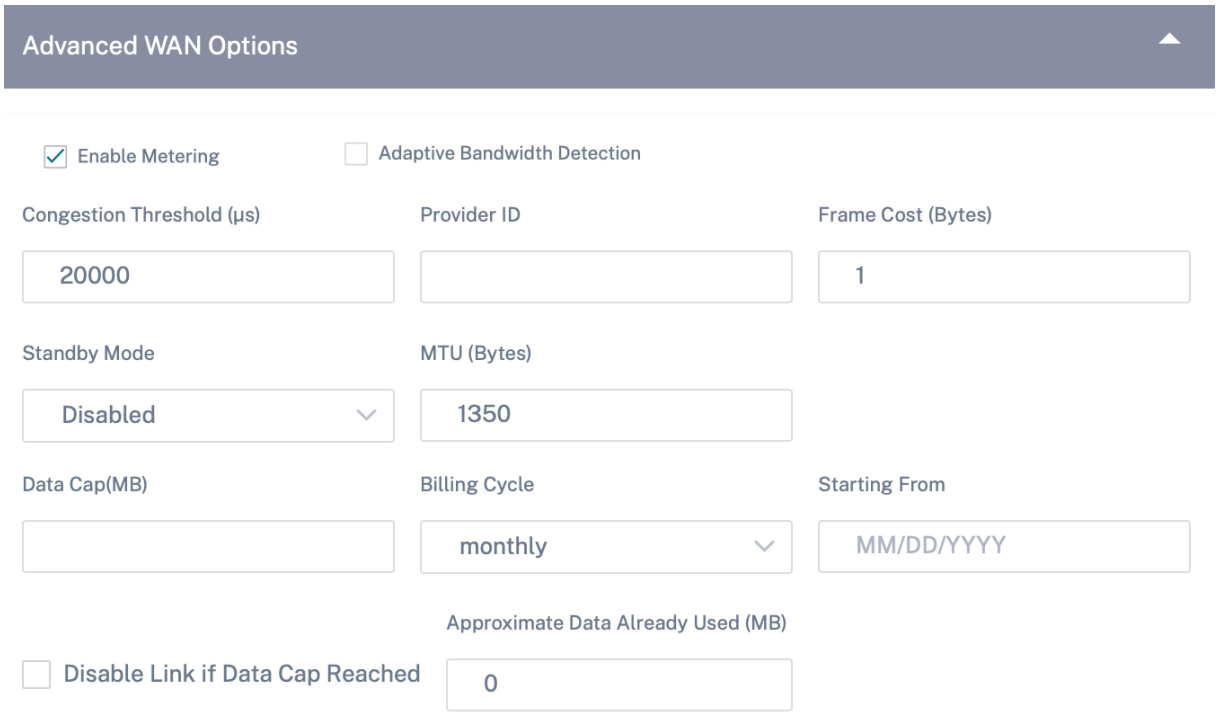
By default, the **Disable Link if Data Cap Reached** check box will be cleared, where it retains the current mode or state set for the metered link to be continued after the data cap is reached until the next billing cycle.

If the metered link is configured, you can provide the approximate data already used in MB for the metered link.

To track the proper metered link usage, you must enter the approximate usage on the metered link if the link has already been used for some days in the current billing cycle. This approximate usage is only for the first cycle. Total usage since the start date to the current date is calculated and shown in the dashboard.

If the metered link is configured, you can provide the approximate data already used in MB for the metered link.

To track the proper metered link usage, you must enter the approximate usage on the metered link if the link has already been used for some days in the current billing cycle. This approximate usage is only for the first cycle. Total usage since the start date to the current date is calculated and shown in the dashboard.



Standby mode

A standby WAN link is not used to carry user traffic unless it becomes active. The standby mode of a WAN link is disabled by default. To enable standby mode, you must specify in which one of the following two modes the standby link operates

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- **On-demand**: The standby link that becomes active when one of the conditions is met.

  When the available bandwidth in the virtual path is less than the configured on-demand bandwidth limit AND there is sufficient usage. Sufficient usage is defined as more than 95% (ON_DEMAND_USAGE_THRESHOLD_PCT) of the current available bandwidth, or the difference between current available bandwidth and current usage is less than 250 kbps (ON_DEMAND_THRESHOLD_GAP_KBPS) both parameters can be changed using t2_variables when all the non-standby paths are dead or disabled.

- **Last-resort**: A standby link that becomes active only when all non-standby links and on-demand standby links are dead or disabled.

Standby priority indicates the order in which a standby link becomes active, if there are multiple standby links:

- A priority 1 standby link becomes active first whereas a priority 3 standby link becomes active last.
- Multiple standby links can be assigned the same priority.

When configuring a standby link, you can specify standby priority and two heartbeat intervals:

- **Active heartbeat interval** - the heartbeat interval used when the standby path is active (default 50ms/1s/2s/3s/4s/5s/6s/7s/8s/9s/10s)
- **Standby heartbeat interval** - the heartbeat interval used when the standby path is inactive (default 1s/2s/3s/4s/5s/6s/7s/8s/9s/10s/disabled)

A standby path is formed with 1 or 2 standby links.

- **On-Demand** - An on-demand standby path is formed between:
  - a non-standby link and an on-demand standby link
  - 2 on-demand standby links
- **Last-Resort** - A last-resort standby path is formed between:
  - a non-standby link and a last-resort standby link
  - an on-demand standby link and a last-resort standby link
  - 2 last-resort standby links

The heartbeat intervals used on a standby path are determined as follows:

- If standby heartbeat is disabled on at least 1 of the 2 links, heartbeat is disabled on the standby path while inactive.
- If standby heartbeat is not disabled on either link, then the larger of the two values are used when the standby path is standby.

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- If active heartbeat interval is configured on both links, then the larger of the two values are used when the standby path is active.

Heartbeat (keep alive) messages:

- On a non-standby path, heartbeat messages are sent only when there has been no traffic (control or user) for at least a heartbeat interval. The heartbeat interval varies depending on the path state. For non-standby, non-metered paths:
    - 50 ms when the path state is GOOD
    - 25 ms when the path state is BAD

On a standby path, the heartbeat interval used depends on the activity state and the path state:

- While inactive, if the heartbeat is not disabled, heartbeat messages are sent regularly at the configured standby heartbeat interval since no other traffic is allowed on it.
- The configured active heartbeat interval is used when the path state is GOOD.
- 1/2 the configured active heartbeat interval is used when the path state is BAD.
- While active, like non-standby paths, heartbeat messages are sent only when there has been no traffic (control or user) for at least the configured active heartbeat interval.
- The configured standby heartbeat interval is used when the path state is GOOD.
- 1/2 the configured standby heartbeat interval is used when the path state is BAD.

While inactive, standby paths are not eligible for user traffic. The only control protocol messages sent on inactive standby paths are heartbeat messages, which are for connectivity failure detection and quality metrics gathering. When standby paths are active, they are eligible for user traffic with added time cost. This is done so that the non-standby paths, if available, are favored during forwarding path selection.

The path state of a standby path with disabled heartbeat, while inactive, is assumed to be GOOD and it is displayed as GOOD in the Path Statistics table under **Reports > WAN Link Metering**. When it becomes active, unlike a non-standby path that starts in DEAD state until it hears from its Virtual Path peer, it starts in GOOD state. If connectivity with the Virtual Path peer is not detected, the path goes BAD and then DEAD. If connectivity with the Virtual Path peer is re-established, the path goes BAD and then GOOD again.

If such standby path goes DEAD and then becomes inactive, the path state does not immediately change to (assumed) GOOD. Instead, it is kept in DEAD state for time so that it cannot be used immediately. This is to prevent activity from oscillating between a lower priority path group with assumed good DEAD paths and a higher priority path group with actually GOOD paths. This on-hold period (NO_HB_PATH_ON_HOLD_PERIOD_MS) is set to 5 min and can be changed via t2_variables.

If path MTU discovery is enabled on a Virtual Path, the standby path's MTU is not used to calculate the Virtual Path's MTU while the path is standby. When the standby path becomes active, the Virtual Path'

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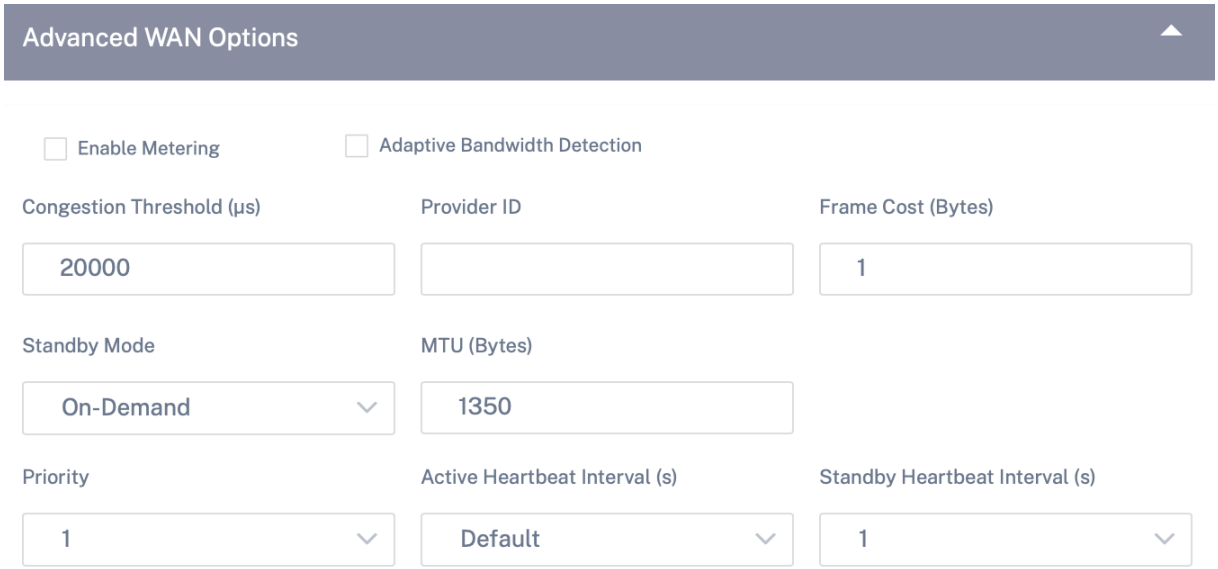
s MTU is recalculated considering the standby path's MTU. (The Virtual Path's MTU is the smallest path MTU among all active paths within the Virtual Path).

Events and log messages are generated when a standby path transitions between standby and active.

Configure standby WAN links

To configure a standby WAN link, at the site level configuration, navigate to **Configuration > Site Configuration > WAN Links** tab. In the **Advanced WAN Options** section, choose a standby mode from the **Standby Mode** drop-down list.



If an on-demand standby link is configured, the global default on-demand bandwidth limit (120%) is applied to the Virtual Path. This specifies the maximum WAN-to-LAN bandwidth allowed for the Virtual Path. It is expressed as a percentage of the total bandwidth provided by all non-standby links in the Virtual Path. As long as the available bandwidth in the Virtual Path is below the limit and if there is sufficient usage, the appliance attempts to activate on-demand paths to supplement bandwidth.

If you want to apply an on-demand bandwidth limit specific to a Virtual Path and keep the global default setting unchanged, a Virtual Path Default Set must be created and the on-demand bandwidth limit can be changed.
To apply settings for a specific Virtual Path, navigate to **Configuration > Basic Settings > Interfaces** tab.

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Zero touch deployment

September 27, 2025

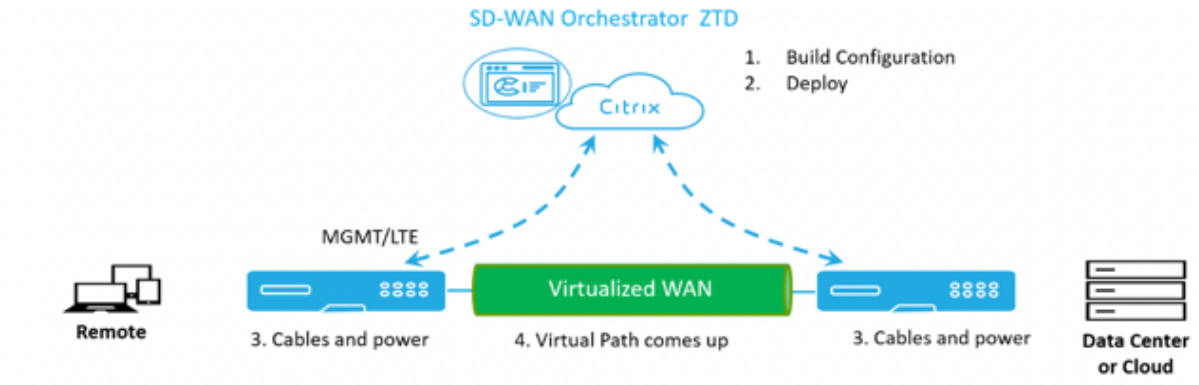
Zero touch deployment allows SD-WAN appliances to be provisioned and configured automatically, eliminating the manual labor involved in setting up your SD-WAN network.

Appliances/devices need access to the following domain names for Zero touch deployment to work:

- sdwanzt.citrixnetworkapi.net
- download.citrixnetworkapi.net
- trust.citrixnetworkapi.net

Zero touch deployment workflow

- Create and define sites using the guided workflow. For more information, see Site configuration.
- Verify and compile the configuration using the deployment tracker. For more information, see the Deployment Tracker section in Network configuration topic.
- Power on and cable up the SD-WAN appliances at the Data Center and branch sites.
- Appliances contact the Citrix SD-WAN Orchestrator service with their serial number.
- Citrix SD-WAN Orchestrator service receives requests for configuration and pushes the relevant files to the appliances.
- The virtual paths are established and the SD-WAN network is now up and running.



IP rules

September 27, 2025

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IP Rules help you to create rules for your network and take certain Quality of Service (QoS) decisions based on the rules. You can create custom rules for your network. For example, you can create a rule as –If source IP address is 172.186.30.74 and destination IP address is 172.186.10.89, set **Traffic Policy** as **Persistent Path** and **Traffic Type** as **Realtime**.

You can create rules for traffic flow and associate the rules with applications and classes. You can specify criteria to filter traffic for a flow, and can apply general behavior, LAN to WAN behavior, WAN to LAN behavior, and packet inspection rules.

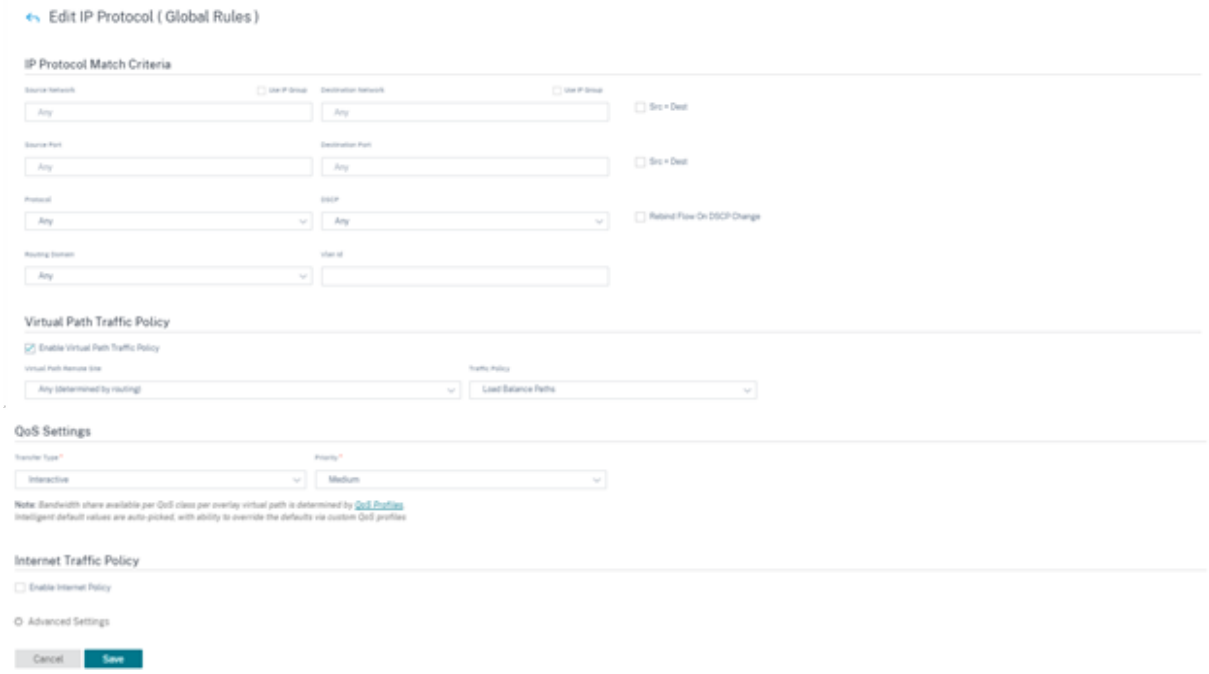
You can create global and site-specific IP rules at the network level. If a site is associated with the globally created rule, you can create site specific rules. In such cases, site specific rules take precedence and override the globally created rule.

The default IP protocol rules HTTP, HTTPS, and ALTHTTPS always appear at the top of the list on the Rules table. However, site-specific IP rules (once created) appear above HTTP, HTTPS, ALTHTTPS, and global IP rules on the Rules table.

Create IP rules

To create IP rules, navigate to **Configuration > QoS > QoS Policies** > **IP Rules**. Select the **Global Rules** tab for creating IP rules at the global level or **Site/Group Specific Rules** for creating rules at a site level.

Click **New IP Rule** under the **IP Rules** section.



- IP Protocol Match Criteria

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- **Add/Remove Sites**: (available only while creating site-specific IP rule) Select the sites, click **Review**, and **Done**.
- **Source Network**: The source IP address and subnet mask that the rule matches.
- **Destination Network**: The destination IP address and subnet mask that the rule matches.
- **Use IP Group**: Select the **Use IP Group** check box to choose any existing IP group from the drop-down list.
- **Src = Dst**: If selected, the source IP address is also used for the destination IP address.
- **Source Port**: The source port (or source port range) that the rule matches.
- **Destination Port**: The destination port (or destination port range) that the rule matches.
- **Src = Dst**: If selected, the source port is also used for the destination port.
- **Protocol**: The protocol with which the rule matches. You can select one of the predefined protocols, or select **Any**, or **Number**.
- **Protocol Number**: This field appears only when you select **Number** from the **Protocol** drop-down list. When you select a protocol number, the integer associated with the protocol is used for the back-end configurations.
- **DSCP**: The DSCP tag in the IP header that the rule matches.
- **Routing Domain**: The routing domain that the rule matches.
- **VLAN ID**: Enter the VLAN ID for the rule. The VLAN ID identifies the traffic to and from the virtual interface. Use VLAN ID as 0 to designate native or untagged traffic.
- **Rebind Flow On DSCP Change**: When selected, flows that are otherwise identical in terms of match criteria are treated as separate if their DSCP fields differ.

- Virtual Path Traffic Policy

  Select the **Enable Virtual Path Traffic Policy** check box.

  - **Virtual Path Remote Site**: Select the virtual path for the remote site.
  - **Traffic Policy**: Choose one of the following traffic policies as needed.
    - **Load Balance Paths**: Application traffic for the flow is balanced across multiple paths. Traffic is sent through the best path until that path is used. The remaining packets are sent through the next best path.
    - **Persistent Path**: Application traffic remains on the same path until the path is no longer available. Select one of the following **Persistence Policies**:
      - **Persist on the originating link**: The application traffic remains on the originating link until the path is no longer available.
      - **Persist on MPLS link if available, else on the originating link**: The application traffic remains on the MPLS link. If the MPLS link is unavailable, then the traffic remains on the originating link.
      - **Persist on Internet link if available, else on the originating link**: The application traffic remains on the internet link. If the internet link is unavailable, then the

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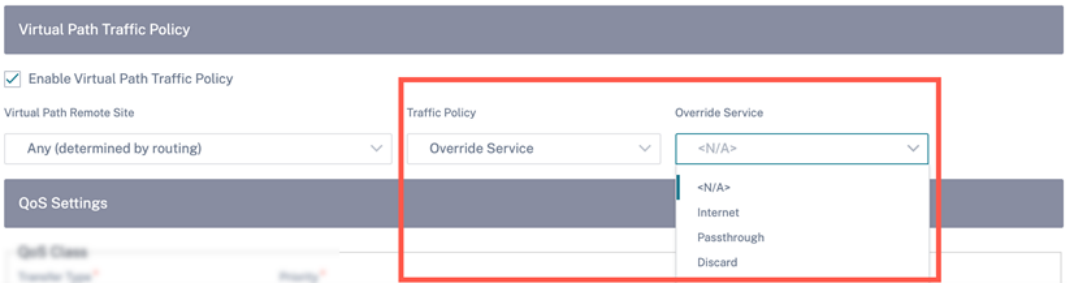
traffic remains on the originating link.

- **Persist on Private Intranet link if available, else on the originating link**: The application traffic remains on the private intranet link. If the private intranet link is unavailable, then the traffic remains on the originating link.

Persistence Impedance is the time (in ms) until which the application traffic remains on the link.

- **Duplicate Paths**: Application traffic is duplicated across multiple paths, increasing reliability.
- **Override Service**: Traffic for the flow overrides to a different service. Select the service type as Intranet, Internet, pass-through, or Discard to which the virtual path service overrides.



- QoS Settings (QoS Class)
  - **Transfer Type**: Choose one of the following transfer types:
    - **Realtime**: Used for low latency, low bandwidth, time-sensitive traffic. Real-time applications are time-sensitive but don't really need high bandwidth (for example voice over IP). Real-time applications are sensitive to latency and jitter but can tolerate some loss.
    - **Interactive**: Used for interactive traffic with low to medium latency requirements and low to medium bandwidth requirements. The interaction is typically between a client and a server. The communication might not need high bandwidth but is sensitive to loss and latency.
    - **Bulk**: Used for high bandwidth traffic and applications that can tolerate high latency. Applications that handle file transfer and need high bandwidth are categorized as a bulk class. These applications involve little human interference and are mostly handled by the systems themselves.
  - **Priority**: Choose a priority for the selected transfer type.
- Internet Traffic Policy
  - Select the **Enable Internet Policy** check box to configure internet traffic policy.

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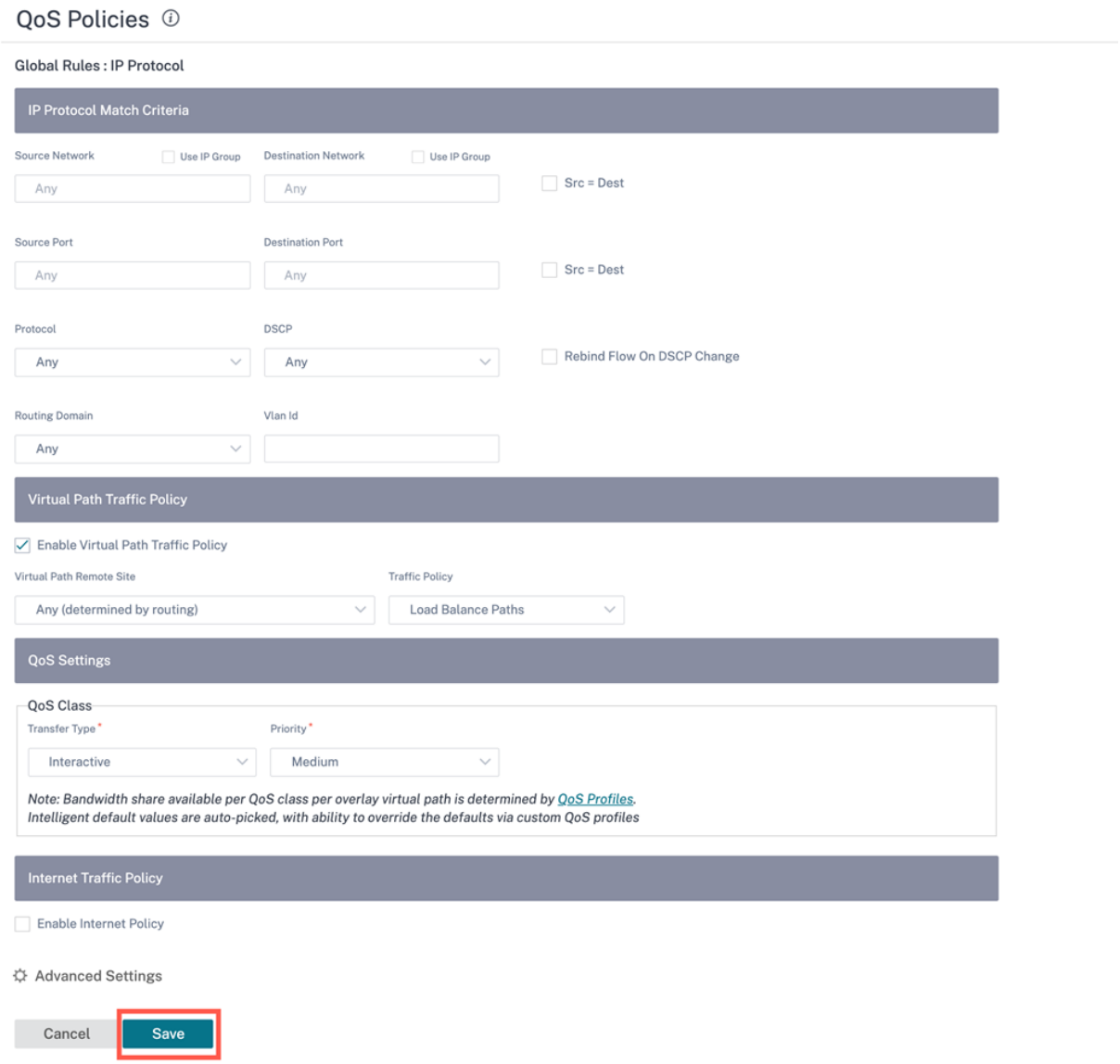
- **Mode**: The method of transmitting and receiving packets for flows that match the rule. You can choose **Override Service** or **WAN link** as needed.
- **WAN link**: The WAN link to be used by flows matching the rule when Internet Load Balancing is enabled.
- **Override Service**: The destination service for flows matching the rule.

> **Note**
>
> A virtual path service cannot override another virtual path service.



Advanced Settings

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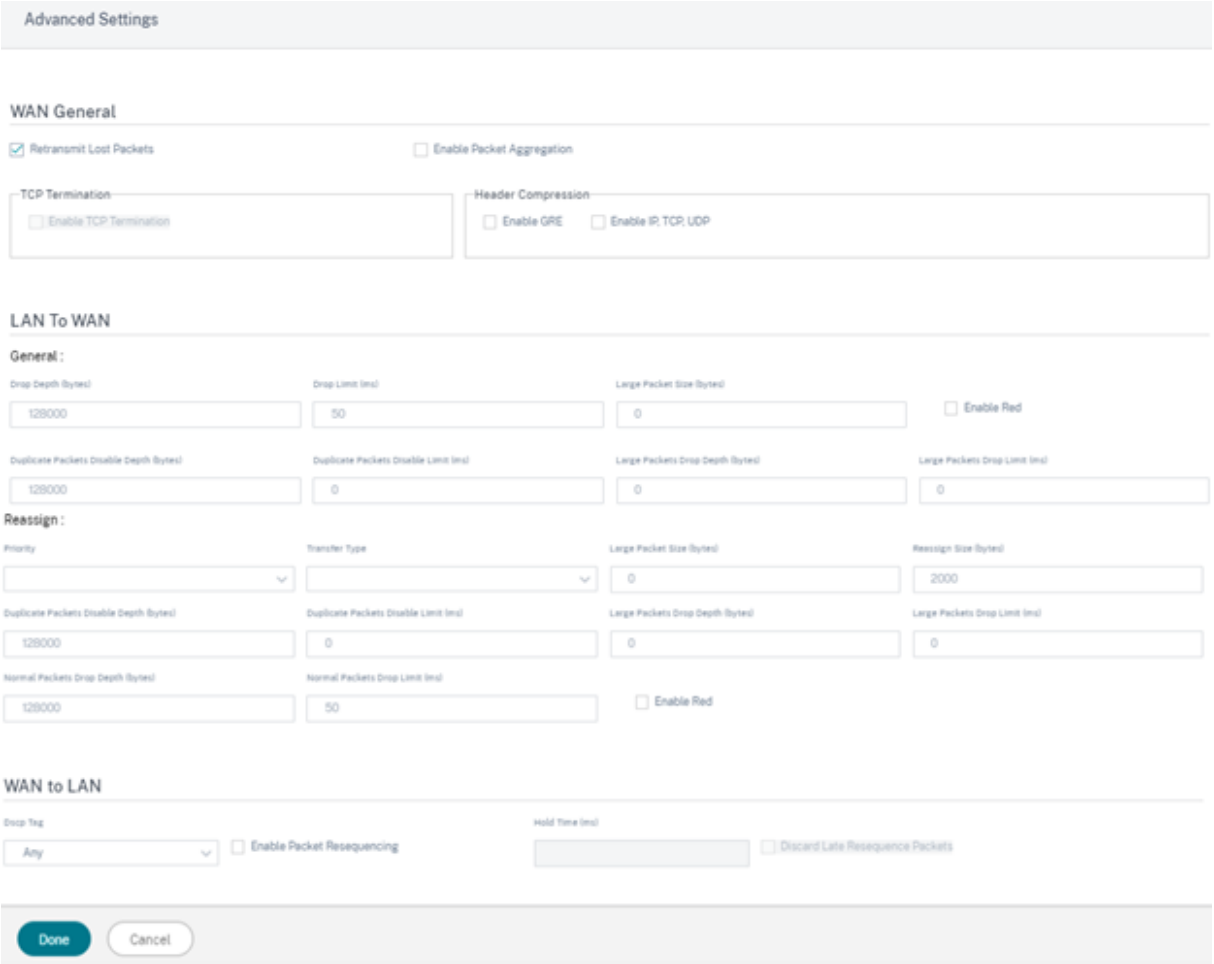

- WAN General
  - **Retransmit Lost Packets**: Sends traffic that matches this rule to the remote appliance over a reliable service and retransmits lost packets.
  - **Enable Packet Aggregation**: Aggregates small packets into larger packets.
  - **Enable TCP Termination**: Enables TCP termination of traffic for this flow. The round-trip time for acknowledgment of packets is reduced, and therefore improves throughput.
  - **Enable GRE**: Compresses headers in GRE packets.
  - **Enable IP, TCP, and UDP**: Compresses headers in IP, TCP, and UDP packets.

    > **Note**
    >
    > IPv6 packets do not support header compression.

- LAN to WAN

  General

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- **Drop Depth(bytes)**: Queue depth threshold after which packets are dropped.
- **Drop Limit**: Time after which packets waiting in the class scheduler are dropped. Not applicable for a bulk class.
- **Large Packet Size**: Packets smaller than or equal to this size are assigned the Drop Limit and Drop Depth values specified in the **Large Packets Drop Depth(bytes)** and **Large Packets Drop Limit(ms)** fields. Packets larger than this size are assigned the values specified in the default Drop Limit and Drop Depth fields.
- **Enable RED**: Random Early Detection (RED) ensures fair sharing of class resources by discarding packets when congestion occurs.
- **Duplicate Packet Disable Depth(bytes)**: The queue depth of the class scheduler at which point the duplicate packets are not generated.
- **Duplicate Packet Disable Limit**: Time for which duplication can be disabled to prevent duplicate packets from consuming bandwidth.
- **Large Packets Drop Depth(bytes)**: If the queue depth exceeds this threshold, the packets are discarded and statistics are counted.
- **Large Packets Drop Limit(ms)**: The maximum amount of estimated time that packets larger than or equal to the Large Packet Size must wait in the class scheduler. If the estimated time exceeds this threshold, the packets are discarded and statistics are counted. Not valid for Bulk classes.

Reassign

- **Priority**: You can set the priority of the standby WAN link as needed. The standby WAN link priority indicates the order in which a standby WAN link becomes active. A high priority standby WAN link becomes active first. A low-priority WAN link becomes active last.
- **Transfer Type**: Select a transfer type with which to associate this rule.
- **Duplicate Packet Disable Depth(bytes)**: The queue depth of the class scheduler at which point duplicate packets are not generated.
- **Duplicate Packet Disable Limit**: Designates the amount of time a packet waits in the queue before duplication is not performed, which prevents duplicate packets from consuming bandwidth when bandwidth is limited.
- **Large Packets Drop Depth(bytes)**: If the queue depth exceeds this threshold, the packets are discarded and statistics are counted.
- **Large Packets Drop Limit(ms)**: If the estimated time exceeds this threshold, the packets are discarded and statistics are counted. Not valid for Bulk classes.
- **Normal Packets Drop Depth (bytes)**: If the queue depth exceeds this threshold, the packets are discarded and statistics are counted.
- **Normal Packets Drop Limit (ms)**: If the estimated time exceeds this threshold, the packets are discarded and statistics are counted. Not valid for Bulk classes.

- WAN to LAN

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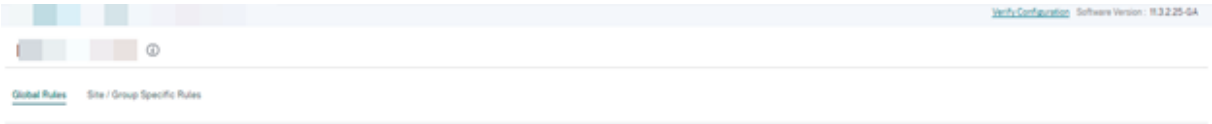
- **DSCP Tag**: DSCP tag applied to the packets that match this rule on WAN to LAN, before sending them to the LAN.
- **Enable Packets Resequencing**: The traffic flows that match the rule gets tagged for sequence order, and the packets gets reordered (if necessary) at the WAN to LAN appliance.
- **Hold Time**: Time interval for which the packets are held for resequencing, after which the packets are sent to the LAN. When the timer expires, the packets are sent to the LAN without waiting any further for the prerequisite sequence numbers.

  If the rule has a traffic policy as duplicate path, the default hold time is 80 ms. Otherwise, the default is 900 ms for TCP rules and 250 ms for non-TCP rules.
- **Discard Late Resequencing Packets**: Discards out-of-order packets that arrived after the packets needed for resequencing have been sent to the LAN.

Click **Save** to save the configuration settings. Click **Verify Configuration** on the **Configuration** > **QoS Policies** page to validate any audit error.



Verify IP rules

To verify IP rules, navigate to **Reports > Real Time > Flows**. Select the site for which you want to view the flow information and the number of flows to display. Click **Customize Columns** and select the check boxes corresponding to the flow information you want to view. Verify if the flow information is according to the configured rules.

Navigate to **Reports > Real Time > Statistics** and select **Rules**. Choose the site and click **Retrieve latest data**. Verify the configured rules. For more information, see Site reports.

Application rules

September 27, 2025

Application rules allow the Citrix SD-WAN™ appliance to parse incoming traffic and classify them as belonging to a particular application or application group. This classification enhances the Quality of Service (QoS) of individual application or application families by creating and applying application rules.

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You can filter traffic flows based on application, application group, or application object match-types and apply application rules to them. The application rules are similar to the Internet Protocol (IP) rules. For information on IP rules see, IP Rules.

For every application rule, you can specify the traffic policy. The following are the available traffic policies:

- **Load Balance Path**: Application traffic for the flow is balanced across multiple paths. Traffic is sent through the best path until that path is used. The remaining packets are sent through the next best path.
- **Persistent Path**: Application traffic remains on the same path until the path is no longer available.
- **Duplicate Path**: Application traffic is duplicated across multiple paths, increasing reliability. The application rules are associated to classes.

How application rules are applied?

In the SD-WAN network, when the incoming packets reach the SD-WAN appliance, the initial few packets do not undergo DPI classification. At this point, the IP rule attributes such as Class, TCP termination are applied to the packets. After DPI classification, the application rule attributes such as Class, traffic policy override the IP rule attributes.

The IP rules have more number of attributes as compared to the application rules. The application rule overrides only a few IP rule attributes. The rest of the IP rule attributes remain processed on the packets.

For example, consider you have specified an application rule for a webmail application such as Google Mail that uses the SMTP protocol. The IP rule set for the SMTP protocol is applied initially before DPI classification. After parsing the packets and classifying it as belonging to the Google Mail application, the application rule specified for the Google Mail application is applied.

Create application rules

To create application rules, navigate to **Configuration > QoS > QoS Policies** > **Application Rules**. Select **Global Rules** tab for creating application rules at the global level or **Site/Group Specific Rules** for creating rules at a site level.

Click **New Application Rule** under the **Application Rules** section.

- Apps and Domains Match Criteria
    - **Apps & Domains**: Choose an application or domain from the drop-down list. You can also create a domain app by clicking **+ New Domain App**. Enter a name and add domains.

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- **Routing Domain**: Select a routing domain. You can select the default routing domain or select **Any**.
- **Source Network**: Source IP address and the subnet mask to match against the traffic.
- **Destination Network**: Destination IP address and the subnet mask to match against the traffic.
- **Source Port**: Source port number or port range to match against the traffic.
- **Destination Port**: Destination port number or port range to match against the traffic.
- **Src = Dest**: If selected, the source port is also used for the destination port.

- Virtual Path Traffic Policy

  Select the **Enable Virtual Path Traffic Policy** check box.

  - **Virtual Path Remote Site**: Select the virtual path for the remote site.
  - **Traffic Policy**: Choose one of the following traffic policies as needed.
    - **Load Balance Paths**: Application traffic for the flow is balanced across multiple paths. Traffic is sent through the best path until that path is used. The remaining packets are sent through the next best path.
    - **Persistent Path**: Application traffic remains on the same path until the path is no longer available. Select one of the following **Persistence Policies**:
      - **Persist on the originating link**: The application traffic remains on the originating link until the path is no longer available.
      - **Persist on MPLS link if available, else on the originating link**: The application traffic remains on the MPLS link. If the MPLS link is unavailable, then the traffic remains on the originating link.
      - **Persist on Internet link if available, else on the originating link**: The application traffic remains on the internet link. If the internet link is unavailable, then the traffic remains on the originating link.
      - **Persist on Private Intranet link if available, else on the originating link**: The application traffic remains on the private intranet link. If the private intranet link is unavailable, then the traffic remains on the originating link.

      Persistence Impedance is the time (in ms) until which the application traffic remains on the link.
    - **Duplicate Paths**: Application traffic is duplicated across multiple paths, increasing reliability.

- QoS Settings (QoS Class)

  - **Transfer Type**: Choose one of the following transfer types:
    - **Realtime**: Used for low latency, low bandwidth, time-sensitive traffic. Real-time applications are time-sensitive but don't really need high bandwidth (for example voice

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over IP). Real-time applications are sensitive to latency and jitter but can tolerate some loss.
    - **Interactive**: Used for interactive traffic with low to medium latency requirements and low to medium bandwidth requirements. The interaction is typically between a client and a server. The communication might not need high bandwidth but is sensitive to loss and latency.
    - **Bulk**: Used for high bandwidth traffic and applications that can tolerate high latency. Applications that handle file transfer and need high bandwidth are categorized as a bulk class. These applications involve little human interference and are mostly handled by the systems themselves.
  - **Priority**: Choose a priority for the selected transfer type.

Advanced Settings

- WAN General
  - **Retransmit Lost Packets**: Sends traffic that matches this rule to the remote appliance over a reliable service and retransmits lost packets.
  - **Enable Packet Aggregation**: Aggregates small packets into larger packets.
- LAN to WAN
  - **Drop Depth(bytes)**: Queue depth threshold after which packets are dropped.
  - **Drop Limit**: Time after which packets waiting in the class scheduler are dropped. Not applicable for a bulk class.
  - **Enable RED**: Random Early Detection (RED) ensures fair sharing of class resources by discarding packets when congestion occurs.
  - **Duplicate Packet Disable Depth(bytes)**: The queue depth of the class scheduler at which point the duplicate packets are not generated.
  - **Duplicate Packet Disable Limit**: Time for which duplication can be disabled to prevent duplicate packets from consuming bandwidth.
- WAN to LAN
  - **DSCP Tag**: DSCP tag applied to the packets that match this rule on WAN to LAN, before sending them to the LAN.
  - **Enable Packets Resequencing**: The traffic flows that match the rule gets tagged for sequence order, and the packets gets reordered (if necessary) at the WAN to LAN appliance.
  - **Hold Time**: Time interval for which the packets are held for resequencing, after which the packets are sent to the LAN. When the timer expires, the packets are sent to the LAN without waiting any further for the prerequisite sequence numbers.

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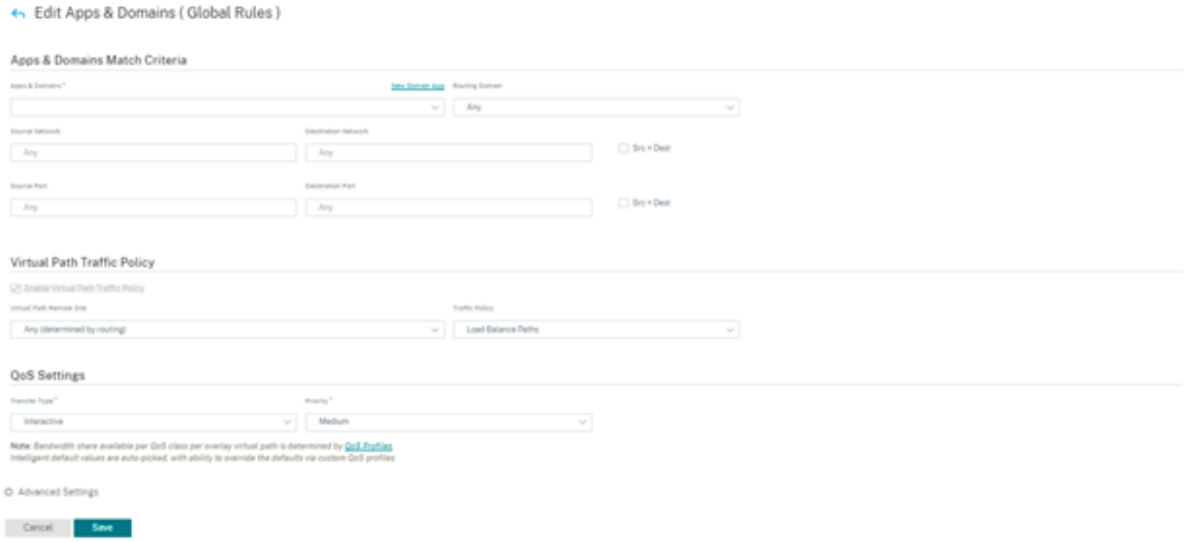
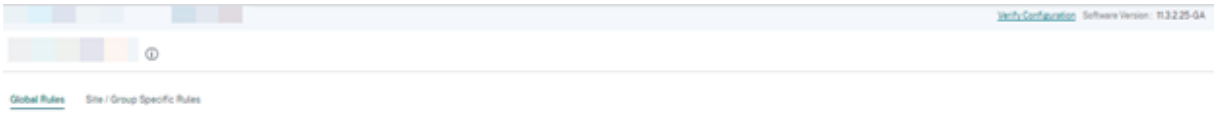
If the rule has a traffic policy as duplicate path, the default hold time is 80 ms. Otherwise, the default is 900 ms for TCP rules and 250 ms for non-TCP rules.

- **Discard Late Resequencing Packets**: Discards out-of-order packets that arrived after the packets needed for resequencing have been sent to the LAN.

Click **Save** to save the configuration settings.



Click **Verify Configuration** on the **Configuration** > **QoS** > **QoS Policies** page to validate any audit error.to validate any audit error.



Create custom application rules

You can also create custom application rules. To create a custom application rule, navigate to **Configuration > QoS > QoS Policies** > **Custom Application Rules**. Select **Global Rules** tab for creating custom application rules at the global level or **Site/Group Specific Rules** for creating rules at a site level.

Click **New Custom Application Rule** under the **Custom Application Rules** section. Click **New Custom App** next to the **Custom Application** field name. Enter a name for the custom application. In the **Match Criteria** section, select the application, protocol, DSCP tag and enter the network IP and port number. Click **Save**.

Enter details in the other fields as needed. For information on field descriptions, refer Create application rules.

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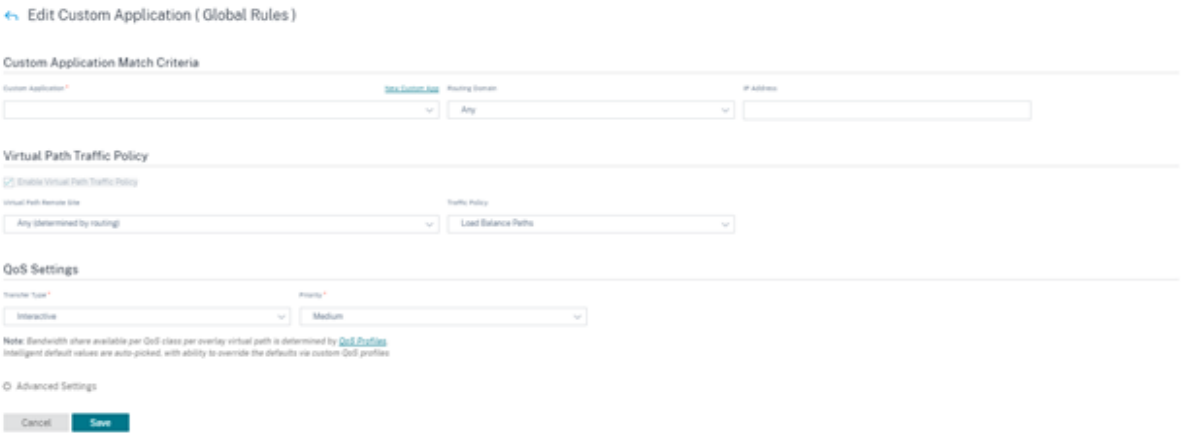
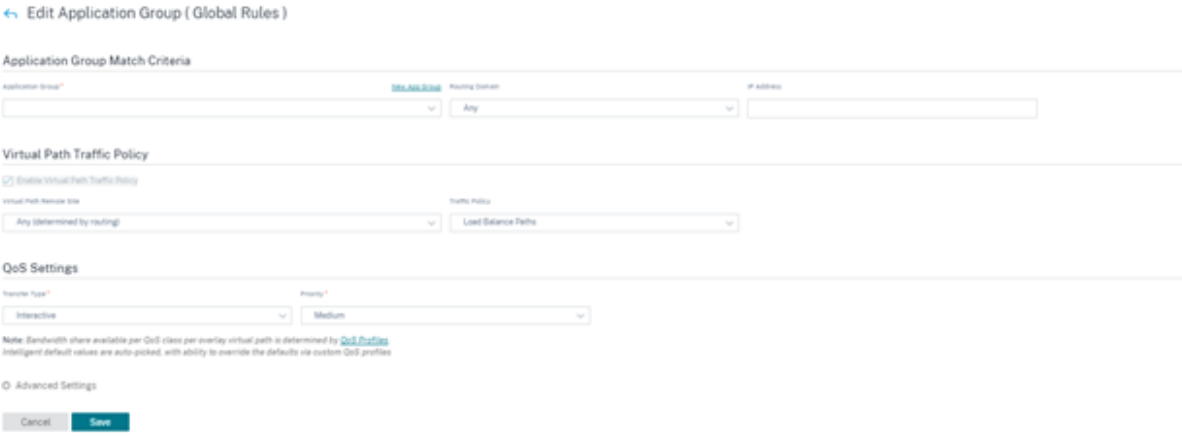


Create application group rules

You can create rules for a group of applications. To create application group rules, navigate to **Configuration > QoS > QoS Policies** > **Application Group Rules**. Select **Global Rules** tab for creating application group rules at the global level or **Site/Group Specific Rules** for creating rules at a site level.

Click **New Application Group Rule** under the **Application Group Rules** section. Click **New App Group** next to **Application Group** field name. Enter a name for the application group. Search and add applications as needed. Click **Save**.

Enter details in the other fields as needed. For information on field descriptions, refer Create application rules.



Verify application rules

To verify application rules, navigate to **Reports > Real Time > Flows**. Select the site for which you want to view the flow information and the number of flows to display. Click **Customize Columns**

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and select the check boxes corresponding to the flow information you want to view. Verify if the flow information is according to the configured rules.

Navigate to **Reports > Real Time > Statistics** and select **Rules**. Choose the site and click **Retrieve latest data**. Verify the configured rules.

For more information about reporting, see Flows.

Classes

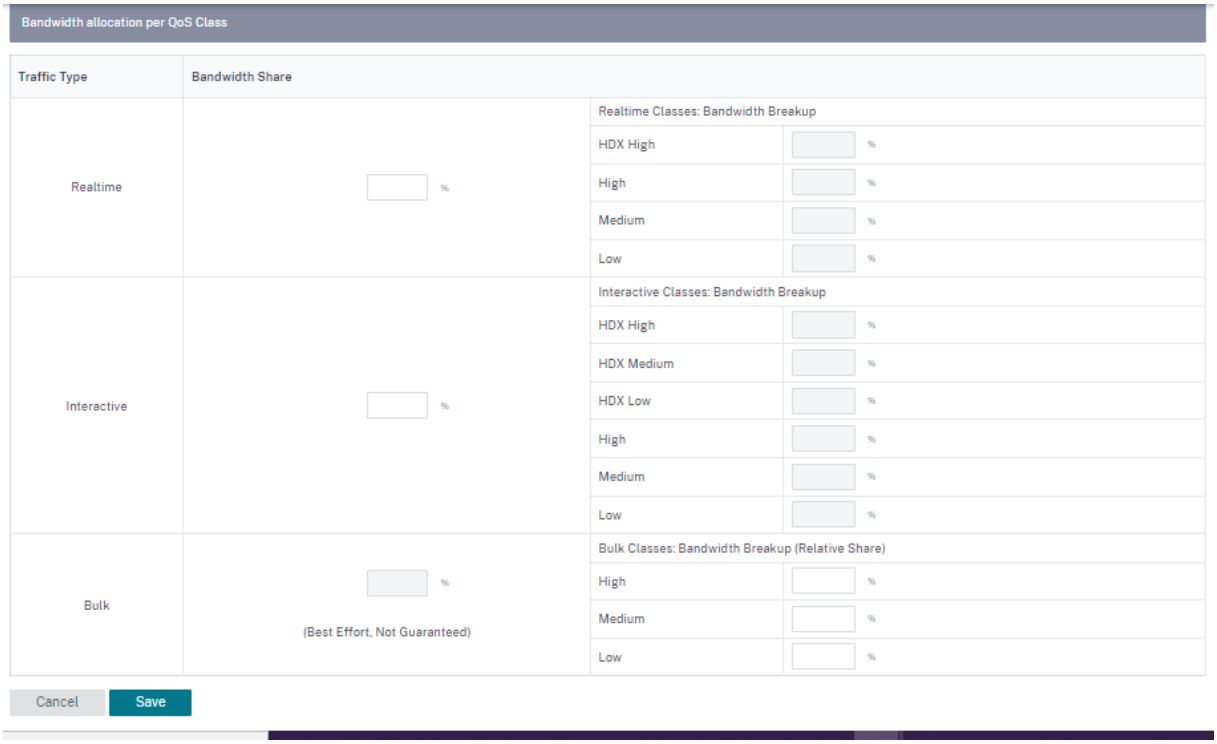
November 25, 2021

Citrix SD-WAN Orchestrator service provides a default set of application and IP/Port based QoS policies that are applied to all traffic going over Virtual Paths. These settings can be customized to fit the deployment needs.

Classes are useful to prioritize the traffic. Application and IP/Port based QoS policies classify traffic and put it into appropriate classes specified in the configuration.

For more information on application based QoS policies and IP address based QoS policies, see QoS policies.

Citrix SD-WAN Orchestrator service supports 13 classes. The following are the default 13 classes:



The following are the different types of classes:

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- **Real-time**: Used for low latency, low bandwidth, time-sensitive traffic. Real-time applications are time sensitive but do not require high bandwidth (for example voice over IP). Real-time applications are sensitive to latency and jitter, but can tolerate some loss.
- **Interactive**: Used for interactive traffic with low to medium latency requirements and low to medium bandwidth requirements. The interaction is typically between a client and a server. The communication might not need high bandwidth but is sensitive to loss and latency.
- **Bulk**: Used for high bandwidth traffic and applications that can tolerate high latency. Applications that handle file transfer and need high bandwidth are categorized as bulk class. These applications involve little human interference and are mostly handled by the systems themselves.

Bandwidth sharing among classes

Bandwidth is shared among classes as follows:

- **Real-time**: Traffic hitting real-time classes are guaranteed to have low latency and bandwidth is capped to the class share when there is competing traffic.
- **Interactive**: Traffic hitting the interactive classes get remaining bandwidth after serving real-time traffic and the available bandwidth is fair shared among the interactive classes.
- **Bulk**: Bulk is best effort. Bandwidth left over after serving real-time and interactive traffic is given to bulk classes on a fair share basis. Bulk traffic can starve if real-time and interactive traffic uses all the available bandwidth.

> **Note**
>
> Any class can use all available bandwidth when there is no contention.

The following example explains the bandwidth distribution based on the class configuration:

Consider there is an aggregated bandwidth of 10 Mbps over Virtual Path. If the class configuration is:

- Real-time: 30%
- Interactive High: 40%
- Interactive Medium: 20%
- Interactive Low: 10%
- Bulk: 100%

The bandwidth distribution outcome is:

- Real-time traffic gets 30% of 10Mbs (3 Mbps) based on the need. If it needs less than 10%, then the rest of the bandwidth is made available to the other classes.

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- Interactive classes share the remaining bandwidth on fair share basis (4 Mbps: 2 Mbps: 1 Mbps).
- Anything leftover when real-time, interactive traffic is not fully using their shares is given to the Bulk class.

For information about customizing QoS classes, see QoS profiles.

Application classification

September 27, 2025

The Citrix SD-WAN™ appliances perform deep packet inspection (DPI) to identify and classify applications using the following techniques:

- DPI library classification
- Citrix-proprietary Independent Computing Architecture (ICA®) classification
- Application vendor APIs (for example Microsoft REST APIs for Office 365)
- Domain name based application classification

DPI library classification

The Deep Packet Inspection (DPI) library recognizes thousands of commercial applications. It enables real-time discovery and classification of applications. Using the DPI technology, the SD-WAN appliance analyses the incoming packets and classifies the traffic as belonging to a particular application or application family.

DPI is enabled globally, by default, for all the sites in your network. Disabling DPI stops DPI classification capability on the appliance. You can no longer use DPI classified application / application categories to configure firewall, QoS, and routing policies. You will also not be able to view the top applications and application categories report.

To disable global DPI, at the Network level, navigate to **Configuration** > **App Settings & Groups** > **DPI Settings** and clear the **Enable Global DPI** check box option.

To enable DPI library classification, in the **Configuration Editor**, navigate to **Global > Applications > DPI Settings** and select the **Enable Deep Packet Inspection** check box.

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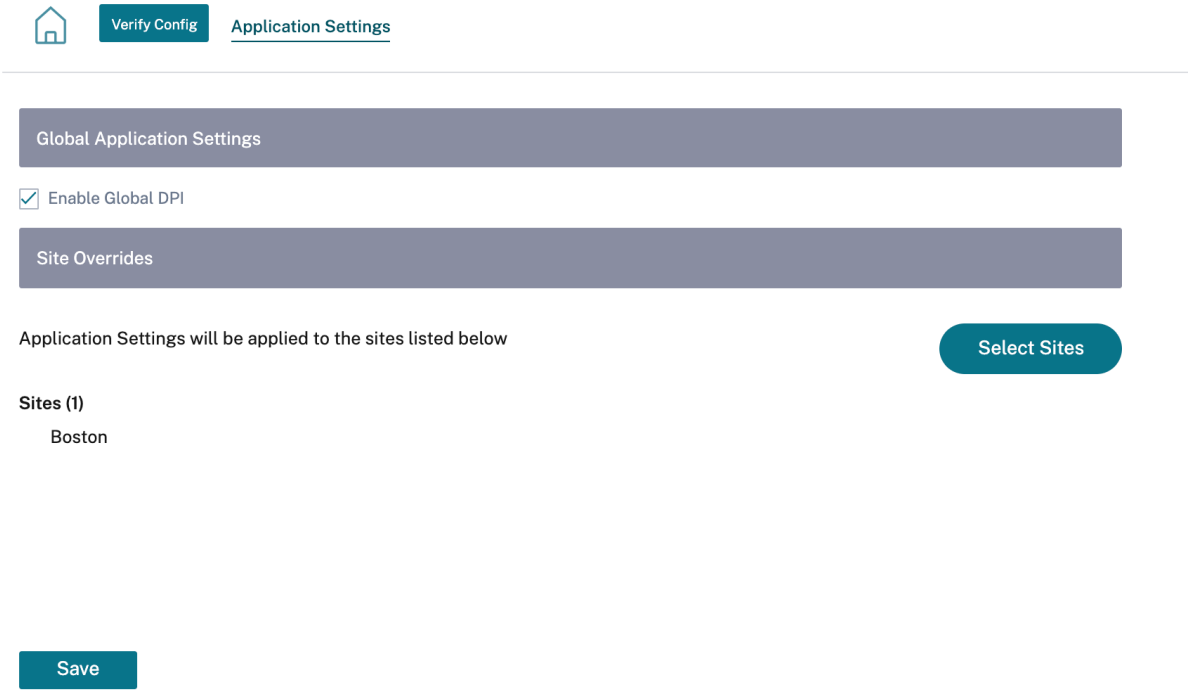

ICA classification

Citrix SD-WAN appliances can also identify and classify Citrix HDX™ traffic for virtual apps and desktops. Citrix SD-WAN recognizes the following variations of the ICA protocol:

- ICA
- ICA-CGP
- Single Stream ICA (SSI)
- Multi-Stream ICA (MSI)
- ICA over TCP
- ICA over UDP/EDT
- ICA over non-standard ports (including Multi-Port ICA)
- HDX Adaptive Transport
- ICA over WebSocket (used by HTML5 Receiver)

> **Note**
>
> Classification of ICA traffic delivered over SSL/TLS or DTLS is not supported in SD-WAN Standard Edition but is supported in SD-WAN Premium Edition and SD-WAN WANOP Edition.
>
> Classification of network traffic is done during initial connections or flow establishment. Therefore, pre-existing connections are not classified as ICA. Classification of connections is also lost

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> when the connection table is cleared manually.
>
> Framehawk traffic and Audio-over-UDP/RTP are not classified as HDX applications. They are reported as either "UDP"or "Unknown Protocol."
>
> Since release 10 version 1, the SD-WAN appliance can differentiate each ICA data stream in multi-stream ICA even in a single-port configuration. Each ICA stream is classified as a separate application with its own default QoS class for prioritization.
>
> - For Multi-Stream ICA functionality to work properly, use SD-WAN Standard Edition 10.1 or above, or SD-WAN Premium Edition.
> - For HDX user based reports to be shown on SDWAN-Center, use SD-WAN Standard Edition or Premium Edition 11.0 or above.
>
> Minimum software requirements for HDX information virtual channel:
>
> - A Current Release of Citrix Virtual Apps and Desktops (formerly XenApp and XenDesktop), since the prerequisite functionality was introduced in XenApp and XenDesktop 7.17 and is not included in the 7.15 Long-Term Service Release.
> - A version of the Citrix Workspace app (or its predecessor, Citrix Receiver) that supports multi-stream ICA and the HDX Insights information virtual channel, CTXNSAP. Look for **HDX Insight with NSAP VC** and Multiport/Multi-stream ICA in the Citrix Workspace app Feature Matrix. See the currently supported release versions at HDX Insights.
> - From 11.2 release onwards, packet duplication is now enabled by default for HDX real-time traffic when multi-stream ICA is in use.

Once classified, the ICA application can be used in application rules and to view application statistics similar to other classified applications.

There are five default application rules for ICA applications one each for the following priority tags:

- Independent Computing Architecture (Citrix)(ICA)
- ICA Real-time (ica_priority_0)
- ICA Interactive (ica_priority_1)
- ICA Bulk-Transfer (ica_prority_2)
- ICA Background(ica_priority_3)

For more information, see Rules by Application Name

If you are running a combination of software that does not support Multi-Stream ICA over a single port, then to perform QoS you must configure multiple ports, one for each ICA stream.
To classify HDX on non-standard ports as configured in XA/XD server policy, you must add those ports in ICA port configurations. Also, to match traffic on those ports to valid IP rules, you must update the ICA IP rules.

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In ICA IP and port list you can specify non-standard ports used in XA/XD policy to process for HDX classification. IP address is used to further restrict the ports to a specific destination. Use '*'for port destined to any IP address. IP address with combination of SSL port is also used to indicate that the traffic is likely ICA even though traffic is not finally classified as ICA. This indication is used to send L4 AppFlow records to support multi-hop reports in Citrix Application Delivery Management.

For information on enabling ICA classification, see HDX QoE configuration

ICA behaviour matrix

	MCN	Orchestartor service
ICA	On	On
MSI	On	Off
HDX reporting	On	Off
Application QoE	Not configured	Not configurd

Application vendor API based classification

Citrix SD-WAN supports the following application vendor API based classification:

- Office 365. For more information, see Office 365 optimization.
- Citrix Cloud and Citrix Gateway service. For more information, see Gateway Service Optimization.

Domain name based application classification

The DPI classification engine is enhanced to classify applications based on the domain name and patterns. After the DNS forwarder intercepts and parses the DNS requests, the DPI engine uses IP classifier to perform first packet classification. Further DPI library and ICA classification are done and the domain name based application ID is appended.

The Domain name based application feature allows you to group several domain names and treat it as a single application. Making it easier to apply firewall, application steering, QoS, and other rules. A maximum of 64 domain name based applications can be configured.

To define domain name based applications, at the network level, navigate to **App Settings & Groups** > **Domains & Apps** > **Domain Name Based Apps**. Enter an application name and add the required domain names or patterns. You can either enter the full domain name or use wild cards at the beginning. The following domain name formats are allowed:

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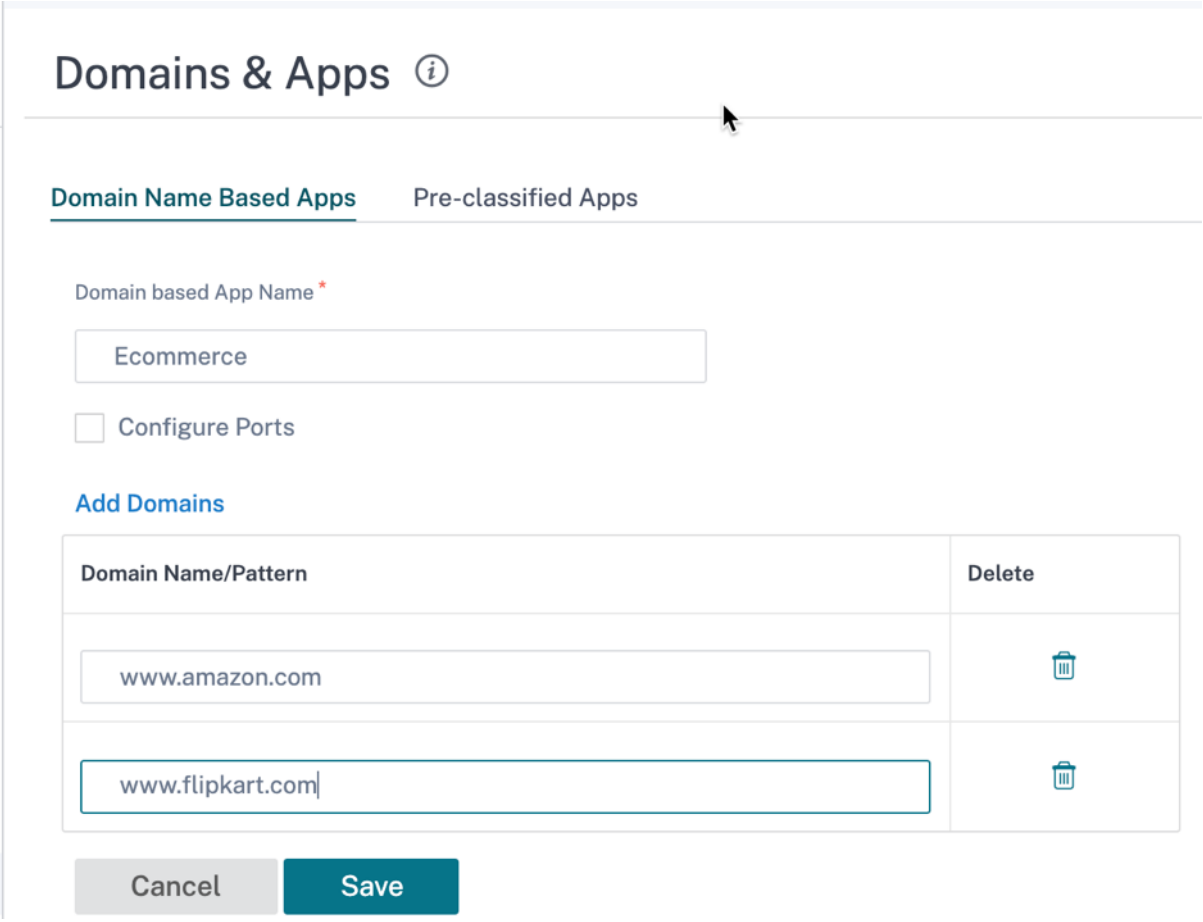
- example.com
- *.example.com



The classified domain name based applications are used in configuring the following:

- DNS Proxy
- DNS Transparent forwarder
- Application objects
- Application Routes
- Firewall policy
- Application QoS Rules
- Application QoE

> **Note**
>
> From Citrix SD-WAN 11.5 onwards, IPv6 and AAAA records are supported.

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Limitations

- If there are no DNS request/response corresponding to a domain name based application, the DPI engine does not classify the domain name based application and hence does not apply the application rules corresponding to the domain name based application.
- If an Application Object is created such that the port range includes port 80 and/or port 443, with a specific IP address match type that corresponds to a domain name based application, the DPI engine does not classify the domain name based application.
- If explicit web proxies are configured, you have to add all the domain name patterns to the PAC file, to ensure that the DNS response does not always return the same IP address.
- The domain name based application classifications are reset on configuration upgrade. Reclassification happens based on pre 11.0.2 release classification techniques such as DPI library classification, ICA classification and Vendor application APIs based classification.
- The application signatures learned (destination IP addresses) by domain name based application classification are reset on configuration update.
- Only the standard DNS queries and their responses are processed.
- DNS response records split over multiple packets are not processed. Only DNS responses in a single packet are processed.
- DNS over TCP is not supported.
- Only top-level domains are supported as domain name patterns.

Classifying encrypted traffic

Citrix SD-WAN appliance detects and reports encrypted traffic, as part of application reporting, in the following two methods:

- For HTTPS traffic, the DPI engine inspects the SSL certificate to read the common name, which carries the name of the service (for example - Facebook, Twitter). Depending on the application architecture only one certificate might be used for several service types (for example - email, news, and so on). If different services use different certificates, the DPI engine would be able to differentiate between services.
- For applications that use their own encryption protocol, the DPI engine looks for binary patterns in the flows, for instance in case of Skype the DPI engine looks for a binary pattern inside the certificate and determines the application.

For detailed procedure on configuring encrypted traffic and viewing reports, see HDX QoE.

To configure application classification settings:

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Application Groups

Application groups enable you to group different types of match criteria into a single object that can be used in firewall policies and application steering. IP Protocol, Application, and Application Family are the available match types.

The following features use application groups as a match type:

- Application Routes
- Firewall policy
- Application QoS Rules
- Application QoE

For more information on creating application groups, see Application Groups

MPLS queues

September 27, 2025

MPLS queues simplify creating SD-WAN configurations when adding a Multiprotocol Layer Switching (MPLS) WAN Link.

Citrix SD-WAN Orchestrator service allows you to add an MPLS specific WAN Link (that is, Access Type). When a new Private MPLS Access Type is selected, you can define the MPLS queues associated with the WAN Link. This allows a single VIP with multiple DSCP tags that correspond to the provider's queuing implementation for the MPLS WAN Link. This maps the Intranet Service to multiple MPLS Queues on a single MPLS WAN Link.

It also allows MPLS providers to identify traffic based on DSCP markings so that the class of service can be applied by the provider.

> **Note**
>
> If you have existing MPLS configurations and would like to implement the Private MPLS Access Type, contact Citrix® Support for assistance.

Configure MPLS queues

1. To configure MPLS queues, at the site level, navigate to **Configuration > Site Configuration > WAN Links**.
2. Click **+ WAN Link** and select the **Create New** radio button.

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3. Select **MPLS** from the **Access Type** drop-down list. Choose your ISP from the **ISP Name** drop-down list.
4. Provide a name for the MPLS link. Enter egress and ingress speeds and their corresponding physical or permitted rates.
5. Click **+ Queue** under the **MPLS Queues** section. Provide the following details and click **Save**.
   - **Queue Name**: The name of the MPLS queue.
   - **DSCP Tag**: The unique **Differentiated Services Code Point(DSCP)** tag of the MPLS queue.
   - **LAN to WAN (%)**: The proportion (%) of bandwidth used for upload cannot exceed the defined physical upload rate.
   - **WAN to LAN (%)**: The proportion (%) of bandwidth used for download cannot exceed the defined physical download rate.
   - **Tracking IP Address**: The Virtual IP Address on the Virtual Path that can be pinged to determine the state of the path.
   - **Congestion Threshold**: The amount of congestion (in microseconds) after which the MPLS Queue throttles packet transmission to avoid further congestion.
   - **Unmatched option**: If enabled, DCSP tags not matched by other MPLS Queues would use this Class. Only one MPLS Queue can be marked for use by unmatched tags.
   - **No retag option**: If enabled, the LAN to WAN intranet traffic retains the original tag and no retag with the default DSCP tag.
   - **Eligibility**: The eligibility settings for an MPLS Queue allow the user to add an extra penalty for using the MPLS Queue for certain Classes of traffic. When a Class of traffic is marked as not-eligible for the MPLS Queue, a penalty is added that makes the WAN Link unlikely to be used unless network conditions require it.

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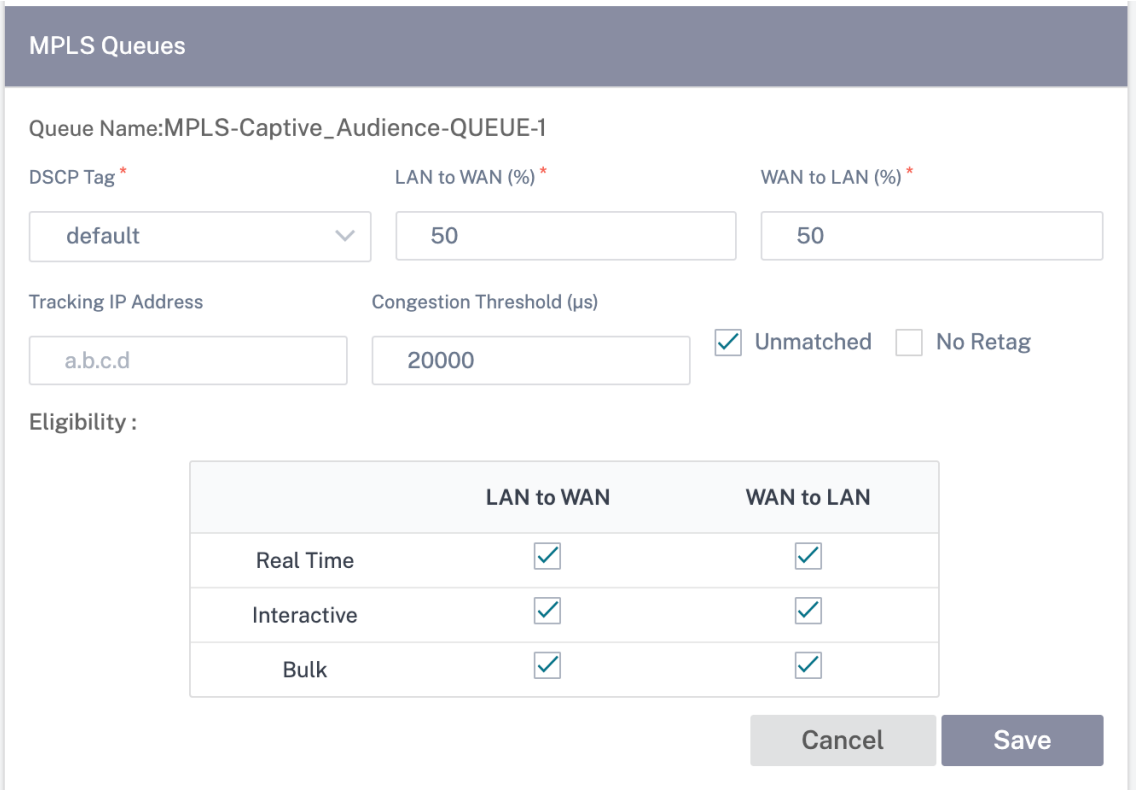

6. Enter access interface details and other required details under **WAN Links**. Save the WAN link configuration.
7. Navigate to **Configuration > Link Settings > Interlink Communication**. On the **MPLS Groups** tab, click **+ MPLS Inter-link Communication Group**.
8. If there is no one-to-one mapping based on the DSCP tag between queues at the local site and the remote site, you must map MPLS Queues to specific Autopath Groups. Inheriting an Autopath Group from the MPLS WAN Link automatically generates paths between queues with matching DSCP tags. All the MPLS links belonging to the ISPs listed under one group can talk to each other by default, through auto-creation of paths.

   Provide a name for the MPLS group, choose a DSCP tag. Click **+ MPLS Provider** and select the ISP from the drop-down list. Click **Save**.

   > **Note**
   >
   > You cannot create multiple MPLS queues using a WAN link template with the same Internet service provider name. However, you can use a different WAN link template with a different Internet service provider name, and use that template to create the site WAN link.

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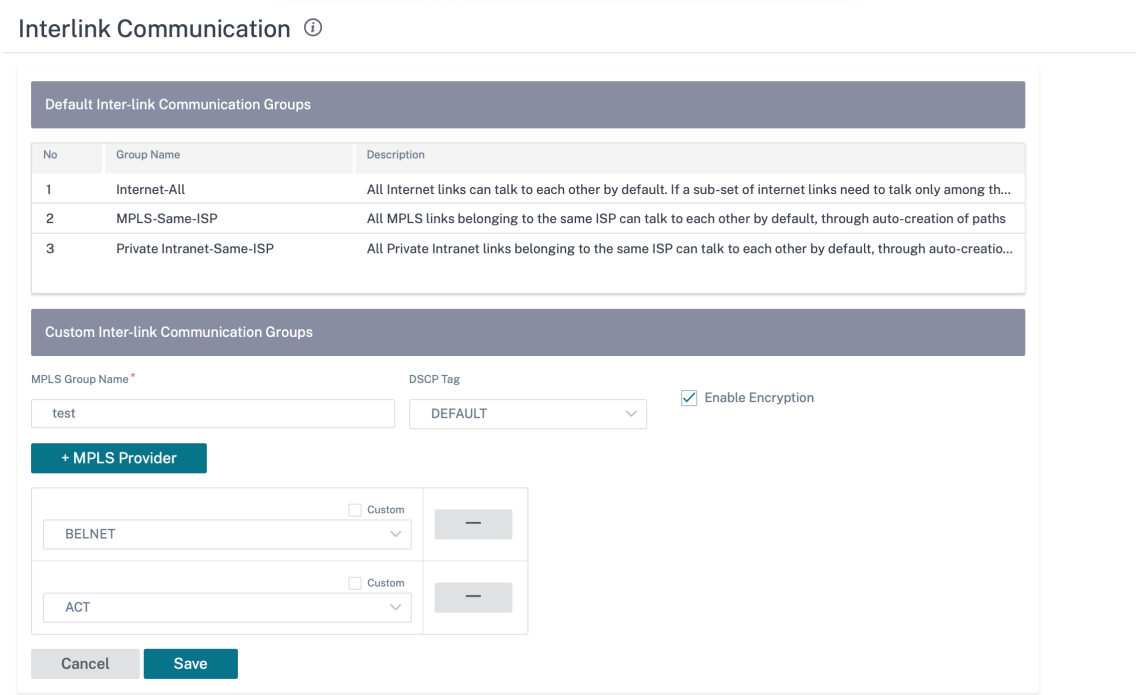

QoS fairness (RED)

September 27, 2025

The QoS fairness feature improves the fairness of multiple virtual path flows by using QoS classes and Random Early Detection (RED). A virtual path can be assigned to one of 16 different classes. A class can be one of three basic types:

- Real-time classes serve traffic flows that demand prompt service up to a certain bandwidth limit. Low latency is preferred over aggregate throughput.
- Interactive classes have lower priority than real-time but have absolute priority over bulk traffic.
- Bulk classes get what is left over from real-time and interactive classes, because latency is less important for bulk traffic.

Users specify different bandwidth requirements for different classes, which enable the virtual path scheduler to arbitrate competing bandwidth requests from multiple classes of the same type. The scheduler uses the Hierarchical Fair Service Curve (HFSC) algorithm to achieve fairness among the classes.

HFSC services classes in first-in, first-out (FIFO) order. Before scheduling packets, Citrix SD-WAN™ examines the amount of traffic pending for the packets class. When excessive traffic is pending, the packets are dropped instead of being put into the queue (tail dropping).

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Why does TCP cause queuing?

TCP cannot control how quickly the network can transmit data. To control bandwidth, TCP implements the concept of a bandwidth window, which is the amount of unacknowledged traffic that it allows in the network. It initially starts with a small window and doubles the size of that window whenever acknowledgments are received. This is called the slow start or exponential growth phase.

TCP identifies network congestion by detecting dropped packets. If the TCP stack sends a burst of packets that introduce a 250 ms delay, TCP does not detect congestion if none of the packets are discarded, so it continues to increase the size of the window. It might continue to do so until the wait time reaches 600–800 ms.

When TCP is not in the slow start mode, it reduces the bandwidth by half when packet loss is detected, and increases the allowed bandwidth by one packet for each acknowledgment received. TCP therefore alternates between putting upward pressure on the bandwidth and backing off. Unfortunately, if the wait time reaches 800 ms by the time packet loss is detected, the bandwidth reduction causes a transmission delay.

Impact on QoS fairness

When TCP transmission delay occurs, providing any kind of fairness guarantee within a virtual-path class is difficult. The virtual path scheduler must apply tail-drop behavior to avoid holding enormous amounts of traffic. The nature of TCP connections is such that a small number of traffic flows to fill the virtual path, making it difficult for a new TCP connection to achieve a fair share of the bandwidth. Sharing bandwidth fairly requires making sure that bandwidth is available for new packets to be transmitted.

Random Early Detection

Random Early Detection (RED) prevents traffic queues from filling up and causing tail-drop actions. It prevents needless queuing by the virtual path scheduler, without affecting the throughput that a TCP connection can achieve.

How to use RED

1. Start a TCP session to create the virtual path. Verify that with RED enabled, the wait time on that class stays at around 50 ms in the steady state.
2. Start a second TCP session and verify that both the TCP sessions share the virtual path bandwidth evenly. Verify that the wait time on the class stays at the steady state.
3. Verify that RED is enabled for a rule in SD-WAN Orchestrator Service.

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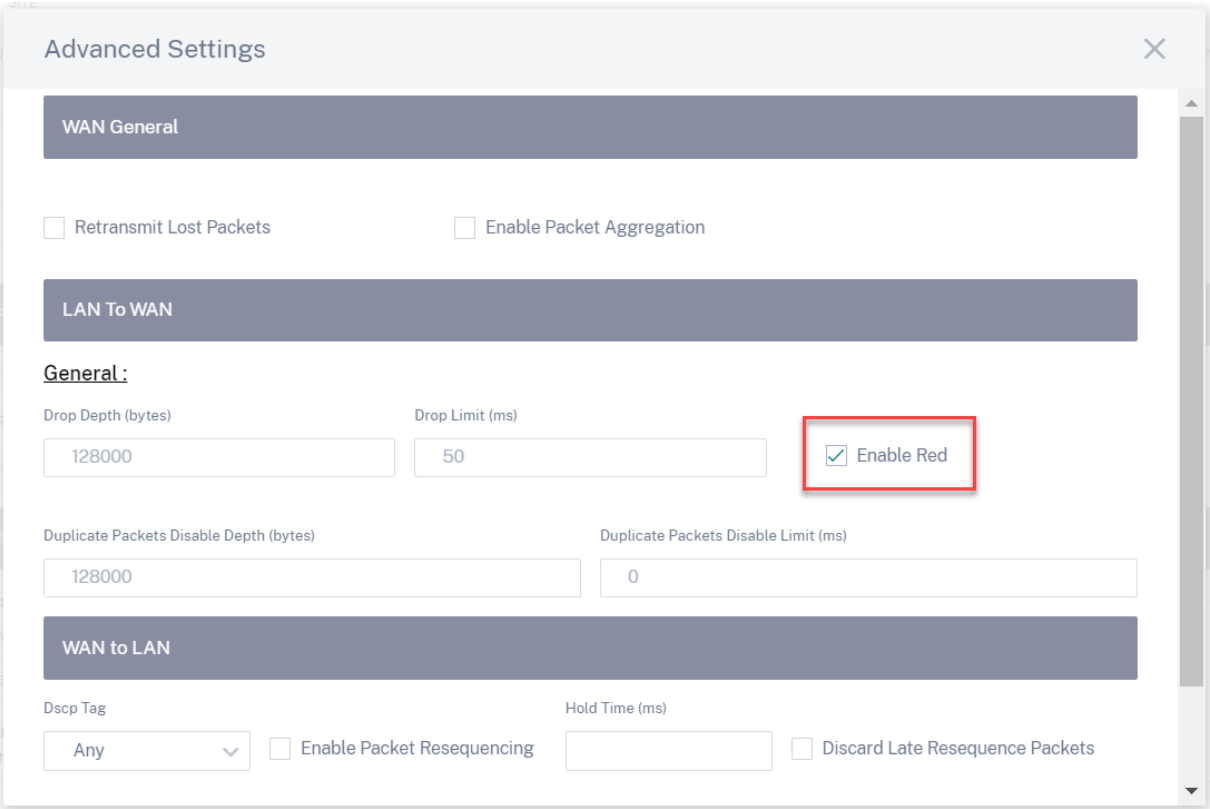
How to enable RED

At the network level, navigate to **Configuration** > **QoS** > **QoS Policies**. Add a rule and navigate to **Advanced Settings** > **LAN to WAN** and select **Enable RED**.



QoS policies

September 27, 2025

An administrator can define application and traffic policies. These policies help to enable traffic steering, Quality of Service (QoS), and filtering capabilities for applications. Specify whether a defined rule can be applied globally across all the sites in the network or on certain specific sites.

Policies are defined in the form of multiple rules which get applied in the user-defined order.

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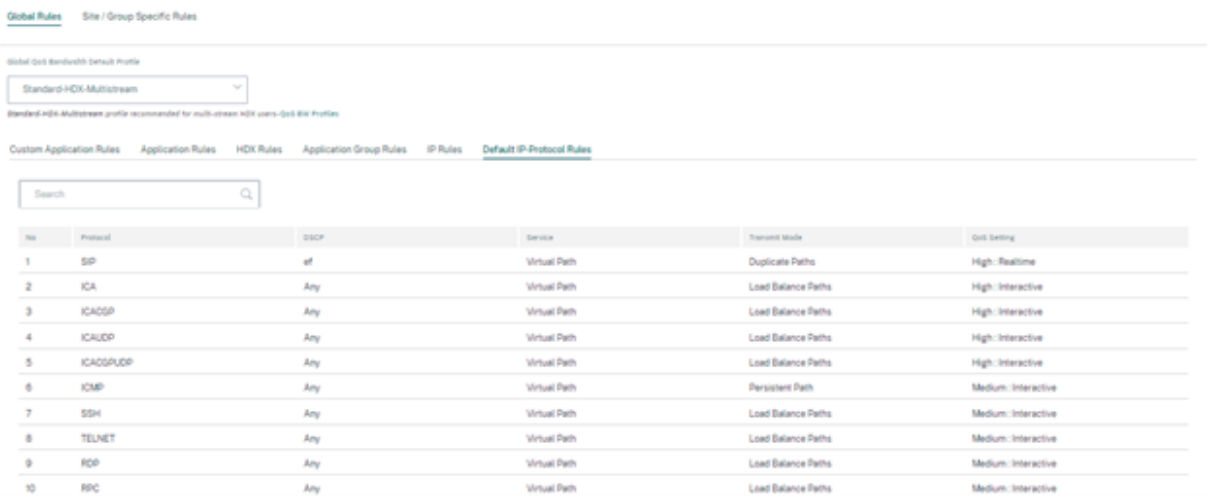

Create new rule

An administrator must place the defined rule based on the priority. The priorities are categorized based on parameters such as top of the list, bottom of the list, or a specific row.

It is recommended to have **more specific** rules for applications or sub applications at the top, followed by **less specific** rules for the ones representing broader traffic.

For example, you can create specific rules for both Facebook Messenger (sub application) and Facebook (application). Put a Facebook Messenger rule on top of the Facebook rule so that the Facebook Messenger rule gets selected. If the order is reversed, Facebook Messenger being a subapplication of the Facebook application, the Facebook Messenger rule would not get selected. It is important to get the order right.

Match criteria

Select traffic for a defined rule such as:

- An application
- Custom defined application
- Group of applications or IP protocol based rule

Rule scope

Specify whether a defined rule can be applied globally across all the sites in the network or on certain specific sites.

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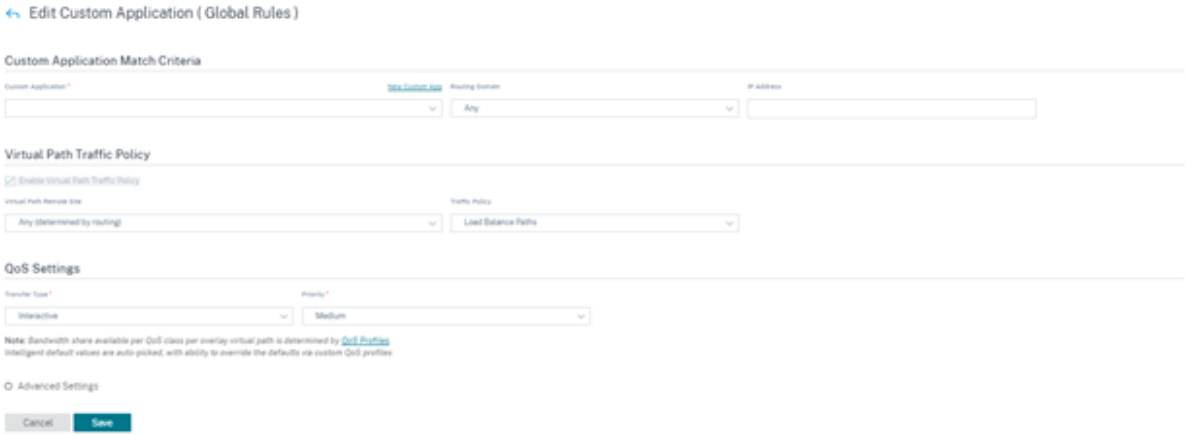
Application steering

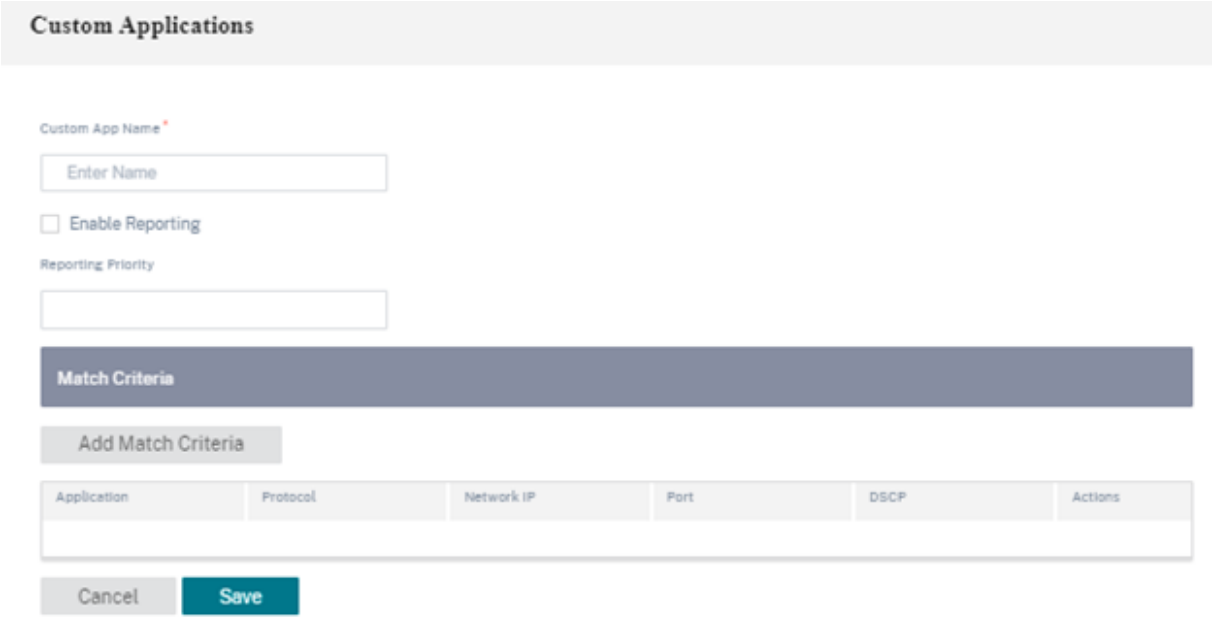
Navigate to **Configuration** > **QoS** > **Custom Application Rules**. Specify how the traffic needs to be steered.



New Custom App: Select a match criterion from the list. The administrator can add a new custom application by giving a name to:

- Custom application
- Protocol (TCP, UDP, ICMP)
- Network IP/Prefix
- Port
- DSCP tag

You can also create a domain name based custom application.



Click **Verify Configuration** on the **Configuration** > **QoS Policies** page to validate any audit error.

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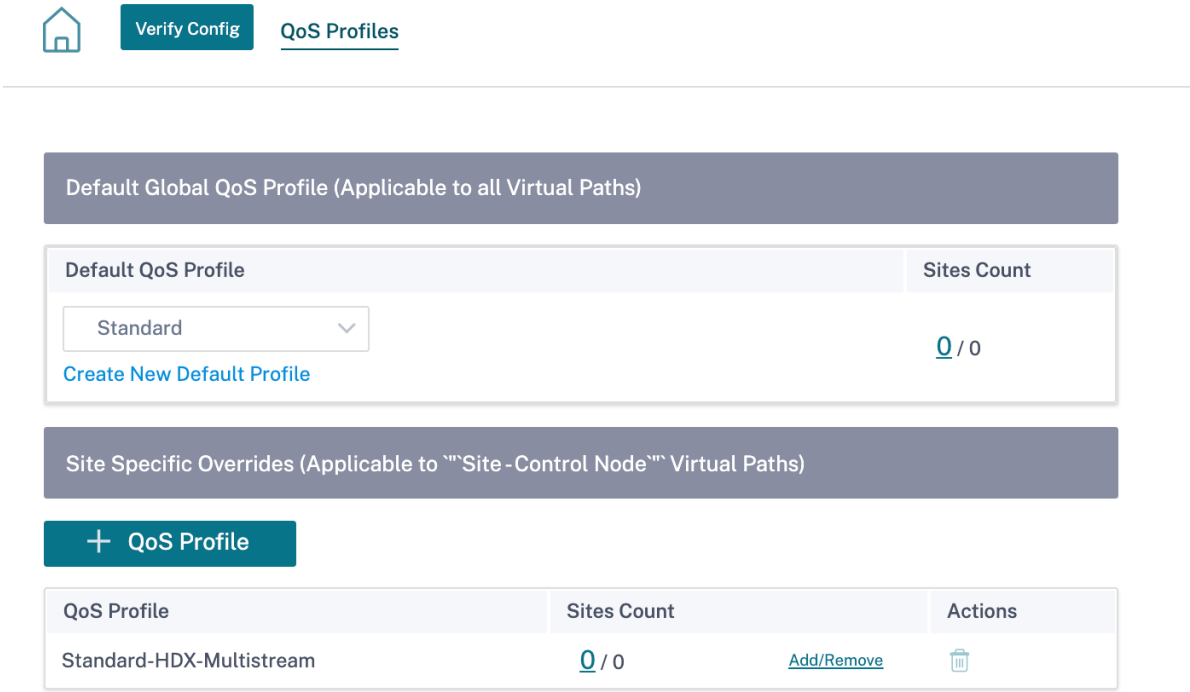
IP Rules **IP Rules** help you to create rules for your network and take certain Quality of Service (QoS) decisions based on the rules. For more information on IP rules, see IP rules.

QoS profiles

The Quality of Service (QoS) section helps to create the QoS profile by using the **+ QoS Profile** option. The QoS profile provides improved service to certain traffic. The goal of QoS is to provide priority including traffic type (Real-time, Interactive, and Bulk classes) and dedicated bandwidth. The bandwidth breakups are available in % values. This also improved loss characteristics.



Click **Verify Configuration** on the **Configuration** > **QoS Policies** page to validate any audit error.

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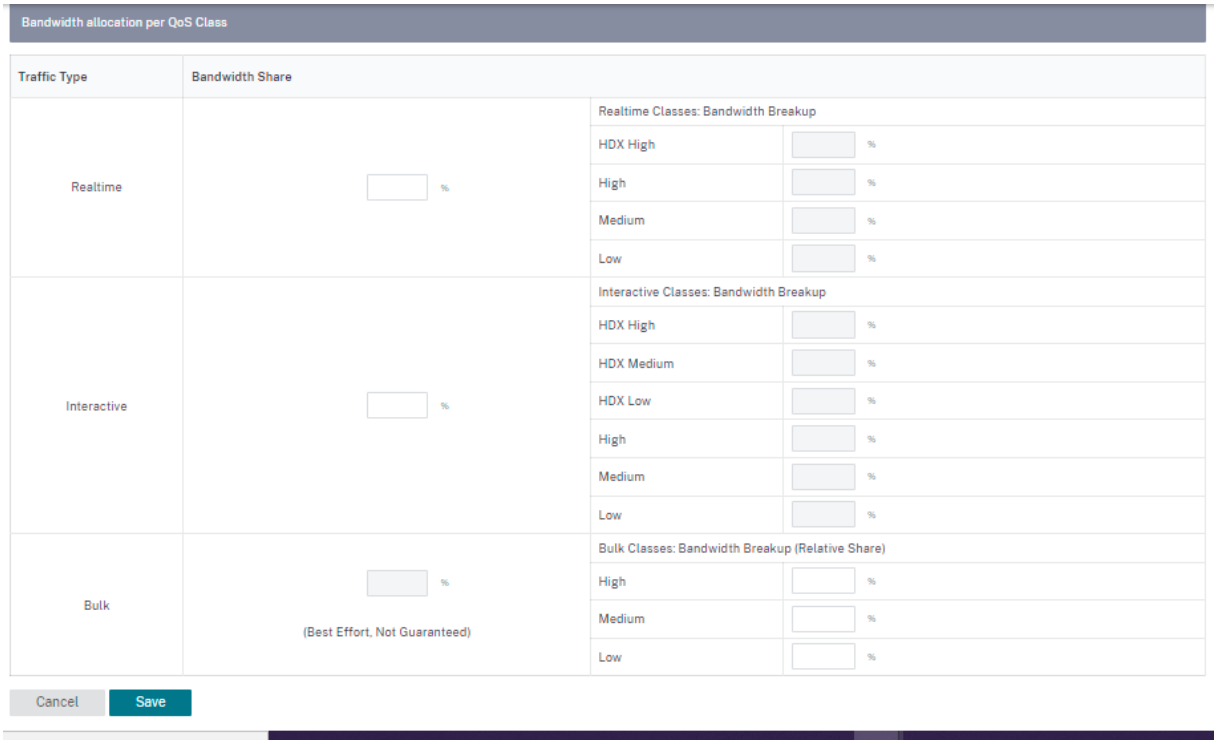
Customizing QoS profiles

If the virtual path default sets are in use, classes can be modified under **Configuration** > **QoS** > **QoS Profiles**. Click **Create New Default Profile**, enter a name for the default set, select the sites, and update the bandwidth allocation for the QoS class. Click **Save**. For more information about Classes, see Classes.



HDX™ QoE

September 27, 2025

Network parameters such as latency, jitter, and packet drop affect the user experience of HDX users. Quality of Experience (QoE) helps the users to understand and check their ICA® quality of experience. QoE is a calculated index, which indicates the ICA traffic performance. The users can tune the rules and policy to improve the QoE.

The QoE is a numeric value between 0–100, the higher the value the better the user experience.

The parameters used to calculate QoE are measured between the two Citrix SD-WAN™ appliances located at the client and server side and not measured between the client or the server appliances themselves. Latency, jitter, and packet drop are measured at the flow level and it can be different from the statistics at the link level. The end host (client or server) application might never know that there is

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a packet loss on the WAN. If the retransmit succeeds, the flow level packet loss rate is lower than the link level loss. However, as a result, it might increase latency and jitter a bit.

You can view a graphical representation of the overall quality of HDX applications in the HDX dashboard on Citrix SD-WAN Orchestrator™ service. The HDX applications are classified into the following three quality categories:

Quality	QoE Range
Good	71-100
Fair	51-70
Poor	0-50

Depending on the selected UI page, a list of the bottom (least QoE) five sites, five users, five sessions, or all of them are displayed in the HDX dashboard.

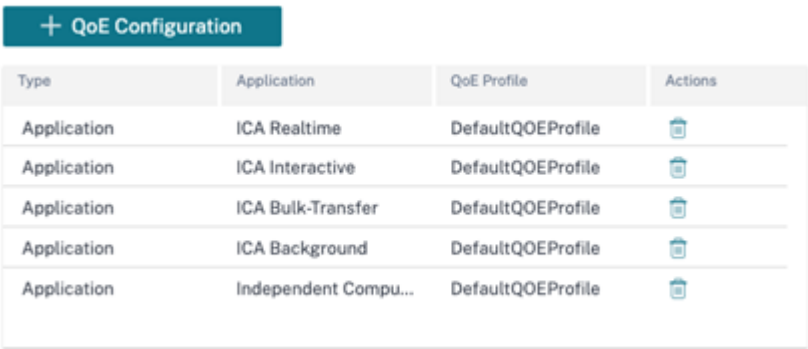
A graphical representation of the QoE for different time intervals allows you to monitor the performance of HDX applications at each site.

Configure HDX QoE

To configure HDX QoE:

1. At the network level, navigate to **Configuration > App Settings & Groups > App Quality Config** and click **+ QoE Configuration**. Add the following applications using the QoE profile that you want to use for the calculation of HDX behavior:

    - ICA Real-time (ica_priority_0)
    - ICA Interactive (ica_priority_1)
    - ICA Bulk-Transfer (ica_priority_2)
    - ICA Background (ica_priority_3)
    - Independent Computing Architecture (Citrix®)(ICA)



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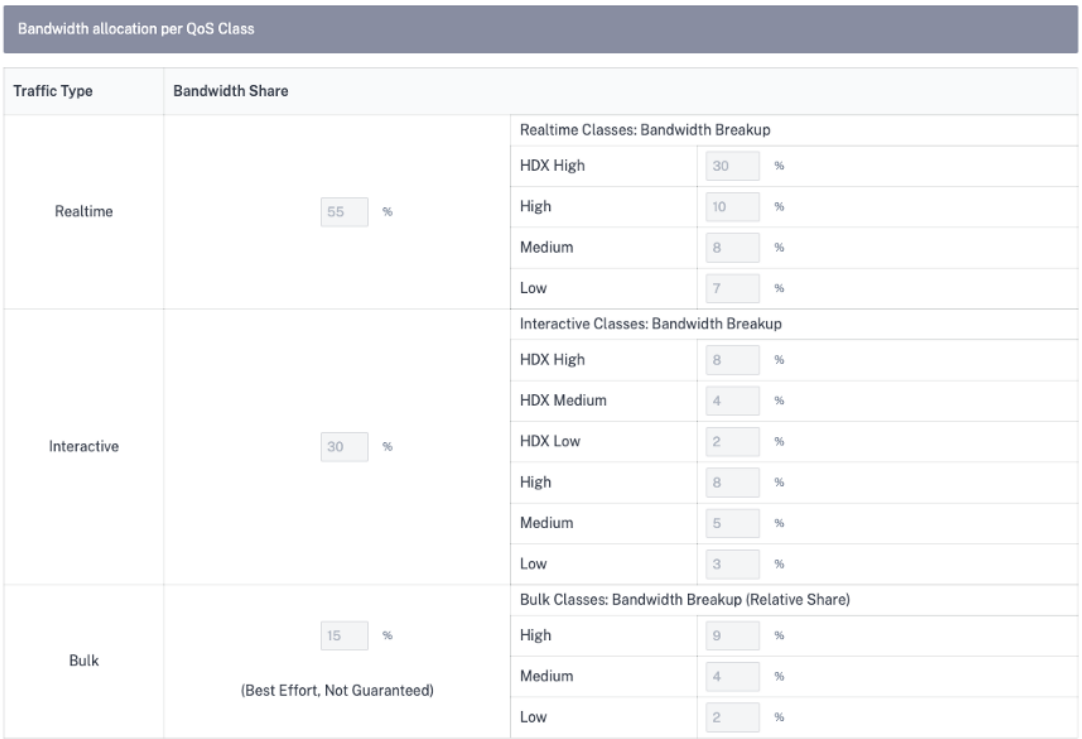
These configurations provide the parameters to measure HDX performance used in HDX report through the profile. Configuration of ICA Real-time, ICA Interactive, ICA Bulk-Transfer, ICA Background are required for HDX Multi-Stream (MSI) connections, Independent Computing Architecture (Citrix) is required for Single Stream (SSI) connections.

2. Navigate to **Configuration > QoS > QoS Profiles** and provide a name for the QoS profile. **Standard-HDX-Multistream** is the default QoS Profile selected and the **HDX Reporting** option is selected by default. Clear **HDX Reporting** if HDX reporting is not required.

In each QoS profile, there is a pre-defined bandwidth percentage for each class. They are configurable to adjust the bandwidth assigned to the classes that the HDX traffic is using.



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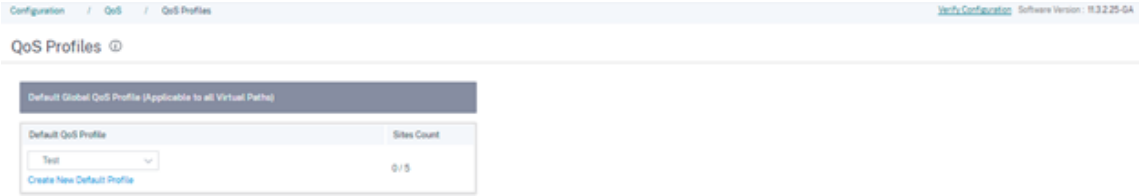
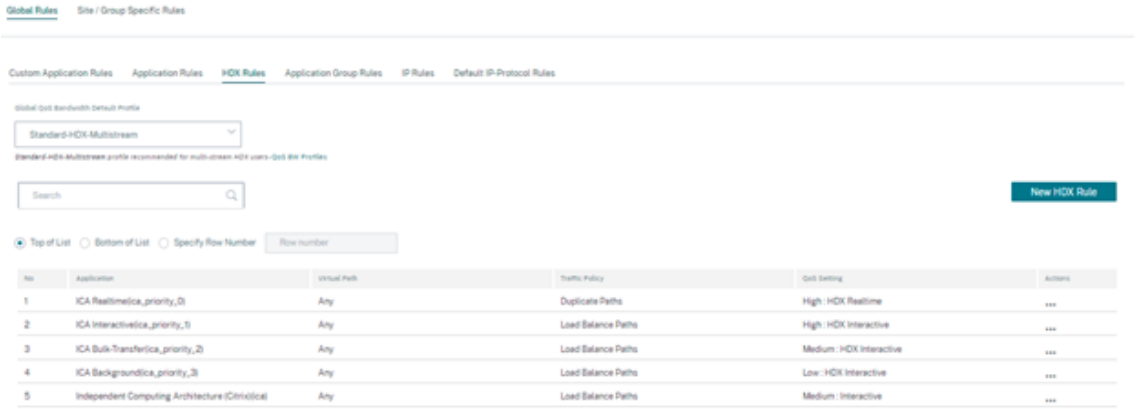
3. Ensure that the new QoS Profile is actively used by checking the **Site Count** indicator.



4. Navigate to **Configuration > QoS > QoS Policies** > **HDX Rules** and set the new QoS Profile with the enabled HDX reporting as the **Global QoS Bandwidth Default Profile**.

5. Add HDX rules. These configurations assign proper QoS settings to HDX connections. To check the rule details or edit the rules, navigate to the **Actions** column, click the horizontal ellipsis (…), and select the **Edit** option. To change the setting of any default rule, click **Clone** and make the required modification.



These configurations can be modified:

- QoS class: Real-time, Interactive, Bulk
- Traffic policy:
  - Duplicate Paths: The traffic is duplicated across multiple paths to increase reliability.
  - Persistent Path: The traffic of a flow remains on the same path, unless the path becomes unavailable.
  - Load Balance Paths: The traffic of a flow is balanced across multiple paths.
  - Advanced Settings: Set policies retransmission, RED, and late packets.

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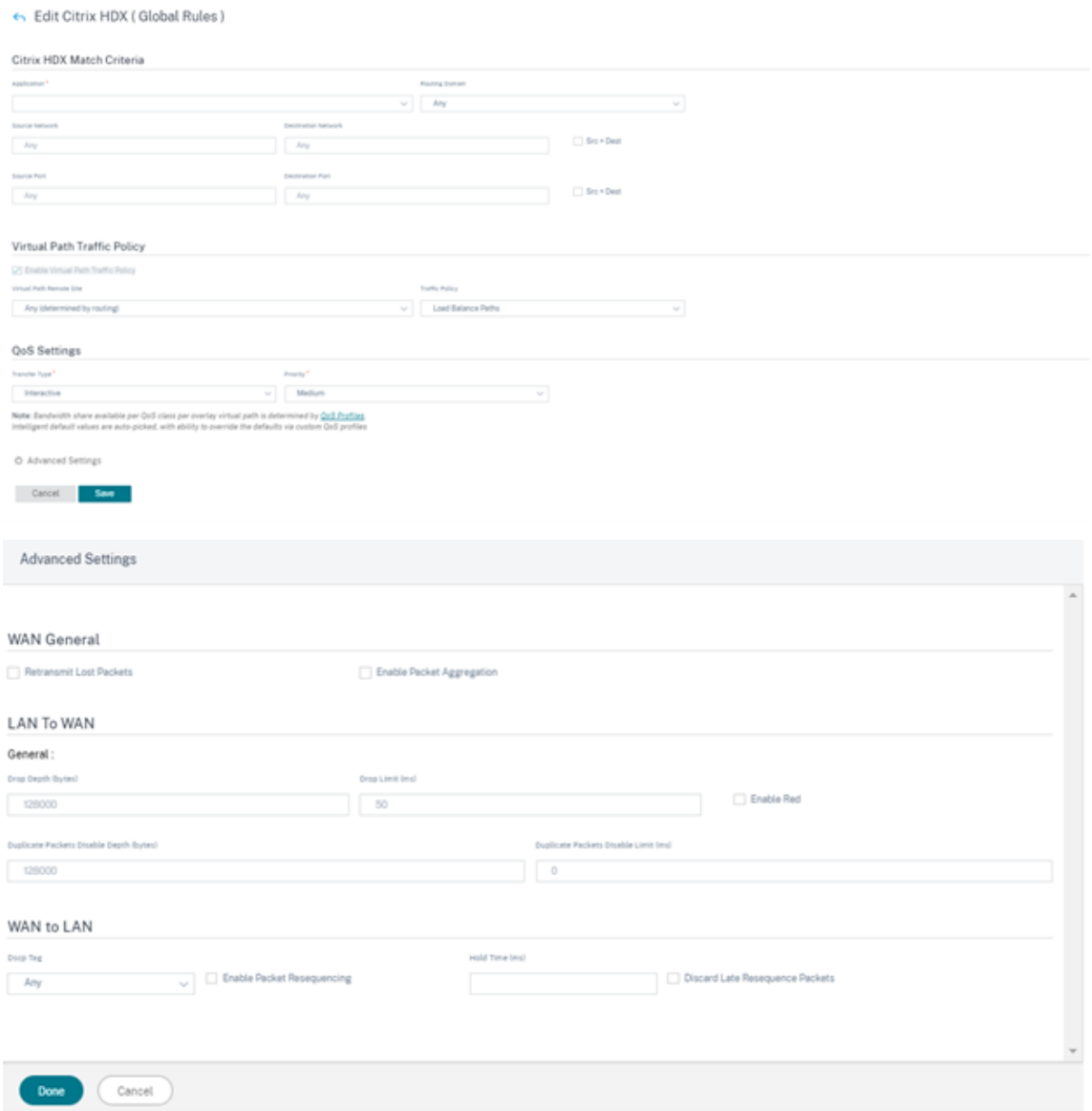

> **Note**
>
> For more information about Classes, see Classes.

HDX dashboard and reports

Citrix SD-WAN Orchestrator service provides the HDX dashboard for up-to-date, detailed measurements of Citrix Virtual Applications and Desktops user experience across the network, for each site, user, and session.

There are two types of HDX sessions –single-stream and multi-stream. A single-stream session has only one connection in the session, whereas a multi-stream session has four. Multi-stream sessions allow for more advanced QoS. The connection in a single-stream HDX session defaults to interactive

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class, while the top priority connection of a multi-stream HDX session defaults to real-time class and the other three to interactive class. This is configurable.

The Quality of Experience (QoE) score is a numeric value between 0–100. The higher the value the better the user experience. Real-time class traffic QoE is calculated based on jitter, latency, and loss rate. The interactive class QoE is calculated based on burst rate and loss rate. The QoE of a session is the average across all the connections in the session. The QoE of a user is the average of all the sessions launched by that user. The QoE of a site is the average of all the sessions on that site.

All the statistics are metrics:

- For HDX traffic on that site
- Experienced by that user
- Of all the connections in that session

They do not include the metrics of other types of traffic. The metrics are either the average across the selected period, or the total across the selected period.

> **Note**
>
> HDX reporting requires minimum software versions:
>
> - Citrix Virtual Apps and Desktops™ 7–1912 LTSR (or Current Release)
> - Citrix Workspace app for Windows 19.12 LTSR (or Current Release)
> - SD-WAN 11.2.0 (or current version)

Citrix always recommends using the latest software version to get the latest bug fixes and enhancements. For instance, SD-WAN requires release 11.2.3 or 11.3.1 to have support for new EDT commands introduce in later versions of Citrix Virtual Apps and Desktops LTSR.

Mac clients and Linux clients do not have full support for multi-stream ICA and HDX reporting through Citrix SD-WAN. For instance, Linux clients support multi-stream, however lack detail such as round-trip time and delay. The CWA feature matrix provides insight into which Operating Systems support the **Multiport ICA** and **HDX Insight with NSAP VC** features.

Users need to access HDX outside of Citrix Gateway encryption, either through direct access to StoreFront or usage of Beacon Points or the Network Location Service.

Sites

This HDX report provides detailed HDX data per site. To view the site statistics, navigate to **Report > HDX > Sites**.

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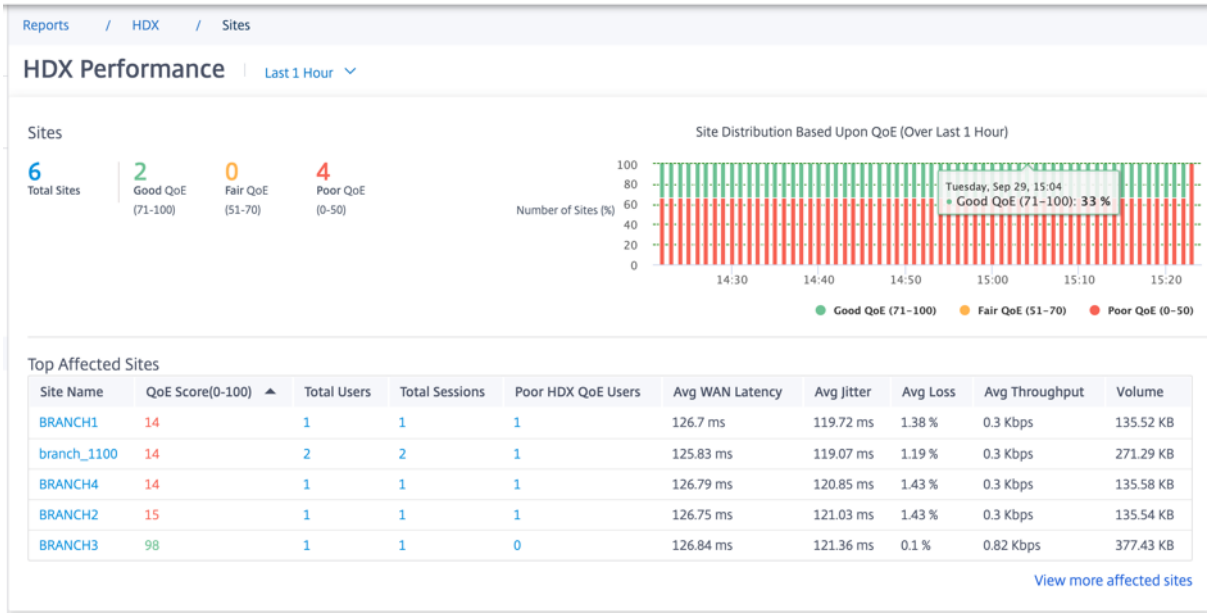

The dashboard reports on site with HDX traffic running during the selected time interval (for example, last 5 minutes, last 30 minutes, last 1 day, last 1 month, and so on). Site performance is categorized as good (71-100), fair (51-70), or poor (0-50) based on the QoE of the site's HDX traffic. The QoE value in the summary section and the **Top Affected Sites** table is the average value across the selected time. The time series graphic report shows detailed history with time lapse. Each bar shows the percentage of good, fair, and poor QoE sites at that time.

You can also view the number of sites in percentage, having Good, Fair, and Poor QoE at that time under the **Site Distribution Based Upon QoE** graph. Hover your mouse to the color bar to see the percentage number of sites in a good/fair/poor state.

> **NOTE**
>
> - The statistics are collected in one direction, from the remote side into the current site. For example, for a session between site-A and site-B, the report of site-A is collected on traffic coming from site-B into site-A, whereas the report of site-B is collected on traffic coming from site-A into site-B. Therefore, the statistics of the same session on site-A and site-B can be different.
> - The **Top Affected Sites** table reflects only the top 5 most affected sites. By default, it shows the 5 sites with the lowest QoE scores. But each column is sortable, ascending, or descending, and used as a query criterion. For example, clicking the **Avg Jitter** column title toggles showing either the 5 sites with the lowest average jitter or the highest average jitter. Same for other columns. To see the details of all the sites with HDX traffic during the selected time period, click **View more affected sites**.

The following are the details of each site:

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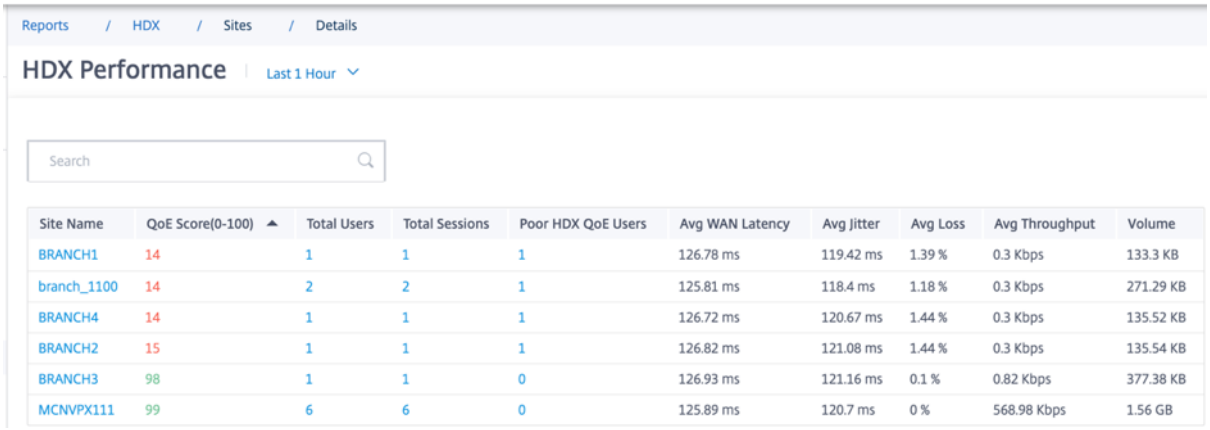
- **Site Name**: The site name.
- **QoE Score (0-100)**: The average QoE score of this site.
- **Total Users**: The total number of active HDX users seen on the site during the selected period.
- **Total Sessions**: The total number of HDX sessions seen on the site during the selected period, including both single-stream and multi-stream sessions.
- **Poor HDX QoE Users**: The number of HDX users suffering from poor QoE (below 50).
- **Avg WAN Latency**: Average latency over the WAN, from the remote site to this site.
- **Avg Jitter**: The average jitter value for the selected duration.
- **Avg Loss**: The average packet loss percentage value for the selected duration.
- **Avg Throughput**: The average data throughput value for the selected duration.
- **Volume**: The total traffic volume seen on this site. The Citrix SD-WAN Orchestrator service GUI might adjust and change the unit based on the number value.

Clicking any column title shows the report sorted on that column. Click **View more affected sites** to see the reports of all sites. Clicking any single row shows the detailed report for that site.

The table in the following screenshot is an example report showing all the sites. It has the same columns as the **Top Affected Sites** table. You can search for any site using the search bar.



Site Name	QoE Score(0-100)	Total Users	Total Sessions	Poor HDX QoE Users	Avg WAN Latency	Avg Jitter	Avg Loss	Avg Throughput	Volume
BRANCH1	14	1	1	1	126.78 ms	119.42 ms	1.39 %	0.3 Kbps	133.3 KB
branch_1100	14	2	2	1	125.81 ms	118.4 ms	1.18 %	0.3 Kbps	271.29 KB
BRANCH4	14	1	1	1	126.72 ms	120.67 ms	1.44 %	0.3 Kbps	135.52 KB
BRANCH2	15	1	1	1	126.82 ms	121.08 ms	1.44 %	0.3 Kbps	135.54 KB
BRANCH3	98	1	1	0	126.93 ms	121.16 ms	0.1 %	0.82 Kbps	377.38 KB
MCNVPX111	99	6	6	0	125.89 ms	120.7 ms	0 %	568.98 Kbps	1.56 GB

Click the individual site row to view a graphical representation of the performance metrics. Hovering the mouse over the graphic provides more details.

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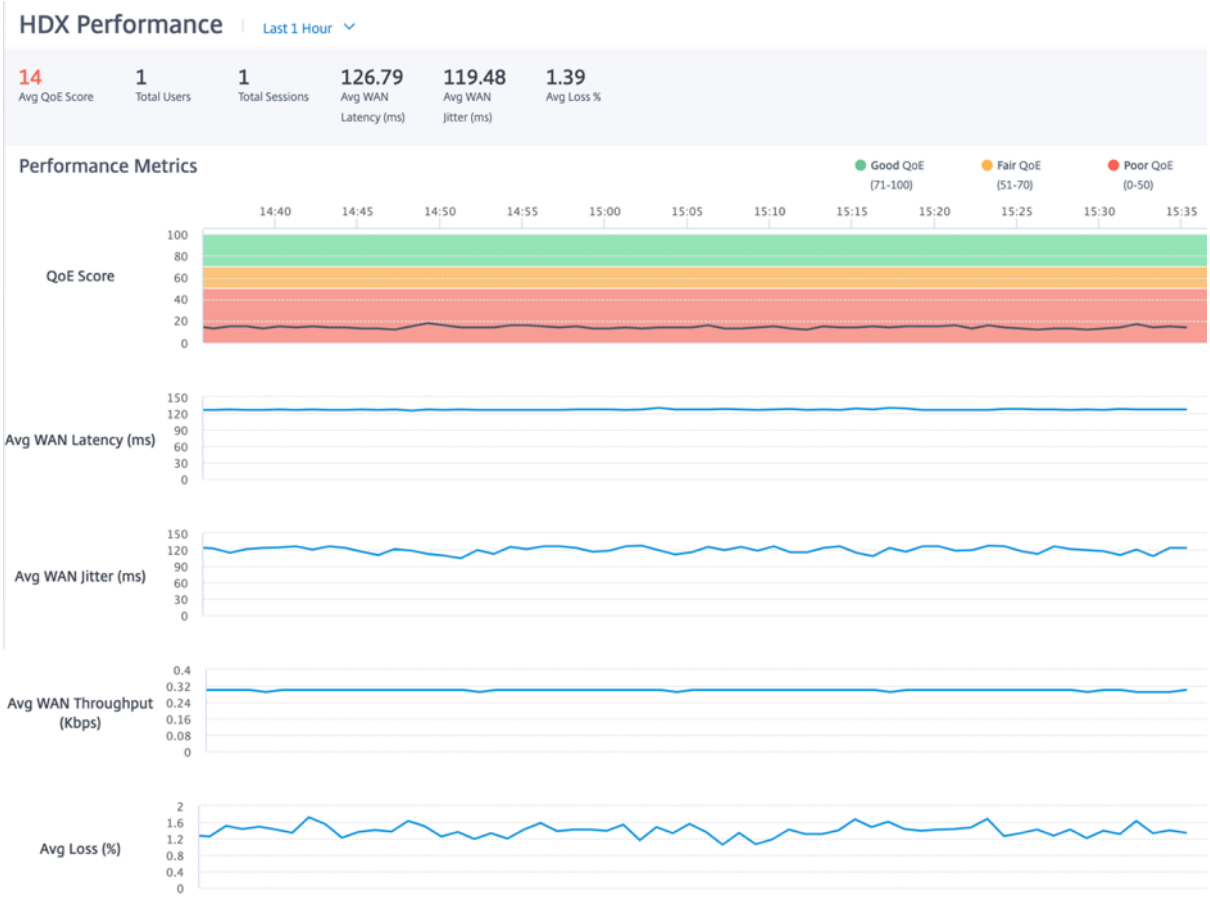
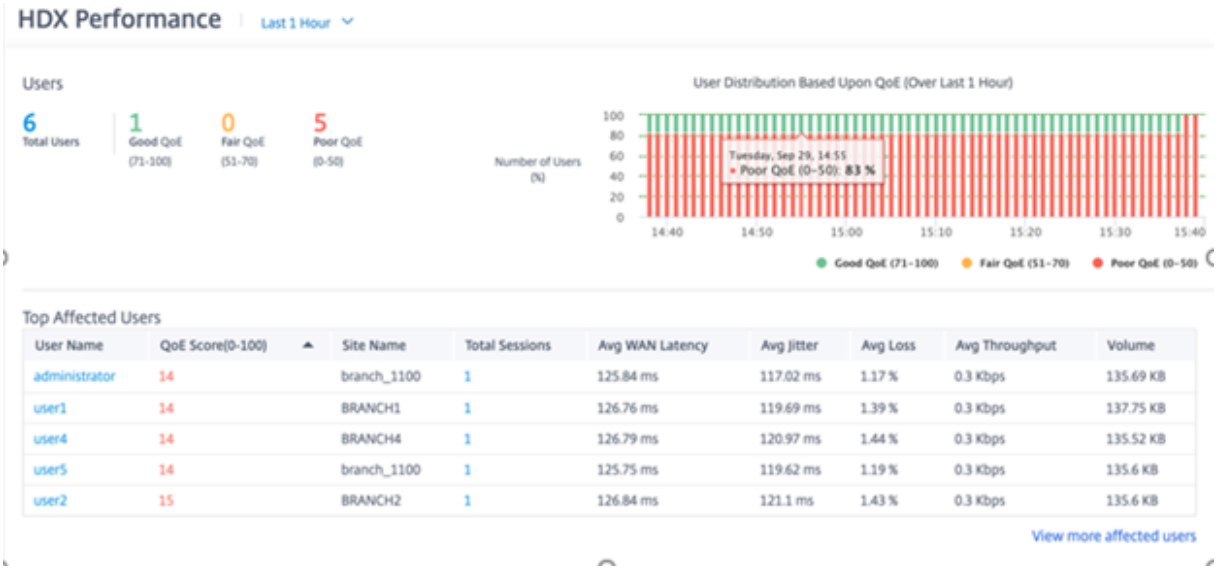


Users

To view the HDX users report, navigate to **Reports > HDX > Users**.



The user report shows the performance experienced by each user during the selected period (for ex-

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ample, last 5 minutes, last 30 minutes, last 1 day, last 1 month, and so on). If the user has been on multiple sites during the selected period, the last site the user logged in from is shown in the report. User experience is categorized as good (71-100), fair (51-70), or poor (0-50) based on the QoE score of their HDX traffic. The QoE values in the summary section and the **Top Affected Users** table are the average values across the selected time period. The time series graphic report shows detailed history with time lapse. Each bar shows the percentage of users with good, fair, and poor QoE at that time.

You can also view the number of users in percentage, having Good, Fair, and Poor QoE at that time under the **User Distribution Based Upon QoE** graph. Hover your mouse to the color bar to see the percentage number of users in good/fair/poor state.

Personally Identifiable Information Currently, the HDX QoE reports have the following two Personally Identifiable Information (PII) fields:

- **User Name**: Displays the user name.
- **IP Address**: Displays the client IP address.

> **NOTE**
>
> - When the user name is not available, the IP address is displayed in the **User Name** field.
> - The HDX user reports are based on statistics from the client side SD-WAN, not the Virtual Delivery Agent (VDA) side SD-WAN. This reflects the end user's HDX experience.
> - The **Top Affected Users** table reflects only the top 5 most affected users. By default, it shows the top 5 users with the lowest QoE. But each column is sortable, ascending, or descending, and used as a query criterion. For example, clicking the **Avg Jitter** column title toggles displaying either the 5 users with the lowest average jitter or the highest average jitter. To see the details of all the users that have HDX traffic during the selected time period, click **View more affected users**.

The following are the details of each user:

- **User Name**: The user name.
- **QoE Score (0-100)**: The average QoE score of this user.
- **Site Name**: The site name that the user logged in from.
- **Total Sessions**: The total number of active HDX sessions from that user, including both single-stream and multi-stream sessions.
- **Avg WAN Latency**: Average latency over the WAN, experienced at the client side.
- **Avg Jitter**: The average jitter value for the selected duration.
- **Avg Loss**: The average packet loss percentage value for the selected duration.
- **Avg Throughput**: The average data throughput value for the selected duration.
- **Volume**: The total traffic volume used by this user. The Citrix SD-WAN Orchestrator service GUI might adjust and change the unit based on the number value.

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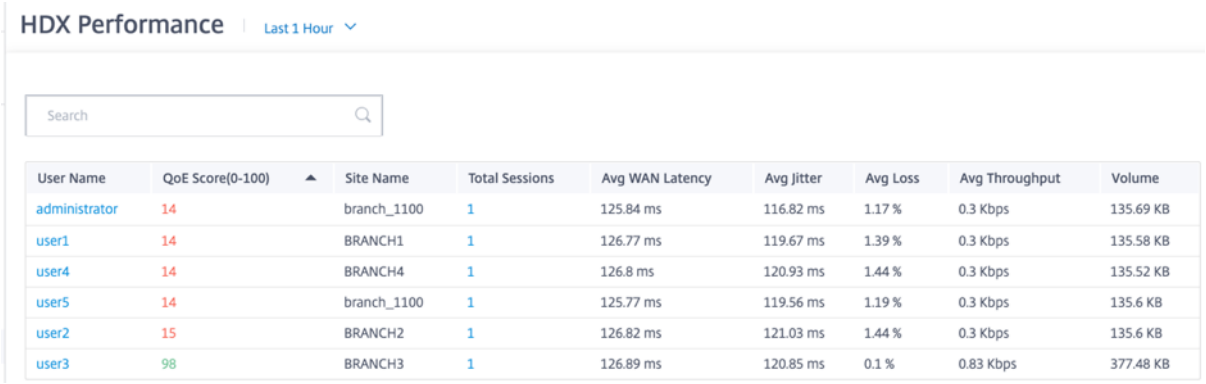
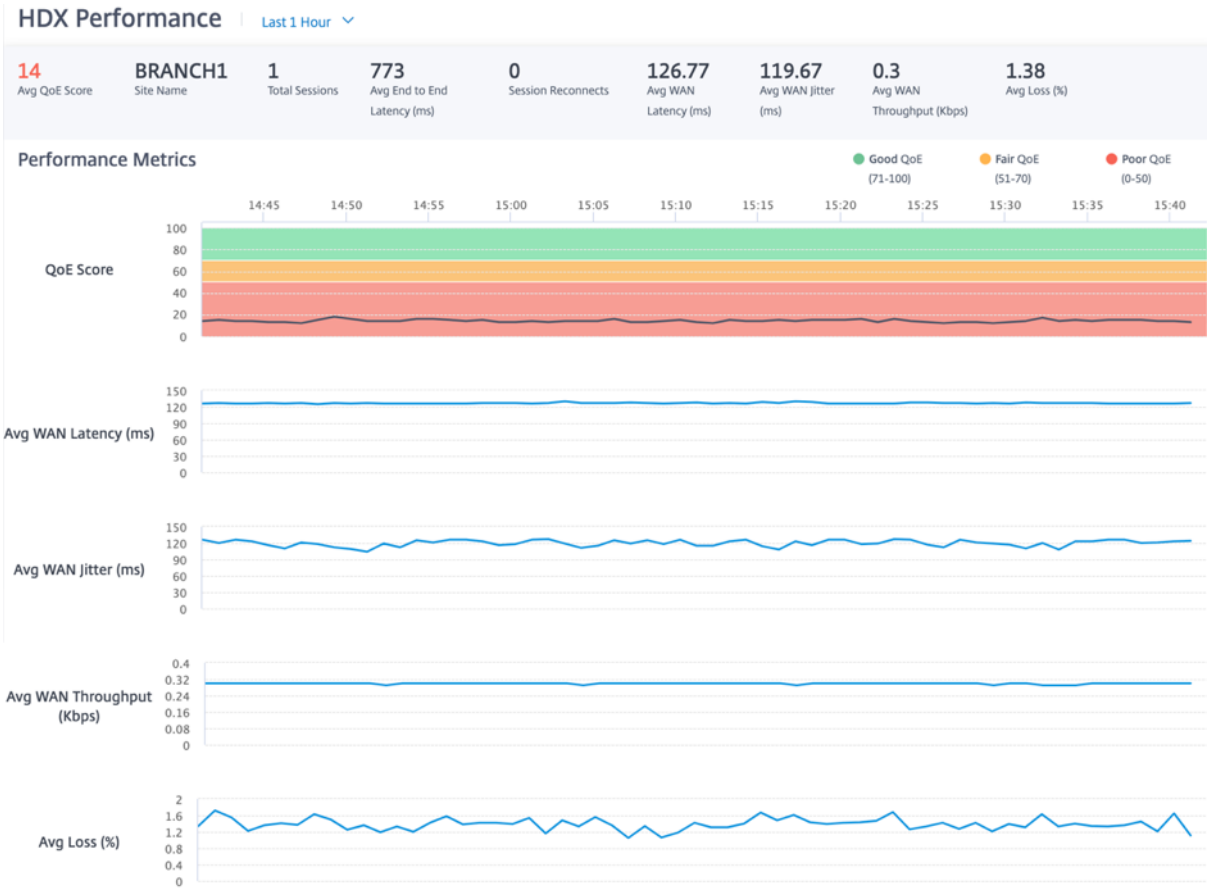
Clicking any column title shows the report sorted on that column. Click **View more affected users** to see the reports of all users. Clicking any single row shows the detailed report for that user.

The following screenshot is an example report table showing all the users. It has the same columns as the **Top Affected Users** table. You can search for any site using the search bar.



User Name	QoE Score(0-100)	Site Name	Total Sessions	Avg WAN Latency	Avg Jitter	Avg Loss	Avg Throughput	Volume
administrator	14	branch_1100	1	125.84 ms	116.82 ms	1.17 %	0.3 Kbps	135.69 KB
user1	14	BRANCH1	1	126.77 ms	119.67 ms	1.39 %	0.3 Kbps	135.58 KB
user4	14	BRANCH4	1	126.8 ms	120.93 ms	1.44 %	0.3 Kbps	135.52 KB
user5	14	branch_1100	1	125.77 ms	119.56 ms	1.19 %	0.3 Kbps	135.6 KB
user2	15	BRANCH2	1	126.82 ms	121.03 ms	1.44 %	0.3 Kbps	135.6 KB
user3	98	BRANCH3	1	126.89 ms	120.85 ms	0.1 %	0.83 Kbps	377.48 KB

Click an individual user row to see a graphical representation of that user's performance metrics.



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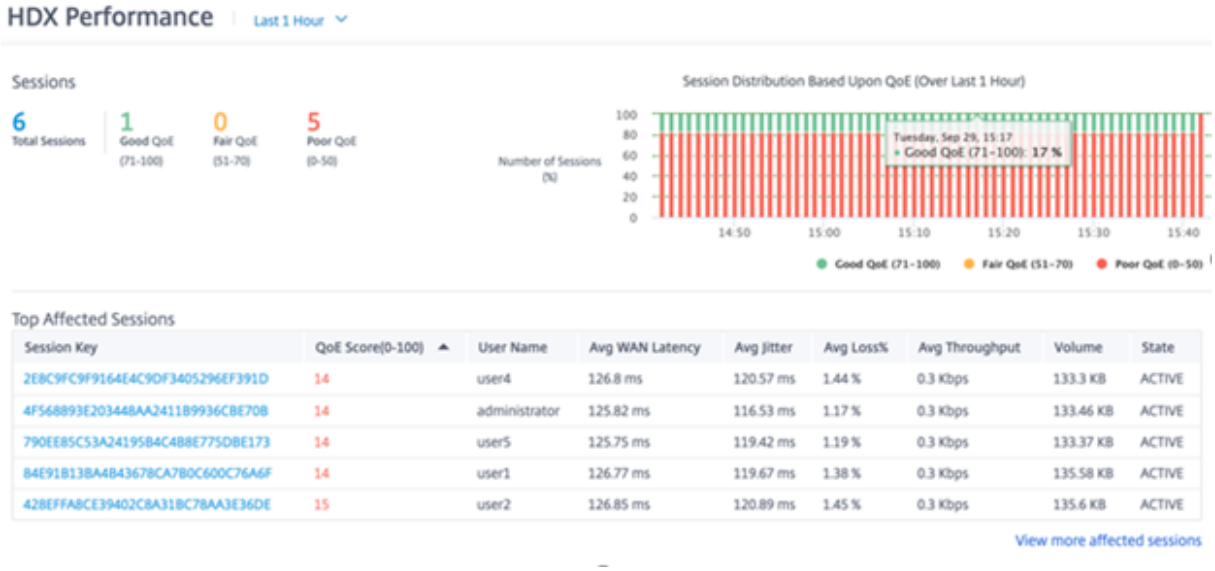
Sessions

The Session report provides details at the session level. To view the session report, navigate to **Reports > HDX > Sessions**.



The dashboard shows the reports of HDX sessions running during the selected period (for example, last 5 minutes, last 30 minutes, last 1 day, last 1 month, and so on). Sessions are categorized as good (71-100), fair (51-70), or poor (0-50) based on the QoE of that session. The QoE value in the summary section and the Top Affected table is the average value across the selected period. The time series graphic report shows detailed history with time lapse. Each bar shows the percentage of good, fair, and poor QoE sessions at that time.

You can also view the number of sessions in percentage, having Good, Fair, and Poor QoE at that time under the **Session Distribution Based Upon QoE** graph. Hover your mouse to the color bar to see the percentage number of sessions in good/fair/poor state.

> **Note**
>
> - The HDX session reports are based on statistics from the client side SD-WAN, not the VDA side SD-WAN. This reflects the end user's HDX experience.
> - The **Top Affected Sessions** table reflects only the top 5 most affected sessions. By default, it shows the top 5 sessions with the lowest QoE. But each column is sortable, ascending, or descending, and used as a query criterion. For example, clicking the **Avg Jitter** column title toggles showing either the 5 sessions with the lowest average jitter or the highest average jitter. To see the details of all the HDX sessions during the selected time period, click **View more affected sessions**.

The following are the Detail of the top each session:

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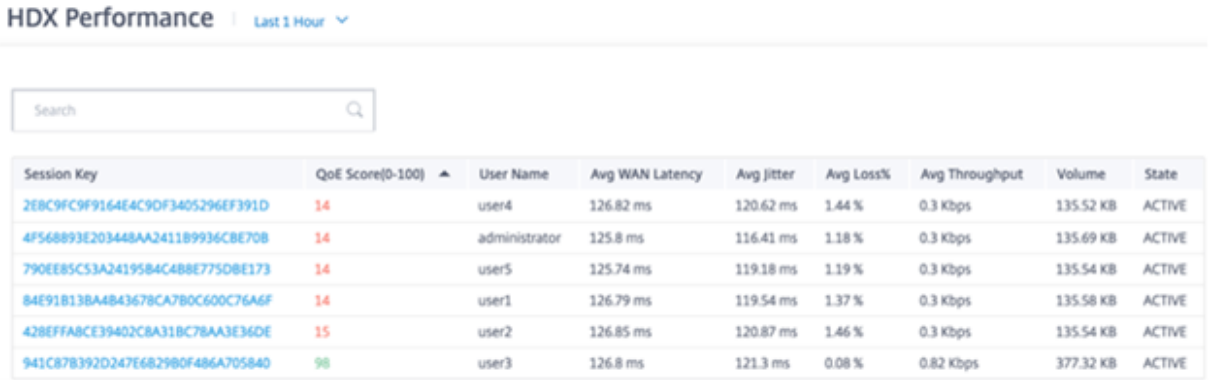
- **Session Key**: The unique identity for an HDX session.
- **QoE Score (0-100)**: The average QoE of this session.
- **User Name**: The user name.
- **Avg WAN Latency**: The average WAN latency of the session for the selected duration, measured at the client side.
- **Avg Jitter**: The average jitter value of the session for the selected duration.
- **Avg Loss %**: The average loss percentage value of the session for the selected duration.
- **Avg Throughput**: The average throughput value of the session for the selected duration.
- **Volume**: The total traffic volume used by this session. The Citrix SD-WAN Orchestrator service GUI might adjust and change the unit based on the number value.

Clicking any column title, shows the report sorted on that column. Clicking **View more affected sessions** shows the reports of all the sessions. Clicking any single row shows the detailed report on that session.

The following screenshot is an example report table showing all the sessions. It has the same columns as the **Top Affected Sessions** table.



Session Key	QoE Score(0-100)	User Name	Avg WAN Latency	Avg Jitter	Avg Loss%	Avg Throughput	Volume	State
2E8C9FC9F9164E4C9DF3405296EF391D	14	user4	126.82 ms	120.62 ms	1.44 %	0.3 Kbps	135.52 KB	ACTIVE
4F5688893E203448AA2411B9936CBE70B	14	administrator	125.8 ms	116.41 ms	1.18 %	0.3 Kbps	135.69 KB	ACTIVE
790EE85C53A24195B4C4B8E775DBE173	14	user5	125.74 ms	119.18 ms	1.19 %	0.3 Kbps	135.54 KB	ACTIVE
84E91B13BA4B43678CA7B0C600C76A6F	14	user1	126.79 ms	119.54 ms	1.37 %	0.3 Kbps	135.58 KB	ACTIVE
428EFFA8CE39402C8A31BC78AA3E36DE	15	user2	126.85 ms	120.87 ms	1.46 %	0.3 Kbps	135.54 KB	ACTIVE
941C87B392D247E6B29B0F486A705840	98	user3	126.8 ms	121.3 ms	0.08 %	0.82 Kbps	377.32 KB	ACTIVE

Click the individual session key to view a graphical representation of the performance metrics along with the details about all the variables affecting QoE.

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- **Avg QoE Score**: The average QoE over the selected period.
- **User Name**: The user who launched this session.
- **VDA Name**: Name of the VDA from which published Desktop/Application are delivered.
- **Session Duration**: The active time of this session in the selected period.
- **Site Name**: The client site of the user when the session was launched.
- **VD/VA**: Whether this session is a **Virtual Desktop** or a **Virtual Application** session.
- **Session State**: The state of the session at the end of the selected period.
- **Session Type**: Whether the session is Multi-stream session or single-stream session the last

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time the session is launched.

- **WAN Optimized**: Whether this session was WAN optimized. If the SD-WAN is PE platform, WAN Optimization is enabled for HDX, and this session is optimized, then this field shows true.
- **Session Reconnects**: If the session has been disconnected and reconnects automatically due to network issue, this field is the count of such occurrence.
- **Network Service**: This is the service name through which this session is delivered.
- **HDX End to End Latency**: Half of the value of round trip time between the VDA and the client.
- **WAN Latency**: The latency from the VDA side SD-WAN to the client side SD-WAN.

Routing

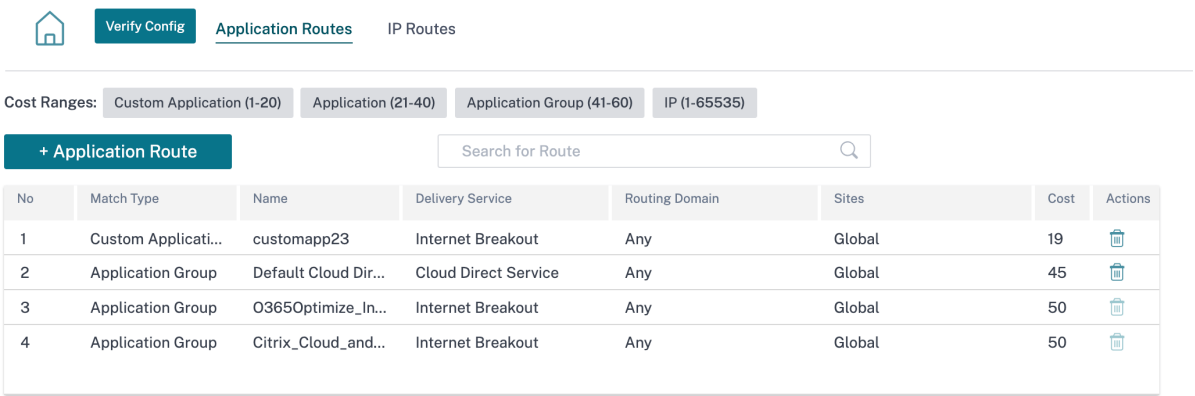
September 27, 2025

The **Routing** section provides the following options:

- Routing Policies
- Routing Domains
- Import Route Profiles
- Export Route Profiles
- Transit Nodes

Routing policies

Routing policies help to enable traffic steering. Based on the selection (Application routes and IP Routes) you can use different ways to steer traffic.



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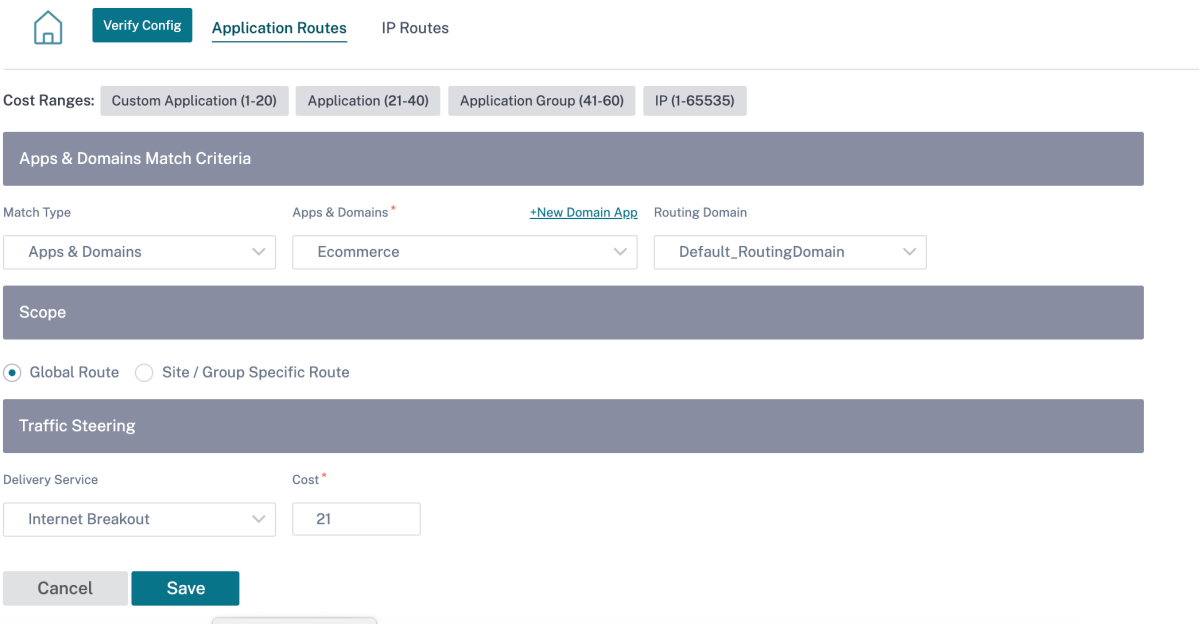
Application Routes

Click **+ Application Route** to create application route.

- **Custom Application Match Criteria**:
  - **Match Type**: Select the match type as **Application/Custom Application/Application Group** from the drop-down list.
  - **Application**: Choose one application from the list.
  - **Routing Domain**: Select a routing domain.
- **Scope**: You can scope the application route at the global level or site and group specific level.
- **Traffic Steering**;
  - **Delivery Service**: Choose one delivery service from the list.
  - **Cost**: Reflects the relative priority of each route. Lower the cost, higher the priority.
- **Eligibility Based on Path**:
  - **Add Path**: Choose a site and WAN links. If the chosen path goes down, then the application route does not receive any traffic.



If a new application route gets added, then the route cost must be in the following range:

- **Custom application**: 1–20
- **Application**: 21–40
- **Application group**: 41–60

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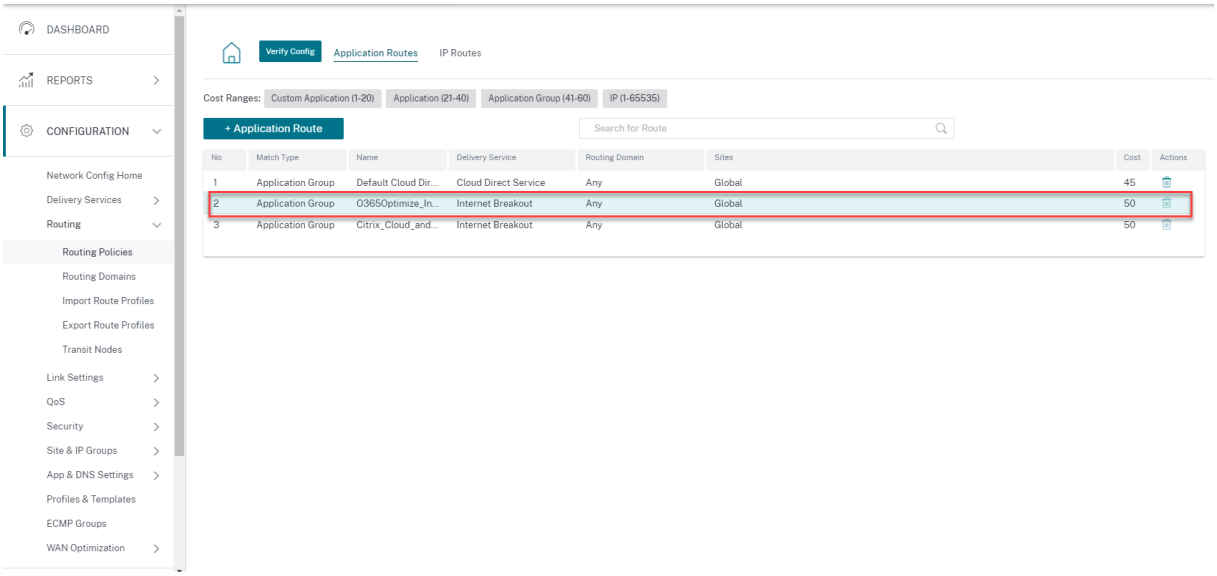
Office 365 optimization

The Office 365 Optimization features adhere to the Microsoft Office 365 Network Connectivity Principles, to optimize Office 365. Office 365 is provided as a service through several service endpoints (front doors) located globally.

To achieve optimal user experience for Office 365 traffic, Microsoft recommends redirecting Office365 traffic directly to the Internet from branch environments and avoiding practices such as backhauling to a central proxy. This is because Office 365 traffic such as Outlook, Word are sensitive to latency and backhauling traffic introduces more latency resulting in poor user experience. Citrix SD-WAN allows you to configure policies to break out Office 365 traffic to the Internet. For more information, see Office 365 Optimization.

In Citrix SD-WAN Orchestrator service, by-default every network have the office 365 rule under **Application Group**. To navigate, go to **Network Configuration > Routing > Routing Policies > Application Routes**.



You cannot delete the rule but can configure the settings as required.

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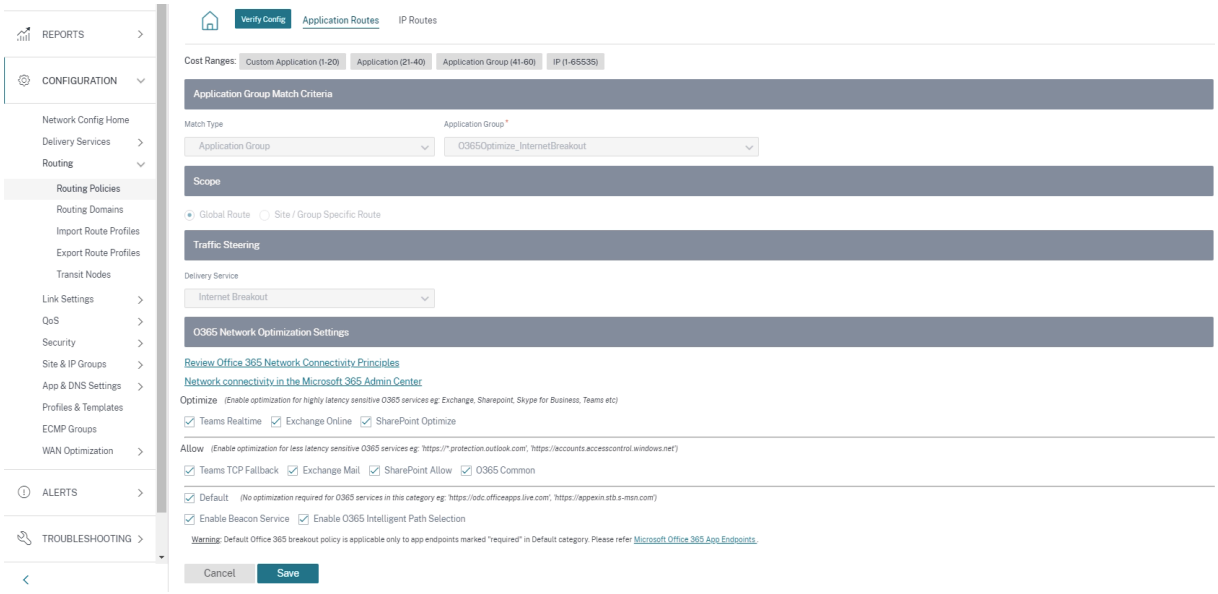

Click the office 365 rule to view the default settings **Match Type, Application Group, Delivery Service,** and so on. You cannot modify these default settings.

Office 365 endpoints are a set of network addresses and subnets. Endpoints are segregated into the following three categories:

- **Optimize** - These endpoints provide connectivity to every Office 365 service and feature, and are sensitive to availability, performance, and latency. It represents over 75% of Office 365 bandwidth, connections, and volume of data. All the Optimize endpoints are hosted in Microsoft data centers. Service requests to these endpoints must be breakout from the branch to the Internet and must not go through the data center.
- **Allow** - These endpoints provide connectivity to specific Office 365 services and features only, and are not so sensitive to network performance and latency. The representation of Office 365 bandwidth and connection count is also lower. These endpoints are hosted in Microsoft data centers. Service requests to these endpoints might be breakout from the branch to the Internet or might go through the data center.
- **Default** - These endpoints provide Office 365 services that do not require any optimization, and can be treated as normal Internet traffic. Some of these endpoints might not be hosted in Microsoft data centers. The traffic in this category is not susceptible to variations in latency. Therefore, direct breaking out of this type of traffic does not cause any performance improvement when compared to Internet breakout. In addition, the traffic in this category may not always be Office 365 traffic, hence it is recommended to disable this option when enabling the Office 365 breakout in your network.

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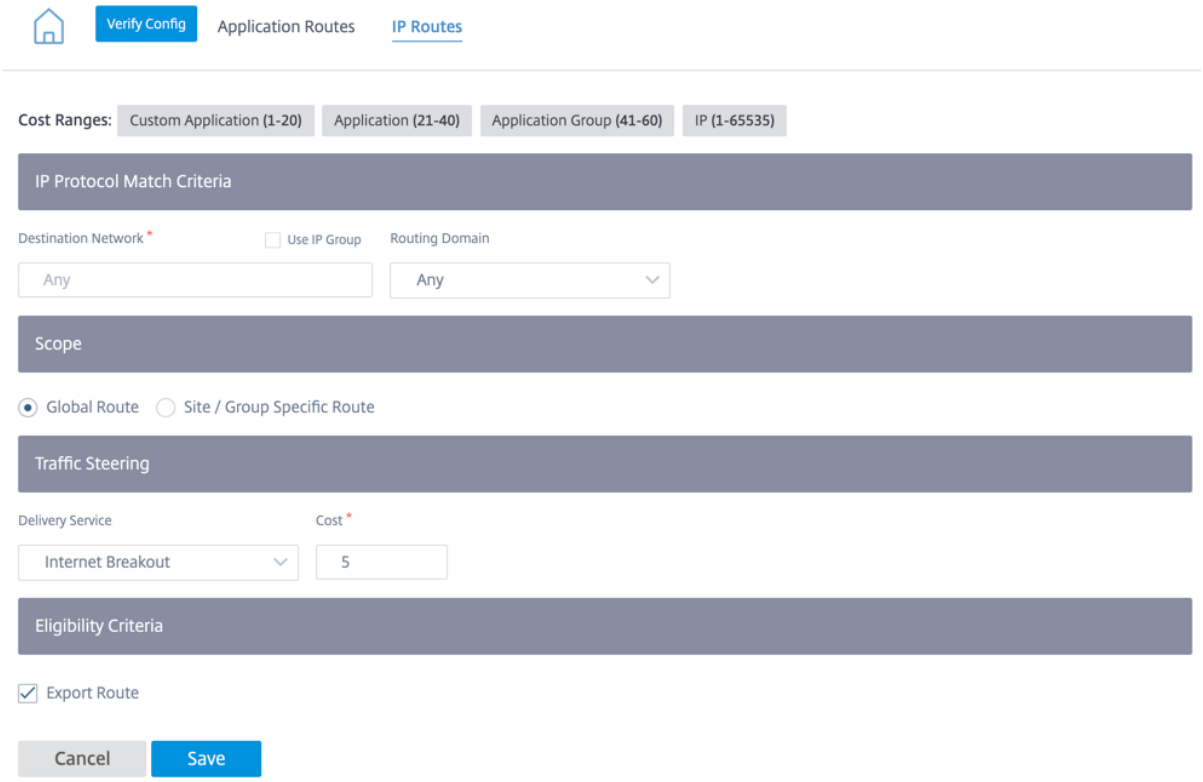
> **NOTE**
>
> By-default, the Optimize, Allow, and Default options are disabled. You cannot delete these settings but can enable as needed.

- **Enable Beacon Service** - Citrix SD-WAN allows you to perform beacon probing and determines the latency to reach Office 365 endpoints through each WAN link. Office 365 Beacon services are enabled by default. You can disable it by clearing this option. For more information, see Office 365 Beacon service.

  You can view the beacon probing availability and latency reports at Network level and Site level.

IP Routes

Go to **IP Routes** tab and click **+ IP Route** to IP Route policy to steer traffic.



- **IP Protocol Match Criteria**:
  - **Destination Network**: Add the destination network that helps to forward the packets.
  - **Use IP Group**: You can add a destination network or enable the **Use IP Group** check box to select any IP group from the drop-down list.
  - **Routing Domain**: Select a routing domain from the drop-down list.

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- **Scope**: You can scope the IP route at the global level or site and group specific level.
- **Traffic Steering**:
  - **Delivery Service**: Choose one delivery service from the drop-down list.
  - **Cost**: The cost field reflects the relative priority of each route. Lower the cost, higher the priority.

  If a new IP route gets added, then the route cost must be in 1-20 range.
- **Eligibility Criteria**:
  - **Export Route**: If the **Export Route** check box is selected and if the route is a local route, then the route is eligible to be exported by default. If the route is an INTRANET/INTERNET based route, then for the export to work, WAN to WAN forwarding has to be enabled. If the **Export Route** check box is cleared, then the local route is not eligible to be exported to other SD-WAN and has local significance.
- **Eligibility based on Path**:
  - **Add Path**: Choose a site and WAN links. If the added path goes down, then the IP route does not receive any traffic.

Click **Verify Config** to validate any audit error.

Route Summarization

Route summarization reduces the number of routes that a router must maintain. A summary route is a single route that is used to represent multiple routes. Route summarization saves bandwidth by sending a single route advertisement, reducing the number of links between routers. Route summarization saves memory because only one route address is maintained. The CPU resources are used more efficiently by avoiding recursive lookups. You have an option to add summary routes without specifying the gateway IP address.

Routing domains

Routing domain helps to improve network security/functionality and work with the IP network routers that enables multiple routing table instances to exist in a virtual router and work simultaneously. With this functionality, the connectivity increases by enabling the network paths to be segmented without using multiple devices as the traffic is automatically segregated. VRF also increases network security and can eliminate the need for encryption and authentication.

Routing domain focuses on Layer 3 traffic through MPLS. The multiprotocol label switching or MPLS cloud in the service provider cloud environment uses multiprotocol border gateway protocol or multiprotocol BGP. Routing domain isolates traffic from source to destination through that MPLS cloud. To

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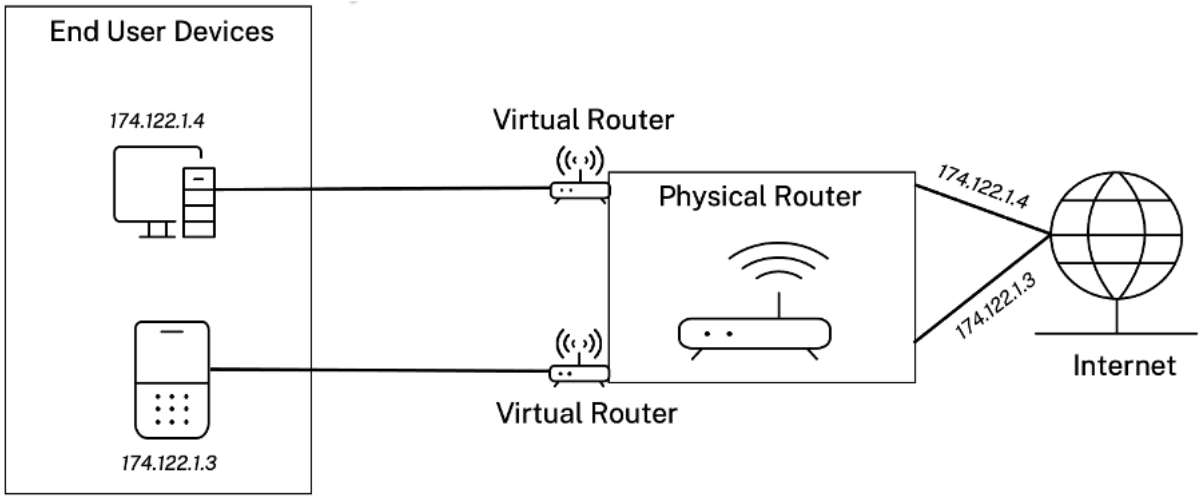
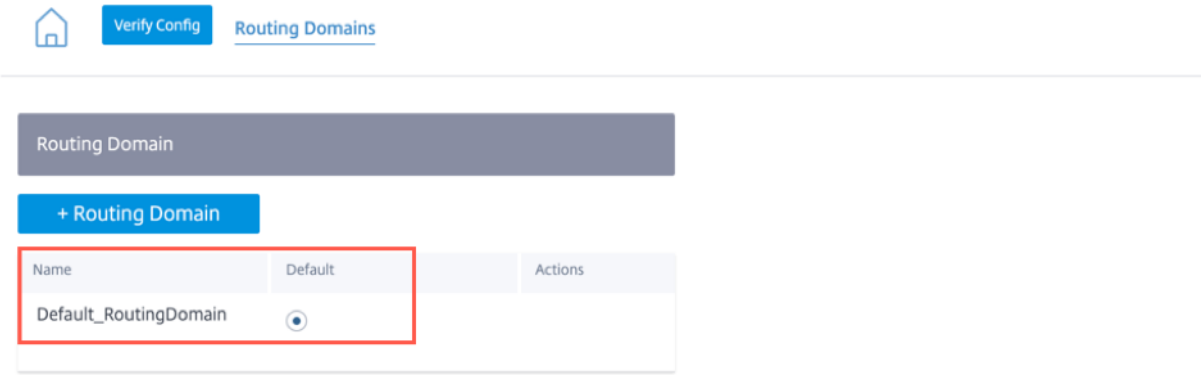
separate overlapping routes and make use of common services, Routing domain incorporates Route Distinguishers (RDs) and Route Targets (RTs).

The following topology describes how the routing domains work:



Once the routing domains are created, you can reference them at the global level (for Intranet services) or interface level.

You can also select the default routing domain that applies to all the sites.



To match routes from a specific routing domain, click **+ Routing Domain** and choose one of the configured Routing Domains from the drop-down list. Click **Save**.

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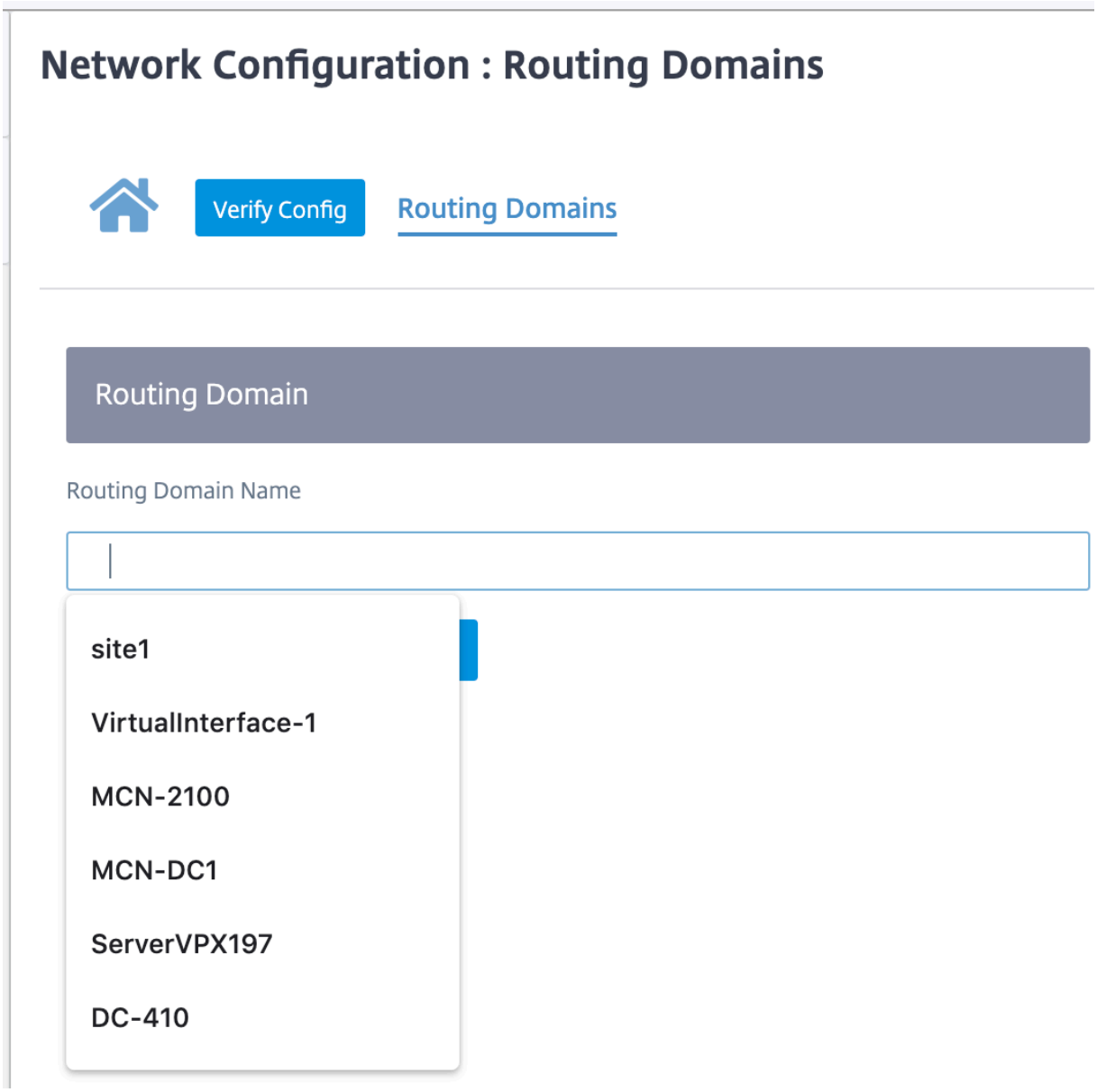

Click **Verify Config** to validate any audit error.

For more information, see Routing Domain.

Inter-routing domain service

Citrix SD-WAN Orchestrator service provides Static Inter-Routing Domain Service, enabling route leaking between Routing Domains within a site or between different sites. This eliminates the need for an edge router to handle route leaking. The Inter-VRF routing service can further be used to set up routes, firewall policies, and NAT rules.

For more information see, Inter-routing domain service.

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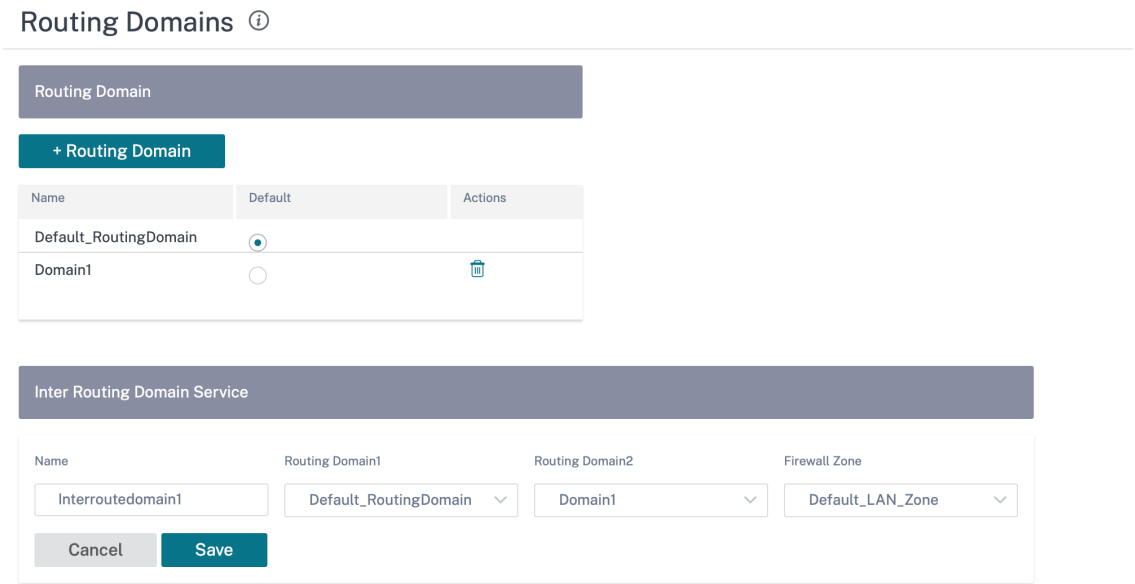
To configure the Inter-Routing Domain service through the Citrix SD-WAN Orchestrator service:

1. At the network level, navigate to **Configuration** > **Routing** > **Routing Domains** > **Inter-Routing Domain Service**.
2. Click **+ Inter-Routing Domain** and enter values for the following parameters:

- **Name**: The name of the Inter-Routing Domain Service.
- **Routing Domain 1**: The first Routing Domain of the pair.
- **Routing Domain 2**: The second Routing Domain of the pair.
- **Firewall Zone**: The Firewall Zone of the Service.
    - **Default**: The **Inter_Routing_Domain_Zone** firewall zone is assigned.
    - **None**: The service behaves like a conduit, which has no Zone and maintains the original zone of the packet.
    - All Zones configured in the network might be selected.



To create routes using the Inter-routing domain service, create a route with Service type as Inter-Routing Domain Service and select the inter-routing domain service. For more information on configuring Routes, see Routing policies.

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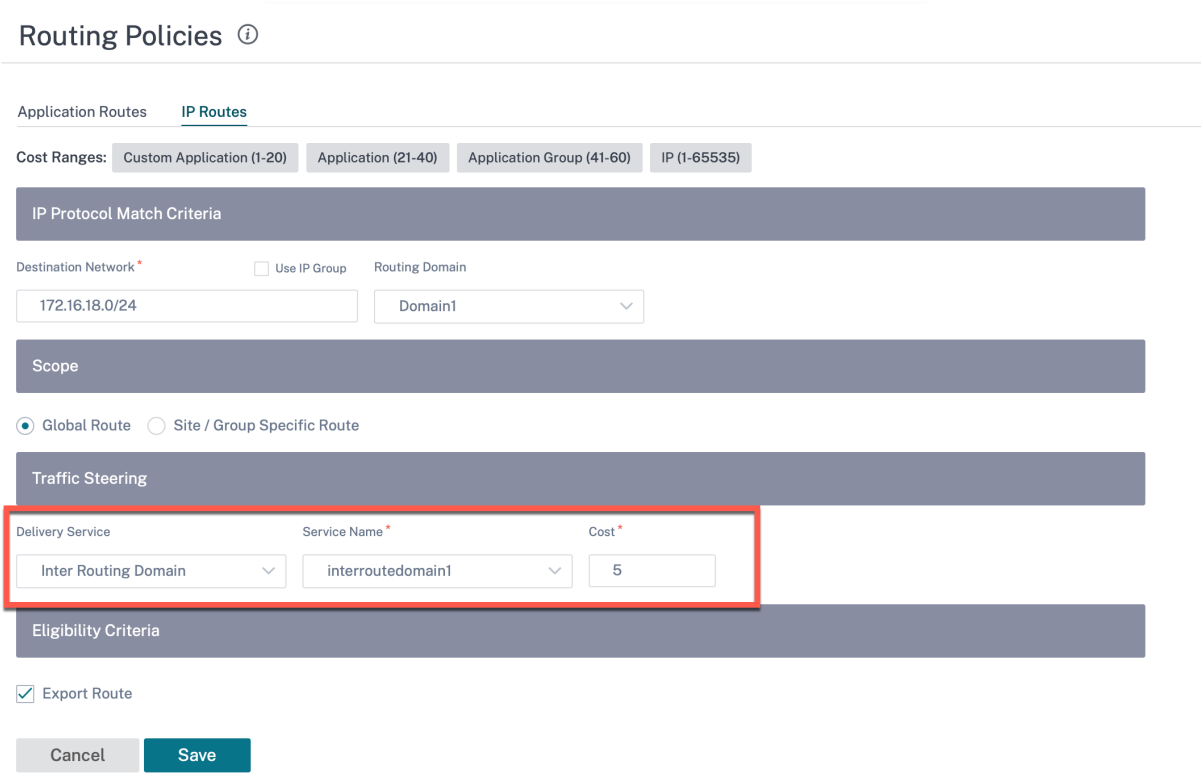

Also add a route from the other Routing Domain pair, to establish connection to and fro between the two routing domains.

You can also configure firewall policies to control the flow of traffic between routing domains. In the firewall policies, select Inter-Routing domain service for the source and destination services and select the required firewall action. For information on configuring Firewall Policies, see Firewall policies.

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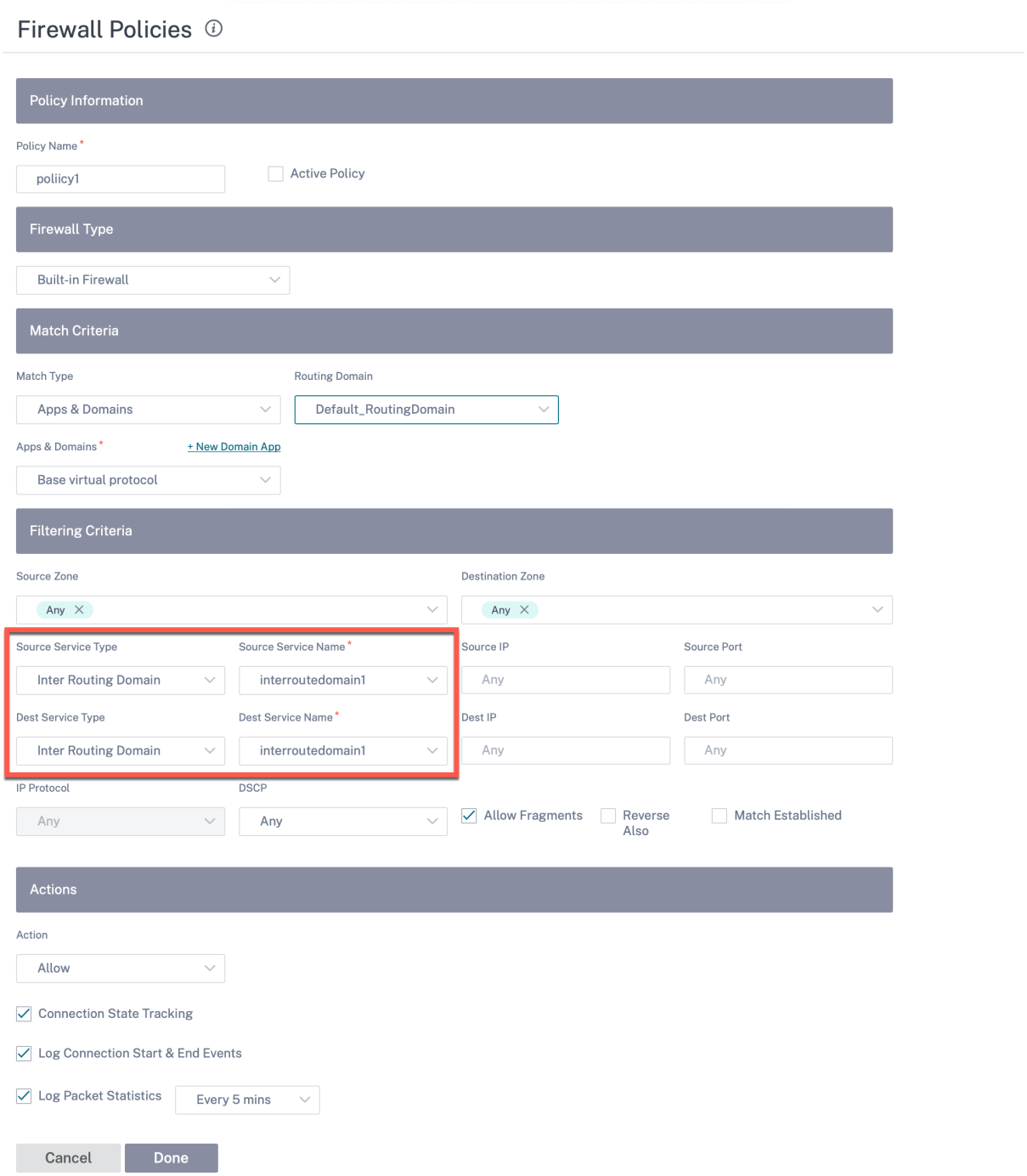

You can also choose Intranet service type to configure Static and Dynamic NAT policies. For More information on configuring NAT policies, see Network Address Translation.

Import route profiles

You can configure Filters to fine-tune how route-learning takes place.

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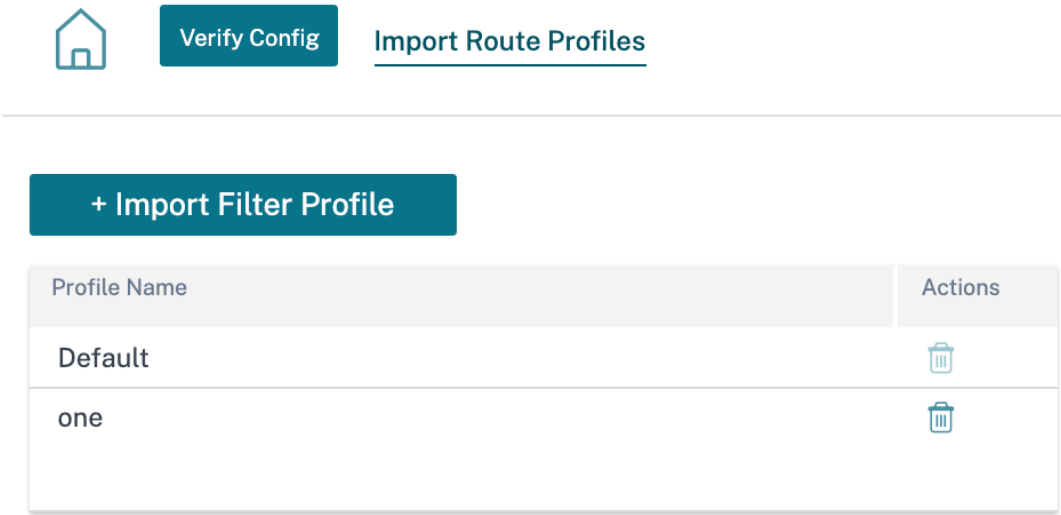
Import filter rules are rules that have to be meet before importing dynamic routes into the SD-WAN route database. By default, no routes are imported.



Add an **Import Filter Profile** with the **Import Profile Name, Profile Availability,** and **Import Filters** along with the following fields:

- **Protocol** - Select the protocol from the list.
- **Routing Domain** - To match routes from a specific routing domain, choose one of the configured Routing Domains from the list.
- **Source Router** - Enter the IP address and netmask of the configured network object that describes the route's network.
- **Destination IP** - Enter the destination IP address.
- **Prefix** - To match routes by prefix, choose a match predicate from the list and enter a Route prefix in the adjacent field.
- **Next Hop** - Enter the next hop destination.
- **Route Tag** - Fill the route tag.
- **Cost** - The method (predicate) and the SD-WAN Route Cost that are used to narrow the selection of routes exported.

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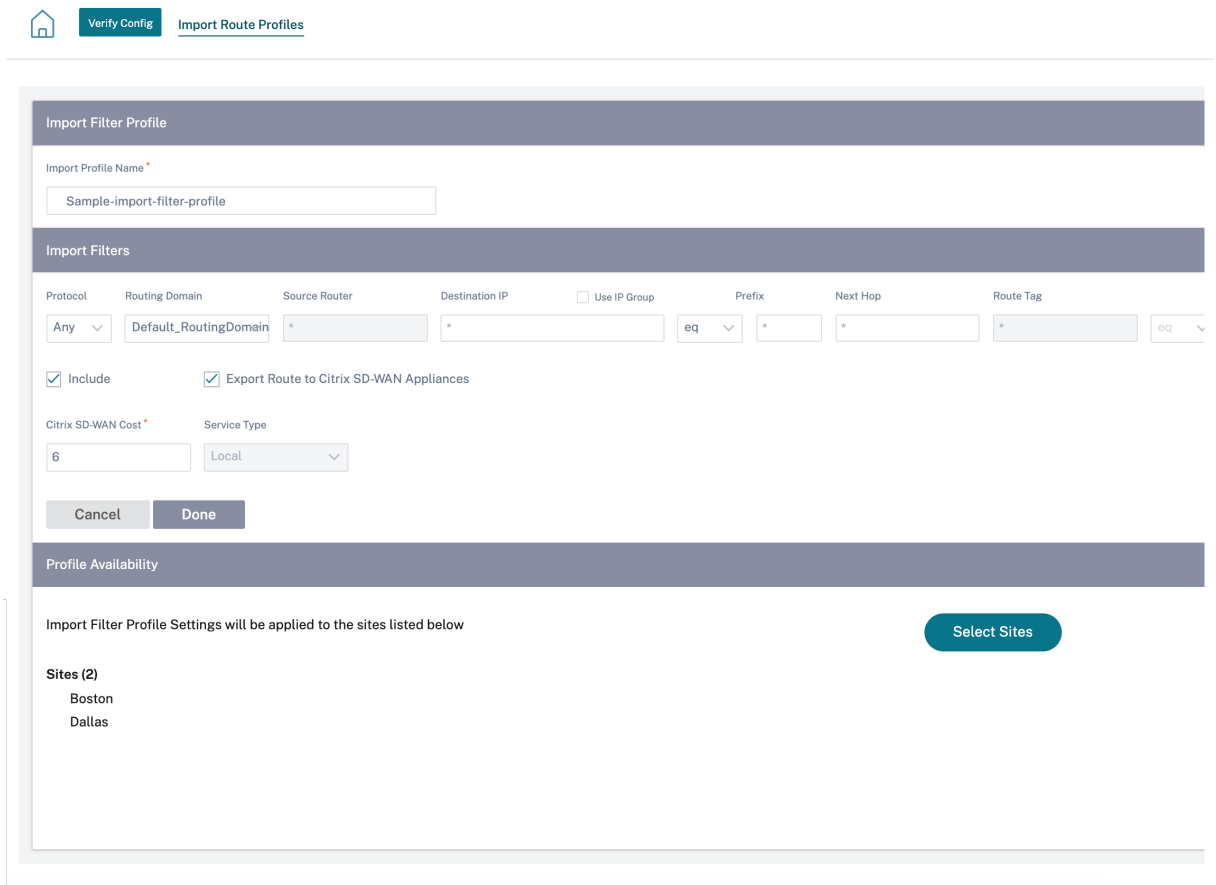

Click **Verify Config** to validate any audit error.

Export route profiles

Define the rules that have to meet when advertising SD-WAN routes over dynamic routing protocols. By default, all routes are advertised to peers.

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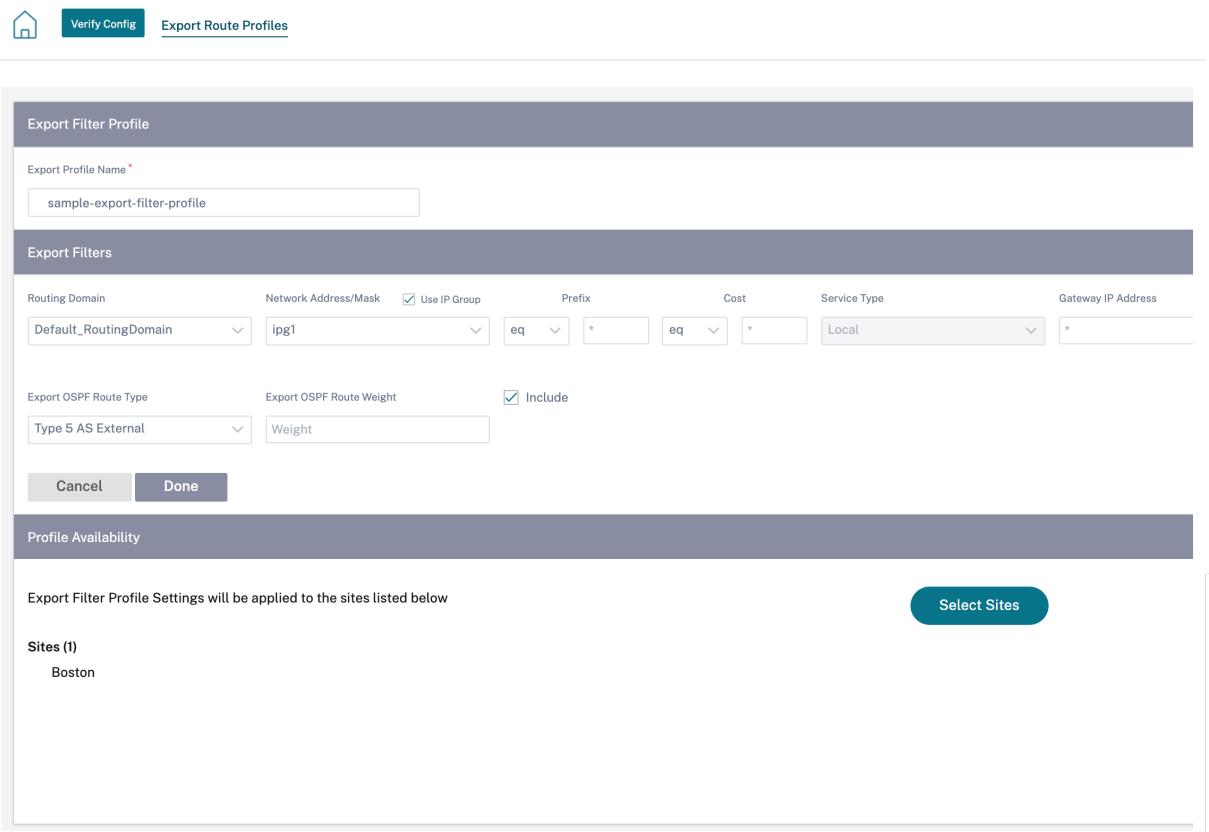

Click **Verify Config** to validate any audit error.

Transit nodes

Virtual overlay Transit Node

You can reduce the cost of routing by configuring a site to route data via a virtual overlay transit node. Transit nodes are used to route data to non-adjacent nodes. For example, if three nodes are connected in series A-B-C, then data from A to C can be routed via B. You can specify the transit node and the sites to be routed via the transit node in the Citrix SD-WAN Orchestrator service. The virtual paths are chosen in the ascending order of cost. Lower the cost, higher the priority.

Default global virtual overlay transit nodes The control nodes (MCN/RCN) and the geo-control nodes (Geo-MCN/RCN) are the default global virtual overlay transit nodes in a network. Enabling hub-and-spoke communication as part of global settings allows all the sites to use the control nodes as transit nodes, by default, for site-to-site communication. If you disable hub-and-spoke communication, ensure that there are site-specific rules that enable the non-control node to act as transit nodes.

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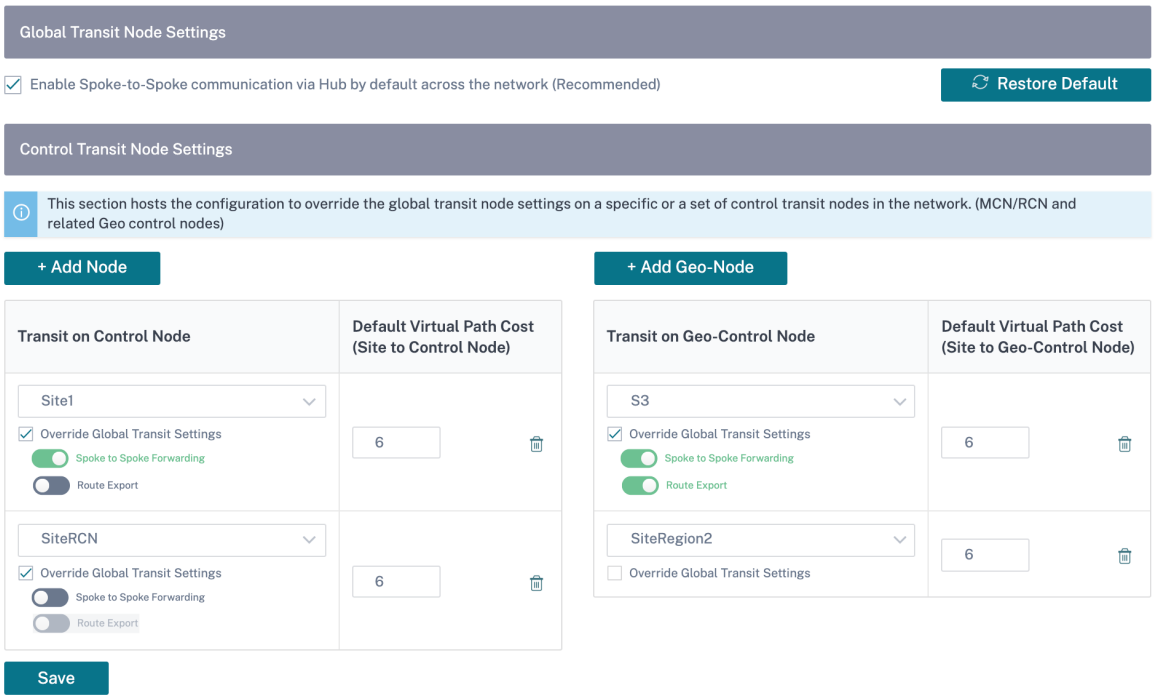

Add the control node and geo-control nodes that you want to use as virtual overlay transit nodes and specify the virtual path cost. The control nodes and geo-control nodes have 6 and 7 as the respective default virtual path costs. You can choose to change the virtual path cost as per your network requirement. Click **Restore Default** to restore the default virtual path costs for the default transit nodes.

> **Note**
>
> You can add a maximum of 3 control nodes and 3 geo-control nodes as transit nodes.

By default, WAN-to-WAN forwarding is enabled on all the paths associated with the selected control and geo-control nodes. WAN-to-WAN forwarding allows a site to act as an intermediate hop between two adjacent sites for any site-to-site, internet or intranet traffic and to act as a mediator for Dynamic Virtual Paths.

Site specific preferences for virtual overlay transit nodes Site-specific preferences for virtual overlay transit nodes allow you to override the global virtual overlay transit node settings for all the sites in your network. You can also choose a non-control node as the primary transit node for a site. Choose a control node or geo-control node as the secondary and the tertiary transit nodes. If the primary transit node is down, the sites use the secondary transit node. If both primary and secondary transit nodes are down, the sites use the tertiary transit node. Specify the cost for the transit nodes and select the sites to which the site-specific virtual overlay transit node settings are applied.

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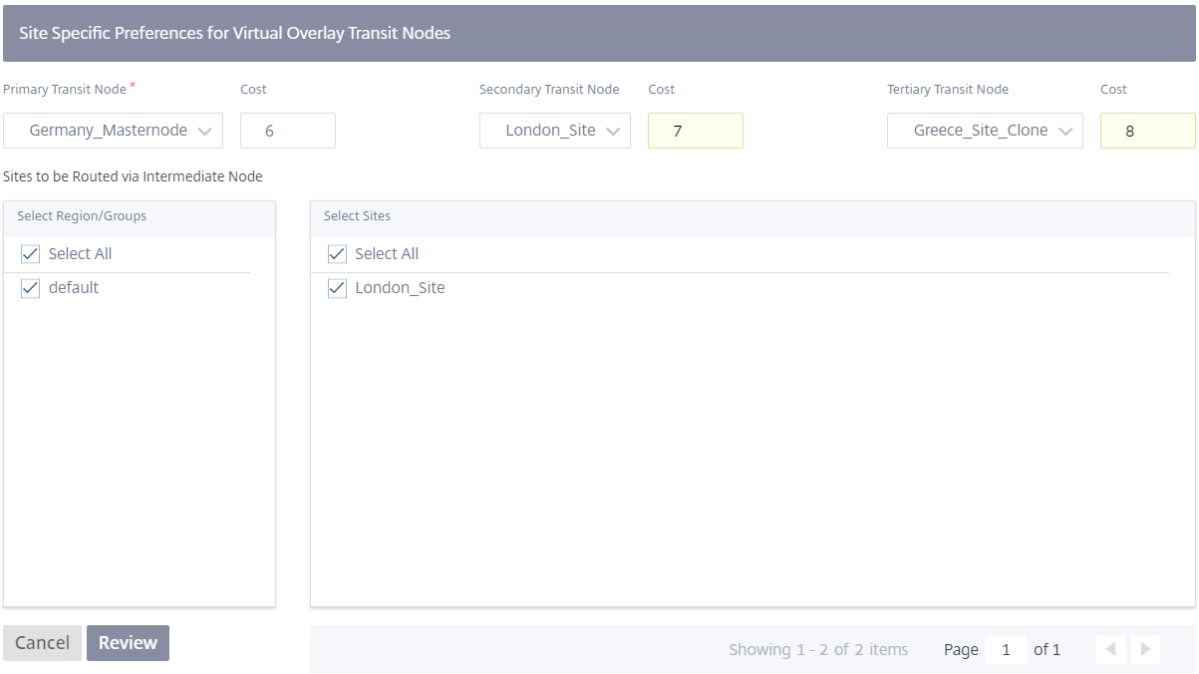

Internet Transit Node

You can add sites as Internet transit sites to enable Internet access to the sites. Sites that need direct internet connectivity, must have at least one link with Internet service enabled. That means, at least one link set to a non-zero bandwidth share %.

Each transit site can be assigned a route cost. The sites with internet service available access the internet directly since the direct route would be the lowest cost routing path. Sites without internet service can route to the internet through the configured transit sites. When the internet transit sites are configured, routes to the internet through these transit sites are automatically pushed to all the sites. Internet transit sites are the sites with Internet service enabled.

For example, if San Francisco and New York are configured as internet transit sites. Routes to the internet via San Francisco and New York automatically get pushed to all the sites.

The virtual overlay transit node with Internet service enabled acts as the primary internet transit node. If internet service is not enabled on the virtual overlay transit node the secondary / backup internet transit node provides a route to the internet.

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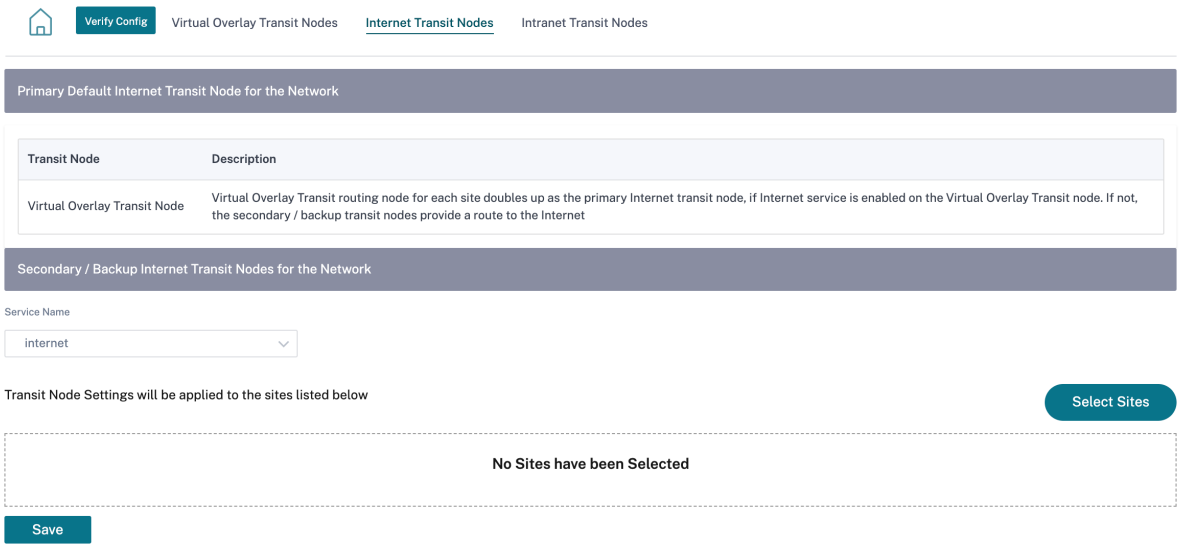

Intranet Transit Node

The intranet transit node enables all the non-intranet sites to access the configured intranet networks. Each transit site can be assigned a route cost. The available sites with intranet service, accesses the intranet networks directly since the direct route would be the lowest cost routing path. Sites without intranet service can route to the intranet networks through the configured transit sites. When the transit sites are configured, routes to intranet networks through these transit sites are automatically pushed to all the sites.

For example, if 10.2.1.0/24 is an intranet network, and Austin and Dallas are the configured transit sites. Routes to that network address through Austin and Dallas automatically get pushed to all the sites.

The virtual overlay transit node with Intranet service enabled acts as the primary intranet transit node. If intranet service is not enabled on the virtual overlay transit node the secondary / backup intranet transit node provides a route to the intranet.

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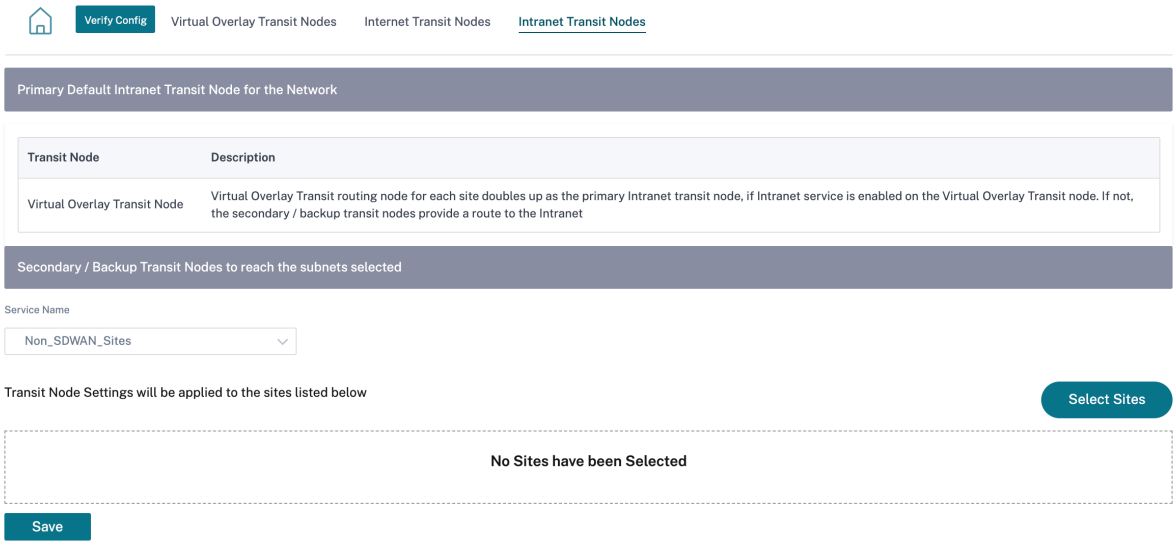

Dynamic routing

September 27, 2025

After configuration and deployment of SD-WAN appliances in the network and once the connections are established, it is important to ensure that the traffic is properly redirected through the overlay SD-WAN network. You can check traffic redirection by using ping and traceroute diagnostic tools. If the ping and traceroute tests indicate that connectivity is established through the underlay paths, traffic redirection can be achieved by using the following dynamic routing protocols.

- **Open Shortest Path First (OSPF)**: It is an interior gateway protocol, used to redirect traffic within an autonomous system, like the enterprise network. OSPF uses a link state routing algorithm to detect changes in the network topology and reroute packets by computing the shortest path first for each route. Use this protocol to redirect MPLS traffic. For more information, see **OSPF** section.
- **Border Gateway Protocol (BGP)**: It is an exterior gateway protocol designed to redirect traffic routing and reachability information among different autonomous systems on the internet. It is capable of making routing decisions based on paths determined by ISPs. Use this protocol to redirect Internet traffic. For more information, see **Configure BGP** section.

Earlier, the dynamic routing capability was available only for a single router ID. You were able configure a unique router ID either globally for all the configured routing domains (one for OSPF and BGP) or provide no router ID. From Citrix SD-WAN 11.3.1 release onwards, you can not only configure a router ID for the entire protocol but also configure a router ID for each routing domain. With this

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enhancement, you can enable stable dynamic routing across multiple instances with different router ID's converging in a stable manner.

If you configure a router ID for a specific routing domain, the specific router ID overrides the protocol level routing domain.

OSPF

To configure OSFF, navigate to **Configuration > Advanced Settings > Dynamic Routing > OSPF**.

OSPF basic settings

Here are the parameters to be configured:

- **Enable**: Allow the OSPF routing protocol on the SD-WAN appliance to start exchanging Hello packets between neighboring routers.
- **Router ID**: The IPv4 address used for OSPF advertisements. This field is optional. If it is not specified, the lowest virtual IPv4 address of the virtual interfaces participating in routing is chosen. For the IPv6 interface, it is mandatory to specify the router ID in IPv4 format. For example, 1.1.1.1.

  > **Note**
  >
  > - The router ID configuration is optional for an IPv4 network. But for an IPv6 network, the router ID configuration is mandatory. The router ID for an IPv6 network must be configured in the same IPv4 format (32-bit notation).
  > - You must create separate IPv4 and IPv6 peering to the same router (if applicable) for learning and advertising.

- **Export OSPF Route Type**: Advertise the SD-WAN route to OSPF neighbors as type 1 Intra-area route or type 5 External route.
- **Export OSPF Route Weight**: The cost advertised to OSPF neighbors is the original route cost and the weight configured here.
- **Advertise SD-WAN Routes**: To advertise SD-WAN routes to the peer network elements.

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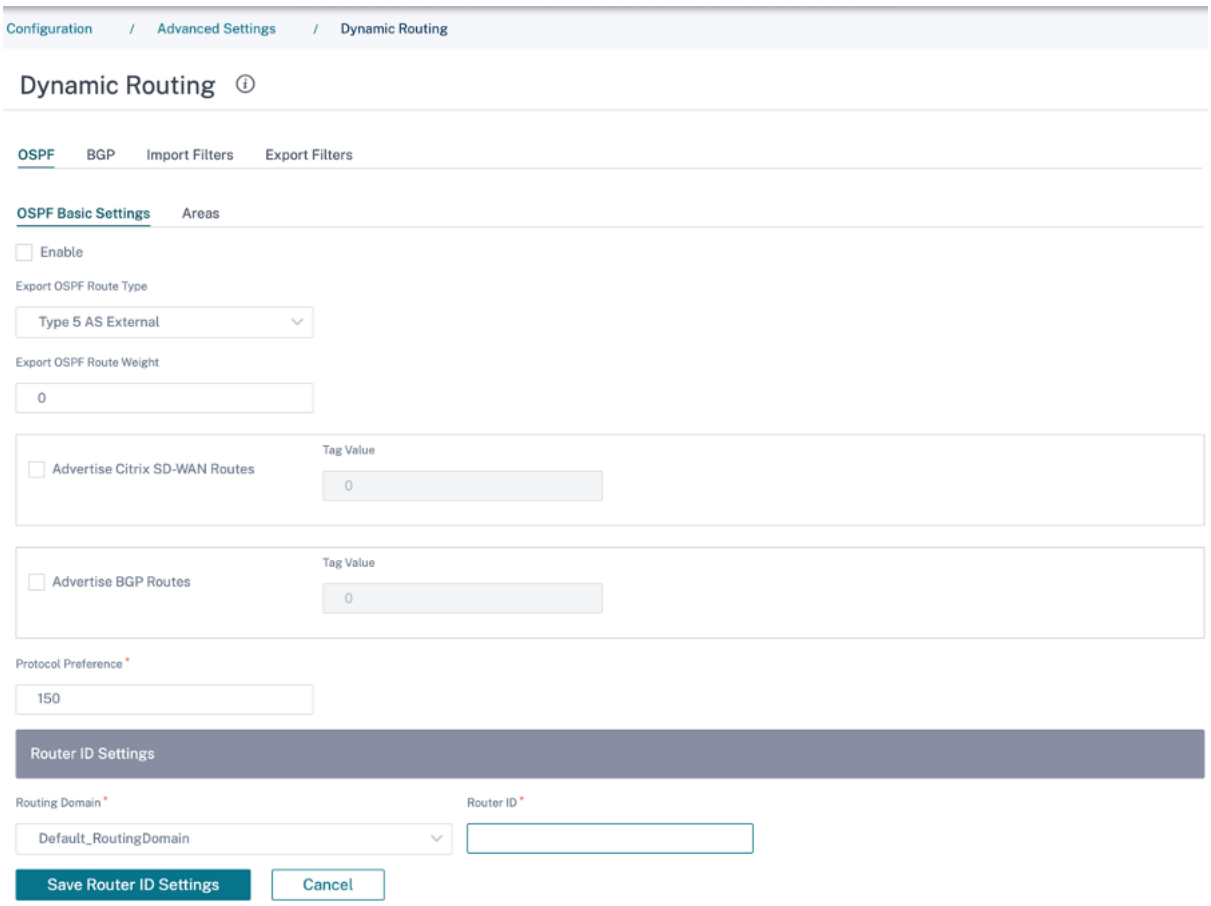
- **Advertise BGP Routes**: To enable redistribution of BGP routes into the OSPF domain.



Areas

Click **+ Area** and provide the Area ID of the network that OSPF will learn routes from and advertise routes. Stub area ensures that this area will not receive route advertisements from outside of the designated Autonomous System. Configure the virtual interface settings.

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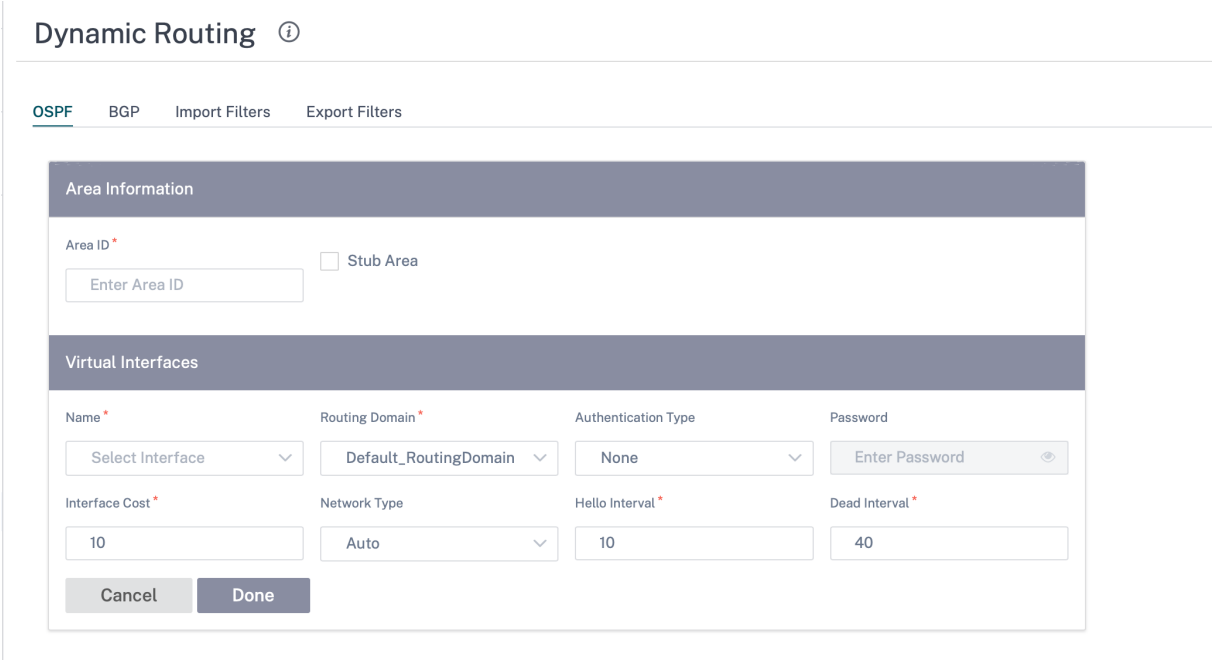
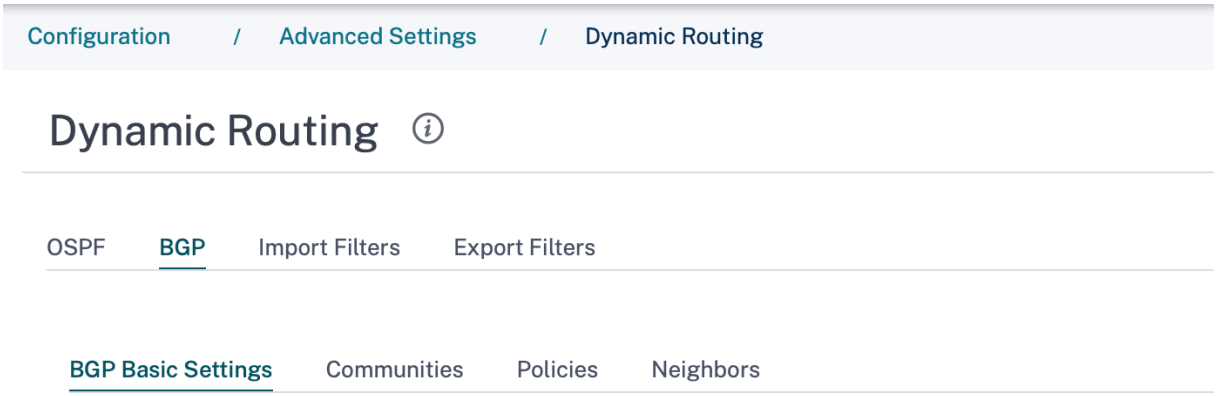


BGP

To configure BGP, navigate to **Configuration > Advanced Settings > Dynamic Routing > BGP**.



BGP basic settings

The following are the parameters to be configured:

- **Enable**: Allow the BGP routing protocol on the SD-WAN appliance to start sending an open message as part of BGP peering.
- **Router ID**: The IPv4 address used for BGP advertisements. If the router ID is not specified the lowest virtual IPv4 address of the virtual interfaces participating in routing is chosen.

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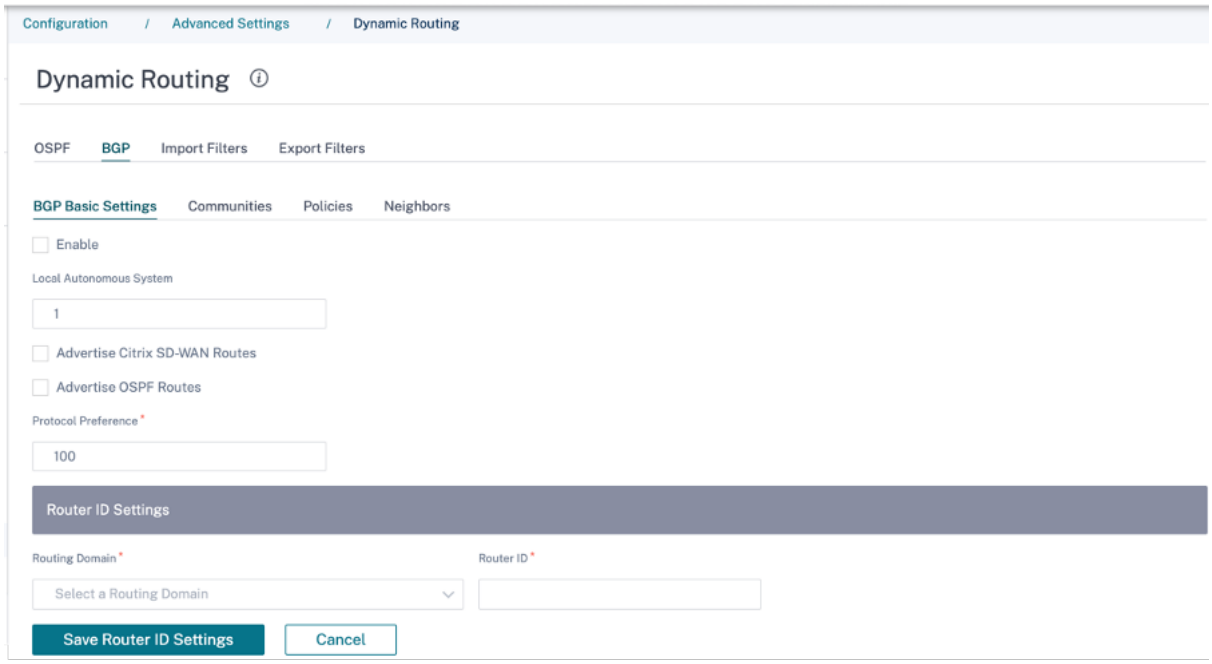
> **Note**
>
> - The router ID configuration is optional for an IPv4 network. But for an IPv6 network, the router ID configuration is mandatory. The router ID for an IPv6 network must be configured in the same IPv4 format (32-bit notation).
> - You must create separate IPv4 and IPv6 peering to the same router (if applicable) for learning and advertising.

- **Local Autonomous System**: Autonomous system number the BGP protocol is running in.
- **Advertise SD-WAN Routes**: To advertise SD-WAN routes to the peer network elements.
- **Advertise OSPF Routes**: To enable redistribution of OSPF routes into the BGP domain.



Communities

Click **+ Community** to add a community. A collection of BGP communities that can be used for route filtering. The community list can also be used to set or modify the communities of a matching route.

For each policy, users can configure multiple community strings, AS-PATH-PREPEND, **MED** attribute. Users can configure up to 10 attributes for each policy.

Specify the name for the community and enter a community string to be advertised.

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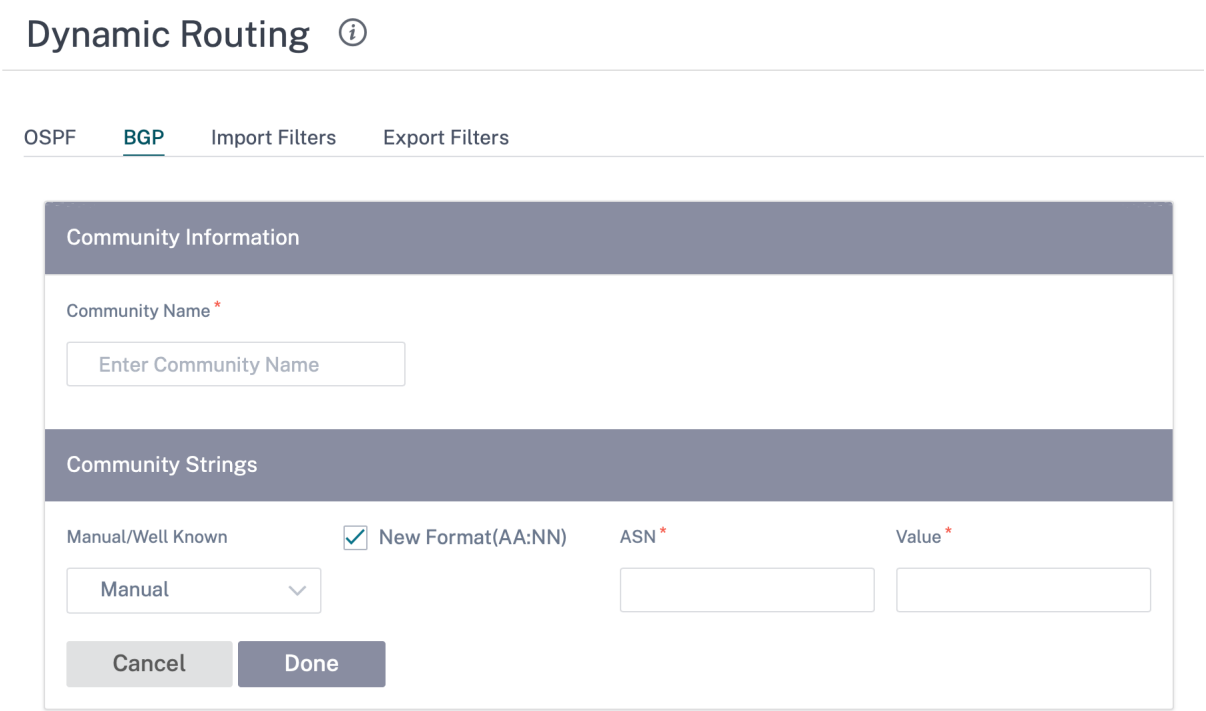

- **Community Name**: Enter a community name.
- **Manual/Well Known**: Configure BGP community manually or select a standard well known BGP community from the list.
- **New Format (AA:NN)**: Select the check box to use the new format for configuring the BGP community.
- **ASN**: The first 16 digit of the BGP community when using the new format for configuration.
- **Value**: Enter the BGP community value.

Policies

A collection of BGP attributes which can be used to set or modify route attributes for each BGP Peer. Create BGP policies to be applied selectively to a set of networks on a per-neighbor basis, in either direction (import or export). An SD-WAN appliance supports eight policies per site, with up to eight network objects (or eight networks) associated with a policy.

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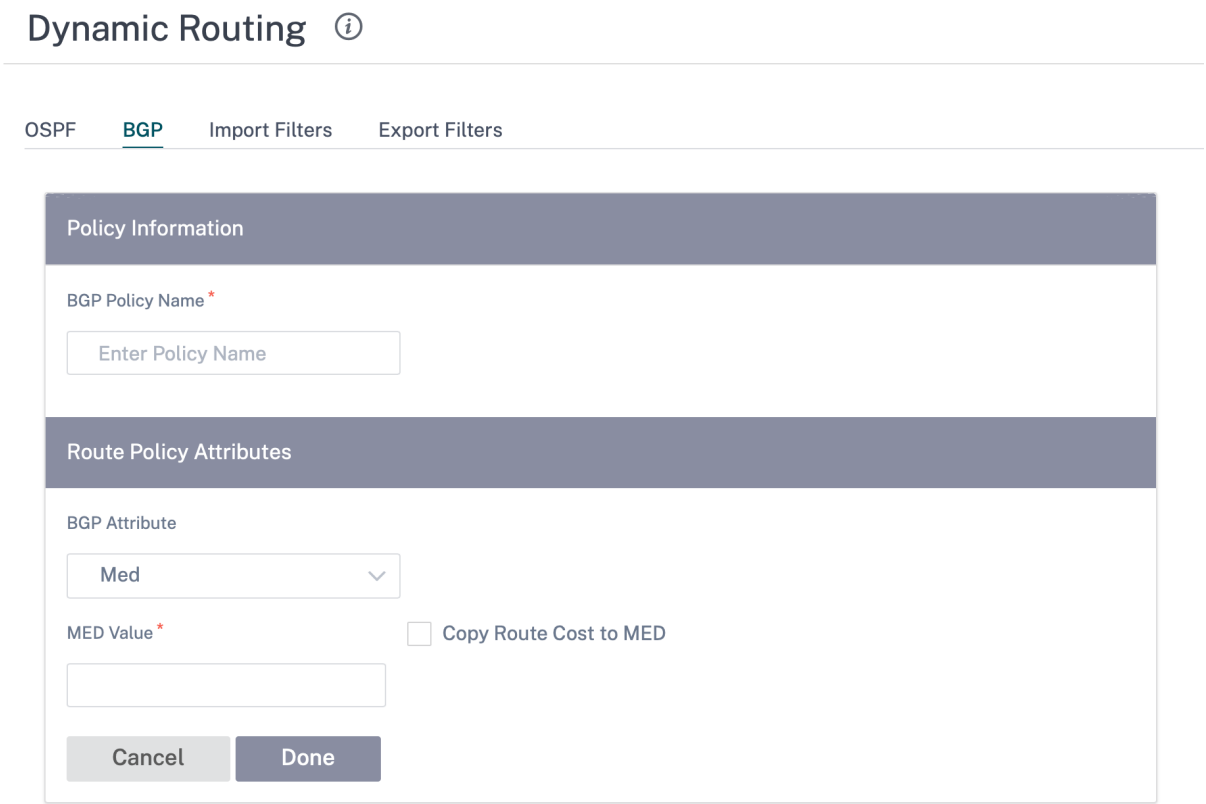

- **BGP Policy Name**: Enter the BGP policy name.
- **BGP Attributes**: Select the BGP attributes from the list and provide the necessary information.

Neighbors

Neighbors are all of the configured BGP peer routers that are checked to find the shortest paths for routing. All the neighbors must be part of the same Autonomous System.

Click **+ Neighbor** to add a configured BGP policy for neighboring routers. You can specify the direction to indicate if this policy is applied for incoming or outgoing routes.

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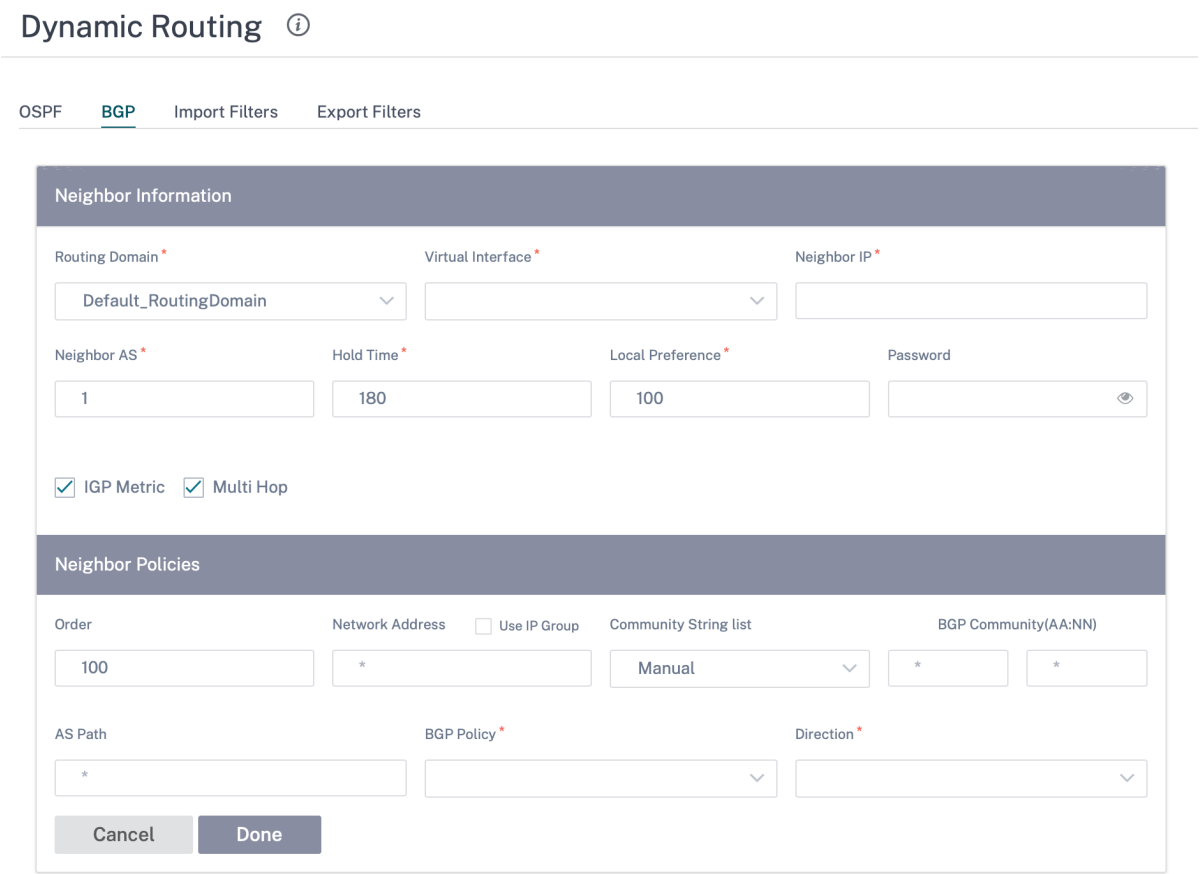

Route filtering

For networks with Route Learning enabled, Citrix SD-WAN Orchestrator™ provides more control over which SD-WAN routes are advertised to routing neighbors rather and which routes are received from routing neighbors, rather than advertising and accepting all or no routes.

Import filters

Import Filters are used to accept or not accept routes which are received using OSPF and BGP neighbors based on specific match criteria. Import filter rules are the rules that must be met before importing dynamic routes into the SD-WAN route database. No routes are imported by default.

You can configure Filters to fine-tune how route-learning takes place.

Click **+ Import Rule**.

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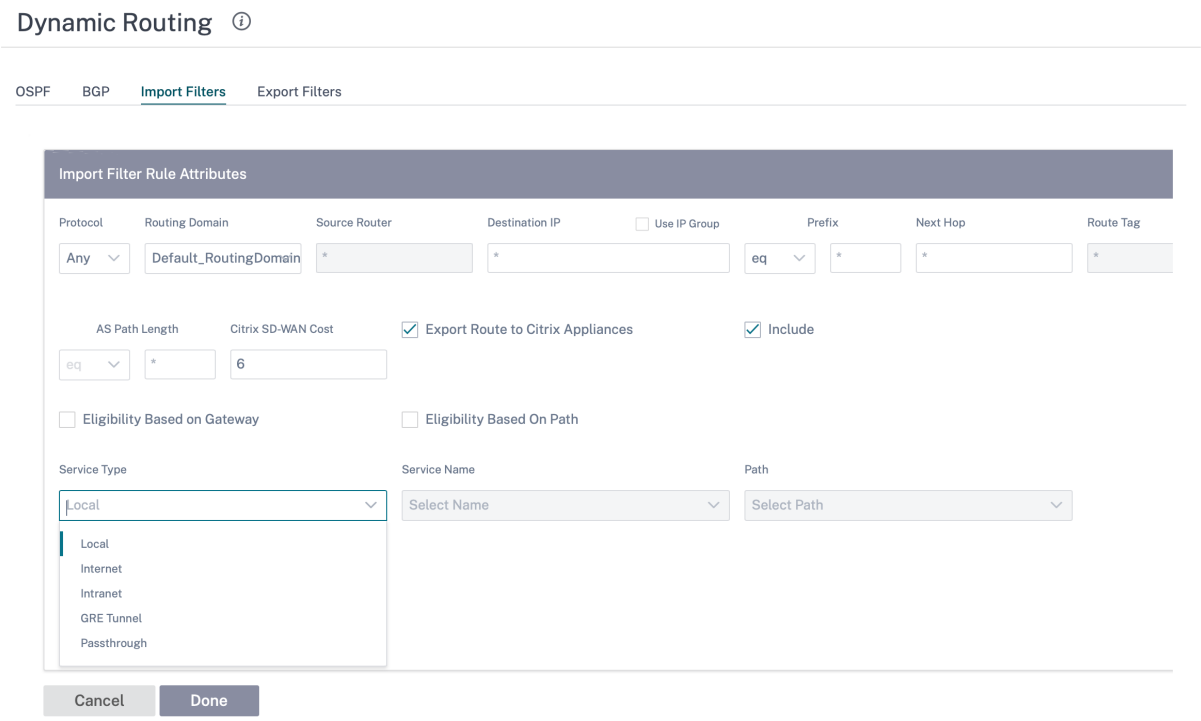

Use the following criteria to construct each Export Filter that you want to create.

Field Criteria	Description	Value
Protocol	The routing protocol using which a route is learned. Select the protocol from the drop-down list.	Any, OSPF, BGP
Routing Domain	Enter the routing domain from the drop-down list.	• Routing Domain name
Source Router	The IP address of the source router, it is applicable for iBGP only	• IP address
Destination IP	The IP address and subnet mask of a route's destination	• IP address
Use IP Group	Select the **Use IP Group** check box as needed.	• IP Group
Prefix	To match routes by prefix, choose a match predicate from the menu and enter a Route prefix in the adjacent field	• eq: Equal to, - lt: Less than, - le: Less than or equal to, - gt: Greater than, - ge: Greater than or equal to

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Field Criteria	Description	Value
Next Hop	The IP address of the next hop	• IP address
Route Tag	The OSPF Route tag that the filter matches. OSPF route tags prevent routing loops during mutual redistributing between OSPF and other protocols	Numeric value
Cost	The route cost used to match OSPF routes for importing	Numeric value
AS Path Length	The AS path length used to match BGP routes for importing	Numeric value
Export Route to Citrix Appliances	Select the check box to enable this filter. Otherwise the filter is ignored	None
Include	Select the check box to Include routes that match this filter. Otherwise matching routes are ignored	None
Eligibility Based on Gateway	Select this check box and provide the **Service Type**, **Service Name** and **Path** from the drop-down list.	Service Type (Local, Internet, Intranet, GRE Tunnel, Passthrough), Service Name, and Path
Eligibility Based on Path	Select this check box and provide the **Service Type**, **Service Name** and **Path** from the drop-down list.	Service Type (Local, Internet, Intranet, GRE Tunnel, Passthrough), Service Name, and Path

Click **Done** to save the settings.

Export filters

Export Filters are used to include or exclude routes for advertisement using OSPF and BGP protocols based on specific match criteria. Export filter rules are the rules that must be met when advertising SD-WAN routes over dynamic routing protocols. All the routes are advertised to peers by default.

Click **+ Export Rule**.

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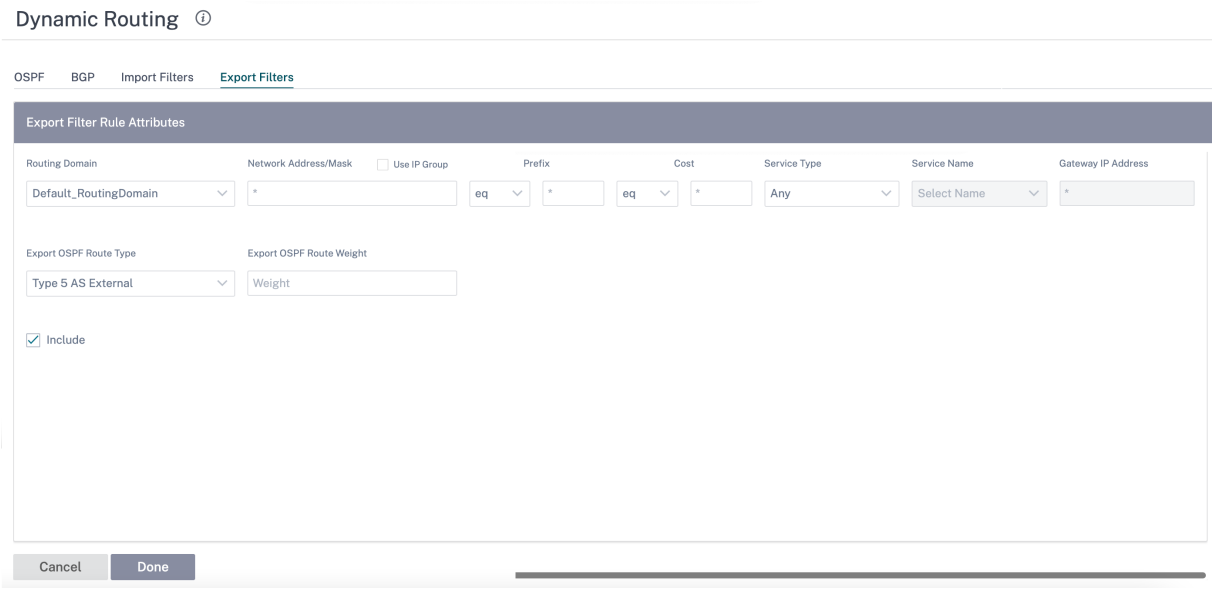

Use the following criteria to construct each Export Filter that you want to create.

Field Criteria	Description	Value
Routing Domain	Select the routing domain from the drop-down list.	Routing domain
Network Address/Mask	Enter the **IP address** and subnet mask of configured Network Object that describes the route's network	• IP address
Use IP Group	Select the check box if needed and enter the IP group from the drop-down list.	• IP group
Prefix	To match routes by prefix, choose a match predicate from the menu and enter a Route prefix in the adjacent field	• eq: Equal to, - lt: Less than, - le: Less than or equal to, - gt: Greater than, - ge: Greater than or equal to
Cost	The method (predicate) and the SD-WAN Route Cost that are used to narrow the selection of routes exported	Numeric value
Service Type	Select the Service types that are assigned to matching routes from a list of Citrix SD-WAN Services	Any, Local, Virtual Path, Internet, Intranet, LAN GRE Tunnel, LAN IPsec Tunnel

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Field Criteria	Description	Value
Site/Service Name	For Intranet, LAN GRE Tunnel, and LAN IPsec Tunnel, specify the name of the configured Service Type to use	Text string
Gateway IP Address	If you choose LAN GRE Tunnel as the Service Type, enter the gateway IP for the tunnel	IP address
Export OSPF Route Type	Advertise the Citrix SD-WAN route to OSPF neighbors as type 1 Intra-area route or type 5 External route. Default route is always advertised as type - 5 external route to normal areas and type-3 summary route to stub areas.	Route type
Export OSPF Route Weight	When export Citrix SD-WAN routes to OSPF, and the weight to each route's Citrix SD-WAN cost as total cost.	Weight
Include	Select the check box to Include routes that match this filter. Otherwise matching routes are ignored	None

Route filtering is implemented on LAN routes and Virtual Path routes in an SD-WAN network (Data Center/Branch) and is advertised to a non-SD-WAN network through using BGP and OSPF.

You can configure up to 512 Export Filters and 512 Import Filters. This is the overall limit, not per routing domain limit.

SD-WAN Overlay Routing

September 27, 2025

Citrix SD-WAN™ provides resilient and robust connectivity between remote sites, data centers, and cloud networks. The SD-WAN solution can accomplish this connectivity by establishing tunnels between SD-WAN appliances in the network. Establishing tunnels enables connectivity between sites

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by applying route tables that overlay the existing underlay network. SD-WAN route tables can fully replace or coexist with the existing routing infrastructure.

Citrix SD-WAN appliances measure the available paths unidirectionally in terms of availability, loss, latency, jitter, and congestion characteristics. The appliances then select the best path on a per-packet basis. It means that the path chosen from Site A to Site B, need not necessarily be the path chosen from Site B to Site A. The best path at a given time is selected independently in each direction. Citrix SD-WAN offers packet-based path selection for rapid adaptation to any network changes. SD-WAN appliances can detect path outages after just two or three missing packets, allowing seamless subsecond failover of application traffic to the next-best WAN path. SD-WAN appliances recalculate every WAN link status in about 50 ms. The following article provides detailed routing configuration within the Citrix SD-WAN network.

Citrix SD-WAN Route Table

The SD-WAN configuration allows static route entries for specific sites, and route entries learned from the underlay network through supported routing protocols; such as OSPF, eBGP, and iBGP. Routes are defined by their next hop and by their service type. It determines how the route is forwarded. The following are the main service types in use:

- **Local Service:** Denotes any route or subnet local to the SD-WAN appliance. It includes the Virtual Interface subnets (automatically creates local routes), and any local route defined in the route table (with a local next hop). The route is advertised to other SD-WAN appliances that have a Virtual Path to this local site where this route is configured when trusted as a partner.

> **Note**
>
> Be cautious when adding default routes, and summary routes as local routes as it can result in virtual path routes at other sites. Always check the route tables to make sure that the correct routing is in effect.

- **Virtual Path** –Denotes any local route learned from a remote SD-WAN site that is reachable down the virtual paths. These routes are normally automatic, however a virtual path route can be added manually at a site. Any traffic for this route is forwarded to the defined Virtual Path for this destination route (subnet).
- **Intranet** –Denotes routes that are reachable through a private WAN link (MPLS, P2P, VPN, and so on). For example, a remote branch that is on the MPLS network but does not have an SD-WAN appliance. It is assumed that these routes must be forwarded to a certain WAN router. Intranet Service is not enabled by default. Any traffic matching this route (subnet) is classified as intranet traffic.

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> **Note**
>
> Notice that when adding an Intranet route there is no next hop, but rather a forward to an Intranet Service. The Service is associated with a given WAN link.

- **Internet** –Similar to Intranet but is used to define traffic flowing to public Internet WAN links rather than private WAN links. One unique difference is that the Internet service can be associated with multiple WAN links and set to load balance (per flow) or be active/backup. A default Internet route gets created when internet service is enabled (it is off by default). Any traffic matching this route (subnet) is classified as Internet for this appliance for delivery to public internet resources.

> **Note**
>
> Internet Service routes can be advertised to the other SD-WAN appliances or prevented from being exported depending on whether you are backhauling Internet access over the Virtual Paths.

- **Passthrough** –Acts as a last resort or override service when an appliance is in-line mode. If a destination IP address fails to match with any other route, then the SD-WAN appliance simply forwards it onto the WAN link next hop. A default route: 0.0.0.0/0 cost of 16 pass-through route is created automatically. Passthrough does not work when the SD-WAN appliance is deployed out of path or in Edge/Gateway mode. Any traffic matching this route (subnet) is classified as passthrough for this appliance. It is recommended that passthrough traffic is limited as much as possible.

> **Note**
>
> Passthrough can be useful when conducting a POC to avoid having to configure numerous routings. Be careful in production because SD-WAN does not account for WAN link utilization for traffic sent to passthrough. It is also helpful when troubleshooting issues and you want to take a certain IP flow out of delivery over the Virtual Path.

- **Discard** - Not a service but a last resort route that drops the packets if it matches. Normally, is does not occur expect when the SD-WAN appliance is deployed out of the path. You must have an Intranet service or local route as a catch all route. Otherwise, the traffic is discarded as there is no passthrough service (even though a passthrough default route is present).

<!–The SD-WAN Configuration Editor enables route table customization for each available site

Route table entries are populated from different inputs:

- Configured Virtual IP Address (VIP) auto-populate as Service Type Local route. The Configuration Editor prevents the same VIP assignment to different site nodes.
- Internet Services enabled at a local site auto-populate a default route (0.0.0.0/0) locally for direct internet breakout.

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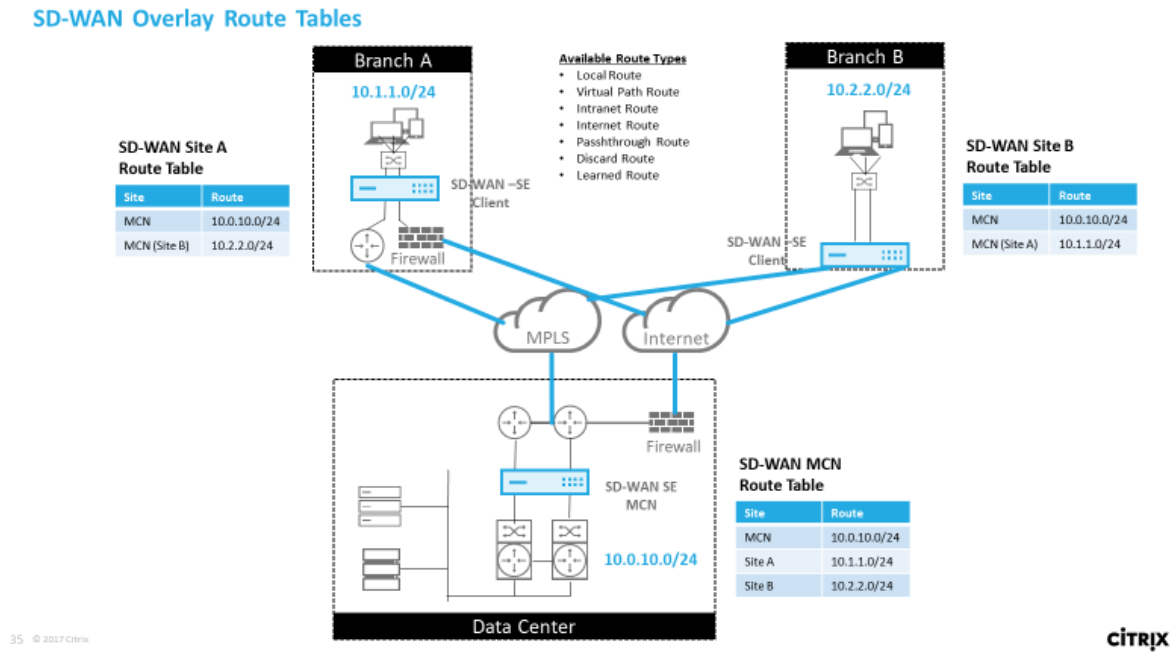
- Admin defined static routes on a per site basis, which are defined as a Service Type Local route.
- A default (0.0.0.0/0) catches all route with cost 16 defined as Passthrough

Administrators can configure one of the preceding routes. In addition to the route cost, include a service type, next hop, or gateway depending on the service type. A default route cost is automatically added to each route type (refer the following table for default route costs). Also, only trusted routes are advertised to other SD-WAN appliances. Untrusted routes are only used by the local appliance.

With WAN-to-WAN Forwarding (Routes Export Template) enabled under Global settings, the MCN site shares the advertised routes to all clients participating in the SD-WAN overlay. This feature enables IP connectivity between hosts at different client node sites, with the communication traveling through the MCN.

Each route for remote branch office subnets is advertised as a Service through the Virtual Path connecting through the MCN. The **Site** column is populated with the client node where the destination resides as a local subnet.

In the following example, **WAN-to-WAN Forwarding** (Routes Export) are enabled. Branch A has a route table entry for the Branch B subnet (10.2.2.0/24) through the MCN as a next hop.



How Citrix SD-WAN Traffic Matches on Defined Routes

The match process for defined routes on Citrix SD-WAN is based on the longest prefix match for the destination subnet (similar to a router operation). The more specific the route, the higher the change on it being matched. Sorting is done in the following order:

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1. Longest prefix matches
2. Cost
3. Service

Therefore a /32 route always precedes a /31 route. For two /32 routes, a cost 4 route always precedes a cost 5 route. For two /32 cost 5 routes, routes are chosen based on ordered IP host. Service order is as follows: Local, Virtual Path, Intranet, Internet, Passthrough, Discard.

As an example, consider the following two routes as follows:

- 192.168.1.0/24 Cost 5
- 192.168.1.64/26 Cost 10

A packet destined for the 192.168.1.65 host would use the latter route even though the cost is higher. It is common for configuration to be in place for the routes intended to be delivered over the Virtual Path overlay with other traffic falling into catch all routes such as a default route to the passthrough service.

Routes can be configured in a site node route table that have the same prefix. The tie break then goes to the route cost, the service type (Virtual Path, Intranet, Internet, and so on), and the next hop IP.

Citrix SD-WAN Routing Packet Flow

- LAN to WAN (Virtual Path) Traffic Route Matching:
    1. LAN interface receives and processes the incoming traffic.
    2. The received frame is compared to the route table for the longest prefix match.
    3. If a match is found, the rule engine processes the frame and creates a flow in the flow database.
- WAN to LAN (Virtual Path) Traffic Route Matching:
    1. SD-WAN receives the Virtual Path traffic from the tunnel and processes it.
    2. The appliance compares the source IP address to see if the source is local.
        - If yes –then WAN eligible and match IP destination to routing table/Virtual Path.
        - If no –then WAN to WAN forwarding enabled check.
    3. (WAN to WAN Forwarding disabled) Forward to LAN based on local routes.
    4. (WAN to WAN Forwarding enabled) Forward to Virtual Path based on route table.
- Non-Virtual Path Traffic:
    1. Incoming traffic is received on the LAN interface and is processed.

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2. The received frame is compared to the route table for the longest prefix match.
3. If a match is found, the rule engine processes the frame and creates a flow in the flow database.

Citrix SD-WAN Routing Protocol Support

Citrix SD-WAN release 9.1 introduced OSPF and BGP routing protocols into the configuration. Introducing routing protocols to SD-WAN enabled easier integration of SD-WAN in more complex underlay networks where routing protocols are actively in use. With the same routing protocols enabled on SD-WAN, configuration of subnets denoted to use the SD-WAN overlay was made easier. In addition, the routing protocols enable communication between SD-WAN and non-SD-WAN sites with direct communication to existing customer edge routers using the common routing protocol. Citrix SD-WAN participating in routing protocols and operating in the underlay network can be done regardless of the deployment mode of SD-WAN (Inline mode, Virtual Inline mode, or Edge/Gateway mode). Also, SD-WAN can be deployed in "learn only"mode where SD-WAN can receive routes but not advertise routes back to the underlay. It is useful when you introduce the SD-WAN solution into a network in which the routing infrastructure is complex or uncertain.

> **Important**
>
> It is easy to leak the unwanted route, if you are not careful.

The SD-WAN Virtual Path route table works as an External Gateway Protocol (EGP), similar to BGP (think site-to-site). For example, when SD-WAN advertises routes from the SD-WAN appliance to OSPF they are typically considered external to site and protocol.

> **Note**
>
> Be aware of environments that have IGPs across the entire infrastructure (across the WAN). It complicates how SD-WAN advertised routes are used. EIGRP is extensively used in the market and SD-WAN does not interoperate with that protocol.

When introducing Routing Protocols to an SD-WAN deployment, the route table is not available until the SD-WAN service is enabled and operation in the network. Therefore, it is not recommended to enable advertise routes from the SD-WAN appliance initially. Use the import and export filters for a gradual introduction of routing protocols on SD-WAN.

Let us take a closer look by reviewing the following example:

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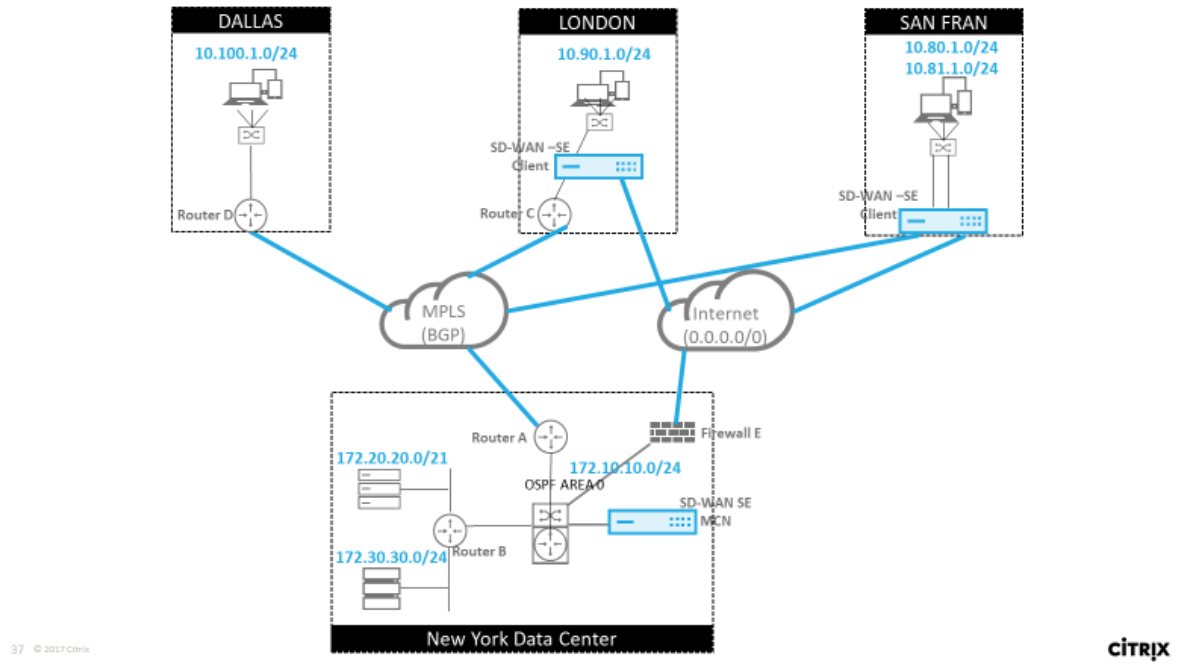

In this example, we examine a routing protocol use case. The preceding network has four locations; New York, Dallas, London, and San Francisco. We deploy SD-WAN appliances at three of these locations. Also, we use SD-WAN to create a hybrid WAN network where MPLS and Internet WAN Links are used to provide a Virtualized WAN. Since Dallas does not have an SD-WAN device, we must consider how to best integrate with existing route protocols to that site. It ensures full connectivity between underlay and SD-WAN overlay networks.

In the example network, eBGP is used between all four locations across the MPLS network. Each location has its own Autonomous System Number (ASN).

In the New York Data Center, OSPF is running to advertise the core Data Center subnets to the remote sites and also announce a default route from the New York Firewall (E). In this example, all internet traffic is backhauled to the data center, even though the London and San Francisco Branches have a path to the internet.

The San Francisco site also must be noted not to have a router. SD-WAN is deployed in Edge/Gateway mode. The appliance is the default gateway for the San Francisco subnet and also participates in eBGP to the MPLS.

- With the New York Data Center, take note that the SD-WAN is deployed in Virtual Inline mode. The intent is to participate in the existing OSPF routing protocol to get traffic forwarded to the appliance as the preferred gateway.
- The London site is deployed in traditional inline mode. The upstream WAN Router (C) remains the default gateway for the London subnet.
- The San Francisco site is a newly introduced site to this network. The idea is to deploy SD-WAN in Edge/Gateway mode and have the appliance act as the default gateway for the new San Fran-

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cisco subnet.

Review some of the existing underlay route tables before implementing SD-WAN.

New York Core Router B:

```
vyos@VYOS-ROUTER-B-CORE:~$ show ip route
Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF,
       I - ISIS, B - BGP, > - selected route, * - FIB route

O>* 0.0.0.0/0 [110/10] via 172.10.10.3, eth1, 00:08:56
O>* 10.90.1.0/24 [110/20] via 172.10.10.1, eth1, 00:21:02
O>* 10.100.1.0/24 [110/20] via 172.10.10.1, eth1, 00:21:02
C>* 127.0.0.0/8 is directly connected, lo
O   172.10.10.0/24 [110/10] is directly connected, eth1, 1d20h00m
C>* 172.10.10.0/24 is directly connected, eth1
C>* 172.20.20.0/24 is directly connected, eth2
C>* 172.30.30.0/24 is directly connected, eth3
C>* 192.168.65.0/24 is directly connected, eth0
```

The local New York subnets (172.x.x.x) are available on router B as directly connected. From the route table we identify that the default route is 172.10.10.3 (Firewall E). Also, we can see that the Dallas (10.90.1.0/24) and London (10.100.1.0/24) subnets are available through 172.10.10.1 (MPLS Router A). The route costs indicate that they were learned from eBGP.

> **Note**
>
> In the example provided, San Francisco is not listed as a route. It is because we have not yet deployed the site with SD-WAN in Edge/Gateway mode for that network.

```
vyos@VYATTA-ROUTER-A:~$ show ip route
Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF,
       I - ISIS, B - BGP, > - selected route, * - FIB route

O>* 0.0.0.0/0 [110/10] via 172.10.10.3, eth1, 00:09:52
B>* 10.90.1.0/24 [20/1] via 192.168.10.2, eth2, 1d23h09m
B>* 10.100.1.0/24 [20/1] via 192.168.10.3, eth2, 1d23h10m
C>* 127.0.0.0/8 is directly connected, lo
O   172.10.10.0/24 [110/10] is directly connected, eth1, 1d20h01m
C>* 172.10.10.0/24 is directly connected, eth1
O>* 172.20.20.0/24 [110/20] via 172.10.10.2, eth1, 00:21:58
O>* 172.30.30.0/24 [110/20] via 172.10.10.2, eth1, 00:21:58
C>* 192.168.10.0/24 is directly connected, eth2
O   192.168.65.0/24 [110/20] via 172.10.10.2, 1d19h57m
C>* 192.168.65.0/24 is directly connected, eth0
```

For the New York WAN Router (A), OSPF learned routes and routes learned across the MPLS through eBGP are listed routes. Note the route costs. BGP is lower administrative domain and cost by default

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20/1 compared to OSPF 110/10.

Dallas Router D:

For the Dallas WAN Router (D) all routes are learned across the MPLS.

```
vyos@VYATTA-ROUTER-D:~$ show ip route
Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF,
       I - ISIS, B - BGP, > - selected route, * - FIB route

B>* 0.0.0.0/0 [20/10] via 192.168.10.1, eth2, 00:10:17
B>* 10.90.1.0/24 [20/1] via 192.168.10.2, eth2, 1d23h10m
C>* 10.100.1.0/24 is directly connected, eth1
C>* 127.0.0.0/8 is directly connected, lo
B>* 172.10.10.0/24 [20/1] via 192.168.10.1, eth2, 1d23h10m
B>* 172.20.20.0/24 [20/20] via 192.168.10.1, eth2, 00:22:17
B>* 172.30.30.0/24 [20/20] via 192.168.10.1, eth2, 00:22:17
C>* 192.168.10.0/24 is directly connected, eth2
C>* 192.168.65.0/24 is directly connected, eth0
```

> **Note**
>
> In this example, you can ignore the 192.168.65.0/24 subnet. This is a management network and not pertinent to the example. All the Routers are connected to the management subnet but is not advertised in any routing protocol.

After the Citrix SD-WAN appliances have been deployed, we can take a refreshed look at the route tables for the BGP router at the Dallas site. We see 10.80.1.0/24 and 10.81.1.0/24 subnets are being seen correctly through eBGP from the San Francisco SD-WAN.

Dallas Router D:

```
vyos@VYATTA-ROUTER-D:~$ show ip route
Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF,
       I - ISIS, B - BGP, > - selected route, * - FIB route

B>* 0.0.0.0/0 [20/10] via 192.168.10.1, eth2, 00:00:01
B>* 10.80.1.0/24 [20/0] via 192.168.10.4, eth2, 3d19h07m
B>* 10.81.1.0/24 [20/0] via 192.168.10.4, eth2, 3d19h07m
B>* 10.90.1.0/24 [20/1] via 192.168.10.2, eth2, 4d23h38m
C>* 10.100.1.0/24 is directly connected, eth1
C>* 127.0.0.0/8 is directly connected, lo
B>* 172.10.10.0/24 [20/1] via 192.168.10.1, eth2, 4d23h38m
B>* 172.20.20.0/24 [20/20] via 192.168.10.1, eth2, 00:00:01
B>* 172.30.30.0/24 [20/20] via 192.168.10.1, eth2, 00:00:01
B   192.168.10.0/24 [20/0] via 192.168.10.4 inactive, 3d19h07m
C>* 192.168.10.0/24 is directly connected, eth2
C>* 192.168.65.0/24 is directly connected, eth0
```

Citrix SD-WAN shows all the routes learned, including routes available through the Virtual Path overlay.

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Let us consider 172.10.10.0/24, which is in the New York Data Center. This route is being learned in two ways:

- As a Virtual Path route (Number 3), service = NYC-SFO with a cost of 5 and type static. It is a local subnet advertised by SD-WAN appliance in New York. It is static in that it is either directly connected to the appliance or it is a manual static route entered in the configuration. It is reachable because the Virtual Path between the sites is in a working/up state.
- As an advertised route through BGP (Number 6), with a cost of 6. This is now considered a fallback route.

The prefix is equal and the cost is different. SD-WAN uses the Virtual Path route unless it becomes unavailable in which case the fallback route is learned through BGP.

Now, let us consider the route 172.20.20.0/24.

- This is learned as a Virtual Path route (Number 9) but has a type of dynamic and a cost of 6. This means that the remote SD-WAN appliance learned this route through a routing protocol, in this case OSPF. By default the route cost is higher.
- SD-WAN also learns this route through BGP with the same cost, so this route might be preferred over the Virtual Path route.

We also see a passthrough and discard route with cost 16. These routes are automatic and cannot be removed. If the device is inline, the passthrough route is used as a last resort. So, if a packet cannot be matched to a more specific route, SD-WAN passes it along to the next hop of the interface group. If the SD-WAN is out of path or in edge/gateway mode, there is no passthrough service, in which case SD-WAN drops the packet using the default discard route. The Hit Count indicates the number of packets that are hitting each route, which can be valuable when troubleshooting.

For the New York site, we want traffic destined to remote sites (London and San Francisco) to be directed to the SD-WAN appliance when the Virtual Path is active.

There are multiple subnets available in the New York site:

- 172.10.10.0/24 (directly connected)
- 172.20.20.0/24 (advertised via OSPF from the core router B)
- 172.30.30.0/24 (advertised via OSPF from the core router B)

We also are required to provide traffic flow to Dallas (10.100.1.0/24) through MPLS.

Dynamic Virtual Paths

Dynamic Virtual Paths can be allowed between two client nodes to build on-demand virtual paths for direct communication between the two sites. The advantage of a dynamic virtual path is that

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traffic can flow directly from one client node to the second without having to traverse the MCN or two virtual paths, which can add latency to the traffic flow. Dynamic virtual paths are built and removed dynamically based on user-defined traffic thresholds. These thresholds are defined as either packets per second (pps) or bandwidth (kbps). This functionality enables a dynamic full mesh SD-WAN overlay topology.

Once the thresholds for dynamic virtual paths are met, the client nodes dynamically create their virtualized path to one another using all available WAN paths between the sites and make full use of it in the following manner:

- Send Bulk data if any exists and verify no loss, then
- Send Interactive data and verify no loss, then
- Send Real Time data after the Bulk and Interactive data are considered stable (no loss or acceptable levels)
- If there is no Bulk or interactive data send Real Time Data after the Dynamic Virtual Path has been stable for a period
- If the user data falls below the configured thresholds for a user defined period, the dynamic virtual path is torn down

  Dynamic Virtual Paths have the concept of an Intermediate site. The intermediate site can be an MCN site or any other site in the network. The site must have Static Virtual Path configured and connected to two or more other client nodes. Another design consideration requirement is to have WAN-to-WAN Forwarding enabled. It would allow all routes from all sites to be advertised to the client nodes where the dynamic virtual path is desired.

Multiple WAN-to-WAN Forwarding Groups can are allowed in the SD-WAN configuration. It enables full control to path establishment between certain client nodes and not others.

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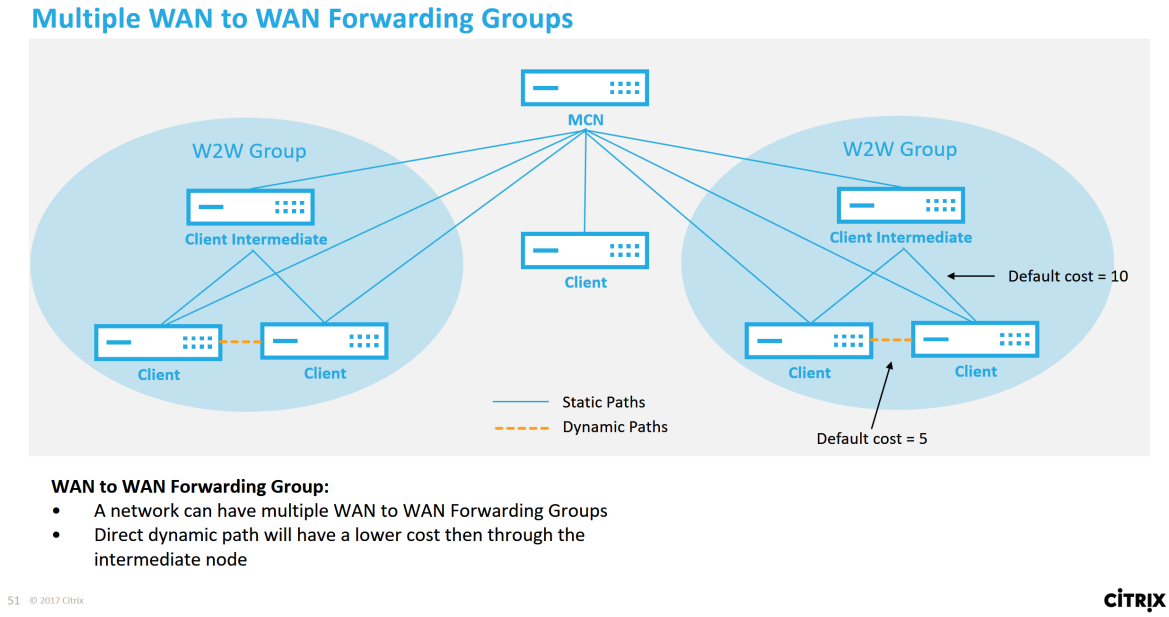

Each SD-WAN device has its own unique route table with the following details defined for each route:

- Num –Order of route of the appliance based on match process (lowest Num processed first)
- Network address –Subnet or host address
- Gateway if necessary
- Service –Service that is applied for the route
- Firewall Zone –The firewall zone classification of the route
- Reachable –Identifies if the Virtual Path state is active for the site
- Site –The name of the site where the route is expected to exist
- Type –Identification of route type (Static or Dynamic)
- Neighbor Direct
- Cost - Cost of the specific route
- Hit Count –Number of times the route has been used per packet. This information would be used to verify that a route is being hit correctly.
- Eligible
- Eligibility Type
- Eligibility Value

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Intranet and Internet Routes

For the Intranet and Internet service types, the user must have defined an SD-WAN WAN Link to support those types of services. It is a pre-requisite for any defined routes for either of these services. If the WAN link is not defined to support the Intranet Service, it is considered as a local route. The Intranet, Internet, and Passthrough routes are only relevant to the site/appliance they are configured for.

When defining Intranet, Internet or Passthrough routes the following are design considerations:

- Must have service defined on the WAN link (Intranet/Internet –required)
- Intranet/Internet must have gateway defined for the WAN link
- Relevant to local SD-WAN device
- Intranet routes can be learned via the Virtual Path but are done so at a higher cost
- With Internet Service, there is automatically a default route created (0.0.0.0/0) catch all route with a max cost
- Do no assume that Passthrough works, it must be tested/verified, also test with Virtual Path down/disabled to verify desired behavior
- Route tables are static unless the route learning feature is enabled

  The maximum supported limit for multiple routing parameters is as follows:

- Maximum Routing Domains: 255
- Maximum Access Interfaces per WAN Link: 64
- Maximum BGP neighbors per site: 255
- Maximum OSPF area per site: 255
- Maximum Virtual Interfaces per OSPF area: 255
- Maximum Route Learning import filters per site: 512
- Maximum Route Learning export filters per site: 512
- Maximum BGP routing policies: 255
- Maximum BGP community string objects: 255

Network address translation

September 27, 2025

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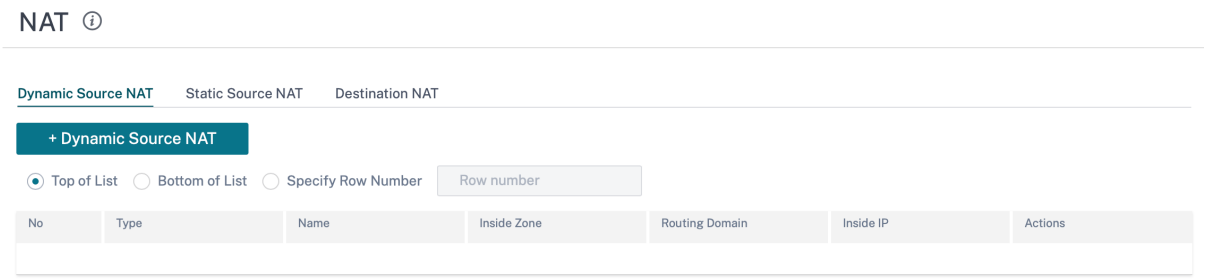
Network Address Translation (NAT) on the SD-WAN appliance performs IP address conservation to preserve the limited number of registered IP addresses. It translates the private addresses in the internal network into a legal public address and connects your private SD-WAN network with the public internet. The public IP address is used for communication over the internet. NAT also ensures extra security by advertising only one address for the entire network to the internet, hiding the entire internal network.

You can configure the following types of NAT:

- Dynamic source NAT
- Static NAT
- Destination NAT

> **Note**
>
> The NAT capability can only be configured at the site level. There is no global configuration (templates) for NAT.

To configure NAT for a site using the Citrix SD-WAN Orchestrator service, from site level, navigate to **Configuration > Advanced Settings > NAT**.



Inbound and Outbound NAT

The direction for a connection can either be inside to outside or outside to inside. When a NAT rule is created, you can define the direction using the **On Receive** check box. When the check box is selected, the direction is configured as **Inbound** and when the check box is cleared, the direction is configured as **Outbound**.

- **Inbound**: The source address is translated for packets received on the service. The destination address is translated for packets transmitted on the service. For example, Internet service to LAN service –For packets received (Internet to LAN), the source IP address is translated. For packets transmitted (LAN to Internet), the destination IP address is translated.
- **Outbound**: The destination address is translated for packets received on the service. The source address is translated for packets transmitted on the service. For example, LAN service to

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Internet service –for packets transmitted (LAN to Internet) the source IP address is translated. For packets received (Internet to LAN) the destination IP address is translated.

Zone Derivation

The source and destination firewall zones for the inbound or outbound traffic must not be the same. If both the source and destination firewall zones are the same, NAT is not performed on the traffic.

For outbound NAT, the outside zone is automatically derived from the service. Every service on SD-WAN is associated to a zone by default. For example, Internet service on a trusted internet link is associated with the trusted internet zone. Similarly, for an inbound NAT, the inside zone is derived from the service.

For a Virtual path service NAT zone derivation does not happen automatically, you have to manually enter the inside and outside zone. NAT is performed on traffic belonging to these zones only. Zones cannot be derived for virtual paths because there might be multiple zones within the Virtual path subnets.

Dynamic source NAT

Dynamic Source NAT is a many-to-one mapping of a private IP address or subnets inside the SD-WAN network to a public IP address or subnet outside the SD-WAN network. It allows multiple hosts to have their source IP addresses translated to the same public IP address with different port numbers. Port restricted NAT uses the same outside port for all translations related to an Inside IP address and port pair. The traffic from different zones and subnets over trusted (inside) IP addresses in the LAN segment is sent over a single public (outside) IP address.

> **Note**
>
> Dynamic NAT translations allow all reciprocal traffic for a session initiated from the Inside Network. To filter these connections, add filter Policies for the outbound traffic.

Port Address Translation

Dynamic NAT does Port Address Translation (PAT) along with IP address translation. Port numbers are used to distinguish which traffic belongs to which IP address. A single public IP address is used for all internal private IP addresses, but a different port number is assigned to each private IP address. PAT is a cost effective way to allow multiple hosts to connect to the Internet using a single Public IP address.

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The **Symmetric** check box defines the PAT configuration. While configuring NAT rules, if the check box is selected, Symmetric NAT is configured and when cleared, Port Restricted NAT gets configured in the back-end.

- **Port Restricted**: Port Restricted NAT uses the same outside port for all translations related to an Inside IP Address and Port pair. This mode is typically used to allow Internet P2P applications.
- **Symmetric**: Symmetric NAT uses the same outside port for all translations related to an Inside IP Address, Inside Port, Outside IP Address, and Outside Port tuple. This mode is typically used to enhance security or expand the maximum number of NAT sessions.

Port Forwarding

Dynamic NAT with port forwarding allows traffic from an Outside network to access specific hosts and ports on the Inside network without the session being initiated from the inside. This is typically used for inside hosts like web servers.

Once the dynamic NAT is configured you can define the port forwarding policies. Configure dynamic NAT for IP address translation and define the port forwarding policy to map an outside port to an inside port. Dynamic NAT port forwarding is typically used to allow remote hosts to connect to a host or server on your private network.

Configure Dynamic Source NAT

To configure dynamic NAT for a site using the Citrix SD-WAN Orchestrator service, from site level, navigate to **Configuration > Advanced Settings > NAT > Dynamic Source NAT** tab. Click **+ Dynamic Source NAT**.

- **Type**: The SD-WAN service types on which the NAT policy is applied. For static NAT, the service types supported are Local, Virtual Paths, Internet, Intranet, and Inter-routing domain services.
- **Routing Domain**: Select the routing domain for which the selected translation applies to.
- **IP Address Type**: Select the IPv4 or IPv6 address type based on your preference.
- **Destination Service**: Provide a name for the service that corresponds to the Service Type.
- **Inside Zone**: The Inside firewall zone match-type that the packet must be from to allow translation.
- **Inside IP/Prefix**: The inside IP address and prefix that has to be translated to if the match criteria is met.
- **Outside IP**: The outside IP address and prefix that the inside IP address is translated to if the match criteria is met. For outbound traffic using Internet and Intranet services, the configured WAN link IP address is dynamically chosen as the outside IP address.
- **Port Parity**: If enabled, outside ports for NAT connections maintain parity (even if inside port is even, odd if outside port is odd).

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- **Bind Responder Route**: Ensures that the response traffic is sent over the same service that it is received on, to avoid asymmetric routing.
- **Allow Related**: Allow traffic related to the flow matching the rule. For example, ICMP redirection related to the specific flow that matched the policy, if there was some type of error related to the flow.
- **IPSec Passthrough**: Allow an IPsec (AH/ESP) session to be translated.
- **GRE/PPTP Passthrough**: Ensures that the response traffic is sent over the same service that it is received on, to avoid asymmetric routing.
- **On Receive**: When this check box is selected, inbound NAT is configured. When cleared, outbound NAT is configured.
- **Symmetric**: When this check box is selected, Symmetric NAT is configured. When cleared, port restricted NAT is configured.

Port Forwarding Rules:

- **Routing Domain**: Select the routing domain for which the selected translation applies to.
- **Protocol**: TCP, UDP, or both.
- **Outside Port**: The Outside port that is port forward into the inside port.
- **Inside IP**: The inside address to forward matching packets.
- **Inside Port**: The Inside port that the outside port will be port forwarded into.

Every port forwarding rule has a parent NAT rule. The outside IP address is taken from the parent NAT rule.

> **Note**
>
> The Citrix SD-WAN Orchestrator service UI displays auto-created NAT rules when the following conditions are fulfilled:
>
> - Internet service is enabled on the site.
> - IPv4 outbound Internet dynamic source NAT rule is not configured at the site.
> - At least 1 WAN link is on an untrusted interface or Internet is enabled on all routing domains.

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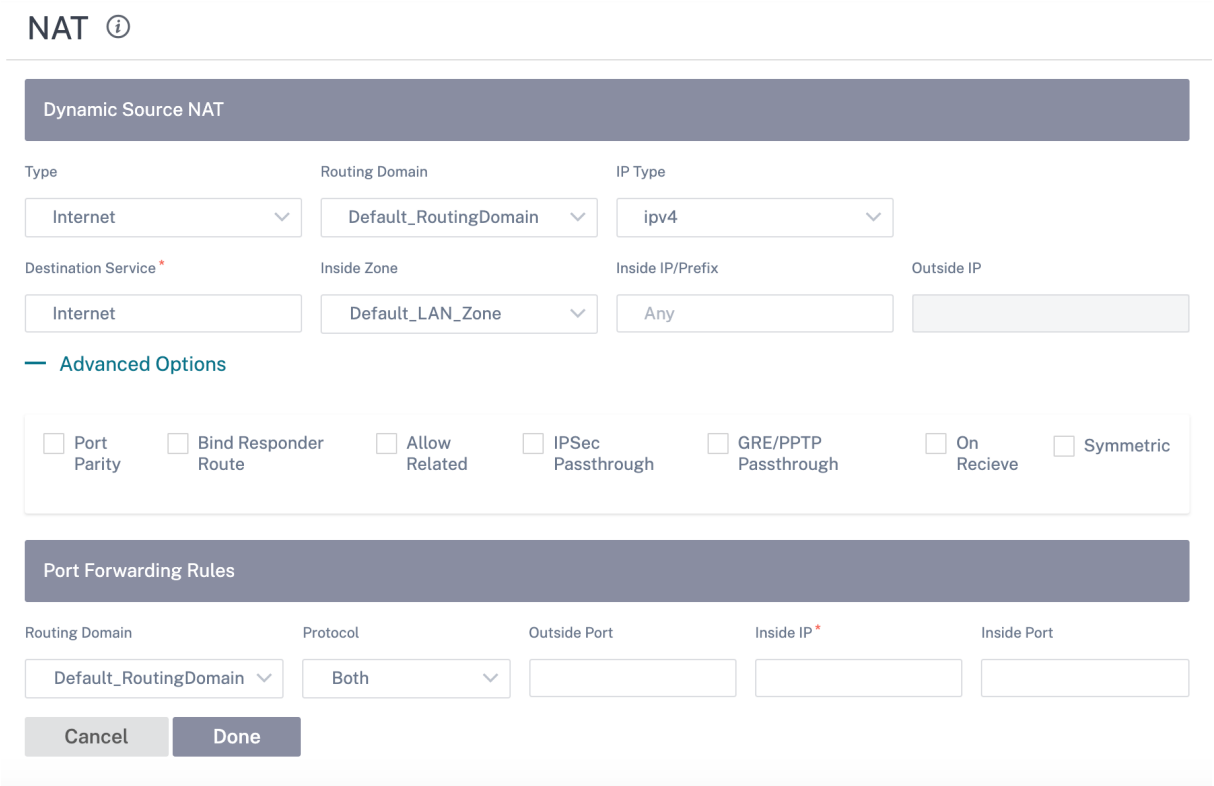

Static source NAT

Static NAT is a one-to-one mapping of a private IP address or subnet inside the SD-WAN network to a public IP address or subnet outside the SD-WAN network. Configure Static NAT by manually entering the inside IP address and the outside IP address to which it has to translate. You can configure Static NAT for the Local, Virtual Paths, Internet, Intranet, and Inter-routing domain services.

Configure Static source NAT

To configure static NAT for a site using the Citrix SD-WAN Orchestrator service, from site level, navigate to **Configuration > Advanced Settings > NAT > Static Source NAT** tab. Click **+ Static Source NAT**.

- **Type**: The SD-WAN service types on which the NAT policy is applied. For static NAT, the service types supported are Local, Virtual Paths, Internet, Intranet, and Inter-routing domain services
- **Destination Service**: Provide a name for the service that corresponds to the Service Type.
- **Inside Zone**: The Inside firewall zone match-type that the packet must be from to allow translation.
- **Outside Zone**: The outside firewall zone match-type that the packet must be from to allow translation.
- **IP Address Type**: Select the IPv4 or IPv6 address type based on your preference.

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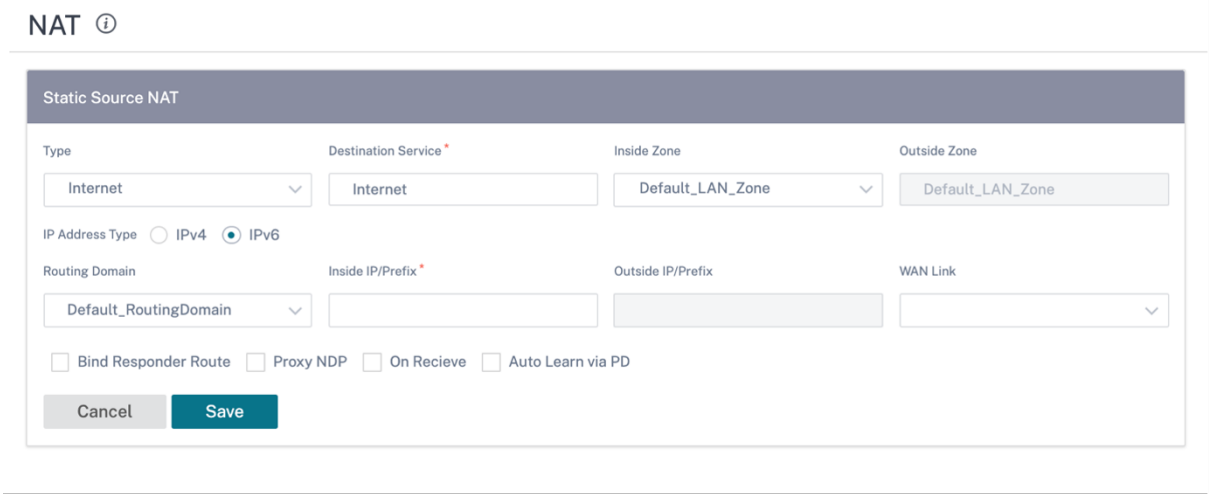
- **Routing Domain**: Select the routing domain for which the selected translation applies to.
- **Inside IP/Prefix**: The inside IP address and prefix that has to be translated to if the match criteria is met.
- **Outside IP/Prefix**: The outside IP address and prefix that the inside IP address is translated to if the match criteria is met.
- **Bind Responder Route**: Ensures that the response traffic is sent over the same service that it is received on, to avoid asymmetric routing.
- **Proxy ARP**: Ensures that the appliance responds to local ARP requests for the outside IP address.
- **Proxy NDP**: Ensures that the appliance responds to local NDP requests for the outside IP address.
- **On Receive**: When this check box is selected, inbound NAT is configured. When cleared, outbound NAT is configured.
- **Auto Learn via PD**: This check box gets enabled only when you select IPv6 as the **IP Address Type**. When selected, Citrix SD-WAN™ requests a prefix from the upstream delegating router and the delegating router responds with a prefix to Citrix SD-WAN.



Static NAT Policies for IPv6 Internet service

Citrix SD-WAN supports static NAT policies for the IPv6 Internet service from release 11.4.0 onwards. A static NAT policy for the IPv6 Internet service specifies the mapping of an inside network prefix to an outside network prefix. The number of static NAT policies required depends on the number of inside networks and the number of outside networks (WAN links). If there are **M** number of inside networks and **N** number of WAN links, then the number of static NAT policies required is **M x N**.

From Citrix SD-WAN release 11.4.0 onwards, while creating a static NAT policy, you can either enter the outside IP address manually or enable **Auto Learn via PD**. When **Auto Learn via PD** is enabled, the SD-WAN appliance receives delegated prefixes from the upstream delegating router through DHCPv6

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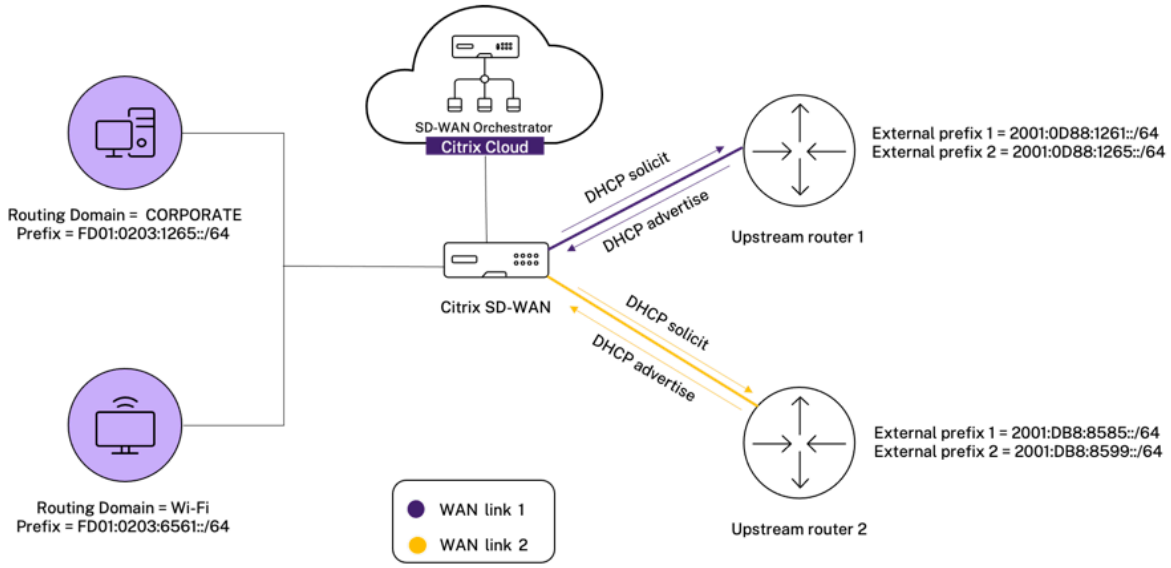
Prefix Delegation. Before Citrix SD-WAN release 11.4.0, the outside IP address was derived from the service automatically and there was no option to enter the outside IP address manually. If you are upgrading an appliance to 11.4.0 or a later release and have static NAT policies configured for IPv6 Internet service, then you must manually update the policies.

Configuration example

In the following topology, the Citrix SD-WAN appliance is configured with 2 inside networks and 2 WAN links:

- Inside network 1 resides in the CORPORATE routing domain with network prefix FD01:0203:6561::/64
- Inside network 2 resides in the Wi-Fi routing domain with network prefix FD01:0203:1265::/64
- Through WAN Link 1, the SD-WAN appliance receives from the upstream delegating router through DHCPv6 Prefix Delegation, 2 delegated prefixes 2001:0D88:1261::/64 and 2001:0D88:1265::/64. These 2 delegated prefixes are used as the outside network prefixes when the traffic from the inside networks transits WAN link 1.
- Through WAN Link 2, the SD-WAN appliance receives from the upstream delegating router through DHCPv6 Prefix Delegation, 2 delegated prefixes 2001:DB8:8585::/64 and 2001:DB8:8599::/64. These 2 delegated prefixes are used as the outside network prefixes when the traffic from the inside networks transits WAN link 2.



In this scenario, there are M=2 inside networks and N=2 WAN links. Therefore, the number of static NAT policies required for proper deployment of the IPv6 Internet service is 2 x 2 = 4. These 4 static NAT policies specify the address translation for:

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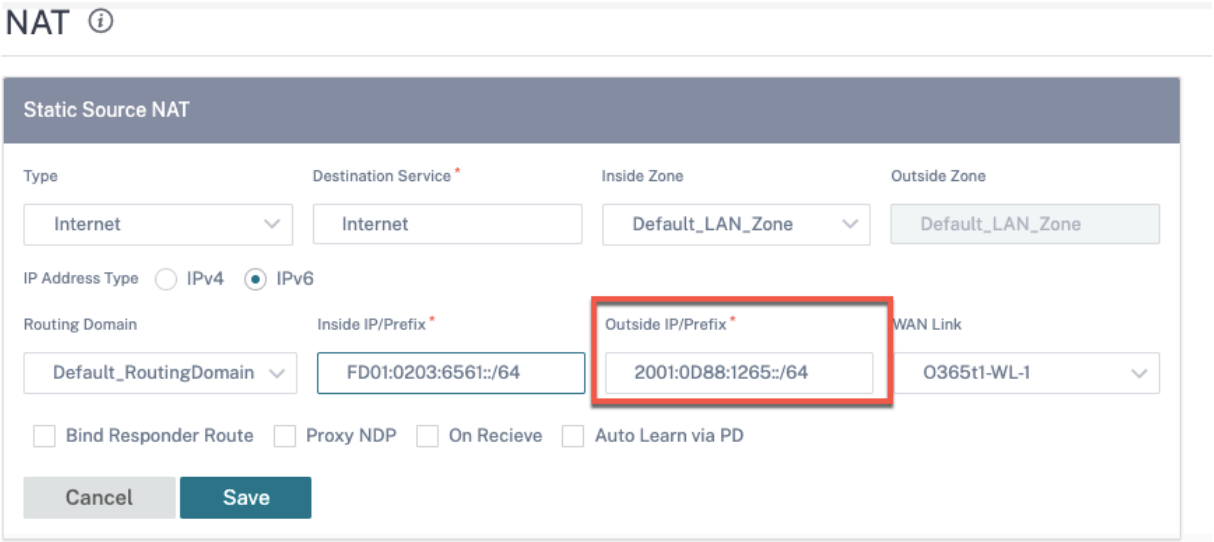
- Inside network 1 through WAN link 1
- Inside network 1 through WAN link 2
- Inside network 2 through WAN link 1
- Inside network 2 through WAN link 2

To configure these static NAT policies, from site level, navigate to **Configuration > Advanced Settings > NAT > Static Source NAT**. Click **+Static Source NAT**.

While creating NAT policies, ensure that you select the **Type** as **Internet** and **IP Address Type** as **IPv6**. Select the WAN link and in the **Inside IP/Prefix** field, enter the inside network prefix (only /64 prefixes are allowed). In the **Outside IP/Prefix** field, you can either manually enter the outside network prefix or select the **Auto Learn via PD** check box.

The following is an example where the outside IP address is entered manually in the static NAT policy.



If you select the **Auto Learn via PD** check box, ensure that the upstream router supports DHCPv6 Prefix Delegation. Citrix SD-WAN requests a prefix from the upstream delegating router and the delegating router responds with a prefix to Citrix SD-WAN. Citrix SD-WAN uses this delegated prefix to translate the inside IP address to the outside IP address.

The following is an example where **Auto Learn via PD** is enabled, so that the outside network prefix is obtained through DHCPv6 Prefix Delegation.

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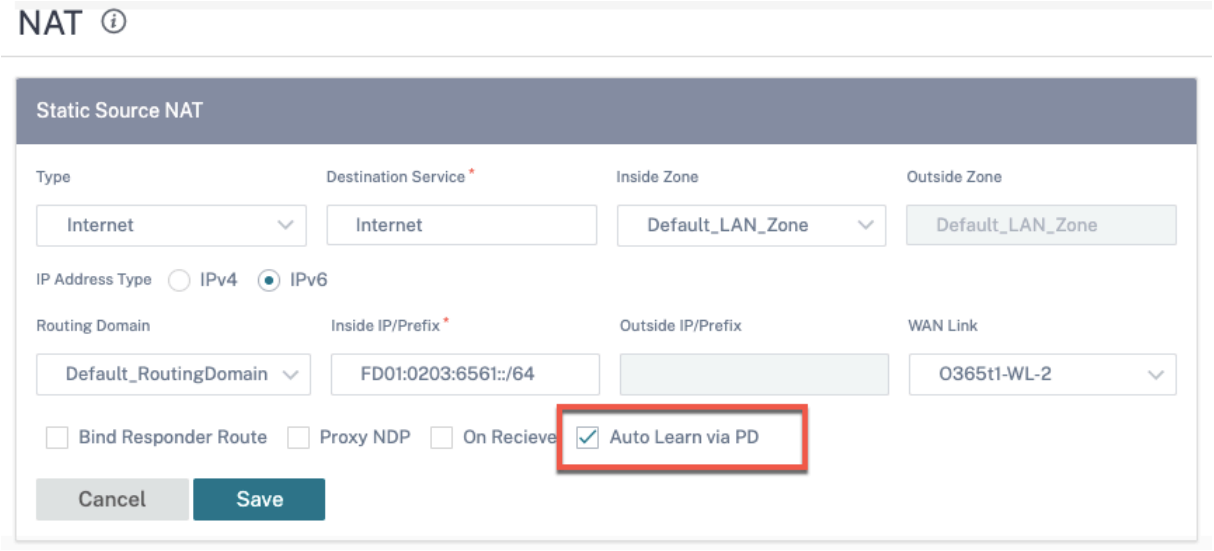

Destination NAT

Destination NAT Policies allow for the configuration of Network Address Translation policies between individual hosts or subnets.

> **Note**
>
> - While both Inbound and Outbound translations can be configured simultaneously for a Service, only the first to match will be used. Multiple translations can occur if a rule exists on the Service a packet is received on and the Service a packet is sent on.
> - Destination NAT translations are applicable only for traffic originating from Local Service.

To configure these destination NAT policies, from site level, navigate to **Configuration > Advanced Settings > NAT > Destination NAT**. Click **+ Destination NAT**.

- **Type**: The SD-WAN service types on which the NAT policy is applied. For static NAT, the service types supported are Local, Virtual Paths, Internet, Intranet, and Inter-routing domain services
- **Service Name**: Provide a name for the service that corresponds to the Service Type.
- **IP Type**: Select the IPv4 or IPv6 address type based on your preference.
- **Inside Port**: The Inside port that the outside port will be port forwarded into.
- **Outside IP**: The outside IP address and prefix that the inside IP address is translated to if the match criteria is met. For outbound traffic using Internet and Intranet services, the configured WAN link IP address is dynamically chosen as the outside IP address.
- **Outside Port**: The Outside port that is port forward into the inside port.
- **Routing Domain**: Select the routing domain for which the selected translation applies to.
- **On Receive**: When this check box is selected, inbound NAT is configured. When cleared, outbound NAT is configured.

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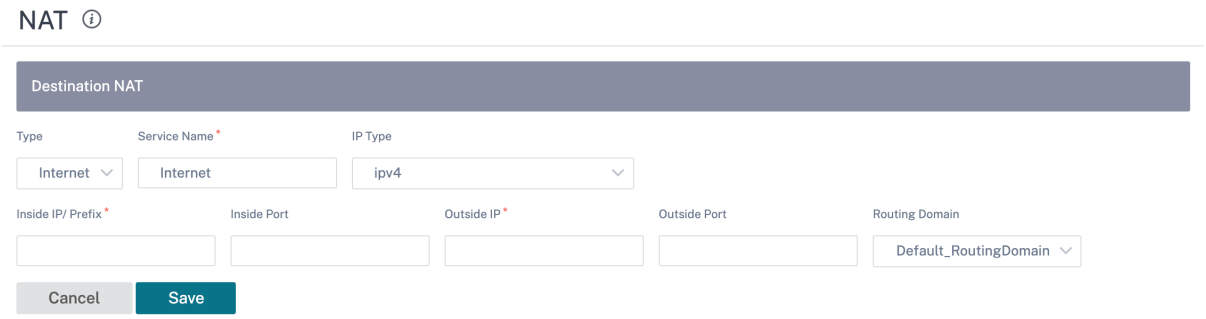
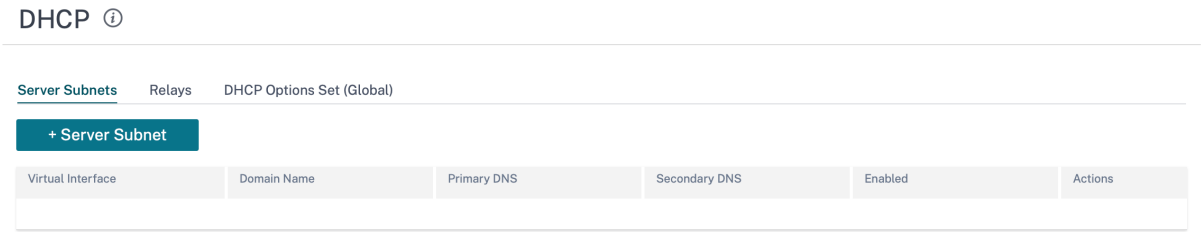


Dynamic host configuration protocol

September 27, 2025

You can configure your SD-WAN appliances as either **DHCP Servers** or **DHCP Relay agent**. The DHCP server feature allows devices on the same network as the SD-WAN appliance's LAN/WAN interface to obtain their IP configuration from the SD-WAN appliance. The DHCP relay feature allows your SD-WAN appliances to forward DHCP packets between DHCP client and server.



DHCP server

Citrix SD-WAN™ appliances can be configured as a DHCP server. It can assign and manage IP addresses from specified address pools within the network to DHCP clients.

The DHCP server can be configured to assign other parameters such as the DNS IP address and default gateway. DHCP server accepts address assignment requests and renewals. The DHCP server also accepts broadcasts from locally attached LAN segments or from DHCP requests forwarded by other DHCP relay agents within the network.

To configure the DHCP server, in the Site configuration page, from site level, navigate to **Configuration > Advanced Settings > DHCP > Server Subnets** > click **+ Server Subnet**.

Select the **Virtual interface** to be used to receive the DHCP requests. The IP Subnet to which the DHCP server provides the IP addresses is auto-populated.

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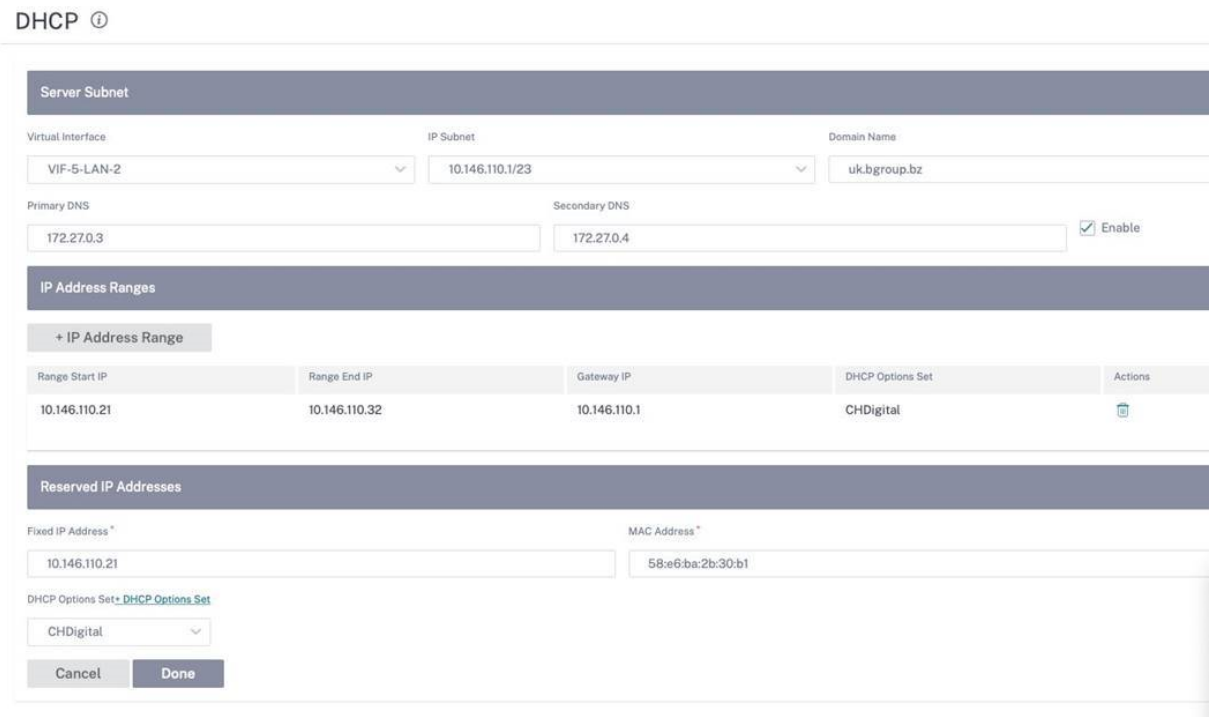

Enter the **Domain Name**, **Primary DNS**, and **Secondary DNS**. The DHCP Server forwards this information to the DHCP clients.

Configure dynamic IP address pools that is used to allocate IP addresses to clients. Specify the range starting and ending IP address and select the **DHCP Option Set**.

> **Note**
>
> The DHCP Option Set is groups of DHCP settings that can be applied to individual IP address ranges. For more information, see DHCP Option Set.

Set the reserved IP address by mapping individual hosts that require a fixed IP address to its MAC address. Enter the **Fixed IP Address**, **MAC Address**, and select a **DHCP Option Set**.

> **Note**
>
> For reserved IP addresses, the **Gateway IP** is set by configuring the **Router** option in the **DHCP Option Set**.

DHCP relay

Citrix SD-WAN appliance can be configured as a DHCP relay. It relays DHCP requests and replies between the local DHCP Clients and a remote DHCP Server.

It allows local hosts to acquire dynamic IP addresses from the remote DHCP Server. Relay agent receives DHCP messages and generates a new DHCP message to send out on another interface.

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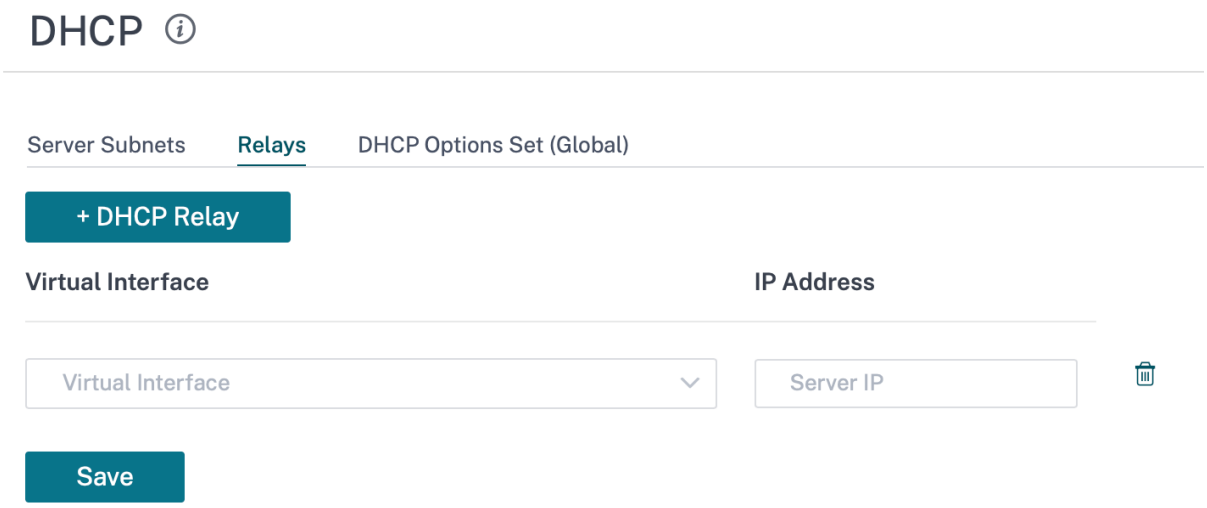
To configure the DHCP server, in the Site configuration page, navigate to **Configuration > Advanced Settings > DHCP > Relays** > click **+ DHCP Relay**.



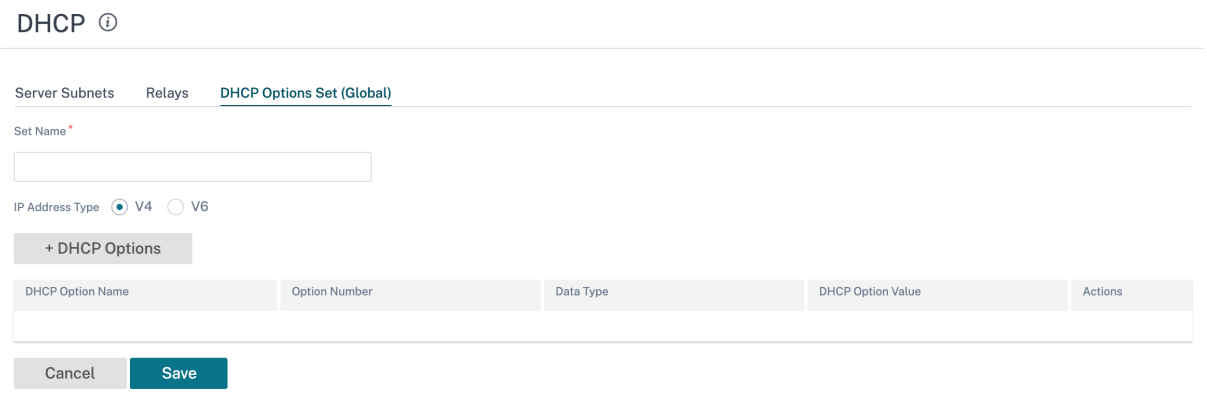
Select a **Virtual Interface** that communicates to a remote DHCP Server. Enter the **DHCP Server IP** that the relay uses to forward the request and response from the clients.

You can configure a single **DHCP Relay** using a common Virtual Network Interface and point it to multiple DHCP Servers.

DHCP options set

DHCP Options are a group of DHCP configurations that can be applied to individual IP address ranges or a single host.

Set a name for the DHCP option profile and choose the **IP Address Type**. Click **+ DHCP Options Set** and select a DHCP option name from the list. The option number is pre-configured. For custom options, the range is 224–254. Select a **Data Type** and enter a **Value** for the option.



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WAN link IP address learning through DHCP client

Citrix SD-WAN appliances support WAN Link IP address learning through DHCP Clients. This functionality reduces the amount of manual configuration required to deploy SD-WAN appliances and reduces ISP costs by eliminating the need to purchase static IP addresses. SD-WAN appliances can obtain dynamic IP addresses for WAN Links on untrusted interfaces. This eliminates the need for an intermediary WAN router to perform this function.

> **Notes**
>
> - DHCP Client can only be configured for untrusted non-bridged interfaces configured as Client Nodes.
> - DHCP client and data port can be enabled on MCN/RCN only if Public IP address is configured.
> - One-Arm or Policy Based Routing (PBR) deployment is not supported on the site with DHCP Client configuration.
> - DHCP events are logged from the client's perspective only and no DHCP server logs are generated.

For information about configuring DHCP for an untrusted virtual interface on fail-to-block mode and fail-to-wire mode, see Site level configuration.

Multicast routing

September 27, 2025

Multicast routing enables efficient distribution of one-to-many traffic. A multicast source, sends multicast traffic in a single stream to a multicast group. The multicast group contains receivers such as hosts and adjacent routers that use the IGMP protocol for multicast communication. Voice over IP, Video on demand, IP television, and Video conferencing are some of the common technologies that use multicast routing. When you enable multicast routing on the Citrix SD-WAN™ appliance, the appliance acts as a multicast router.

Source specific multicast

Multicast protocols typically allow multicast receivers to receive multicast traffic from any source.

With the source specific multicast (SSM), you can specify the source from which the receivers receive the multicast traffic. It ensures that the receivers are not open listeners to every source that is sending multicast streams but rather listen to a particular multicast source.

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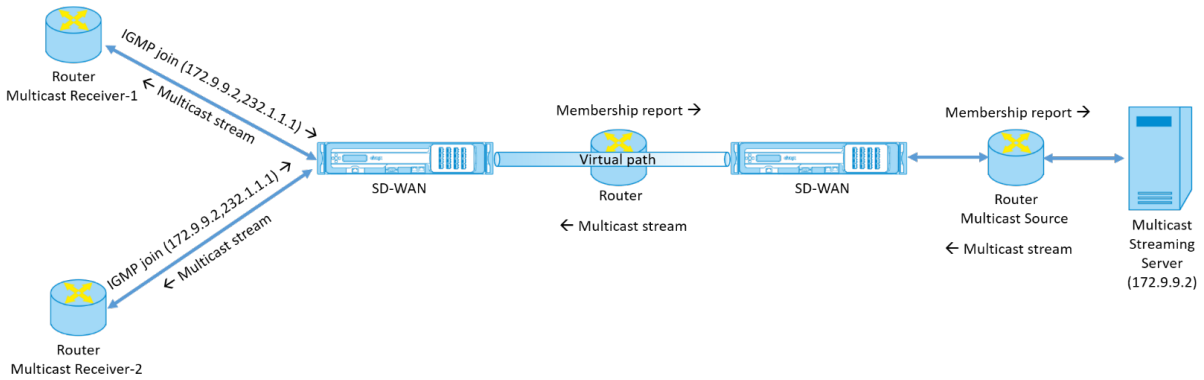
The SSM reduces the cost of resources used in consuming traffic from every possible source. The SSM also provides a layer of security by ensuring that the receivers receive traffic from a known sender.

The following topology shows two multicast receivers at a branch site and a multicast server (172.9.9.2) at the Data Center. The multicast server streams traffic over a particular group (232.1.1.1), the receivers join the group. Any traffic streamed on the multicast group is relayed to all the receivers that joined the group.

> **Note**
>
> For SSM to work, the multicast group IP must fall within the range 232.0.0.0/8.



1. The multicast receivers send an IP IGMP join request indicating that the receivers want to join the multicast group and want to receive the multicast stream from the source.

   The IGMP join includes 2 attributes the multicast source and group (S, G). IGMP Version 3 is used for SSM on the multicast source and the receiver to relay some INCLUDE specific source addresses.

   The SSM allows the receivers to explicitly receive streams from specific Multicast servers, whose source address is explicitly provided by the receivers as part of the JOIN request. In this example, an IGMP v3 join request is triggered with an explicit include source list, which contains the source 172.9.9.2, to be the address that sends the multicast stream over the group 232.1.1.1.

2. The Citrix SD-WAN at the branch listens to all the IGMP requests from these receivers and converts it into a membership report and sends it over the Virtual Path to the SD-WAN appliance at the data center.

3. The Citrix SD-WAN appliance at the data center receives the membership report over the Virtual Path and forwards it to the Multicast Source, establishing a control channel.

4. The Multicast source transmits the multicast stream over the Virtual path to the multicast receivers.

The control channel traffic and the multicast stream flow through the established virtual path between

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the branch and the data center. The Citrix SD-WAN overlay path insures and insulates multicast traffic from WAN degradation or link brownouts.

Multicast configuration

To configure multicast, perform the following on the SD-WAN Orchestrator service at both the source and destination.

1. Create a multicast group - Provide a name and IP address for the multicast group. The multicast group IP must fall within the range 232.0.0.0/8 for source specific multicast.
2. Enable IGMP proxy –You can configure the Citrix SD-WAN appliance as an IGMP/MLD proxy to carry the IGMP control channel information for multicast routing.
3. Define the upstream and downstream services - An upstream interface enables the IGMP PROXY to connect to the SD-WAN appliance closer to the actual multicast source that streams the traffic. A downstream interface enables the IGMP Proxy to connect to the hosts that are farther away from the actual multicast source that streams the traffic.
   The upstream and downstream services are different for the appliance at the source and the appliance at the destination.

> **Note**:
>
> Once the Branch or MCN is configured as upstream, it needs to be configured as upstream for the other groups as well.

To configure multicast, at the site level, navigate to **Configuration** > **Advanced Settings** > **Multicast Groups**. Create a multicast group by providing a name and IP address (IPv4 or IPv6) for the multicast group. Click **Enable IGMP Proxy**.

Configure the upstream and downstream paths for the Branch and data center appliances.

For the appliance closer to the multicast receiver (Branch), the appliance receives the multicast traffic on the Virtual Path Interface and sends the traffic on the Local Interface towards the receiver.

> **Note**:
>
> - When a multicast source is configured as an Intranet service, the source IP of the multicast stream must have a route mapped to the Intranet service.
> - Ensure to create appropriate firewall policies to allow multicast traffic on the SD-WAN appliance.

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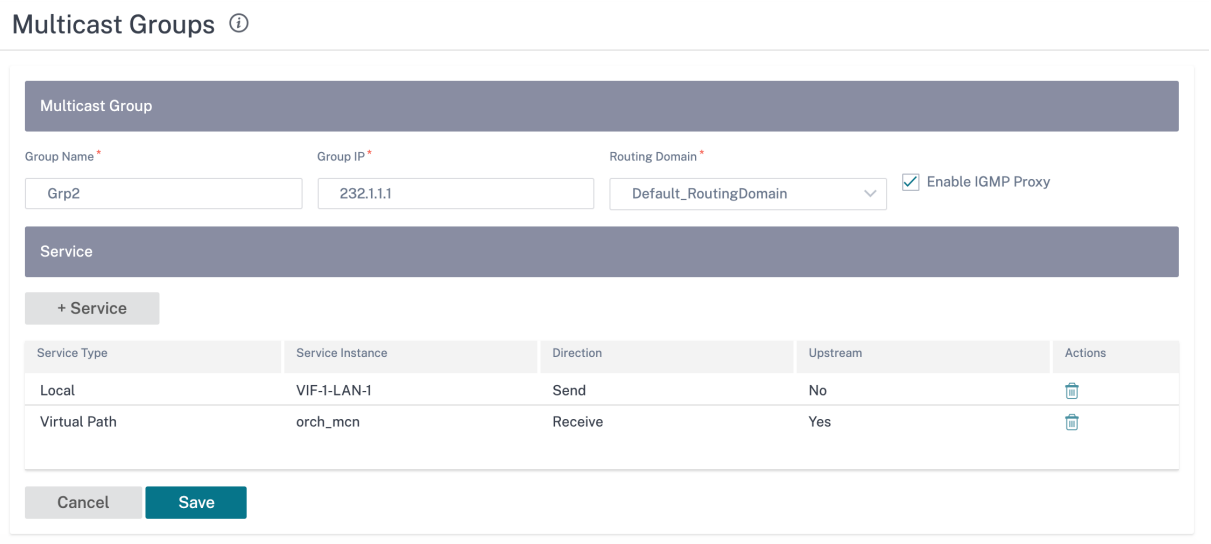
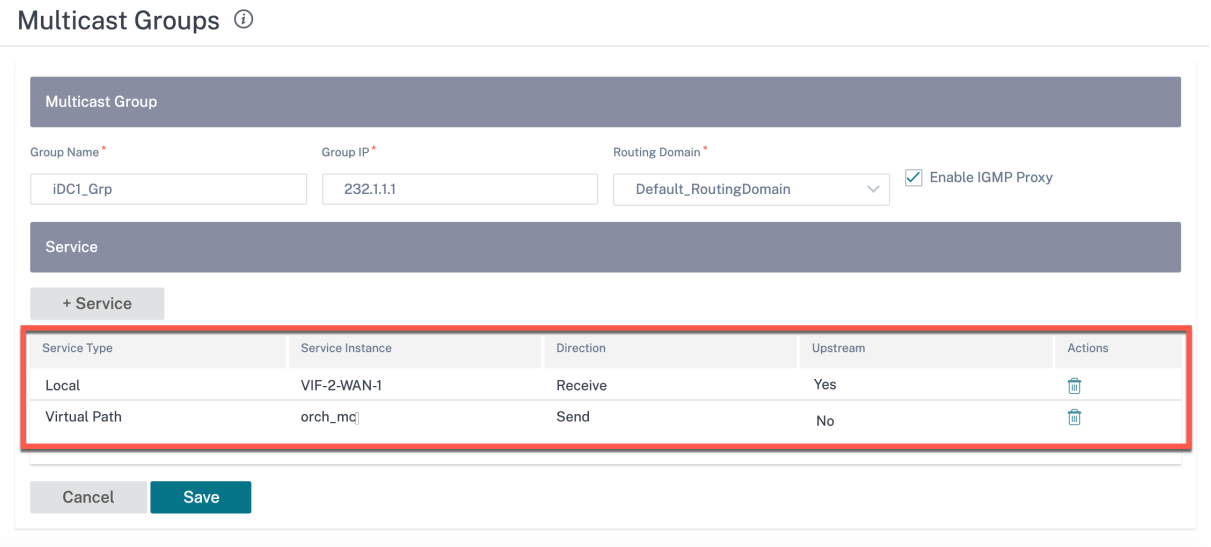


For the appliance closer to the multicast source (Data center), the appliance receives the multicast traffic on the Local Interface and sends the traffic on the Virtual Path Interface.



Monitoring

Flows statistics

After the multicast control channel is established and the multicast source begins streaming, you can view the multicast flows statistics. You can see that Multicast UDP traffic was sent on the virtual path service from a receiver to the multicast group 232.1.1.1.

> **Note**:
>
> If SSM is enabled and if the traffic is received from a different server that is not part of the expected

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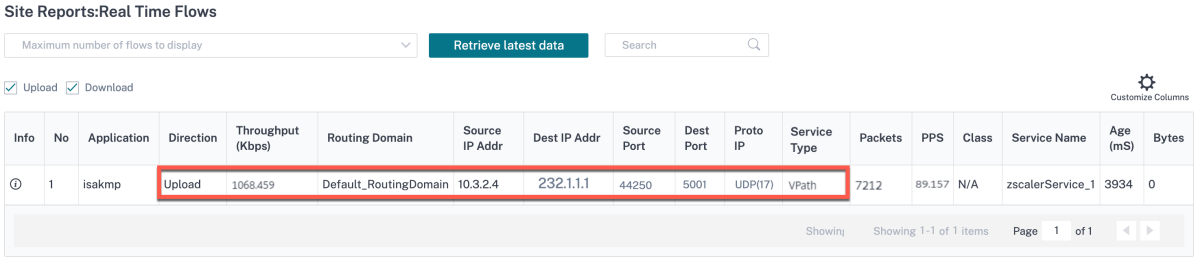
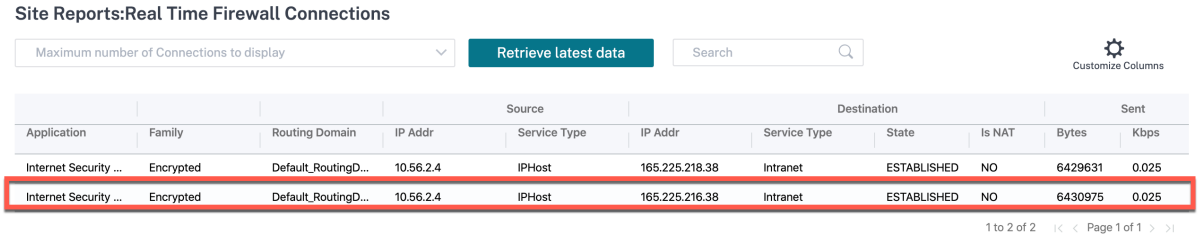
> list of source senders the SD-WAN appliance will not have any reporting data.



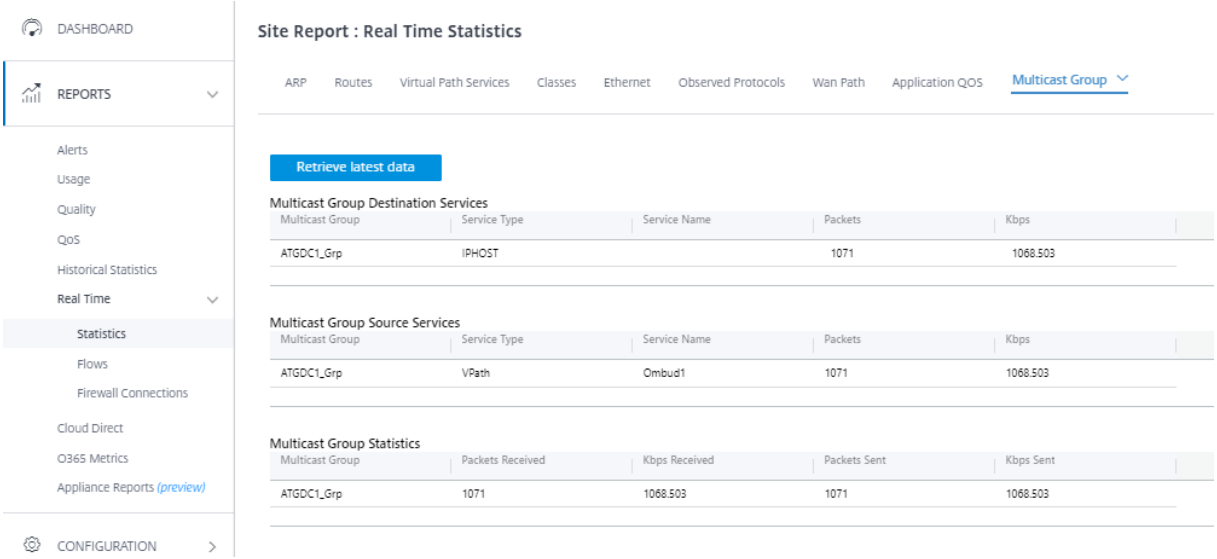
Firewall statistics

The firewall table shows the multicast traffic coming over the LAN interface over the Multicast group IP address and is sent over the virtual path.



Multicast group statistics

The multicast group table provides details about multicast traffic such as packets sent and received over source, destination, and the aggregation of both.



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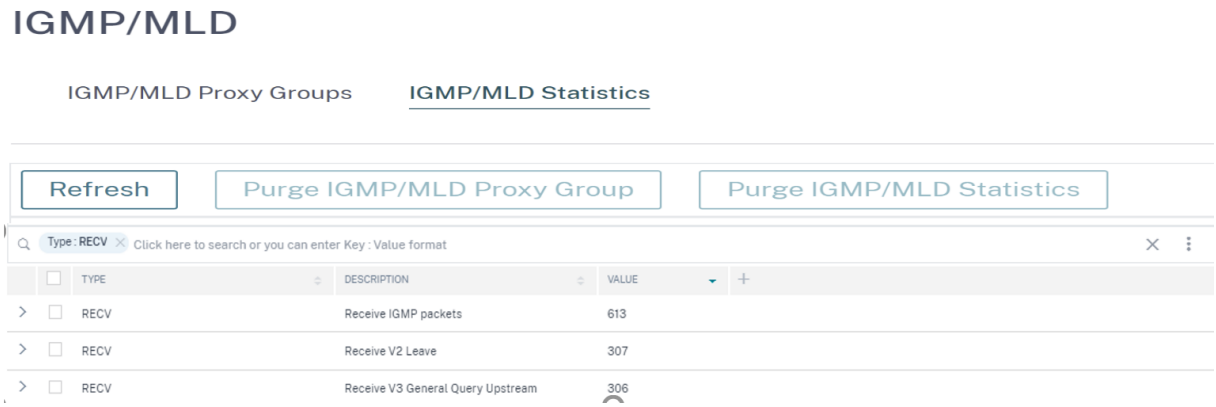
IGMP/MLD

When the multicast receivers initiate a join group request, you can see the receiver details under **Reports** > **Real Time** > **IGMP/MLD** > **IGMP/MLD Stats**. You can see this information at both the source and the destination. Click **Refresh** to get the current data.

The following image shows that the IGMP/MLD packets received and the filter type RECV is used to include IGMP/MLD receive packets.



To view the details of IGMP proxy groups, navigate to **Reports** > **Real Time** > **IGMP/MLD** > **IGMP/MLD Proxy Groups**. Click **Refresh** to get the current data.

Select **Purge IGMP/MLD Stats** to purge IGMP statistical data from the IGMP stats table.

Select **Purge IGMP/MLD Group** to purge IGMP group data from the IGMP groups table.

Virtual router redundancy protocol

September 27, 2025

Virtual Router Redundancy Protocol (VRRP) is a widely used protocol that provides device redundancy to eliminate the single point of failure inherent in static default-routed environment.

VRRP allows you to configure two or more routers to form a group. This group appears as a single default gateway with one virtual IP address and one virtual MAC address.

A back-up router automatically takes over if the primary / main router fails. In a VRRP set-up, the main router sends a VRRP packet known as an advertisement to the back-up routers. When the main router stops sending the advertisement, the back-up router sets the interval timer. If no advertisement is received within this hold period, the back-up router starts the failover routine.

VRRP specifies an election process in which, the router with the highest priority becomes the main router. If the priority is the same among the routers, the router with the highest IP address becomes

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the main router. The other routers are in backup state. The election process is initiated again if the main router fails, a new router joins the group, or an existing router leaves the group.

VRRP ensures a high availability default path without configuring dynamic routing or router discovery protocols on every end-host.

Citrix SD-WAN release version 10.1 supports VRRP version 2 and version 3 to inter-operate with any third party routers. Citrix SD-WAN release version 11.5 supports version 6. The SD-WAN appliance acts as the main router and direct the traffic to use the Virtual Path Service between sites. You can configure the SD-WAN appliance as the VRRP main router by configuring the Virtual Interface IP as the VRRP IP and by manually setting the priority to a higher value than the peer routers. You can configure the advertisement interval and the preempt option.

The below network diagram shows a Citrix SD-WAN™ appliance and a router configured as a VRRP group. The SD-WAN appliance is configured to be the main router. If the SD-WAN appliance fails, the back-up router takes-over within milliseconds, ensuring that there is no downtime.

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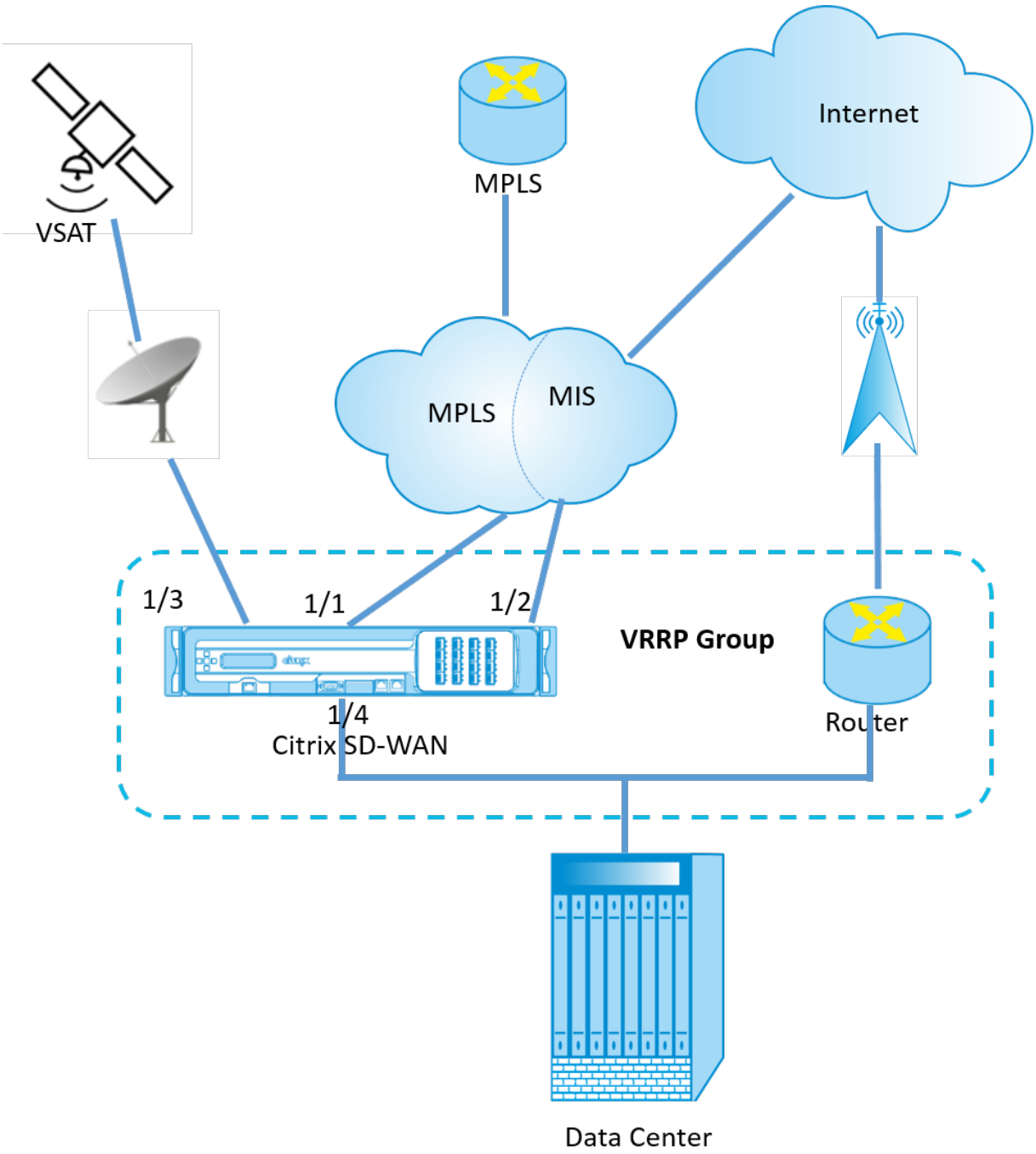

To configure VRRP, in the Site configuration page, navigate to **Configuration** > **Advanced Settings** > **VRRP** > click **+ Add VRRP**.

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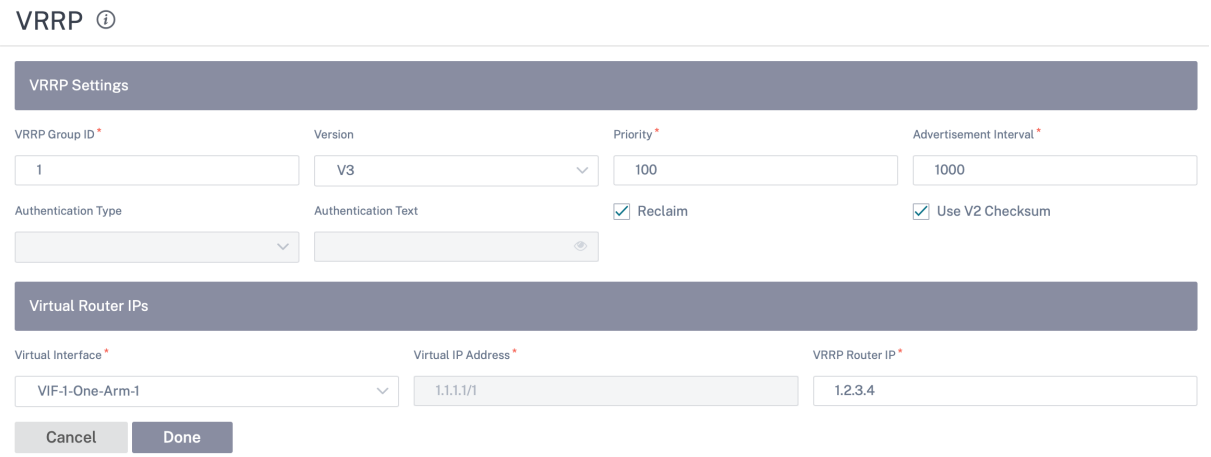

You can edit the following member path parameters:

- **VRRP group ID**: The VRRP group ID. The group ID must be a value range is 1–255. The same group ID must be configured on the back-up routers too.
- **Version**: The VRRP protocol version. You can choose between VRRP protocol V2 and V3.
- **Priority**: The priority of the Citrix SD-WAN appliance for the VRRP group. The priority range is 1–254. Set this value to maximum (254) to make the SD-WAN appliance the main router.

  > **Note**
  >
  > If the router is the owner of the VRRP IP address, the priority is set to 255 by default.

- **Advertisement Interval**: The frequency in milliseconds, with which the VRRP advertisements are sent when the SD-WAN appliance is the main router. The default advertisement interval is one second.
- **Authentication Type**: You can choose **Plain Text** to enter an authentication string. The authentication string is sent as a plain text without any encryption in the VRRP Advertisements. Choose **None**, if you do not want to set up authentication.
- **Authentication Text**: The authentication string to be sent in the VRRP Advertisement. This option is enabled if the **Authentication Type** is **Plain Text**.

  > **Note**
  >
  > The **Authentication Type** and **Authentication Text** parameters are enabled only for VRRP protocol version 2.

- **Use V2 Checksum**: Enables compatibility with third party network devices for VRRPv3. By default, VRRPv3 uses the v3 checksum computation method. Certain third party devices might only support VRRPv2 checksum computation. In such cases, enable this option.

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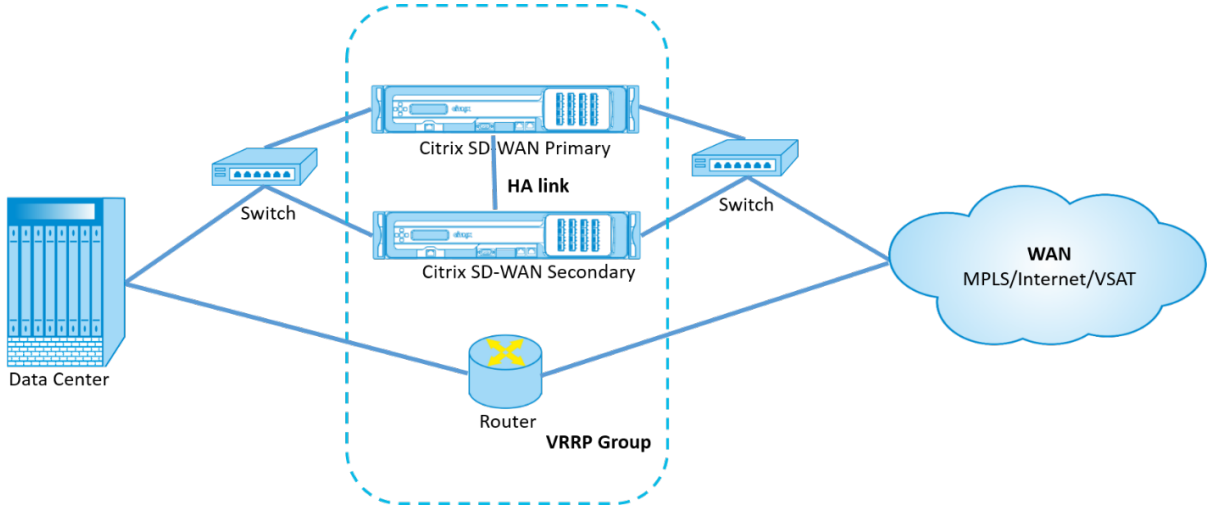
- **Virtual Interface**: The virtual interface to be used for VRRP. If IPv6 is used, then the virtual interface will have NDP RA enabled by default. Choose one of the configured virtual interfaces.
- **Virtual IP Address**: The virtual IP address assigned to the virtual interface. Choose one of the configured virtual IP addresses for the virtual interface. You can specify either the IPv4 or IPv6 address.
- **VRRP Router IP**: The virtual router IP address for the VRRP group. By default, the Virtual IP address of the SD-WAN appliance is assigned as the virtual router IP address. The VRRP Virtual Router IP should be a link-local IPv6 address.

Limitations

- VRRP is supported in Gateway Mode deployment only.
- You can configure up to four VRRP IDs (VRID).
- Up to 16 virtual network interfaces can participate in VRID.

High Availability and VRRP

You can significantly reduce network downtime and traffic disruption by applying both the high availability and VRRP features on your SD-WAN network. Deploy a pair of Citrix SD-WAN appliance in active/standby roles along with a standby router to form the VRRP group. This group appears as a single default gateway with one virtual IP address and one virtual MAC address.



The following are 2 cases with the High Availability and VRRP deployment:

1st case: High availability failover timer on SD-WAN equals the VRRP failover timer.

The expected behavior is high availability switchover to happen before the VRRP switchover, that is the traffic continues to flow through the new Active SD-WAN appliance. In this case SD-WAN continues with the VRRP Master role.

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2nd case: High availability failover timer on SD-WAN greater than the VRRP failover timer.

The expected behavior is the VRRP switchover to the router happens, that is the router becomes VRRP Master and traffic might momentarily flow through the router, bypassing the SD-WAN appliance.

But once the high availability switchover happens, SD-WAN again becomes VRRP Master, that is the traffic now flows through the new active SD-WAN appliance.

For more information on high availability deployment modes, see High Availability.

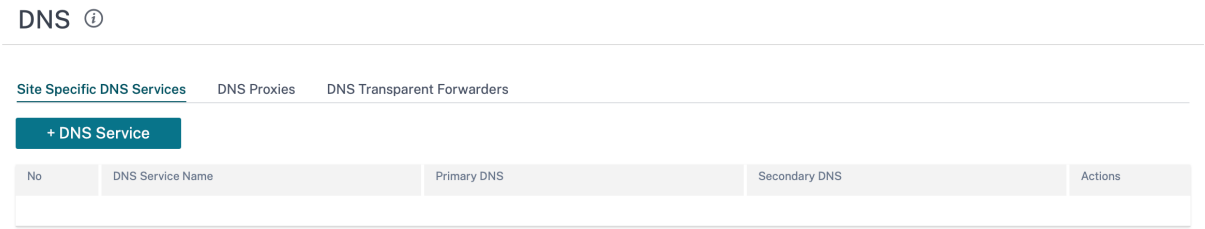
Domain Name System settings

September 27, 2025

Domain Name System (DNS) translates human readable domain names to machine-readable IP addresses, and the opposite way. Citrix SD-WAN™ provides the following DNS features:

- DNS Proxy
- DNS Transparent Forwarding

To configure DNS settings, in the Site configuration page, navigate to **Configuration > Advanced Settings** > **DNS Settings**.



Site specific DNS servers

On the **Site specific DNS servers** tab, click **+ DNS Server** to configure site-specific DNS servers to which the DNS requests are routed. Provide a name for the DNS server. Choose one of the following service types:

- **Static**: Intercepts the DNS requests destined to the Citrix SD-WAN IP address and forwards it to the specified IPv4 DNS servers. You can create internal, ISP, google or any other open source DNS service.
- **Dynamic**: Intercepts the DNS requests destined to the Citrix SD-WAN IP address and redirects it to one of the IPv4 DNS servers learned from the DHCP based WAN links. If the WAN link goes

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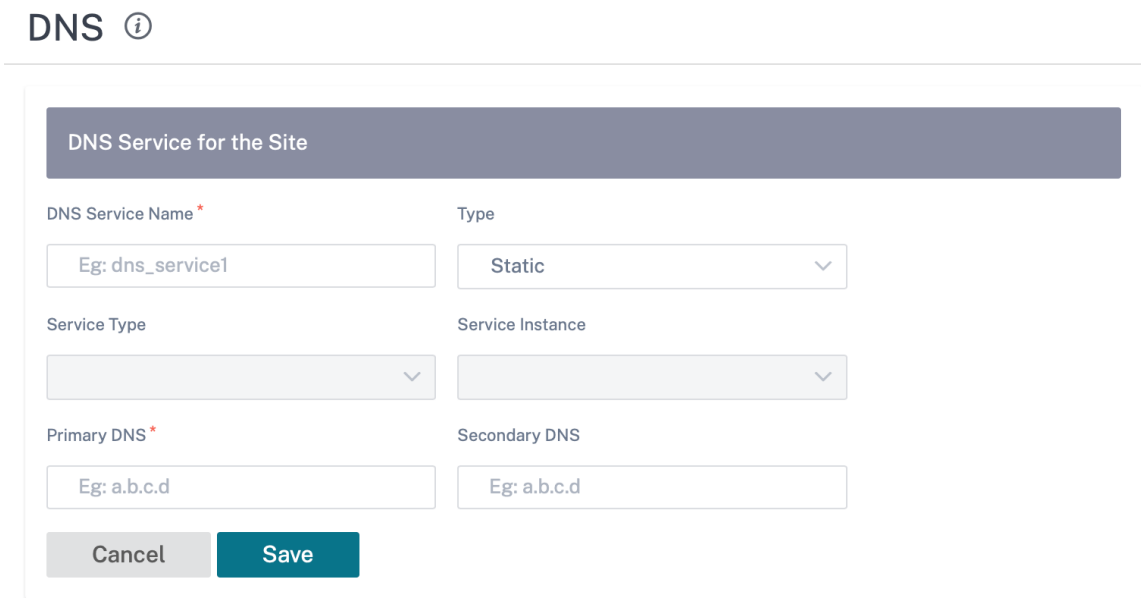
down, another DHCP based WAN links DNS server is chosen. This feature is useful in the deployment where ISPs allow DNS requests only to DNS servers hosted by them. Dynamic DNS service can be configured at site level only. Only one dynamic DNS service is permitted per site.

- **StaticV6**: Intercepts the DNS requests destined to the Citrix SD-WAN IP address and forwards it to the specified IPv6 DNS servers. You can create internal, ISP, google or any other open source DNS service.
- **DynamicV6**: Intercepts the DNS requests destined to the Citrix SD-WAN IP address and redirects it to one of the IPv6 DNS servers learned from the DHCP based WAN links. If the WAN link goes down, another DHCP based WAN links DNS server is chosen. This feature is useful in the deployment where ISPs allow DNS requests only to DNS servers hosted by them. Dynamic DNS service can be configured at site level only. Only one dynamic DNS service is permitted per site.

To configure the Static DNS service, select the **Type** as **Static** (for IPv4 address) or **StaticV6** (for IPv6 address) and enter a pair of **Primary DNS** and **Secondary DNS** server IP addresses.

To configure Dynamic DNS service, select the **Type** as **Dynamic** (for IPv4 address) or **DynamicV6** (for IPv6 address)and select **Internet** for **Service Type** and **Service Instance**.

The corresponding DNS proxy services get listed in the **InBand Management DNS** drop-down list under **Site Configuration > Interfaces**.



DNS proxy

DNS proxy intercepts the DNS requests destined to the SD-WAN IP address and forwards it to the selected DNS servers. You can configure a proxy with multiple forwarders that helps steering DNS re-

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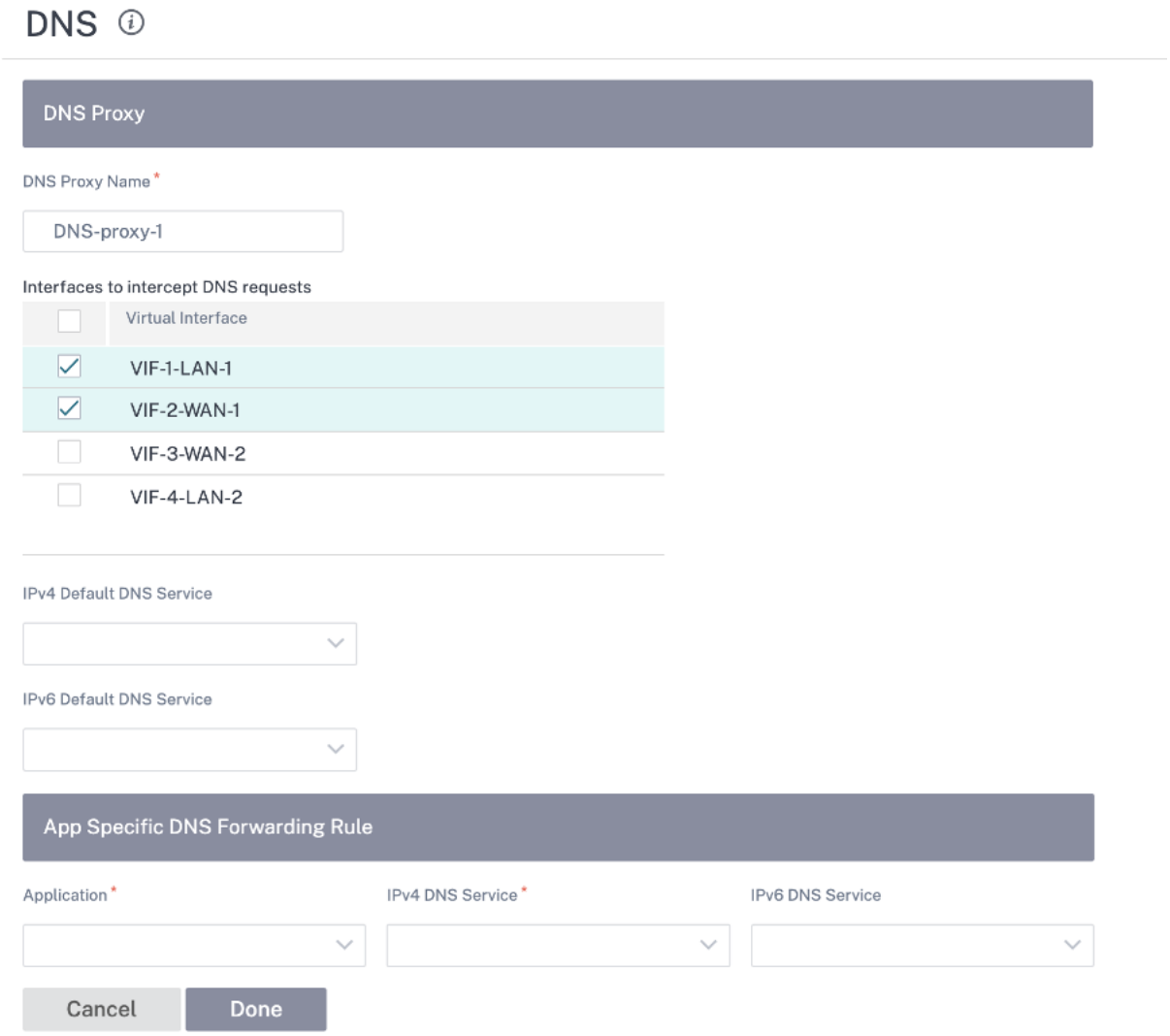
quests based on application domain names.



- DNS proxy settings:
  - **DNS Proxy Name**: Name of the DNS Proxy.
  - **Interfaces to intercept DNS requests**: The interfaces on which the DNS requests are intercepted. Only trusted interfaces are allowed.
  - **Default DNS Server for all traffic**: The default DNS server to which the DNS requests is forwarded, if none of the applications match in the DNS forwarder look-up.
  - **IPv4 Default DNS Service**: The IPv4 default DNS service to which the DNS requests are forwarded, if none of the applications match in the DNS forwarder look-up.
  - **IPv6 Default DNS Service**: The IPv6 default DNS service to which the DNS requests are forwarded, if none of the applications match in the DNS forwarder look-up.
- App specific DNS Forwarding rules:

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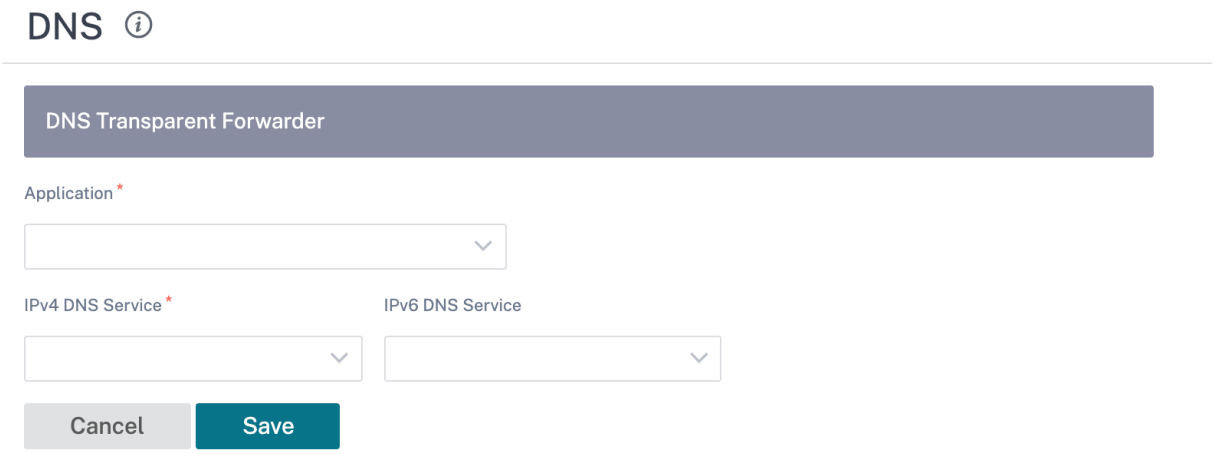
- **Application**: Applications for which DNS requests have to be forwarded to the selected DNS server.
- **IPv4 DNS Service**: The IPv4 DNS service that the DNS request is forwarded to for the specified application.
- **IPv6 DNS Service**: The IPv6 DNS service that the DNS request is forwarded to for the specified application.

DNS transparent forwarders

Citrix SD-WAN can be configured as a transparent DNS forwarder. In this mode, SD-WAN can intercept DNS requests that are not destined to its IP address and forward them to the specified DNS servers. Only the DNS requests coming from the local service on trusted interfaces are intercepted. If the DNS requests match any applications in the DNS forwarder list, then it is forwarded to the configured DNS service.



- **Application**: Applications for which DNS requests have to be forwarded to the selected DNS server.
- **IPv4 DNS Service**: The IPv4 DNS service that the DNS request is forwarded to for the specified application.
- **IPv6 DNS Service**: The IPv6 DNS service that the DNS request is forwarded to for the specified application.

Virtual Path Route Cost

September 27, 2025

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Citrix SD-WAN™ supports the following routing enhancements related to data center administration.

For example, consider the SD-WAN network with two data centers; one in North America and one in Europe. You want all sites in North America to route traffic through the data center in North America and all sites in Europe to use the Europe data center. Previously, in SD-WAN 9.3 and earlier release versions, this functionality of data center administration was not supported. This is implemented with the introduction of Virtual Path Route cost.

- Virtual Path Route cost: You can configure the Virtual Path route cost for individual virtual paths that are added to the route cost when a route is learned from a remote site.

This feature invalidates or deletes the WAN to WAN forwarding Cost.

- OSPF Route Cost: You can now import OSPF route cost (type1 metric) by enabling **Copy OSPF Route Cost** in the import filters. OSPF Route cost is considered in route selection instead of SD-WAN cost. Cost up to 65534 instead of 15 is supported, but it is advisable to accommodate for an appropriate virtual path route cost that is added if the route is learned from a remote site.
- BGP - VP cost to MED: You can now copy the Virtual Path route cost for SD-WAN routes into BGP MED values when exporting (redistributing) SD-WAN routes to BGP peers. This can be set for individual neighbors by creating a BGP policy and applying it in the “OUT”direction for each neighbor.
- Any site can have multiple virtual paths to other sites. Sometimes, if there is a Branch to which there is connectivity to services through more virtual paths, there can be two virtual paths from the Branch site. One virtual path through DC1 and the other through DC2. DC1 can be an MCN and DC2 can be a Geo-MCN, and can be configured as another site with Static Virtual Path.
- Add a default cost for each VP as 1. Virtual Path Route cost helps associate a cost to each virtual path of a site. This helps to manipulate route exchanges/updates over a specific virtual path instead of default site cost. With this, we can manipulate which data center to be preferred for sending out the traffic.
- Allow cost to be configured within a small range of values (for example; 1–10) for each VP.
- Virtual path cost must be added to any route shared with neighbor sites to indicate routing preference, including routes learned via Dynamic Routing.
- No Static Virtual Path must have a lower cost than a Dynamic Virtual Path.

> **Note**
>
> VP Route cost deprecates the WAN to WAN forwarding cost that existed in release versions earlier than release version 10.0. The routing decisions based on WAN to WAN forwarding costs have to be reinfluenced by using VP route cost as the WAN to WAN forwarding cost has no significance

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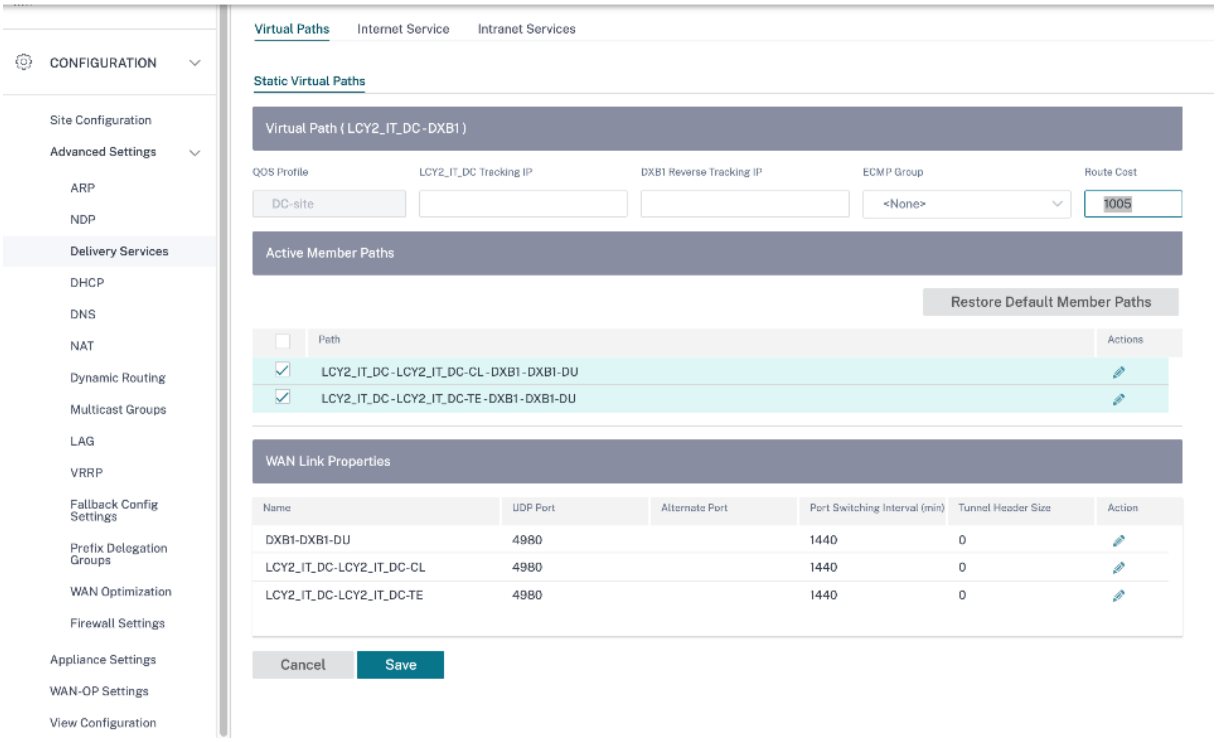
> when you migrate to release version 10.0.

How to Configure Virtual Path Route Cost

To configure Virtual Path Route Cost, at the site level navigate to **Advances Settings** > **Delivery Services** > **Virtual Paths** > **Static Virtual Paths** and enter the route cost for the virtual path. All routes are installed with basic Citrix SD-WAN cost + VP route cost to influence route costs across multiple virtual paths.



Use Case:

For example, there are subnets 172.16.2.0/24 and 172.16.3.0/24. Assume that there are two data centers DC1 and DC2 that use both these subnets to transmit traffic to SD-WAN. With the default virtual path route cost, you cannot influence routing since it depends on which route got installed first it can be either the DC2 first or the DC1 next.

With virtual path, you can influence specifically DC2 virtual path to have a higher virtual path route cost (for example, 10) while DC1 has the default VP route cost of 5. This manipulation helps install routes with DC1 first and DC2 next for both.

You can have four routes, two routes to 172.16.2.0/24; one via DC1 with lower cost and then via DC2 with higher cost, and 2 more for 172.16.3.0/24.

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Security

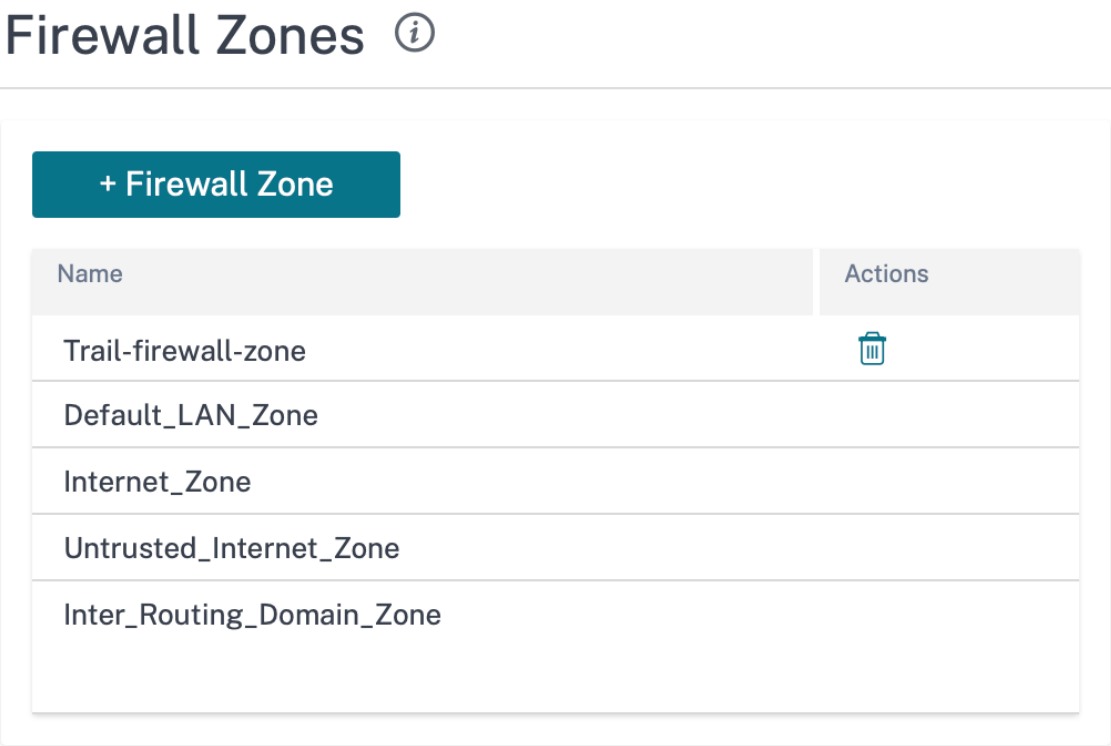
September 27, 2025

You can configure the security settings such as network encryption, virtual path IPsec, firewall, and certificates that are applicable to all the appliances across the network.

Firewall zones

You can configure zones in the network and define policies to control how traffic enters and leaves the zones. The following zones are available by default:

- **Default_LAN_Zone**: Applies to traffic to or from an object with a configurable zone, where the zone has not been set.
- **Internet_Zone**: Applies to traffic to or from an Internet service using a trusted interface.
- **Untrusted_Internet_Zone**: Applies to traffic to or from an Internet service using an untrusted interface.



You can also create your own zones and assign them to the following types of objects:

- Virtual Network Interfaces

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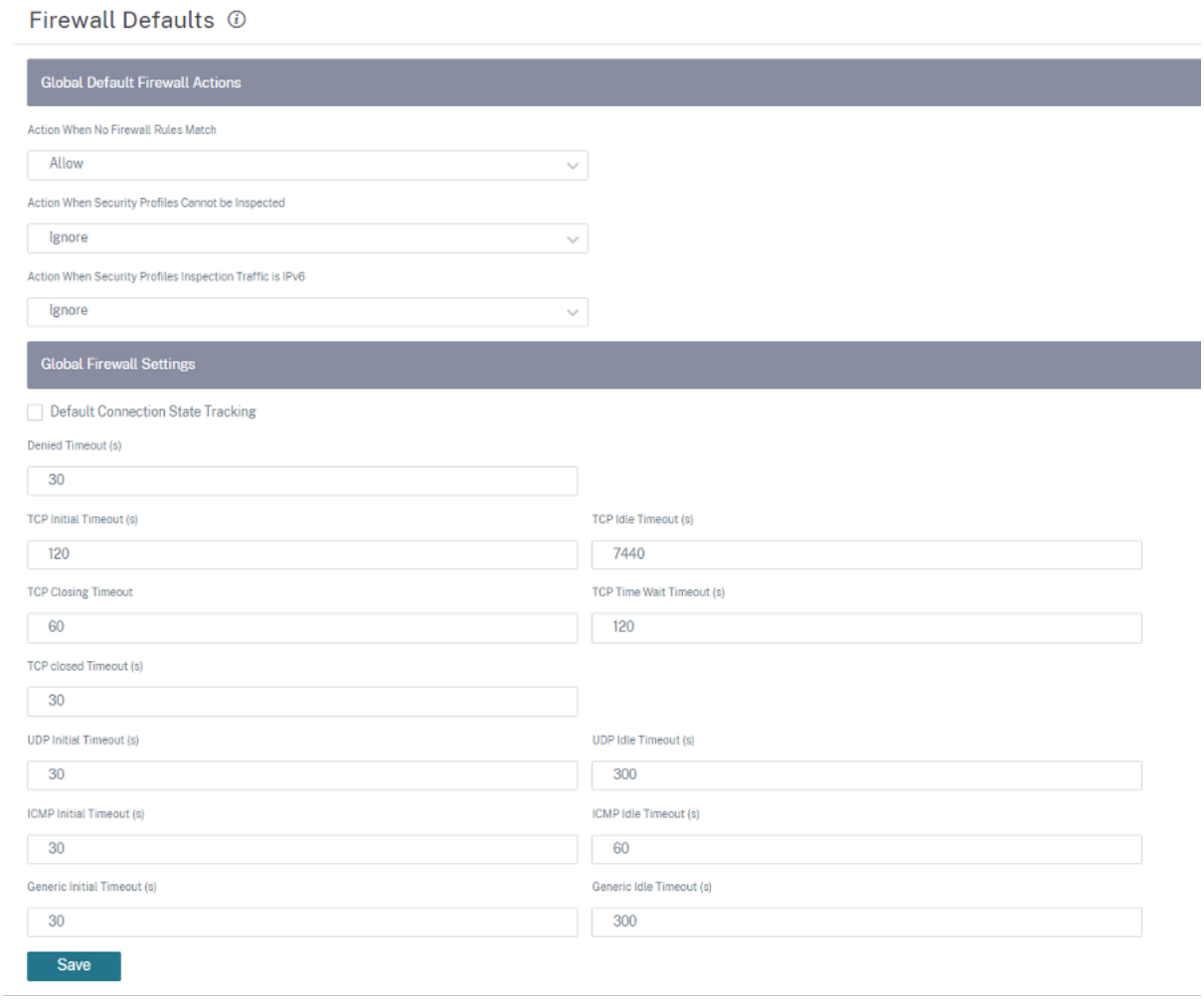
- Intranet Services
- GRE Tunnels
- LAN IPsec Tunnels

Click **Verify Config** to validate any audit error.

Firewall defaults

You can configure the global default firewall actions and global firewall settings that can be applied to all the appliances in the SD-WAN network. The settings can also be defined at the site level which overrides the global setting.



- **Action When No Firewall Rules Match**: Select an action (Allow or Drop) from the list for the packets that do not match a Firewall policy.
- **Action When Security Profiles Cannot be Inspected**: Select an action (Ignore or Drop) for the packets that match a firewall rule and engage a security profile but temporarily cannot be in-

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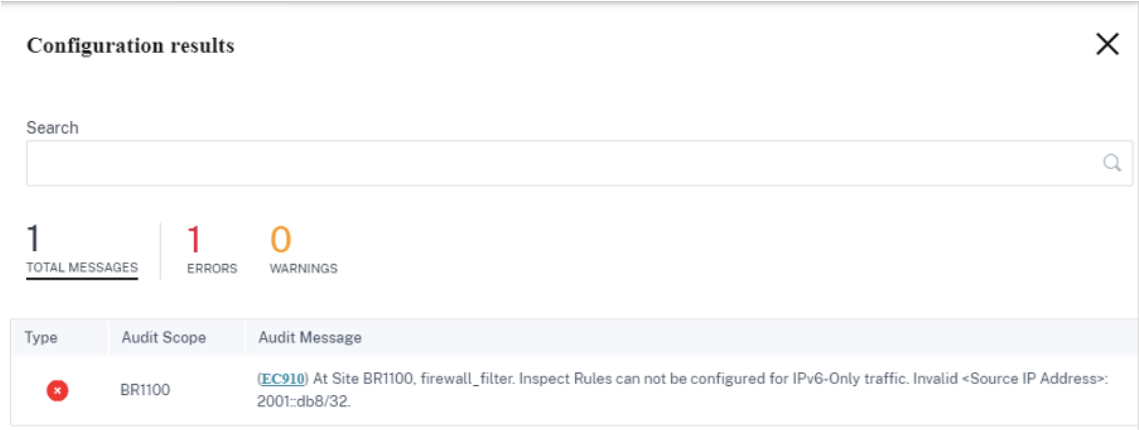
spected by the Edge Security subsystem. If you select **Ignore**, then the relevant firewall rule is treated as not matched and the next firewall rule in order is evaluated. If you select **Drop**, the packets matching the relevant firewall rule, are dropped.

- **Default Firewall Action**: Select an action (Allow/Drop) from the list for packets that do not match a policy.
- **Action When Security Profiles Inspection Traffic is IPv6**: Select an option (Ignore or Drop) for the traffic that match the inspect firewall policies.
  - If you select the Ignore option, it allows to bypass the traffic through Citrix SD-WAN™ network and send it to respective service.
  - If you select the Drop option, IPv6 packets matching the Inspect firewall policies are dropped.

> **Note**
>
> If the INSPECT firewall policies are configured and matching criteria explicitly includes IPv6, an audit error is thrown as shown in the following screenshot:



For example, you can explicitly select the source/destination IP as IPv6 with inspect (for IP Protocol) action while creating a firewall policy and save it. When you click **Verify Configuration**, an audit error appears.

- **Default Connection State Tracking**: Enables directional connection state tracking for TCP, UDP, and ICMP flows that do not match a filter policy or NAT rule.

> **Note**
>
> Asymmetric flows are blocked when **Default Connection State Tracking** is enabled even when there are no Firewall policies defined. If there is the possibility of asymmetric flows at a site, the recommendation is to enable it at a site or policy level and not globally.

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- **Denied Timeout (s)**: Time (in seconds) to wait for new packets before closing denied connections.
- **TCP Initial Timeout (s)**: Time (in seconds) to wait for new packets before closing an incomplete TCP session.
- **TCP Idle Timeout (s)**: Time (in seconds) to wait for new packets before closing an active TCP session.
- **TCP Closing Timeout**: Time (in seconds) to wait for new packets before closing a TCP session after a terminate request.
- **TCP Time Wait Timeouts (s)**: Time (in seconds) to wait for new packets before closing a terminated TCP session.
- **TCP Closed Timeout (s)**: Time (in seconds) to wait for new packets before closing an aborted TCP session.
- **UDP Initial Timeout (s)**: Time (in seconds) to wait for new packets before closing the UDP session that has not seen traffic in both directions.
- **UDP Idle Timeout (s)**: Time (in seconds) to wait for new packets before closing an active UDP session.
- **ICMP Initial Timeout (s)**: Time (in seconds) to wait for new packets before closing an ICMP session that has not seen traffic in both directions
- **ICMP Idle Timeout (s)**: Time (in seconds) to wait for new packets before closing an active ICMP session.
- **Generic Initial Timeout (s)**: Time (in seconds) to wait for new packets before closing a generic session that has not seen traffic in both directions.
- **Generic Idle Timeout (s)**: Time (in seconds) to wait for new packets before closing an active generic session.

Click **Verify Config** to validate any audit error.

Firewall policies

Firewall policies provide security by ensuring that network traffic is restricted only to a specific firewall rule depending on the match criteria and by applying specific actions. The **Firewall Policies** contains three sections.

- **Global Default** –Global default policy is an aggregation of a couple of firewall rules. The policy that you create under the **Global Default** section is applied across all the sites in the network.
- **Site Specific** –You can apply the defined firewall rules on certain specific sites.

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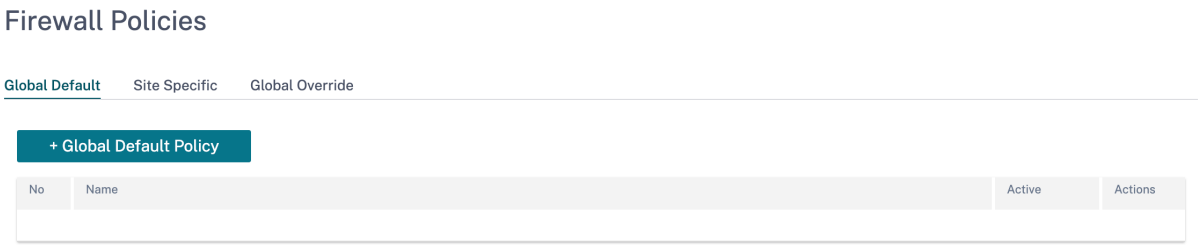
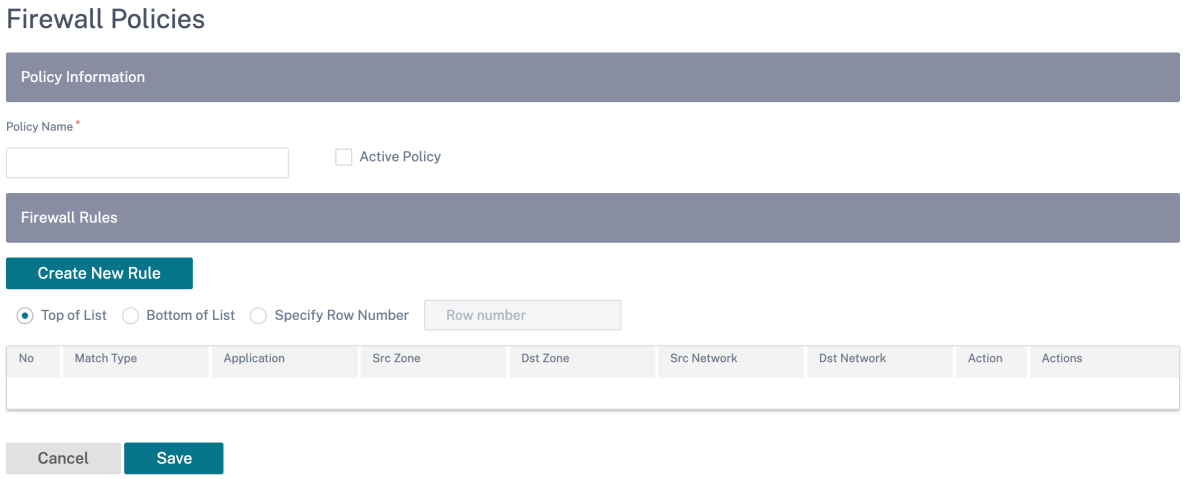
- **Global Override** –You can override both global and site-specific policies using **Global Override Policy**.



You can define firewall rules and place it based on the priority. You can choose the priority order to begin from the top of the list, bottom of the list, or from a specific row.

It is recommended to have more specific rules for applications or subapplications at the top, followed by less specific rules for the ones representing broader traffic.



To create a firewall rule, click **Create New Rule**.

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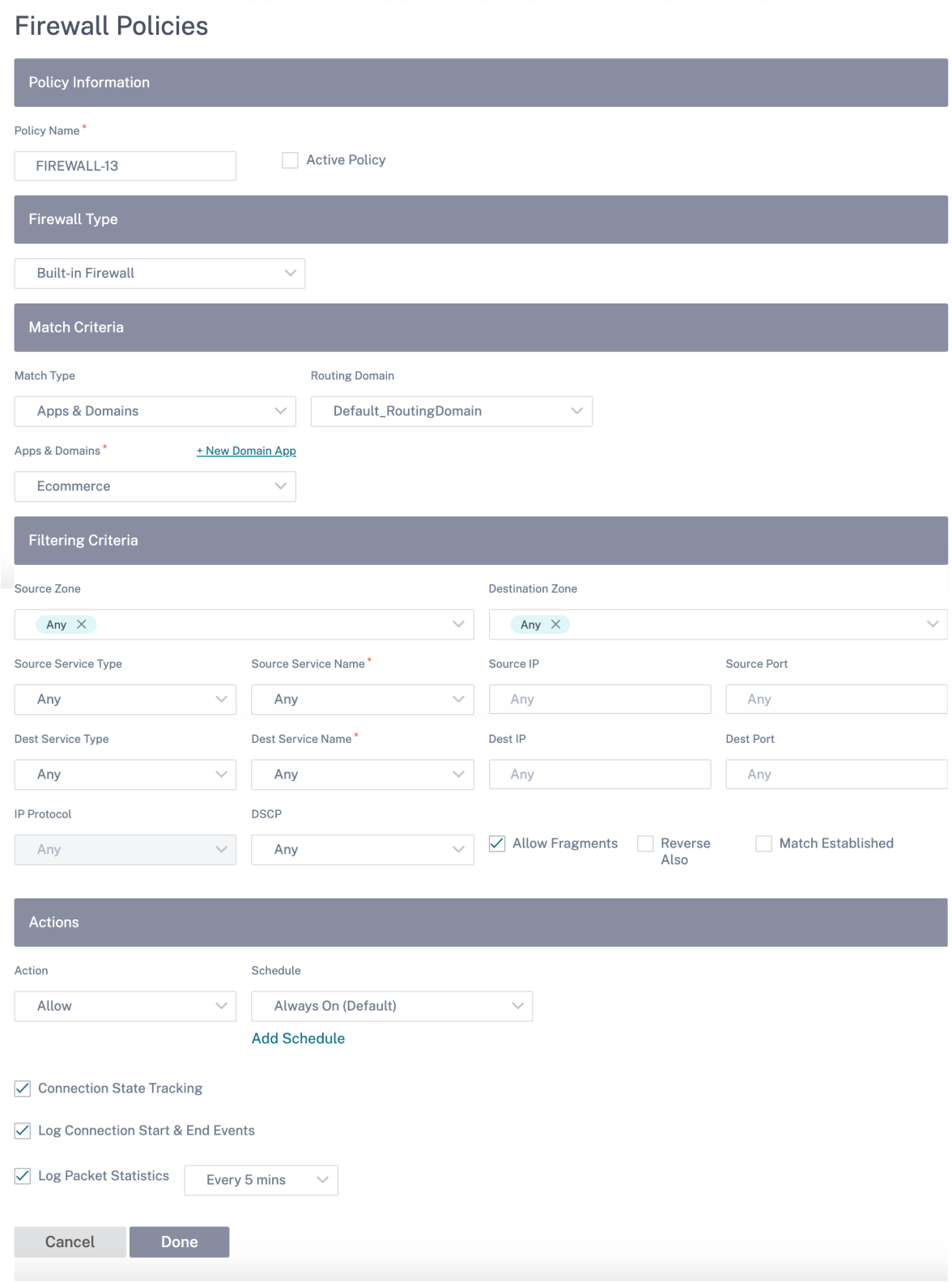

- Provide a policy name and select the **Active Policy** check box if you want to apply all the firewall rules.

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- The match criteria defines the traffic for the rule such as, a domain name-based application, a custom defined application, group of applications, application family, or IP protocol based.
- Filtering criteria:
  - **Source Zone**: The source firewall zone.
  - **Destination Zone**: The destination firewall zone.
  - **Source Service Type**: The source SD-WAN service type –Local, Virtual Path, Intranet, IP Host, or Internet are examples of Service Types.
  - **Source Service Name**: The name of a service tied to the service type. For example, if the virtual path is selected for Source Service type, it would be the name of the specific virtual path. This is not always required and depends on the service type selected.
  - **Source IP**: The IP address and subnet mask the rule uses to match.
  - **Source Port**: The source port the specific application uses.
  - **Dest Service Type**: The destination SD-WAN service type –Local, Virtual Path, Intranet, IP Host, or Internet are examples of service types.
  - **Dest Service Name**: Name of a service tied to the service type. This is not always required and depends on the service type selected.
  - **Dest IP**: The IP address and subnet mask the filter use to match.
  - **Dest Port**: The destination port the specific application uses (that is, HTTP destination port 80 for the TCP protocol).
  - **IP Protocol**: If this match type is selected, select an IP protocol that the rule matches with. Options include ANY, TCP, UDP ICMP and so on.
  - **DSCP**: Allow the user to match on a DSCP tag setting.
  - **Allow Fragments**: Allow IP fragments that match this rule.
  - **Reverse Also**: Automatically add a copy of this filter policy with source and destination settings reversed.
  - **Match Established**: Match incoming packets for a connection to which outgoing packets were allowed.
- The following actions can be performed on a matched flow:
  - **Allow**: Permit the flow through the Firewall.
  - **Drop**: Deny the flow through the firewall by dropping the packets.
  - **Reject**: Deny the flow through the firewall and send a protocol specific response. TCP sends a reset, ICMP sends an error message.

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- **Count and Continue**: Count the number of packets and bytes for this flow, then continue down the policy list.

Apart from defining the action to be taken, you can also select the logs to be captured.

Network security

Select the encryption mechanism to be used across the network. You can configure the global security settings that secure the entire SD-WAN network.

Network Encryption mode defines the algorithm used for all encrypted paths in the SD-WAN network. It is not applicable for non–encrypted paths. You can set the encryption as AES-128 or AES-256.

FIPS compliance

FIPS mode enforces users to configure FIPS compliant settings for their IPsec Tunnels and IPsec settings for Virtual Paths.

Enabling FIPS mode offers the following capabilities:

- Displays the FIPS compliant IKE Mode.
- Displays a FIPS Compliant IKE DH Group from which users can select the required parameters for configuring the appliance in FIPS compliant mode (2,5,14 –21).
- Displays the FIPS compliant IPsec Tunnel Type in IPsec settings for Virtual Paths
- IKE Hash and (IKEv2) Integrity mode, IPsec auth mode.
- Performs audit errors for FIPS based Lifetime Settings.

To enable FIPS compliance on Citrix SD-WAN Orchestrator™ service:

1. Go to **Configuration** > **Security** > **Network Security**.
2. In the **Network Security Settings** section, click the **Enable FIPS Mode** check box.

Enabling FIPS mode enforces checks during configuration to ensure that all IPsec related configuration parameters adhere to the FIPS standards. You are prompted through audit-errors and warnings to configure IPsec.

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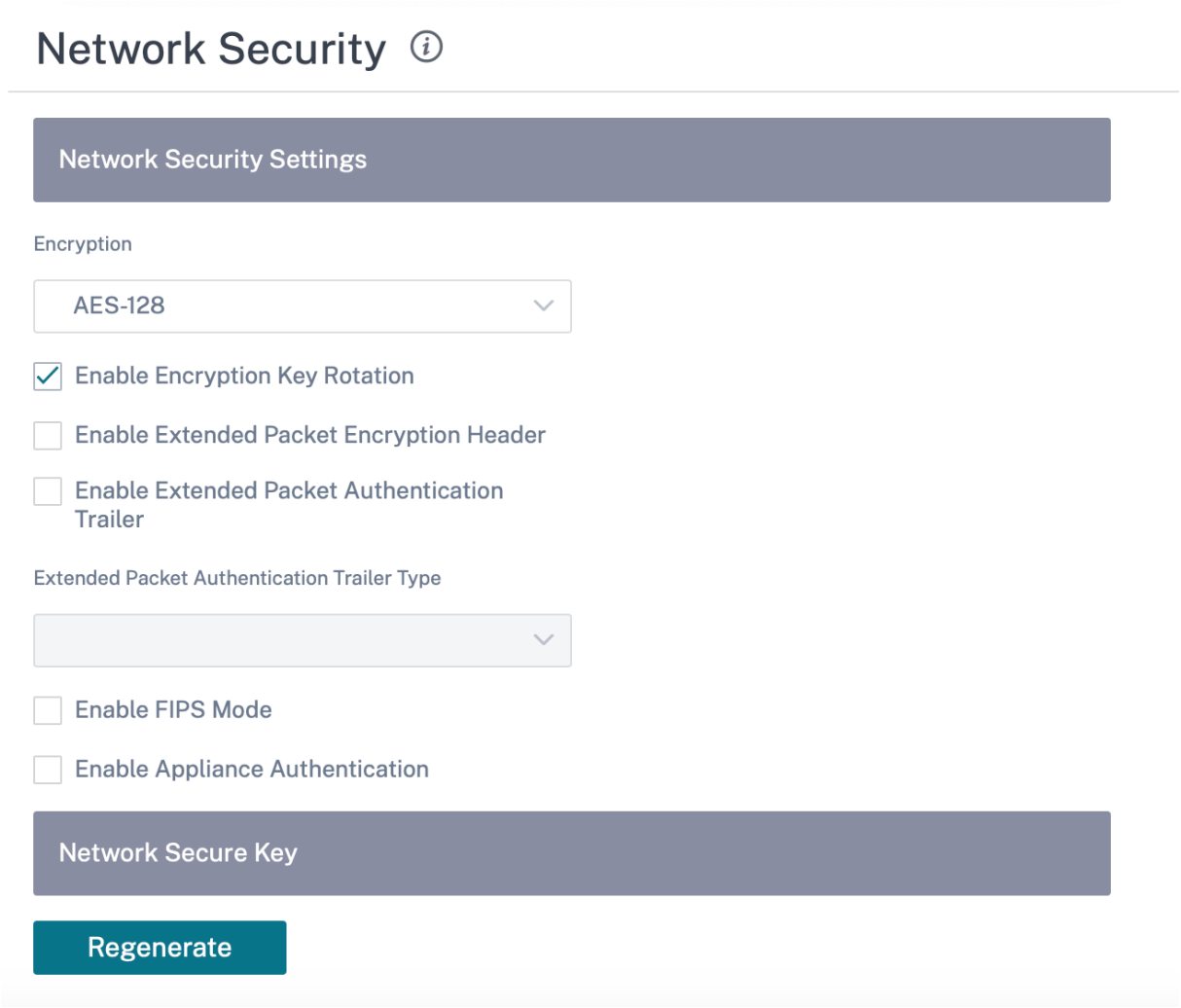

If the IPsec configuration does not comply with FIPS standards when it is enabled, an audit error might be triggered. Following are the type of audit errors that are displayed when you click **Verify Config** on the Citrix SD-WAN Orchestrator service UI.

- When FIPS mode is enabled and Non-FIPS compliant option is selected.
- When FIPS mode is enabled and incorrect lifetime value is entered.
- When FIPS mode is enabled and IPsec settings for virtual path default set is also enabled, and incorrect Tunnel mode is selected (ESP vs ESP_Auth / AH).
- When FIPS mode is enabled, IPsec settings for virtual path default set are also enabled, and incorrect lifetime value is entered.

Enable Encryption Key Rotation: When enabled, encryption keys are rotated at intervals of 10–15 minutes.

Enable Extended Packet Encryption Header: When enabled, a 16 bytes encrypted counter is prepended to encrypted traffic to serve as an initialization vector, and randomize packet encryption.

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Enable Extended Packet Authentication Trailer: When enabled, an authentication code is appended to the contents of the encrypted traffic to verify that the message is delivered unaltered.

Extended Packet Authentication Trailer Type: This is the type of trailer used to validate packet contents. Select one of the following from the drop-down menu: **32-Bit Checksum** or **SHA-256**.

SSL inspection

Secure Sockets Layer (SSL) inspection is a process of intercepting, decrypting, and scanning the HTTPS and secure SMTP traffic for malicious content. SSL inspection provides security to the traffic flowing to and from your organization. You can generate and upload your organization's root CA certificate and perform the man-in-the-middle inspection of the traffic.

> **NOTE**
>
> SSL inspection is supported from Citrix SD-WAN 11.3.0 release onwards.

To enable SSL inspection, at the network level, navigate to **Configuration > Security > SSL Inspection > Configuration** and define the following SSL configuration settings.

- **Enable SMTPS Traffic Processing**: The secure SMTP traffic undergoes SSL inspection.
- **Enable HTTPS Traffic Processing**: The HTTPS traffic undergoes SSL inspection.
- **Block Invalid HTTPS Traffic**: By default, when the **Block Invalid HTTPS Traffic** check box is cleared, non-HTTPS traffic on port 443 is ignored and allowed to flow unimpeded. When **Block Invalid HTTPS Traffic** is selected, non-HTTPS traffic is blocked for SSL inspection. Enabling this option may result in otherwise legitimate traffic getting blocked, that is, HTTP traffic on port 443 or HTTPS traffic from sites with an expired certificate.
- **Client Connection Protocols**: Select the required client protocols. The protocols available are SSLvHello, SSLv3, TLSv1, TSLv1.1, TLSv1.2, and TLSv1.3.
- **Server Connection Protocols**: Select the required server protocols. The protocols available are SSLvHello, SSLv3, TLSv1, TSLv1.1, TLSv1.2, and TLSv1.3.

> **NOTE**
>
> The versions older than TLSv1.2 are considered vulnerable and must not be enabled, unless backward compatibility is important.

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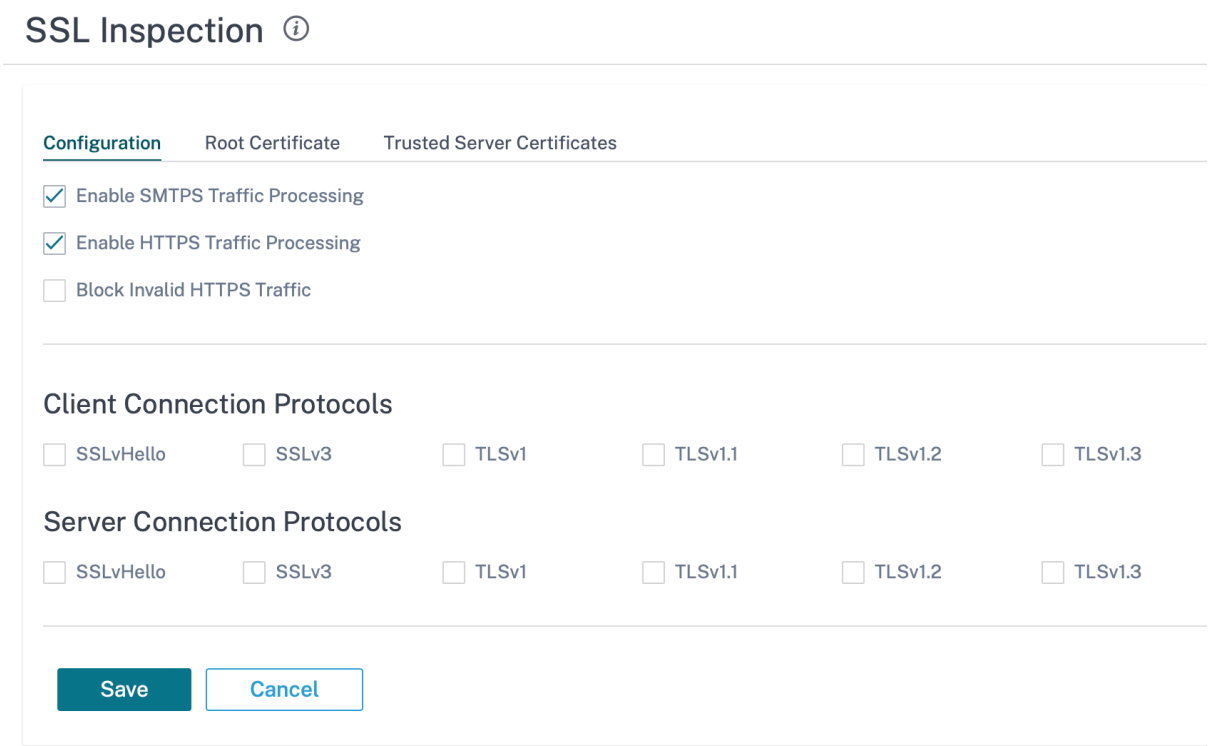
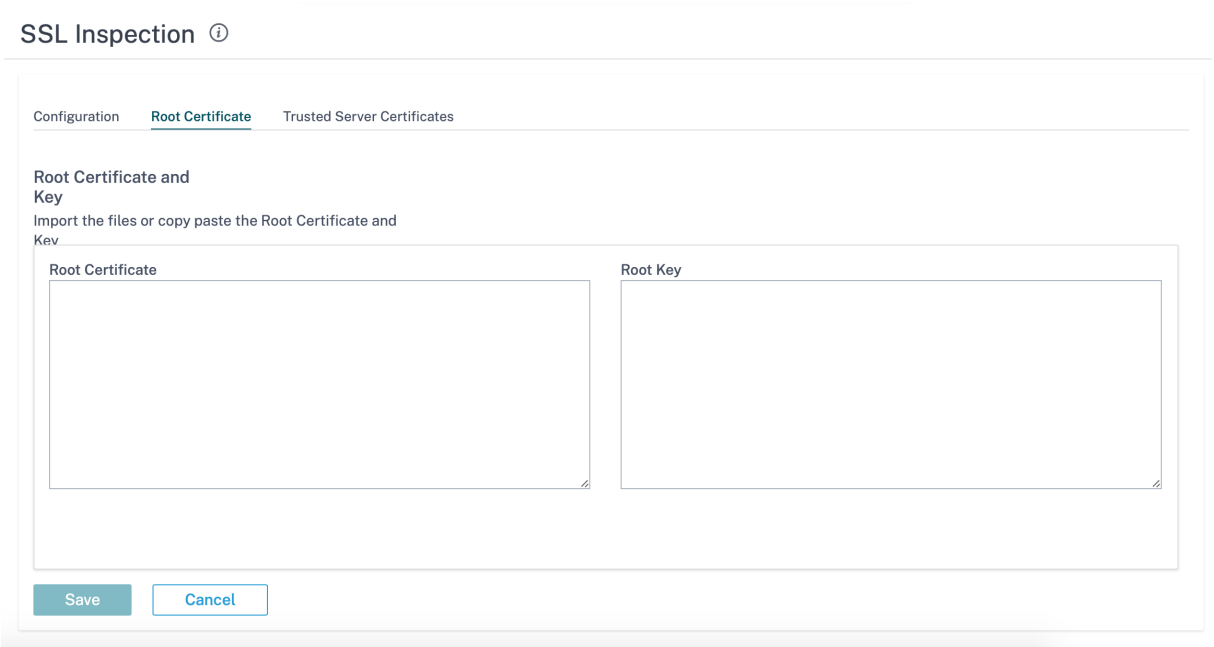


On the **Root Certificate** tab, copy and paste the root certificate and key of your organization root certificate authority (CA) in PKCS#8 format. The root CA is used to create and sign a forged copy of the certificates of the original sites, so that SSL inspection can be performed. It is implicitly assumed that the root CA certificate is installed on all client workstations and devices that can have their traffic SSL inspected.



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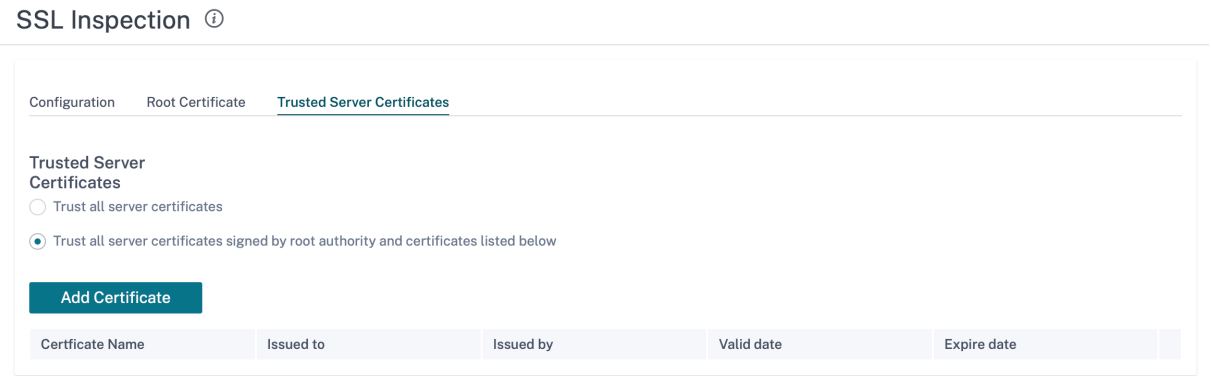
The default, **Trust all server certificates signed by root authority and certificates listed below** option results in SD-WAN validating all server certificates against the standard list of root CAs and the root CA previously configured. It also discards servers that have an invalid certificate. To override this behavior, upload the SSL self-signed certificate of internal servers on the **Trusted Server Certificates** tab. Click **Add Certificate** and provide a name, browse for the certificate, and upload it. Alternately, if you select **Trust all server certificates**, all the servers are considered as trusted by Citrix SD-WAN, regardless of their certificate validation status.



As part of security profiles, you can create SSL rules and enable them for SSL inspection. For more information on creating SSL rules for a security profile, see Edge security.

Intrusion prevention

Intrusion Prevention System (IPS) detects and prevents malicious activity from entering your network. IPS inspects the network traffic and takes automated actions on all incoming traffic flows. It includes a database of over 34,000 signature detections and heuristic signatures for port scans, allowing you to effectively monitor and block most suspicious requests.

IPS uses signature based detection, which matches the incoming packets against a database of uniquely identifiable exploit and attack patterns. The signature database is automatically updated daily. Since there are thousands of signatures, the signatures are grouped into Category and Class types.

You can create IPS rules and enable only the signature categories or class types that your network requires. Since intrusion prevention is a compute sensitive process, use only the minimal set of signature categories or class types that are relevant for your network.

You can create an IPS profile and enable a combination of IPS rules. These IPS profiles can then be associated globally with the entire network or with only specific sites.

Each rule can be associated with multiple IPS profiles and each IPS profile can be associated with multiple sites. When an IPS profile is enabled, it inspects the network traffic for the sites with which the IPS profile is associated and for the IPS rules enabled within that profile.

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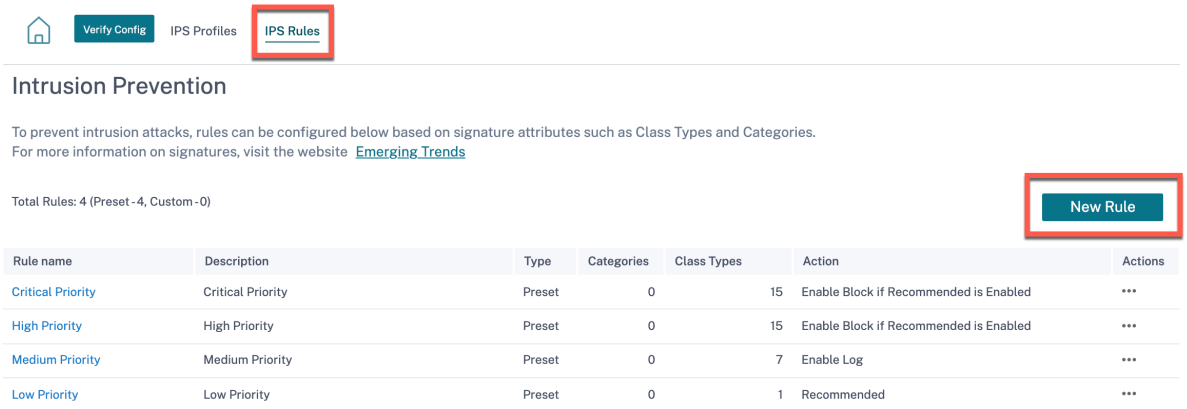
To create IPS rules, at the network level, navigate to **Configuration > Security > Intrusion Prevention > IPS Rules** and click **New Rule**.



Provide a rule name and description. Select the match category or class type signature attributes, select an action for the rule, and enable it. You can choose from the following rule actions:

Rule Action	Function
Recommended	There are recommended actions defined for each signature. Perform the recommended action for the signatures.
Enable Log	Allow and log the traffic matching any of the signatures in the rule.
Enable Block if Recommended is Enabled	If the rule action is **Recommended** and the signature's recommended action is **Enable Log**, drop the traffic matching any of the signatures in the rule.
Enable Block	Drop the traffic matching any of the signatures in the rule.

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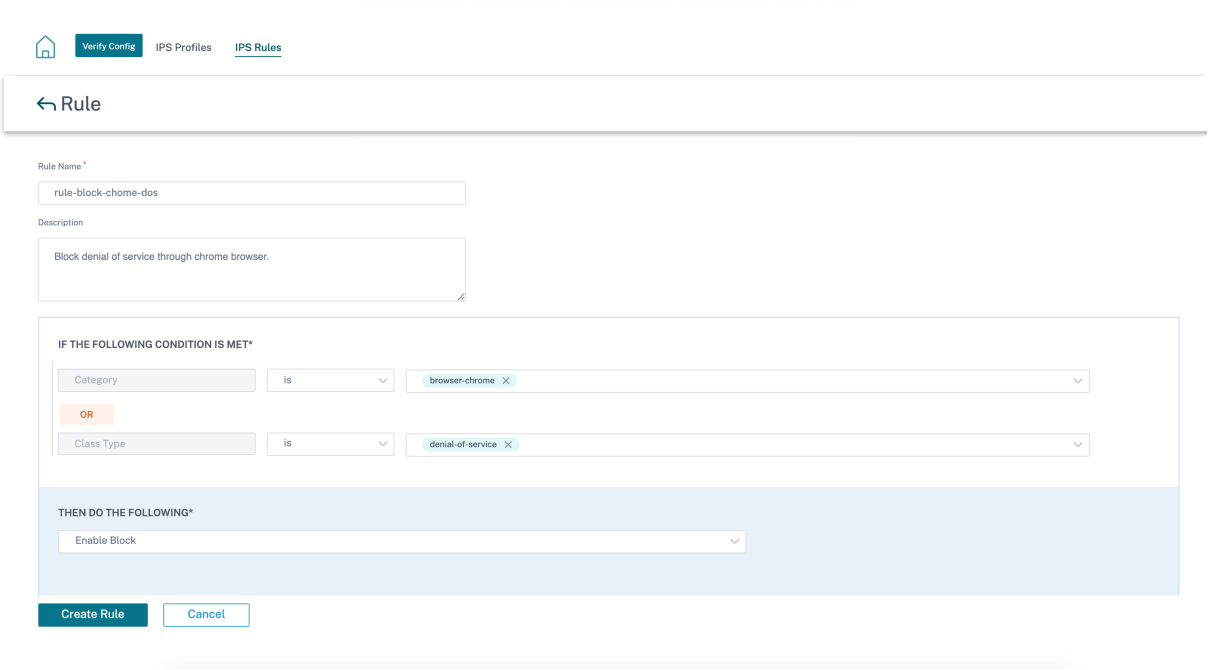
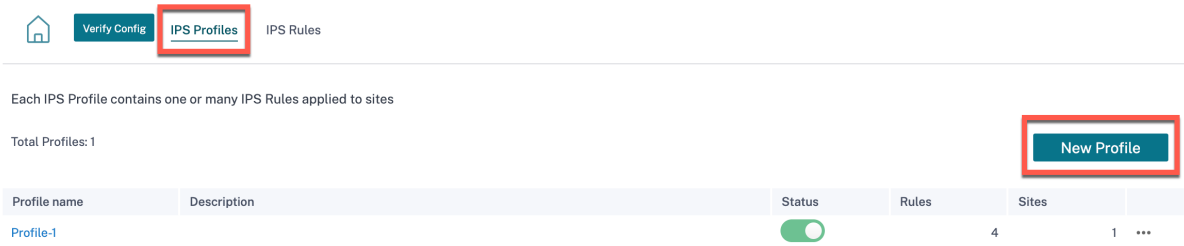


> **Note**
>
> - Since Intrusion Prevention is a compute sensitive process use only the minimal set of signature categories that are relevant to your edge security deployments.
> - The SD-WAN firewall drops the traffic on all WAN L4 ports that are not port-forwarded and are not visible in the IPS engine. This provides an extra security layer against trivial DOS and scan attacks.

To create IPS profiles, at the network level, navigate to **Configuration > Security > Intrusion Prevention > IPS Profiles** and click **New Profile**.



Provide a name and description for the IPS profile. On the **IPS Rules** tab, enable the required **IPS Rules** and turn on **Enable IPS Profiles**.

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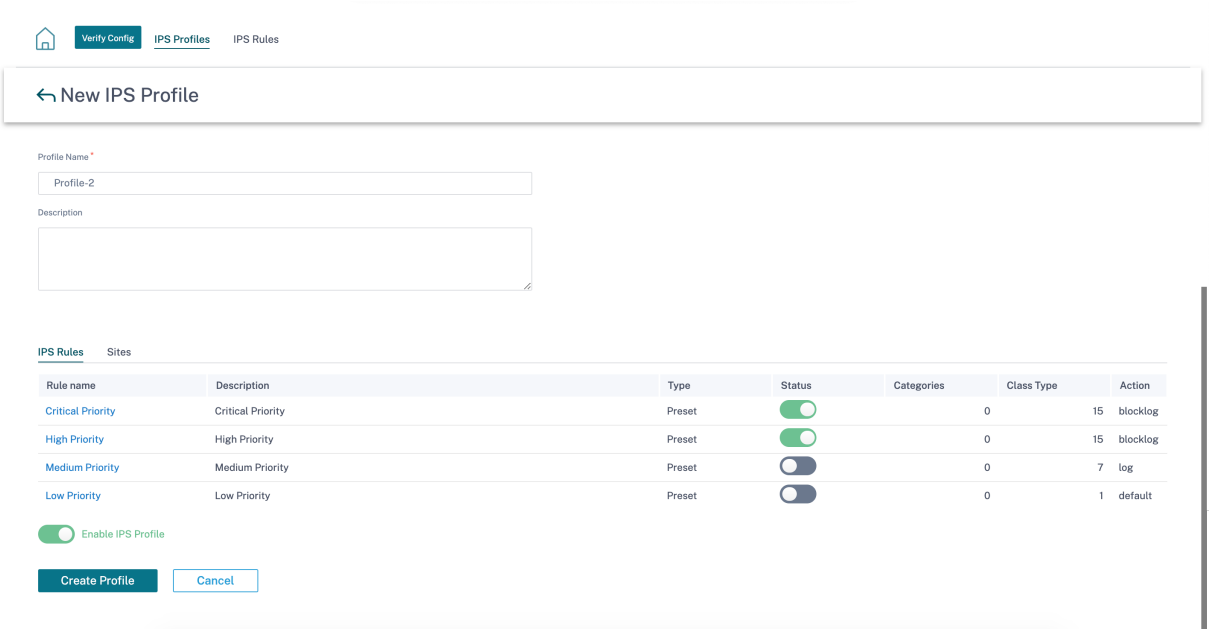
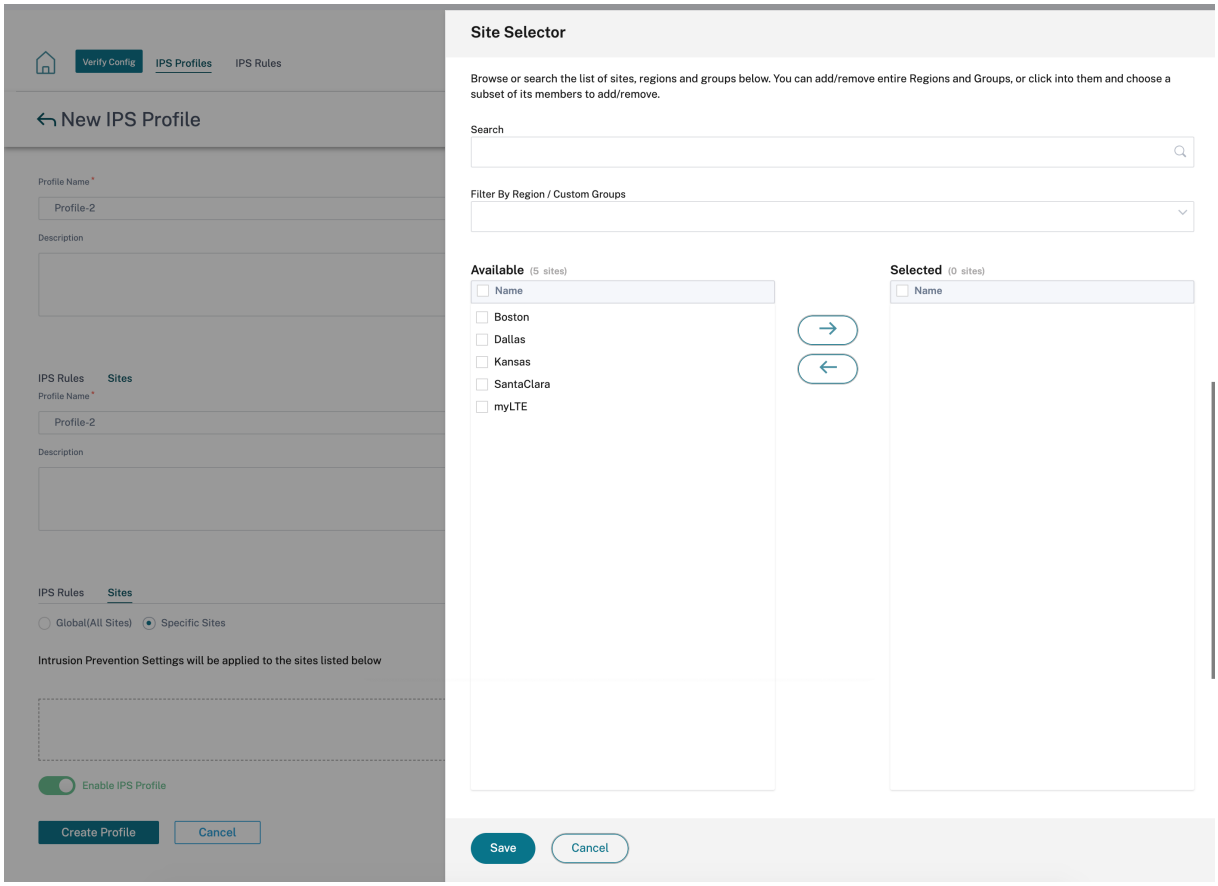


On the **Sites** tab, click **Select Sites**. Select the sites and click **Save**. Click **Create Profile**.



You can enable or disable these IPS profiles while creating security profiles. The security profiles are used to create firewall rules. For more information, see Security profile –Intrusion Prevention.

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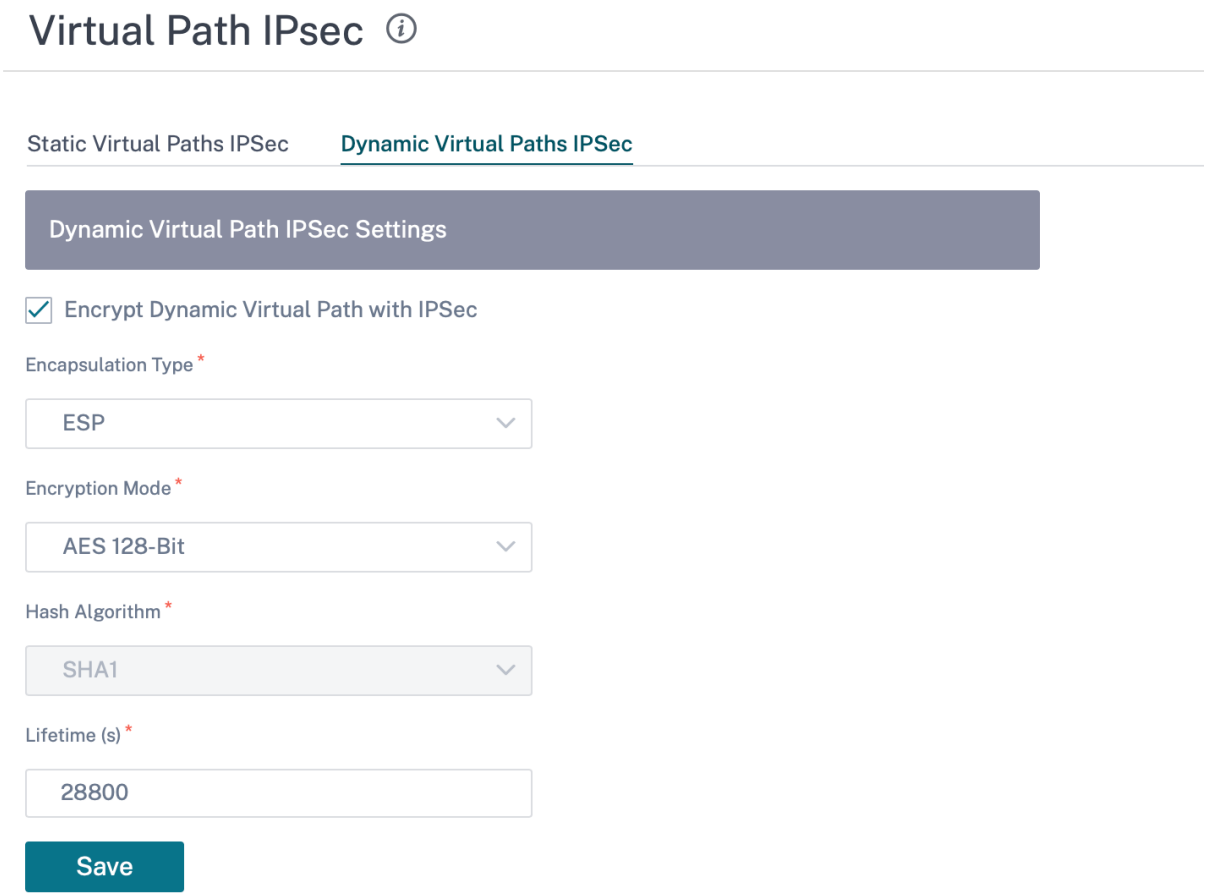
Virtual path IPsec

Virtual Path IPsec defines the IPsec tunnel settings to ensure secure transmission of data over the Static Virtual Paths and Dynamic Virtual Paths. Select the **Static Virtual Paths IPSec** or **Dynamic Virtual Paths IPSec** tab to define the IPsec tunnel settings.

- **Encapsulation Type**: Choose one of the following security types:
  - **ESP**: Data is encapsulated and encrypted.
  - **ESP+Auth**: Data is encapsulated, encrypted, and validated with an HMAC.
  - **AH**: Data is validated with an HMAC.
- **Encryption Mode**: The encryption algorithm used when ESP is enabled.
- **Hash Algorithm**: The hash algorithm used to generate an HMAC.
- **Lifetime (s)**: The preferred duration, in seconds, for an IPsec security association to exist. Enter 0 for unlimited.

For information on configuring IPsec service, see IPsec service.



Click **Verify Config** to validate any audit error

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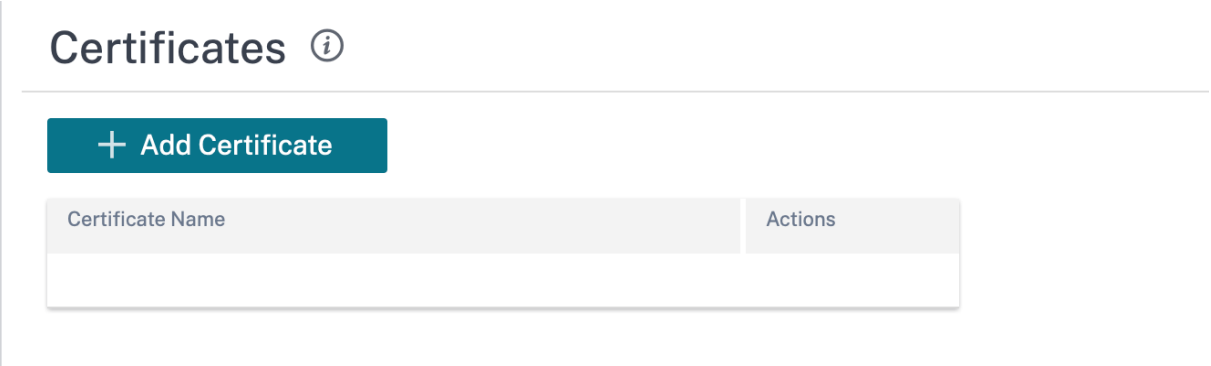
Certificates

There are two types of certificates: Identity and Trusted. Identity Certificates are used to sign or encrypt data to validate the contents of a message and the identity of the sender. Trusted Certificates are used to verify message signatures. Citrix SD-WAN appliances accept both Identity and Trusted Certificates. Administrators can manage certificates in the Configuration Editor.



Click **Verify Config** to validate any audit error

To add a certificate click **Add Certificate**.

- **Certificate Name**: Provide the certificate name.
- **Certificate Type**: Select the certificate type from the drop-down list.
    - **Identity Certificates**: Identity certificates require that the certificate's private key be available to the signer. Identity Certificates or their certificate chains that are trusted by a peer to validate the contents and identity of the sender. The configured Identity Certificates and their respective Fingerprints are displayed in the Configuration Editor.
    - **Trusted Certificates**: Trusted Certificates are self-signed, intermediate certificate authority (CA) or root CA certificates used to validate the identity of a peer. No private key is required for a Trusted Certificate. The configured Trusted Certificates and their respective Fingerprints are listed here.

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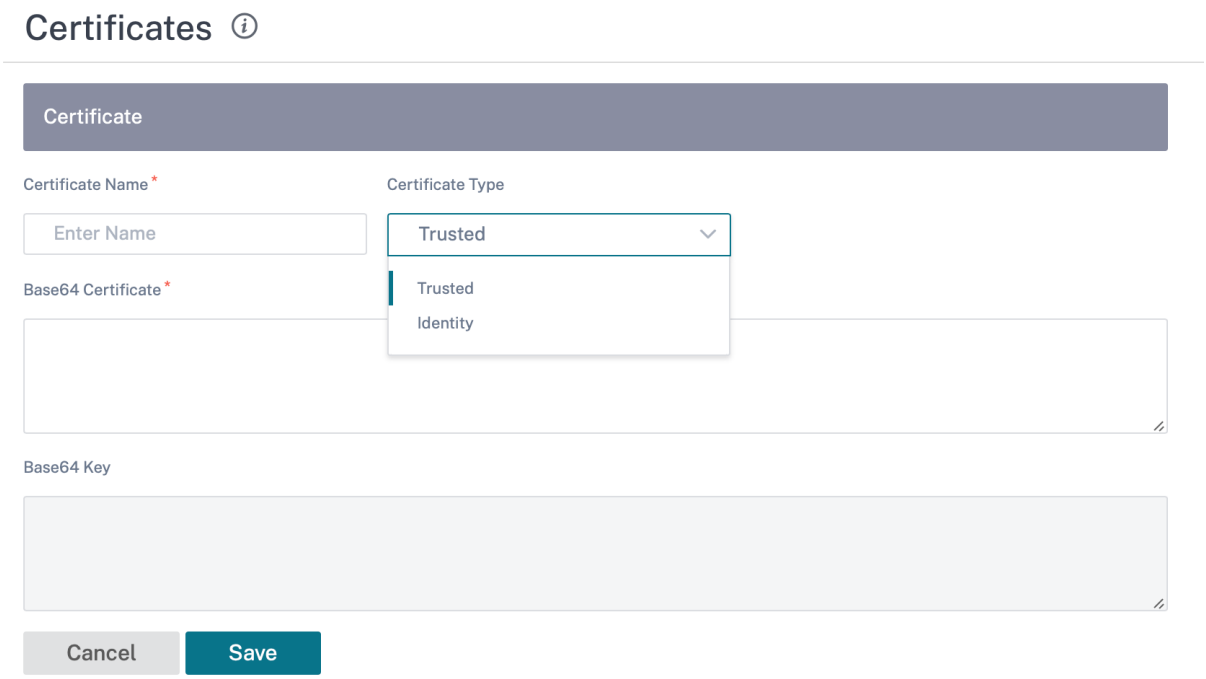

Hosted firewalls

Citrix SD-WAN Orchestrator service supports the following hosted firewalls:

- Palo Alto Networks
- Check Point

Palo Alto Networks

Citrix SD-WAN Orchestrator service supports hosting Palo Alto Networks Next-Generation Virtual Machine (VM)-Series Firewall on the SD-WAN 1100 platform. The following are the supported virtual machine models:

- VM 50
- VM 100

The Palo Alto Network virtual machine series firewall runs as a virtual machine on SD-WAN 1100 platform. The firewall virtual machine is integrated in Virtual Wire mode with two data virtual interfaces connected to it. Required traffic can be redirected to the firewall virtual machine by configuring policies on SD-WAN Orchestrator.

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Check Point

Citrix SD-WAN Orchestrator service supports hosting **Check Point CloudGuard Edge** on SD-WAN 1100 platform.

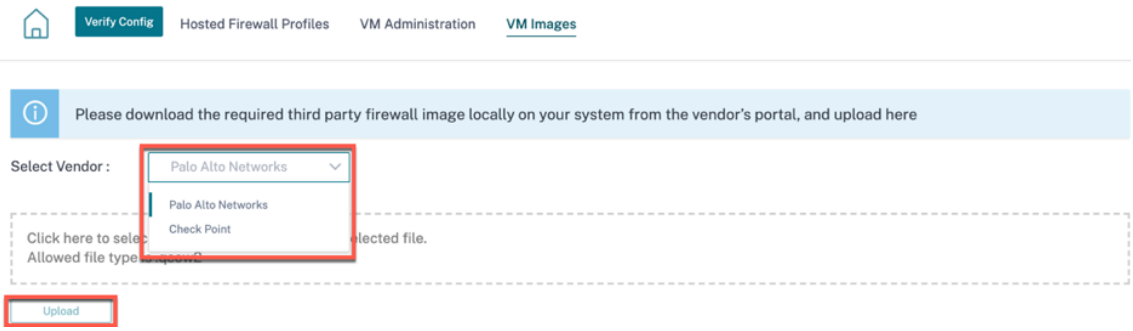
The **Check Point CloudGuard Edge** runs as a virtual machine on SD-WAN 1100 platform. The firewall virtual machine is integrated in **Bridge** mode with two data virtual interfaces connected to it. Required traffic can be redirected to the firewall virtual machine by configuring policies on SD-WAN Orchestrator.

Benefits The following are the primary goals or benefits of Palo Alto Networks integration on the SD-WAN 1100 platform:

- Branch device consolidation: A single appliance that does both SD-WAN and advanced security
- Branch office security with on-prem NGFW (Next Generation Firewall) to protect LAN-to-LAN, LAN-to-Internet, and Internet-to-LAN traffic

Perform the following steps for provisioning the firewall virtual machine through SD-WAN Orchestrator:

1. From Citrix SD-WAN Orchestrator service GUI, navigate to **Configuration > Security >** select **Hosted Firewall**.
2. To upload the software image, go to **VM Images** tab. Select the Vendor name as Palo Alto Networks/Check Point from the drop-down list. Click or drop the software image file in the box and click **Upload**.



   A status bar appears with the ongoing upload process. Do not click **Refresh** or perform any other action until the image file shows 100% uploaded.

   After the image is successfully uploaded, it will be available to use and can be selected when initiating the virtual machine provisioning.

3. Go to **VM Administration** tab and click **Provision**.

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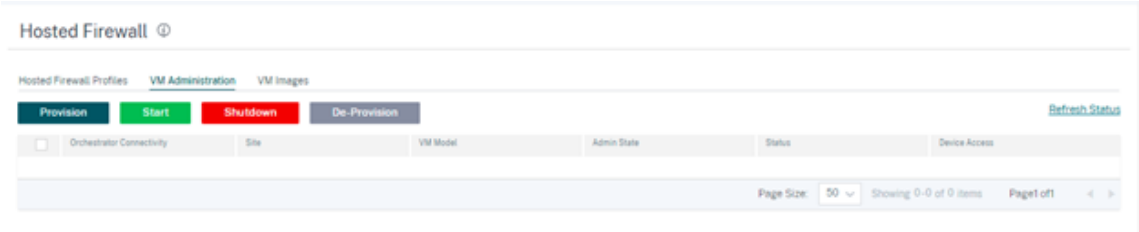
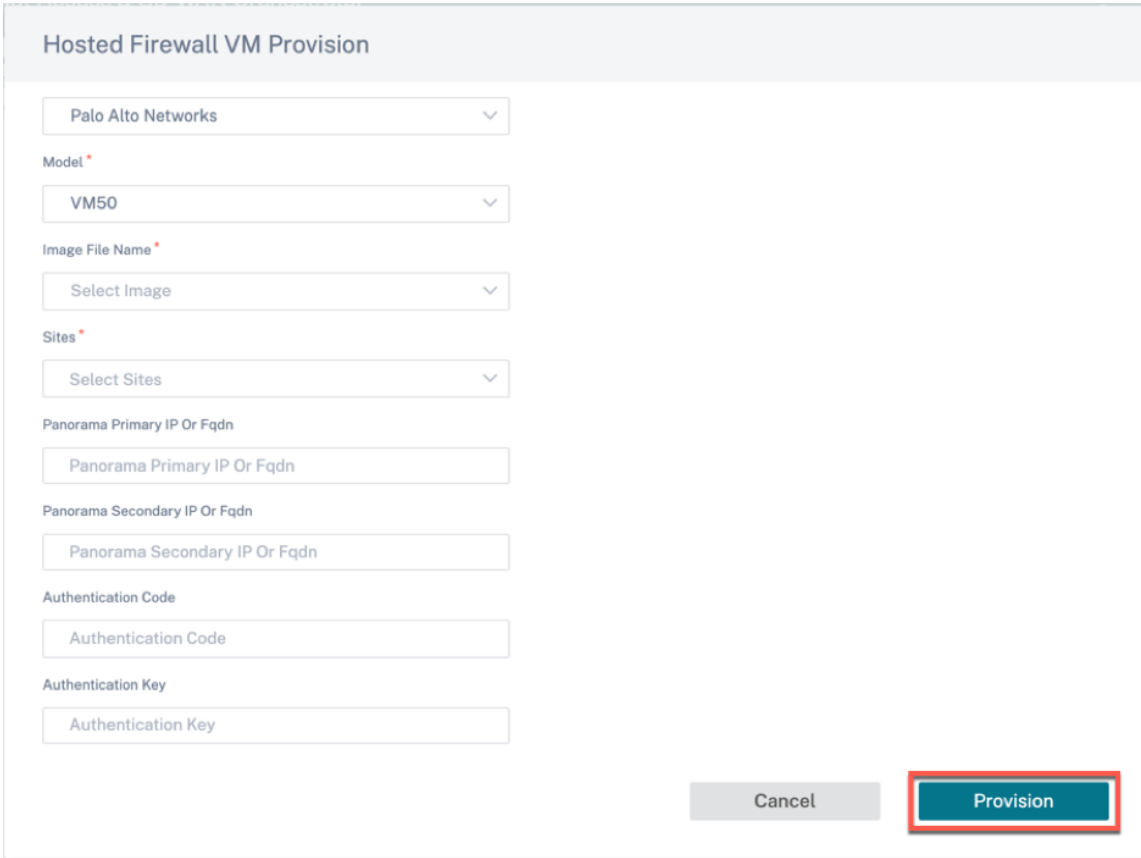


4. Provide the following details:



- **Vendor**: Select the vendor name as **Palo Alto Networks/Check Point**.
- **Model**: Select the virtual machine model number from the drop-down list.
- **Image File Name**: Select the software image from the uploaded files to provision Hosted Firewall virtual machine.

  > **Note**
  >
  > The software image is provided by the vendors (Palo Alto Networks/Check Point).

- **Sites**: Select sites from the drop-down list where Hosted Firewall virtual machine has to be provisioned.
- **Panorama Primary IP or FQDN**: Enter the management server primary IP address or fully qualified domain name (Optional).

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- **Panorama Secondary IP or FQDN**: Enter the management server secondary IP address or fully qualified domain name (Optional).
- **Authentication Code**: Enter the virtual authentication code to be used for licensing.
- **Authentication Key**: Enter the virtual authentication key to be used in the management server.

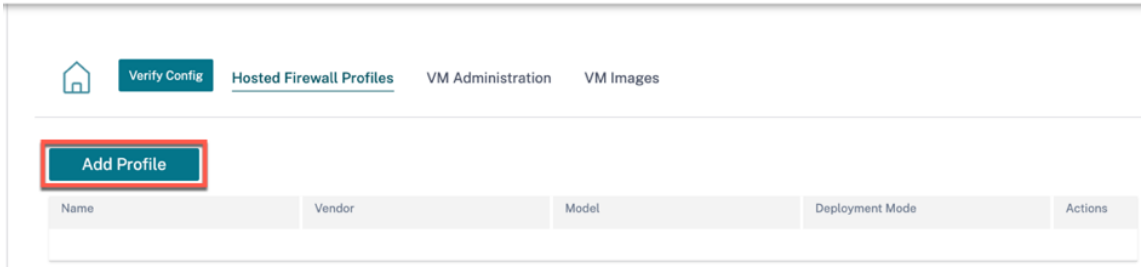
Virtual Machine Authentication Key is needed for automatic registration of the Palo Alto Networks virtual machine to the Panorama.

- Click **Provision**.

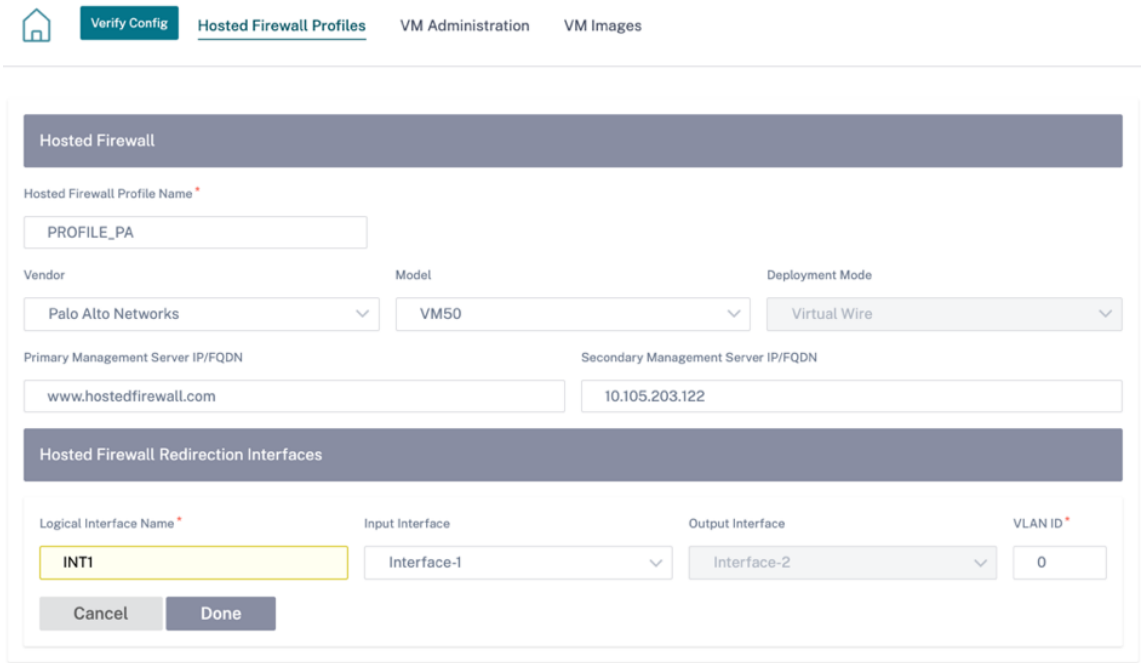
Once the virtual machine is provisioned on the SD-WAN 1100 platform, you can **Start, Shutdown,** or completely **De-Provision** that hosted firewall virtual machine.

Traffic redirection

1. For traffic redirection, go to **Hosted Firewall Profiles** tab and click **Add Profile**.



2. Provide the required information to add the **Hosted Firewall** template and click **Add**.



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The **Hosted Firewall Template** allows you to configure the traffic redirection to the **Firewall virtual machine** hosted on SD-WAN Orchestrator. The following inputs are required to configure the template:

- **Hosted Firewall Profile Name**: Name of the hosted firewall template.
- **Vendor**: Name of the firewall vendor.
- **Model**: Virtual Machine model of the hosted firewall. You can select the virtual machine model number as VM 50/VM 100.
- **Deployment Mode**: The Deployment Mode field is auto populated and grayed out. For the Palo Alto Networks vendor, the deployment mode is Virtual Wire and for the Check Point vendor, the deployment mode is Bridge.
- **Primary Management Server IP/FQDN**: Primary management server IP/ fully qualified domain name of Panorama.
- **Secondary Management Server IP/FQDN**: Secondary management server IP/ fully qualified domain name of Panorama.
- **Hosted Firewall Redirection Interfaces**: These are logical interfaces used for traffic redirection between SD-WAN Orchestrator and hosted firewall.

Interface-1, Interface-2 refers to first two interfaces on the hosted firewall. If VLANs are used for traffic redirection then, same VLANs must be configured on the hosted firewall. VLANs configured for traffic redirection are internal to the SD-WAN Orchestrator and hosted firewall.

> **Note**
>
> Redirection input interface has to be selected from connection initiator direction. The redirection interface is automatically chosen for the response traffic. For Example, if outbound internet traffic is redirected to hosted firewall on Interface-1 then, response traffic is automatically redirected to hosted firewall on Interface-2. There is no need of Interface-2, if there is no internet inbound traffic.

Only two physical interfaces are assigned to host the Palo Alto Networks firewall and two data interfaces are assigned to Check Point virtual machine.

If traffic from multiple zones must be redirected to the hosted firewall then, multiple sub interfaces can be created using internal VLANs and associated to different firewall zones on the hosted firewall.

> **Note**
>
> SD-WAN firewall policies are auto created to Allow the traffic to/from hosted firewall man-

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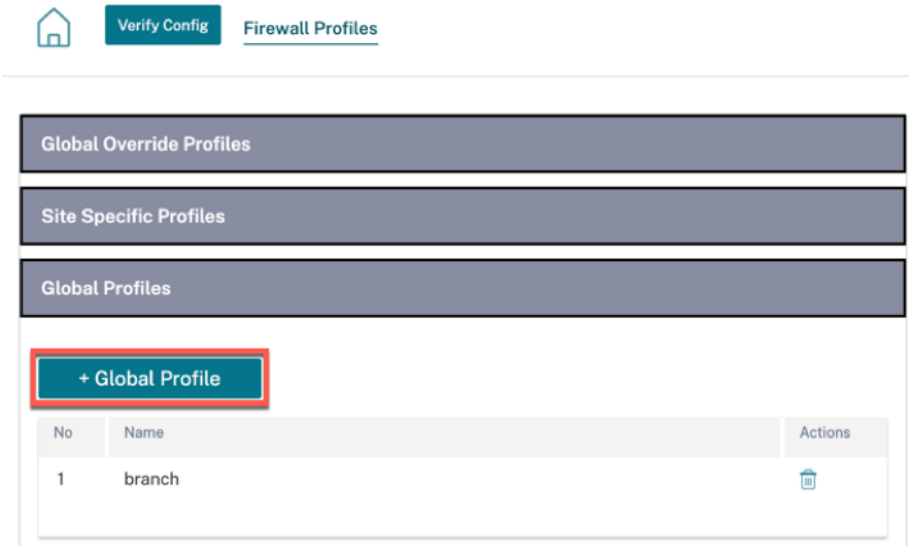
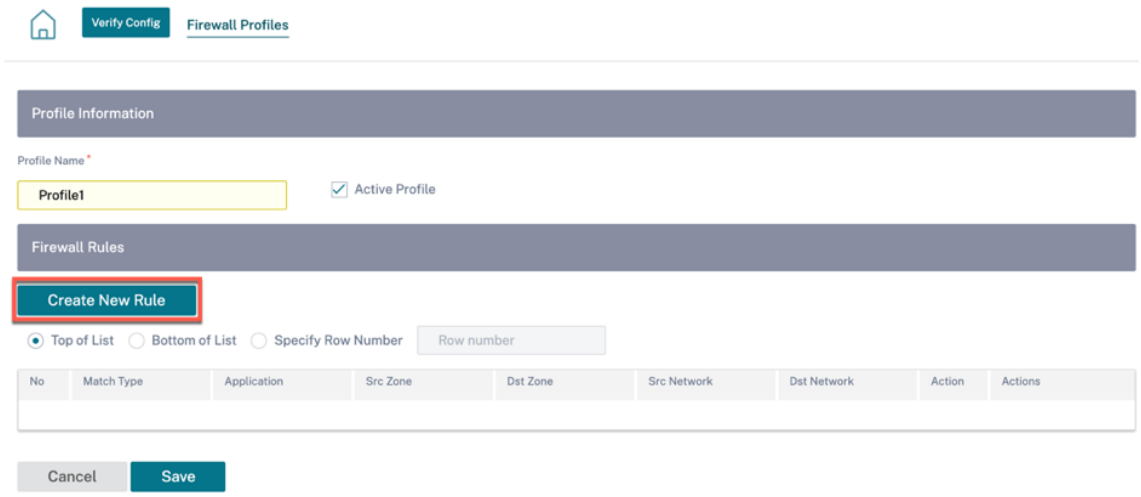
> agement servers. This avoids redirection of the management traffic that is originated from (or) destined to hosted firewall.

Traffic redirection to firewall virtual machine can be done using SD-WAN firewall policies.

3. Navigate to **Configuration > Security > Firewall Profiles >** go to **Global Profiles** section. Click **+ Global Profile**.



4. Provide a profile name and select the **Active Profile** check box. Click **Create New Rule**.



5. Change the **Policy Type** to **Hosted Firewall**. The **Action** field is auto filled to **Redirect to Hosted Firewall**. Select the **Hosted Firewall Profile** and the **Hosted Firewall Redirection Interface** from the drop-down list.

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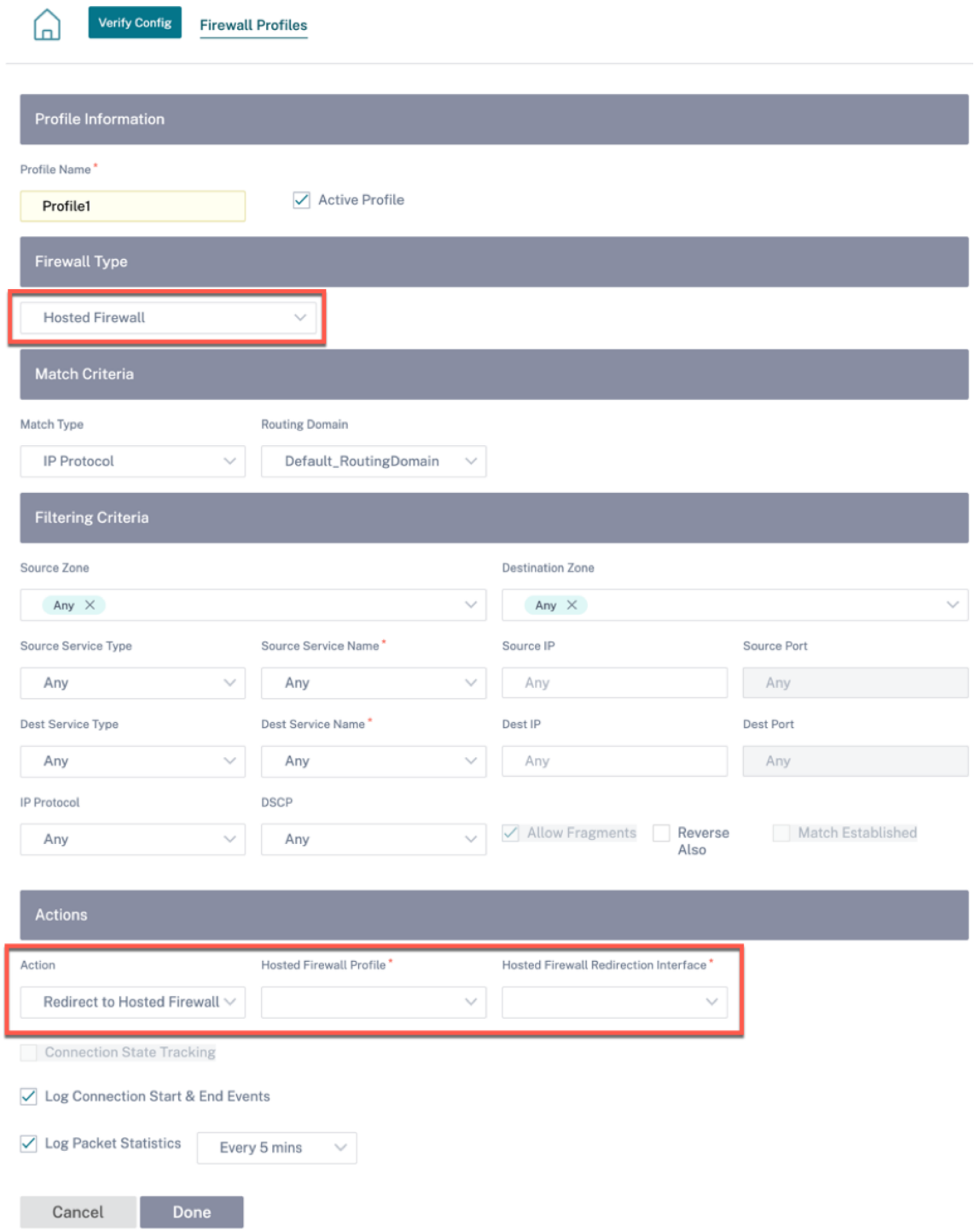

6. Fill the other match criteria as required and click **Done**.

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Edge security

September 27, 2025

The Citrix SD-WAN™ Edge security capabilities enable advanced security on Citrix SD-WAN branch appliances. It simplifies information security management for protecting the branch network from internet threats by providing a single management and reporting pane for various security functionalities along with SD-WAN. It eliminates the need for multiple branch solutions, by consolidating routing, SD-WAN, and security capabilities on a single appliance and reduces network complexity and costs.

The Edge Security stack includes the following security functionality:

- Web filtering
- Anti-Malware
- Intrusion Prevention
- SSL Inspection

Edge Security functionality is available on Citrix SD-WAN Advanced Edition appliances. For more information on Editions, see Citrix SD-WAN Platform Editions and Citrix SD-WAN Platform software support. For more information on supported appliances, see the Citrix SD-WAN Data Sheet.

> **Note**
>
> - Citrix SD-WAN 1100 SE, SD-WAN 210 SE, 210 SE LTE, and 410 SE appliances now support Advanced Edge Security capabilities with Advanced Security add-on licenses. The Advanced security add-on license is supported on 210 platforms from Citrix SD-WAN 11.3.1.1000 release onwards. The Advanced security throughput depends upon your advanced security add-on license. Advanced security throughput request beyond the throughput supported by your security add-on license is dropped.
> - The Advanced Edge Security capabilities are not supported in Fail-to-wire deployment mode. It is recommended to use Gateway or Fail-to-block deployment modes.

Since the Edge Security feature is compute-sensitive, Citrix® advises you to use the Advanced Edition appliance only at branch sites that do not already have a next generation firewall solution.

While configuring a branch site with Edge Security capabilities, ensure that a **Device Model** that supports Advanced Edition is selected and the **Device Edition** is **AE**. For more details on adding and configuring a site, see Site configuration.

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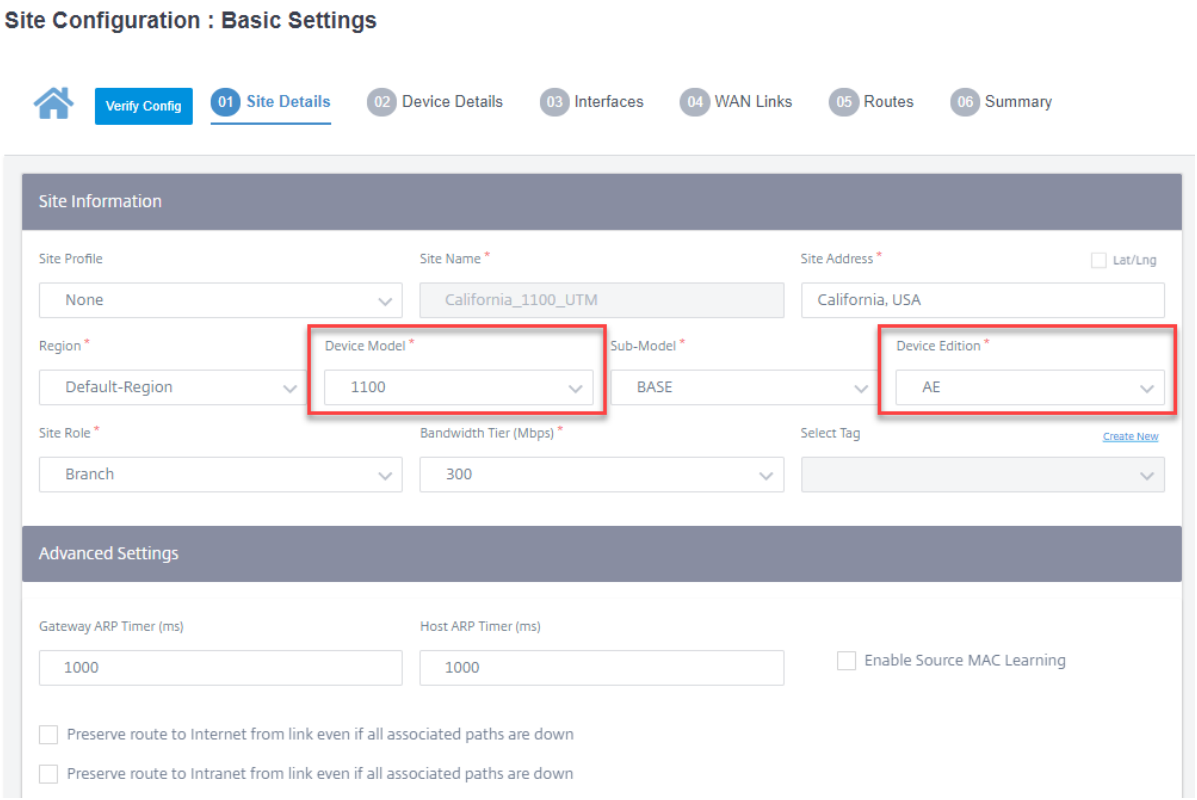

Citrix SD-WAN Orchestrator service allows you to define security profiles for Edge Security capabilities and associate these security profiles with firewall policies. The firewall policies are enhanced to accept security profiles parameters that specify the advanced security capabilities.

> **Note**
>
> You can create security profiles and configure Edge Security features through the Citrix SD-WAN Orchestrator service only.

Security profiles

A security profile is a set of specific edge security options that is applied to a specific segment of traffic define by a firewall policy. The intention is to protect the traffic from security threats. For example, you can define security profiles with different levels of security and access rights for different segments of your network. You can enable and configure Web filtering, Anti-Malware, and Intrusion Prevention settings for each security profile.

The security profiles are then associated to firewall policies to set the criteria for the traffic to be inspected. For example, in an organization, you can create different security profiles for employee subnets and guest firewall zones. You can then assign the security profile to an appropriate firewall policy that matches employee and guest traffic respectively.

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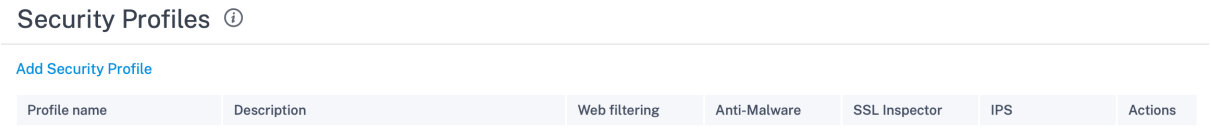
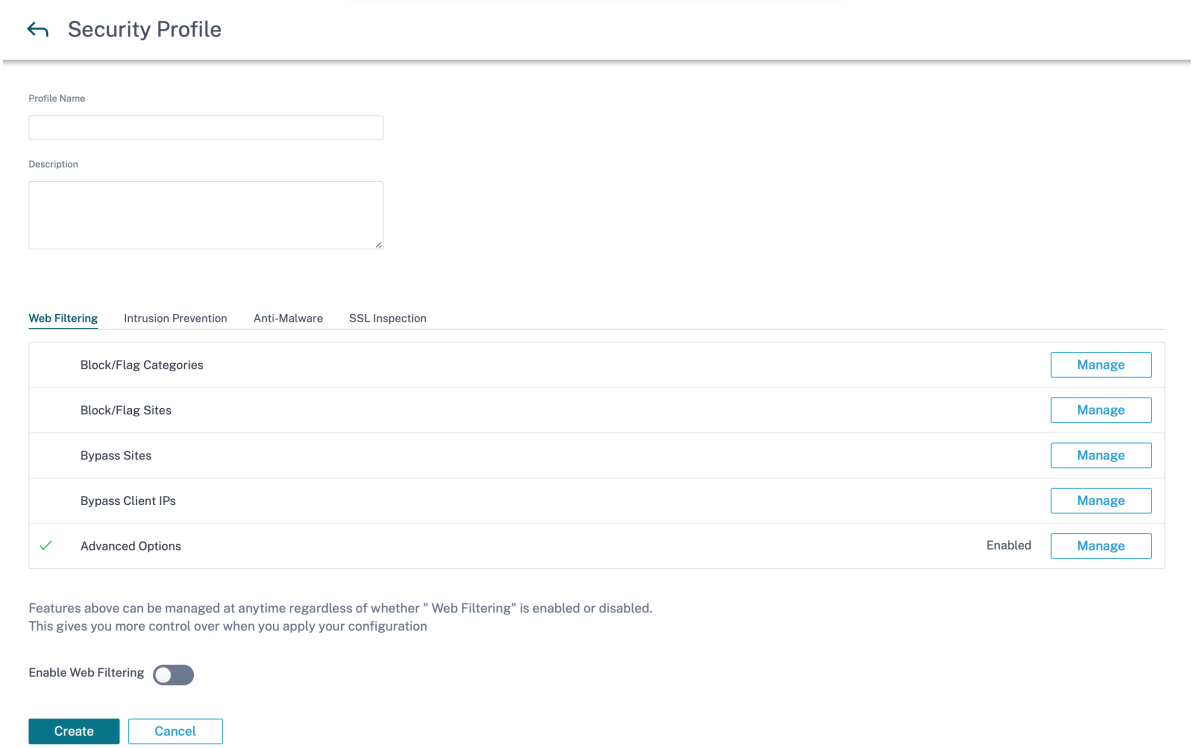
To create a security profile, at the network level navigate to **Configuration** > **Security** > **Security Profile** and click **Add Security Profile**.



Provide a name and a description for the security profile. Enable and configure Web filtering, Anti-Malware, and Intrusion Prevention settings as required.



Web filtering

Web filtering allows you to filter the websites your network users access through a categorization database which includes about 32 billion URLs and 750 million domains. It can prevent the exposure to inappropriate sites, spyware, phishing, pharming, website redirection, and other Internet threats. It can also enforce internet policies, preventing access to social media, peer to peer communication, gambling, and other sites frequently disallowed by corporate policies. Web Filter monitors internet traffic on your network and filters it by logging web activities and flagging or also blocking inappropriate content.

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When you visit a website and web filtering is enabled, the URL is sent to a cloud database for categorization.

> **Note**
>
> Configure a valid DNS server and enable HTTPS internet access through the SD-WAN management interface. This makes the cloud database reachable so that web filtering can work.

The categorization result is then cached on the SD-WAN appliance to increase the processing speed of future requests. The result is then used to flag, block, or allow websites without increasing the load time. You can add rules to block or bypass sites that are either uncategorized or mis-categorized, or to configure exceptions. You can also bypass web filtering for specific user IPs or subnets.

Block/flag category

You can flag or block different categories of websites. Web filtering classifies URLs into six category groups, IT resources, Miscellaneous, Privacy, Productivity, Security, and Sensitive. Each of these groups has different URL categories. When you choose the block option it implicitly flags the website as well. When you try to access a website of a category that is blocked, it is flagged as a violation and the website is blocked. Categories that are flagged allow you to access the websites, but the event is flagged as a violation. You can view the details in the security logs or reports.

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Expand all

Total Blocked: 5, Flagged: 5

IT Resources (9)		Blocked: 2 | Flagged: 2	
Category	Description	Block	Flag
Streaming Media	Sales, delivery, or streaming of audio or video content, including sites that provide downloads for such viewers.	☑	☑
Shareware and Freeware	Software, screensavers, icons, wallpapers, utilities, ringtones. Includes downloads that request a donation, and open source projects.	☐	☐
Peer to Peer	Peer to peer clients and access. Includes torrents, music download programs.	☐	☐
Online Greeting Cards	Online Greeting card sites.	☐	☐
Personal Storage	Online storage and posting of files, music, pictures, and other data.	☐	☐
Web Advertisements	Advertisements, media, content, and banners.	☑	☑
Content Delivery Networks	Delivery of content and data for third parties, including ads, media, files, images, and video.	☐	☐
Internet Communications	Internet telephony, messaging, VoIP services and related businesses.	☐	☐
Web Hosting	Free or paid hosting services for web pages and information concerning their development, publication and promotion.	☐	☐
Misc (2)		Blocked: 1 | Flagged: 1	
Privacy (5)		Blocked: 0 | Flagged: 0	
Productivity (33)		Blocked: 0 | Flagged: 0	
Security (7)		Blocked: 2 | Flagged: 2	
Sensitive (23)		Blocked: 0 | Flagged: 0	

Done Cancel

Block/flag sites

You can add rules to block or flag specific sites that are allowed by the settings in the categories section. You can also block/flag uncategorized or miss-categorized sites. Enter the domain name provide a description and select **Block** or **Flag**. The decisions for URLs in the **Block/Flag Sites** list take precedence over the decisions based on the site category.

> **Note**
>
> - You can only add fully qualified domain names (FQDNs), for example - *somedomain.com*. You cannot add URL paths, for example - *somedomain.com/path/to/file*.
> - Any domain added to block/flag sites also includes its subdomains. For instance, adding *domain.com* will block/flag *subdomain1.domain.com*, *subdomain2.domain.com*, and *subdo-*

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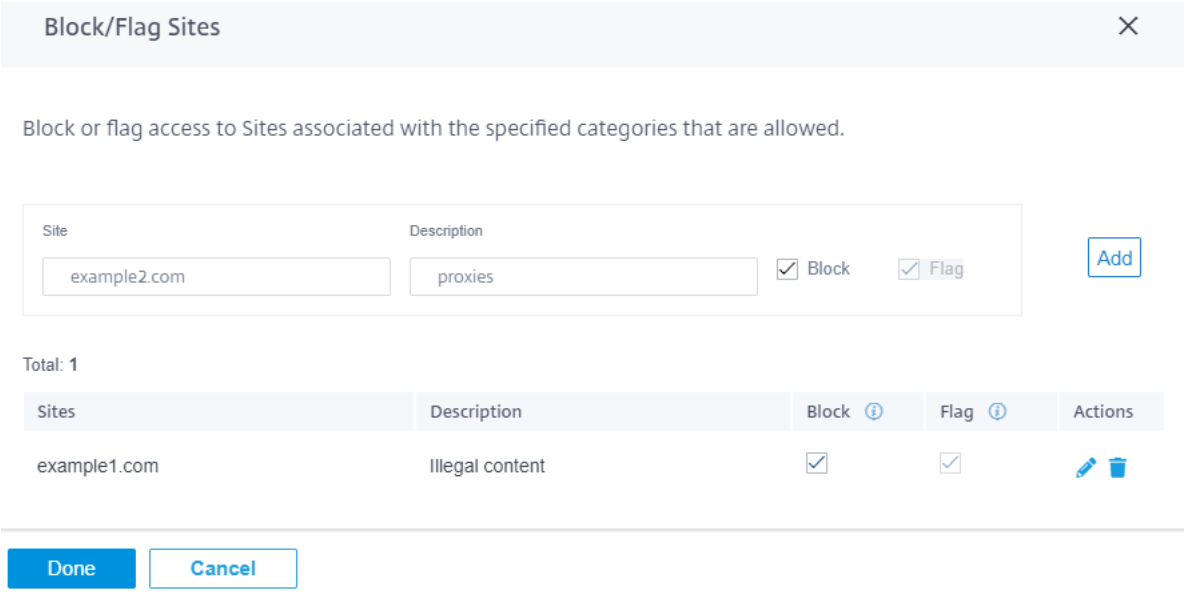
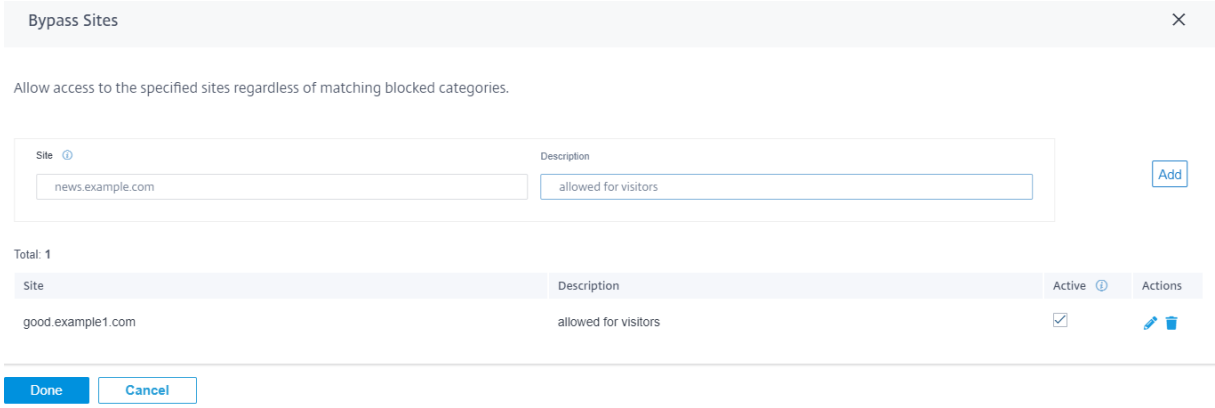
> *mainlevel2.subdomainlevel1.domain.com.*



Bypass sites

You can add rules to allow specific sites within categories that are blocked. Any domain added to the **Bypass Sites** list is allowed, even if it is blocked by category or by individual URL. Enter the domain name and provide a description. Select **Active** to allow the URL.

> **Note**
>
> - You can only add fully qualified domain names (FQDNs), for example - *somedomain.com*. You cannot add URL paths, for example - *somedomain.com/path/to/file*.
> - Any domain added to bypass sites also includes its subdomains. For instance, adding *domain.com* bypasses *subdomain1.domain.com*, *subdomain2.domain.com*, and *subdomainlevel2.subdomainlevel1.domain.com.*



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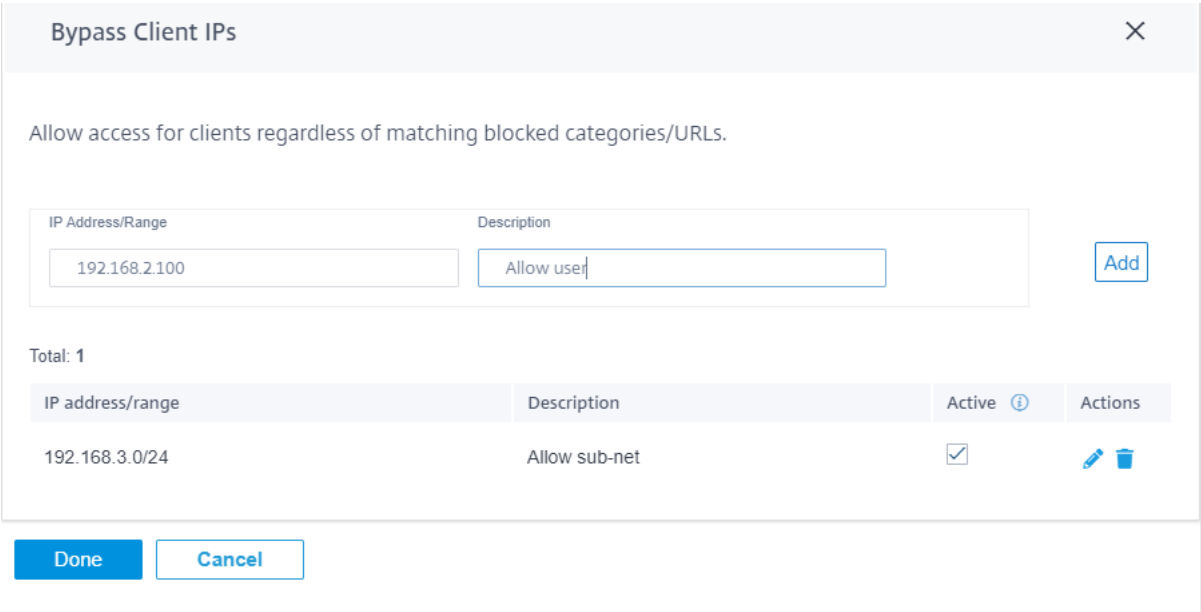
Bypass client IPs

You can add rules to bypass web filtering for specific IP addresses or subnets. You can provide either an IP address or subnet CIDR notation and a meaningful description. The web filter does not block any traffic, regardless of the blocked categories or sites. Select **Active** to allow traffic from these IP addresses.

> **Note**
>
> Since DHCP IPs can change, use this feature only for clients with static IPs or subnets.



Advanced options

HTTPS options HTTPS options are considered for web filtering if SSL inspection is not configured or the traffic matches an Ignore SSL inspection rule. In these cases, while the full URL is not visible, web filtering might still be performed based on the Server Name Indication (SNI), server certificate, or IP address:

- **Process HTTPS traffic by Server Name indication (SNI) information if present**: SNI is an extension to the Transport Layer Security (TLS) protocol by which a client indicates the name of the website that the user is trying to connect to at the start of the secure connection handshake process.

  This not only enables the server to provide the right certificate, but also the SD-WAN appliance to identify the target website and determine its URL category, even if the end-to-end communication is encrypted. If this option is enabled, HTTPS traffic is categorized using the SNI in the HTTPS data stream, if present.

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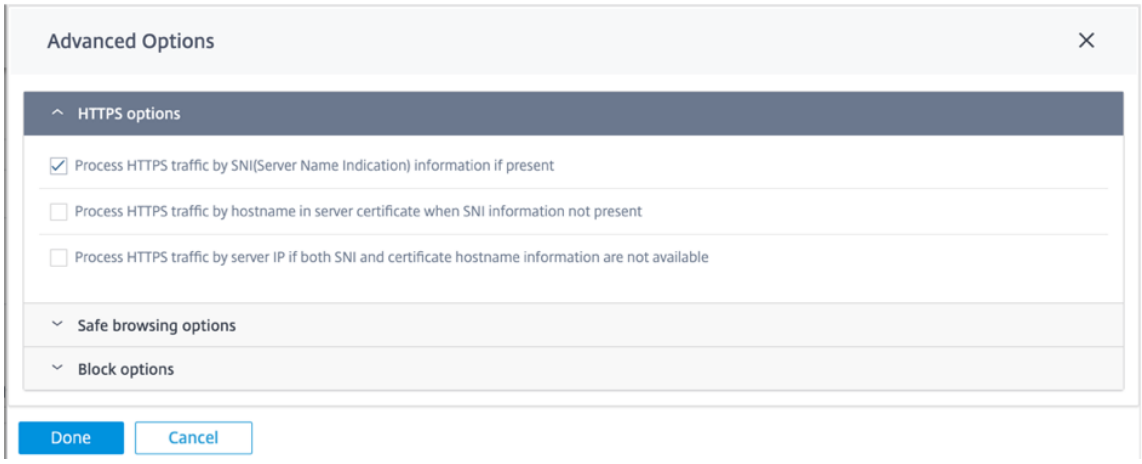
> **Note**
>
> The **Process HTTPS traffic by SNI** option is enabled by default.

- **Process HTTPS traffic by hostname in server certificate when SNI information not present**: If this option is enabled and SNI information is not present, then the certificate is fetched from the HTTPS server and the server name on the certificate is used for categorization and filtering purposes.
- **Process HTTPS traffic by server IP if both SNI and certificate hostname information are not available**: If this option is enabled and neither of the previous options worked, HTTPS traffic is categorized using the IP address.



Safe browsing options Under **Advanced Options**, the following safe browsing options are added that you can select/deselect as needed:

- **Enforce safe search on popular search engines**: Safe search is enforced on all searches using supported search engines. For example, Google, Yahoo!, Bing, Ask, and so on.
- **Enforce restrict mode on YouTube**: Restrict mode is enforced on all YouTube content. The restrict mode is an option to intentionally limit your YouTube experience.
- **Force searches through kid-friendly search engine**: All searches in popular search engines are redirected through kidzsearch.com. The Kidzsearch.com is a web portal powered by Google Custom Search with academic autocomplete that emphasizes safety for children.

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> **Note**
>
> Safe Browsing only takes effect if related traffic undergoes the **SSL inspection**. Towards this end, ensure that the **SSL inspection** is turned on for the respective security profile and **Inspect** rules for search engines and YouTube are not disabled.

Block Options

- **Block QUIC (UDP port 443)**: The firewall blocks any outgoing communication on UDP port 443, which is typically used for the QUIC protocol, which cannot be processed by the web filtering module. Blocking QUIC results in the browser falling back to TCP based HTTP(S) communication.
- **Block pages from IP only hosts**: Users entering an IP address rather than domain name is blocked.
- **Allow if referrer matches any Bypass Sites**: If a page containing external content is allowed through **Bypass URL**, the external content is passed regardless of other block policies.

  > **Note**
  >
  > Although this option allows you to access the external websites, it exposes a security risk. The referrer option in the HTTP header can be overwritten by browser add-ons and plug-ins. Citrix advises you to use this option judiciously.

- **Close connection for blocked HTTPS sessions without redirecting to block page**: The SD-WAN appliance issues an HTTP redirect to a custom block page in case the URL is blocked. However, this redirect is not possible for HTTPS sessions without resulting in a Man-in-the-Middle (MitM) session termination, displaying an invalid certificate browser warning page. This option results in the HTTPS session being terminated instead, to prevent a false warning about a potential attack on the target website.

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> **Note**
>
> This option is enabled by default. When enabled, not all the HTTPS traffic gets the SSL inspection treatment.

- **Custom URL for Block**: Set an external server location to redirect users when they are denied access to a website by Web Filter. If a custom URL is configured, the following query string variables are passed so that the receiving system can customize its content.
  - **reason**: The reason the user was denied access. This is the Category name *Web-based+Email*, and a longer category description. For example, *Sites+offering+web+based+email+and+e* (the **space** characters are replaced with "+") in case the site was blocked due to its category. Otherwise, if blocked due to "block URLs"it is empty.
  - **appname**: The application that is responsible for the denial (Web filtering).
  - **appid**: The application identifier, an internal identifier for web-filtering which can be ignored).
  - **host**: the domain-name of the URL that the end-user was denied access to.
  - **clientAddress**: The IP address of the end-user that was denied access.
  - **url**: The requested URL that was denied access.

> **Note**
>
> If you do not use your own webpage to process the denial, the built-in denial issues a redirect to a non-routable IP address.

You can view detailed web filtering reports on the Citrix SD-WAN Orchestrator service. For more details, see Reports –Web filtering

Intrusion Prevention

Intrusion Prevention detects and prevents malicious activity in your network. It includes a database of over 34,000 signature detections and heuristic signatures for port scans allowing you to effectively

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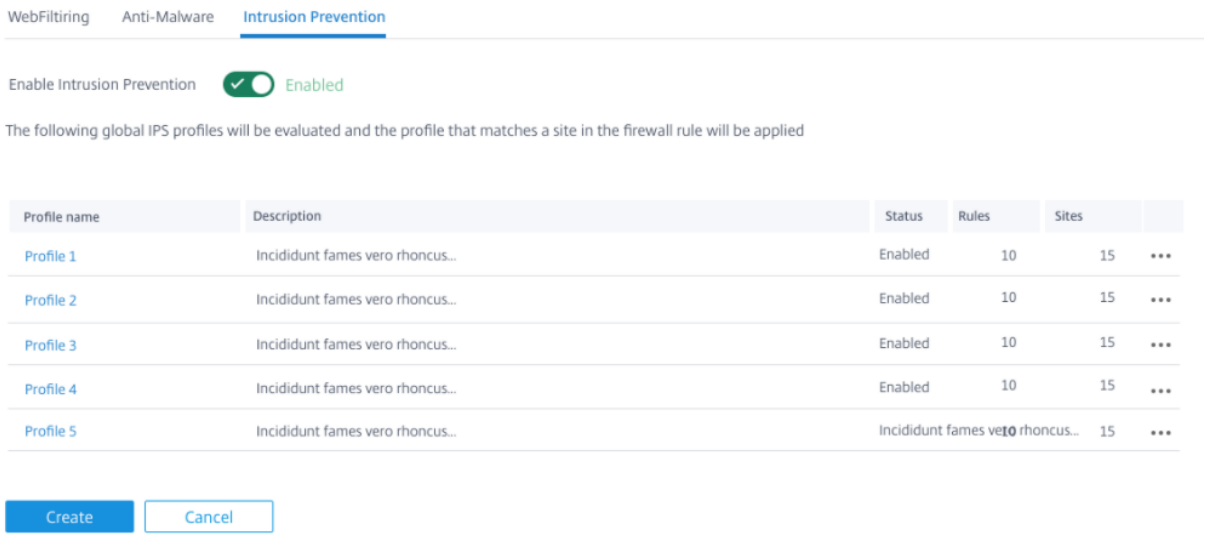
monitor and block most suspicious requests. You can choose to enable or disable **IPS** while defining a security profile. When you enable IPS, it inspects the network traffic against signatures which are site-dependent and determined by the IPS profile site mapping. For more information on creating, managing, and associating IPS profiles to sites, Intrusion Prevention.

> **Note**
>
> Intrusion Prevention only detects malicious traffic over the traffic captured by the respective Firewall policies.



You can view detailed Intrusion Prevention reports on the Citrix SD-WAN Orchestrator service. For more details, see Reports –Intrusion Prevention.

Anti-Malware

The Edge Security Anti-Malware scans and eradicates viruses, trojans, and other malware. Anti-Malware can scan HTTP, FTP, and SMTP traffic at your network and examine it against a database of known signatures and file patterns for infection. If no infection is detected, the traffic is sent to the recipient. If an infection is detected, Anti-Malware deletes or quarantines the infected file and notifies the user.

Anti-Malware uses Bitdefender's engine to scan the downloaded files using a combination of signature database, heuristics for suspicious patterns and dynamic emulator analysis. The download files are blocked if any of these tests fails.

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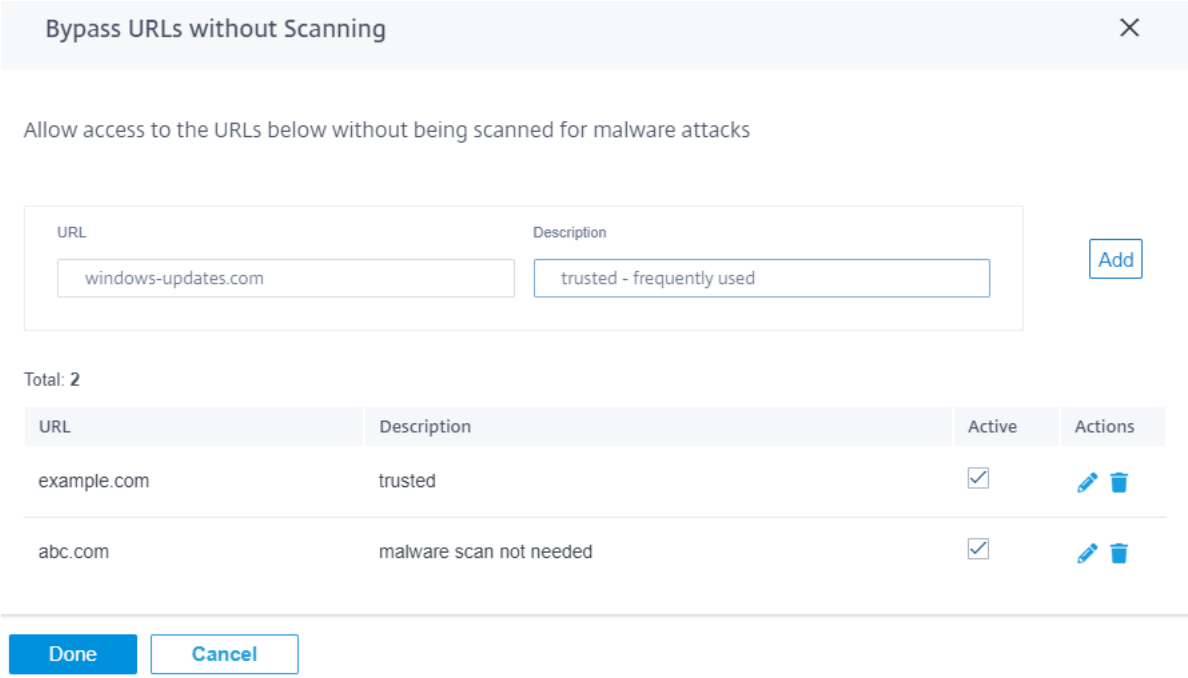
Bypass URLs without scanning

You can bypass Anti-Malware scanning for trusted internal sites or external sites that are used for regular updates, generate more traffic, and are considered safe. By allowing trusted sites to pass through without scanning, you can reduce the resource spent on scanning these sites.

Enter the **URL**, provide a brief description, and add the URL to the bypass URL list.



Scan by file types

Anti-Malware by default supports scanning of 41 file-type extensions in HTTP traffic. Anti-Malware scanning involves in depth analysis through signatures, heuristics, and emulation, making it a compute sensitive process.

You can also add a new file type. To add a new file type, click **Manage** > provide **File Types** and **Description** > click **Add**. Select the **Scan** check box to include the file type for Anti-Malware scanning. Clear the **Scan** check box for file types that need not to be scanned. You can also edit or delete the file types if necessary.

> **Note**
>
> The file-types that are selected by default make a balance between the Anti-Malware effectiveness and system performance. Enabling more file types, increase the Edge Security processing load and compromises the overall system capacity.

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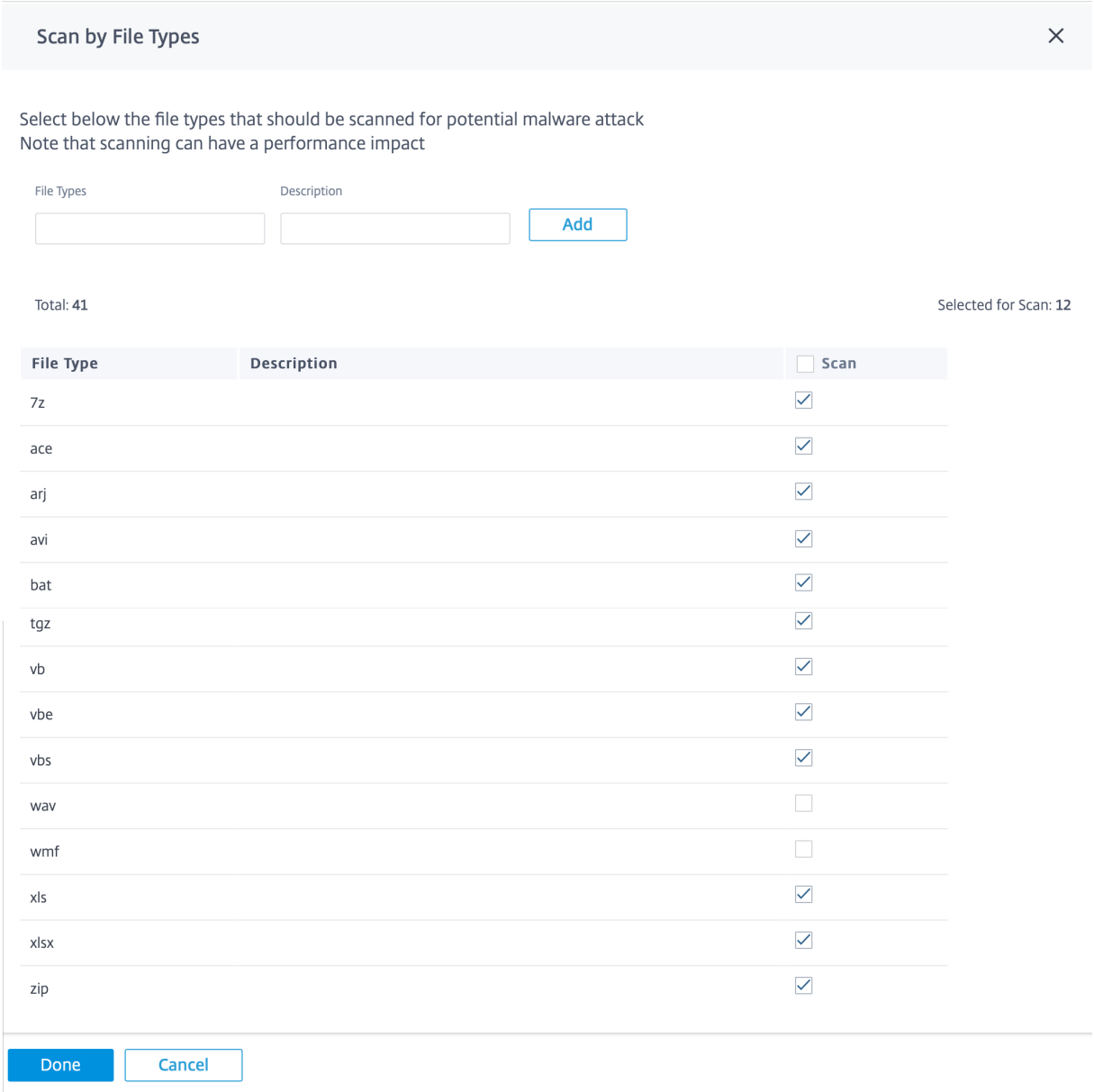

Scan by MIME types

A multipurpose internet mail extension (MIME) type is an internet standard that describes the content of an internet file based on the nature and format. Similar to file types, you can also add and choose to exclude certain MIME types from Anti-Malware scanning.

To add MIME types, click **Manage** > add a MIME type in the **MIME Types** field and provide a **Description** > click **Add**. Select the **Scan** check box to include the MIME type for Anti-Malware scanning. Clear the **Scan** check box for MIME type that need not be scanned. You can also edit or delete the MIME types if necessary.

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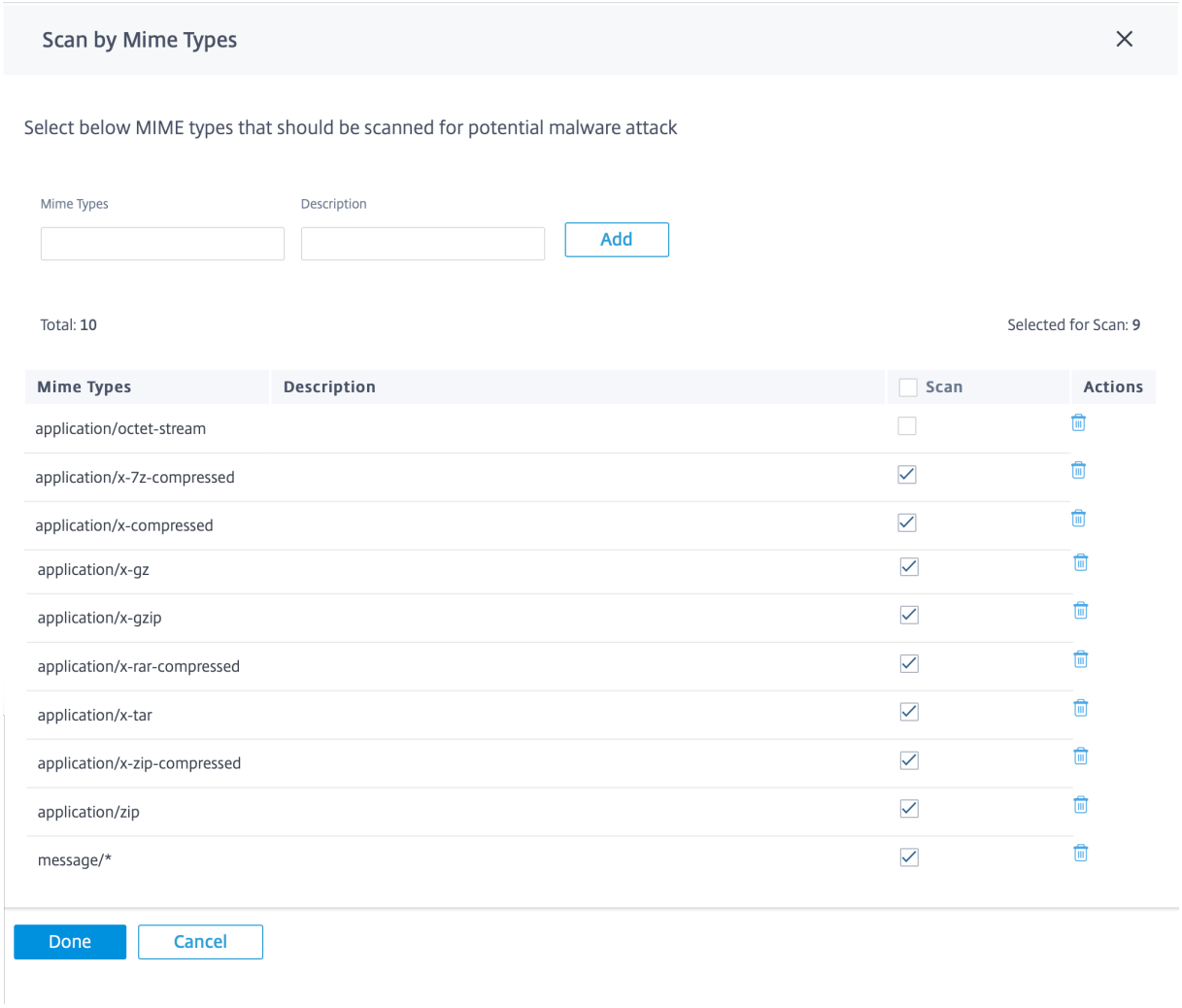
> **Note**
>
> The MIME types selected by default are chosen to have balance between anti-malware effectiveness and system capacity. Enabling more file types increase the Edge Security processing load and compromises the overall system capacity.



Other scan options

You can choose to enable or disable Anti-Malware scans on the following internet protocols:

- **Scan HTTP**: Enable Anti-Malware scanning on HTTP traffic.
- **Scan FTP**: Enable Anti-Malware scanning on FTP downloads.
- **Scan SMTP**: Enable Anti-Malware scanning on SMTP **message attachments** and choose the action to be performed.

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- **Remove Infection**: The infected attachment is removed and the email is delivered to the recipient.
- **Pass Message**: The email is delivered to the recipient with the attachment intact.

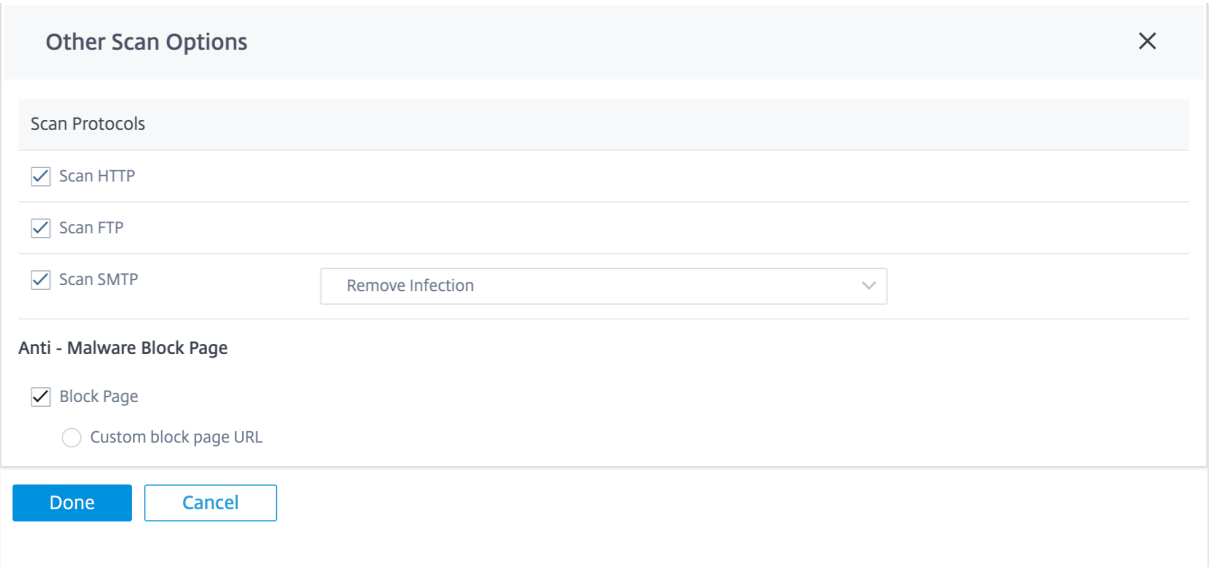
  > **Note**
  >
  > For **Remove Infection** and **Pass Message** actions the email subject line is prepended with "[VIRUS]".

- **Block Message**: The email is blocked and not delivered to the recipient.

You can set an external server location to redirect users when they are denied access to a website by Anti-Malware. Select the **Block Page** check box.

- **Custom block page URL**: Creates a custom redirect page. If a custom URL is configured, the following query string variables are passed so that the receiving system can customize its content.
  - **Host**: The domain-name of the URL that the end-user was denied access to.
  - **URL**: The requested URL that was denied access.

> **NOTE**
>
> If you do not use your own webpage to process the denial, then the built-in denial issues a redirect to a non-routable IP address.



You can view detailed Anti-Malware scan reports on the Citrix SD-WAN Orchestrator service. For more details, see Reports –Anti-Malware.

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SSL inspection

Secure Sockets Layer (SSL) inspection is a process of intercepting, decrypting, and scanning the HTTPS and secure SMTP traffic for malicious content. It can perform the following:

- Scan for malware
- Perform URL filtering on the full URL path rather than only the top-level domain
- Redirect users to a custom block page for HTTPS traffic similar to that of HTTP traffic

> **NOTE**
>
> SSL inspection is supported from Citrix SD-WAN 11.3.0 release onwards.

You can enable SSL inspection and create SSL rules as part of the Security profiles. SSL rules provide the ability to define the conditions to handle the HTTPS and secure SMTP traffic. Before configuring the SSL rules, ensure that you have configured your organization's root CA and deployed the root CA to client devices. For information on configuring root CA, see Security.

On the **SSL Inspection** tab, select **Enable SSL Inspector** to enable SSL inspection. Click **New Rule** and provide a description. Select one of the following conditions:

- **SSL Inspector: SNI Hostname**: Defines the SSL rule based on the Server Name Indicator (SNI) host name.
- **SSL Inspector: Certificate Subject**: Defines the SSL rule based on the SSL certificate.
- **SSL Inspector: Certificate Issuer**: Defines the SSL rule based on who the certificate issuer is.

Select the **Operation** and provide a **Value** to match the condition. Select one of the following **Actions**:

- **Inspect**: The traffic that meets the selected rule conditions undergoes SSL inspection.
- **Ignore**: The traffic that meets the selected rule conditions does not undergo SSL inspected and is allowed to flow unimpeded. Basic web filtering based on the SNI can still be performed.

Enable the rule and click **Done**.

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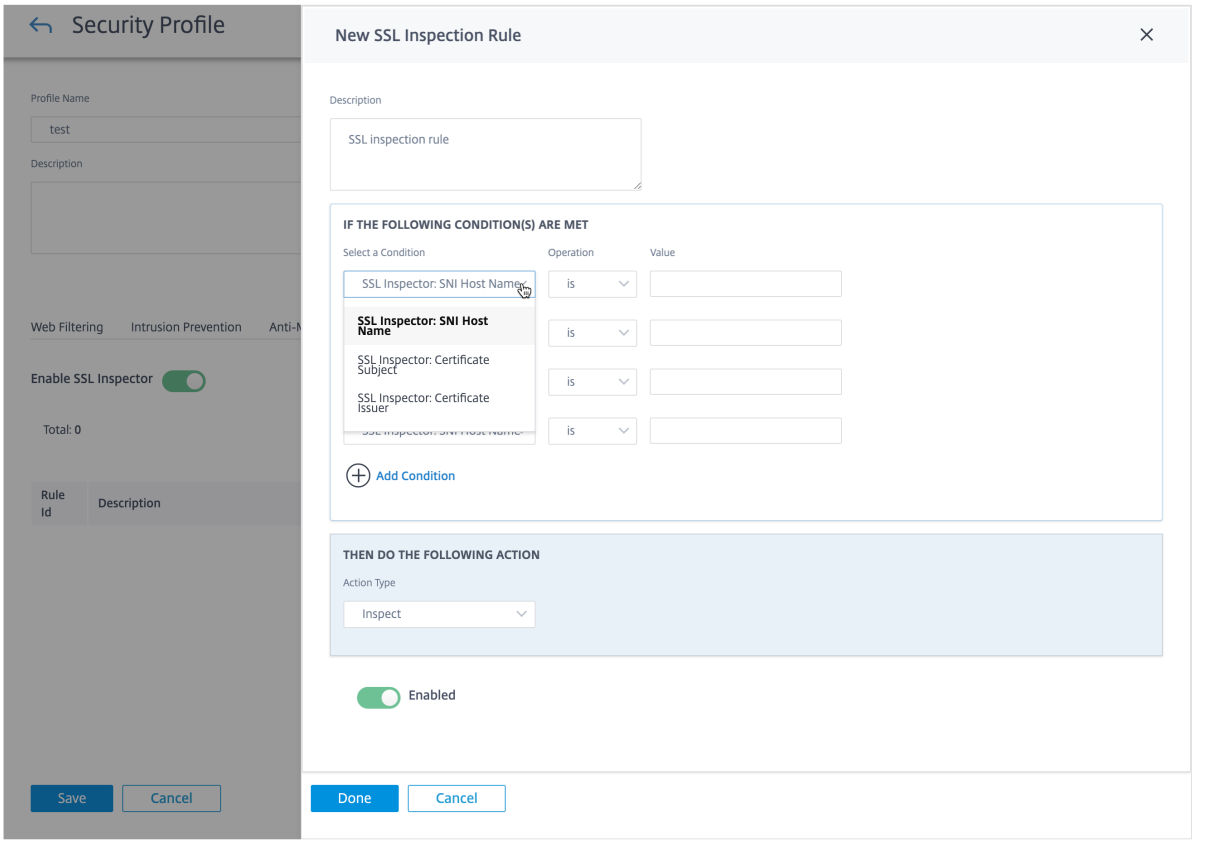

Before completing the SSL inspection configuration, consider the following:

- SSL inspection is a compute-sensitive operation that can reduce Edge Security throughput by up to 70%. It is recommended that you selectively inspect rather than selectively ignore. The default configuration reflects selective inspect by having **Ignore all traffic** enabled as the fallback rule.
- Web filtering **safe browsing options** require SSL inspection of search engine and YouTube traffic. You must not disable or delete the respective default rules if you are planning to use the safe browsing options.

Edge security firewall policy

The Edge Security capabilities are triggered using firewall policies. You can define a firewall policy for the match type **IP Protocol** and map it to a security profile. If the incoming traffic matches the filtering criteria, an inspect action is triggered and the security capabilities, configured as per the selected security profile, are applied.

Citrix SD-WAN evaluates firewall policies in a “first-match”manner, where the first matching policy determines the action. Firewall policies must be configured in the following order:

1. IP protocol, Office 365, and DNS app firewall policies with non-inspect action

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2. Edge security firewall policies (IP protocol firewall policies with inspect action)
3. Application firewall policies

To configure a firewall policy and enable edge security, navigate to **Configuration** > **Security** > **Firewall Profiles** and add a profile based on your preference. Click **Create New Rule**. Select the **Match Type** as **IP Protocol** and configure the filtering criteria. For more information, see Firewall profiles. Select the **Inspect (for IP Protocol)** action and select a security profile.

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Verify Config | Firewall Profiles

Profile Information

Profile Name *

profile-test

☐ Active Profile

Built-in Firewall

Match Criteria

Match Type: IP Protocol

Routing Domain: Default_RoutingDomain

Filtering Criteria

Source Zone: Any

Destination Zone: Any

Source Service Type: Any

Source Service Name *: Any

Source IP: Any

Source Port: Any

Dest Service Type: Any

Dest Service Name *: Any

Dest IP: Any

Dest Port: Any

IP Protocol: Any

DSCP: Any

☑ Allow Fragments

☐ Reverse Also

☐ Match Established

Actions

Action: Inspect (for IP Protocol)

Security Profile *: daasdf

☐ Connection State Tracking

☑ Log Connection Start & End Events

☑ Log Packet Statistics — Every 5 mins

Cancel | Done

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> **Note**
>
> While there is no limit on the number of security profiles you can create, you can only assign up to 32 Inspect firewall policies to a site.

Limitations

- The appliance software takes longer time to download for Citrix SD-WAN Standard Edition (SE) appliances that are upgraded to Advanced Edition (AE). The Edge Security subsystem of AE appliances is bundled separately to prevent any impact on the download size for SE appliances.
- The Citrix SD-WAN Edge Security web filtering can only check the Server Name Indication (SNI) for the HTTPS sites to decide whether to block, flag, or allow the traffic.
- External syslog server support is not available through Citrix SD-WAN Orchestrator service for Citrix SD-WAN Edge Security.

Related topics

- Intrusion Prevention
- Web filtering reports
- Anti-Malware reports
- Intrusion Prevention reports
- Security alerts
- Security logs

Firewall settings

July 29, 2021

You can configure firewall settings at a site level. These settings provide security to all the SD-WAN appliances on a specific site.

The following are the instructions to configure the Site-specific override firewall settings:

1. At the site level, navigate to **Configuration** > **Advanced settings** > **Firewall settings**.
2. Select the **Site Specific Override** option from the **Override Firewall Settings** drop-down menu. This action applies the defined firewall rules on a specific site.

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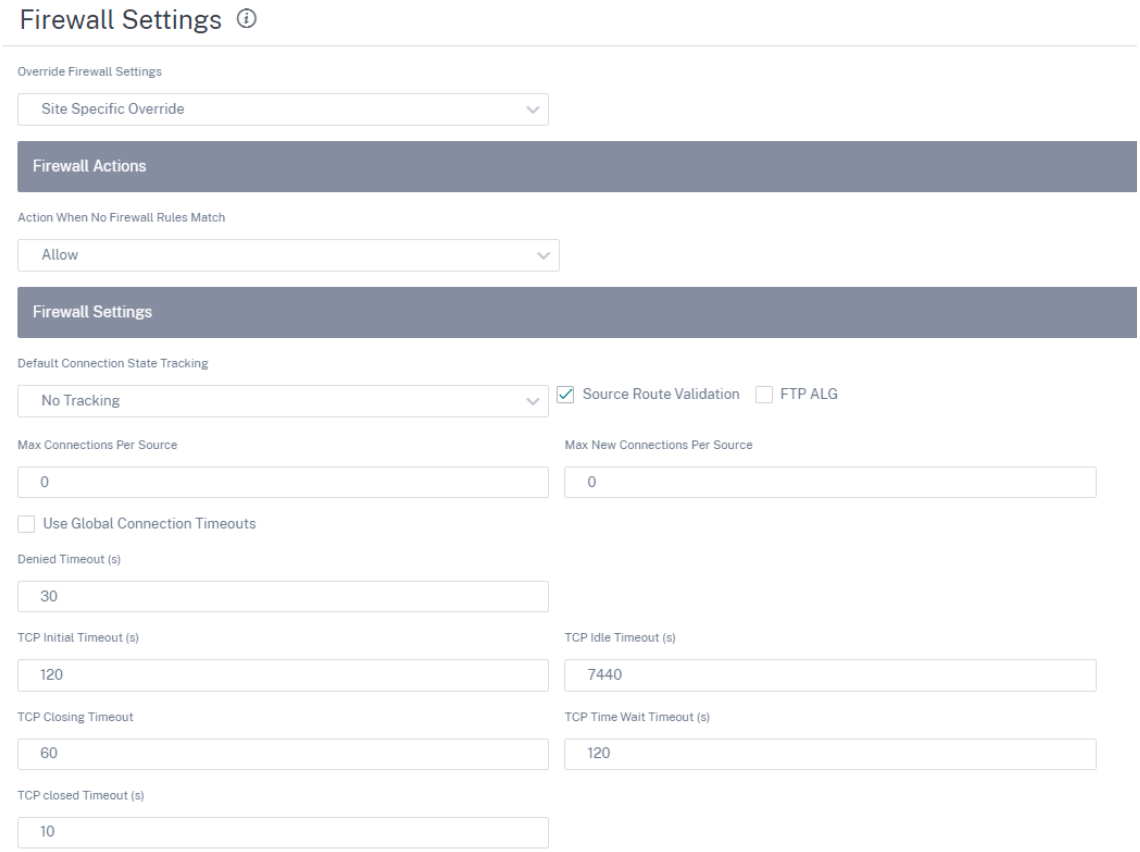
> **Note**
>
> If you want to switch from site-specific setting to a global default setting, select the **Global Defaults** option from the drop-down list. This action removes the site-specific configuration and retains the global specific defaults.



- **Action When No Firewall Rules Match**: Select an action (Allow or Drop) from the drop-down list for the packets that do not match a Firewall policy.
- **Default Connection State Tracking**: Enables directional connection state tracking for TCP, UDP, and ICMP flows that do not match a filter policy or NAT rule.
- **Source Route Validation**: When you select this check box, packets are dropped when they are received on an interface that is different from the packet's route, as determined by the source IP address.
- **FTP ALG**: When you select this check box, the FTP ALG (Application layer gateway) monitors connections on TCP port 21 and updates FTP messages with the appropriate NAT IP addresses.
- **Max Connections per Source**: Maximum number of non-established connections that each source IP address can allow. By default, each source IP address allows an unlimited number of non-established connections.

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- **Max New Connections per Source**: Maximum number of connections that each source IP address can allow. By default, each source IP address allows unlimited number of connections.
- **Use Global Connection Timeouts**: When you select this check box, SD-WAN enables the global timeout settings. To configure specific timeout settings, clear this check box.
  - **Denied Timeout (s)**: Time (in seconds) to wait for new packets before closing denied connections.
  - **TCP Initial Timeout (s)**: Time (in seconds) to wait for new packets before closing an incomplete TCP session.
  - **TCP Idle Timeout (s)**: Time (in seconds) to wait for new packets before closing an active TCP session.
  - **TCP Closing Timeout**: Time (in seconds) to wait for new packets before closing a TCP session after a terminate request.
  - **TCP Time Wait Timeouts (s)**: Time (in seconds) to wait for new packets before closing a terminated TCP session.
  - **TCP Closed Timeout (s)**: Time (in seconds) to wait for new packets before closing an aborted TCP session.

3. Click **Save**.

Configure firewall segmentation

November 24, 2021

Virtual Route Forwarding (VRF) firewall segmentation provides multiple routing domains accesses to the internet through a common interface, with each domain's traffic isolated from that of the others. For example, employees and guests can access the internet through the same interface, without any access to each other's traffic.

- Local guest-user Internet access
- Employee-user Internet access for defined applications
- Employee-users may continue hairpin all other traffic to the MCN
- Allow the user to add specific routes for specific routing domains.
- When enabled, this feature applies to all routing domains.

You can also create multiple access interfaces to accommodate separate public facing IP addresses. Either option provides the required security necessary for each user group.

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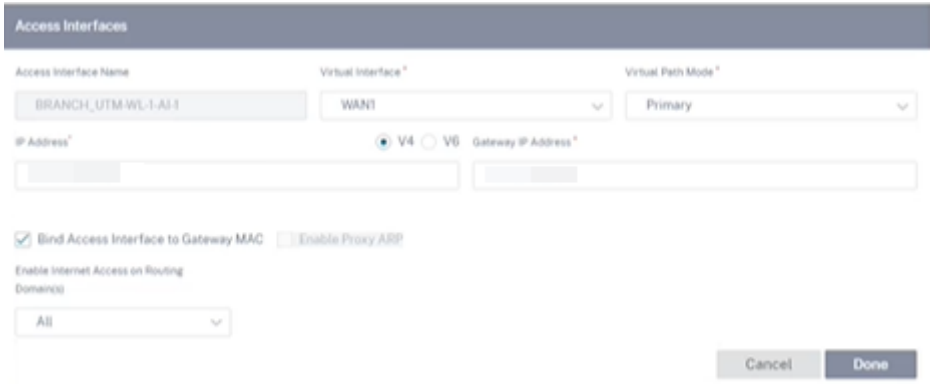
Enabling Internet Access on Routing Domain(s)

You can enable Internet access on a routing domain through Citrix SD-WAN Orchestrator service. This option auto-creates a DEFAULT route (0.0.0.0/0) on all the routing tables of the respective routing domains. You can enable Internet access for all the routing domains, or none. It avoids the need for creating exclusive static route across all the routing domains if the Internet access is required.



For more information, see Access interface.

Use Cases

The following are the supported use cases for firewall segmentation:

- Customers have multiple routing domains at a branch site without the requirement to include all domains at the data center (MCN). They need the ability to isolate different customers'traffic in a secure manner
- Customers must be able to have a single accessible firewalled Public IP address for multiple routing domains to access the internet at a site (extend beyond VRF lite).
- Customers need an Internet route for each routing domain supporting different services.
- Multiple routing domains at a branch site.
- Internet Access for different routing domains.

Multiple routing domains at a branch site

With the Virtual Forwarding and Routing Firewall segmentation enhancements, you can:

- Provide an infrastructure, at the branch site, that supports secure connectivity for at least two user groups, such as employees and guests. The infrastructure can support up to 254 routing domains.
- Isolate each routing domain's traffic from the traffic of any other routing domain.
- Provide Internet access for each routing domain,

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    - A common Access Interface is required and acceptable
    - An Access Interface for each group with separate Public facing IP addresses

- Traffic for the employee can be routed directly out to the local internet (specific applications)
- Traffic for the employee can be routed or backhauled to the MCN for extensive filtering (0 route)
- Traffic for the routing domain can be routed directly out to the local internet (0 route)
- Supports specific routes per routing domain, if necessary
- Routing domains are VLAN based
- Removes the requirement for the RD to have to reside at the MCN
- Routing Domain can now be configured at a branch site only
- Allows you to assign multiple RD to an access interface (once enabled)
- Each RD is assigned a 0.0.0.0 route
- Allows specific routes to be added for an RD
- Allows traffic from different RD to exit to the internet using the same access interface
- Allows you to configure a different access interface for each RD
- Must be unique subnets (RD are assigned to a VLAN)
- Each RD can use the same FW default Zone
- The traffic is isolated through the Routing Domain
- Outbound flows have the RD as a component of the flow header. Allows SD-WAN to map return flows to correct Routing domain.

Prerequisites to configure multiple routing domains:

- Internet access is configured and assigned to a WAN Link.
- Firewall configured for NAT and correct policies applied.
- Second routing domain added globally.
- Each routing domain added to a site.
- For information about configuring Internet services on the routing domains, see WAN links.

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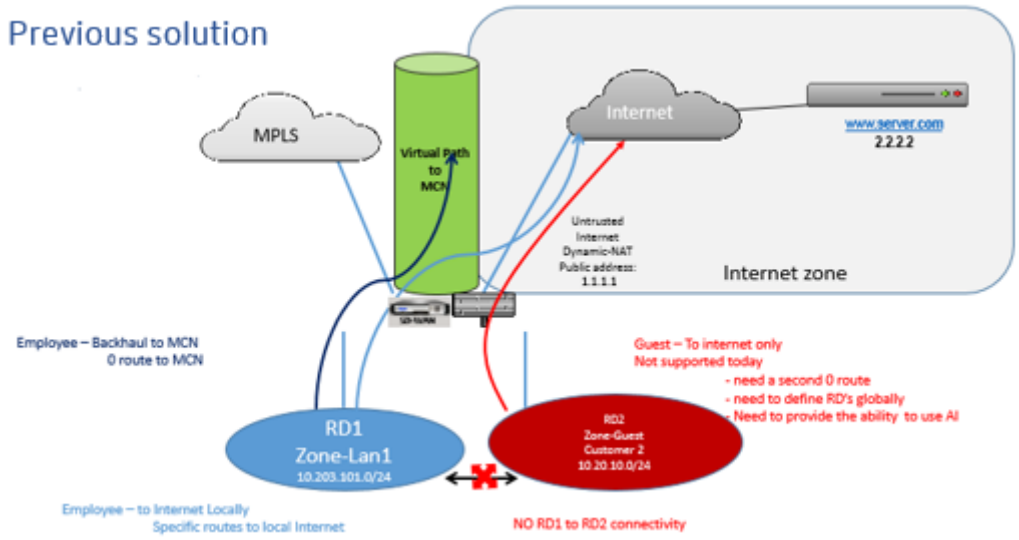
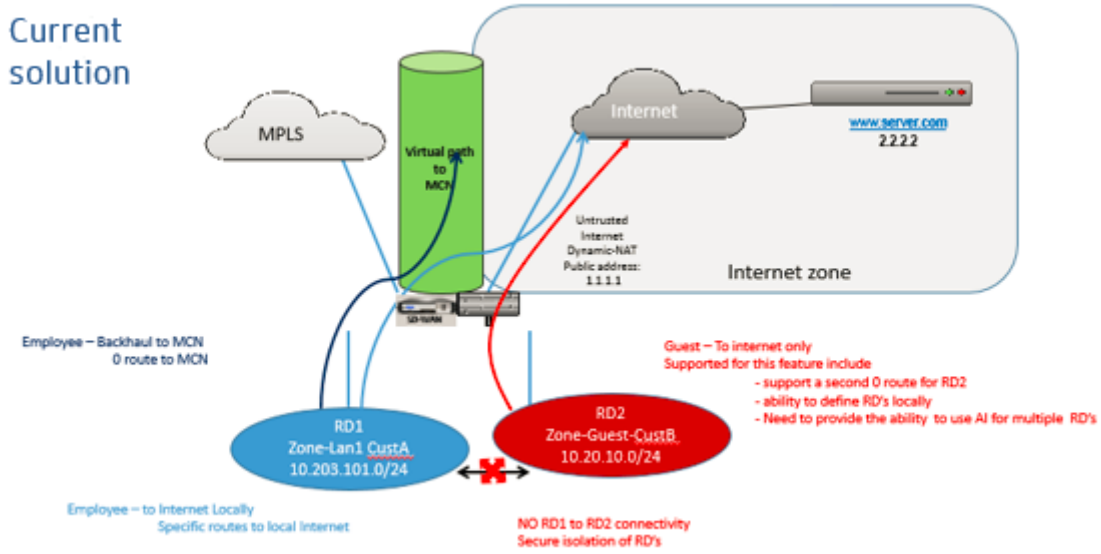
Deployment scenarios





Limitations

- The internet service must be added to the WAN link before you can enable Internet access for all Routing Domains. (Until you do, the check box for enabling this option is grayed out).

  After enabling Internet access for all routing domains, auto add a dynamic-NAT rule.
- Access Interface (AI): Single AI per subnet.
- Multiple AIs require a separate VLAN for each AI.

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- If you have two routing domains at a site and have a single WAN Link, both domains use the same public IP address.
- If Internet access for all routing domains is enabled, all sites can route to Internet. (If one routing domain does not require internet access, you can use the firewall to block its traffic.)
- The WAN links are shared for Internet access.
- No QOS per routing domain; first come first serve.

Link aggregation groups

September 27, 2025

The Link Aggregation Groups (LAG) functionality allows you to group two or more ports on your SD-WAN appliance to work together as a single port. This ensures increased availability, link redundancy, and enhanced performance.

Earlier, only the Active-Backup mode was supported in LAG. From Citrix SD-WAN 11.3 release onwards, the 802.3AD Link Aggregation Control Protocol (LACP) protocol based negotiations are supported. The LACP is a standard protocol and provides more functionality for LAGs.

The LAG functionality is available only on the following platforms:

- Citrix SD-WAN™ 110 SE
- Citrix SD-WAN 210 SE
- Citrix SD-WAN 410 SE
- Citrix SD-WAN 1100 SE/PE
- Citrix SD-WAN 2100 SE/PE
- Citrix SD-WAN 4100 SE
- Citrix SD-WAN 5100 SE/PE
- Citrix SD-WAN 6100 SE/PE

The LACP LAG functionality is not available on the following platforms:

- Citrix SD-WAN 1000 SE / PE
- Citrix SD-WAN 2000 SE / PE
- Citrix SD-WAN 4000 SE
- VPX/VPXL platforms

While configuring Link Aggregation Groups (LAG), you can configure the **Mode** and **Transmission Policy**. Mode defines how the ports handle the traffic. The following are the supported modes:

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- **Active-Backup**: In Active-Backup mode, at any time only one port is active, and the other ports are in backup mode. You can send the traffic through one port at a time. The Active-Backup mode supports rely on the Data Plane Development Kit (DPDK) package for LAG functionality.
- **LACP**: You can send the traffic through all the ports simultaneously. As a benefit, you get more bandwidth along with the link redundancy mechanism.

As LAG groups have many ports, the transmission policy helps to select the port that can be used to send traffic. The **Transmission Policy** drop-down list can be enabled only if the mode is **LACP**. The following are the supported transmission policies:

- **MAC+IP**: The link selection for a given packet is based on the layer 2 and 3 parameters. So, the source and destination MAC and IP addresses take these parameters and hash them. According to hash, it selects the port.
- **IP+L4**: The IP+L4 policy is based on the source and destination IP and layer 4 ports and protocol. The IP+L4 policy notifies which packet is going through which port. Packet with the same parameters will always be sent on one of the links. That means, the same or single flow (same source and destination Mac and IP) always goes through the same ports and not distributes across the other ports. As a benefit, the out of order packets cannot reach to the destination device.

You can create virtual interfaces using LAGs and these interfaces are further used to configure LAN/WAN links and HA.

> Note
>
> - A minimum of two ports and a maximum of four ports are supported per LAG.
> - All members of LAG must be of the same type, for example 1/1 or 1/2. 1/1 and 10/1 are not supported LAG configuration.
> - The Link State Propagation (LSP) feature is not supported, if LAGs are used as Ethernet interfaces in Interface Groups.
> - The port priority and system priority options are not supported with the LACP implementation.
> - With 11.3 release onwards, in SD-WAN with the LACP implementation, the ports are always in active mode. That means SD-WAN can always start the negotiation.

Platform	Maximum number of LAGs supported	LACP supported ports
110	1	1/1
210	2	1/1 or 1/2

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Platform	Maximum number of LAGs supported	LACP supported ports
410	1	1/1 or 1/2
1100	3	1/1 or 1/2
2100	3	1/1 or 1/2
4100	4	1/1 or 1/2
5100	3	10/1 or 10/2

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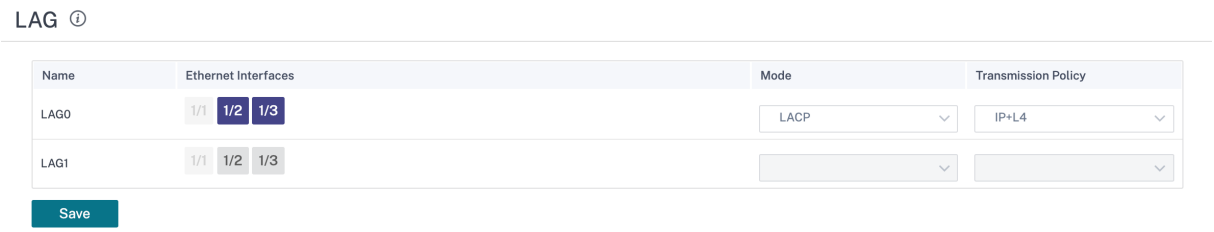
Platform	Maximum number of LAGs supported	LACP supported ports
6100	4	1/1 or 1/2

To configure link aggregation groups, at the site level, navigate to **Configuration > Advanced Settings > LAG** and select the member Ethernet interfaces to form a link aggregation group.



Once the ports are added to the LAG, you can select the LAGs to configure interfaces under **Site Configuration**. These interfaces are further used to configure LAN/WAN links and HA. You cannot change settings for individual member ports, any configuration changes made to the LAG, is automatically pushed to the member ports.

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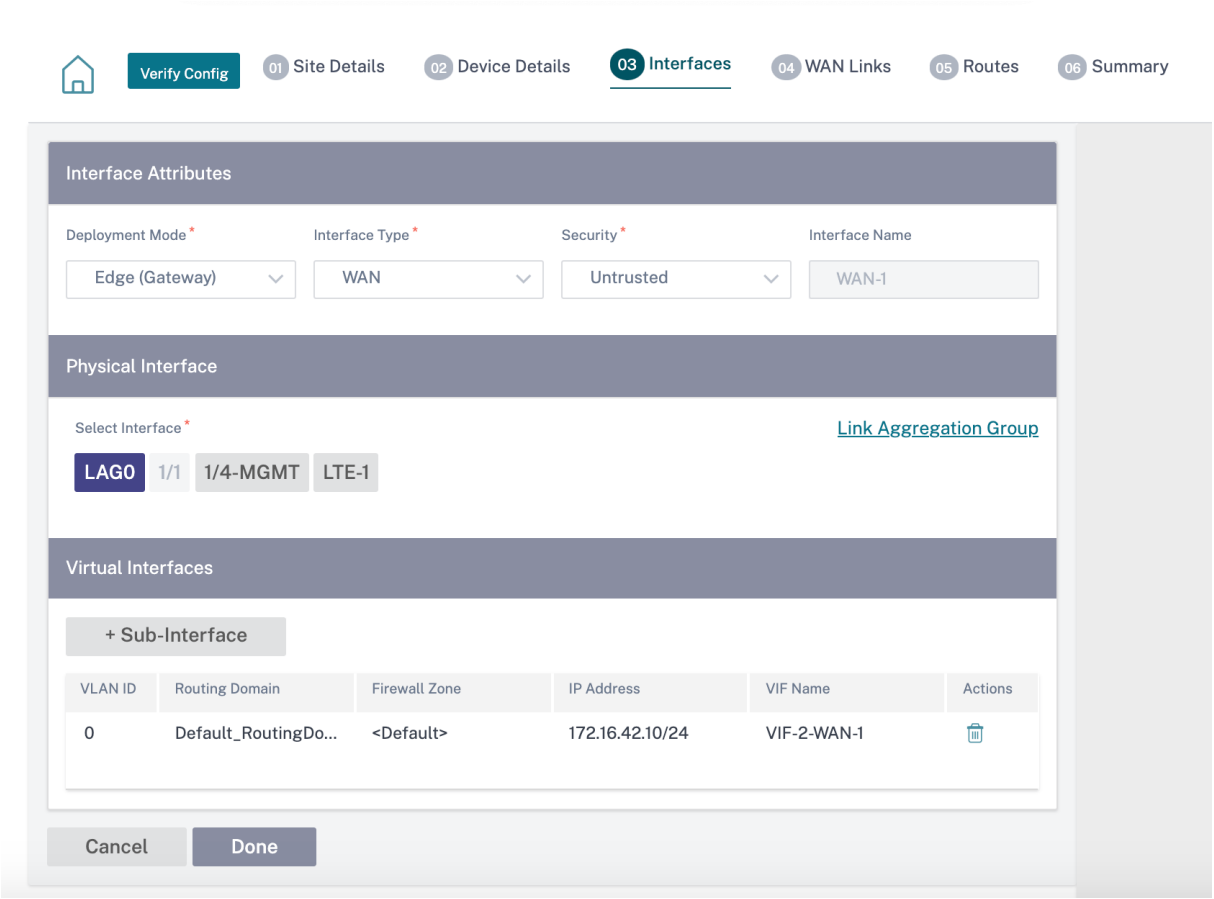
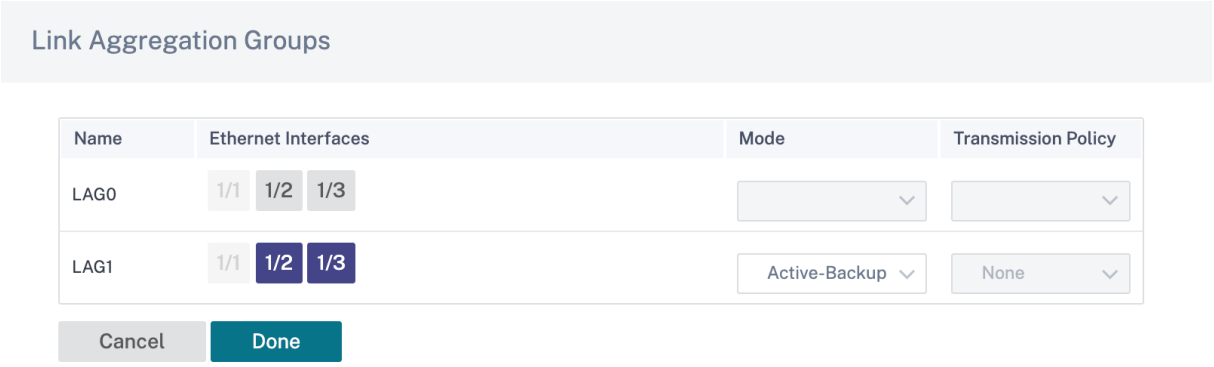


In the **Interfaces** section, click **Link Aggregation Group** to quickly change the LAG configuration if necessary.



You can view the details of the interfaces that are configured with LAG and LACP under **Reports > Appliance Reports > LACP LAG Group**. For more information, see Appliance reports.

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Certificate authentication

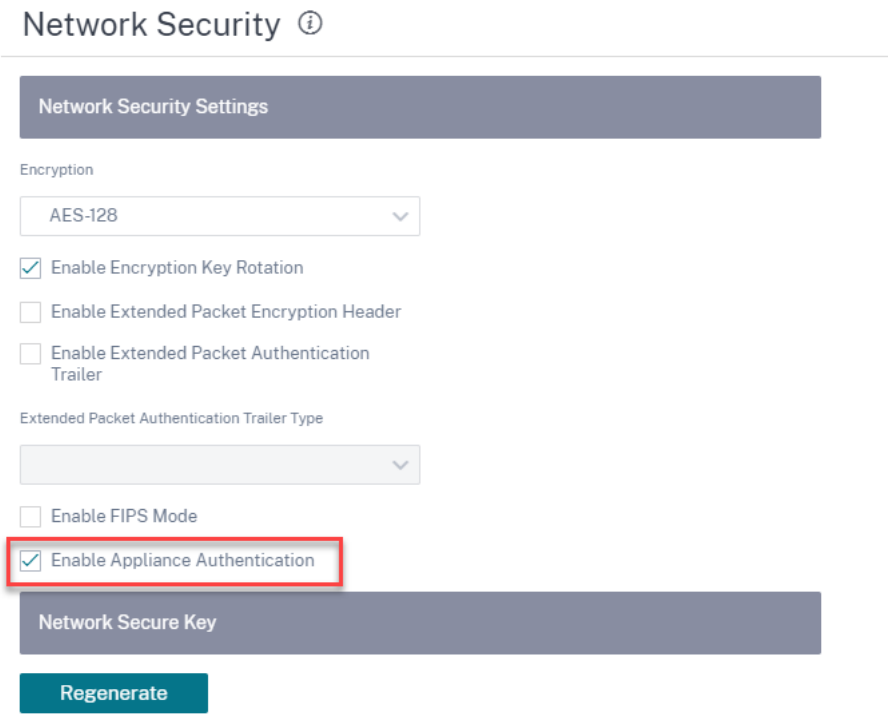
November 11, 2021

Secure paths are established between appliances in the SD-WAN network by using security techniques such as network encryption and virtual path IPsec tunnels. In addition to the existing security measures, certificate based authentication is introduced in Citrix SD-WAN 11.0.2.

Using Certificate authentication organizations can use certificates issued by a private Certificate Authority (CA) to authenticate appliances. The appliances are authenticated before establishing the virtual paths. For example, if a branch appliance tries to connect to the data center with a certificate that does not match with the certificate that the data center expects, the virtual path is not established.

The certificate issued by the CA maps a public key to the name of the appliance. The public key is compatible with the corresponding private key possessed by the appliance identified by the certificate.

To enable appliance authentication, at the network level navigate to **Configuration** > **Security** > **Network Security** and select **Enable Appliance Authentication**.



Inline mode

January 13, 2022

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In this mode, the SD-WAN appliance appears to be an Ethernet bridge. Most of the SD-WAN appliance models include a fail-to-wire (Ethernet bypass) feature for inline mode. If power fails, a relay closes and the input and output ports become electrically connected, allowing the Ethernet signal to pass through from one port to another. In the fail-to-wire mode, the SD-WAN appliance looks like a cross-over cable connecting the two ports.

Advantages and Use-cases

The following are the advantages/use cases for the Inline mode deployment:

- Keeping the MPLS router therefore fail-to-wire is a lovely feature. Fail-to-wire capable devices enable seamless failover to underlay infrastructure if the box went down.
    - If your devices support fail-to-wire (SD-WAN 210 and above), this allows placing a single SD-WAN inline to hardware bypass the LAN traffic to the customer edge router when the SD-WAN crashes/goes down.
    - If the MPLS Links are present that yield a natural extension to the customer's LAN/Intranet, the fail-to-wire bridge-pair port is the best choice (fail-to-wire capable pairs) such that, when the device crashes or goes down the LAN traffic is hardware bypassed to the customer edge router (still maintained the next hop).
- Networking is simple.
- SD-WAN sees all traffic through the inline mode, so it is the best-case scenario for the proper bandwidth/capacity accounting.
- Few integration requirements as you need only an IP of the L2 segment. LAN segments are well known as you have an arm to the LAN interface. If you connect to a core switch, you can also run dynamic routing to get visibility to all LAN subnets.
- Customer's expectations are that SD-WAN must blend into the existing infrastructure as a new network node (nothing else changes).
- Proxy ARP - In inline mode, it is a blessing for SD-WAN to proxy ARP requests to LAN next-hop if the gateway went down or the SD-WAN interface towards next-hop went down.
    - Generally, in inline mode with bridge-pair (fail-to-block or fail-to-wire) with multiple WAN connections (MPLS/Internet), it is recommended to enable Proxy ARP for the bridge pair interface that connects the LAN hosts to their next-hop gateway.
    - For any reason when the next-hop is down or the SD-WAN interface to the next-hop is down rendering the gateway unreachable, SD-WAN acts as a proxy for ARP requests allowing the LAN hosts to still seamlessly send packets and use the remaining WAN connections that keep the virtual path up.
- High availability - If fail-to-wire is not an option, devices can be placed in parallel high availability (common LAN and WAN interfaces for the Active/Standby) devices to achieve redundancy.

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- If your appliances don't support fail-to-wire, like the SD-WAN 110, you have to go with inline parallel high availability that enables to have a standby device kick in if the primary went down.

Recommendations

The following are the recommendations for the Inline mode deployment:

- The inline mode is best for the branches where the existing infrastructure is not to be changed and SD-WAN sits transparently inline to the LAN segment.
- Data centers can also deploy inline fail-to-wire or inline parallel high availability as it is immensely important to ensure that the data center workloads are not blackholed due to device down/crash.

Cautions

The following are the information that you need to be careful about in the Inline mode:

- Plumbing network with two arms to the SD-WAN (LAN and WAN side), needs some downtime as the network must be plumbed in two arms.
- Must ensure if fail-to-wire is used, it is behind a customer edge router/firewall in a **TRUSTED** zone so that security is not compromised.
- MPLS QoS changes a little in this as the previous QoS policies might have depended on the source IP addresses or DSCP based which will now be masked because of an overlay.
- Care must be taken to repurpose the MPLS router with a well-designed SD-WAN specific reserved bandwidth with a specific DSCP tag, such that SD-WAN's QoS takes care of prioritizing traffic and sends out high priority applications immediately followed by other classes (but be able to account for the overall bandwidth reserved for SD-WAN on the MPLS router). MPLS queues are an alternative or MPLS with a single DSCP set on the auto path group that can take care of this.
- If the Internet interfaces are **TRUSTED** as the links terminate on the customer edge router, to use Internet service, you must write an exclusive dynamic NAT rule to enable internet breakout from the appliance.
- If the Internet links are the only WAN connections and still terminate on the customer edge router, it is still fine to bypass the connections if the customer edge router takes precautions to steer the packets via their existing underlay infrastructure.

    - Proper care must be taken to account for the flow of bypassing LAN traffic over bridge-pair with an Internet connection and when the appliance is down. Since this is a sensitive enterprise Intranet traffic, in the eve of failure, the customer must know how to handle it.

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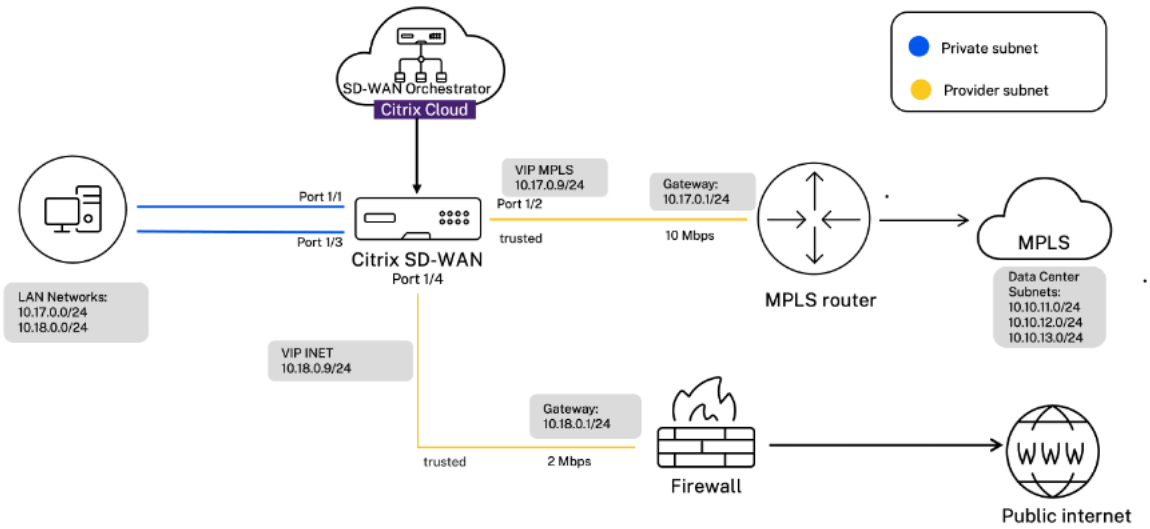
Before you begin

Before you begin the configuration, ensure that you have a good understanding of the network topology and gathered the details of the site.

The following is an example of an SD-WAN network where a branch is configured in inline mode.



The details of each site are provided in the following table:

Site details	Inline mode
Site Name	Branch 1
Management IP	172.30.2.20/24
Security Key	If any
Model/Edition	2100
Mode	Inline
Topology	2 x WAN Path
VIP Address	10.17.0.9/24 - MPLS, 10.18.0.9/24 - Internet, Public IP a.b.c.d
Gateway MPLS	10.17.0.1
Gateway Internet	10.18.0.1
Link Speed	MPLS - 10 Mbps, Internet - 2 Mbps
Route	No additional routes were added

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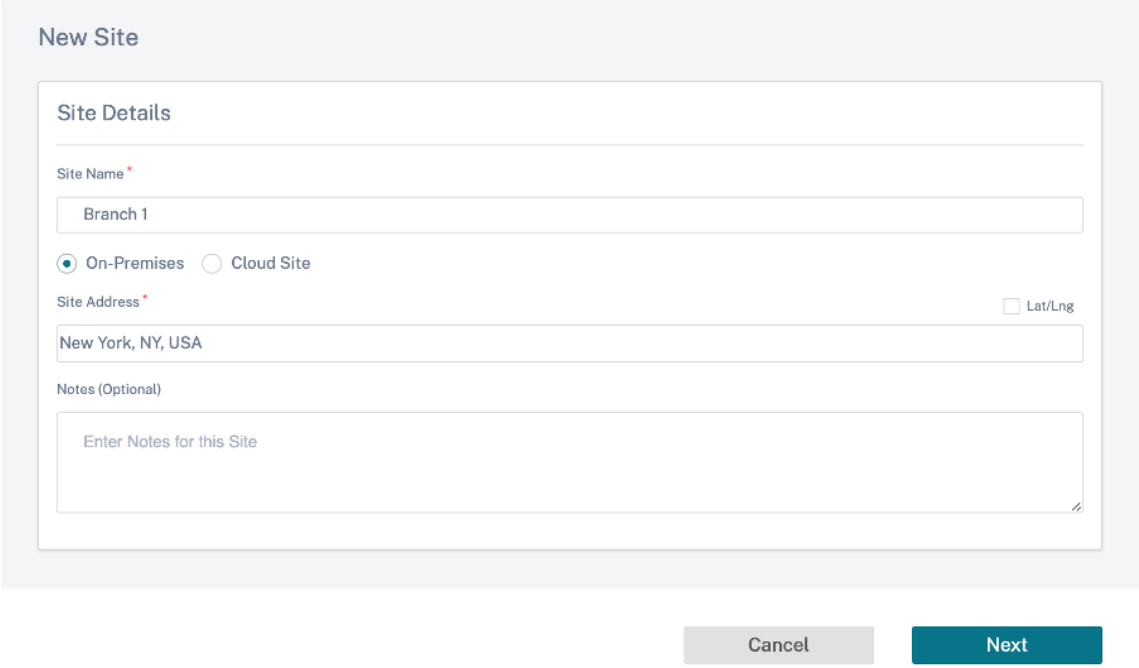
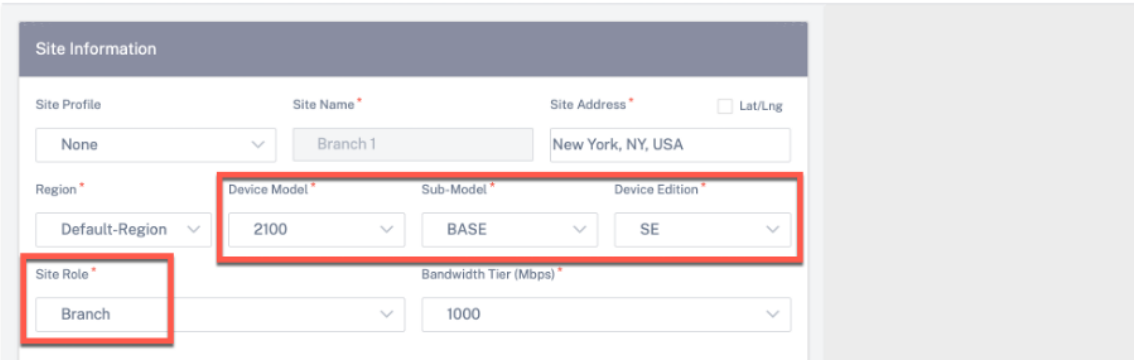
Site details	Inline mode
VLANs	None (default 0)

Configure inline mode

1. At the customer level configuration, navigate to **Configuration > Network Home**. Click **Add Sites**.



2. Click **Next** and navigate to **Site Details** tab. Select the site role as **Branch**. Click **Next** and navigate to **Device Details** tab. Enter the serial number of the appliance.



3. Click **Next** and navigate to **Interfaces** page. Click **+ Interface**. Select **Inline (Fail-To-Wire)** as the **Deployment mode**. Select the interfaces based on your preference and virtual IP addresses. Click **Done**.

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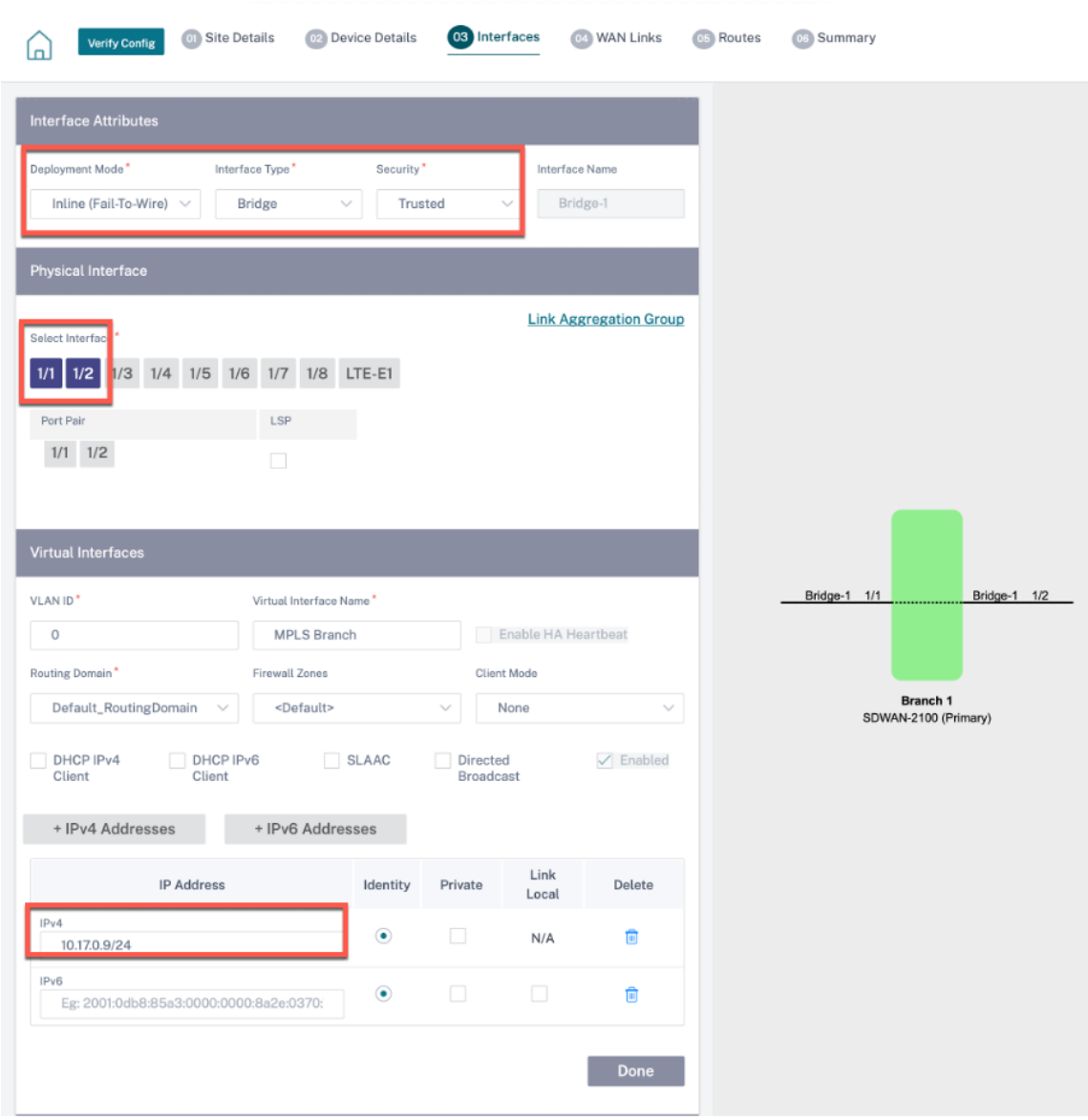
Add two interface pairs in bridge pair mode; one for MPLS and one for Internet.

4. Click **Next** and navigate to the **Interfaces** tab. Click **+ Interface**.
5. Select **Virtual Inline (One-Arm)** from the **Deployment Mode** drop-down list and **One-Arm** as the **Interface Type**. Select the Ethernet interface that connects to the Virtual Inline mode router. As per this topology, add two virtual LANs with the same physical interface; one for MPLS and one for Internet.

   To add the first VLAN, in the **Virtual Interfaces** section, enter the VLAN ID, name for the virtual interface, and IP address. Click **Done**.



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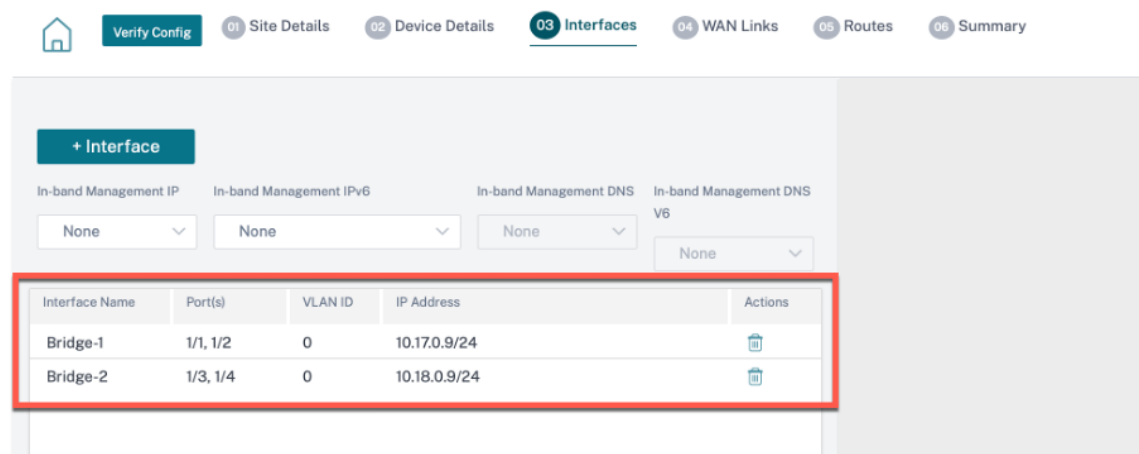

6. Click **Next** and navigate to **WAN Links** tab. Click **+ WAN Link** and select the **Create New** radio button. Add two WAN links; One for MPLS and one for Internet.

   For the internet WAN link, select **Public Internet** as the **Access Type**. Select the **ISP Name** and the name of the WAN link gets populated automatically. Select speed and choose the required virtual interface and the gateway.

   For the MPLS WAN link, select **MPLS** as the **Access Type**. Select the ISP Name and the name of the WAN link gets populated automatically. Select speed and choose the required virtual interface and the gateway.

   > **Note**
   >
   > If the data center and branches have different ISPs, then you must create an autopath group and include the details of ISPs in it.

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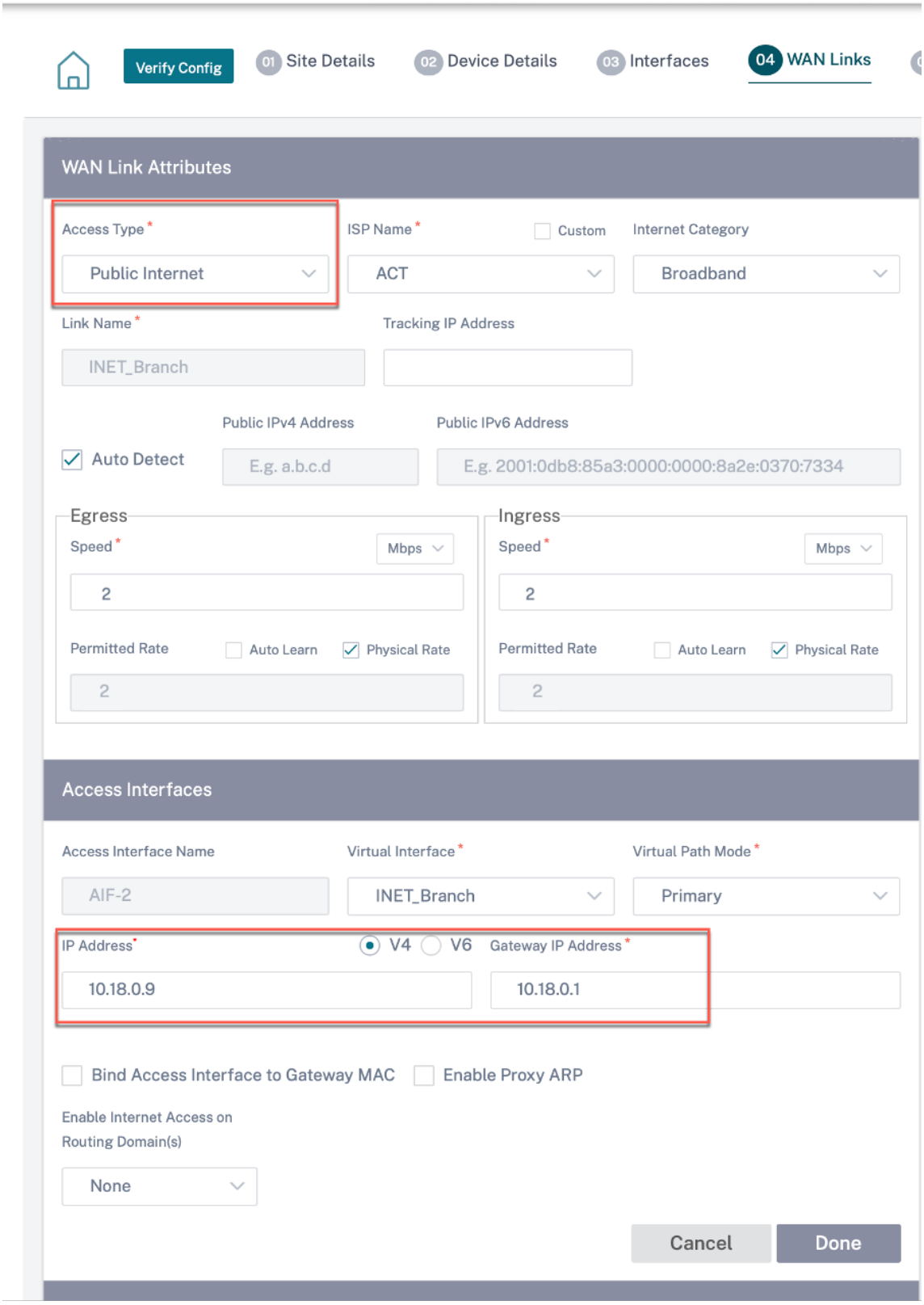

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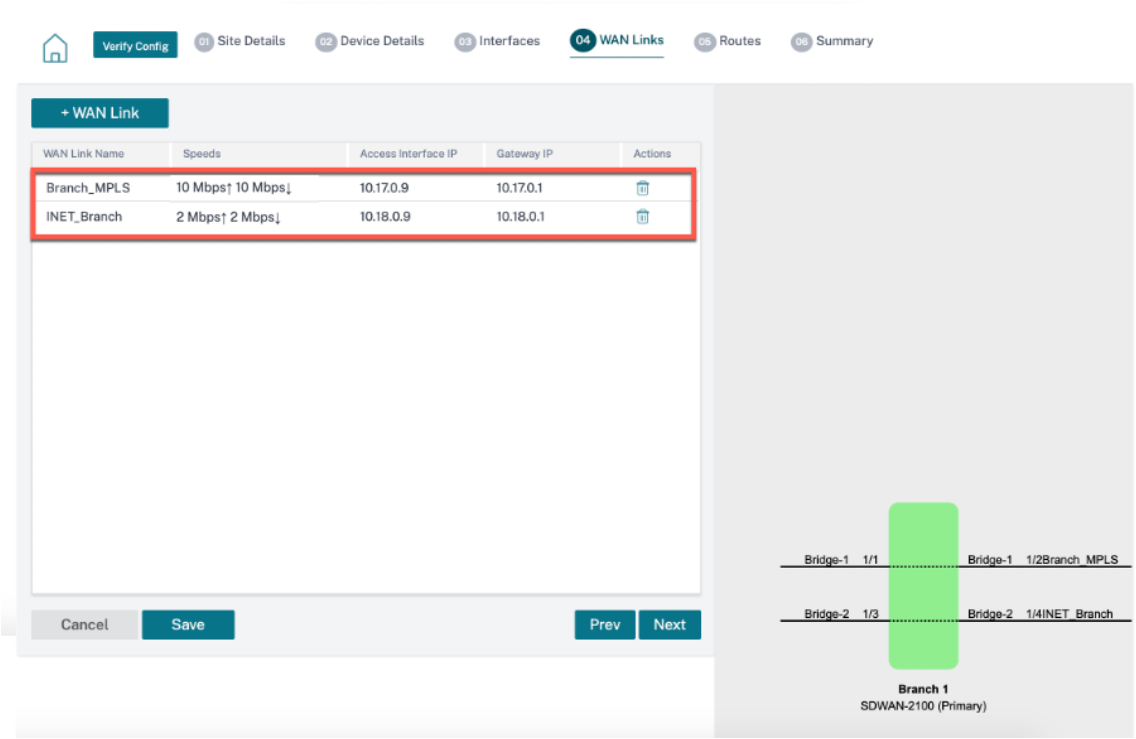

7. Click **Done** and then **Save**. Click Verify to validate the configurations. If any errors observed, fix them before proceeding further.

Virtual inline mode

January 13, 2022

In virtual inline mode, the router uses routing protocol such as PBR, OSPF, or BGP to redirect incoming and outgoing WAN traffic to the appliance, and the appliance forwards the processed packets back to the router.

Virtual inline mode is the simplest and recommended way to network SD-WAN in the data center. It allows parallel network plumbing of SD-WAN with the head-end core router while the data center is serving its existing workloads with existing infrastructure. The virtual inline mode allows us to easily define PBRs to divert LAN traffic to go through SD-WAN and get overlay benefits.

Advantages and Use-cases

The following are the advantages of Virtual Inline mode deployment:

- Seamless forwarding to SD-WAN for overlay benefits under normal conditions and seamless failover to underlying infrastructure if SD-WAN fails.

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- Simple Networking and Integration requirements. The single one-arm interface from headend router to SD-WAN in virtual inline.
- Easy to deploy dynamic routing in Import only mode (export nothing) to get visibility of LAN subnets so they can be sent to remote SD-WAN peer appliances.
- Easy to define PBR on the routers (1 per WAN VIP) to indicate how to choose the physical.

Recommendations

The following are the recommendations for the Virtual Inline mode deployment:

- The virtual inline mode is best for data center networking as the SD-WAN network plumbing can be worked on parallel while the data center is serving its existing workloads with existing infrastructure.
- SD-WAN is in a one-arm interface that is managed with an SLA tracking on VIPs. If the tracking goes down, the traffic resumes routing via existing underlay infrastructure.
- Branches can also be deployed in virtual inline mode. However, they are more predominant with Inline/Gateway deployments.

Cautions

The following are the information that you need to be careful about in the Virtual Inline mode:

- Proper care must be taken to distinctly MAP the SD-WAN logical VIP of a WAN link defined to the right physical interface (else this might cause undesirable issues in WAN metric assessment and choice of WAN paths).
- Proper design considerations are to be made to know if all traffic is diverted via SD-WAN or only specific traffic.
- This means SD-WAN must be dedicated some share of bandwidth exclusively for itself that must be set on the interfaces such that SD-WAN's capacity is not used by other non-SD-WAN traffic causing undesirable outcomes.
    - Bandwidth accounting issues and congestion issues might occur if SD-WAN WAN links capacity is defined incorrectly.
- Dynamic routing can cause some issues if improperly designed where if the SD-WAN routes data center and branch VIPs are exported to the headend and if routing is influenced towards SD-WAN, overlay packets start looping and cause undesirable outcomes.
- Dynamic routing must be properly administered considering all potential factors of what to learn/what to advertise.
- One-arm physical interface might become a bottleneck sometimes. Needs some design considerations in those lines as it caters to both upload/download and also acts as LAN to LAN and LAN to WAN/WAN to LAN traffic from SD-WAN.

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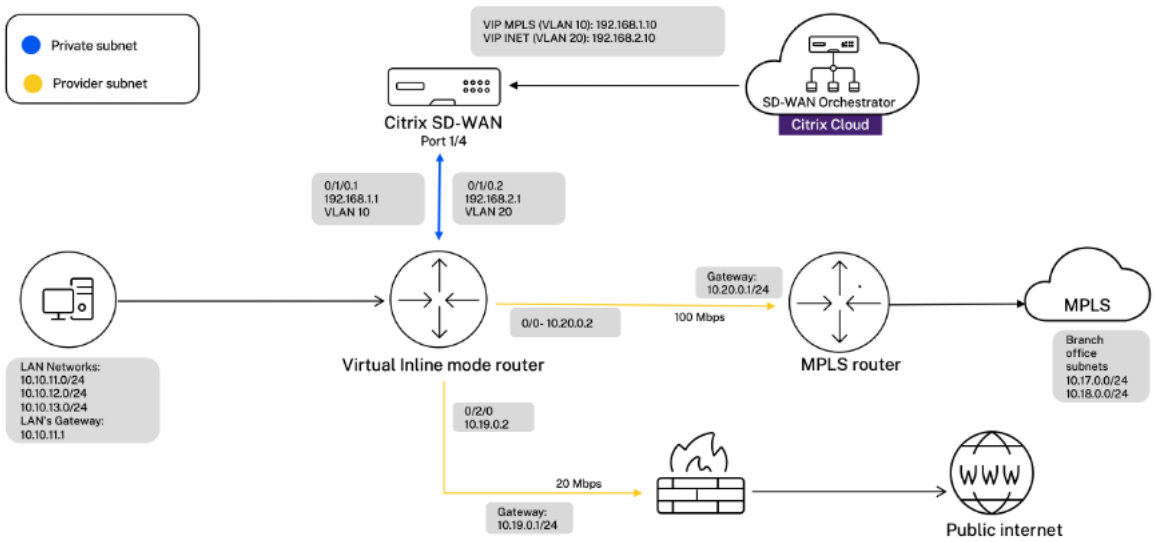
- Excessive LAN to LAN traffic might be a point to note during design.
- If the dynamic routing is not used, there must be proper care if administering all LAN subnets, which if not, might cause undesirable routing issues.
- There are potential routing loop issues if you define some default route (0.0.0.0/0) on the SD-WAN in the virtual inline to point back to the headend router. In such situations, if the virtual path went down, any traffic coming from the data center LAN (like monitoring traffic) is looped back to the headend and back to SD-WAN causing undesirable routing issues (If the virtual path is down, the remote branch subnets become reachable **NO** causing the default route to be HIT, that causes the loop issues).

Before you begin

Before you begin the configuration, ensure that you have a good understanding of the network topology and gathered the details of the site.

The following is an example of an SD-WAN network where the data center is configured in virtual inline mode.



The details of the site are provided in the following table:

Site details	Virtual inline mode
Site Name	San Jose Data Center
Management IP	172.30.2.10/24
Security Key	If any

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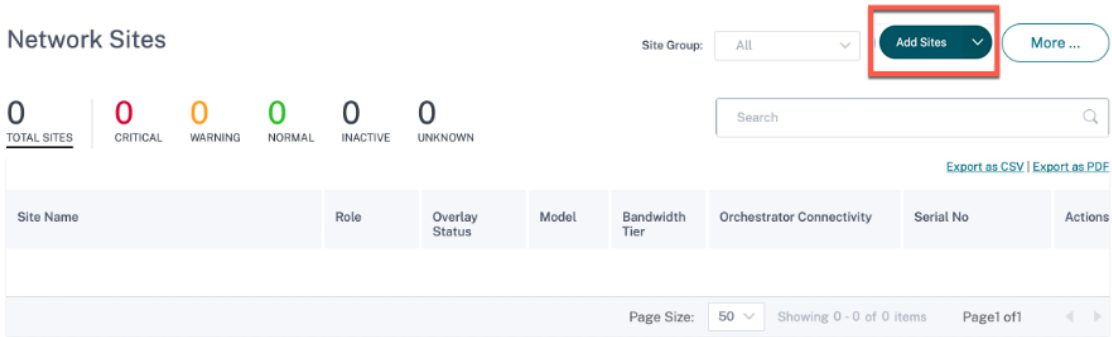
Site details	Virtual inline mode
Model/Edition	4100
Mode	Virtual Inline Mode
Topology	2 x WAN Path
VIP Address	192.168.1.10/24 - MPLS, 192.168.2.10/24 - Internet, Public IP - w.x.y.z
Gateway MPLS	10.20.0.1
Gateway Internet	10.19.0.1
Link Speed	MPLS - 100 Mbps, Internet - 20 Mbps
Route	Add a route on the SD-WAN SE Appliance on how to reach the LAN Subnets through any of the physical interfaces.
VLANs	MPLS - VLAN 10, Internet - VLAN 20

Configure virtual inline mode

1. At the customer level configuration, navigate to **Configuration > Network Home**. Click **Add Sites**. Enter the site name, select **On-Premises** check box, and add other details as required.



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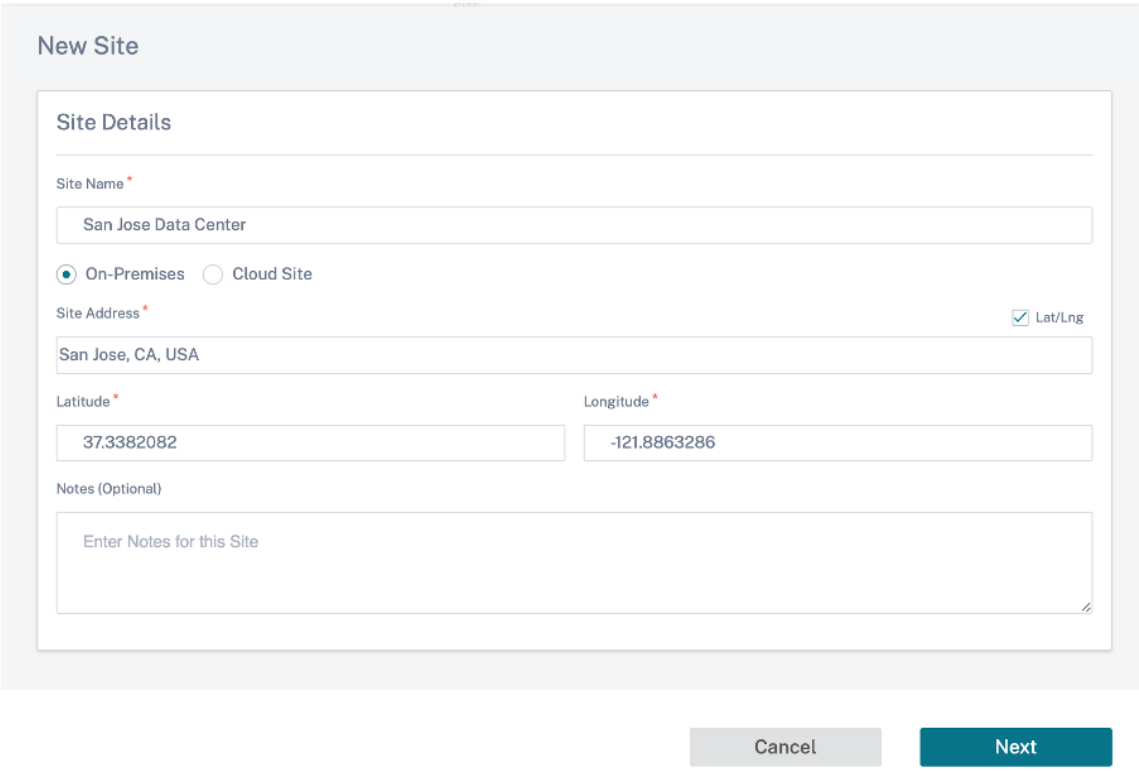

2. Click **Next** and navigate to **Site Details** tab. Select the site role as **MCN**. select the device model, edition, and bandwidth as per your preference.

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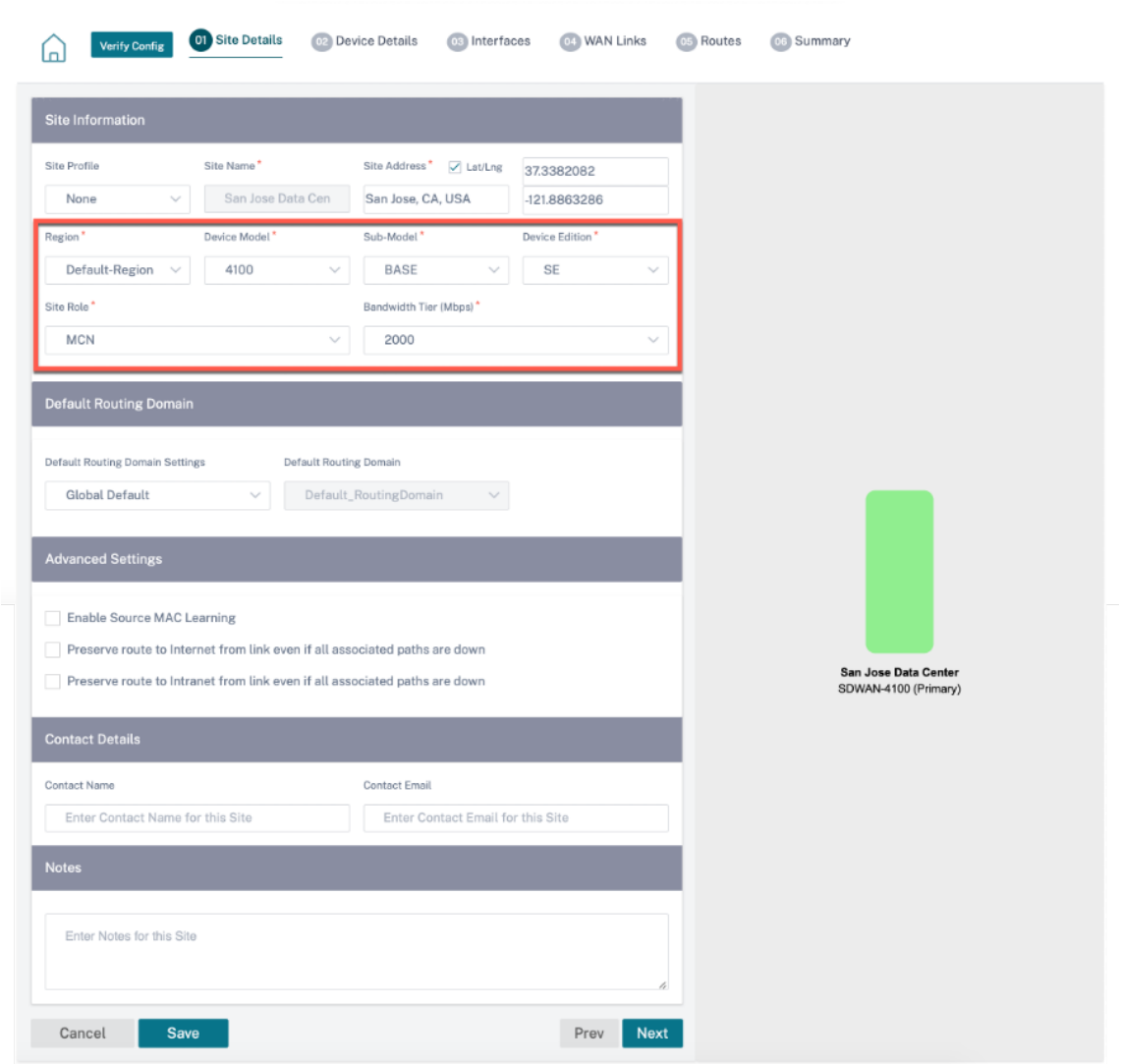

3. Click **Next** and navigate to **Device Details** tab. Enter the serial number of the appliance.
4. Click **Next** and navigate to the **Interfaces** tab. Click **+ Interface**.
5. Select **Virtual Inline (One-Arm)** from the **Deployment Mode** drop-down list and **One-Arm** as the **Interface Type**. Select the Ethernet interface that connects to the Virtual Inline mode router. As per this topology, add two virtual LANs with the same physical interface; one for MPLS and one for Internet.

   To add the first VLAN, in the **Virtual Interfaces** section, enter the VLAN ID, name for the virtual interface, and IP address. Click **Done**.

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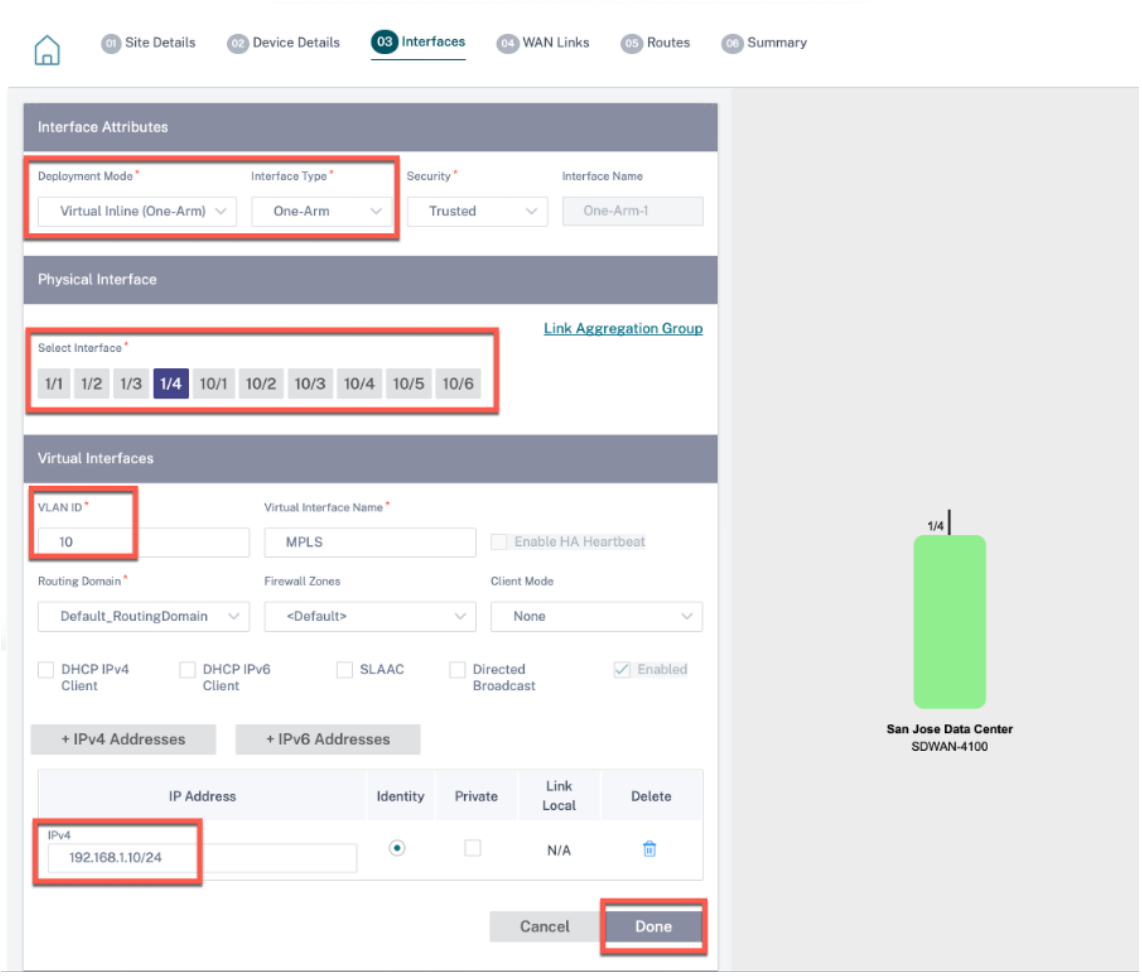

6. Click **+ Sub-Interface** to add another VLAN and then enter the virtual interface details. Click **Done** at the bottom of the screen to navigate to the next tab.

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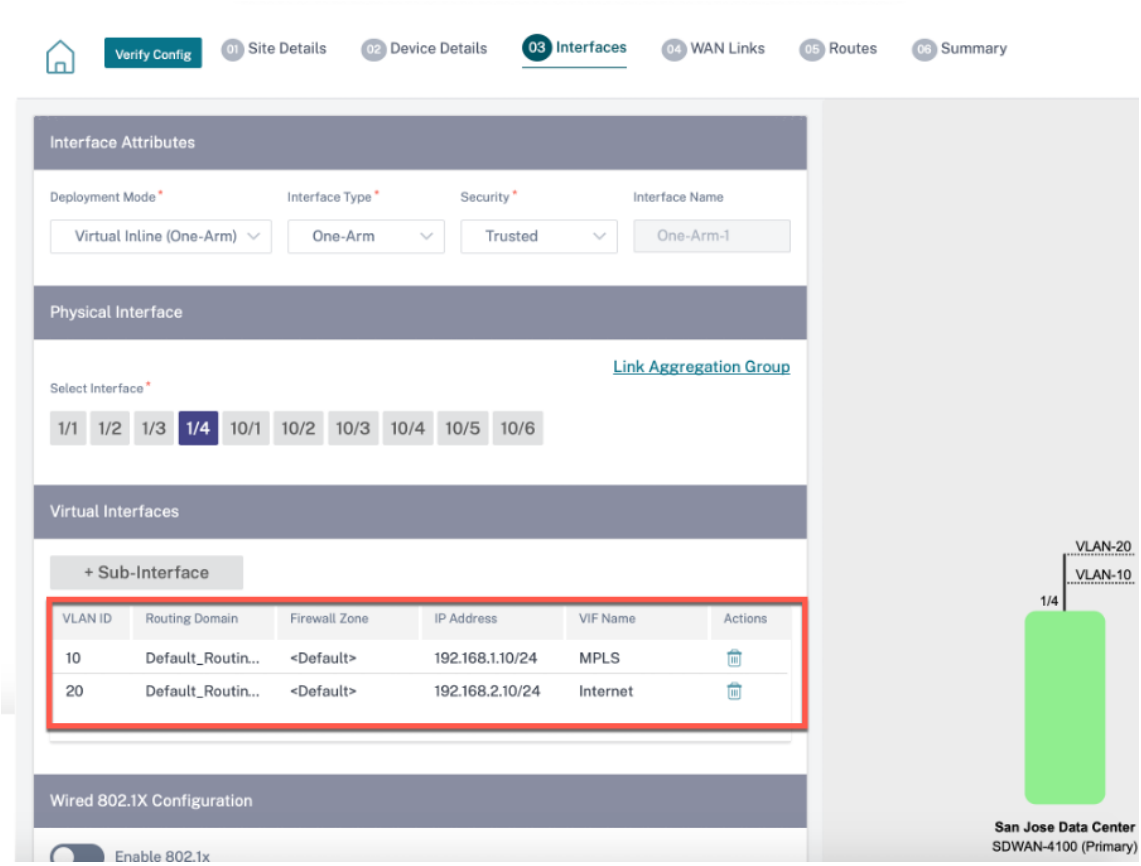

7. Click **Next** and navigate to **WAN Links** tab. Click **+ WAN Link** and select the **Create New** radio button. Add two WAN links; One for MPLS and one for Internet.

   To add an internet WAN link, select **Public Internet** as the **Access Type**. Provide an ISP name for the WAN link, select the speed. Select **Internet** from the **Virtual Interface** drop-down list. Enter the IP address of the access interface and the gateway. Click **Done**.

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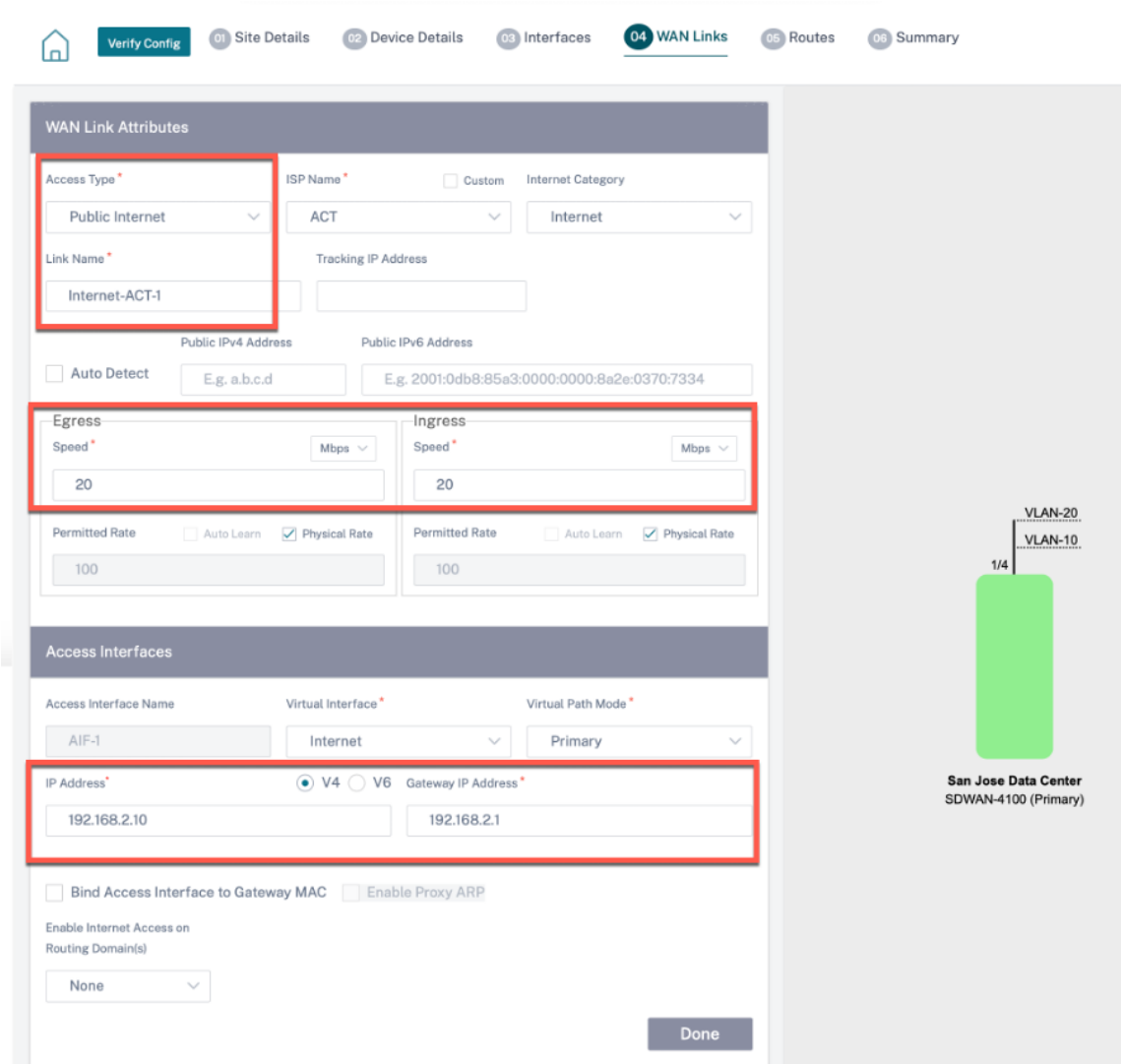

To add an MPLS WAN link, from the **WAN links*** tab, click **+ WAN Link** and select the **Create New** radio button. Select **MPLS** as the **Access Type**. Select the ISP Name and the name of the WAN link gets populated automatically. Select speed and choose the MPLS from the **Virtual Interface** drop-down list. Enter the IP address of the access interface and the gateway. Click **Done**.

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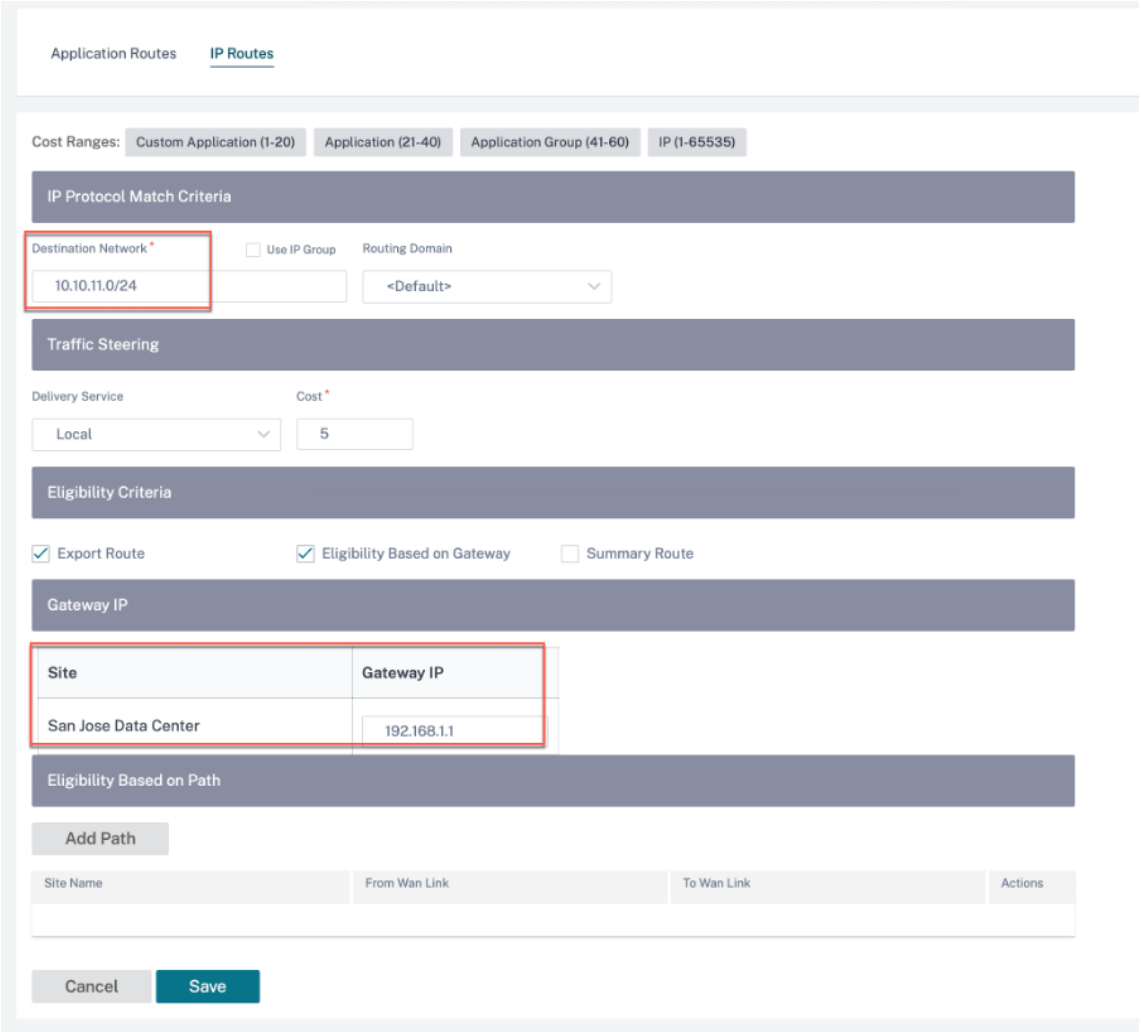
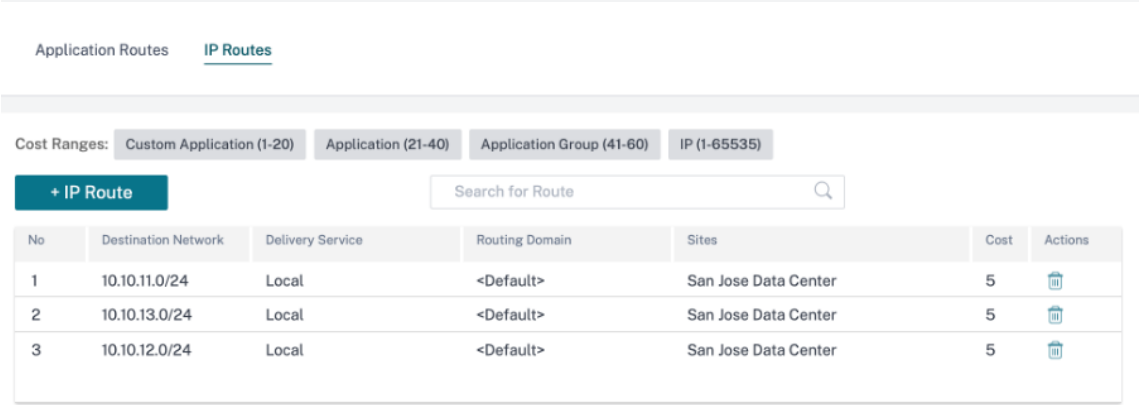
8. Click **Next** and navigate to **Routes > IP Routes** tab. Add a route on the SD-WAN appliance on how to reach the LAN Subnets (10.10.11.0/24, 10.10.12.0/24, 10.10.13.0/24, and so on) through any of the physical interfaces. Click **Save**. Repeat this step to add more routes.





9. Click **Save** and then **Verify** to validate the configurations. If any errors observed, fix them before proceeding further.

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Azure Virtual WAN

September 27, 2025

Microsoft Azure Virtual WAN and Citrix SD-WAN™ provide simplified network connectivity and centralized management across hybrid cloud workloads. You can automate the configuration of branch appliances to connect to the Azure Virtual WAN hubs and configure branch traffic management policies according to your business requirements. The built-in dashboard interface provides instant troubleshooting insights that can save time and provides visibility for large-scale site-to-site connectivity.

Microsoft Azure Virtual WAN allows you to enable simplified connectivity to Azure Cloud workloads and to route traffic across the Azure backbone network and beyond. Azure provides 54+ regions and multiple points of presence across the globe. Azure regions serve as hubs that you can choose to connect to the branches. After the branches are connected, use the Azure cloud service through hub-to-hub connectivity. You can simplify connectivity by applying multiple Azure services including hub peering with Azure VNets. Hubs serve as traffic gateways for the branches.

Microsoft Azure Virtual WAN offers the following advantages:

- **Integrated connectivity solutions in hub and spoke** - Automate site-to-site connectivity and configuration between on-premises and the Azure hub from various sources including connected partner solutions.
- **Automated setup and configuration** –Connect your virtual networks to the Azure hub seamlessly.
- **Intuitive troubleshooting** –You can see the end-to-end flow within Azure and use this information to take required actions.

Hub-to-Hub communication

From 11.1.0 release onwards, Azure Virtual WAN supports hub-to-hub communication using **Standard** type method.

Azure Virtual WAN customers can now use Microsoft's global backbone network for inter-region hub-to-hub communication (Global transit network architecture). This enables branch to Azure, branch-to-branch over the Azure backbone, and branch to hub (in all Azure regions) communication.

You can use Azure's backbone for inter-region communication only when you purchase the **Standard** SKU for Azure Virtual WAN. For pricing details, see Virtual WAN pricing. With the **Basic SKU**, you cannot use Azure's backbone for inter-region hub-to-hub communication. For more details, see Global transit network architecture and Virtual WAN.

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Hubs are all connected to each other in a Virtual WAN. This implies that a branch, user, or VNet connected to a local hub can communicate with another branch or VNet using the full mesh architecture of the connected hubs.

You can also connect VNets within a hub transiting through the virtual hub, and VNets across the hub, using the hub-to-hub connected framework.

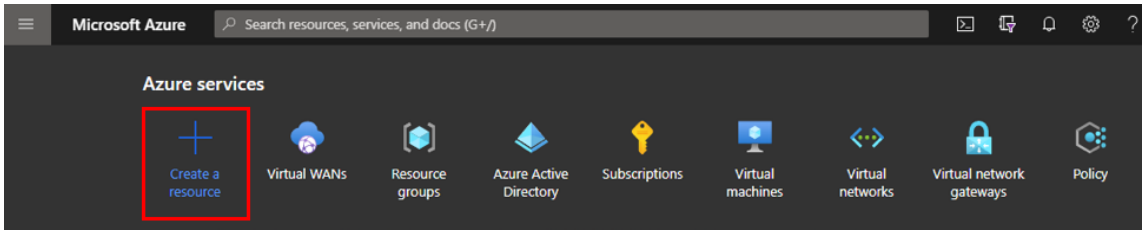
There are two types of Virtual WAN:

- **Basic**: Using the **Basic** method, the hub-to-hub communications happen within one region. The **Basic** WAN type helps to create a basic hub (SKU = Basic). Basic hubs are limited to site-to-site VPN functionality.
- **Standard**: Using the **Standard** method, hub-to-hub communications happen among different regions. A **Standard** WAN helps to create a standard hub (SKU = Standard). A **Standard** hub contains ExpressRoute, User VPN (P2S), full mesh hub, and VNet to VNet transit through the hubs.

Create Azure Virtual WAN service in Microsoft Azure

To create the Azure Virtual WAN resource, perform the following steps:

1. Log into the Azure portal and click **Create a resource**.



2. Search for **Virtual WAN** and click **Create**.
3. Under **Basic**, provide the values for the following fields:
   - **Subscription**: select and provide the subscription detail from the drop-down list.
   - **Resource group**: Select an existing resource group or create a new one.

     > **Note**
     >
     > When creating the service principal to allow Azure API communication, ensure to use the same resource group that contains the Virtual WAN. Otherwise, the Citrix SD-WAN Orchestrator service will not have sufficient permissions to authenticate to Azure Virtual WAN APIs that enable automated connectivity.

   - **Resource group location**: Select the Azure region from the drop-down list.

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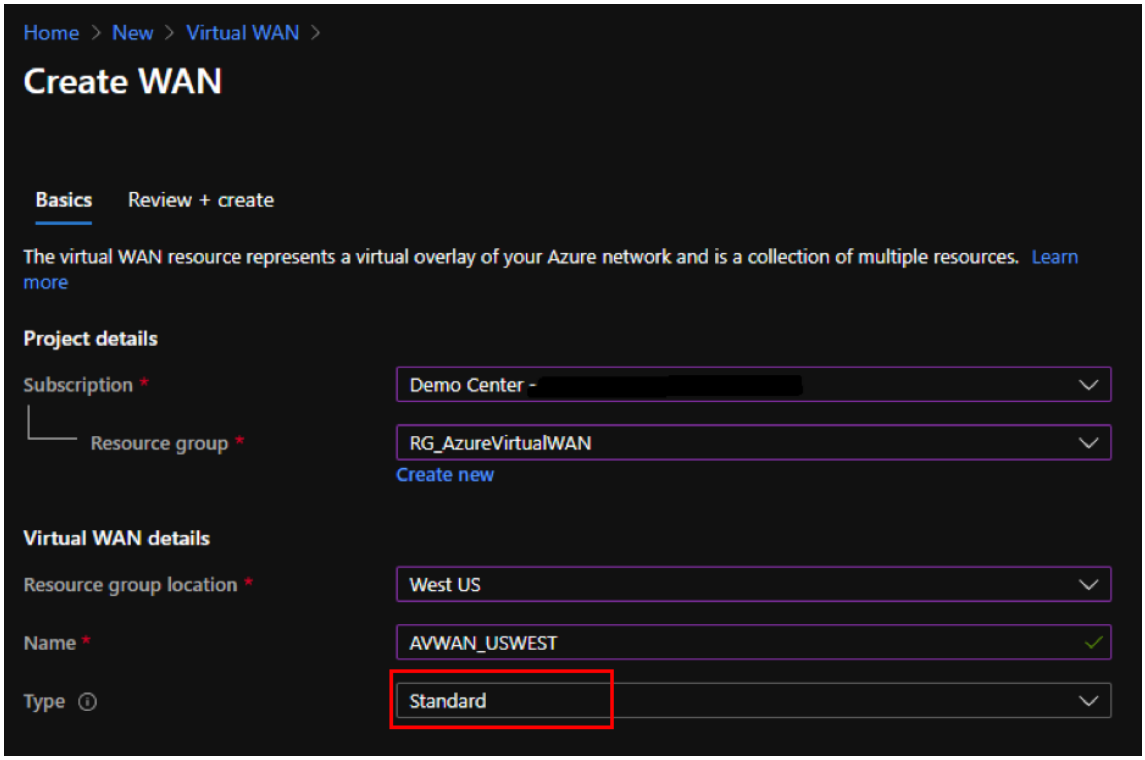
- **Name**: Provide the name for the new Virtual WAN.
- **Type**: select **Standard** type if you want to use hub-to-hub communication between different regions, otherwise select **Basic**.



4. Click **Review + create**.
5. Review the details that you entered to create the Virtual Wan and click **Create** to finish the Virtual WAN creation.

The deployment of the resource takes less than a minute.

> **Note**
>
> You can upgrade from Basic to Standard, but cannot revert from Standard back to Basic. For steps to upgrade a virtual WAN, see Upgrade a virtual WAN from Basic to Standard.

Create a Hub in the Azure Virtual WAN

Perform the following steps to create a hub to enable connectivity from various different endpoints (for example, on-premises VPN devices, or SD-WAN devices):

1. Select the previously created Azure Virtual WAN.
2. Select **Hubs** under **Connectivity** section and click **+ New Hub**.

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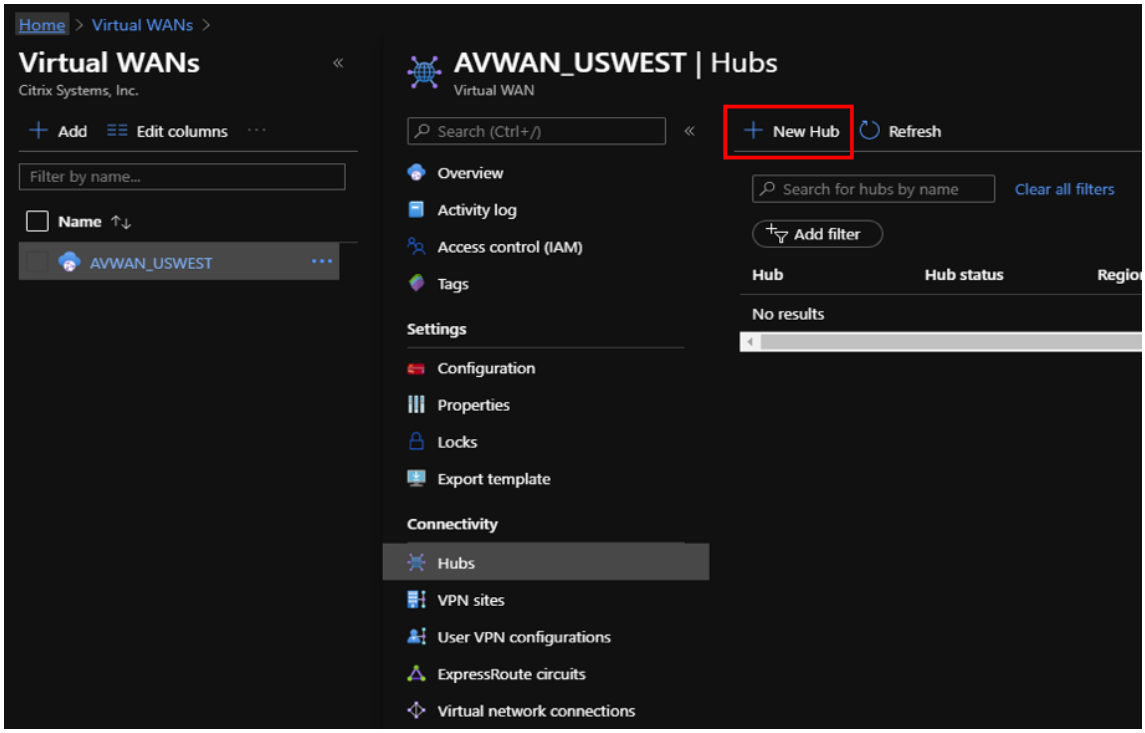
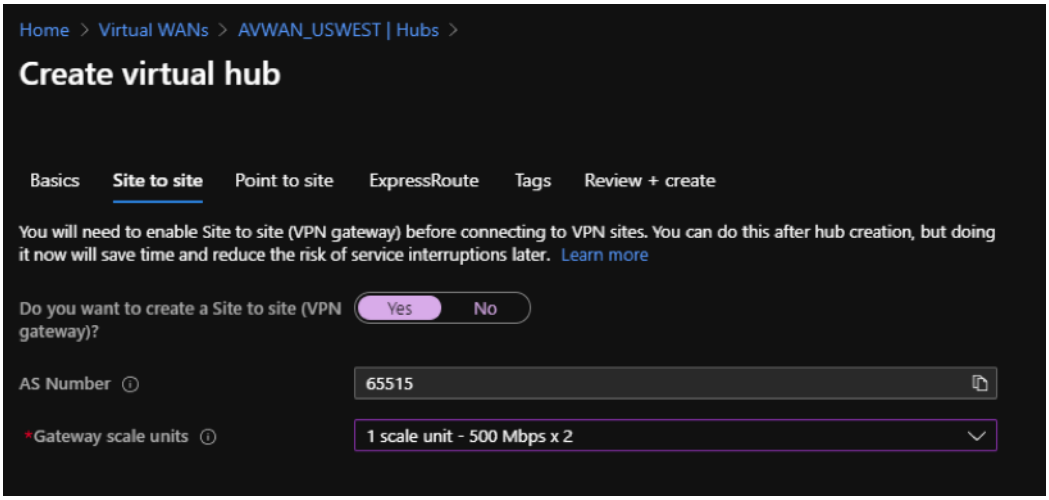


3. Under **Basic**, provide the values for the following fields:

   - **Region** –Select the Azure region from the drop-down list.
   - **Name** –Enter the name for the new Hub.
   - **Hub private address space** –Enter the address range in CIDR. Select a unique network that is dedicated for the hub only.

4. Click **Next: Site to Site >** and provide the values for the following fields:

   - **Do you want to create a Site to site (VPN gateway)?** –Select **Yes**.
   - **Gateway scale units** –Select the scale units from the drop-down list as needed.



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5. Click **Review + create**.
6. Review the settings and click **Create** to start the virtual hub creation.

The deployment of the resource can take up to 30 minutes.

Create a service principal for Azure Virtual WAN, and identify IDs

For the Citrix SD-WAN Orchestrator service to authenticate through Azure Virtual WAN APIs and enable automated connectivity, a registered application must be created and identified with the following authentication credentials:

- Subscription ID
- Client ID
- Client Secret
- Tenant ID

> **Note**
>
> When creating the service principal to allow Azure API communication, ensure to use the same resource group that contains the Virtual WAN. Otherwise, the Citrix SD-WAN Orchestrator service will not have sufficient permissions to authenticate to Azure Virtual WAN APIs that enable automated connectivity.

Perform the following steps to create an application registration:

1. In the Azure portal, navigate to **Azure Active Directory**.
2. Under Manage, select **App registration**.
3. Click **+ New registration**.

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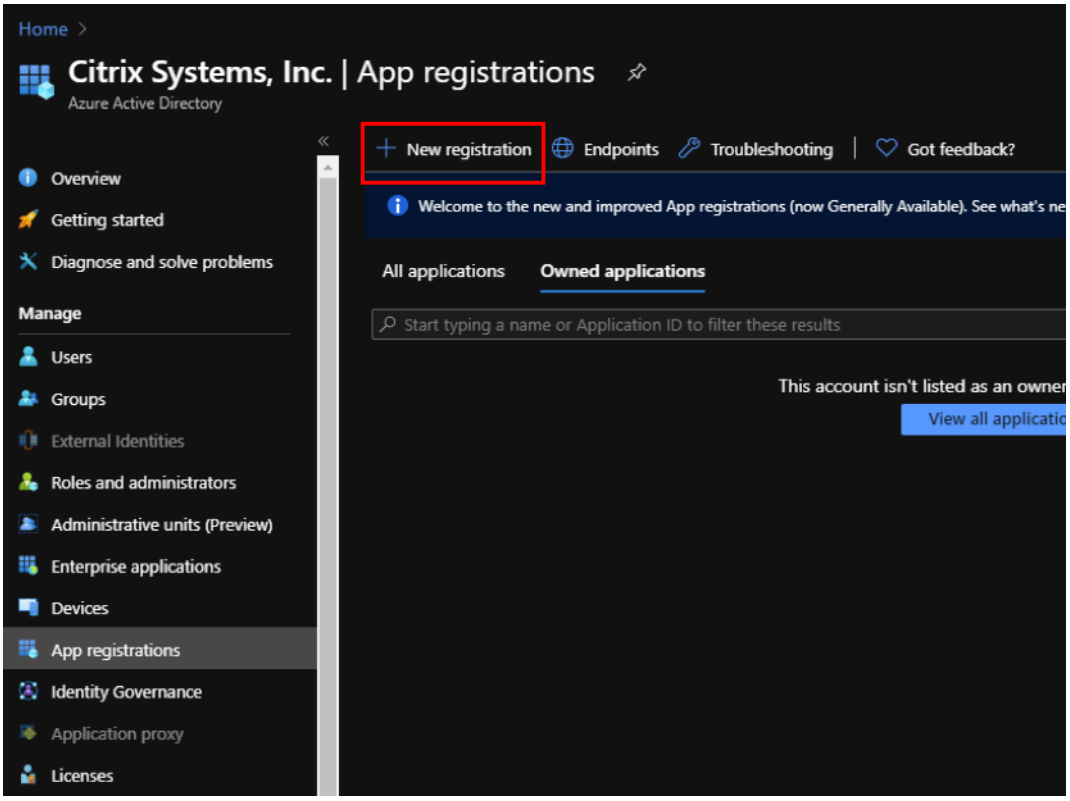

4. Provide values for the following fields to register an application:

   - **Name** –Provide the name for the application registration.
   - **Supported account types** –select Accounts in this organizational directory only (* - Single tenant) option.
   - **Redirect URI (optional)** –select Web from the drop-down list and enter a random, unique URL (for example, https:// localhost: 4980)
   - Click **Register**.

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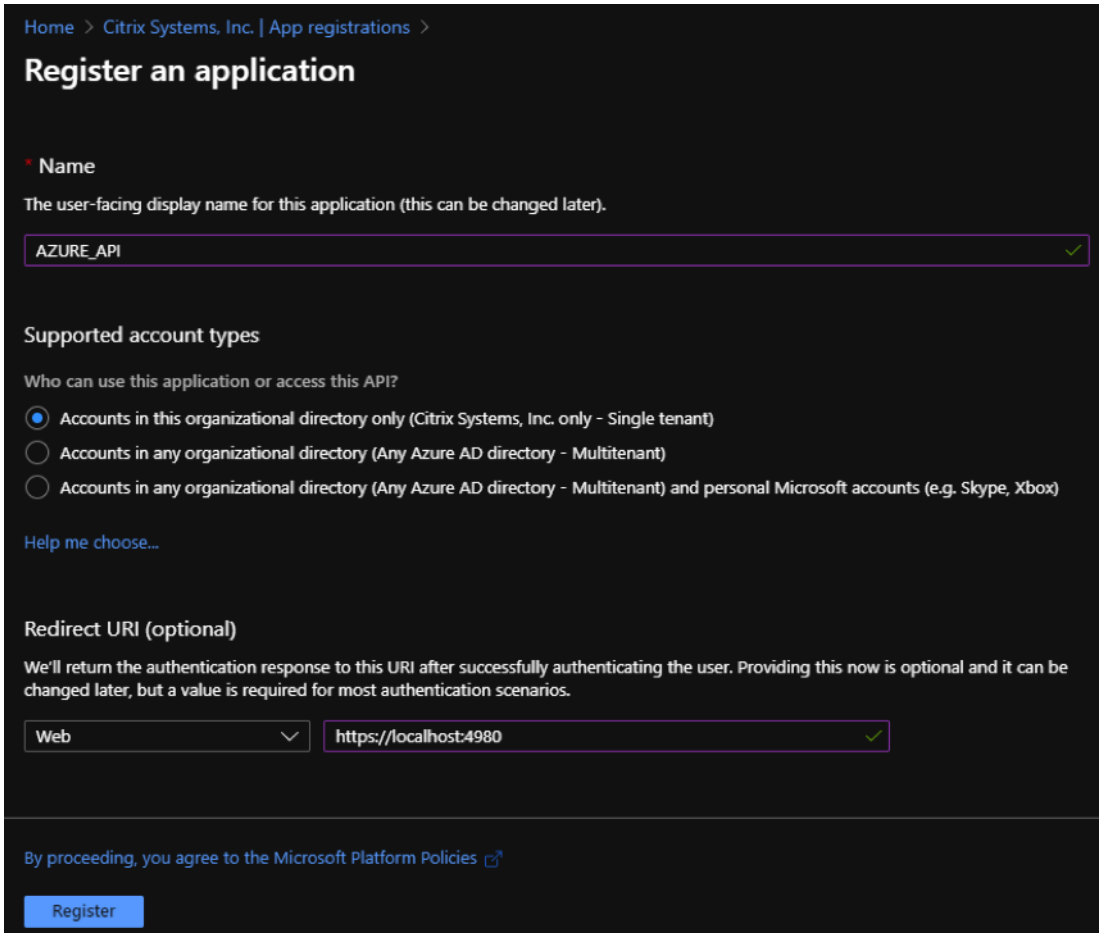
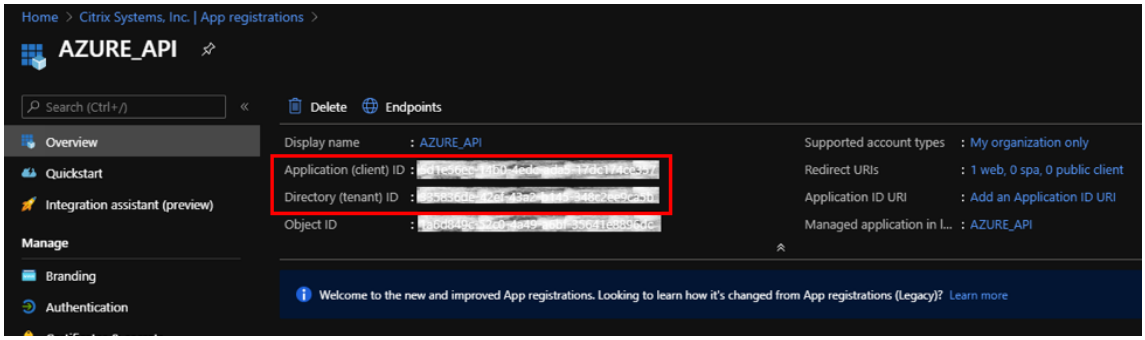


You can copy and store the **Application (client) ID** and the **Directory (tenant) ID** that can be used in the Citrix SD-WAN Orchestrator service for authentication to the Azure subscription for usage of the API.



The next step for the application registration, create a service principal key for authentication purposes.

To create the service principal key, perform the following steps:

a) In the Azure portal, navigate to **Azure Active Directory**.

b) Under **Manage**, navigate to **App registration**.

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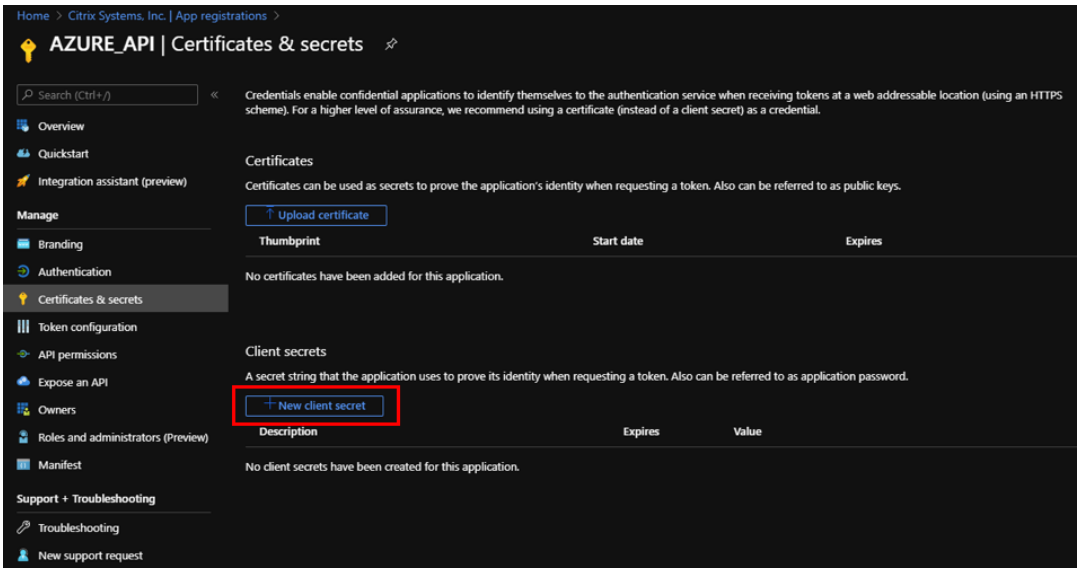
c) Select the registered application (created previously).

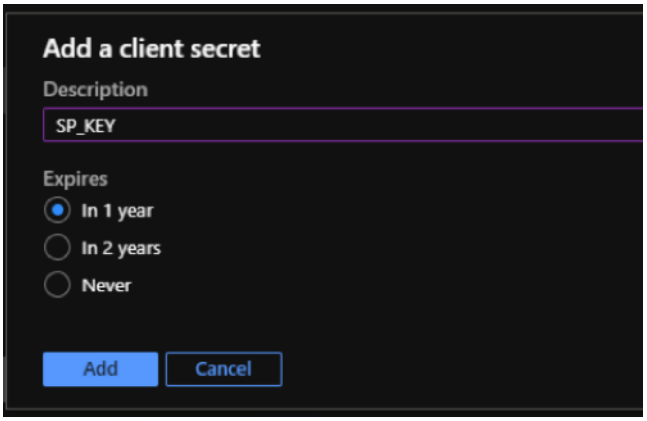
d) Under **Manage**, select **Certificates & secrets**.

e) Under **Client secrets**, click **+ New client secret**.



f) To add a client secret, provide values for the following fields:

- **Description**: Provide a name for the service principal key.
- **Expires**: Select the duration for expiration as needed.



g) Click **Add**.

h) The client secrete is disabled in the **Value** column. Copy the key to your clipboard. This is the Client Secret that you must enter into the Citrix SD-WAN Orchestrator service.

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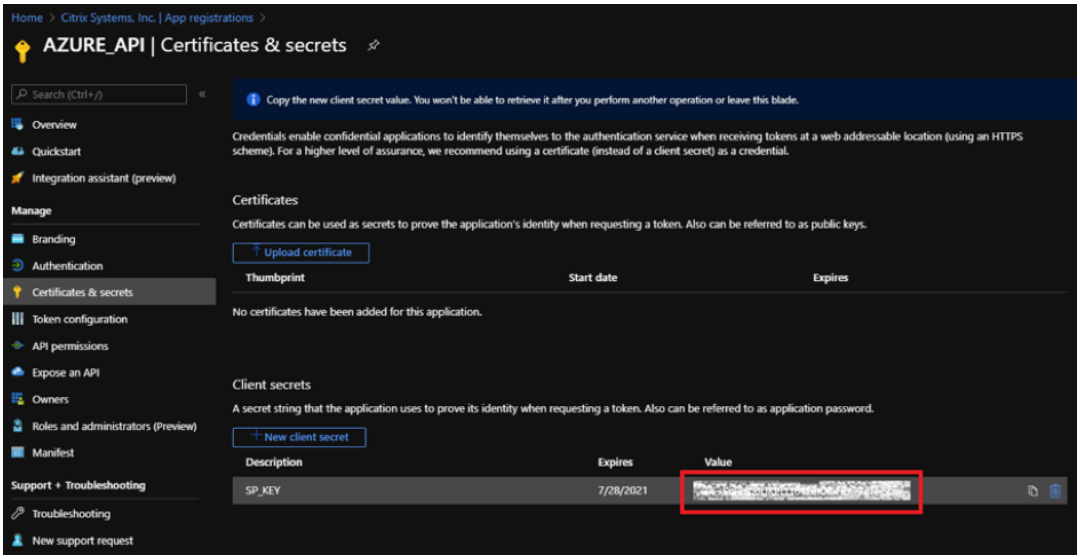
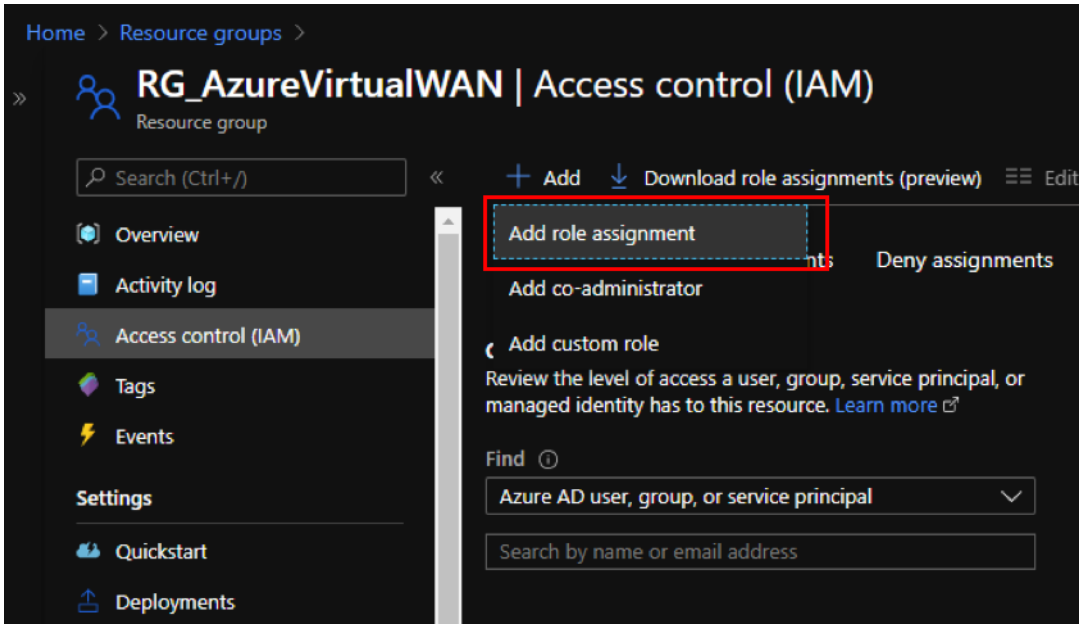


> **Note**
>
> Copy and store the secret key value before reloading the page because, it will no longer be displayed afterwards.

Perform the following steps to assign the appropriate roles for an authentication purpose:

1. In the Azure portal, navigate to the **Resource Group** where the Virtual WAN was created.
2. Navigate to **Access control (IAM)**.
3. Click **+ Add** and select **Add role assignment**.



4. To add role assignment, provide values for the following fields:

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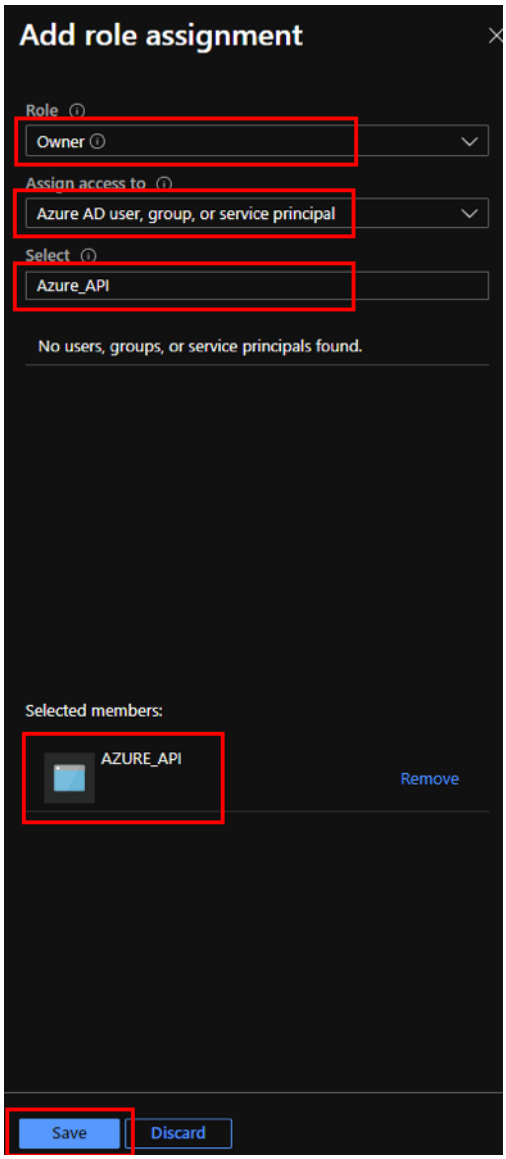
- **Role** –Select Owner from the drop-down list. This role allows management of everything including access to resources.
- **Assign access to** –select **Azure AD user, group,** or **service principal**.
- **Select** –Provide the name of the registered application created earlier and select the corresponding entry when it appears.

5. Click **Save**.



Lastly, you need to obtain the Subscription ID for the Azure account. You can identify your **Subscription ID** by searching for Subscriptions in the Azure portal.

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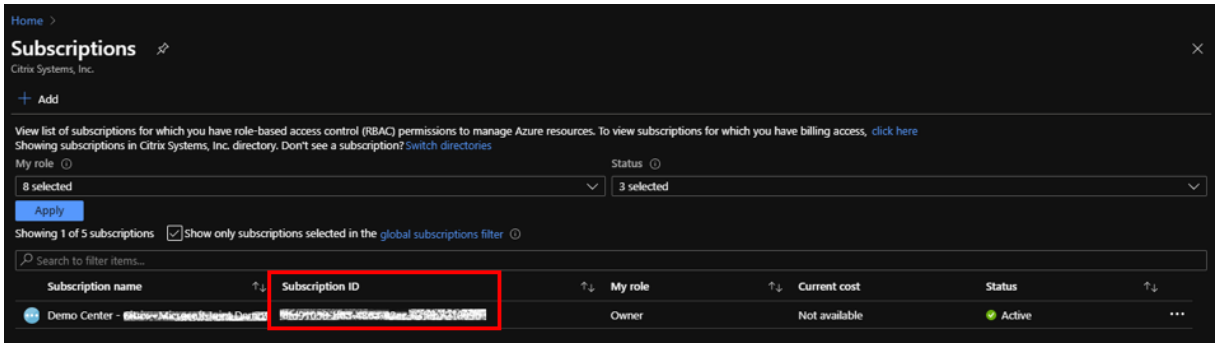

Configure Azure Virtual WAN Delivery Service in Citrix SD-WAN Orchestrator service

Microsoft Azure Virtual WAN and Citrix SD-WAN provide simplified network connectivity and centralized management across cloud workloads. This service provides automatic configuration of branch appliances to connect to the Azure Virtual WAN and configure branch traffic management policies according to your business requirements.

Provide the Azure Service Principal information to map any Citrix SD-WAN sites to Azure Virtual WAN. Before configuring the sites to an Azure Virtual WAN service, you need to create the Azure Virtual WAN Hubs with site-to-site connectivity gateway resource in your respective Azure region. Site-to-site connections are established between Citrix SD-WAN appliances and Azure.

> **Note**
>
> Only the Virtual WAN hubs created in the Azure portal for your subscription are listed for mapping.

As part of mapping Citrix SD-WAN branches to Azure Virtual WANs, a branch site needs to be associated with Azure WAN resources to establish IPsec tunnels with the Azure Virtual Hubs using the preselected IPsec IKE/IPsec settings. The Sites and Azure backbone routes are learned over BGP by default. When Citrix SD-WAN branch sites have multiple internet WAN links configured, two WAN links are automatically chosen to provide redundancy. The chosen Citrix SD-WAN software must have the support to switch between primary and secondary IPsec tunnels, which are supported from the 11.1 release onwards.

> **Note**
>
> One Citrix SD-WAN site can connect to multiple Azure Virtual Hubs in the same or different Azure regions.

Certain Citrix SD-WAN appliances have resource limitation on the number of IPsec tunnels that can be supported. Hence the configuration mapping might fail, if the Citrix SD-WAN appliance tunnel count restrictions are not met.

The following are the IPsec tunnel limit per SD-WAN platform:

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SD-WAN appliances	IPsec Tunnels supported
4100, 5100, 6100	256
1100, 2100	128
110, 210, 410, 1000, 2000	8

Prerequisites

Perform the following prerequisites before beginning the configuration in the Citrix SD-WAN Orchestrator service:

- Complete setup of Azure infrastructure (peer VNet with Hub, registered application for automation, and so on)
- Obtain access to Citrix SD-WAN Orchestrator service as a cloud-hosted service. Ensure to use a Citrix Cloud account that has gone through the proper onboarding process, otherwise the authentication fails.
- Ensure that the Azure subscription is not already in use with any other Citrix SD-WAN Orchestrator service configuration.
- Have already deployed MCN and branch SD-WAN nodes and confirm Virtual Path over Internet WAN link types. Citrix SD-WAN Orchestrator service automatically enables Intranet Service through the configuration process.
- Ensure that the branch SD-WAN nodes are set to auto-learn the Internet WAN link's Public IP address.

Perform the following to complete the configuration of Azure Virtual WAN and establish the IPsec tunnels with SD-WAN devices:

1. On Citrix SD-WAN Orchestrator service, from the customer level, navigate to **Delivery Channels** > **Bandwidth Alocation**. Allocate a percentage of bandwidth for the Azure Virtual WAN delivery service (for example, 20%). You might have to subtract the allocated percentage from any of the other delivery services (for example, Virtual Path), so that the total allocated percentages equal 100.

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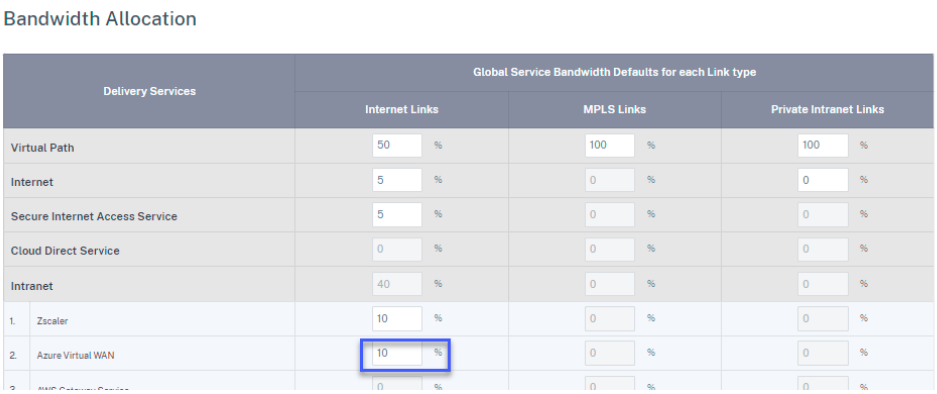
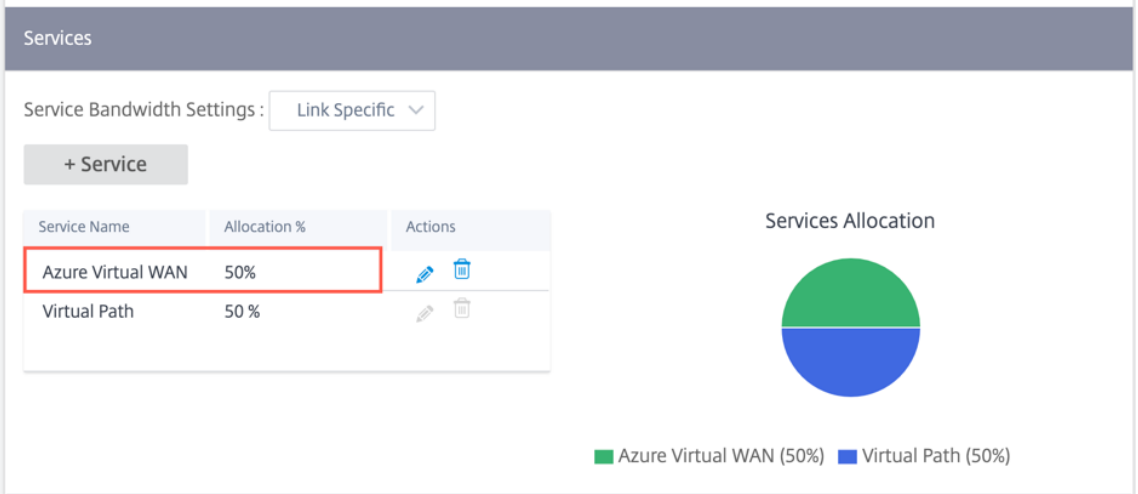


> **Note**
>
> Provide the subscription bandwidth (in %) for the Azure Virtual WAN service. You can reserve the subscription bandwidth both at global (**All Sites > Configuration > Delivery Channels > Bandwidth Allocation**) and site (**Site > Site Configuration > WAN Links > Services**) level.

Optionally, one can also allocate different bandwidth for different sites. For this, perform a link specific configuration for the selected site. To do this, select the appropriate **Site > WAN Links tab > Services** section. You can overwrite the global bandwidth allocation by selecting **Link Specific** for **Service Bandwidth Settings** and allocating the desired bandwidth.



2. From the customer level, navigate to **Configuration > Delivery Channels**. In the **SaaS and Cloud On-Ramp Services** section, click the **Azure Virtual WAN** tile. The **Azure Virtual WAN** page is displayed.

   You can also navigate to **Azure Virtual WAN** page from **Configuration > SaaS & Cloud On Ramp > Azure Virtual WAN**.

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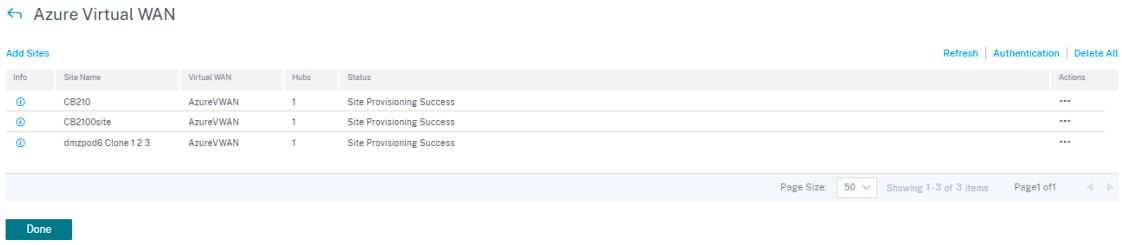
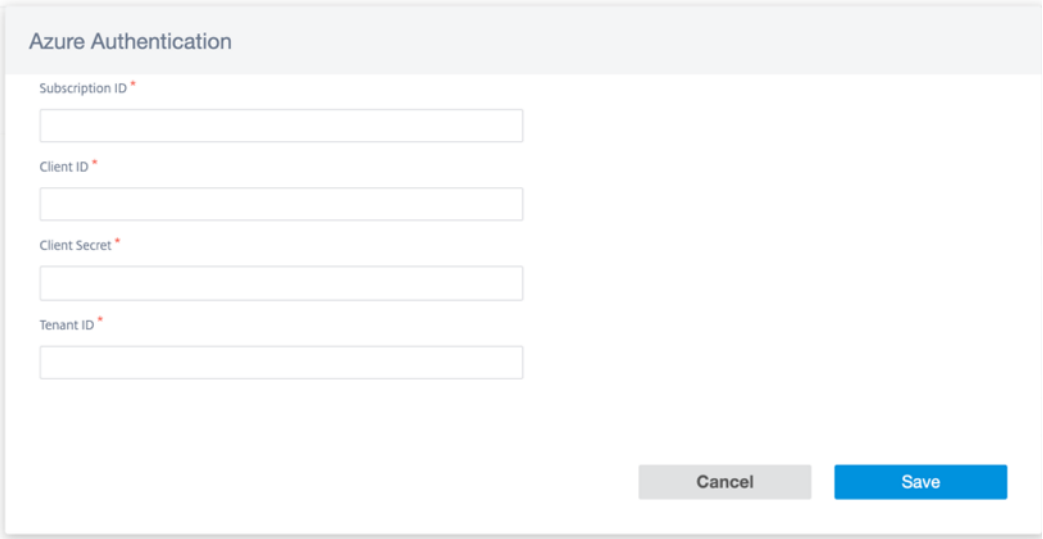


3. On the top right corner of the **Azure Virtual WAN** page, click the **Authentication** link.
4. Provide Azure **Subscription ID, Client ID, Client Secret,** and **Tenant ID** captured earlier during the creation of the Azure service principal. If the credentials are not correct, then the authentication fails and further action is not allowed. Click **Save**.



After authentication is successful, you must associate a branch site with Azure Virtual WAN resources to establish IPsec tunnels. One Branch can be connected to multiple Hubs within an Azure Virtual WAN resource and one Azure Virtual WAN resource can be connected with multiple branch sites.

> **Note**
>
> You can clear the authentication settings by clicking the **Clear Authentication** link. Ensure that you delete the site mappings before deleting the authentication.

5. After successful Azure authentication, click **Add Sites** to add a site.

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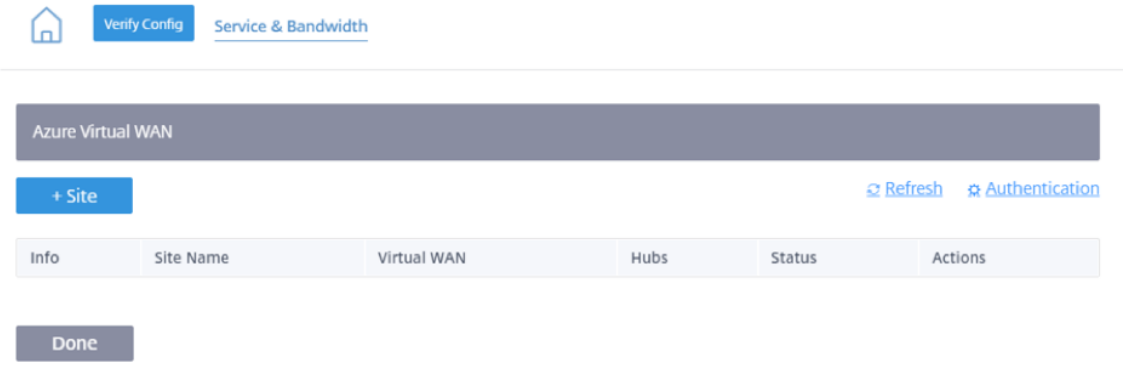
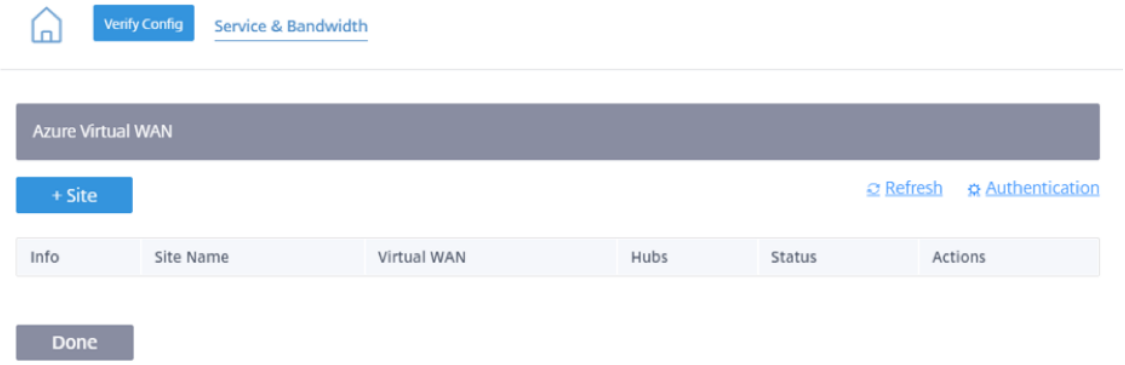


> **Note**
>
> The **Add Sites** option is disabled if you have not reserved the subscription bandwidth.

6. Provide the following details:

   - **Filter by Region/Custom Groups** –You can select all or selective region/groups.
   - **Select Sites** –You can select all or selective sites that you want for mapping.



   - **Azure Virtual WAN** - Select the Azure Virtual WAN from the drop-down list that is associated with the subscription. Same site cannot be connected to multiple WANs.
   - **Azure Hubs** - Select the Azure hubs. Only Azure Virtual WANs with Azure Virtual hubs are listed for mapping. You can add multiple hubs connected to the same site.

     > **Note**
     >
     > The **Azure Virtual WAN** field lists the virtual WANs that have a corresponding hub already created.

ALB Internal IP –The Azure Load Balancer (ALB) IP input is required if the particular site is an Azure VPX and deployed in a High Availability (HA) mode. Else this field is optional.

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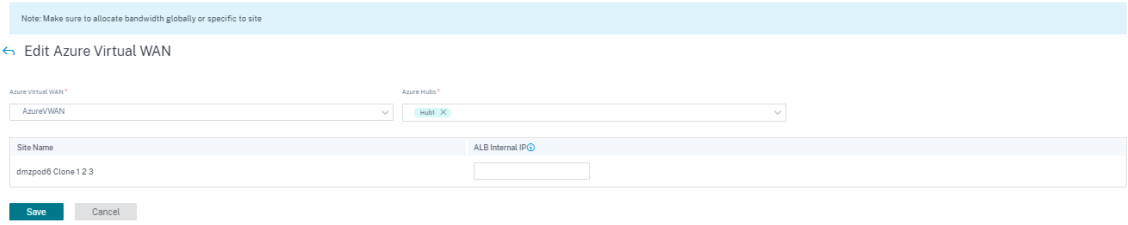
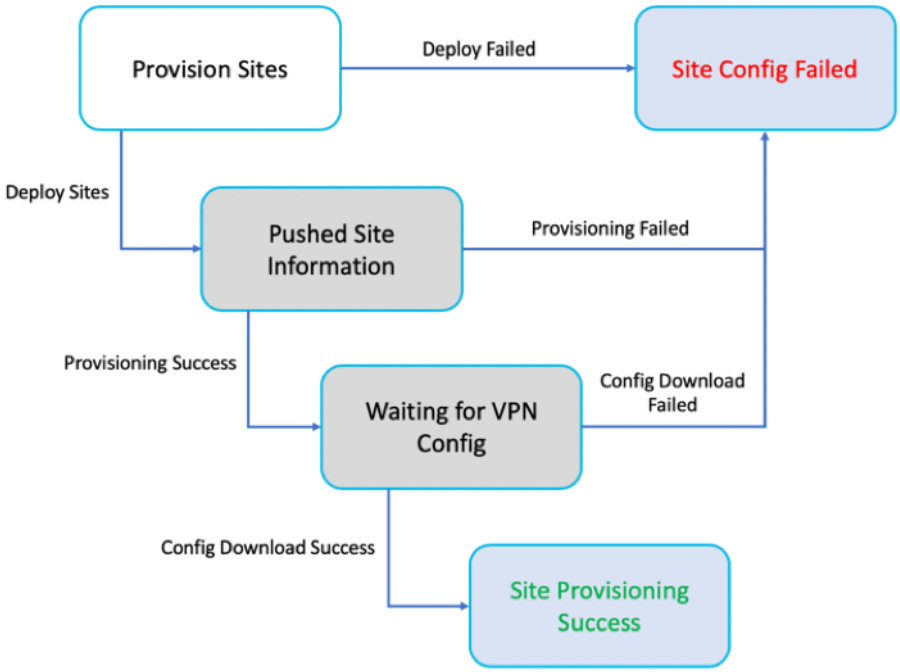
7. Click **Save**
8. Once the site is deployed, you can see the following information:



The following diagram describes the high-level workflow of Citrix SD-WAN Orchestrator service and Azure Virtual WAN connection.



- **Info** - Displays the Azure Virtual WAN Tunnel configuration details and status.
- **Site Name** –Displays the deployed site name.
- **Virtual WAN** –Displays the Azure Virtual WAN the corresponding site is mapped with.
- **Hubs** –Displays the number of hubs.
- **Status** –Displays the different deployment states with the completion message. If the site is provisioned successfully, then only the IPsec tunnels can be created.
- **Action** –You can **Edit** or **Delete** the configured site.

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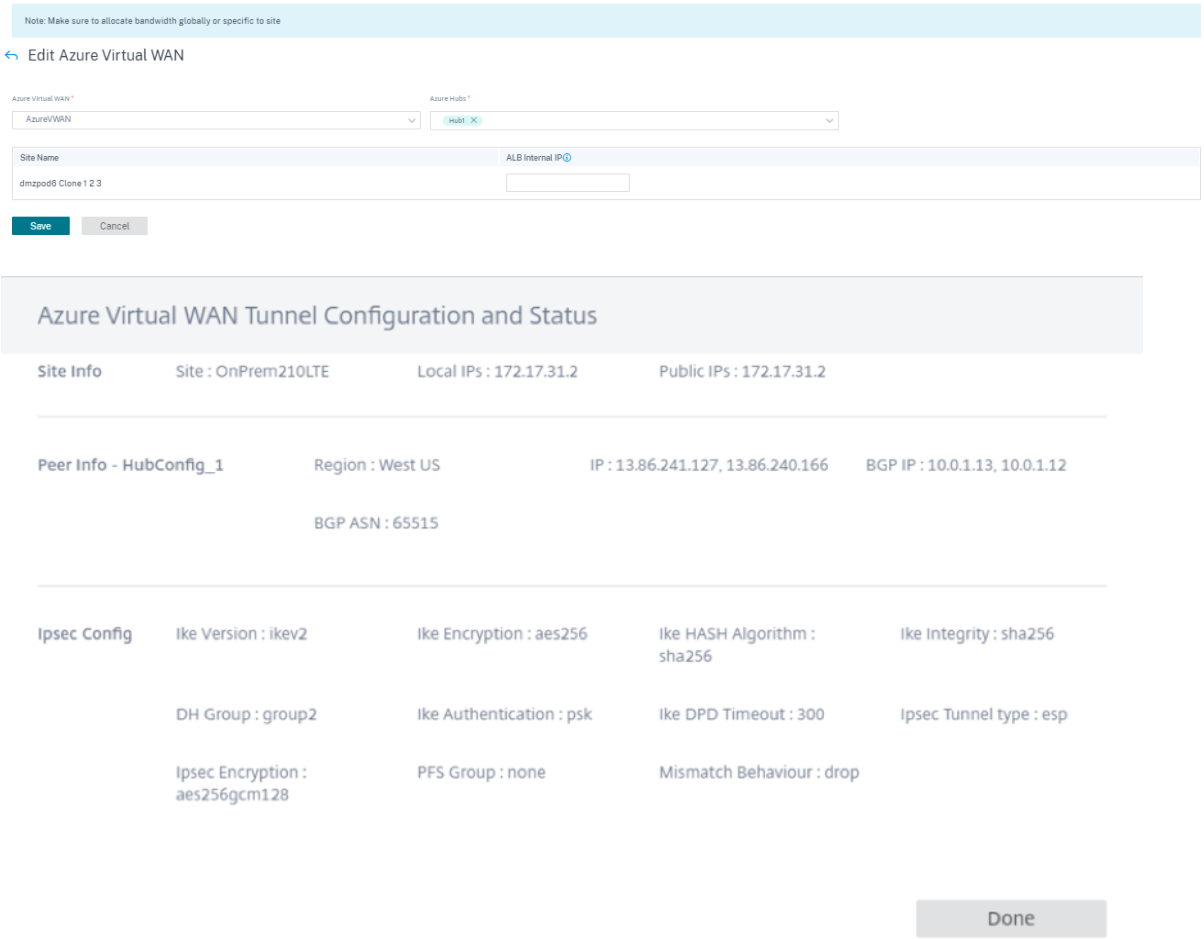

Mapping of Citrix SD-WAN sites to Azure Virtual WAN hubs might take some time since it involves downloading IPsec configuration from Azure. The branch mapping status shows as **Configuration Downloaded** after the branch configuration is downloaded. It is recommended to refresh the site status before you activate the configuration to see the updated status.

Once the site is successfully provisioned, you need to perform the **Verify, Stage,** and **Active** process to create the IPsec tunnels.

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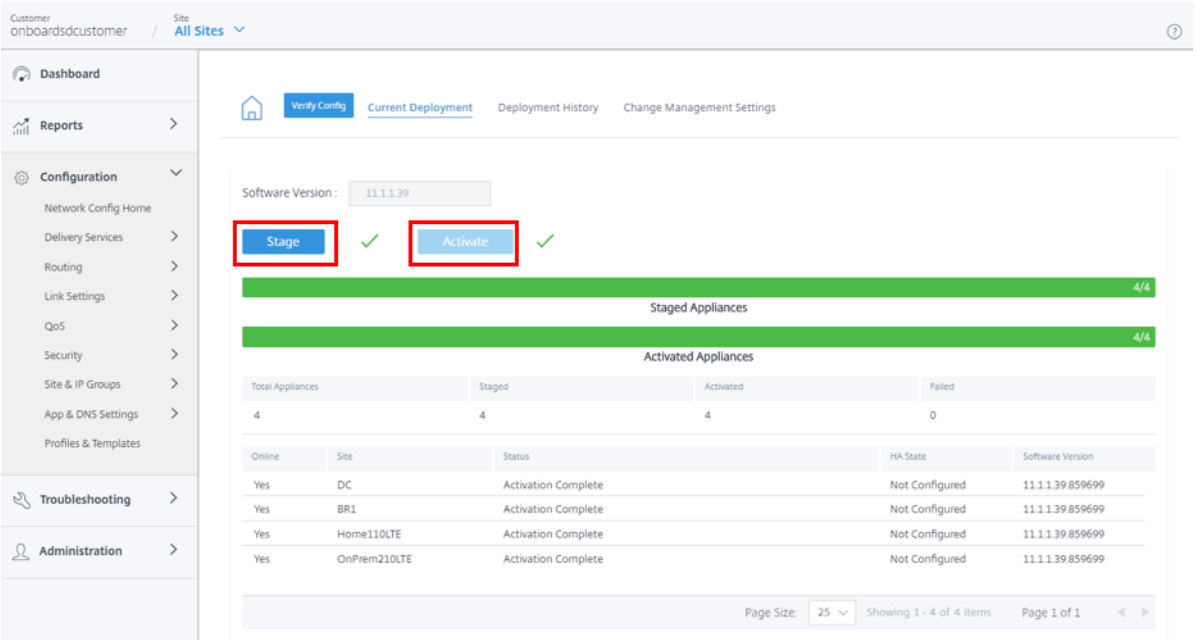
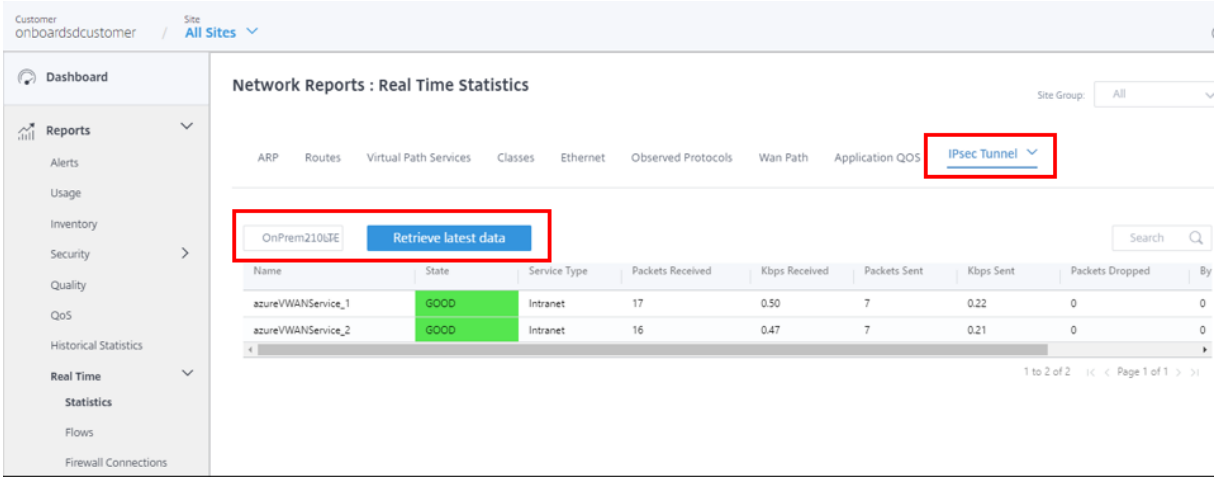


After activation, you can see the state of the tunnels for each site by navigating to **All Sites > Reports > Real Time > Statistics > IPsec Tunnel**, select the desired site, then click **Retrieve latest data**. If the configuration is not activated, the tunnels information will not be available. Two tunnels are created for the purpose of redundancy.



Also, you can see the routes to Azure Virtual WAN for each site by navigating to **All Sites > Reports > Real Time > Statistics > Routes**, select the desired site, then click **Retrieve latest data**.

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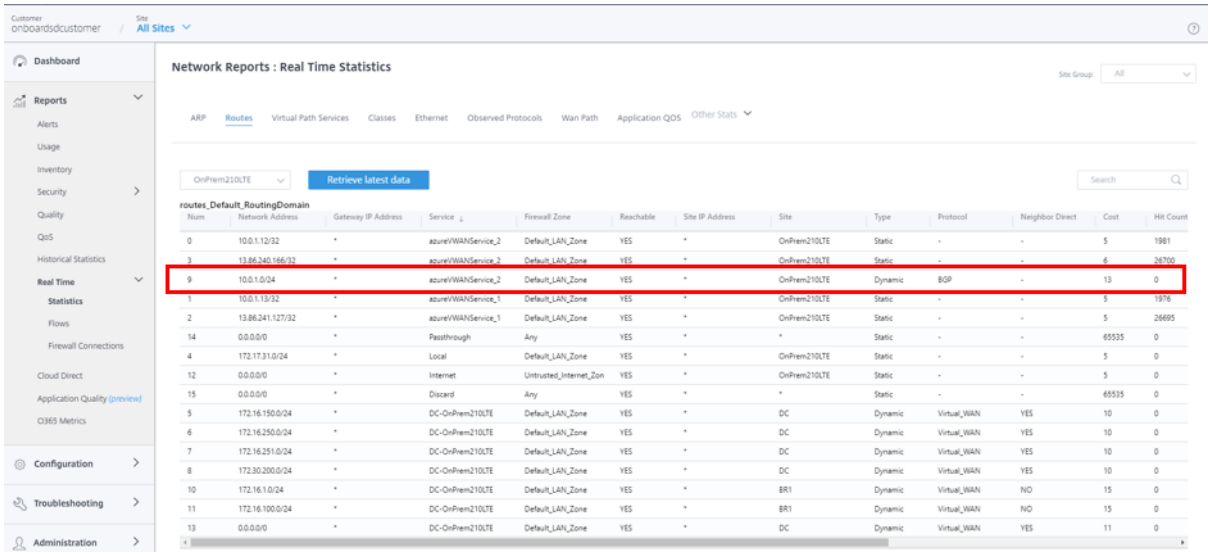
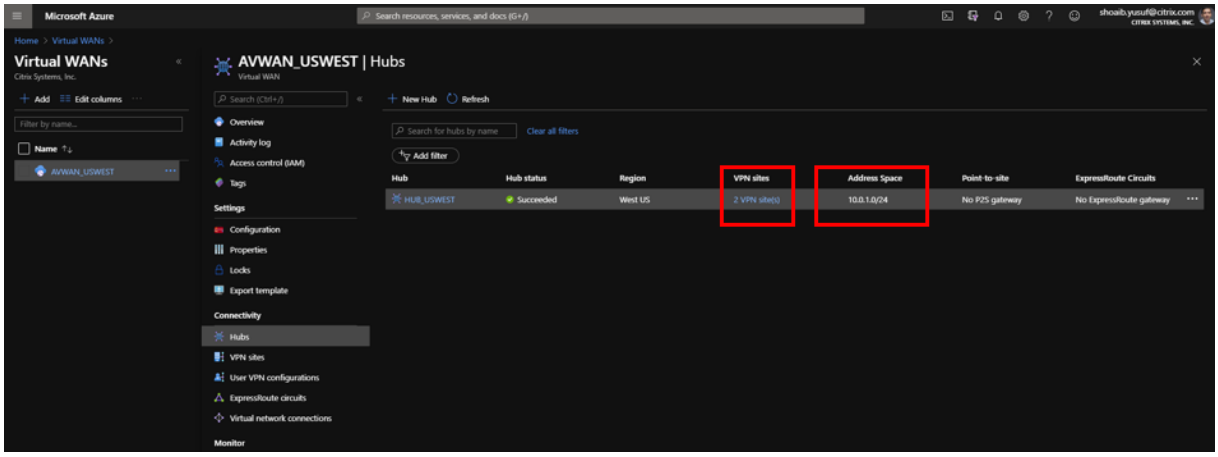


During the initial configuration of Azure Virtual WAN, the 10.0.1.0/24 VNet is associated, and this route has been learned by the on-premises SD-WAN and enter into the route table with **azureVWANservice** as the delivery service type. Type indicating **Dynamic** and Protocol indicating **BGP** can be determined that the route was learned dynamically over BGP.

In the Azure portal, successfully deployed VPN sites can be monitored in the Azure Virtual WAN hub. Also, you will find the Address Space associated with the Hub that was learned by the on-premises SD-WAN device.



Selecting any of the connected VPN sites provides detail of the connected SD-WAN. Including the public IP Address/FQDN that terminates the IPsec tunnel, the private IP address space, and the BGP address that would be the SD-WAN's WAN interface VIP address, and more importantly the speed and connectivity status to the hub.

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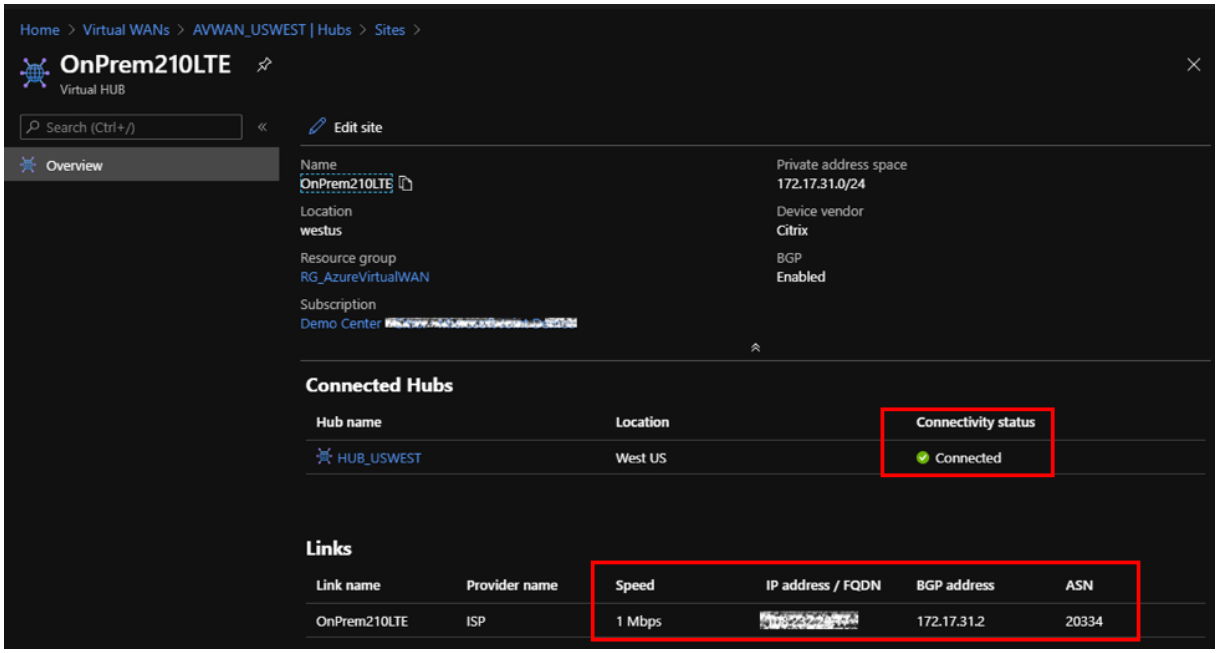
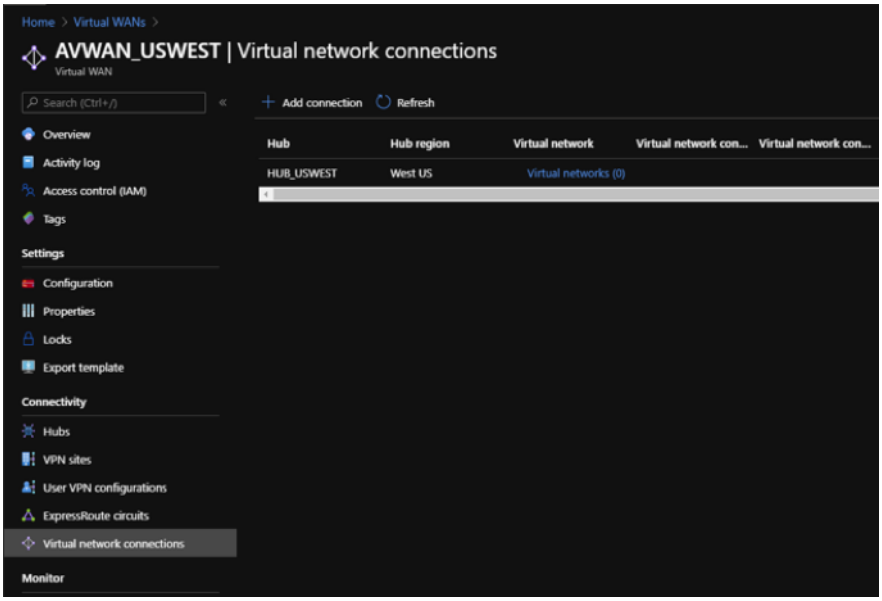


In Azure, virtual network connections can be added to make available resources in Azure by connecting VNets. To complete this configuration, perform the following:

1. In the Azure portal, select the Virtual WAN resource.
2. Under **Connectivity**, navigate to **Virtual network connections**.
3. Click **+ Add connection**.



4. To add connection, specify values for the following fields:
   - **Connection name** –Enter the name for the new connection.
   - **Hubs** –Select from the available hubs in the drop-down list.

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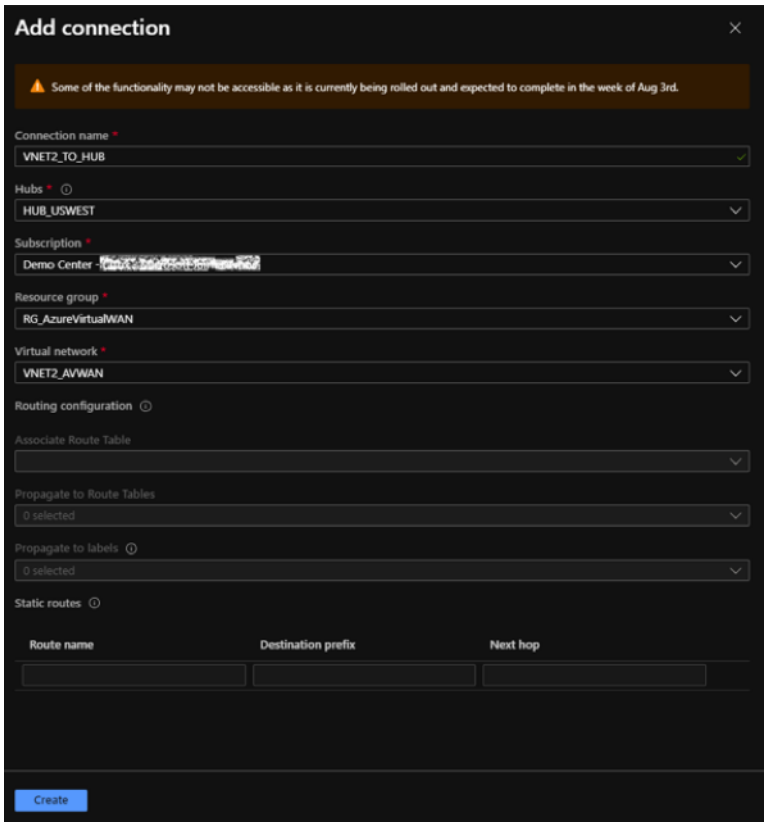
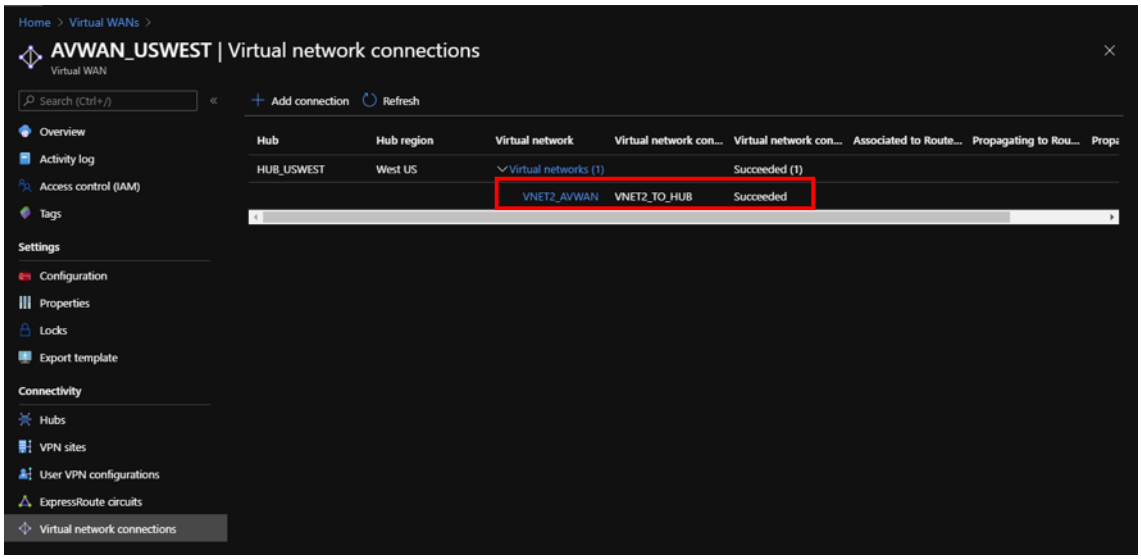
- **Subscription** –Select from the available subscriptions in the drop-down list.
- **Resource group** –Select the resource group from the drop-down list where the Virtual WAN resource is deployed.
- **Virtual network** –Select from the available virtual networks in the drop-down list.



5. Click **Create**.



With the new VNet peered to the Hub, on-premises SD-WAN devices are dynamically learned the new

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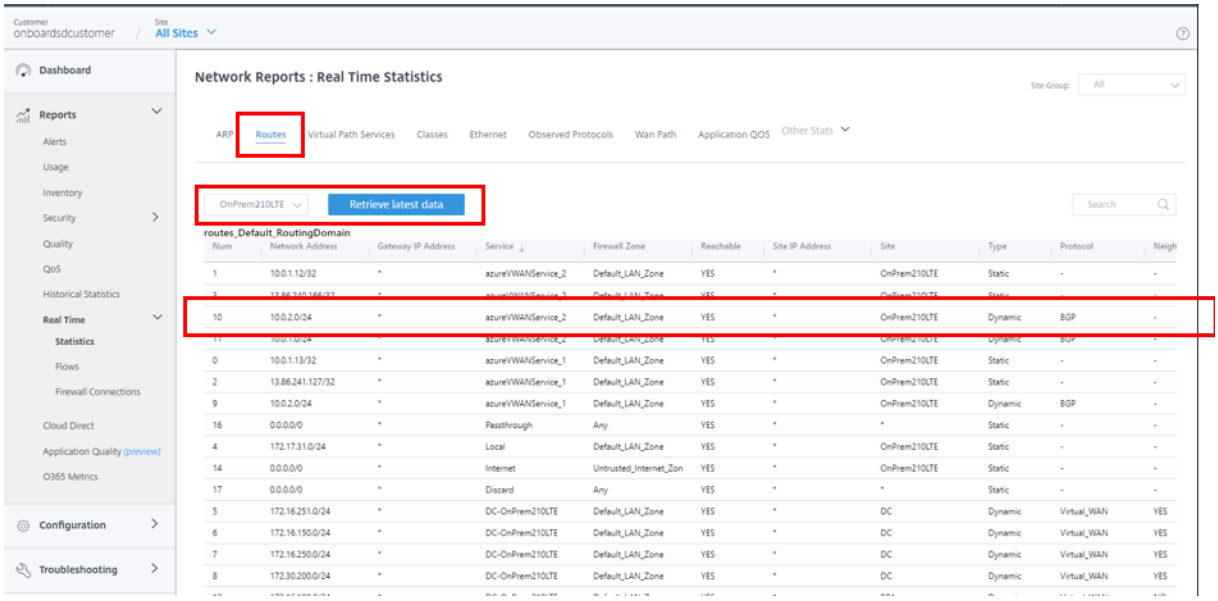
route through BGP. To retrieve the latest route table for the SD-WAN device in Citrix SD-WAN Orchestrator service, navigate to **All Sites > Reports > Real Time > Statistics > Routes**. Select the desired site and click **Retrieve latest data**.



Citrix SD-WAN deployed VPN sites can access resources deployed in VNets peered to the Azure Virtual WAN Hubs through the previously mentioned configuration steps.

Citrix SD-WAN™ integration with Google Network Connectivity Center

September 27, 2025

Google Network Connectivity Center (NCC) provides a mechanism for enterprises to connect On-premises, Virtual Private Clouds(VPCs) on Google Cloud, and other enterprise networks and manage them as spokes to a centralized logical hub on Google Cloud.

Citrix SD-WAN's integration with Google NCC provides a fast, secure, and resilient on-ramp for organizations to connect and migrate data from their branch offices, remote sites, and on-premises networks to Google Cloud. In addition, enterprises can use Google's high-speed internet backbone to connect to workloads and other branch offices.

For information on how to integrate Citrix SD-WAN with Google NCC, see Citrix SD-WAN for Google Network Connectivity Center Deployment Guide.

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SD-WAN configuration for Citrix Virtual Apps and Desktops™ Standard for Azure integration

September 27, 2025

Citrix SD-WAN™ is a next-generation WAN edge solution that accelerates digital transformation with flexible, automated, and secure connectivity and performance for SaaS, cloud, and virtual applications to ensure an always-on workspace experience.

Citrix SD-WAN is the recommended and best way for organizations to connect to Citrix Virtual Apps and Desktops Standard for Azure with a quick and easy set-up. For more information, see Citrix blog.

Benefits

- Easy to set up SD-WAN in Citrix Virtual Apps and Desktops Standard for Azure through a guided and automated workflow
- Always-on, high performance connectivity through advanced SD-WAN technologies
- Benefits across all connections (VDA-to-DC, user-to-VDA, VDA-to-cloud, and user-to-cloud)
- Reduces latency compared to backhauling traffic to the data center
- Traffic management to ensure Quality of Service (QoS)
    - QoS across HDX/ICA traffic streams (single-port HDX AutoQoS)
    - QoS between HDX™ and other traffic
    - HDX QoS fairness between users
    - End-to-end QoS
- Link bonding delivers more bandwidth for faster performance
- High Availability (HA) with seamless link failover and SD-WAN redundancy on Azure
- Optimized VoIP experience (packet racing for reduced jitter and minimal packet loss, QoS, local break-out for reduced latency)
- Major cost savings and much faster and easier to deploy compared to ExpressRoute

Pre-requisites

To evaluate these new capabilities, the following pre-requisites must be adhered to:

1. You must have an existing SD-WAN network with Citrix SD-WAN Orchestrator service entitlement. If you don't have an existing SD-WAN network then you must set up one using Citrix SD-WAN Orchestrator service. For more details, see configuring a Master Control Node (MCN).

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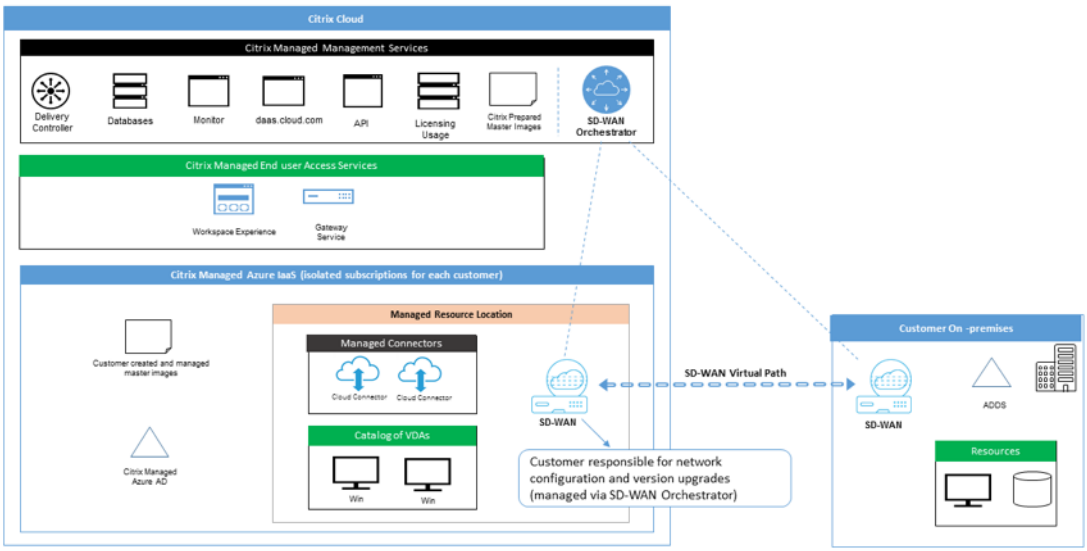
2. You must have a subscription to Citrix Virtual Apps and Desktops Standard for Azure.
3. Currently, this integration support is only available for customers. If you are a partner or an MSP and must try this service then you must subscribe to Citrix Virtual Apps and Desktops Standard for Azure as a customer. Only then this integration can be enabled.
4. To use SD-WAN features (such as QoS for MSI, application visibility), the Network Location Service (NLS) must be configured for all the SD-WAN sites in your network.
5. You must have a DNS server and AD either deployed where the client endpoints are present (co-located in your data center environment, which would also have the MCN) or you can also utilize Azure Active Directory (AAD).
6. The DNS server must be capable of resolving both internal (private) and external (public) IPs.
7. Make sure that the FQDN sdwan-location.citrixnetworkapi.net is whitelisted in the firewall. This is the FQDN for network location service which is critical in sending traffic over the SD-WAN virtual path.

For the list of cloud services that has to be whitelisted on the firewall, see Prerequisites for Citrix SD-WAN Orchestrator service usage.

Deployment architecture



Any deployment would feature the following entities:

- An on-premises location hosting the SD-WAN appliance which can either be deployed in branch mode or as an MCN. This location contains the client machines, active directory, and DNS. How-

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ever, you can also choose to use Azure's DNS and AD. In most scenarios the on-premises location serves as an on-prem data center and houses the MCN.

- **Citrix Virtual Apps and Desktops Standard for Azure cloud service**: This entity provides:
  - The UI for enabling and monitoring SD-WAN connectivity for Citrix Virtual Apps and Desktops Standard for Azure.
  - Creates SD-WAN virtual machine instances in Azure.
  - Manages their lifetime.
  - Bundles SD-WAN instance costs with Citrix Virtual Apps and Desktops Standard for Azure costs for customer billing.
  - Configures the local networking environment (subnets, local routing, firewall rules and so on) for SD-WAN instances.
  - Supplies SD-WAN instance information to the Citrix SD-WAN Orchestrator service to provide and consume SD-WAN monitoring and other operational data.
- **Citrix SD-WAN Orchestrator service**: Citrix SD-WAN Orchestrator service provides the UI for SD-WAN management:
  - Including management of instances deployed in Citrix Virtual Apps and Desktops Standard for Azure.
  - Implements initial provisioning for Citrix Virtual Apps and Desktops Standard for Azure SD-WAN instances.
  - Implements restrictions on SD-WAN instance management to reflect the Citrix Virtual Apps and Desktops Standard for Azure configuration.
  - Integrates with Citrix Virtual Apps and Desktops Standard for Azure to provide and consume SD-WAN monitoring and other operational data.
- **Virtual and physical SD-WAN appliances**: Virtual and physical SD-WAN appliances run as multiple instances within the cloud (VMs), on-premises in the data center, and in the branches (physical appliances or VMs) to provide connectivity among these locations and to/from the public Internet.

  SD-WAN instance in Citrix Virtual Apps and Desktops Standard for Azure subscription is created as a single or a set of virtual appliances (if there was HA deployment) by Citrix Virtual Apps and Desktops Standard for Azure cloud service in Azure within the realms of Citrix Virtual Apps and Desktops Standard for Azure subscription. SD-WAN appliances in other locations (DC and branches) are created by the customer. All of these SD-WAN appliances are managed (in terms of configuration and software upgrades) by SD-WAN administrators through the Citrix SD-WAN Orchestrator service.
- **Citrix Virtual Apps and Desktops Standard for Azure VDA, Connector** - Uses the Citrix Virtual Apps and Desktops Standard for Azure SD-WAN appliance as a gateway to all resources outside

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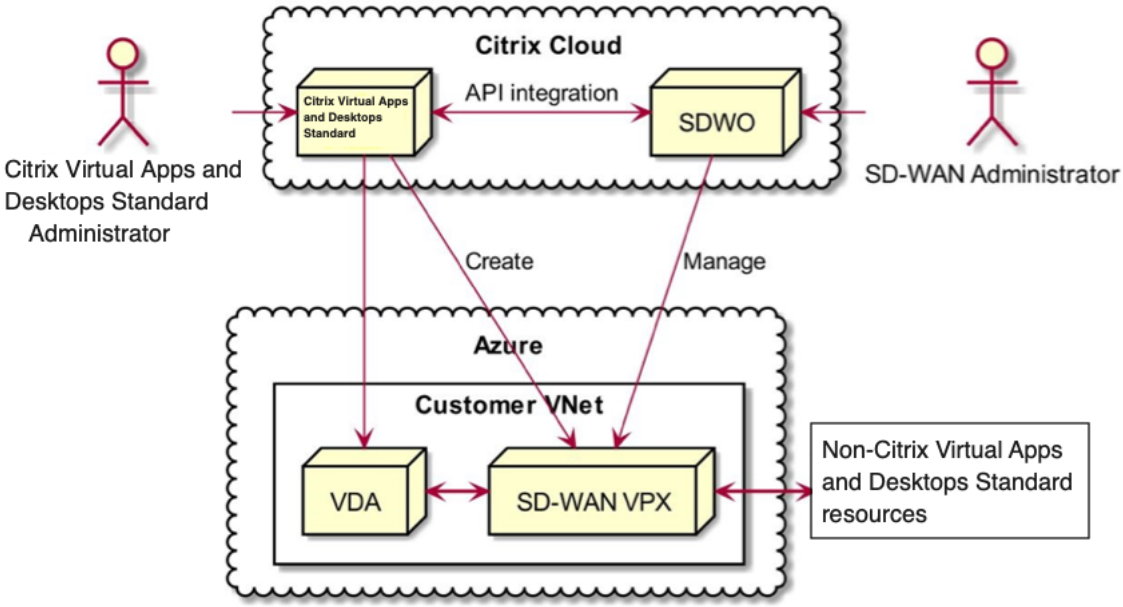
of the Citrix Virtual Apps and Desktops Standard for Azure VNet, including enterprise on-prem resources, certain Azure services, and SaaS applications on the public Internet.

User roles

1. **Citrix Virtual Apps and Desktops Standard for Azure Administrator**: Decides to use SD-WAN connectivity and obtains the necessary networking information from the SD-WAN administrator (or another network administrator role):
   - Starts the configuration of SD-WAN connectivity through Citrix Virtual Apps and Desktops Standard for Azure UI.
   - Once SD-WAN connectivity is fully enabled, manages Citrix Virtual Apps and Desktops Standard for Azure catalogs using SD-WAN connectivity.
   - Together with the SD-WAN Administrator, monitors SD-WAN connectivity and takes more actions as necessary.
2. **SD-WAN administrator**: Provides SD-WAN configuration information to Citrix Virtual Apps and Desktops Standard for Azure Administrator:

- Activates SD-WAN instances in Citrix Virtual Apps and Desktops Standard for Azure to enable connectivity to other network elements, and performs extra configuration activities.
- Together with the SD-WAN administrator, monitors SD-WAN connectivity and takes extra actions as necessary.



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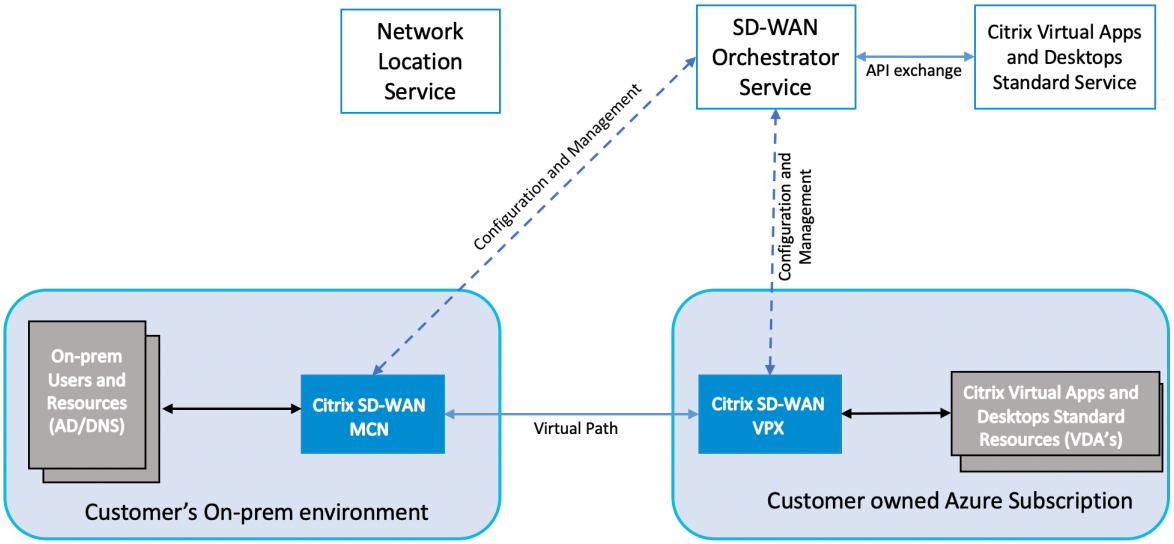
Access management for SD-WAN Citrix Virtual Apps and Desktops Standard for Azure integration

- Both Citrix Virtual Apps and Desktops Standard for Azure and Citrix SD-WAN Orchestrator service rely on Citrix Cloud IDAM to identify users as having **Read-Only** or **Read-Write** access.
- In addition, the Citrix SD-WAN Orchestrator service has the capability to assign similar access rights to users exclusively within the Citrix SD-WAN Orchestrator service. The two authorization mechanisms are combined with the **OR** logic: it is sufficient to have admin access rights either in Citrix Cloud or in Citrix SD-WAN Orchestrator service to get access to SD-WAN configuration management.

Deployment and configuration



In a typical deployment a customer would have the Citrix SD-WAN appliance (H/W or VPX) deployed as an MCN in their data center/large office. The customer data center would usually host on-prem users and resources such as AD and DNS servers. In some scenarios the customer can use Azure Active Directory services (AADS) and DNS, both of which are supported by Citrix SD-WAN and Citrix Virtual Apps and Desktops Standard for Azure integration.

Within the Citrix Managed Azure subscription, the customer needs to deploy the Citrix SD-WAN virtual appliance and VDAs. The SD-WAN appliances are managed through the Citrix SD-WAN Orchestrator service. However, for the purpose of this integration the SD-WAN appliance within the Citrix Managed Azure subscription is configured via Citrix Virtual Apps and Desktops Standard for Azure UI/workflow. Once the SD-WAN appliance gets configured it connects to the existing Citrix SD-WAN network and further tasks such as configuration, visibility, and management are handled through the Citrix SD-WAN

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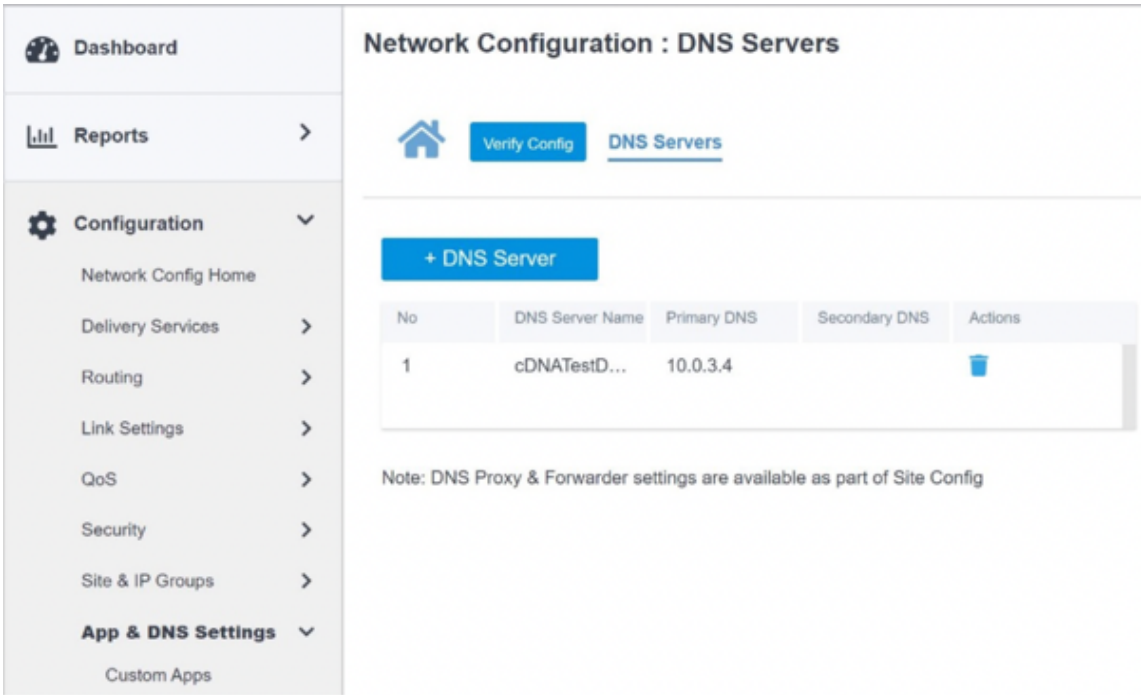
Orchestrator service. Both Citrix SD-WAN Orchestrator service and Citrix Virtual Apps and Desktops Standard for Azure communicate with each other using APIs.

The third component in this integration is the network location service which allows internal users to bypass the gateway and connect to the VDA's directly, reducing latency for internal network traffic. For phase 1 of this integration the network location service needs to be configured manually. For more information, see Network location service (NLS).

Configuration

1. After you followed all the pre-requisites highlighted in the pre-requisites section, the first item that must be configured is the DNS. This must be configured in the Citrix SD-WAN Orchestrator service. You need admin rights to configure DNS on the Citrix SD-WAN Orchestrator service. To configure DNS, navigate to **Configuration > App & DNS Settings > DNS Servers** in the Citrix SD-WAN Orchestrator service GUI and click **+DNS Server**. Enter the primary and secondary DNS in the ensuing screen.



As highlighted in the Deployment and configuration section above, the AD and DNS is present in the on-premises location acting as the data center and in a deployment featuring SD-WAN it is available behind the SD-WAN that is on the LAN network. It's the AD/DNS IP that you must configure here. In case you are using Azure Active Directory service/DNS, configure 168.63. 129.16 as the DNS IP.

If you are making use of an on-premises AD/DNS, check if you can ping the IP of your DNS from your SD-WAN appliance. You can do this by navigating to **Troubleshooting > Diagnos-**

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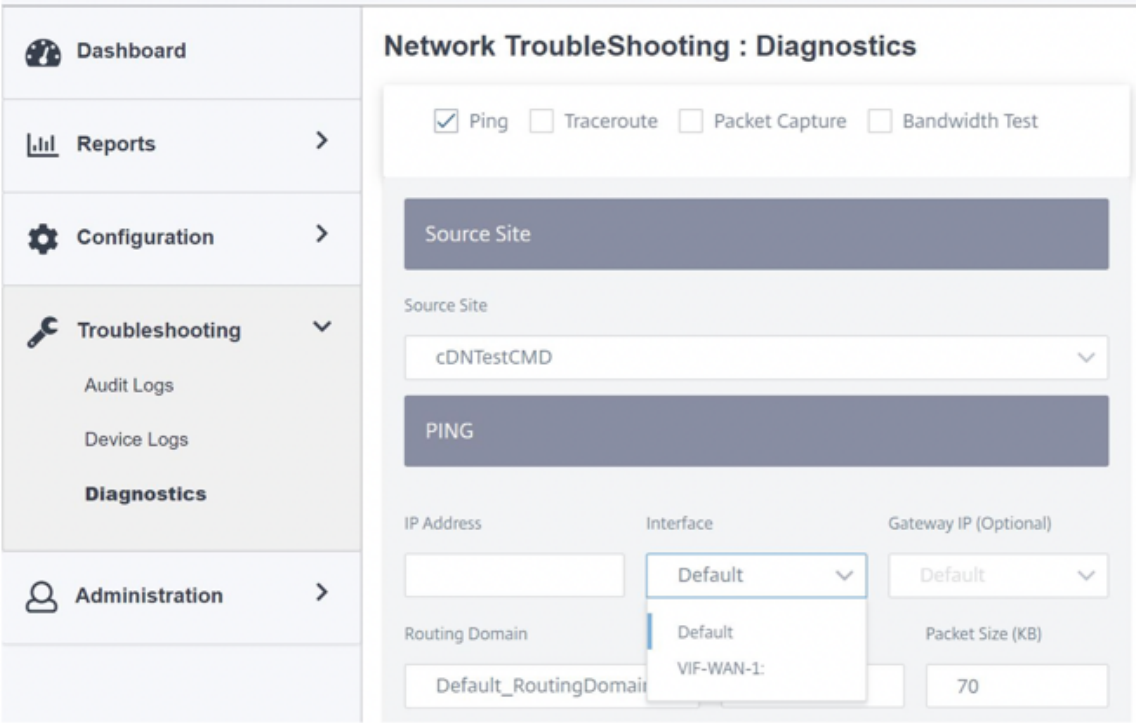
tics. Check the check box against **Ping** in the ensuing screen and initiate a ping from the LAN interface/Default interface of the SD-WAN appliance to the IP of your AD/DNS.



If the ping succeeds then it signifies that your AD/DNS can be reached successfully. If not, then there is a routing issue in your network which is preventing reachability to your AD/DNS. If possible, try to host your AD and SD-WAN appliance on the same LAN segment. In case there is still an issue, reach out to your network admin. Without completing this step successfully, the catalog creation step will not succeed and you are likely got an error message stating **Global DNS IP not configured**.

> **Note**
>
> Ensure that the DNS is capable of resolving both internal and external IPs.

2. Log in to the Citrix Virtual Apps and Desktops Standard for Azure UI. You can view the following screen:

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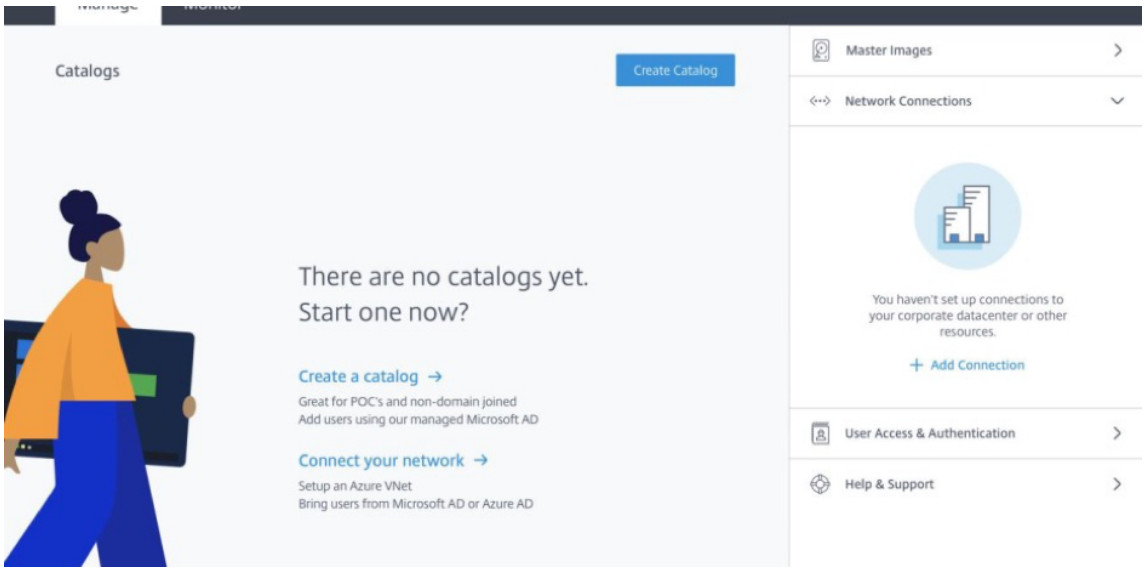
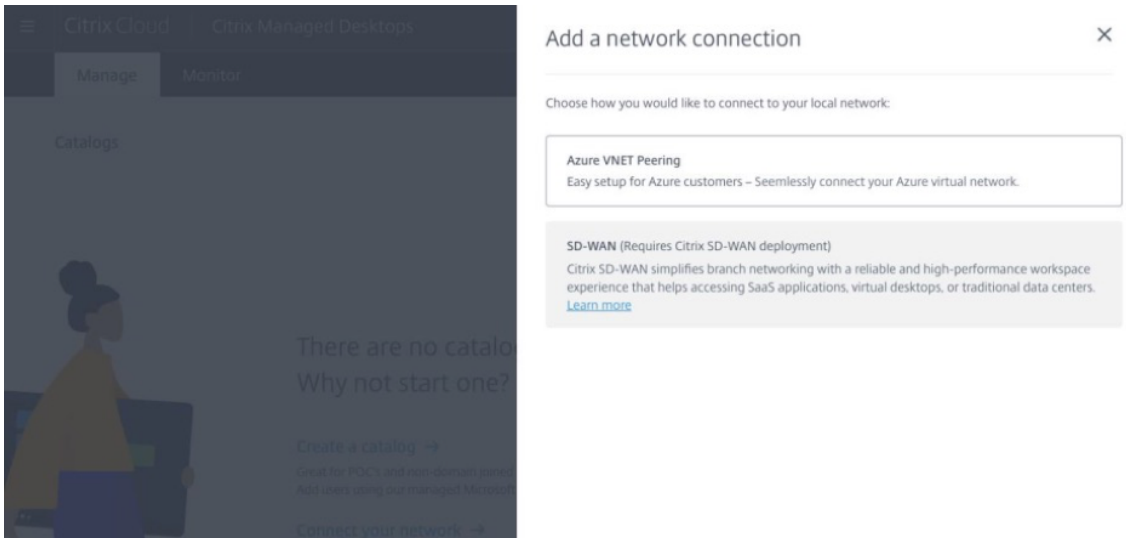


Click **Network Connections** to create network connectivity between your on-prem resources and Citrix Virtual Apps and Desktops Standard for Azure subscription. Click **+ Add Connection**.



The SD-WAN option is only be enabled if you meet the following requirements:

- You must have an existing SD-WAN network with Citrix SD-WAN Orchestrator service entitlement. If you don't have an existing SD-WAN network then set up one using Citrix SD-WAN Orchestrator service. For more details, see Configuring a Master Control Node (MCN).
- You must have a subscription to Citrix Virtual Apps and Desktops Standard for Azure.
- Currently, this integration support is only available for customers. If you are a partner or an MSP and must try this service then you must subscribe to Citrix Virtual Apps and Desktops Standard for Azure as a customer, only then this integration can be enabled. Otherwise, this option remains disabled.

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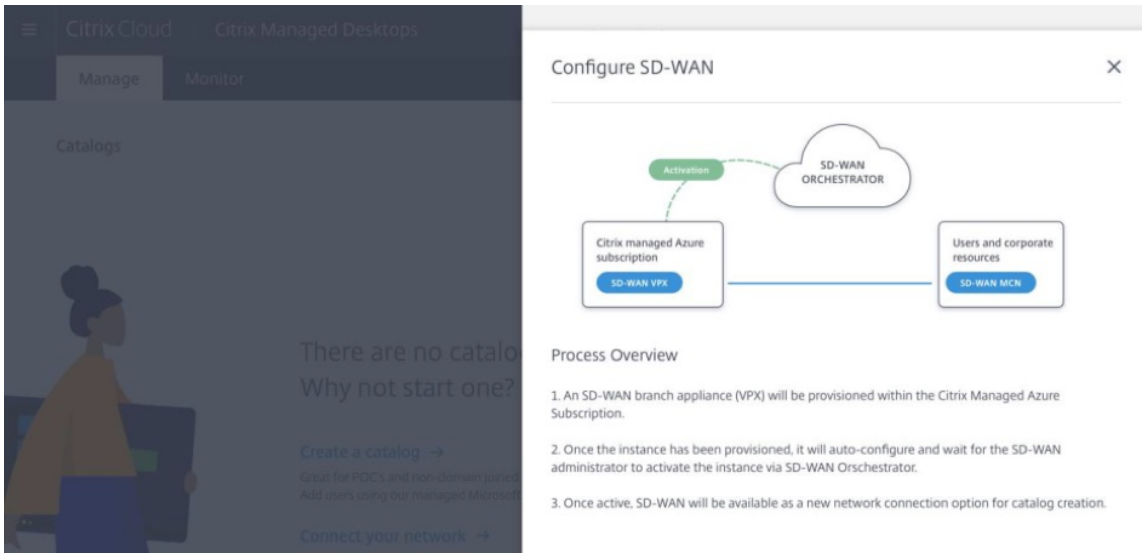
In case you want to try this integration and need trial access for the Citrix SD-WAN Orchestrator service then request a trial by visiting citrix.cloud.com or sdwan.cloud.com.

3. Once you meet the conditions highlighted in the pre-requisites, click the **SD-WAN** tab to view the overall workflow:



4. Enter the following details to configure the SD-WAN:

   - **Deployment mode**: You can see two deployment mode options - Standalone and High Availability.

     - **Standalone**: The deployment mode for SD-WAN can either be standalone where a single SD-WAN instance is deployed. If the SD-WAN instance fails due to either an issue with the SD-WAN firmware or the underlying Azure infra you cannot reach out to the resources deployed behind the SD-WAN instance in Azure. In other words, the instance behaves in a fail to block mode.

     - **High Availability**: To guard against software failure of the SD-WAN instance you might choose to deploy the instance in high availability mode which deploys two SD-WAN instances in active standby mode. Citrix® recommends deploying instances in high availability mode for production networks.

   - **Enter SD-WAN site name**: Enter the site name to identify a site in your SD-WAN network. Make sure that the name you choose is unique and easy to recall.

   - **Throughput and number of offices**: Currently, only D3_V2 option is supported. D3_V2 supports up to 200 Mbps of throughput and can establish direct connectivity to 16 sites. The connections that are not direct go through the MCN.

   - **Region**: Select the Azure region where you want to deploy the SD-WAN instance. This needs to be the same region where you intend to deploy your Citrix Virtual Apps and Desktops Standard for Azure resources.

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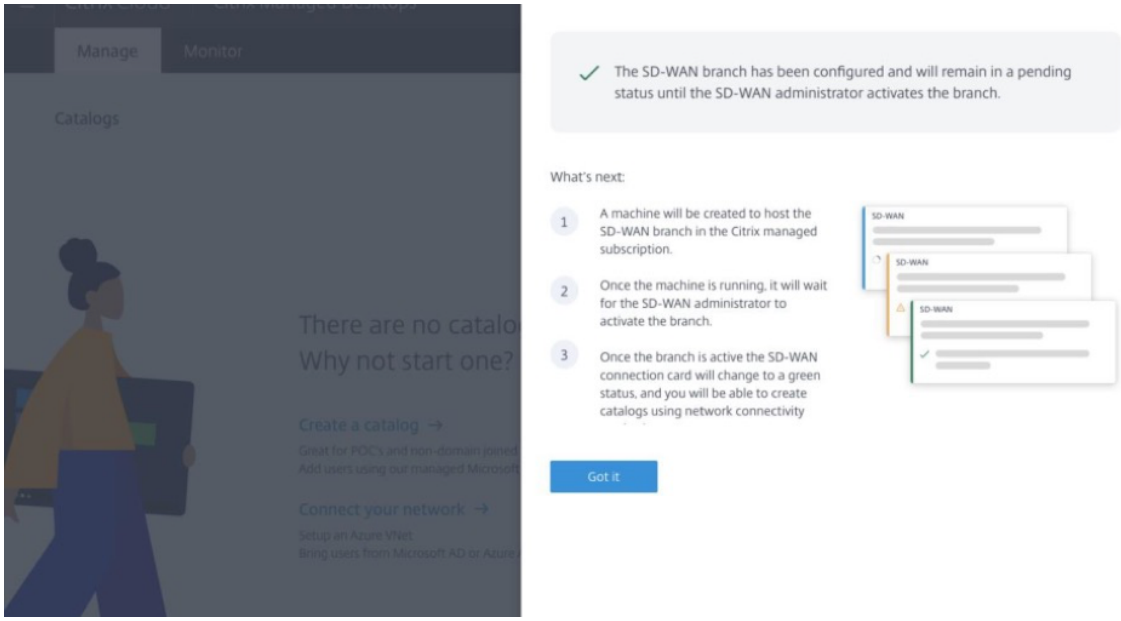
- **VDA subnet**: VDA subnet is the subnet where you want to deploy your VDA and other Citrix Virtual Apps and Desktops Standard for Azure resources in Azure.
- **SD-WAN subnet**: SD-WAN subnet is the subnet where you want to deploy your SD-WAN appliance/s.

> **Note**
>
> This integration only supports domain joined catalogs, non-domain joined aren't supported as of today.

5. Once you provide all the information that asked for in the previous step, the provisioning and deployment ensues and it takes around 20 odd minutes for the process to complete. During this time, the following steps take place behind the scenes:

   - A virtual SD-WAN appliance (VPX) starts to get provisioned in Azure based on the configuration chosen by you. Once provisioning succeeds, the SD-WAN VPX comes up with the chosen CPU and memory profile along with the network configuration supplied during the previous step.
   - Once provisioning succeeds, the VPX appliance reaches out to the Citrix SD-WAN Orchestrator service over public Internet to request for the configuration package.



6. Once the SD-WAN branch is configured, you can view the configuration details.

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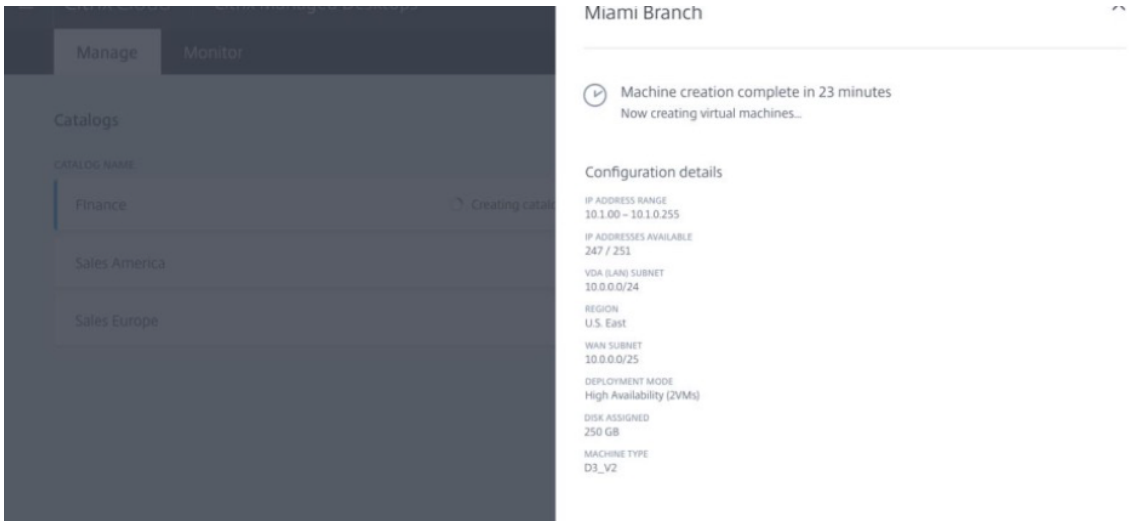
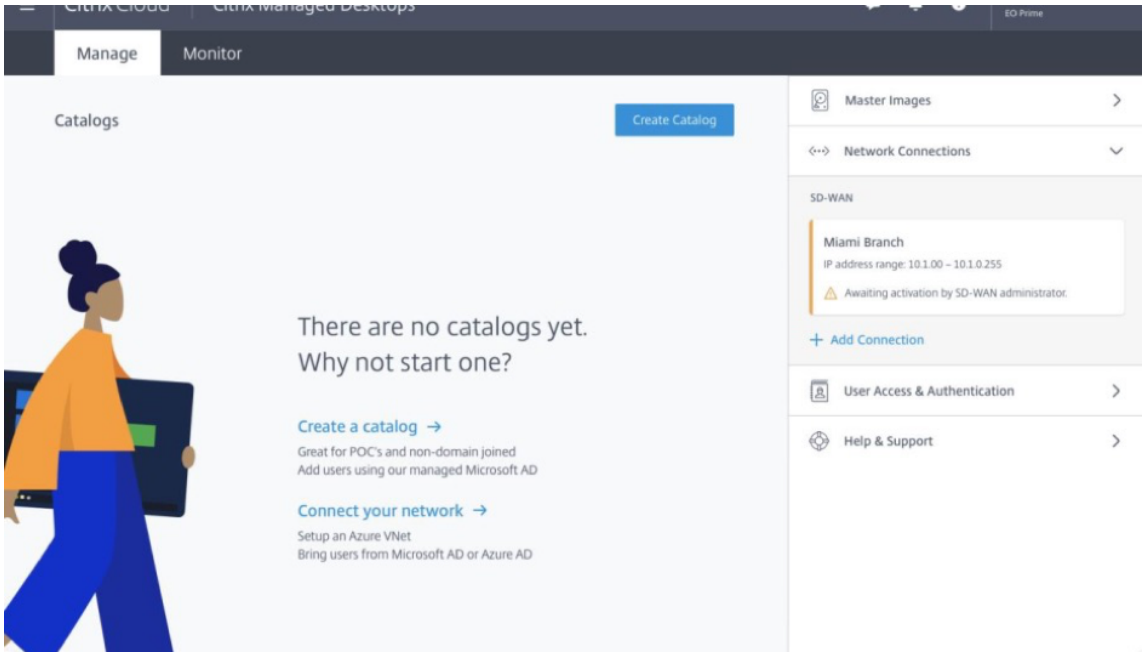


7. Once the instance is provisioned, you can see the following screen. At this point the network administrator must log into the Citrix SD-WAN Orchestrator service to allow the addition of the SD-WAN VPX appliance to the network.



8. The network administrator must log in to the Citrix SD-WAN Orchestrator service and navigate to Network configuration home page, where you can see a line item for the SD-WAN site in Citrix Virtual Apps and Desktops Standard for Azure.

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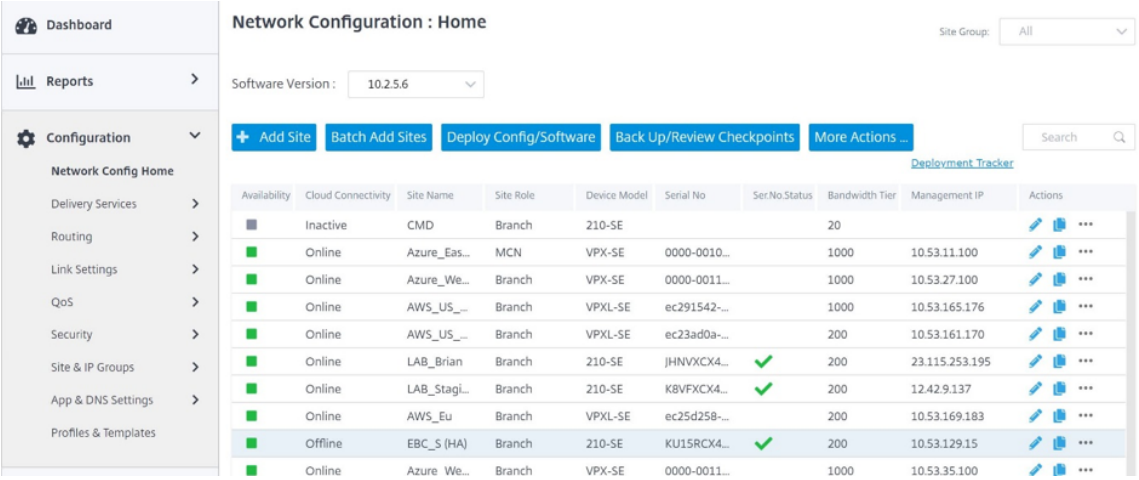
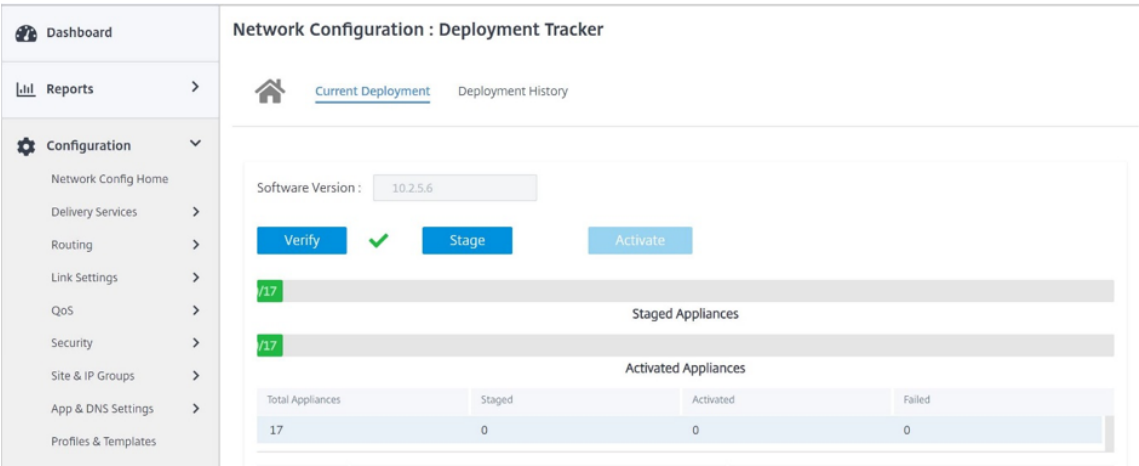


9. The network administrator must deploy the sites at this stage. Click the **Deploy Config/Software** to deploy.



10. Once the **Deploy Config/Software** step succeeds, you can see that the status on the Citrix Virtual Apps and Desktops Standard for Azure screen changes to **you can now create catalogs using SD-WAN**.

Network location service

With the **Network Location** service in Citrix Cloud™, you can optimize internal traffic to the apps and desktops you make available to subscribers' workspaces to make HDX sessions faster.

Users on both internal and external networks have to connect to VDAs through an external gateway. While this is expected for external users, internal users experience slower connections to virtual resources. The **Network Location** service allows internal users to bypass the gateway and connect to the VDAs directly, reducing latency for internal network traffic.

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Configuration

To set up the **Network Location** service, you configure network locations that correspond to the VDAs in your environment using the **Network Location** service PowerShell module that Citrix provides. These network locations include the public IP ranges of the networks where your internal users are connecting from.

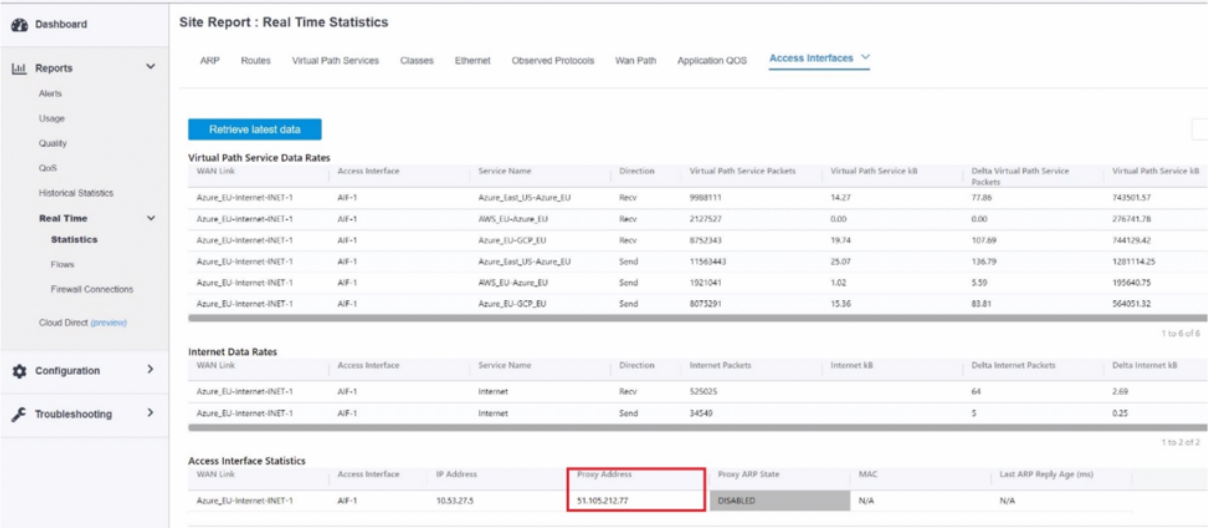
When subscribers launch Citrix Virtual Apps and Desktops Standard for Azure sessions from their workspace, Citrix Cloud detects whether subscribers are internal or external to the company network based on the public IP address of the network from which they are connecting.

- If a subscriber connects from the internal network, Citrix Cloud routes the connection directly to the VDA, bypassing Citrix Gateway.
- If a subscriber connects externally, Citrix Cloud routes the subscriber through Citrix Gateway as expected and then redirects the subscriber to the VDA in the internal network.

> **Note**
>
> The public IP that needs to be configured in the network location service needs to be the public IP assigned to the WAN links.

Public IP assigned to the SD-WAN appliance

The public IP that needs to be configured in NLS needs to be the WAN link IPs of all the links used to send traffic over the virtual path. You can find this information by navigating to **Site > Reports > Real time > Statistics > Access Interfaces**.



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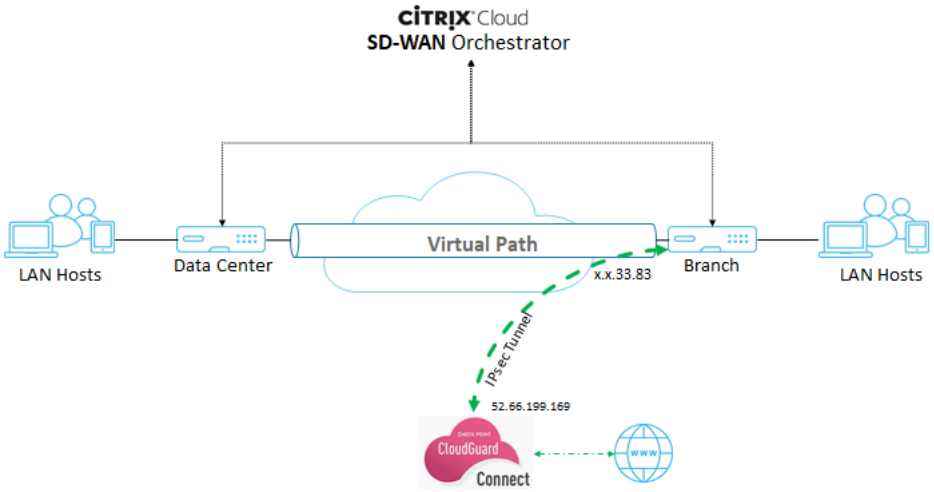
Integration of Citrix SD-WAN Orchestrator™ with Check Point CloudGuard Connect

September 27, 2025

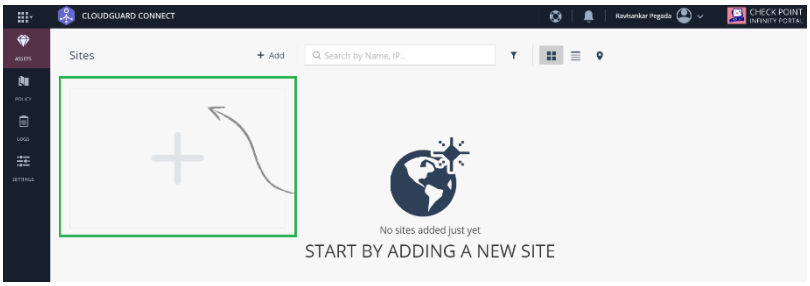
Integration topology



Configuration on Check Point portal

1. Add a Site on the Check Point portal.

   a) Log into the Check Point portal and add a site.



   A pop-up window to create a site appears. Provide the required general details and click Next

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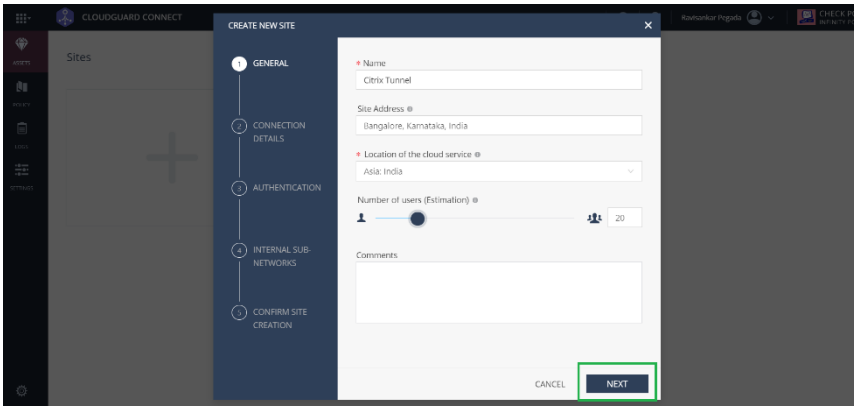
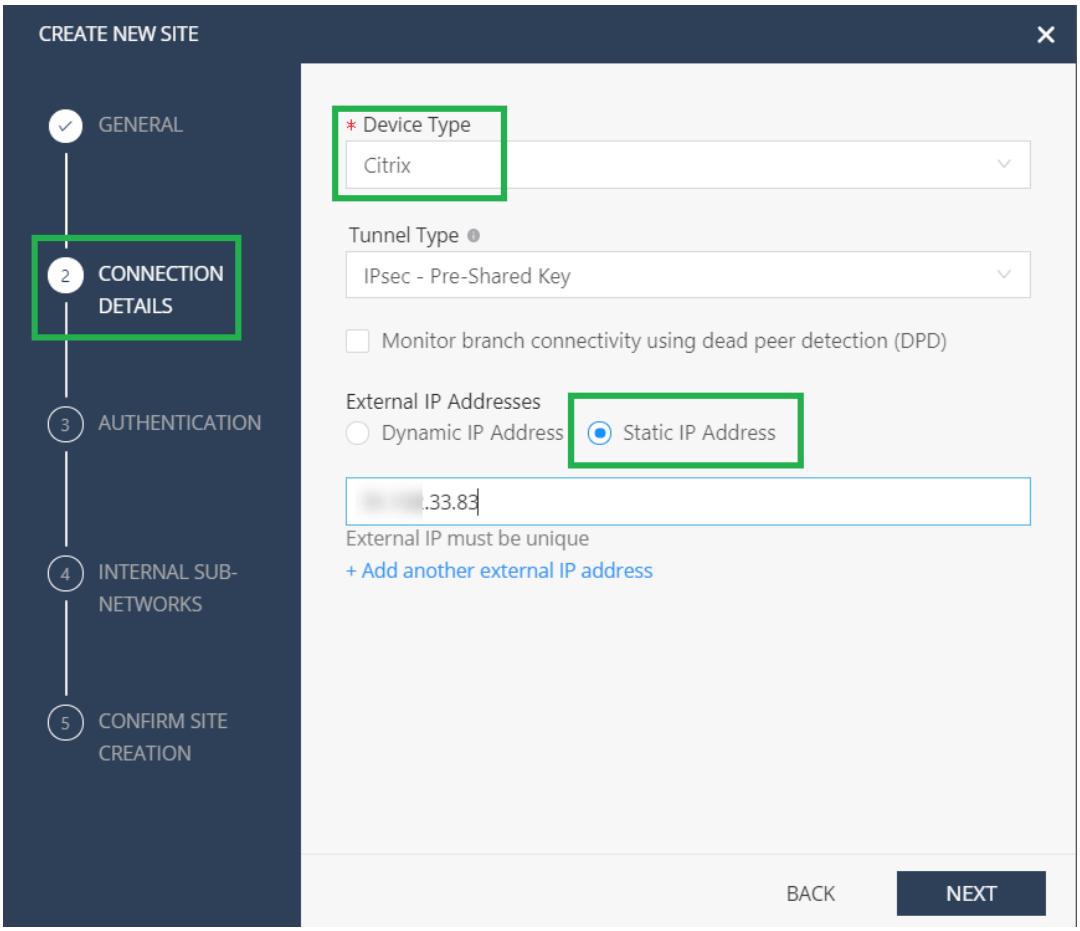


b) Provide the connection details. Select the **Device Type** as **Citrix®** and **External IP addresses** as **Static IP Address**.

> **Note**
>
> Provide the branch WAN Link public IP address as the **External IP Address**. It is "x.x.33.83"as per the topology.

If you are using multiple internet WAN links, click **Add another external IP address** to specify the Public IP address associated with those WAN links.



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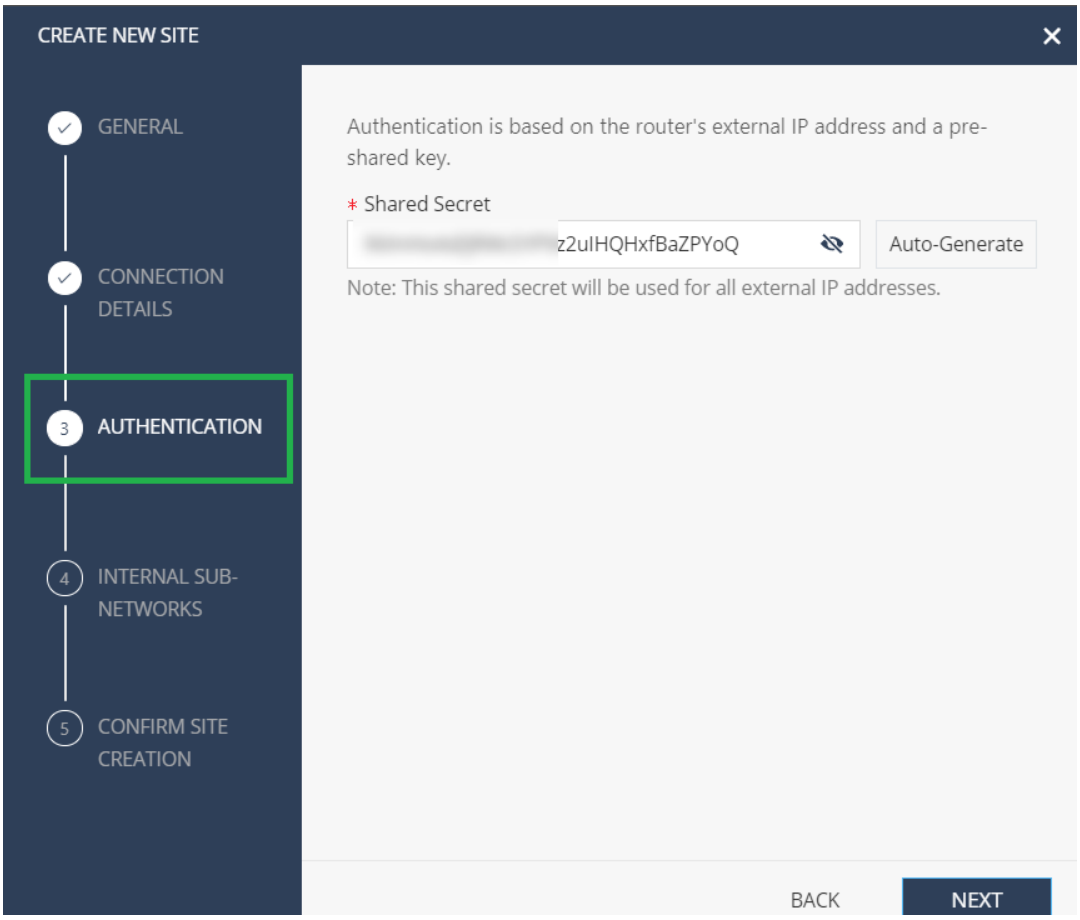
c) In the **Authentication** section, define the pre-shared key or auto-generated the key.



d) Provide the Internal subnetwork. It is the LAN subnets behind the SD-WAN appliance, which goes through the tunnel, called as **Protected Networks** in the Citrix SD-WAN Orchestrator service. It must match at both the Citrix SD-WAN Orchestrator service and the Check Point end to ensure that the tunnel is established.

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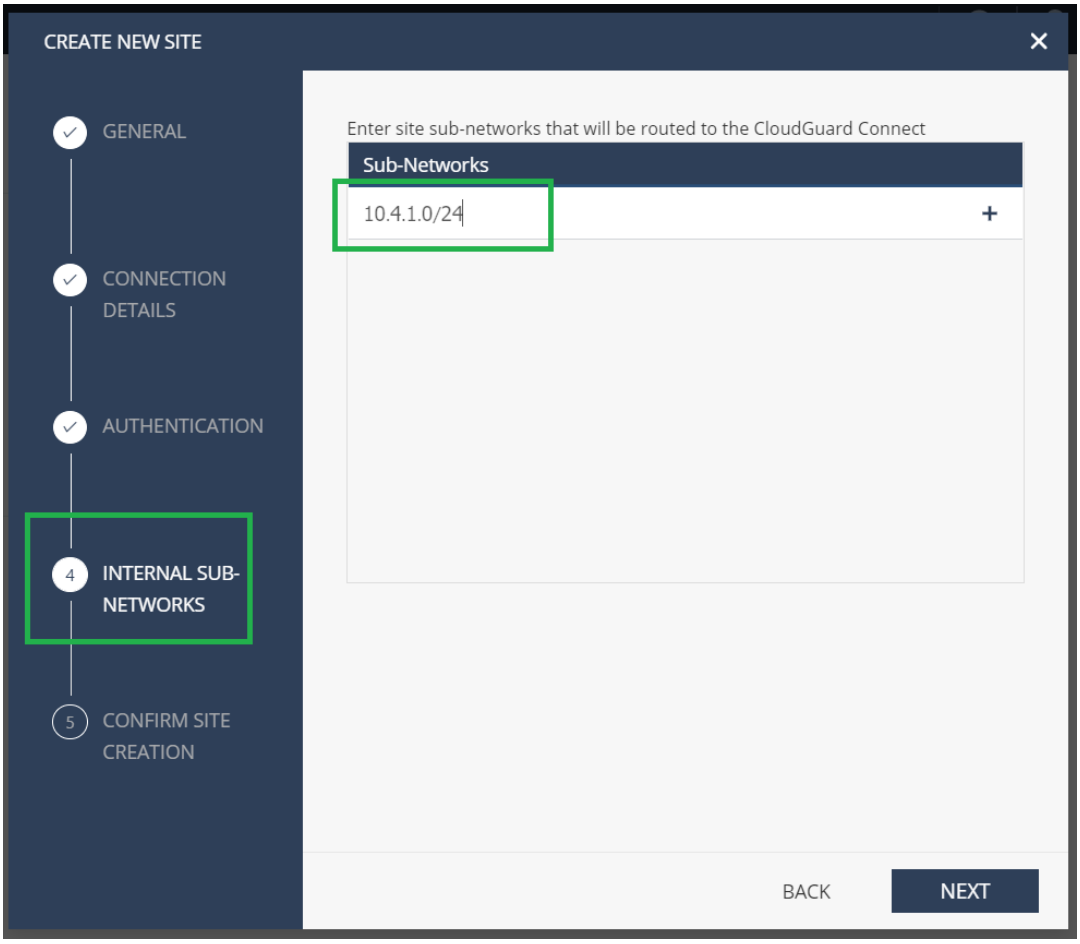

e) Validate the configuration and click **FINISH AND CREATE SITE**.

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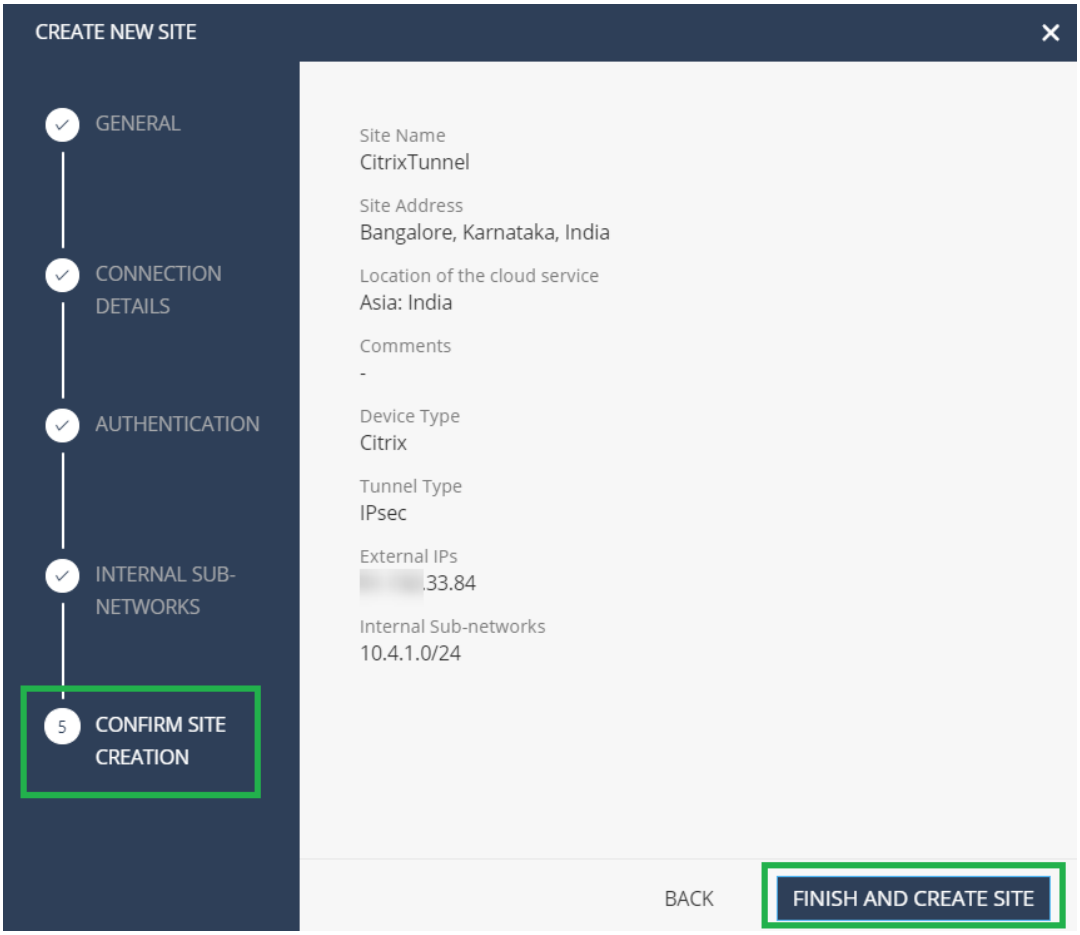
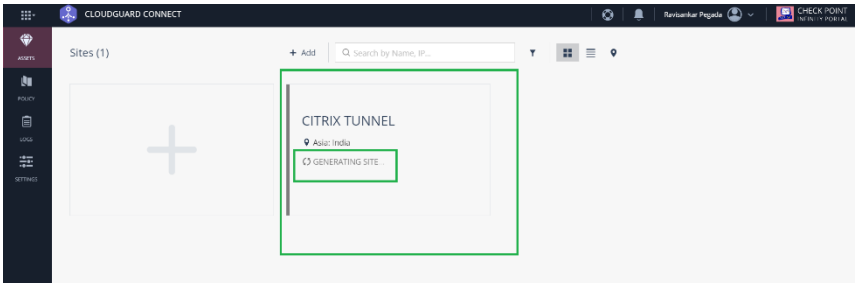
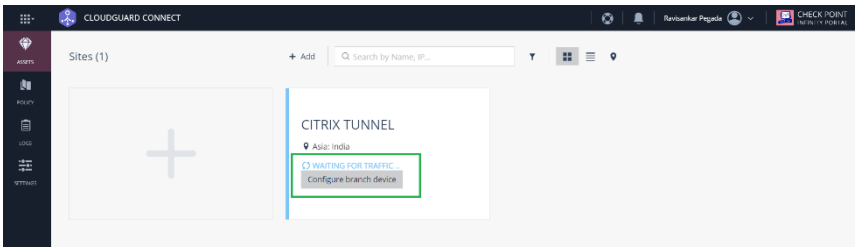


A site tile is added with the status **GENERATING SITE**.



Check Point takes around 20 minutes to generate a site. After the site is generated, the tile status changes to **WAITING FOR TRAFFIC**.



2. Click **Configure branch device** to view tunnel details. It includes details of the tWO IPsec tun-

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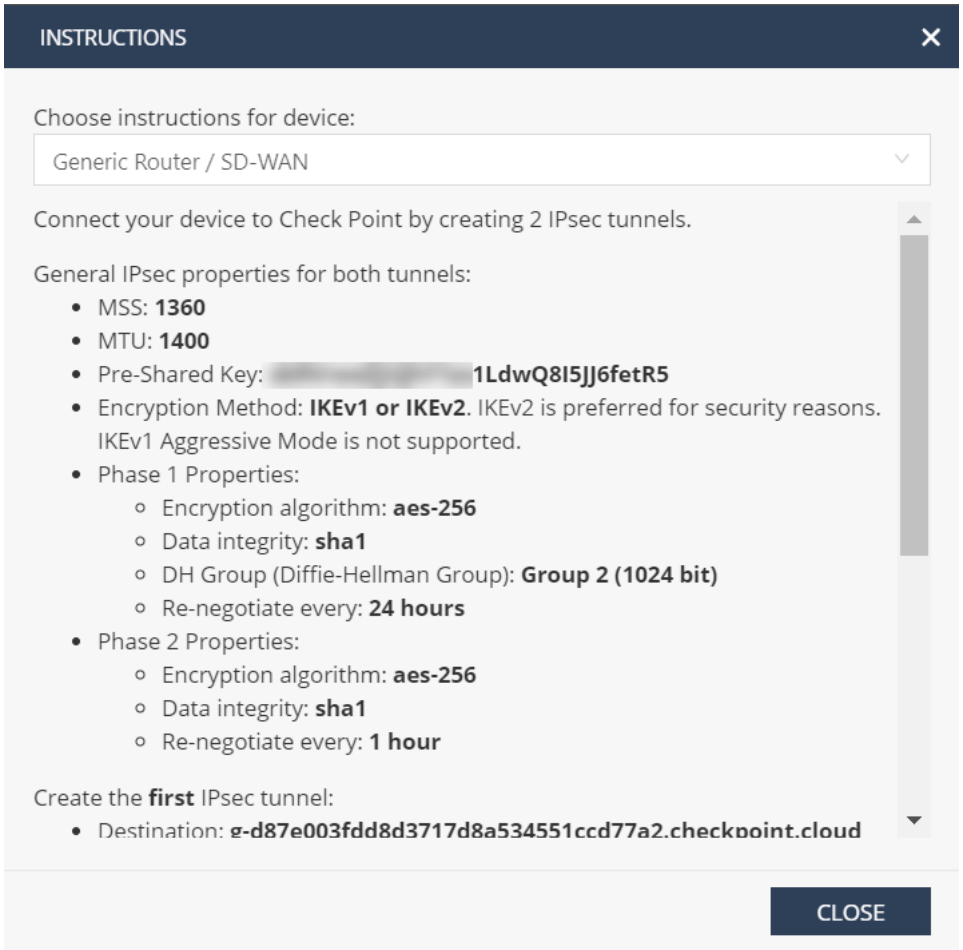
nels towards Check Point Cloud.



In this example, the tunnel destination is mentioned in FQDN format. Resolve this FQDN to get the tunnel destination IP address that can be used in the Citrix SD-WAN™ configuration.

For example- C:\Users\john>ns lookup g-d87e003fdd8d3717d8a534551ccd77a2.checkpoint.cloud
Server: router
Address: 192.168.0.1

Non-authoritative answer:
Name: g-d87e003fdd8d3717d8a534551ccd77a2.checkpoint.cloud
Address: 52.66.199.169

Configuration on Citrix SD-WAN Orchestrator service

Use the Tunnel destination and IPsec parameters to build a configuration on the Citrix SD-WAN Orchestrator service.

1. Create an IPsec encryption profile.

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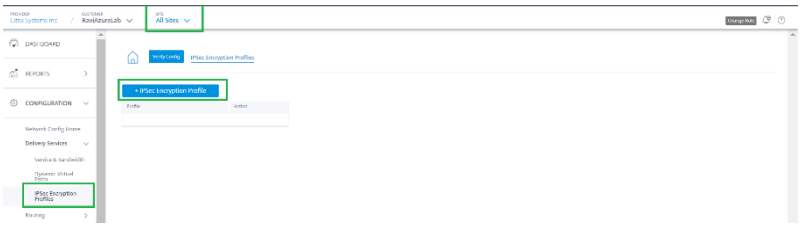
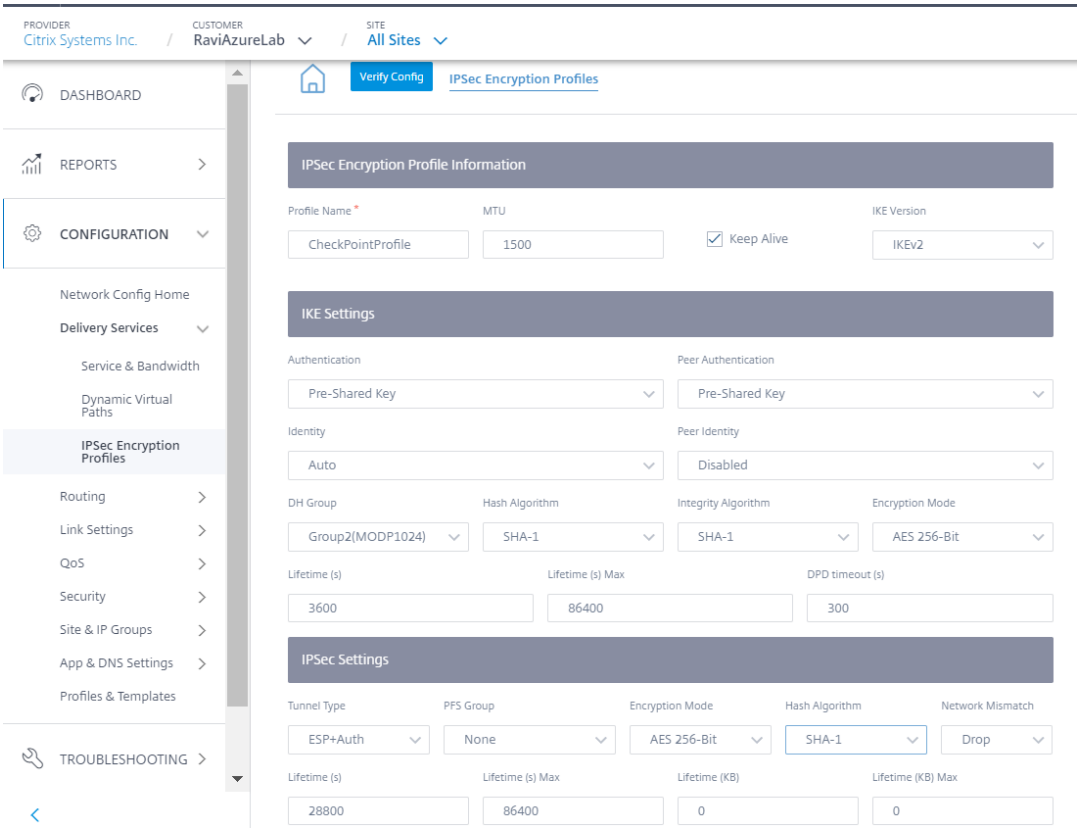
a) In the Citrix SD-WAN Orchestrator service UI, at the network level, navigate to **Configuration** > **IPsec Encryption Profiles** and click **+IPsec Encryption Profile**.

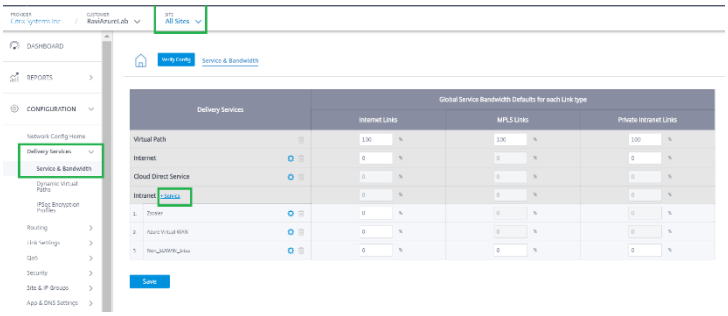


b) Configure the IKE and IPsec settings as per the Check Point configuration.



2. Add IPsec tunnel towards Check Point Cloud.

a) Navigate to **Configuration** > **Delivery Services** > **Service & Bandwidth** and add an Intranet service.



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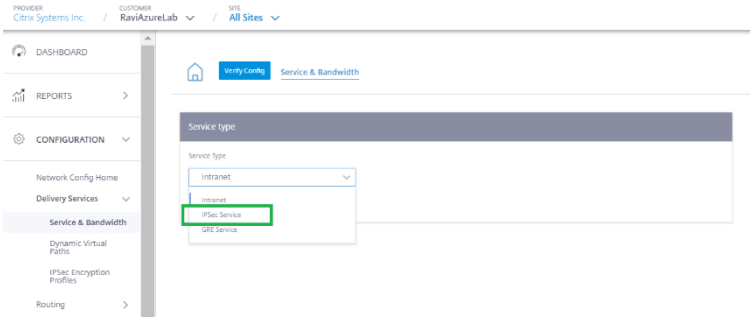
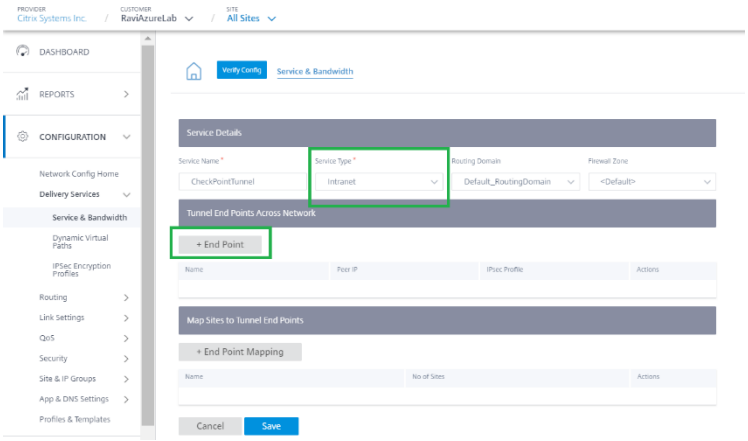
b) Select the **Service type** as **IPsec Service**.

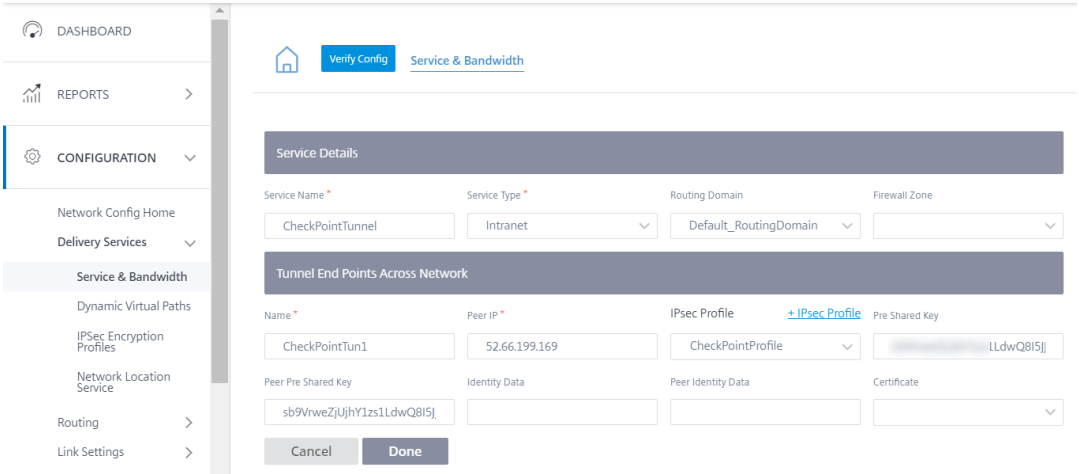


c) Configure IPsec Tunnel towards Check Point Cloud. Click **+End Point** to add the Check Point end point information.



d) Provide the following details:

- Peer IP(Check Point FQDN IP address that was resolved)
- IPsec Profile that we have created in the previous step
- Pre-shared key that you got from Check Point.



Similarly, add the second tunnel end point towards Check Point cloud for redundancy.

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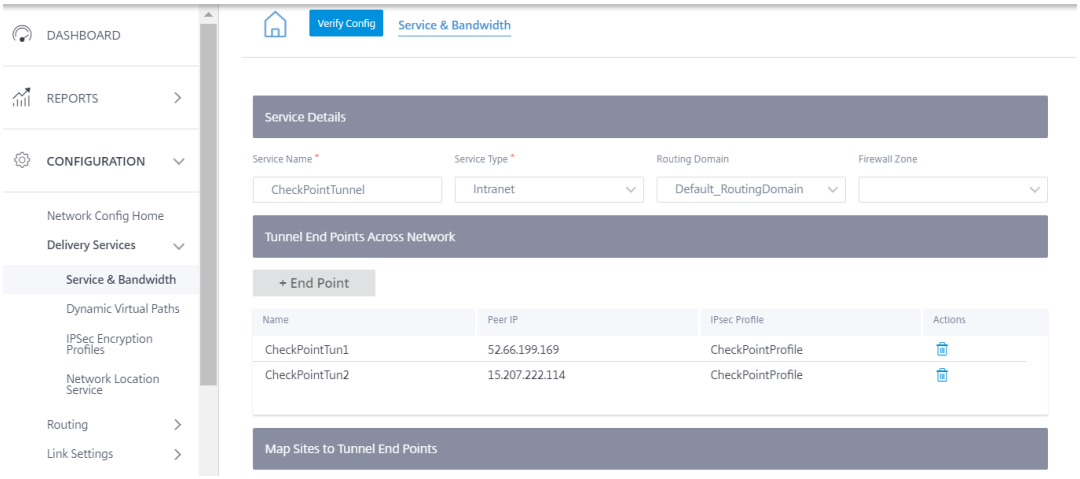
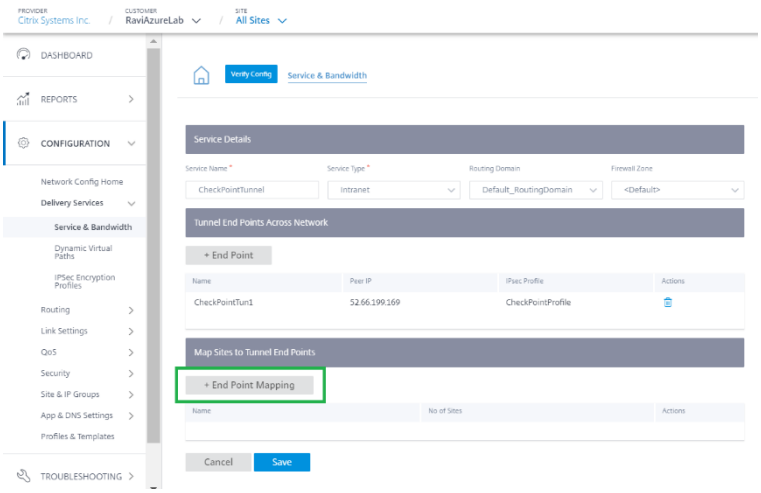
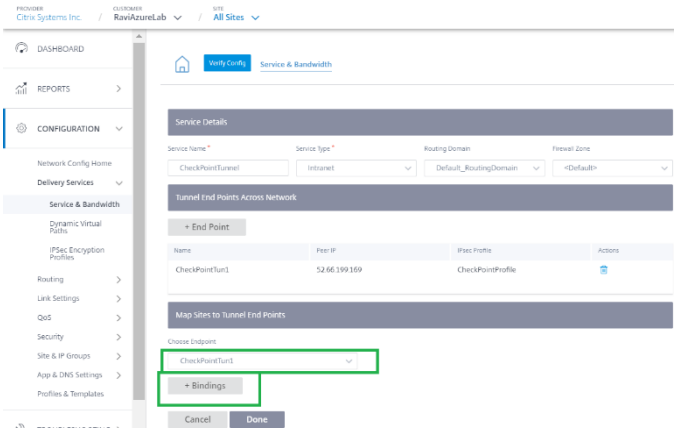


e) Click **+ End Point Mapping** to add an End Point mapping.



Choose the End Point as **CheckPointTun1**, the one created in the previous step and click **+ Bindings** to bind a site. Similarly, add **CheckPointTun2** as the second end point.



Bind the tunnel to a branch site (For example- BranchAzure) and provide the protected network details.

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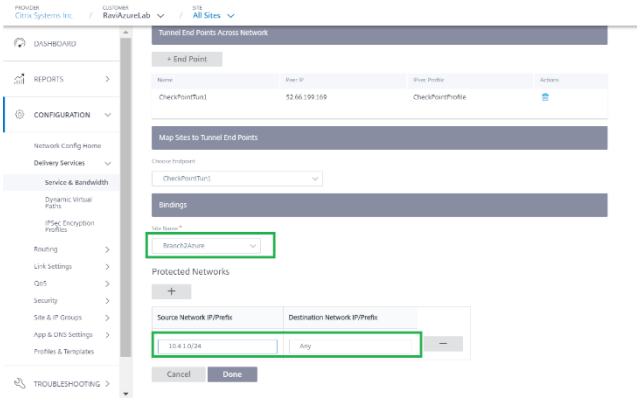
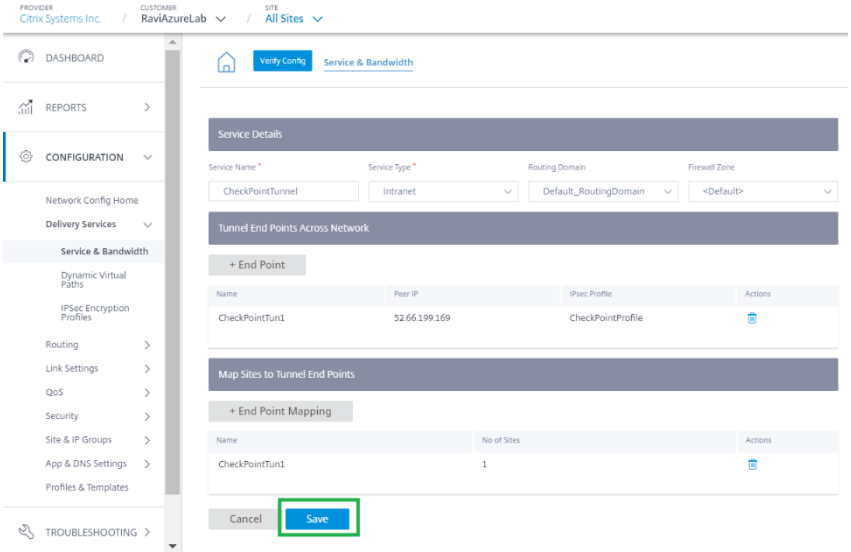
> **Note**
>
> The protected network has to be the branch site that is configured in the Check Point portal. The Public IPs must match.

In this case, the protected network's source network is the LAN network of the branch and the destination as is any. The source network must match the network configured in the Check Point portal. Click **Done**.



Click **Save** to save IPsec Tunnel configuration.

check-point-generating-site.png



f) After the **CheckPointTunnel** delivery service is added, allocate the bandwidth share for the service to be applied to the site to which the end point is mapped.

> **Note**
>
> The bandwidth percentage allocated here is the guaranteed bandwidth share for this Checkpoint Delivery service when in contention.

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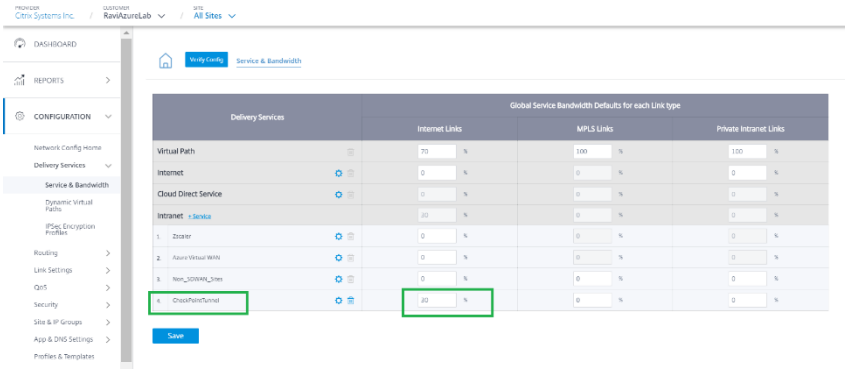
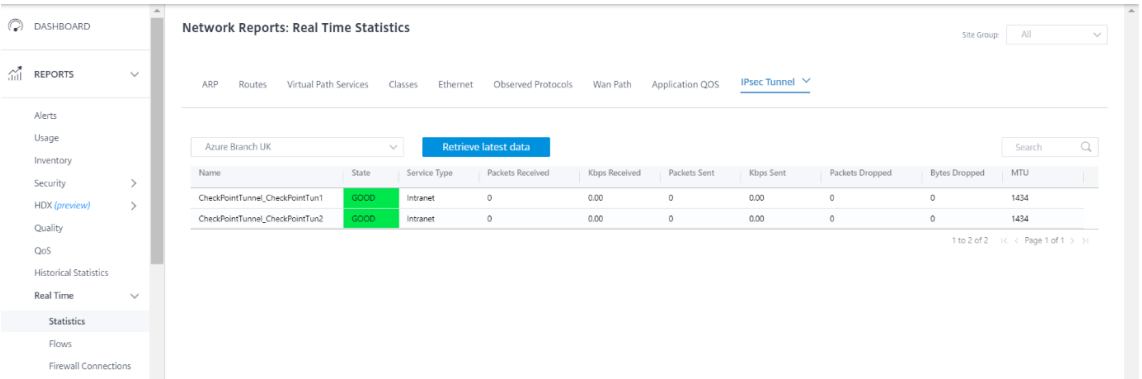


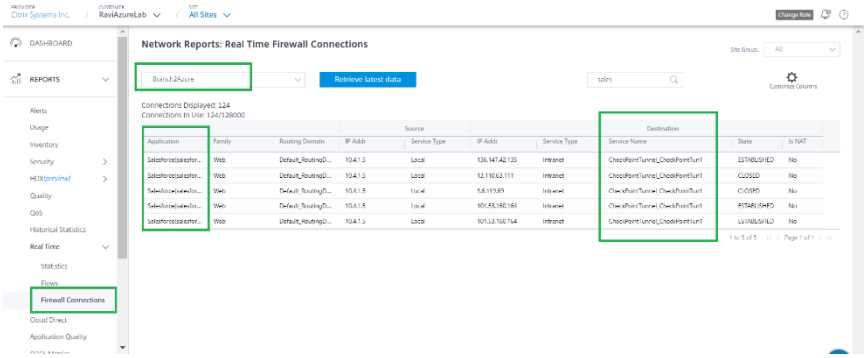
3. Deploy the configuration on the Citrix SD-WAN Orchestrator service through staging and activation.
4. Check the Tunnel status towards Check Point Cloud from the branch site.



Monitoring

Access Internet from a branch site host through the Check Point Cloud over the IPsec Tunnel. For example, try accessing salesforce.com.

This application is reported in firewall connections with the destination service as **CheckPointTunnel_CheckPointTun**.



This traffic is updated in the IPsec Tunnel statistics (Packets sent and received).

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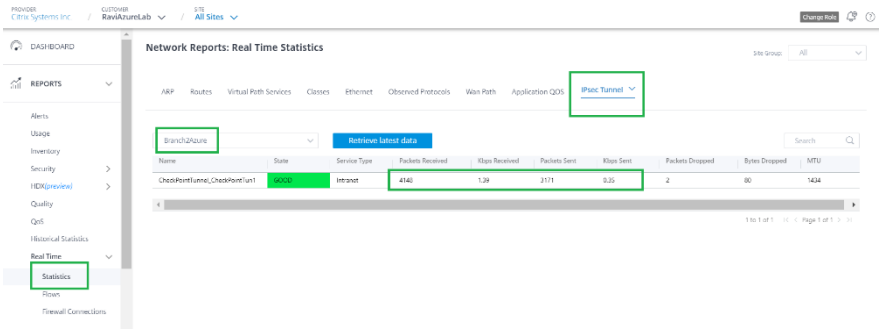
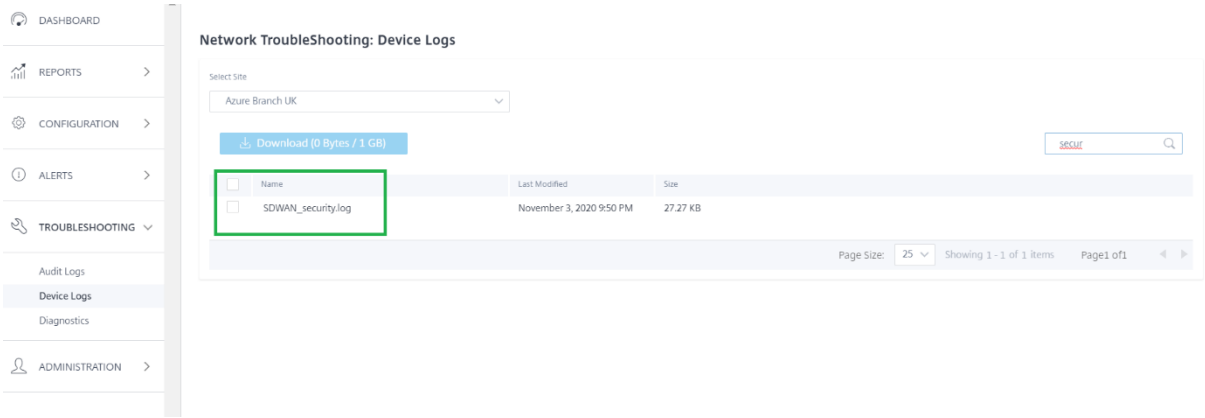
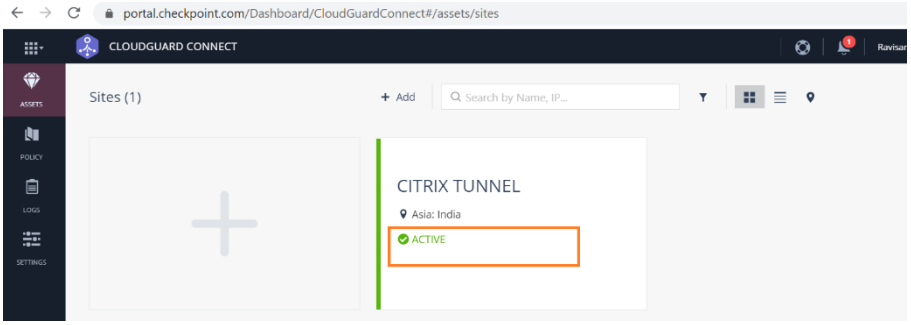


Logs

Logs related to IPsec Tunnel creation can be found in the SDWAN_security.log file.



The site status on the Check Point portal is updated as **Active**.



Try to access a website (for example - Facebook.com) you can able access through Check Point Cloud. You can now modify the Check Point Access Control policies by adding a policy to block the Facebook application.

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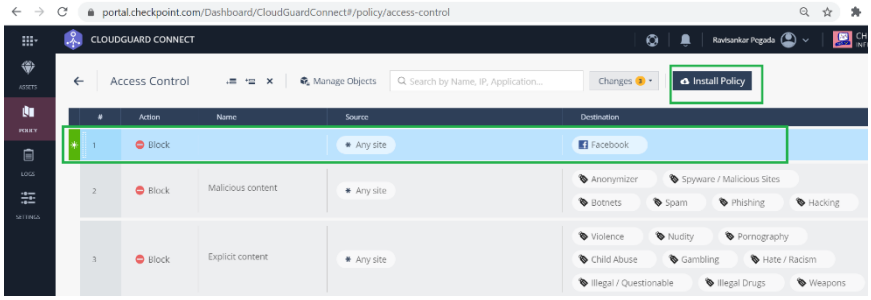
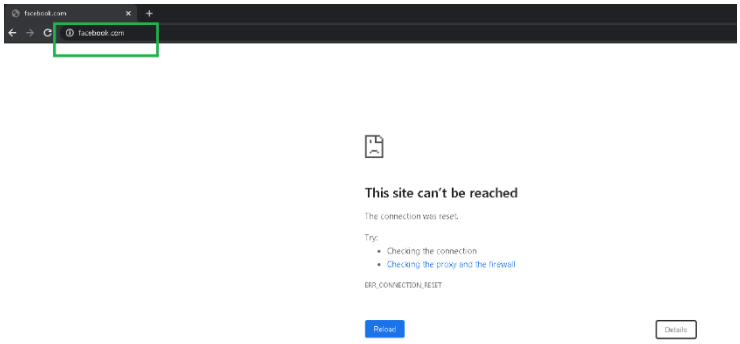


After the policy is installed, Facebook.com is blocked.



It shows that the Internet traffic is redirected from SD-WAN, towards the Check Point Cloud through the IPsec tunnel. The action was taken as per the policy definition on the Check Point Cloud.

Deploy Citrix SD-WAN™ Standard Edition instance on Azure

September 27, 2025

Citrix SD-WAN Standard Edition (SE) for Azure logically bonds multiple network links into a single secure logical virtual path. The solution enables organizations to use connections from different service providers including Broadband, MPLS, 4G/LTE, Satellite, and point-to-point links to get high resiliency virtual WAN paths. Citrix SD-WAN for Azure enables organizations to have a direct secure connection from each branch to the applications hosted in Azure, eliminating the need to backhaul cloud bound traffic through a data center. Some of the benefits of using Citrix SD-WAN in Azure are:

- Create direct connections from every location to Azure.
- Ensure an always-on connection to Azure.
- Extend your secure perimeter to the cloud.
- Evolve to a simple, easy to manage branch network.

For more details on topology, use case and manually provisioning an SD-WAN SE instance on Azure, see Deploy Citrix SD-WAN Standard Edition Instance on Azure.

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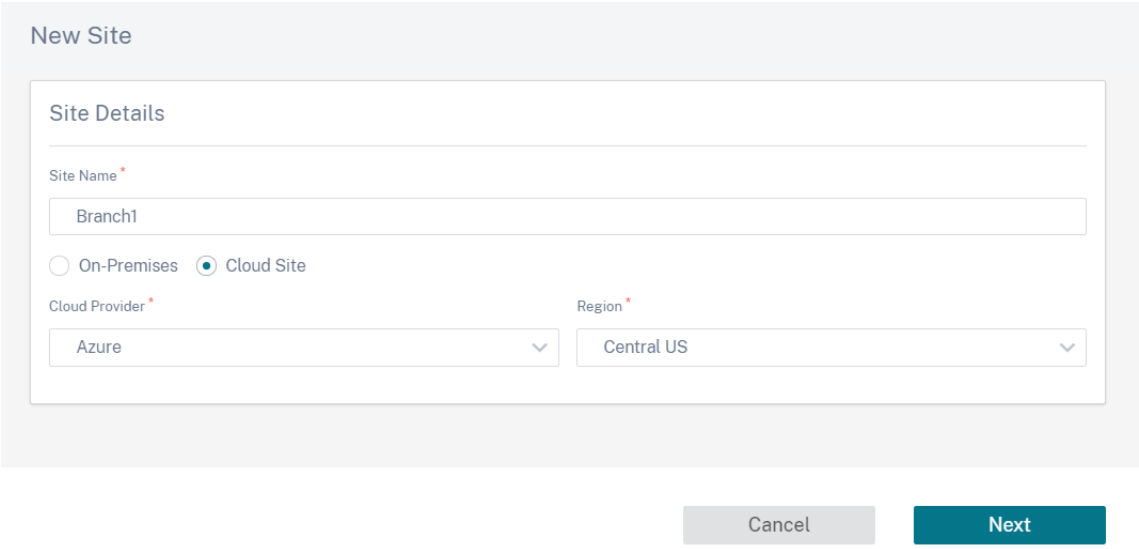
Citrix SD-WAN Orchestrator service allows deploying a Citrix SD-WAN instance in Azure quickly and easily. Citrix SD-WAN Orchestrator service automates the process of provisioning a virtual machine in Azure while defining a cloud site. A new and unique resource group, specified by the user, is created in Azure for every cloud site. You can either choose the existing VNets/subnets under the resource group or create VNets/subnets used for provisioning. You can use a virtual machine instance template to deploy Citrix SD-WAN VPX directly from Citrix SD-WAN Orchestrator service. The interfaces and WAN link configurations are auto populated on the Orchestrator configuration based on the resources created in Azure. You can then stage and activate the configuration on the VPX instance through Citrix SD-WAN Orchestrator service.

As a prerequisite for deploying SD-WAN VPX instance on Azure, ensure that you have a Citrix SD-WAN Orchestrator service subscription and a Microsoft Azure service subscription.

To deploy an SD-WAN VPX instance on Azure:

1. On the **Network Dashboard**, click **+ New site** to create a cloud site. Provide a name for the site and select **Cloud Site**. Select **Azure** as the **Cloud Provider** and select the **Azure Region** where you want to deploy the SD-WAN instance.



2. Provide the site details. For more details on site roles and advanced settings, see Site details.

> **Note**
>
> The **Enable Source MAC Learning** option stores the source MAC address of the received packets so that outgoing packets to the same destination can be sent to the same port.

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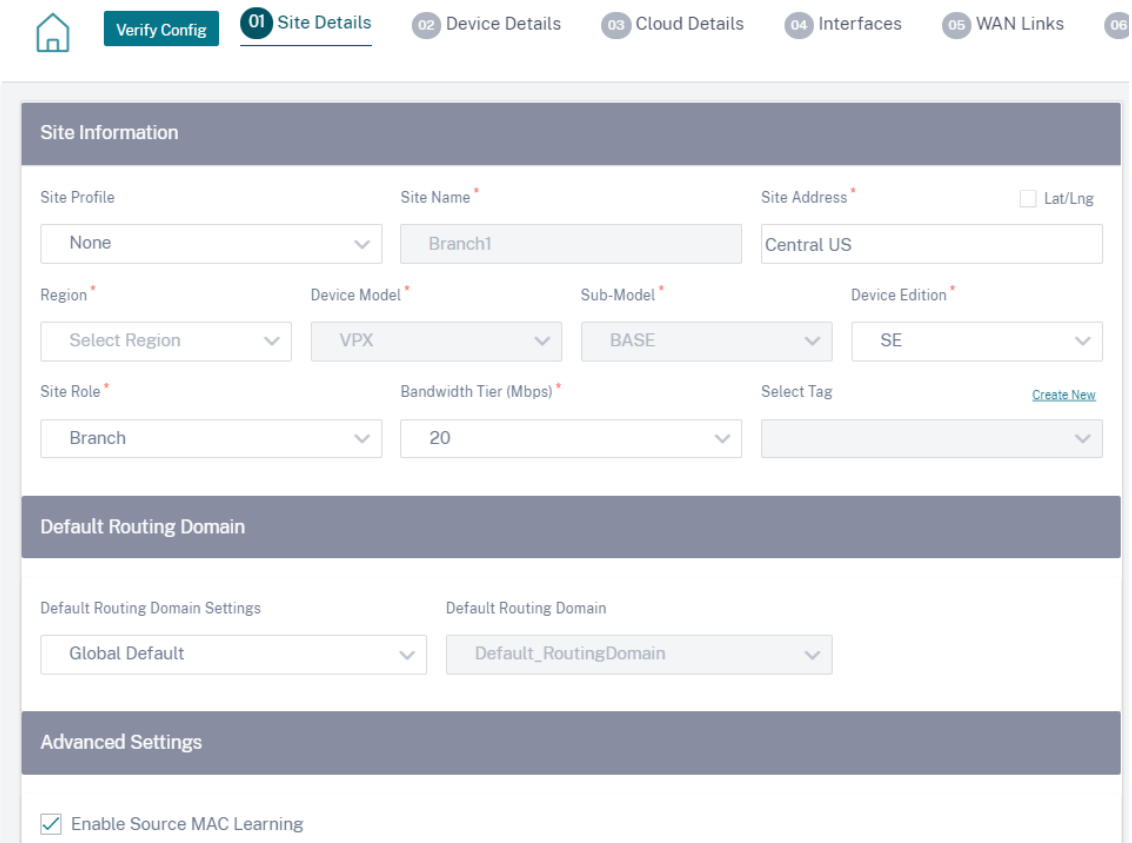

3. Enable High Availability (HA), if necessary. If HA is enabled, two virtual machines, a primary and a secondary virtual machine is created on Azure. You do not have to provide the device serial numbers. The device serial numbers are fetched automatically during provisioning. For more details on Advanced HA settings, see Device details. To allow traffic through HA on the Azure portal, see Internet breakout for Azure HA site.

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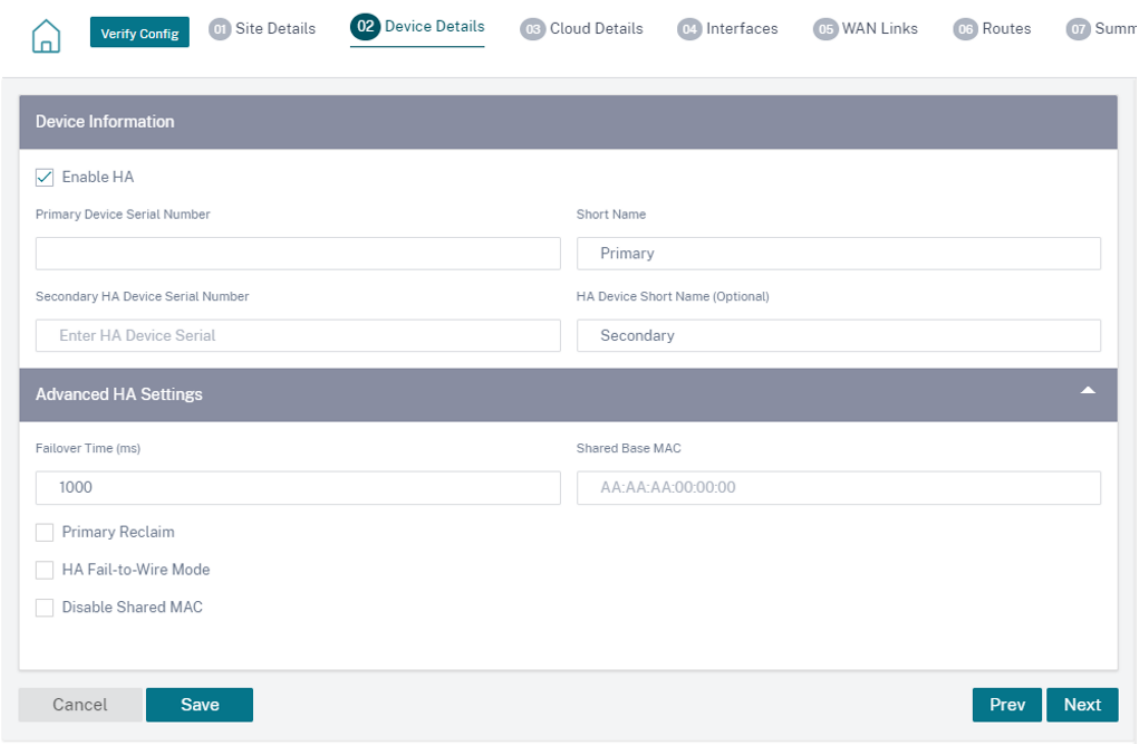

4. Provide the Cloud service subscription details and the virtual machine configuration parameters.

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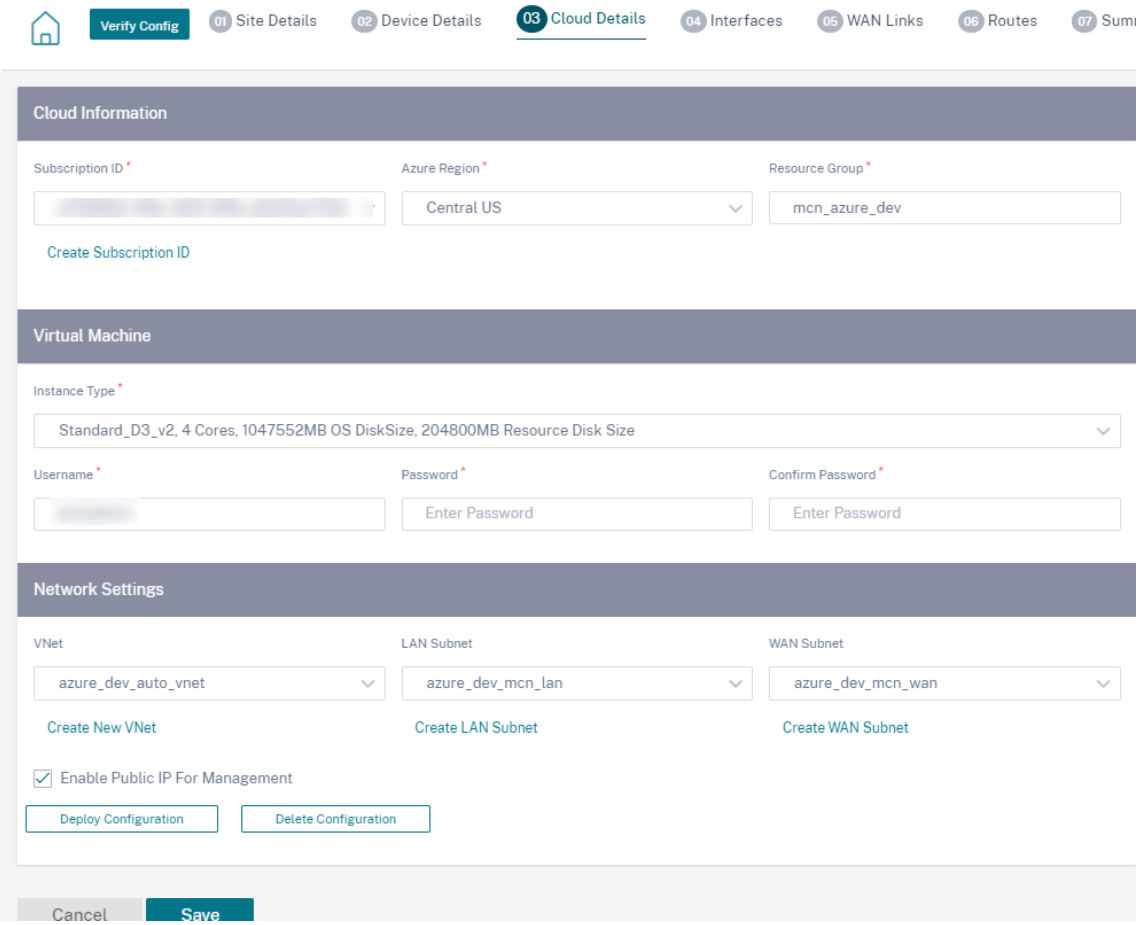
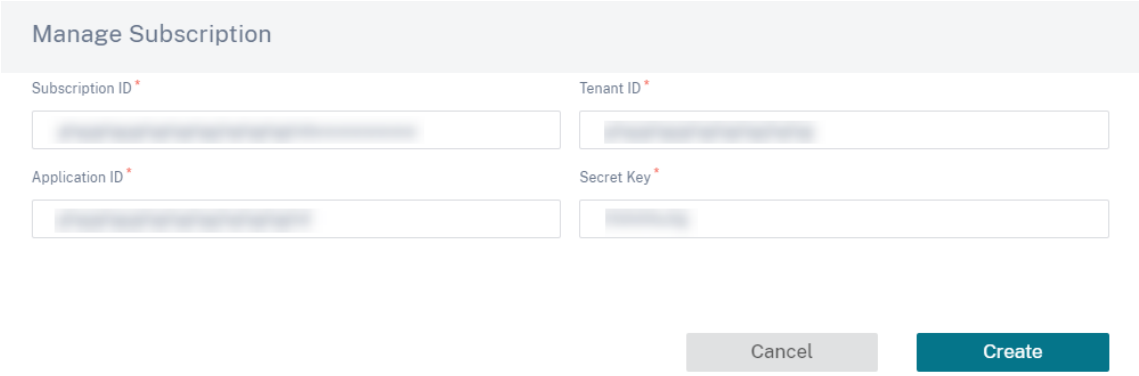


a. Click **Create subscription ID**. Provide the Subscription ID, Tenant ID, Application ID, and Secret key as available on your Azure portal. For information on where to find the subscription details on the Azure portal, see Identify Ids.



You can add multiple subscriptions. After the subscription details are saved, you can select a subscription ID. Specify the **Azure region** where you want to deploy the instance and provide a name for the new **Resource Group**.

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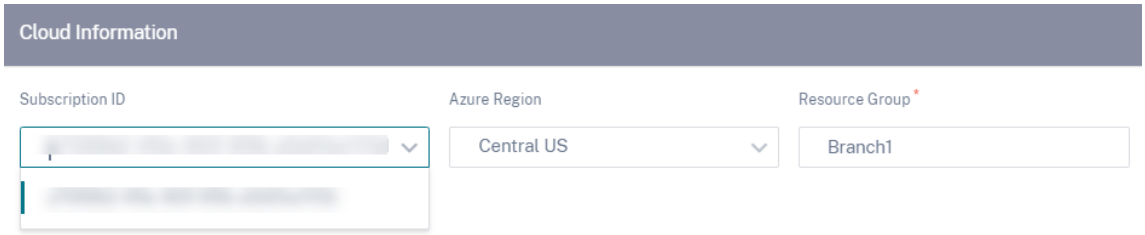
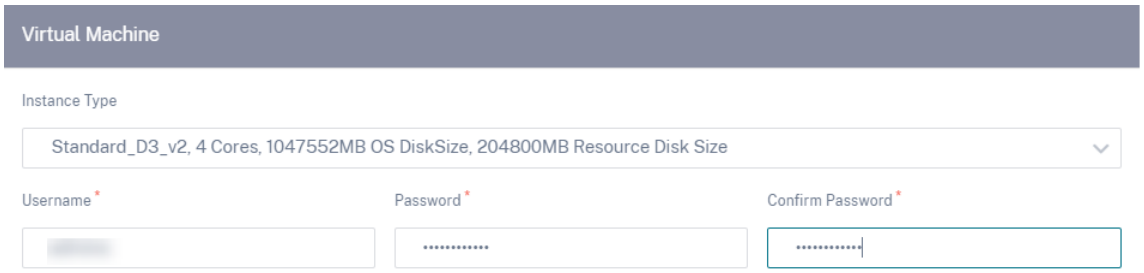


b. Select one of the following virtual machine instance types as per your requirement and provide the login credentials.
- Instance type D3_V2 for max uni-directional throughput of 200 Mbps with 16 max virtual paths/branches.
- Instance type D4_V2 for max uni-directional throughput of 500 Mbps with 16 max virtual paths/branches.
- Instance type F8 standard for max uni-directional throughput of 1 Gbps with 64 max virtual paths/branches.
- Instance type F16 standard for max uni-directional throughput of 1 Gbps with 128 max virtual paths/branches.



> **Note**
>
> You cannot provision the instance with the user name admin, as it is a reserved name. However, to get admin access after provisioning the instance, use admin as the user name and the password created while provisioning the instance. If you use the user name created while provisioning the instance, you get read-only access.

Guidelines for user name:

- User name must only contain letters, numbers, hyphens, and underscore and must not start with a hyphen or number.
- User names must not include reserved words.
- The value is in between 1 and 64 characters long.

Guidelines for Password:

- The value must not be empty.
- Password must have three of the following:

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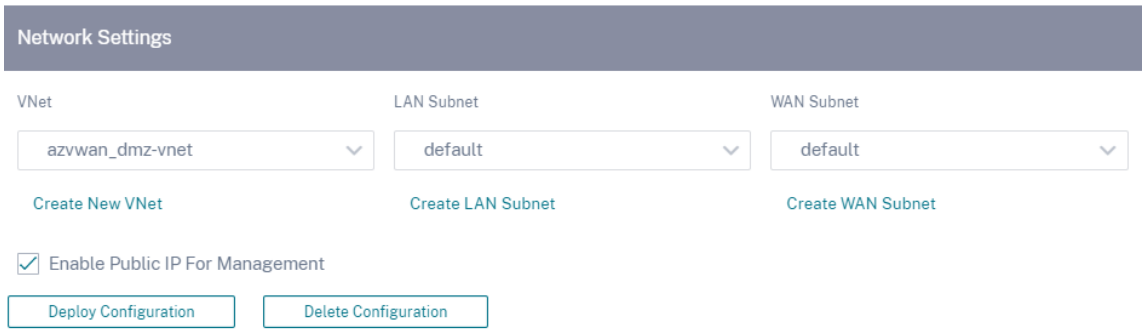
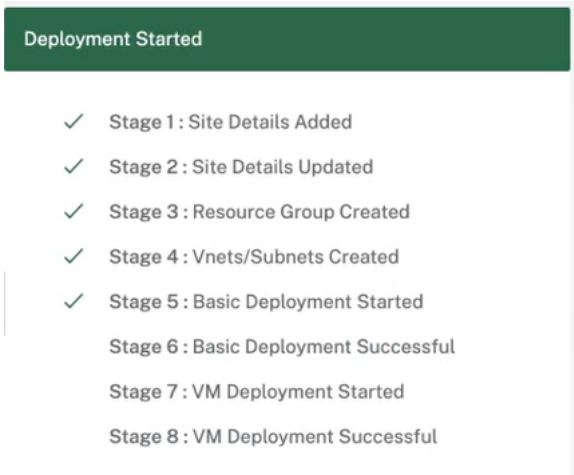
- One lower case character
- One upper case character
- One Special character
- The value is in between 12 and 72 characters long.

c. Create a New VNet or select an existing VNet. Existing VNets are displayed based on the selected cloud subscription. For the selected VNet you can either select existing LAN and WAN subnets or create subnets. Ensure that the **Enable public IP for Management** option is selected and click **Save**.

> **Note**
>
> The LAN and WAN subnets must not be the same.



d. Click **Deploy Configuration** to create an SD-WAN VPX instance in Azure with the specified virtual machine and network settings. This would take about 10-15 minutes. The deployment status is displayed in the UI.



> **Note**
>
> - After the instance is created in Azure, proceed with the **Stage and Activate** process to upgrade the Azure VPX to the desired software version and configuration as defined in Orchestrator.

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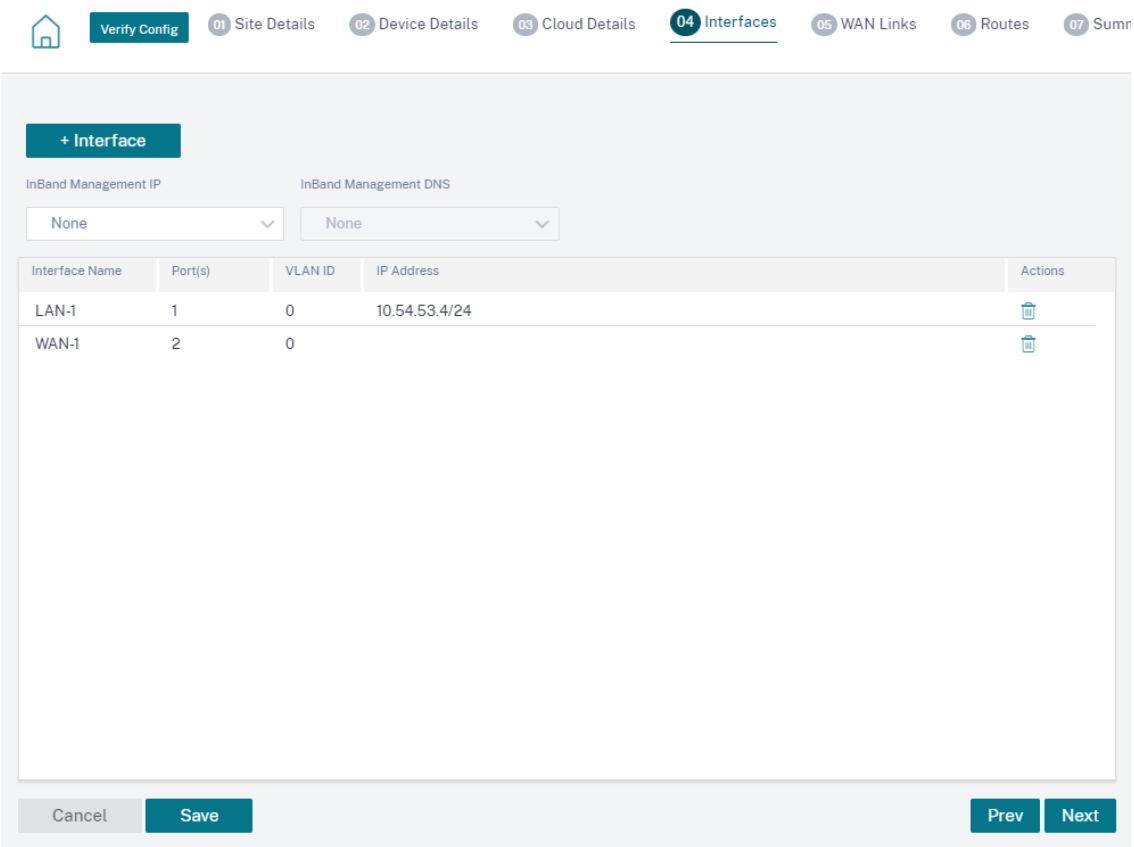
- After the deployment is initiated, you cannot make any changes to the Cloud site settings such as resource-group, VNets, subnets, user name, and password for VPX. If the deployment fails, you can provide revised settings before initiating the deployment.
- To remove the SD-WAN VPX instance from Azure and proceed with a clean deployment, click **Delete Configuration**. This does not delete the site from Citrix SD-WAN Orchestrator service. It only removes the SD-WAN VPX instance. You can provide revised cloud site details and proceed with deploying the configuration.
- To delete the virtual machine on Azure and free up resources, click **Delete Configuration**.

5. The interfaces, WAN links, and routes are auto-created based on the resources provisioned on Azure. You can navigate to the **Interfaces**, **WAN links**, and **Routes** tab to view the settings.

> **Note**
> IPv4 addresses are used for the LAN, WAN, and access interface settings. IPv6 addresses are not yet supported.



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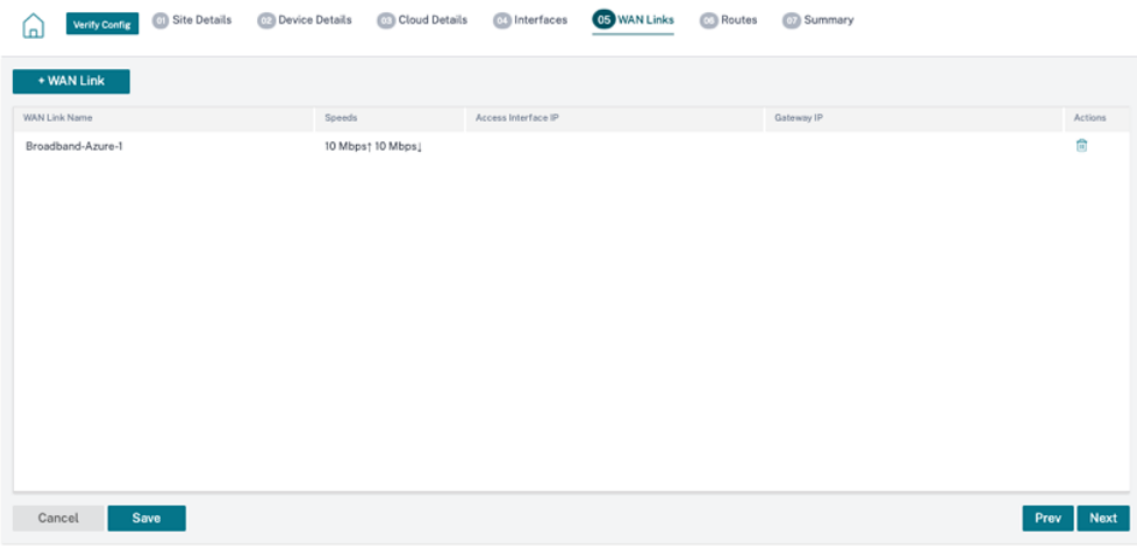

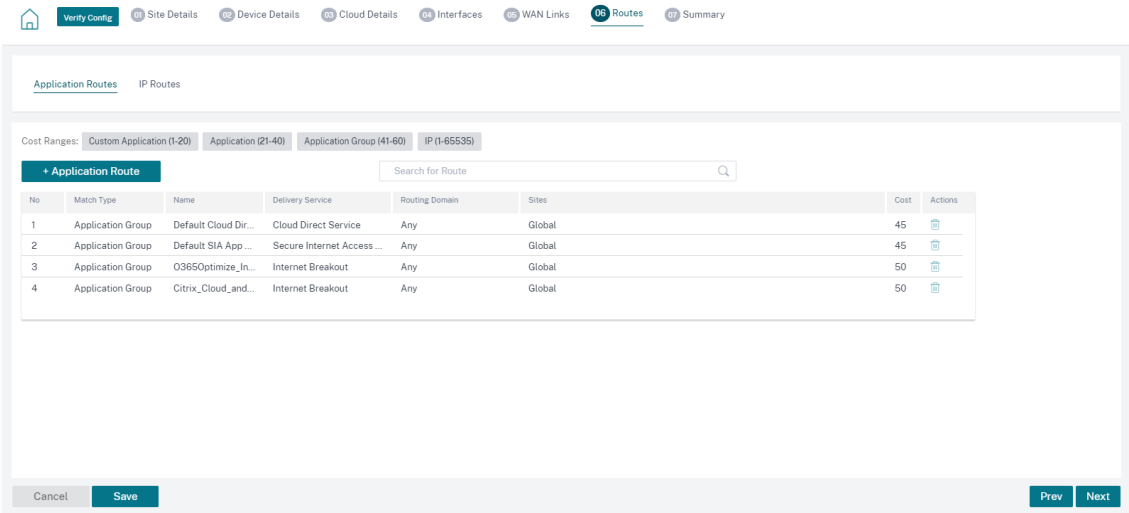

6. After the virtual machine is deployed successfully, it takes about 5–10 min for the virtual machine to be up and running.

   The **Summary** section provides a summary of the site details, interface details, and WAN link details. Click **Save**. Click **Verify Config** to populate the device serial number.

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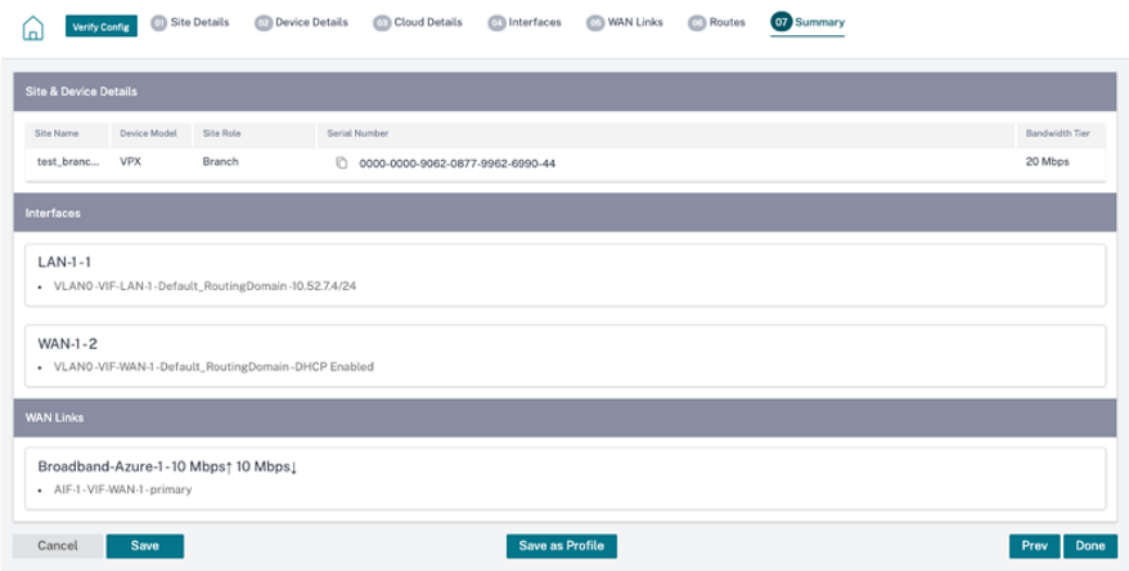
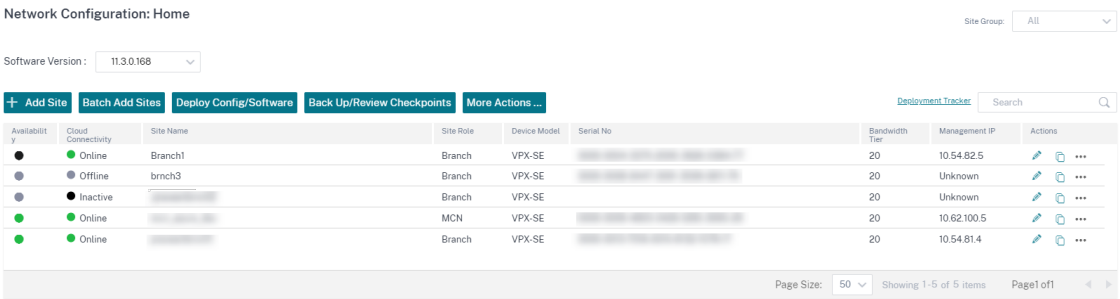


The Azure virtual machine is created and the configuration is ready. However, the configuration is not applied to the SD-WAN instance.

7. To push the configuration to the provisioned SD-WAN instance in Azure, navigate to **Network Configuration: Home**. Select the required software version and click **Deploy Config / Software**. For more details on staging and activation see, Deployment tracker.



After the Staging and Activation process is complete and the virtual paths are established. You can now manage and monitor the instance using Citrix SD-WAN Orchestrator service.

Create a service principal for deploying VPX in Azure

For the Citrix SD-WAN Orchestrator service to authenticate through Azure APIs and enable automated connectivity, a registered application must be created and identified with the following authentication credentials:

- Subscription ID
- Client ID

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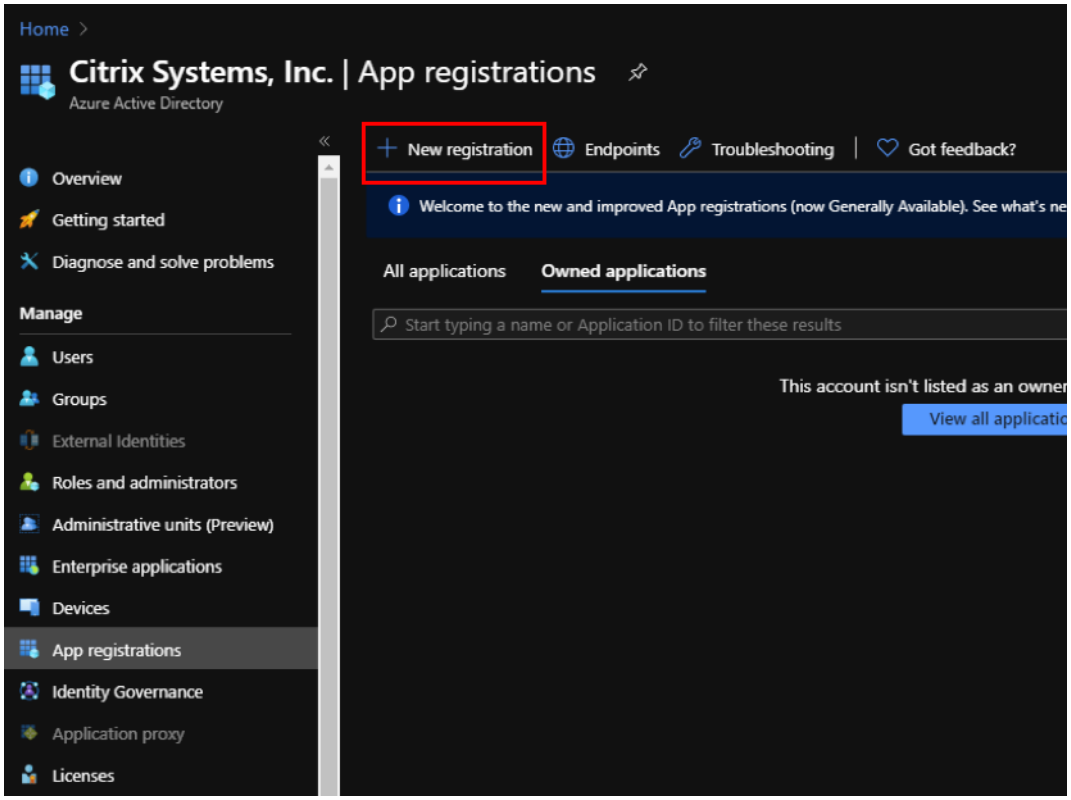
- Client Secret
- Tenant ID

> **Note**
>
> After creating the service principal to allow Azure API communication, ensure to associate appropriate roles at the subscription level. Otherwise, Citrix SD-WAN Orchestrator service will not have sufficient permissions to authenticate and deploy resources using Azure APIs that enable automated connectivity.

Perform the following steps to create an application registration:

1. In the Azure portal, navigate to **Azure Active Directory**.
2. Under Manage, select **App registration**.
3. Click **+ New registration**.



4. Provide values for the following fields to register an application:
   - **Name** –Provide the name for the application registration.
   - **Supported account types** –select Accounts in this organizational directory only (* - Single tenant) option.
   - **Redirect URI (optional)** –select Web from the drop-down list and enter a random, unique URL (for example, https:// localhost: 4980)

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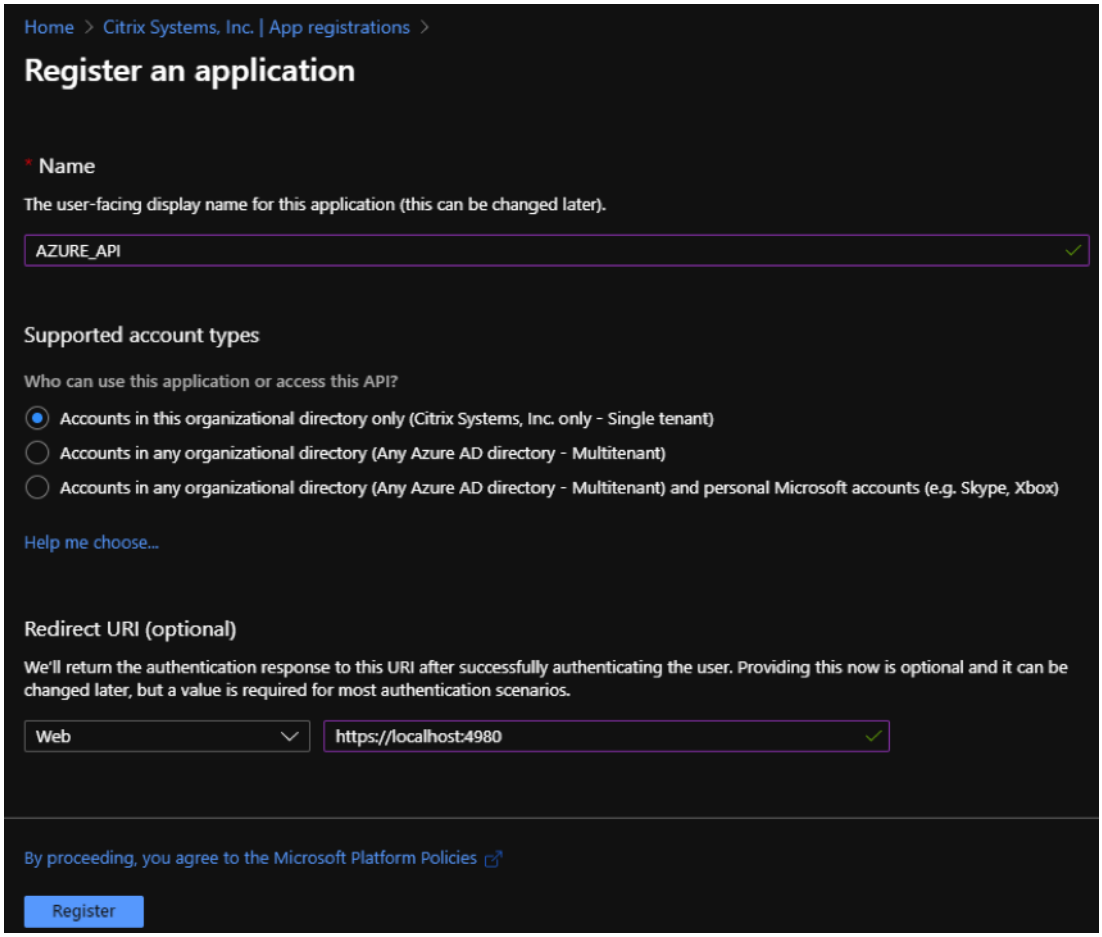
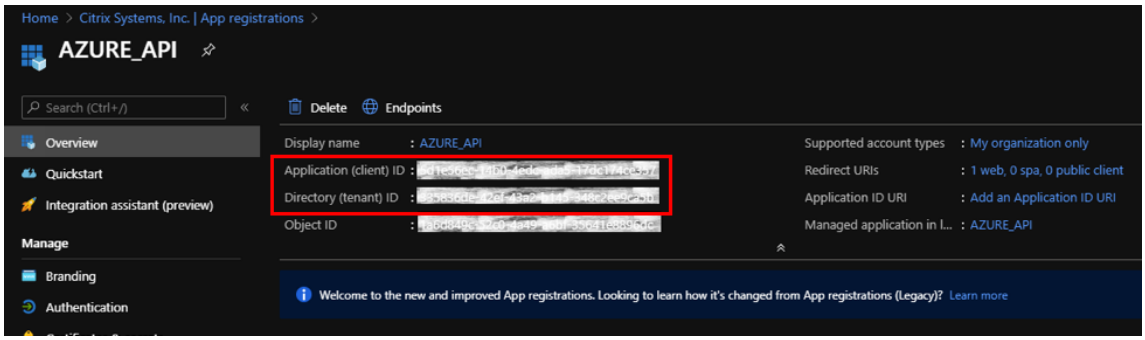
- Click **Register**.



You can copy and store the **Application (client) ID** and the **Directory (tenant) ID** that can be used in the Citrix SD-WAN Orchestrator service for authentication to the Azure subscription for usage of the API.



The next step for the application registration, create a service principal key for authentication purposes.

To create the service principal key, perform the following steps:

a) In the Azure portal, navigate to **Azure Active Directory**.

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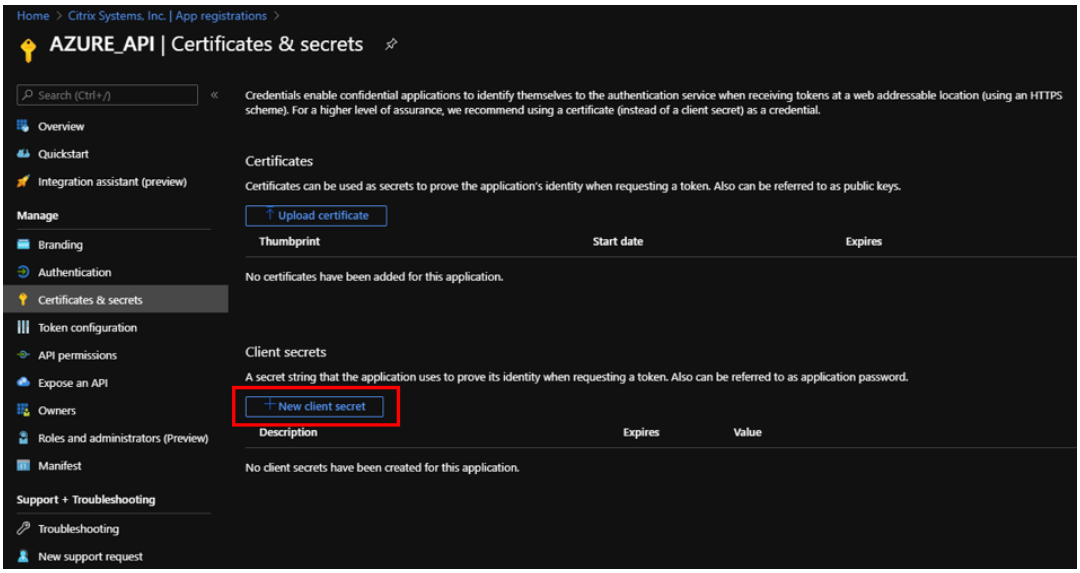
b) Under **Manage**, navigate to **App registration**.

c) Select the registered application (created previously).

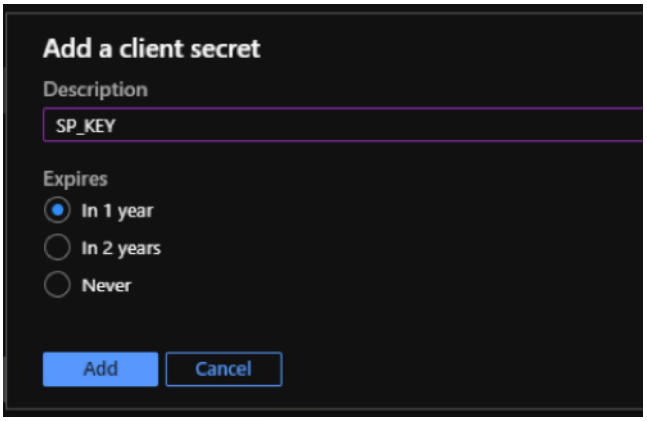
d) Under **Manage**, select **Certificates & secrets**.

e) Under **Client secrets**, click **+ New client secret**.



f) To add a client secret, provide values for the following fields:

- **Description**: Provide a name for the service principal key.
- **Expires**: Select the duration for expiration as needed.



g) Click **Add**.

h) The client secrete is disabled in the **Value** column. Copy the key to your clipboard. This is the Client Secret that you must enter into the Citrix SD-WAN Orchestrator service.

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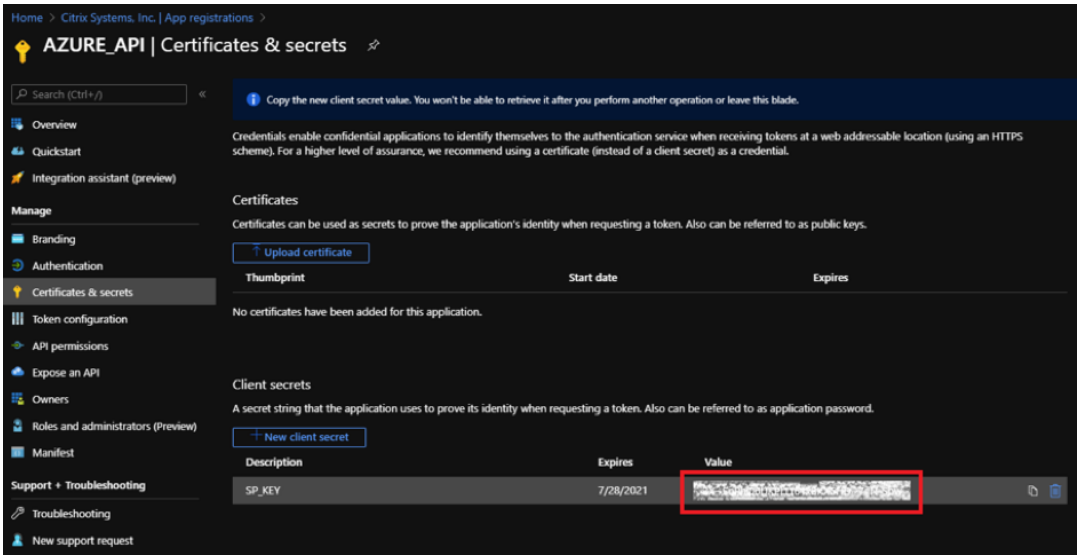
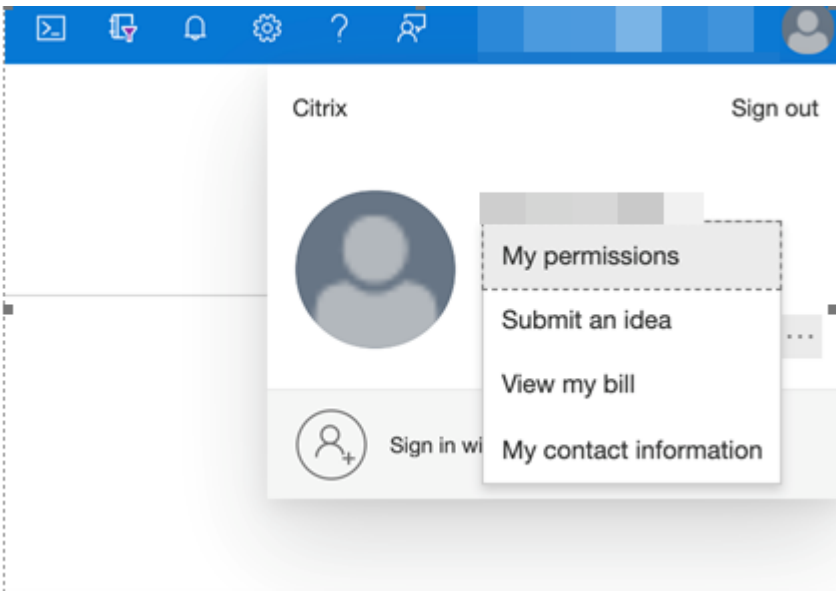


> **Note**
>
> Copy and store the secret key value before reloading the page because, it will no longer be displayed afterwards.

Role assignments

You can assign appropriate roles for an authentication purpose at the subscription-level. Perform the following steps for role assignment:

1. On the Azure portal, navigate to the profile name. Right-click the profile name and select My permissions.



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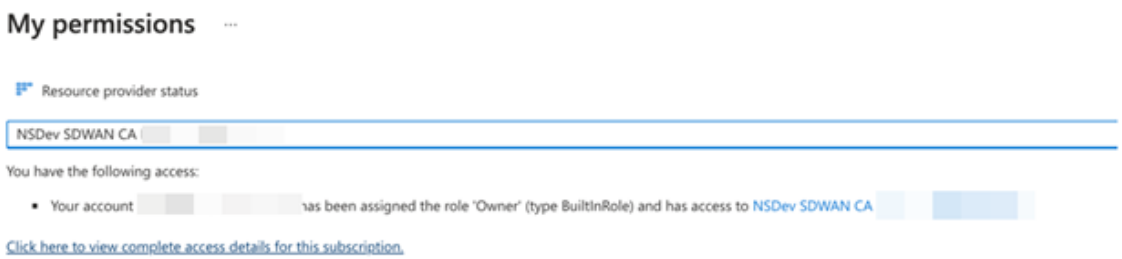
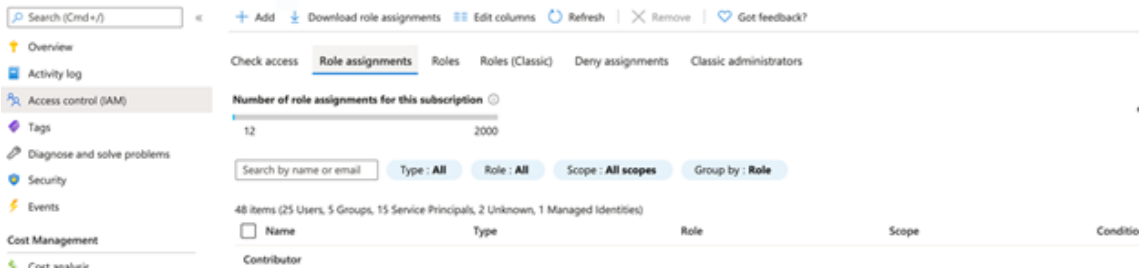
2. On the My permissions page, select the Click here to view complete access details for this subscription link.



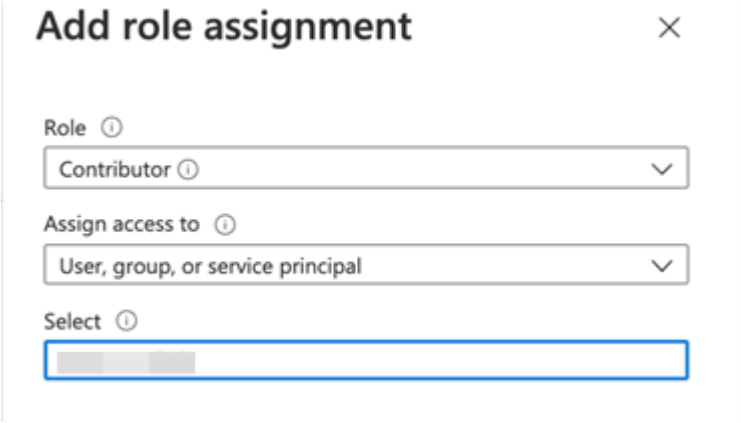
3. On the left navigation section go to Access control (IAM) and select the Role assignments tab and click +.



4. For “Add role assignment”, pick role = “Contributor”, Assign access to = “User,group or service principal”and for third drop-down list for Select = Azure App name and then “Save”. This grants enough privileges for making API call to Azure using service principal.

5. On the Add role assignment page, select the following options:

   - Role: Contributor
   - Assign access to: User, group, or service principal
   - Select: Provide the name of the Azure app.



6. Click **Save**. These steps grant enough privileges for Citrix SD-WAN Orchestrator service to make an API call to Azure using service principal.

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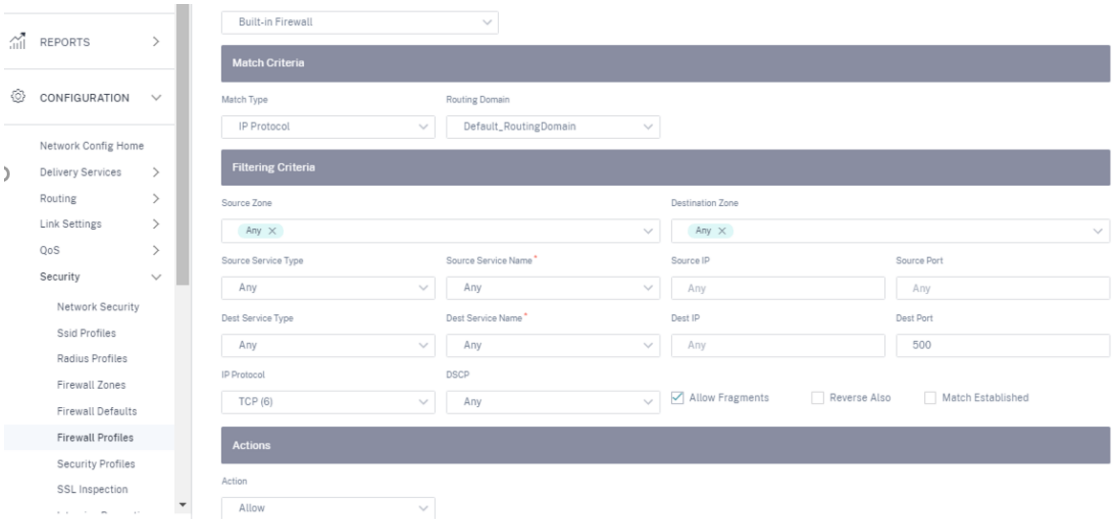
Internet breakout for Azure HA site

To configure internet breakout for Azure HA site:

1. In the site appliance, configure DHCP IP on the WAN interface with Public IP configured for the WAN link.
2. Configure Internet service on the Site.
3. Add an Outbound Dynamic port restricted NAT with the inside service as Internet.
4. Add a firewall policy on the site to allow Azure load balancer health probes on port number 500.



5. Add another load-balancing rule on the Azure external load balancer for TCP on port number 80, with direct server return disabled.

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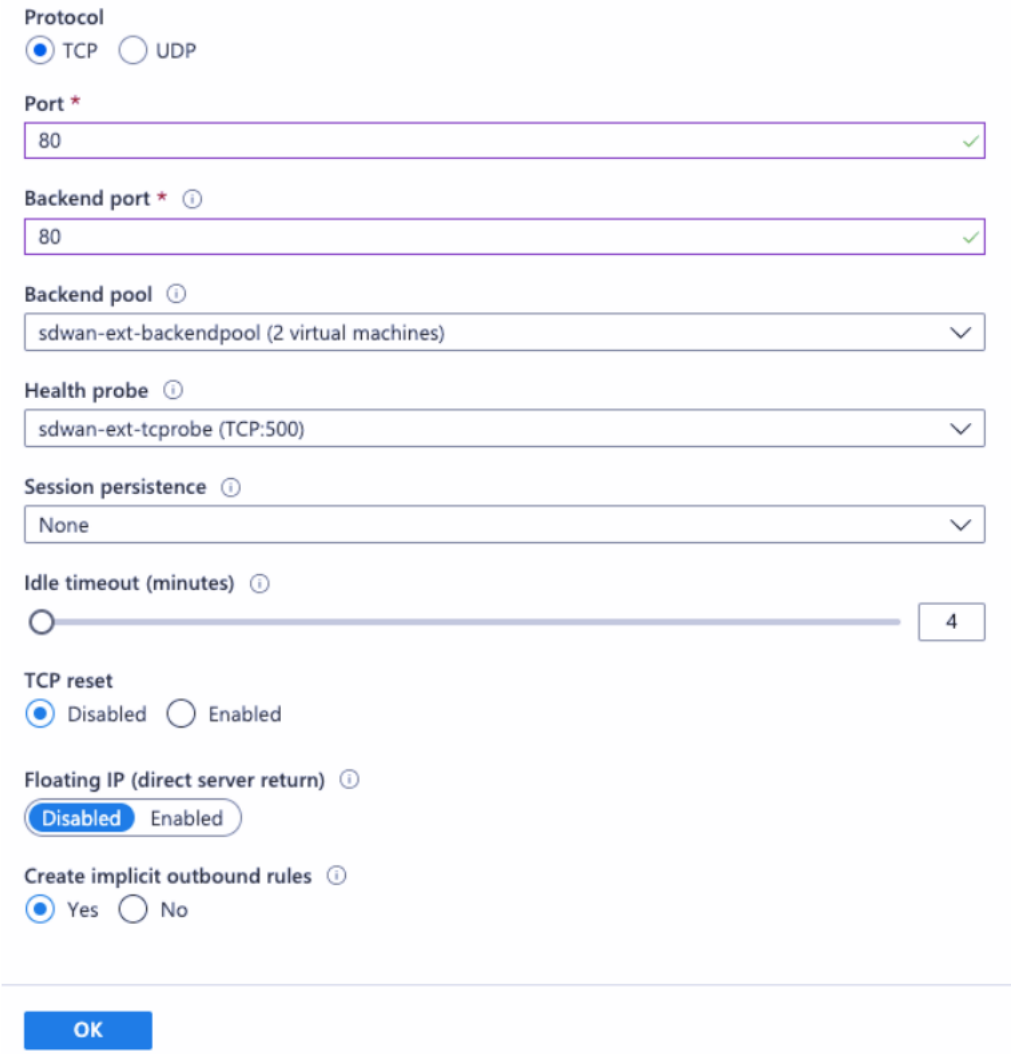

6. On the end client machine that must breakout to the internet, set the route next hop IP address to the Internal Load Balancer private IP address. The load balancer IP address is configured as LAN VIP in the site.

Citrix Cloud™ and Gateway Service optimization

September 27, 2025

With the **Citrix Cloud and Gateway Service optimization** feature enhancement, you can detect and route traffic destined for the Citrix Cloud and Gateway Service. You can create policies to either break the traffic out to internet directly or, to send it via a backhaul route over the virtual path. In the absence of this feature, when the default route is virtual path, gateway service will hairpin back to the customer's Data Center and then would go out to Internet adding unnecessary latency. In addition

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to that, you now get visibility into Citrix® Gateway service and Citrix Cloud traffic and can create QoS policies to prioritize it over the virtual path.

The **Citrix Cloud and Gateway Service breakout** feature is enabled by default in Citrix SD-WAN software version 11.2.1 and above.

For Citrix SD-WAN software version below 11.3.0, the first packet detection and classification of Citrix Cloud and Gateway Service traffic is performed only if the **Citrix Cloud and Gateway Service breakout** feature is not disabled.

For Citrix SD-WAN software version 11.3.0 and above, the first packet detection and classification of Citrix Cloud and Gateway Service traffic is performed irrespective of whether the **Citrix Cloud and Gateway Service breakout** feature is enabled or not.

> **Note**
>
> - You can configure the Citrix Cloud and Gateway Service optimization only through the Citrix SD-WAN Orchestrator service.
> - **Citrix SD-WAN Orchestrator traffic optimization** is introduced from Citrix SD-WAN software version 11.2.3 or higher. The goal is to provide a more granular classification, and thus, separately identify Citrix SD-WAN Orchestrator traffic and other dependent services' traffic from Citrix Cloud, and provide an Internet breakout option. As a result, customers can now choose to optimize only the Citrix SD-WAN Orchestrator traffic.

On selecting the **Citrix Cloud** check box, the **Citrix SD-WAN Orchestrator™ and dependant critical services** check box is preselected. This allows all Citrix Cloud Web UI and API traffic (including that of Orchestrator and dependent services) in the firewall and takes internet breakout.

Also, you can choose to select only **Citrix SD-WAN™ Orchestrator and dependant critical services** check box and disable other traffic to give the privilege of bypassing firewall just to Orchestrator related traffic seamlessly.

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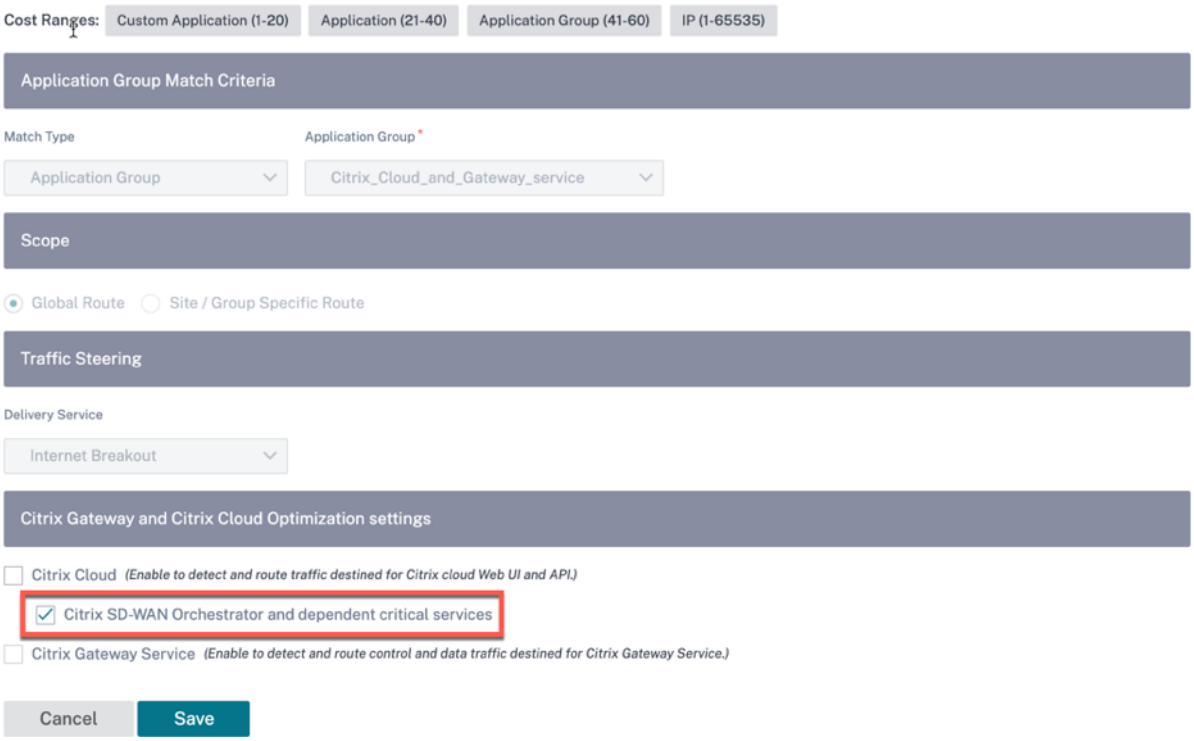

Citrix Cloud and Gateway Service categories

Following are the traffic categories used for classification and optimization purposes:

- **Citrix Cloud**: Enable to detect and route traffic destined for Citrix Cloud Web UI and APIs.
  - Citrix SD-WAN Orchestrator and dependant critical services:
    - **Citrix SD-WAN Orchestrator**: Enables direct internet breakout of heartbeat and other traffic required to establish and maintain connectivity between Citrix SD-WAN appliance and Citrix SD-WAN Orchestrator.
    - **Citrix Cloud Download Service**: Enables direct internet breakout for download of appliance software, configuration, scripts, and other requirements onto the Citrix SD-WAN appliance.
- **Citrix Gateway Service**: Enable to detect and route traffic (control and data) destined for Citrix Gateway Service.
  - **Gateway Service Client Data**: Enables direct internet breakout of ICA® data tunnels between clients and Citrix Gateway Service. It requires high bandwidth and low latency.
  - **Gateway Service Server Data**: Enables direct internet breakout of ICA data tunnels between Virtual Delivery Agents (VDAs) and Citrix Gateway Service. It requires high band-

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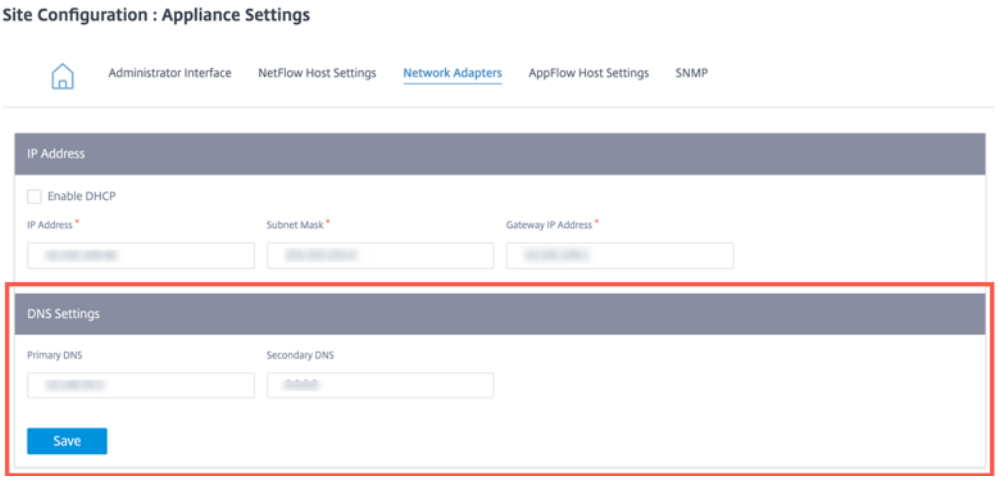
width and low latency and only relevant in VDA resource locations (VDA to Citrix Gateway Service connections).

- **Gateway Service Control Traffic**: Enables direct internet breakout of the control traffic. No specific QoS considerations.
- **Gateway Service Web Proxy Traffic**: Enables direct internet breakout of the Web proxy traffic. It requires high bandwidth but latency requirements might vary.

Prerequisites

Ensure that you have the following:

1. To perform the Citrix Cloud and Gateway Service breakout, an Internet service has to be configured on the appliance. For more information on configuring an Internet service, see Internet access.
2. Ensure that the Management interface has internet connectivity. If the dedicated management interface is not connected, ensure that in-band management is enabled and outbound management traffic has internet connectivity.
3. You can use the Citrix SD-WAN web interface to configure the management interface settings.
4. Ensure that the management DNS is configured. To configure management interface DNS, at site level navigate to **Configuration > Appliance Settings > Network Adapter**. Under the **DNS Settings** section, provide the primary and secondary DNS server detail and click **Save**.



How Citrix Cloud and Gateway Service optimization works

1. The Citrix SD-WAN appliance downloads a list of application signatures using the cloud service API.

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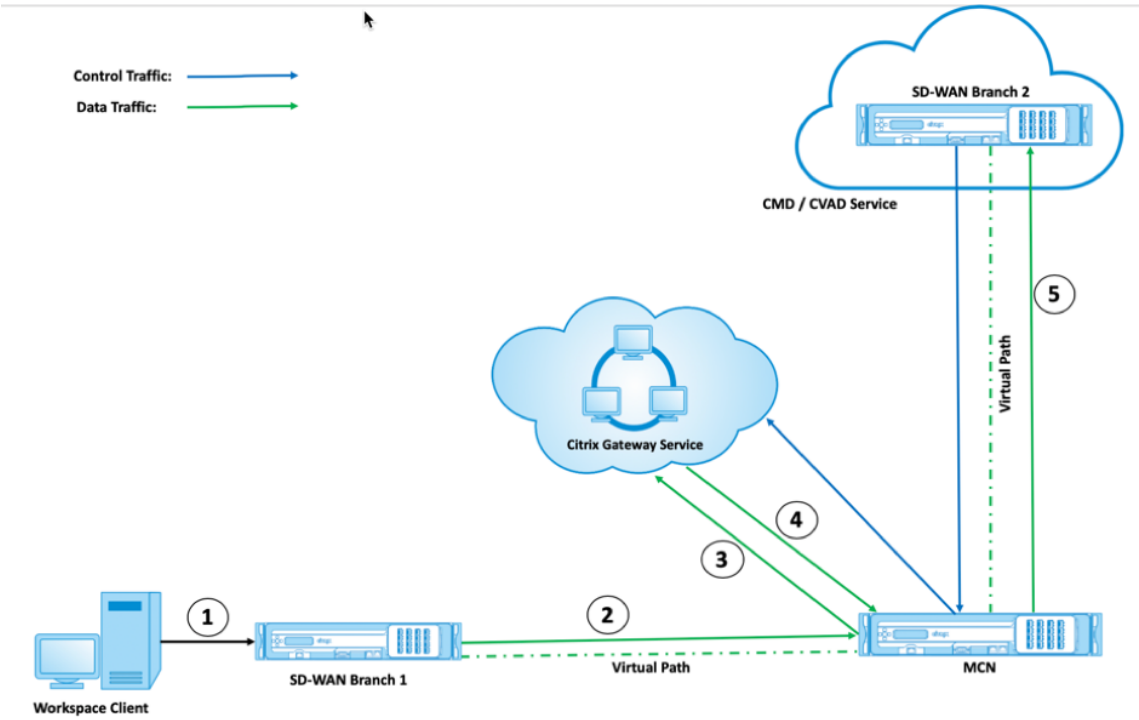
2. When a request for the Citrix Cloud and Gateway Service application arrives, the application is classified on the first packet using the signatures.
3. Once the Citrix Cloud and Gateway Service traffic is classified, the auto created application route and firewall policies take effect and breaks out the traffic directly to the Internet.
4. The Citrix Cloud and Gateway Service use Quad9 by default for forwarding DNS requests.

Traffic flow with/without breakout enabled

- **Without breakout enabled**:



- **With breakout enabled**:

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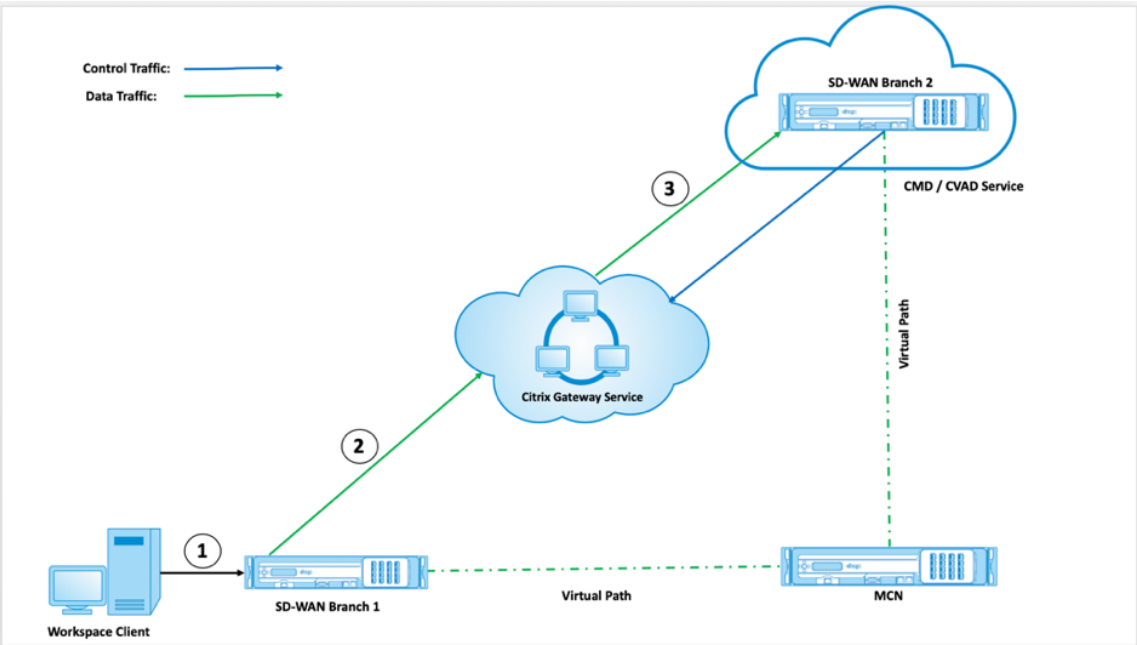

If you use a cloud security stack (for example - Zscaler, Check Point, Palo Alto) to process internet traffic, the Gateway Service receives packets from the public IP address of that security stack, instead of the SD-WAN branch. This defeats Direct Workload Connection and thus, packets to the cloud-hosted SD-WAN will not be able to take Virtual Path. For more information, see Direct Workload Connection.

By enabling breakout, the Gateway Service receives packets directly from the SD-WAN branch. Dynamic Virtual Paths come up between the SD-WAN branch and the cloud-hosted SD-WAN and the traffic goes via this virtual path between the two sites. For more information on enabling the Dynamic Virtual Paths, see Setup dynamic paths for branch to branch communication.

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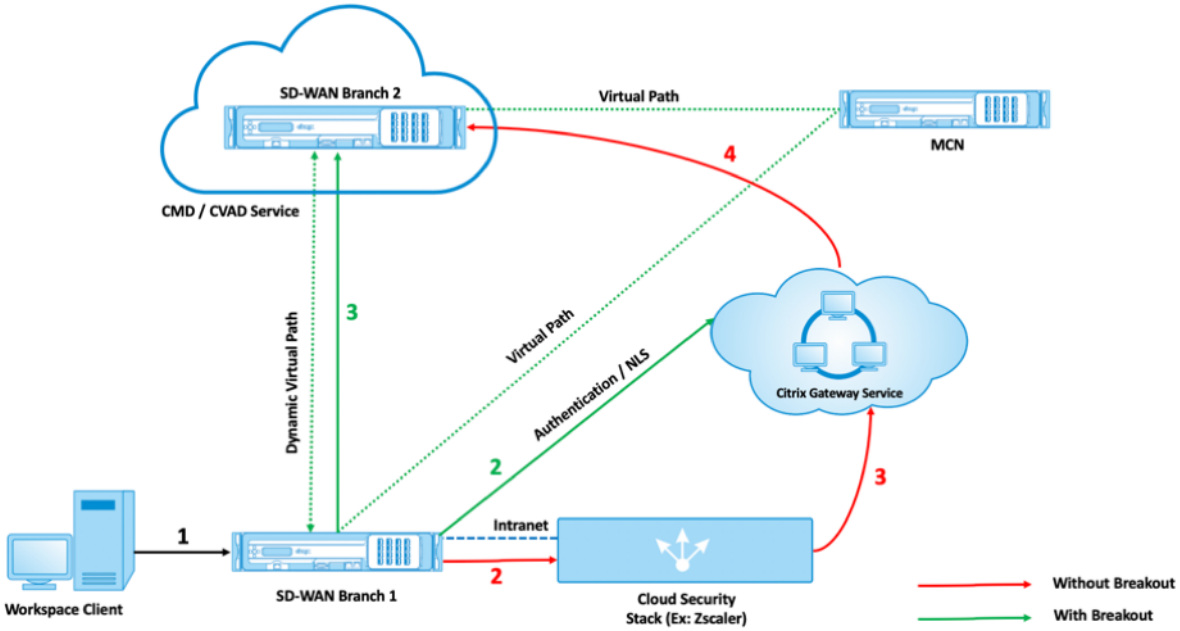
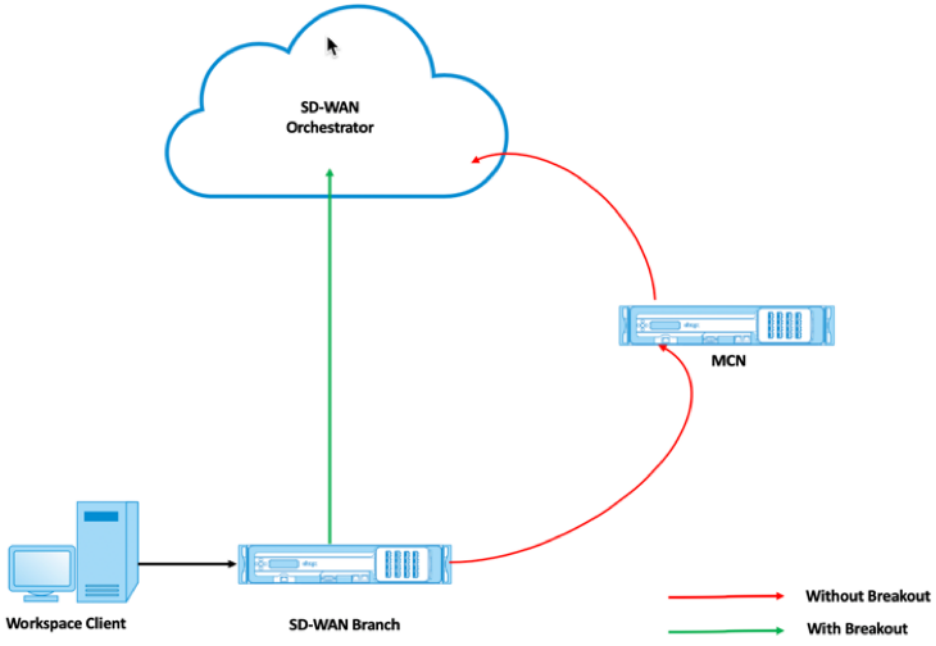


By enabling breakout, traffic required to establish and maintain connectivity between Citrix SD-WAN devices and Citrix SD-WAN Orchestrator will no longer be backhauled through the data center. The traffic reaches Citrix SD-WAN Orchestrator by directly breaking out to internet from the branches where the Citrix SD-WAN devices are located.



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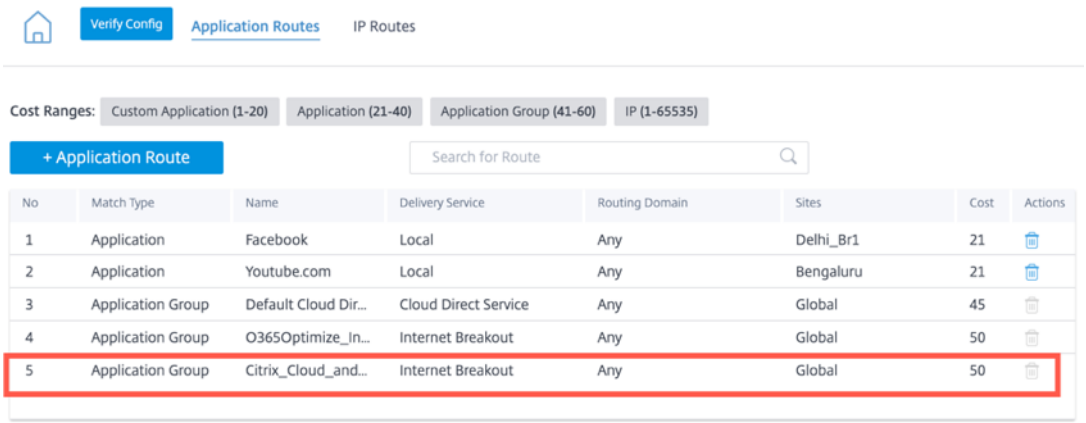
Configure Gateway Service breakout

The Citrix Cloud and Gateway Service breakout policy allows you to specify which category of Citrix Cloud and Gateway Service traffic you can directly break out from the SD-WAN branch.

The **Citrix Cloud** and **Citrix Gateway Service** options are available under **Citrix Gateway and Citrix Cloud Optimization** settings.

Citrix applications can access several services in the Citrix Cloud. For details, see System and Connectivity Requirements.

In the Citrix SD-WAN Orchestrator service, by-default every network has the Citrix Cloud and Gateway Service route. To navigate, go to **Network Configuration > Routing > Routing Policies > Application Routes**.



You cannot delete the route but you can configure the settings as required. The **Citrix Cloud and Gateway Service** are enabled by-default.

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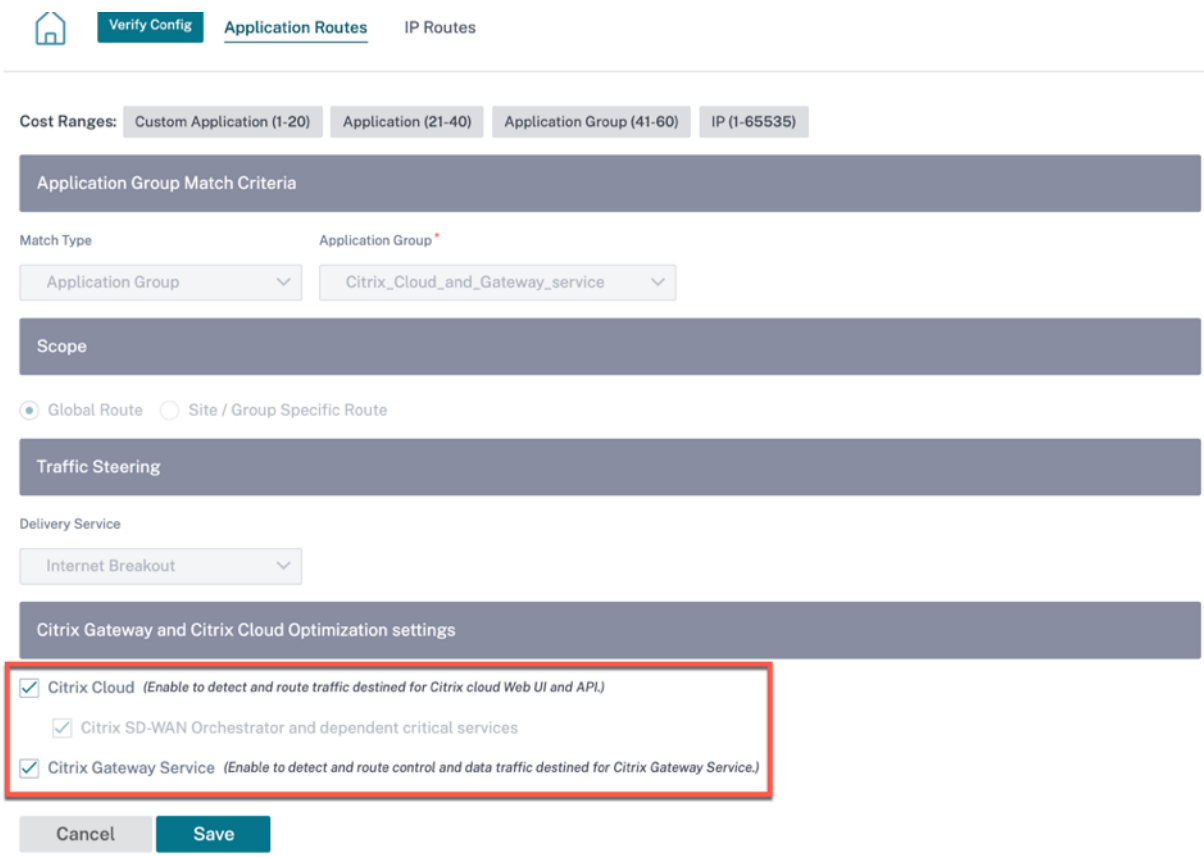

Transparent forwarder for Citrix Cloud and Gateway Service

The SD-WAN branch breaks out for the Citrix Cloud and the Gateway Service begins with a DNS request. The DNS request going through the Citrix Cloud and Gateway Service domains have to be steered locally. If Citrix Cloud and Gateway Service Internet break out is enabled, the internal DNS routes are determined. Citrix Cloud and Gateway Service DNS requests are forwarded to open source DNS service Quad 9 by default. Quad 9 DNS service is secure, scalable, and has multi pop presence. You can change the DNS service if necessary.

To add a DNS server, at site level, navigate to **Configuration > Advanced Settings > DNS**. Under **Site Specific DNS Servers** section, click **+ DNS Server**.

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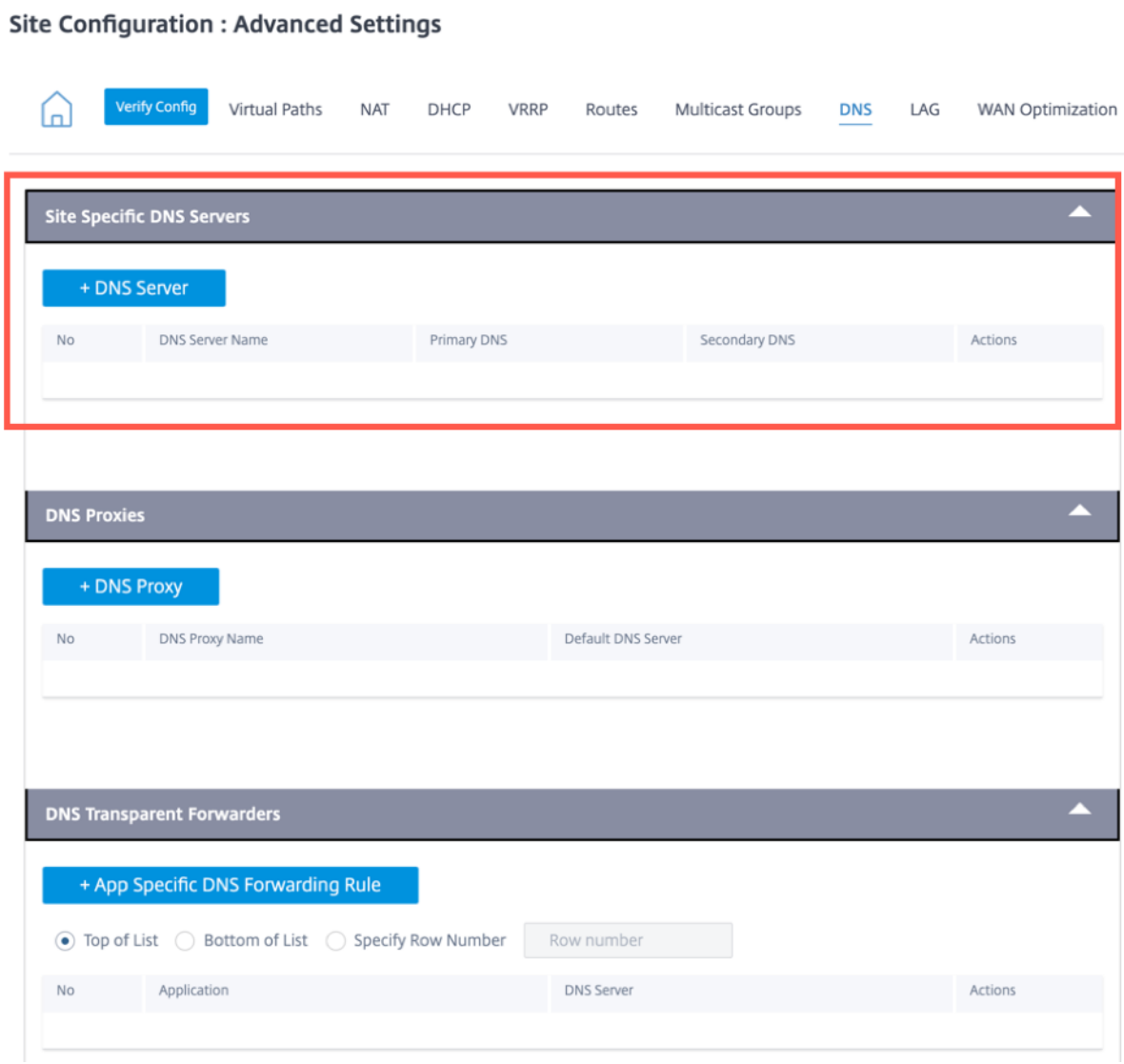
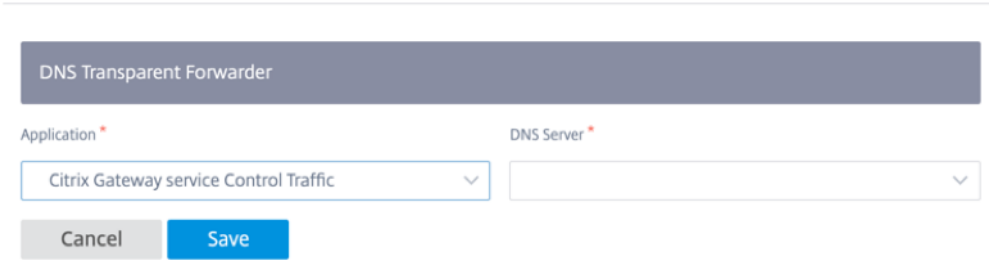


Transparent forwarders for Citrix Cloud and Gateway Service applications are created at every SD-WAN branch that has Internet service and Citrix Cloud and Gateway Service breakout enabled.

To add a specific DNS forwarding rule, click **+ App Specific DNS Forwarding Rule** under **NDS Transparent Forwarder** section. With this configuration, you can choose to change the default Quad9 DNS transparent forwarder for Citrix Cloud and Gateway Service Applications.



- **Application**: Select the Citrix Cloud and Gateway Service application from the **Application**

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drop-down list.

- **DNS Server**: Select the DNS server that you created under **Site Specific DNS Servers** from the drop-down list.

Monitoring

You can monitor the Citrix Cloud and Gateway Service real-time statistics and usage report as the following:

- **Real-time Statistics**

Network Reports : Real Time Statistics

ARP | Routes | Virtual Path Services | Classes | Ethernet | Observed Protocols | Wan Path | Application QOS | Application Routes

Branch1_Site | Retrieve latest data

Num	Application Object	Gateway IP Address	Service	Firewall Zone	Reachable	Site	Type	Cost	Hit Count
0	row_index	app_name	gw_ip	service	firewall_zone	reachable	site_name	route_type	cost
0	O365Optimize_InternetBre...	*	Internet	Internet_Zone	YES	Branch1_Site	Static	50	0
1	NGS_WebProxy_Breakout	*	Internet	Internet_Zone	YES	Branch1_Site	Static	50	0
2	NGS_ServerData_Breakout	*	Internet	Internet_Zone	YES	Branch1_Site	Static	50	0
3	NGS_ControlTraffic_Breako...	*	Internet	Internet_Zone	YES	Branch1_Site	Static	50	0
4	NGS_ClientData_Breakout	*	Internet	Internet_Zone	YES	Branch1_Site	Static	50	398
5	CitrixCloud_Breakout	*	Internet	Internet_Zone	YES	Branch1_Site	Static	50	21

Network Reports : Real Time Statistics

ARP | Routes | Virtual Path Services | Classes | Ethernet | Observed Protocols | Wan Path | Application QOS | Application Routes

azure07 | Retrieve latest data

Num	Application Object	Gateway IP Address	Service	Firewall Zone	Reachable	Site	Type	Cost	Hit Count
0	row_index	app_name	gw_ip	service	firewall_zone	reachable	site_name	route_type	cost
0	O365Optimize_InternetBre...	*	Internet	Untrusted_Internet_Zon	YES	azure07	Static	50	1917
1	NGS_WebProxy_Breakout	*	Internet	Untrusted_Internet_Zon	YES	azure07	Static	50	0
2	NGS_ServerData_Breakout	*	Internet	Untrusted_Internet_Zon	YES	azure07	Static	50	9361
3	NGS_ControlTraffic_Breako...	*	Internet	Untrusted_Internet_Zon	YES	azure07	Static	50	18105
4	NGS_ClientData_Breakout	*	Internet	Untrusted_Internet_Zon	YES	azure07	Static	50	0
5	CitrixCloud_Breakout	*	Internet	Untrusted_Internet_Zon	YES	azure07	Static	50	222

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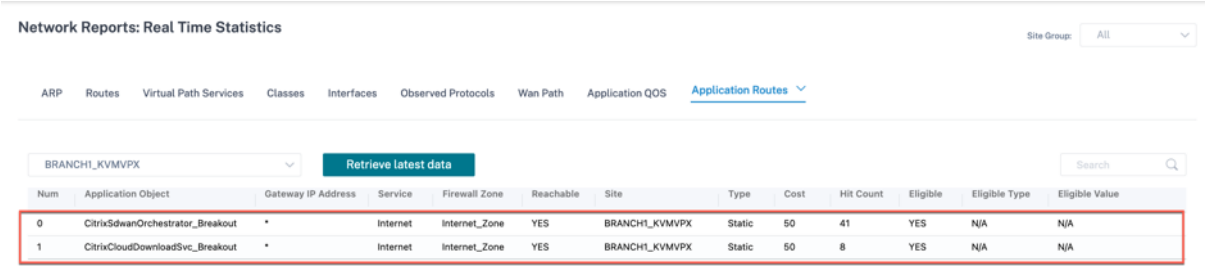
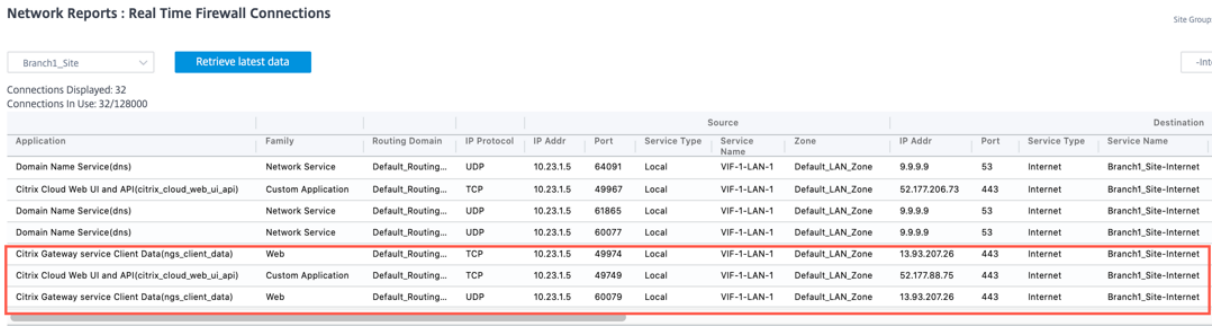
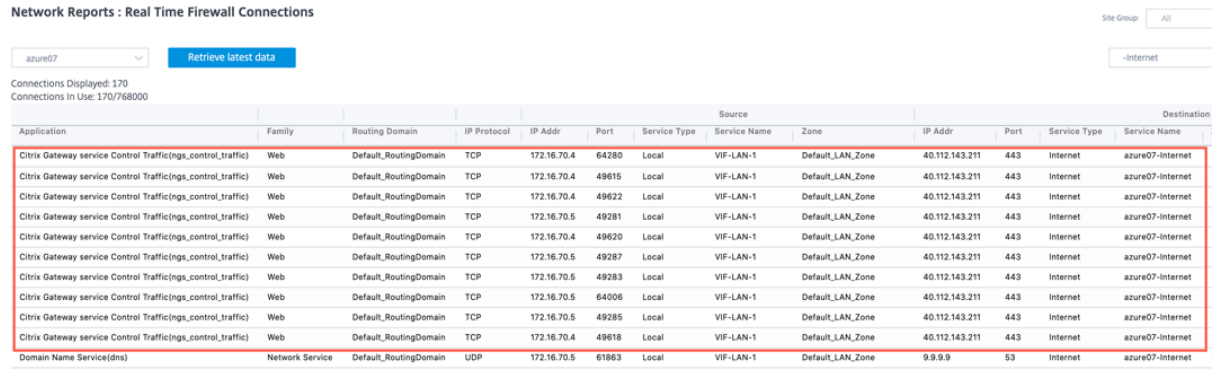


Num	Application Object	Gateway IP Address	Service	Firewall Zone	Reachable	Site	Type	Cost	Hit Count	Eligible	Eligible Type	Eligible Value
0	CitrixSdwanOrchestrator_Breakout	*	Internet	Internet_Zone	YES	BRANCH1_KVMVPX	Static	50	41	YES	N/A	N/A
1	CitrixCloudDownloadSvc_Breakout	*	Internet	Internet_Zone	YES	BRANCH1_KVMVPX	Static	50	8	YES	N/A	N/A

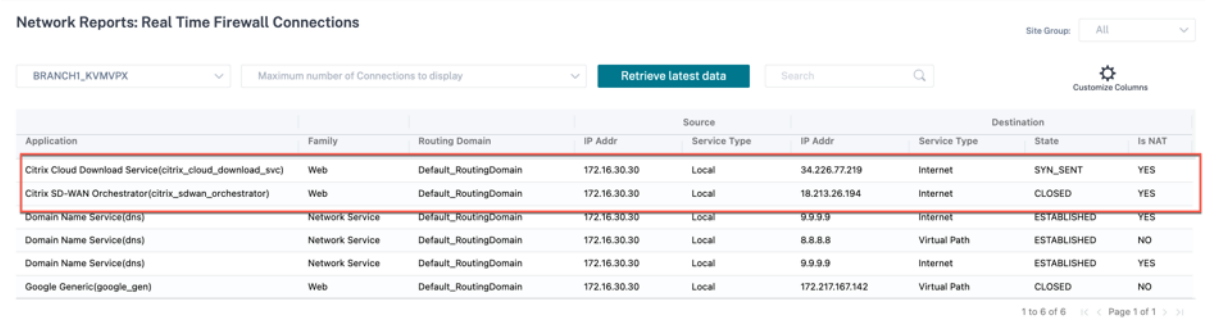
- **Real-time Firewall Connections**



Application	Family	Routing Domain	IP Protocol	Source IP Addr	Source Port	Source Service Type	Source Service Name	Source Zone	Destination IP Addr	Destination Port	Destination Service Type	Destination Service Name
Domain Name Service(dns)	Network Service	Default_Routing...	UDP	10.23.1.5	64091	Local	VIF-1-LAN-1	Default_LAN_Zone	9.9.9.9	53	Internet	Branch1_Site-Internet
Citrix Cloud Web UI and API(citrix_cloud_web_ui_api)	Custom Application	Default_Routing...	TCP	10.23.1.5	49967	Local	VIF-1-LAN-1	Default_LAN_Zone	52.177.206.73	443	Internet	Branch1_Site-Internet
Domain Name Service(dns)	Network Service	Default_Routing...	UDP	10.23.1.5	61865	Local	VIF-1-LAN-1	Default_LAN_Zone	9.9.9.9	53	Internet	Branch1_Site-Internet
Domain Name Service(dns)	Network Service	Default_Routing...	UDP	10.23.1.5	60077	Local	VIF-1-LAN-1	Default_LAN_Zone	9.9.9.9	53	Internet	Branch1_Site-Internet
Citrix Gateway service Client Data(ngs_client_data)	Web	Default_Routing...	TCP	10.23.1.5	49974	Local	VIF-1-LAN-1	Default_LAN_Zone	13.93.207.26	443	Internet	Branch1_Site-Internet
Citrix Cloud Web UI and API(citrix_cloud_web_ui_api)	Custom Application	Default_Routing...	TCP	10.23.1.5	49749	Local	VIF-1-LAN-1	Default_LAN_Zone	52.177.88.75	443	Internet	Branch1_Site-Internet
Citrix Gateway service Client Data(ngs_client_data)	Web	Default_Routing...	UDP	10.23.1.5	60079	Local	VIF-1-LAN-1	Default_LAN_Zone	13.93.207.26	443	Internet	Branch1_Site-Internet



Application	Family	Routing Domain	IP Protocol	Source IP Addr	Source Port	Source Service Type	Source Service Name	Source Zone	Destination IP Addr	Destination Port	Destination Service Type	Destination Service Name
Citrix Gateway service Control Traffic(ngs_control_traffic)	Web	Default_RoutingDomain	TCP	172.16.70.4	64280	Local	VIF-LAN-1	Default_LAN_Zone	40.112.143.211	443	Internet	azure07-Internet
Citrix Gateway service Control Traffic(ngs_control_traffic)	Web	Default_RoutingDomain	TCP	172.16.70.4	49615	Local	VIF-LAN-1	Default_LAN_Zone	40.112.143.211	443	Internet	azure07-Internet
Citrix Gateway service Control Traffic(ngs_control_traffic)	Web	Default_RoutingDomain	TCP	172.16.70.4	49622	Local	VIF-LAN-1	Default_LAN_Zone	40.112.143.211	443	Internet	azure07-Internet
Citrix Gateway service Control Traffic(ngs_control_traffic)	Web	Default_RoutingDomain	TCP	172.16.70.5	49281	Local	VIF-LAN-1	Default_LAN_Zone	40.112.143.211	443	Internet	azure07-Internet
Citrix Gateway service Control Traffic(ngs_control_traffic)	Web	Default_RoutingDomain	TCP	172.16.70.4	49620	Local	VIF-LAN-1	Default_LAN_Zone	40.112.143.211	443	Internet	azure07-Internet
Citrix Gateway service Control Traffic(ngs_control_traffic)	Web	Default_RoutingDomain	TCP	172.16.70.5	49287	Local	VIF-LAN-1	Default_LAN_Zone	40.112.143.211	443	Internet	azure07-Internet
Citrix Gateway service Control Traffic(ngs_control_traffic)	Web	Default_RoutingDomain	TCP	172.16.70.5	49283	Local	VIF-LAN-1	Default_LAN_Zone	40.112.143.211	443	Internet	azure07-Internet
Citrix Gateway service Control Traffic(ngs_control_traffic)	Web	Default_RoutingDomain	TCP	172.16.70.5	64006	Local	VIF-LAN-1	Default_LAN_Zone	40.112.143.211	443	Internet	azure07-Internet
Citrix Gateway service Control Traffic(ngs_control_traffic)	Web	Default_RoutingDomain	TCP	172.16.70.5	49285	Local	VIF-LAN-1	Default_LAN_Zone	40.112.143.211	443	Internet	azure07-Internet
Citrix Gateway service Control Traffic(ngs_control_traffic)	Web	Default_RoutingDomain	TCP	172.16.70.4	49618	Local	VIF-LAN-1	Default_LAN_Zone	40.112.143.211	443	Internet	azure07-Internet
Domain Name Service(dns)	Network Service	Default_RoutingDomain	UDP	172.16.70.5	61863	Local	VIF-LAN-1	Default_LAN_Zone	9.9.9.9	53	Internet	azure07-Internet



Application	Family	Routing Domain	Source IP Addr	Source Service Type	Destination IP Addr	Destination Service Type	State	Is NAT
Citrix Cloud Download Service(citrix_cloud_download_svc)	Web	Default_RoutingDomain	172.16.30.30	Local	34.226.77.219	Internet	SYN_SENT	YES
Citrix SD-WAN Orchestrator(citrix_sdwan_orchestrator)	Web	Default_RoutingDomain	172.16.30.30	Local	18.213.26.194	Internet	CLOSED	YES
Domain Name Service(dns)	Network Service	Default_RoutingDomain	172.16.30.30	Local	9.9.9.9	Internet	ESTABLISHED	YES
Domain Name Service(dns)	Network Service	Default_RoutingDomain	172.16.30.30	Local	8.8.8.8	Virtual Path	ESTABLISHED	NO
Domain Name Service(dns)	Network Service	Default_RoutingDomain	172.16.30.30	Local	9.9.9.9	Internet	ESTABLISHED	YES
Google Generic(google_gen)	Web	Default_RoutingDomain	172.16.30.30	Local	172.217.167.142	Virtual Path	CLOSED	NO

- **Usage**

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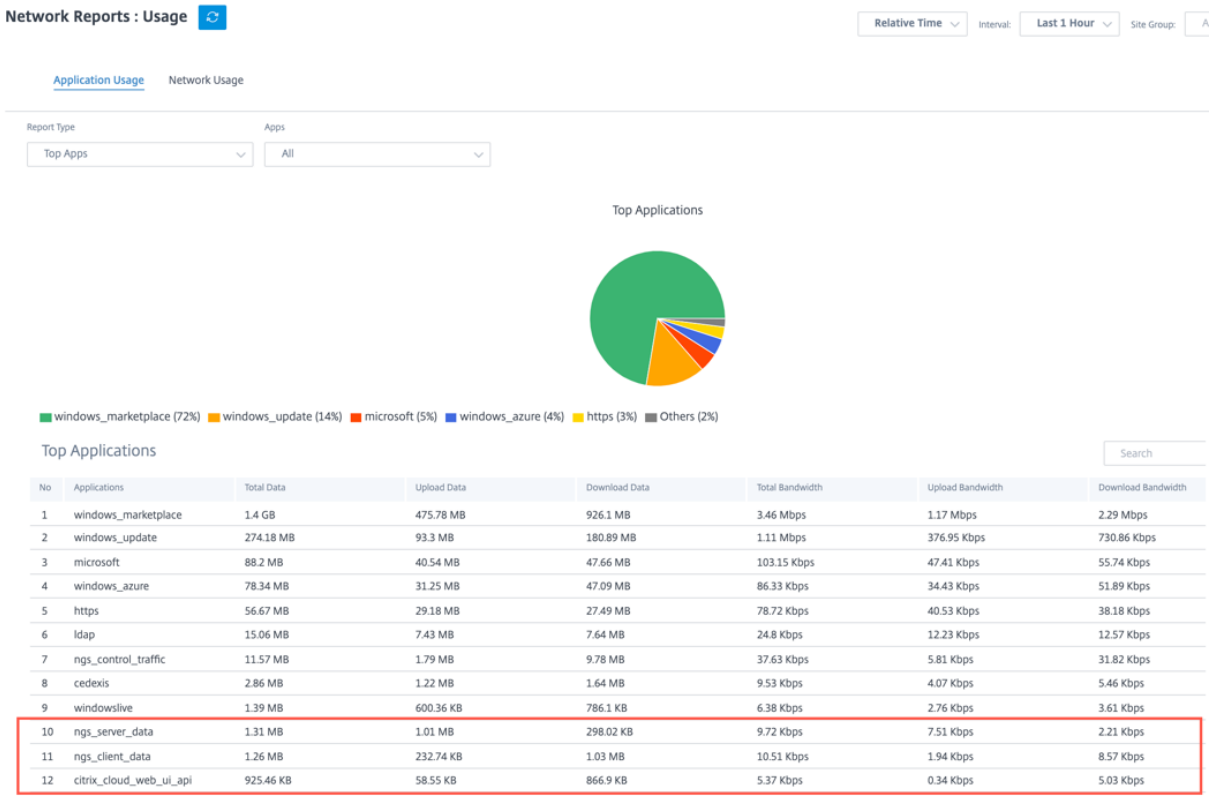
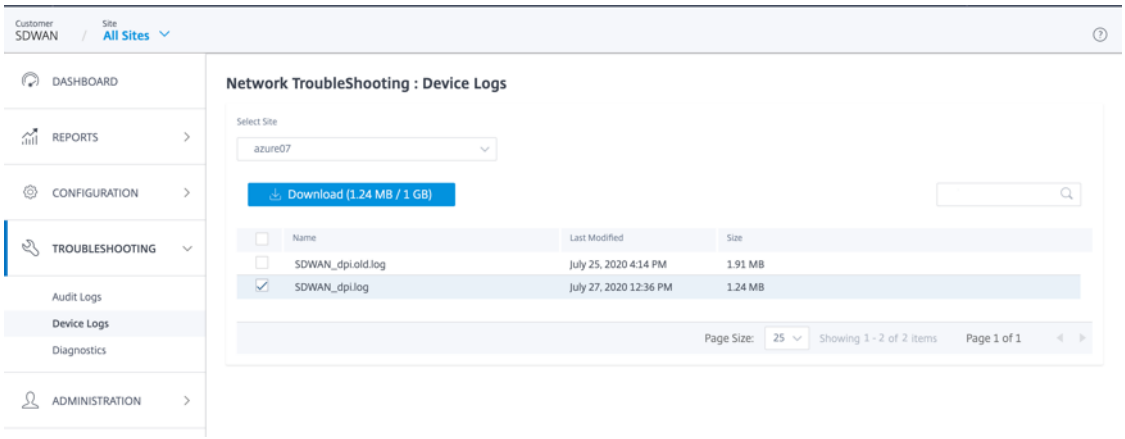


No	Applications	Total Data	Upload Data	Download Data	Total Bandwidth	Upload Bandwidth	Download Bandwidth
1	windows_marketplace	1.4 GB	475.78 MB	926.1 MB	3.46 Mbps	1.17 Mbps	2.29 Mbps
2	windows_update	274.18 MB	93.3 MB	180.89 MB	1.11 Mbps	376.95 Kbps	730.86 Kbps
3	microsoft	88.2 MB	40.54 MB	47.66 MB	103.15 Kbps	47.41 Kbps	55.74 Kbps
4	windows_azure	78.34 MB	31.25 MB	47.09 MB	86.33 Kbps	34.43 Kbps	51.89 Kbps
5	https	56.67 MB	29.18 MB	27.49 MB	78.72 Kbps	40.53 Kbps	38.18 Kbps
6	ldap	15.06 MB	7.43 MB	7.64 MB	24.8 Kbps	12.23 Kbps	12.57 Kbps
7	ngs_control_traffic	11.57 MB	1.79 MB	9.78 MB	37.63 Kbps	5.81 Kbps	31.82 Kbps
8	cedexis	2.86 MB	1.22 MB	1.64 MB	9.53 Kbps	4.07 Kbps	5.46 Kbps
9	windowslive	1.39 MB	600.36 KB	786.1 KB	6.38 Kbps	2.76 Kbps	3.61 Kbps
10	ngs_server_data	1.31 MB	1.01 MB	298.02 KB	9.72 Kbps	7.51 Kbps	2.21 Kbps
11	ngs_client_data	1.26 MB	232.74 KB	1.03 MB	10.51 Kbps	1.94 Kbps	8.57 Kbps
12	citrix_cloud_web_ui_api	925.46 KB	58.55 KB	866.9 KB	5.37 Kbps	0.34 Kbps	5.03 Kbps

Troubleshooting

The connectivity errors are logged in **SDWAN_dpi.log** file. To download the log file, navigate to **Troubleshooting > Device Logs**, select the required site, choose the log file, and click **Download**.



You can also verify the device alerts. To verify, navigate to **Network > Alerts**.

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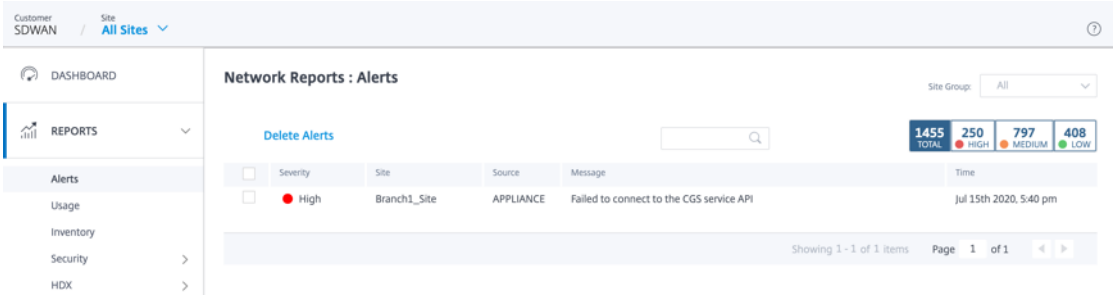

PE support: WAN optimization configuration

September 27, 2025

You can configure and deploy Citrix SD-WAN Premium Edition (PE) through Citrix SD-WAN Orchestrator service. You can now configure WAN Optimization Configurations like Features, Tuning, Applications, and Rules through SD-WAN Orchestrator. Deployment of SD-WAN PE appliances is also now possible through Orchestrator.

> **NOTE**
>
> The Citrix SD-WAN™ PE is only supported on Citrix SD-WAN 1100, 2100, 5100, and 6100 platforms.

The WAN optimization features can be applied per site wise or globally to all the sites of the network. Citrix SD-WAN Orchestrator service provides step-by-step instructions for enabling and configuring the PE WAN Optimization features for your Virtual WAN.

> **Note**
>
> You must have a Citrix SD-WAN PE license installed to access, enable, configure, and activate WAN Optimization features in your Virtual WAN.

To globally configure PE WAN Optimization features, navigate to **Configuration > WAN Optimization** at network level. You need to configure the following features to complete the global WAN optimization configuration:

- Features
- Tuning
- WAN Opt Apps
- WAN Opt App Groups
- Rules

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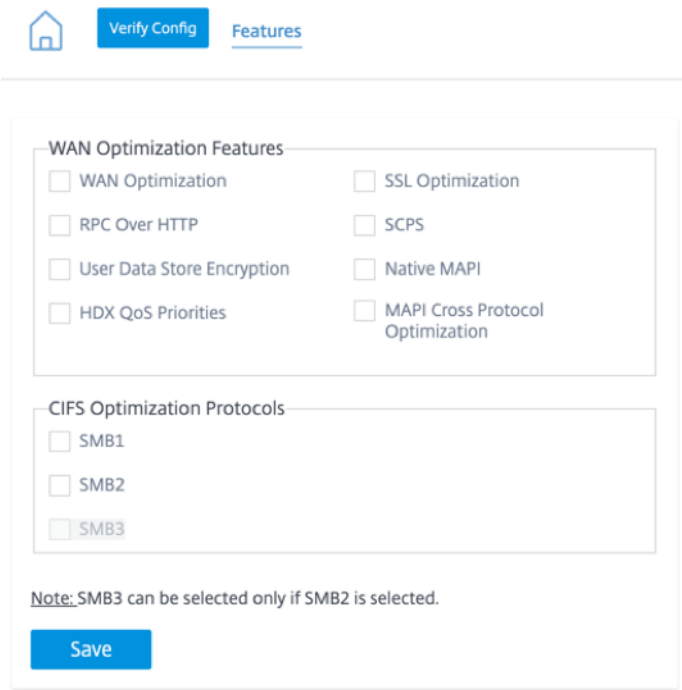
Features

To enable the WAN Optimization in the Features settings, navigate to **Configuration > WAN Optimization > Features**.

You can also accept the default settings pre-selected in the form, or customize the settings. Click the check boxes to select or deselect an option.



The Features configuration page contains the following two sections:

- WAN Optimization Features
- CIFS Optimization Protocols

WAN Optimization Features

- **WAN Optimization**: Enable WAN Optimization for this configuration. This also enables compression, deduplication, and TCP Protocol Optimization.
- **SSL Optimization**: Enable optimization for traffic streams with SSL encryption.
- **RPC Over HTTP**: Enable optimization of Microsoft Exchange traffic that uses RPC over HTTP.
- **SCPS**: Enable TCP Protocol optimization for Satellite Links.
- **User Data Store Encryption**: Enable enhanced security of data through the encryption of WAN Optimization compression history.
- **Native MAPI**: Enable optimization of Microsoft Exchange traffic.

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- **HDX™ QoS Priorities**: Select the check box to enable optimization of ICA traffic based on prioritization of HDX subchannels.
- **MAPI Cross Protocol Optimization**: Enable cross-protocol optimization of Microsoft Outlook (MAPI) traffic.

CIFS Optimization Protocols

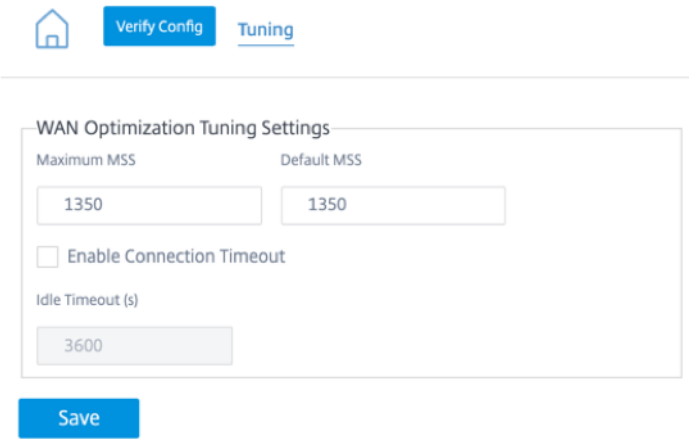
The CIFS Optimization Protocols options are as follows:

- **SMB1**: Select the check box to enable Optimization of Windows File Sharing (SMB1).
- **SMB2**: Select the check box to enable Optimization of Windows File Sharing (SMB2).
- **SMB3**: Select the check box to enable Optimization of Windows File Sharing (SMB3). You must first select the SMB2 option before you can select SMB3.

Click **Save** to enable and add the selected Features to the configuration package.

Tuning

To configure the WAN Optimization Tuning settings, navigate to **Configuration > WAN Optimization > Tuning**.



The **Tuning** settings options are as follows:

- **Maximum MSS**: Enter the maximum size (in bytes) for the Maximum Segment Size (MSS) for a TCP segment.
- **Default MSS**: Enter the default size (in octets) for the MSS for TCP segments.
- **Enable Connection Timeout**: Select the check box to enable automatic termination of a connection when the idle threshold is exceeded.
- **Idle Timeout (s)**: Enter a threshold value (in seconds) to specify the amount of idle time permitted before an idle connection is terminated.

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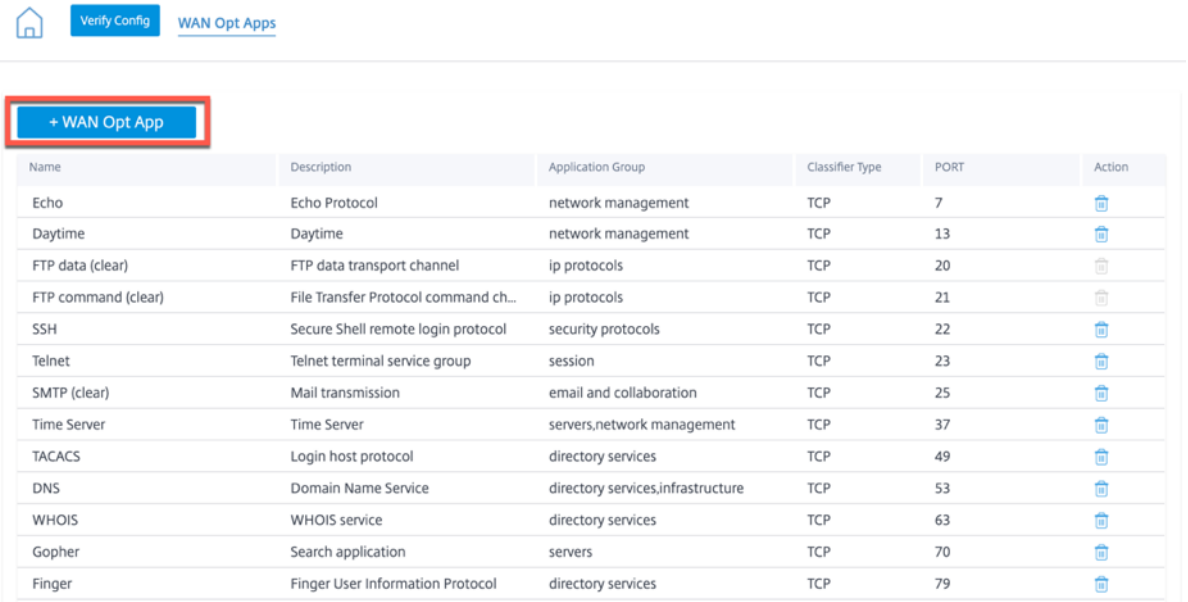
> **NOTE**
>
> You must first select the Enable Connection Timeout check box before the Idle Timeout (s) field can be configured.

Click **Save** to apply the **Tuning** settings to the global configuration.

WAN Opt Apps

In the Citrix SD-WAN on-premises appliances, you can see the **WAN Opt Apps** option as **Application Classifiers** under the configuration editor. The **Application Classifiers** option name is changed to **WAN Opt Apps** in SD-WAN Orchestrator.

To configure the WAN Optimization Applications, navigate to **Configuration > WAN Optimization > WAN Opt Apps**.

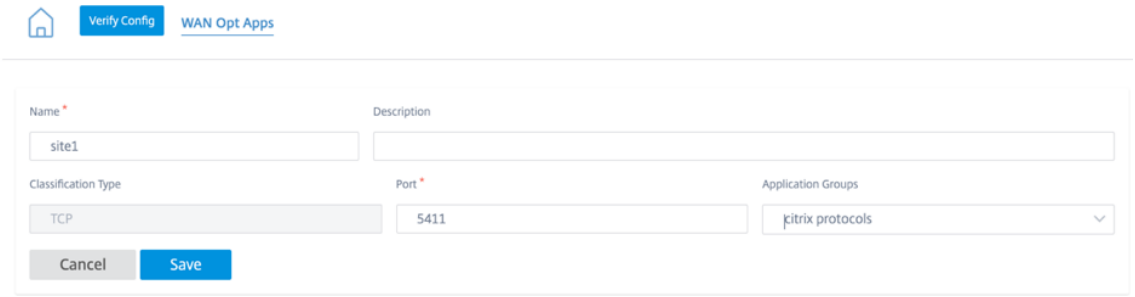


Name	Description	Application Group	Classifier Type	PORT	Action
Echo	Echo Protocol	network management	TCP	7	
Daytime	Daytime	network management	TCP	13	
FTP data (clear)	FTP data transport channel	ip protocols	TCP	20	
FTP command (clear)	File Transfer Protocol command ch...	ip protocols	TCP	21	
SSH	Secure Shell remote login protocol	security protocols	TCP	22	
Telnet	Telnet terminal service group	session	TCP	23	
SMTP (clear)	Mail transmission	email and collaboration	TCP	25	
Time Server	Time Server	servers,network management	TCP	37	
TACACS	Login host protocol	directory services	TCP	49	
DNS	Domain Name Service	directory services,infrastructure	TCP	53	
WHOIS	WHOIS service	directory services	TCP	63	
Gopher	Search application	servers	TCP	70	
Finger	Finger User Information Protocol	directory services	TCP	79	

The WAN Optimization Applications page displays some default set of applications.

You can also add a new application.

1. Click **+ WAN Opt App** option.



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2. Enter an application name and description.
3. Provide the port number for the application.
4. Select the application group from the drop-down list.
5. Click **Save**.

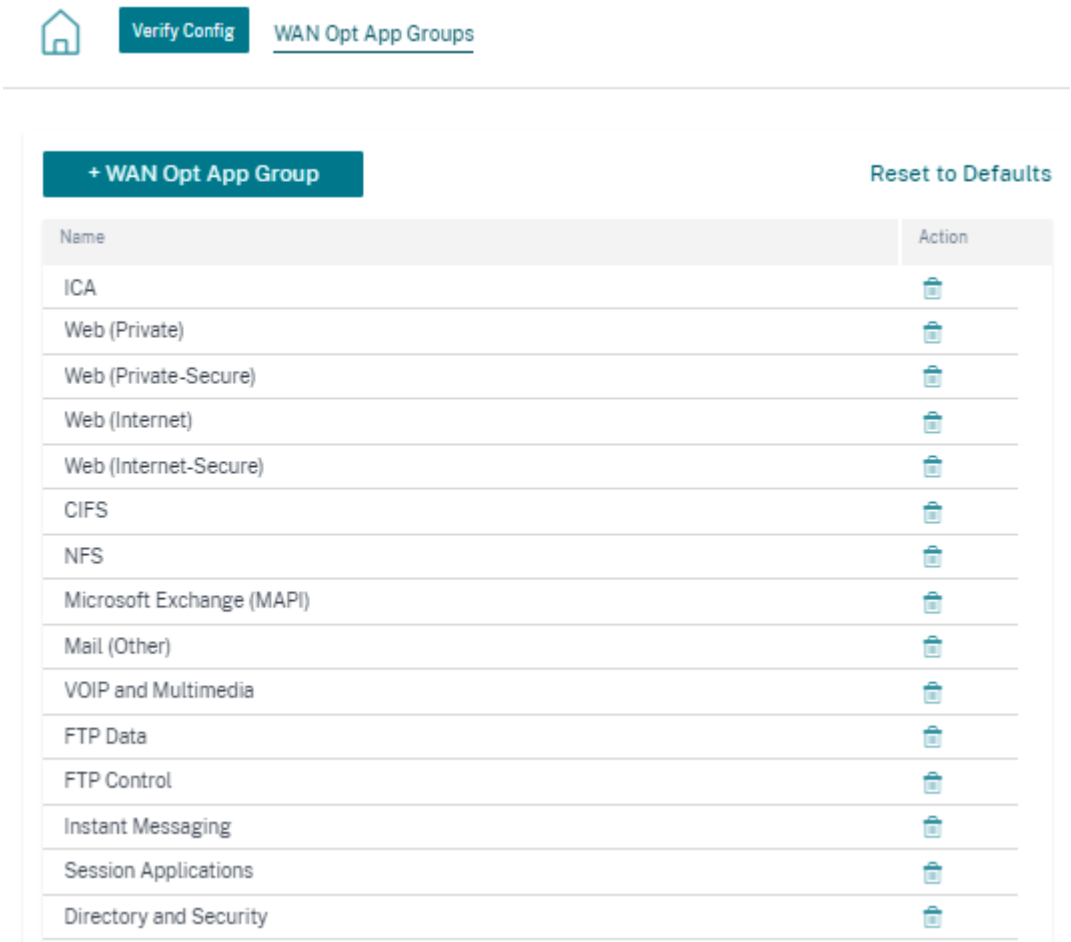
You can delete an existing application using the trashcan icon under the **Action** column.

WAN Opt App Groups

The **WAN Optimization Application Groups** page displays the default set of application groups. Instead of having a large applications list, you can now create an application group with similar application class. For example, ICA® application group contains ICA and ICA CGP applications. This page displays the default set of application groups.

You can also create an application group.

1. Click the **+ WAN Opt App Group** option to create an application group.



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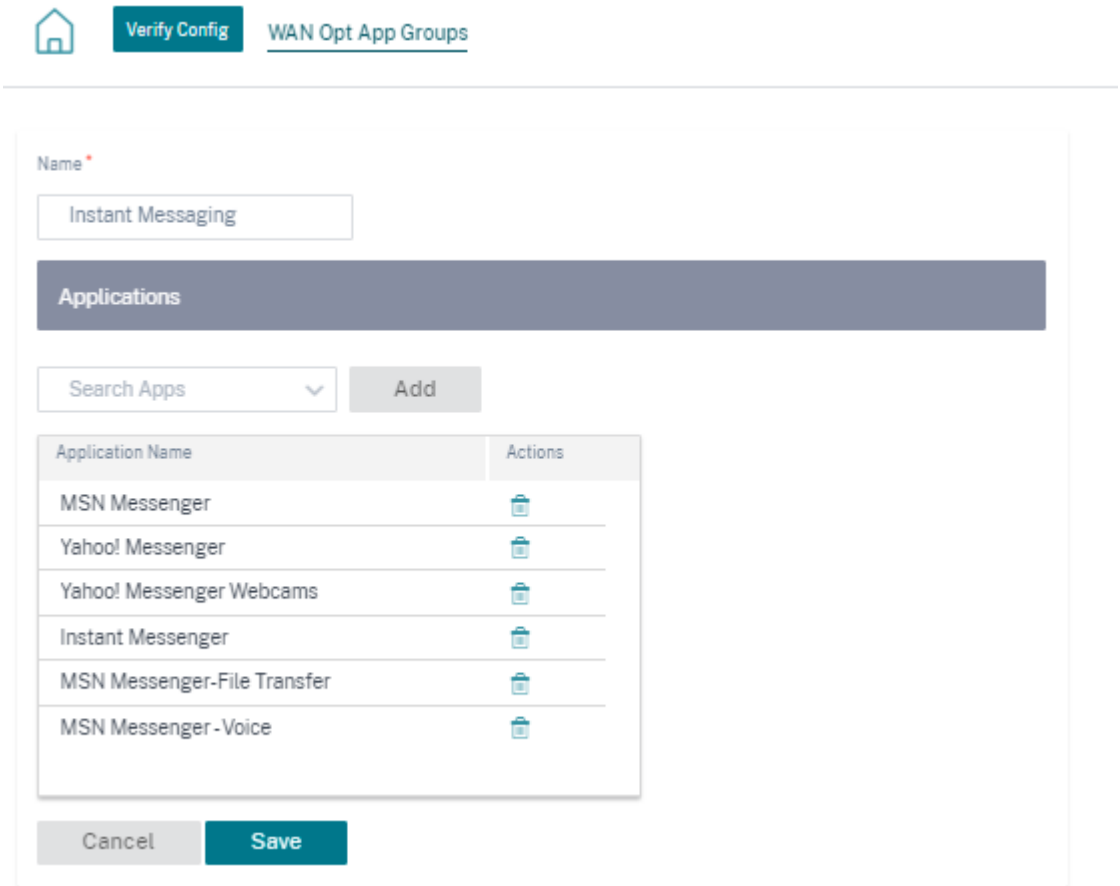
2. Provide a name to your application group. Search the application from the drop-down list and click **Add**.



3. Click **Save**.

You can also edit the existing application group. Click the application group row in the existing table to edit. You can add more such applications or delete any application.

Click the **Reset to Defaults** button to retrieve the list of default WAN optimization application groups. This action deletes the previously created WAN optimization application groups and the modified WAN optimization application groups.

Rules

In the Citrix SD-WAN on-premises appliances, you can see the **Rules** option as **Service Classes** under the configuration editor. The **Service Classes** option name is changed to **Rules** in SD-WAN Orchestrator. The **Rules** page displays the default set of pre-created rules. You can also create rule for the application group.

1. Click **+ Rule** to create a rule.

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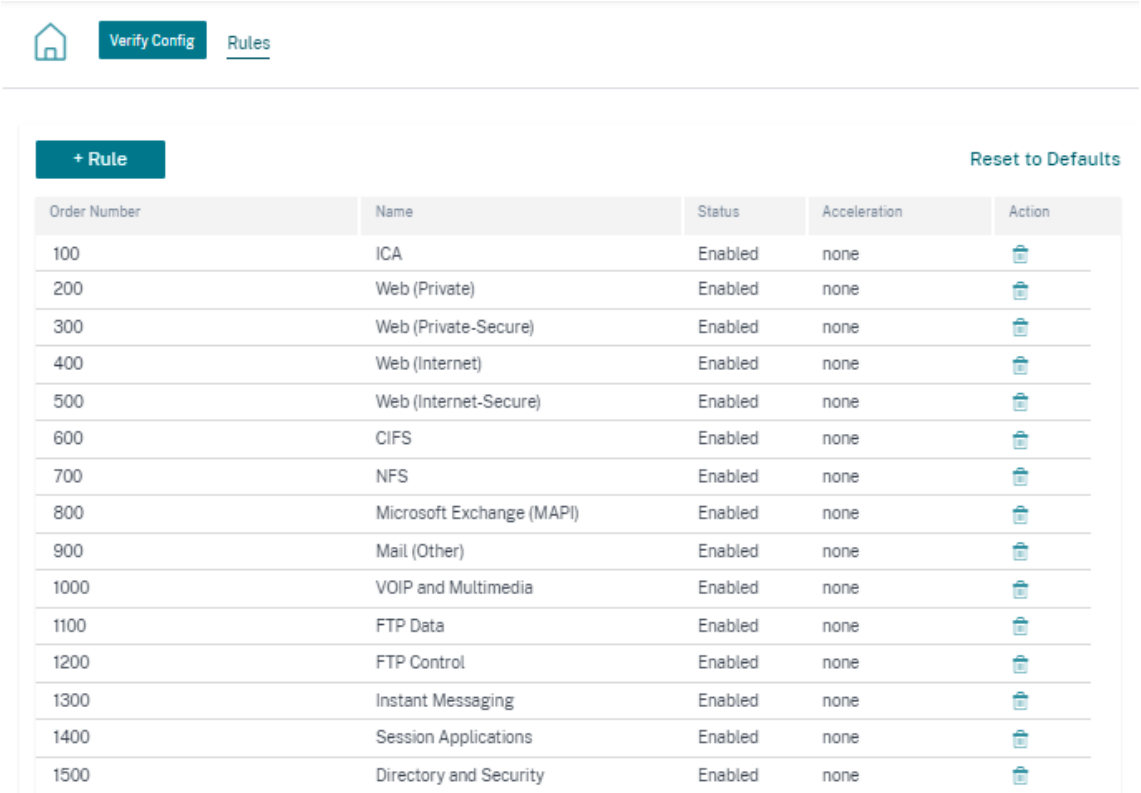

Order Number	Name	Status	Acceleration	Action
100	ICA	Enabled	none	
200	Web (Private)	Enabled	none	
300	Web (Private-Secure)	Enabled	none	
400	Web (Internet)	Enabled	none	
500	Web (Internet-Secure)	Enabled	none	
600	CIFS	Enabled	none	
700	NFS	Enabled	none	
800	Microsoft Exchange (MAPI)	Enabled	none	
900	Mail (Other)	Enabled	none	
1000	VOIP and Multimedia	Enabled	none	
1100	FTP Data	Enabled	none	
1200	FTP Control	Enabled	none	
1300	Instant Messaging	Enabled	none	
1400	Session Applications	Enabled	none	
1500	Directory and Security	Enabled	none	

2. Provide the details for the following basic settings:

   - **Name**: Provide a name to the application.
   - **Order**: Provide the order number.
   - **Enabled**: Select the check box to enable the rule.
   - **Acceleration Policy**: Select a policy from the drop-down list. You can select one of the following options as needed:

     - **none**: Select none if you do not want to enable an acceleration policy for this Rule. A policy of none is generally used only for uncompressible encrypted traffic and real-time video.
     - **flow control only**: Select the flow control only policy to disable compression but enable flow-control acceleration. Select this for rules that are always encrypted, and for the FTP control channel.
     - **disk** –Select the disk policy to specify the appliance disk as the location for storing the traffic history used for compression. This enables Disk Based Compression (DBC) policy for this Rule. Generally, a policy of disk is usually the best choice, as the appliance automatically selects disk or memory as the storage location, depending on which is more appropriate for the traffic.

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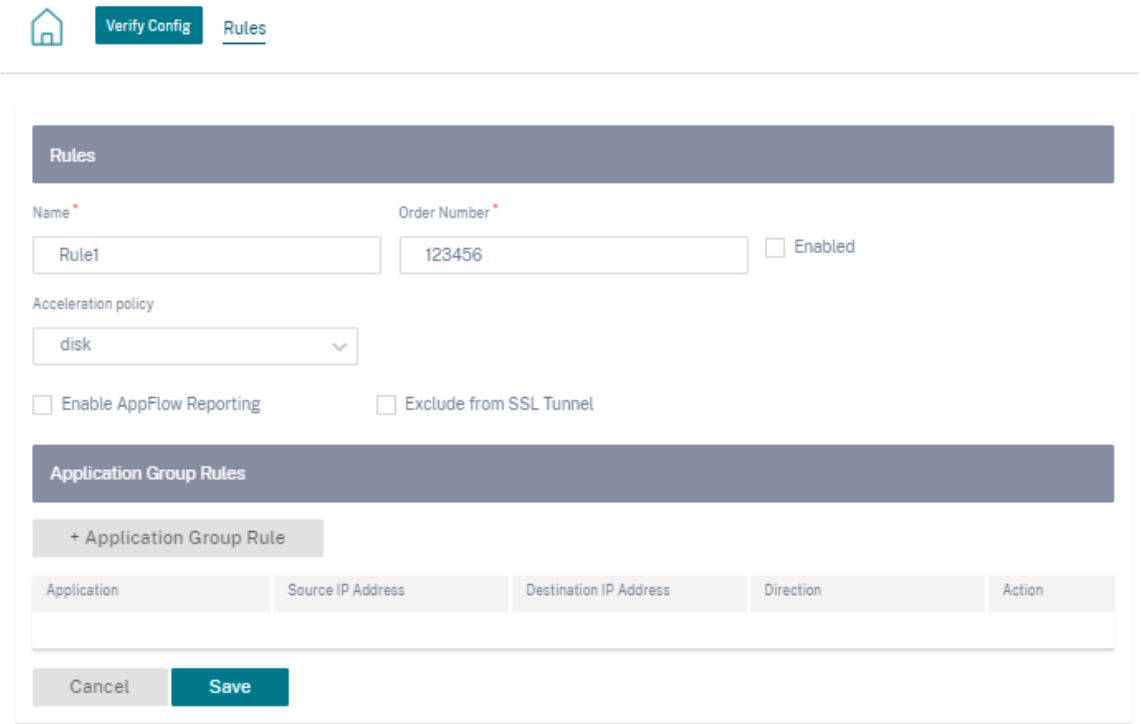
- **memory**: Select the memory policy to specify memory as the location for storing the traffic history used for compression.

- **Enable AppFlow® Reporting**: Select the check box to enable AppFlow reporting for this Service Class. AppFlow is an industry standard for unlocking application transactional data processed by the network infrastructure. The WAN Optimization AppFlow interface works with any AppFlow collector to generate reports. The collector receives detailed information from the appliance, using the AppFlow open standard.
- **Exclude from SSL Tunnel** –Select the check box to exclude traffic associated with the Service Class from SSL Tunneling.



3. Click **+ Application Group Rule** to attach the pre-created application group and provide the necessary details for the following fields:

   - **Direction**: Select direction as **BIDIRECTIONAL** or **UNIDIRECTIONAL** from the drop-down list.
   - **Application Group**: Select an application group from the drop-down list.
   - **Source IP**: Enter the source IP address. Click **+ Source IP Address** to add multiple source IP addresses. Select the **Exclude** check box to exclude the specified source IP address from this rule. Clear the check box to include the address.
   - **Destination IP**: Enter the destination IP address. Click **+ Destination IP Address** to add multiple destination IP addresses. Select the **Exclude** check box to exclude the specified

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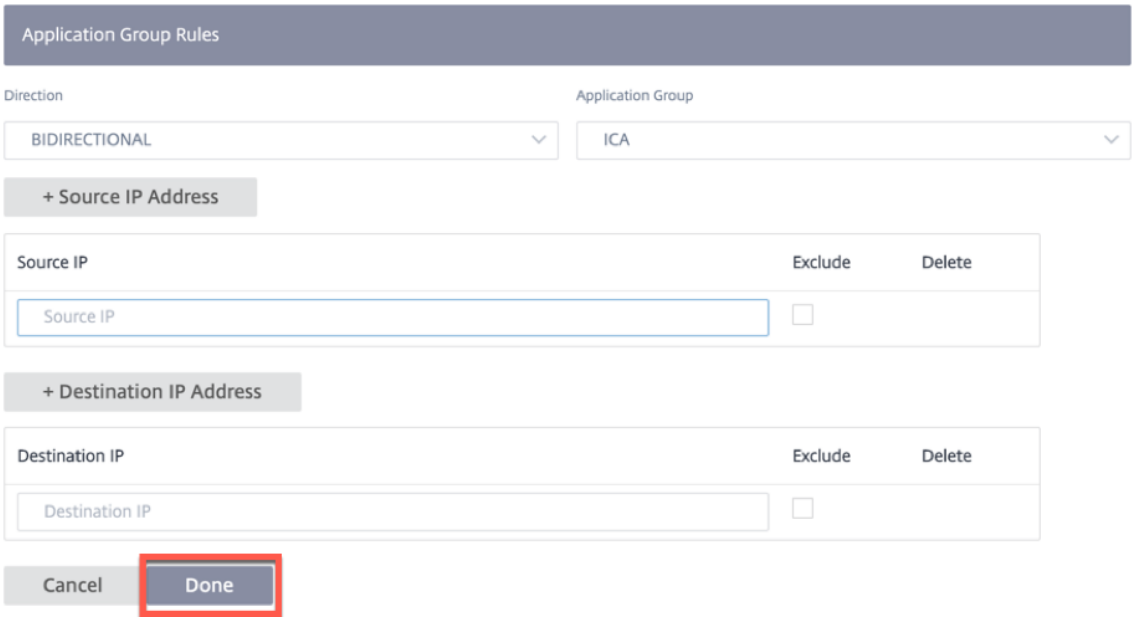
source IP address from this rule. Clear the check box to include the address.



4. Click **Done**.

Click any rule row from the existing table that you want to edit. Make the change as needed and click **Save**. Also, you can delete the existing Rule.

Click the **Reset to Defaults** button to retrieve the list of default rules. This action deletes the previously created rules and the modified rules.

Custom rules that are created cannot have an order value greater than 2000. Following are the default pre-defined rules that have fixed order values, and are non-editable:

- Other TCP traffic - 2000
- Unclassified Traffic - 2100

Deployment

All of the **WAN optimization configuration** settings are entitled to change management. Once the WAN Optimization configuration is done, you can proceed with **Staging** and **Activation** to start the virtual machine.

As the WAN optimization runs as a virtual machine, it has a different binary file that has to be downloaded to start the virtual machine. In Citrix SD-WAN Orchestrator service, the binary file transfer happens during the staging in the background and it is tied to the change management.

> **Note**
>
> As the binary file download happens during the staging, it takes some additional time to down-

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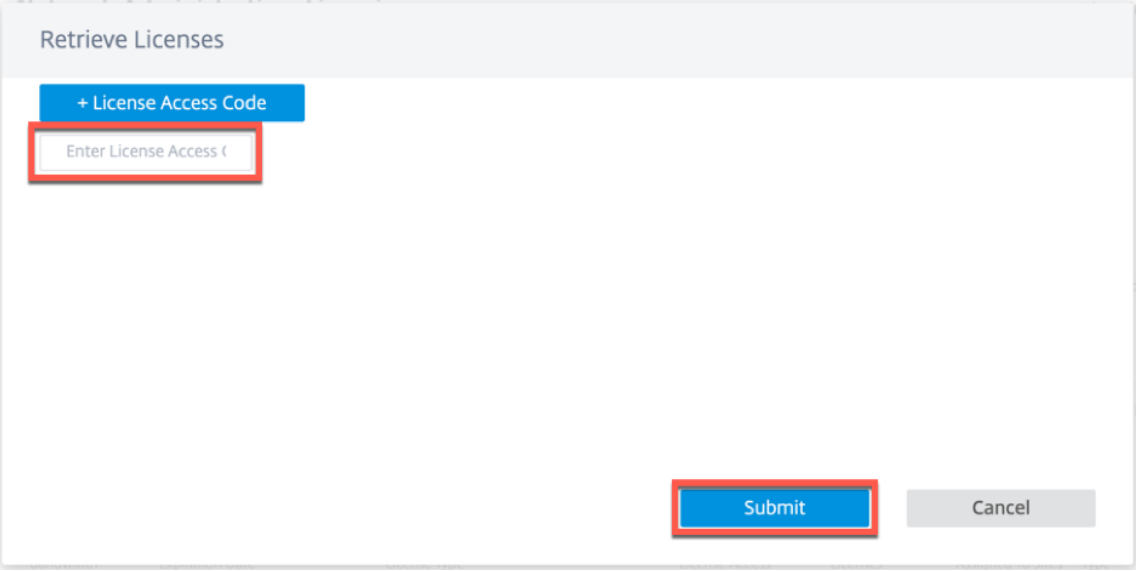
> load.

Prerequisites

To perform the change management, ensure that the following actions are completed:

1. To configure an appliance as PE, the device edition must be set as **PE**.
2. Apply for a PE license. An appliance must have an appropriate PE license. The license code is provided by the Citrix® team.

   Go to the **Administrator > Licensing**. Click **Retrieve Licenses** option, provide the code, and click **Submit**.

   You can see the number of licenses available with the associated device model.

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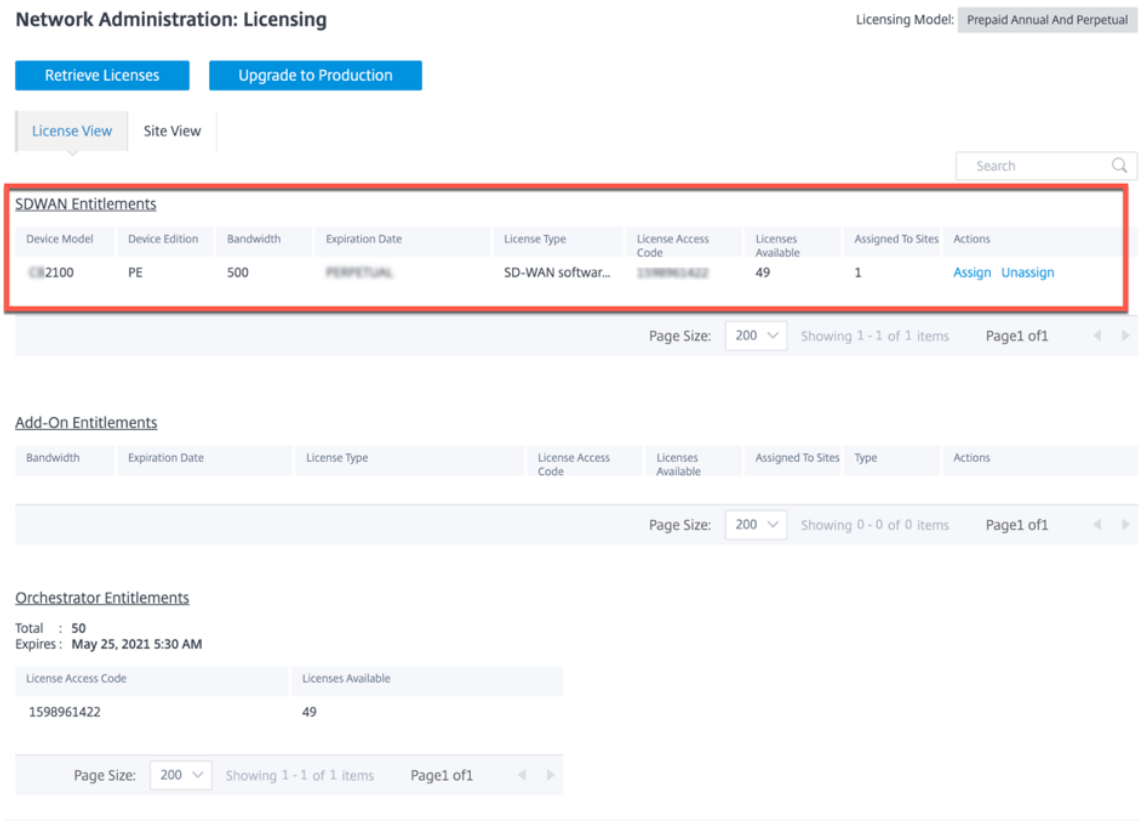

You can **Assign** or **Unassign** the license to the PE configured site as needed. You can also get an option to view the licensed and unlicensed site. By default, when you create a site, you get a Standard Edition (SE) grace license for 20 days.

> **Note**
>
> To apply the PE license, it has to match with the site properties (Device Model, Device Edition, and Bandwidth Tier).

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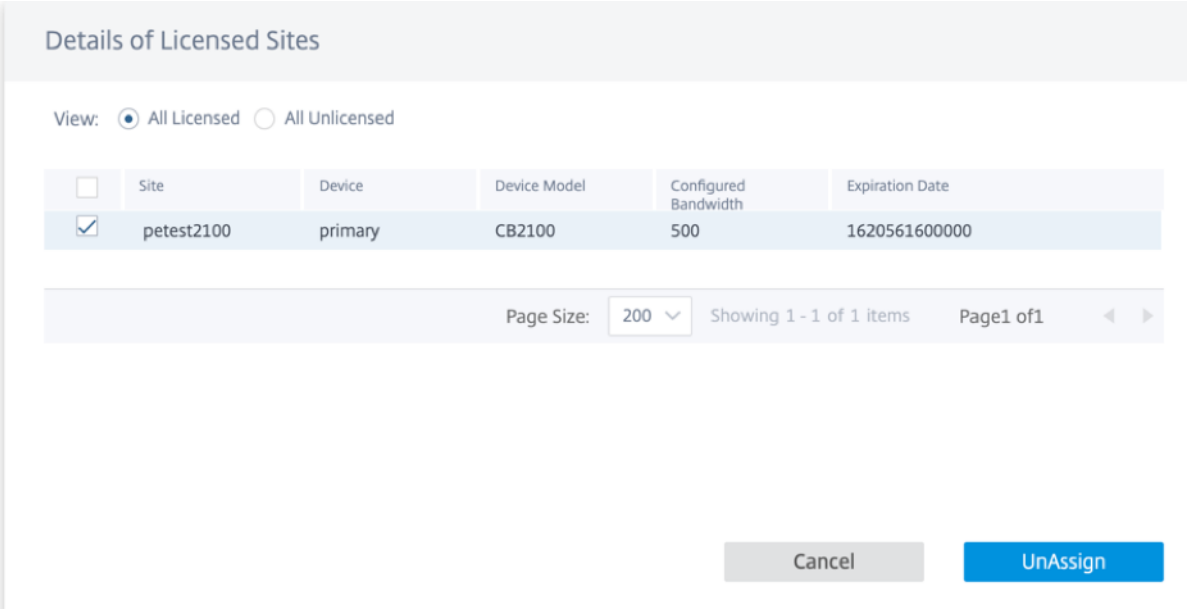
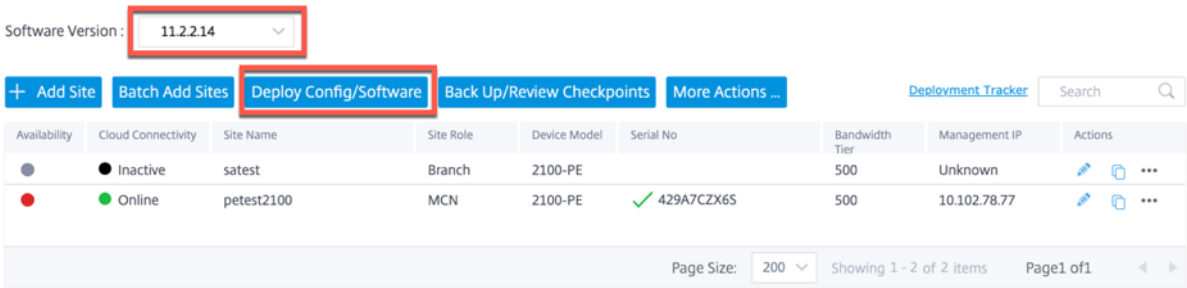


Once you configure the site as PE, select the software version as 11.2.2.14 and click **Deploy Config/-Software**.

> **Note**
>
> **Citrix SD-WAN PE Support** through SD-WAN Orchestrator is currently only available for SD-WAN software version of 11.2.2.14.



Click **Stage** and then **Activate**. The **Activate** button is available after the staging is completed. It might take some time to complete the staging activity as a binary file around 200 MB gets downloaded in the back end.

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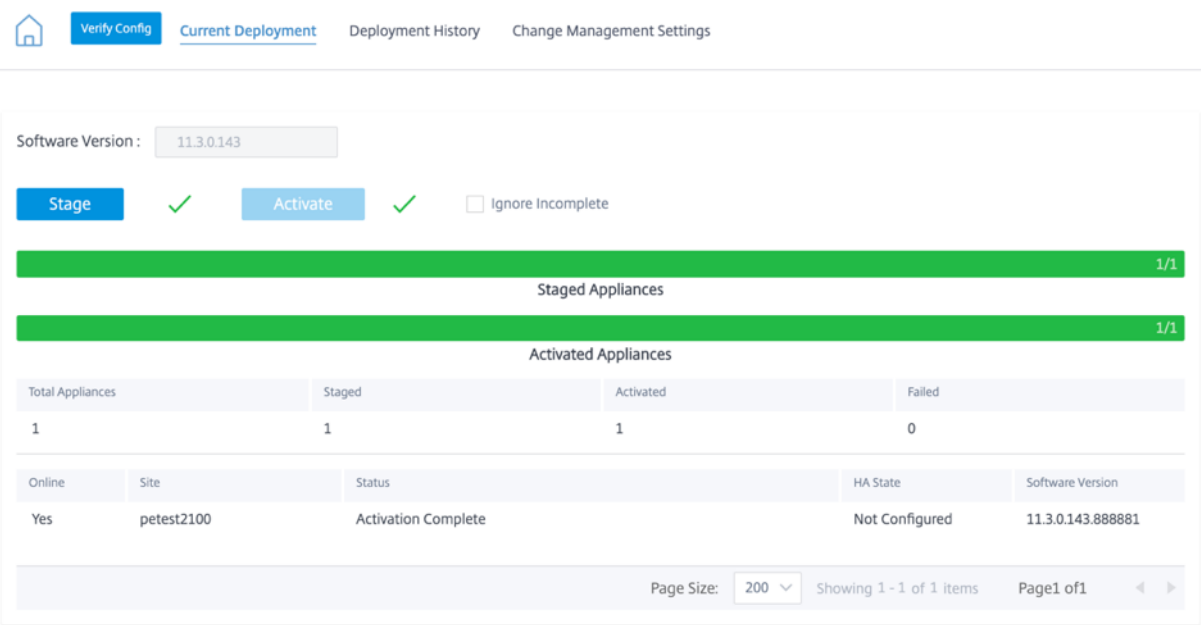
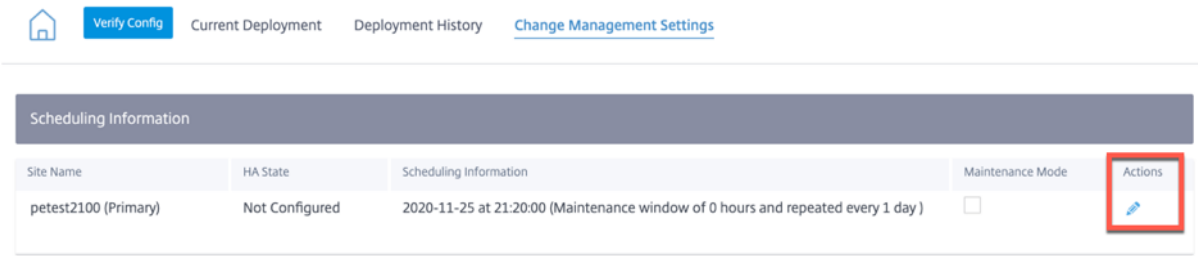


Once the staging and activation process is completed, the WAN optimization virtual machine will not activate immediately. You have to set the scheduling information as part of the **Change Management Settings**.

Click **Change Management Settings** and click the pencil icon under the **Action** column.



Provide the schedule information and click **Save**.

You can enter/edit the following parameters:

- **Site Name**: Appliance name as given by the user during the site configuration.
- **Date**: Date on which scheduled installation/upgrade will start from. Also, mention the local time of the appliance when the installation must being once the files are received. Valid Format is HH:MM:SS.
- **Maintenance Window**: The amount of time given by the user for installation. If the value is provided as 0, then the provision starts immediately after the files are present on the appliance irrespective of the date and time values given in the **Date** field.
- **Repeat Window**: Frequency with which the system checks for a new upgrade version and performs the upgrade only when a new version is available.

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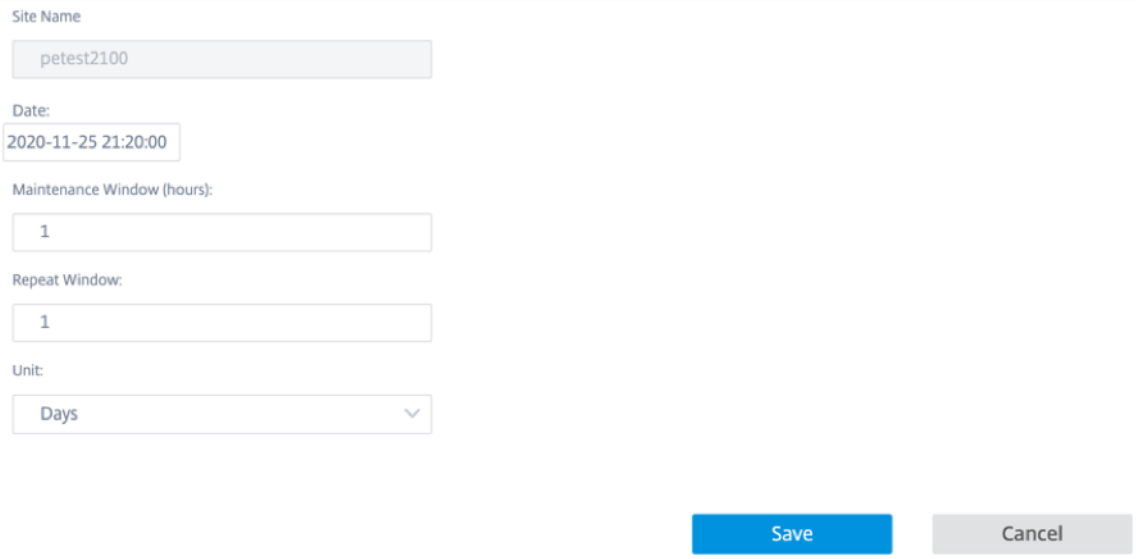
- **Unit**: Unit chosen to check for new versions can be any one of Hours/Days/Weeks/Months.



The WAN Optimization provision happens as part of the time/date mentioned in the scheduled window. Once the virtual machine is UP, only then the WAN Optimization capabilities can be applied.

> **NOTE**
>
> SD-WAN Orchestrator doesn't provide the provisioning status of the WAN Optimization Virtual Machine and the WAN Optimization Version. You must use the Citrix SD-WAN appliance UI to view the version and provisioning status.

Limitations

PE Appliance Settings, Monitoring, and Statistics features support will only be available in the upcoming release of SD-WAN Orchestrator.

WAN optimization

September 27, 2025

After the global configuration is completed, you have the option of customizing the sets and settings for each of the sites.

The **WAN Optimization global** settings that you just configured are automatically applied to each site of the network. You can elect to accept the defaults, or customize the configuration for any site. The procedures for configuring settings for a site are the same as for configuring the global, with a few minor differences.

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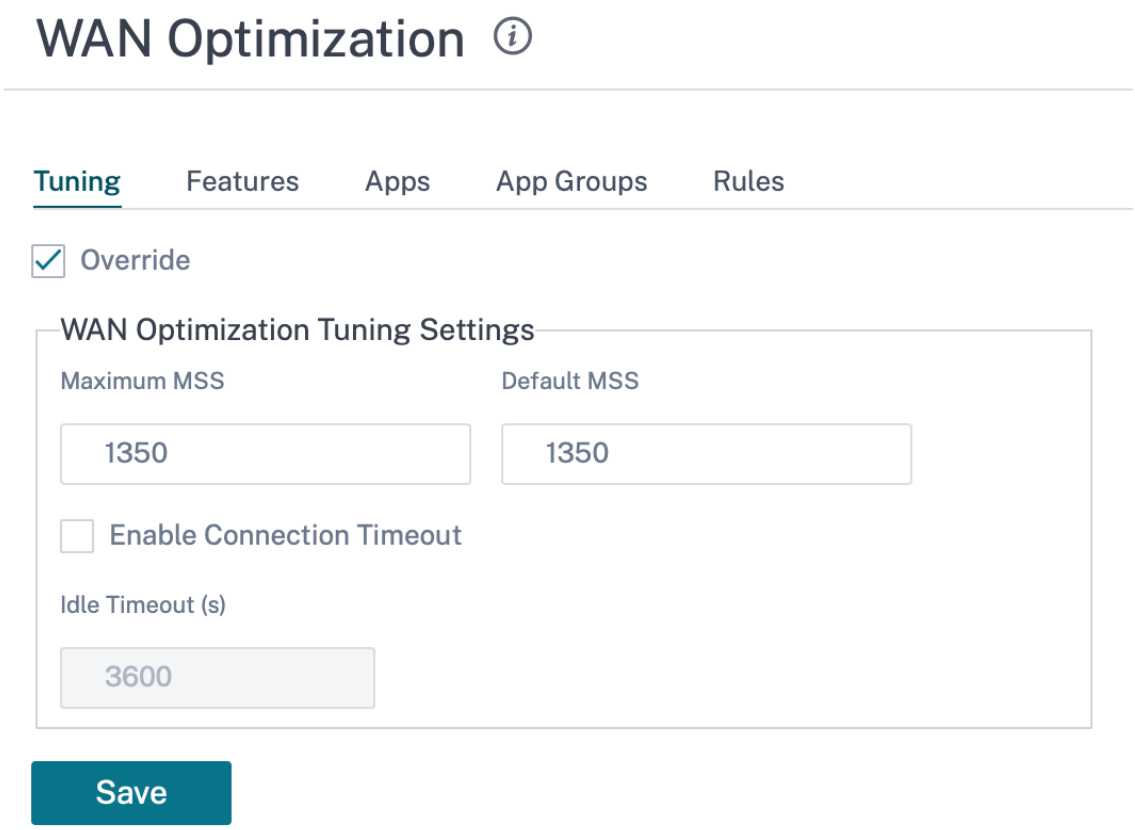
Perform the following steps to customize the configuration for a specific PE site:

1. At site level, navigate to **Configuration > Advanced Settings > WAN Optimization**. You can also directly click the configured PE site from the Network level then select **Advanced Settings > WAN Optimization**.
2. Select **Override** check box to enable editing. If the Override check box is not selected, all settings configured under global are applied to this site by default.



3. Enter your changes and click Save.

The **Override** option is available for all the WAN Optimization features configuration.

You have now completed configuring the settings for your Virtual WAN.

WAN-Optimization settings

September 27, 2025

You can configure WAN Optimization settings like KeyStore, Windows Domain, SSL Profiles, CA Certificates, Certificate Key Pairs, and Secure Peering for each site, through Citrix SD-WAN Orchestrator ser-

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vice. To configure WAN optimization settings, from the site-level, navigate to **Configuration** > **WAN-OP Settings**.

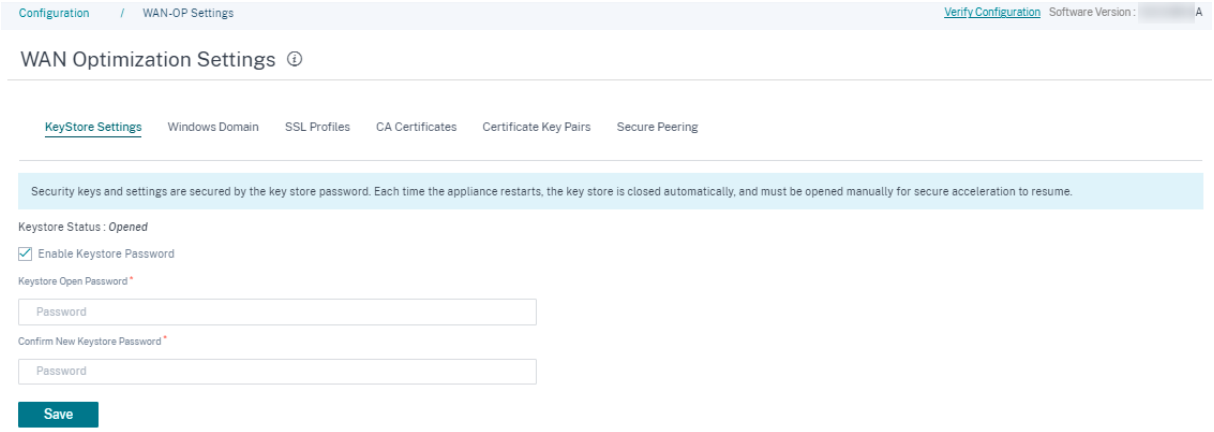
Citrix SD-WAN Orchestrator service supports WAN Optimization settings for SD-WAN PE appliances running the software version 11.3.1 or higher.

> **Note**
>
> The option to configure WAN optimization settings is not available while creating or editing a site template.

KeyStore Settings

You can enable KeyStore settings by selecting the **Enable KeyStore Password** check box. Set the KeyStore password by updating the **KeyStore Open Password** and the **Confirm New Keystore Password** fields and then click **Save**. To disable KeyStore settings, clear the **Enable KeyStore Password** check box.

The key store password secures the security keys and settings of the SD-WAN appliance. Every time the SD-WAN appliance restarts, the key store is automatically closed. You must then open the key store for secure acceleration to resume.



Windows Domain

You can join the server-side Citrix SD-WAN™ appliance to a domain that the Windows file server and Exchange server are a part of. This makes the SD-WAN appliance a trusted member of the Windows security system.

To add a server-side SD-WAN appliance to a domain name:

1. In the **Windows Domain** section, update the **Domain Name**, **User Name**, and **Password** fields.
2. Click **Save**.

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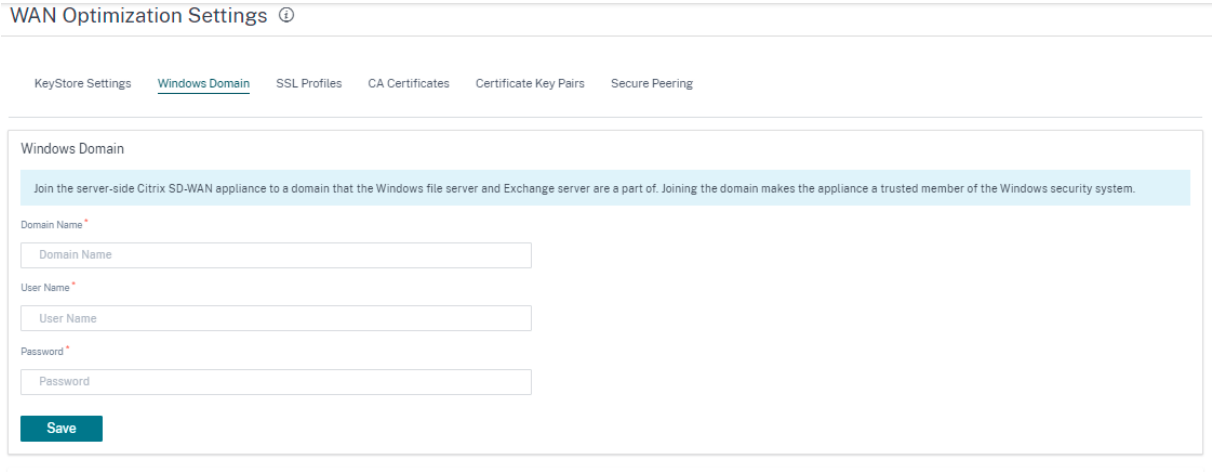

To add the users to a domain name:

1. In the **Delegate Users** section, click **Add**.
2. Update the **Domain Name**, **User Name**, and **Password** fields.
3. Click **Save**. The user profile appears in the list with basic information such as the domain to which the user is connected, and so on.

You can also edit or remove an end-user profile by navigating to the **Actions** column and clicking the 3 dots.

SSL Profiles

Citrix SD-WAN Orchestrator service supports all SSL related configuration of the SD-WAN PE appliances for security and usability. On the SD-WAN Premium (Enterprise) Edition, service classes are configured by Citrix SD-WAN Orchestrator service and therefore, you cannot attach any SSL profiles. To accommodate the expression of SSL profile mapping to a service class, the work flow for SSL profiles is changed to allow for attaching Service classes in the profile node.

To create SSL profile on a new SD-WAN PE appliance:

1. Navigate to **Configuration** > **WAN-OP Settings** > **SSL Profiles** and then click **Add**. Create the SSL Profile.
2. On the **SSL Profile** page, provide a profile name and select the Service Classes that are associated to this profile. Choose the Proxy Type and provide relevant data.
3. Provide all the other data on the **SSL Profile** page.

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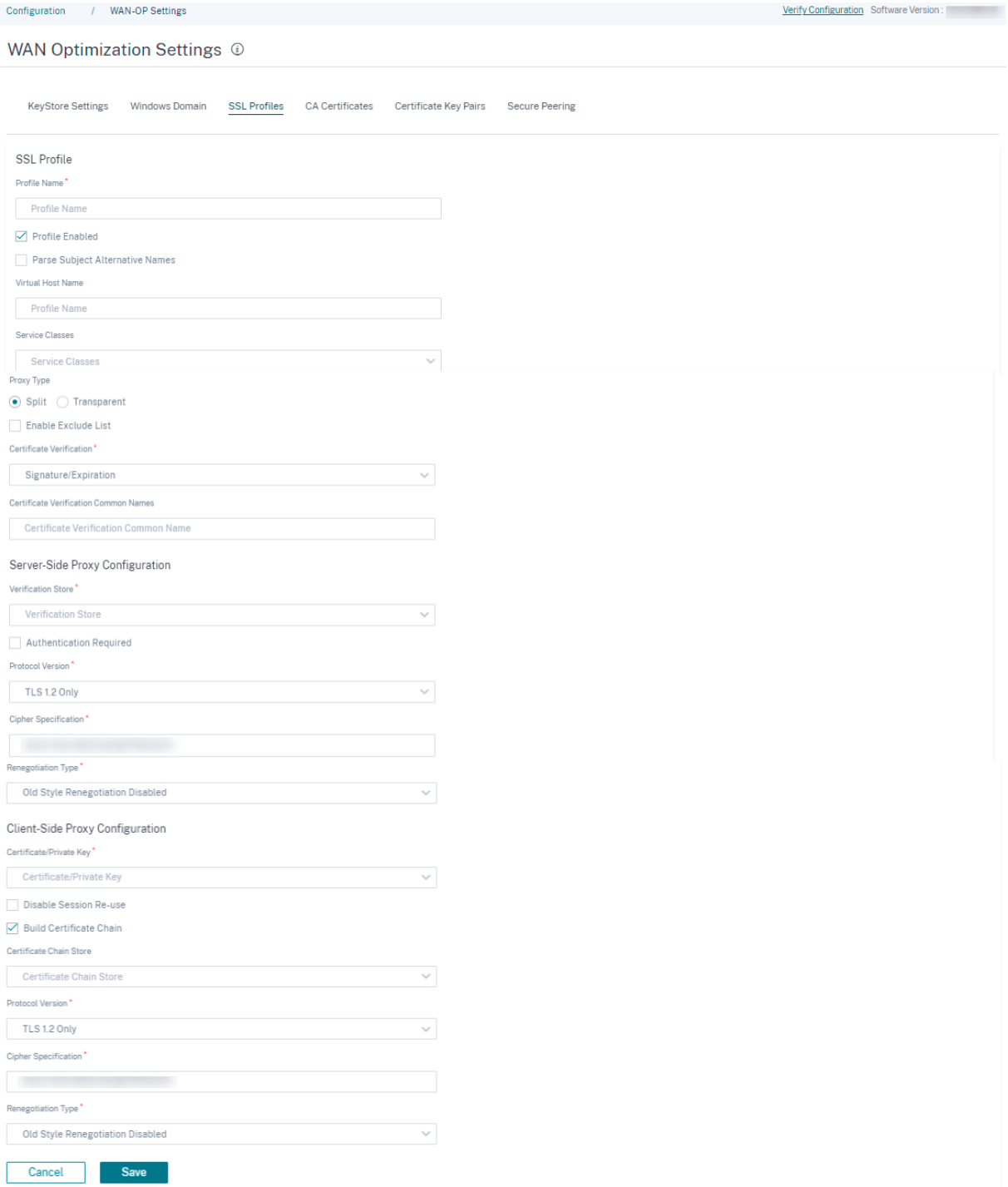
4. Click **Save**.



After you create the SSL profile and associate it with a service class, you can view the SSL profile information as shown below.

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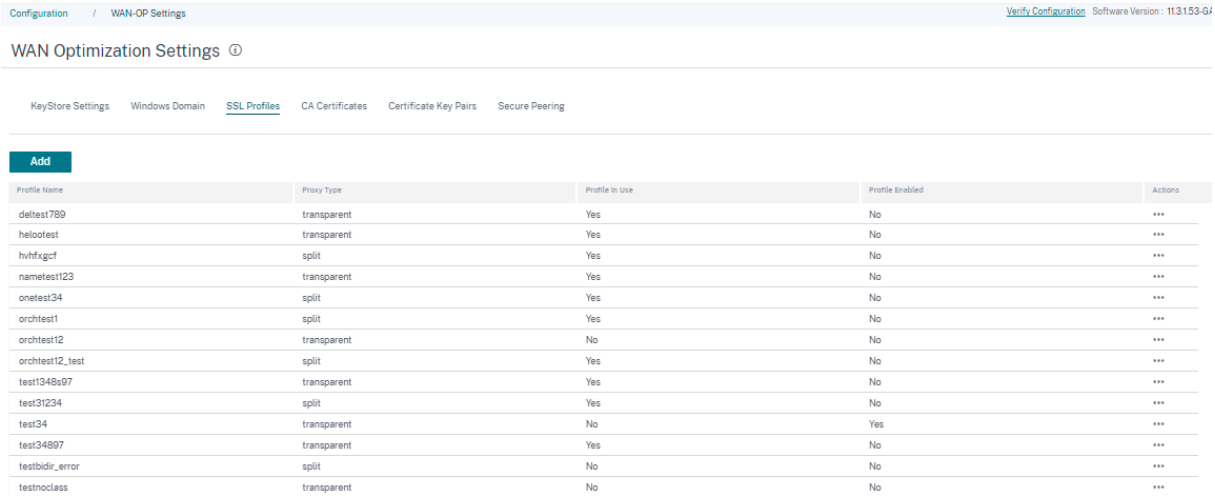


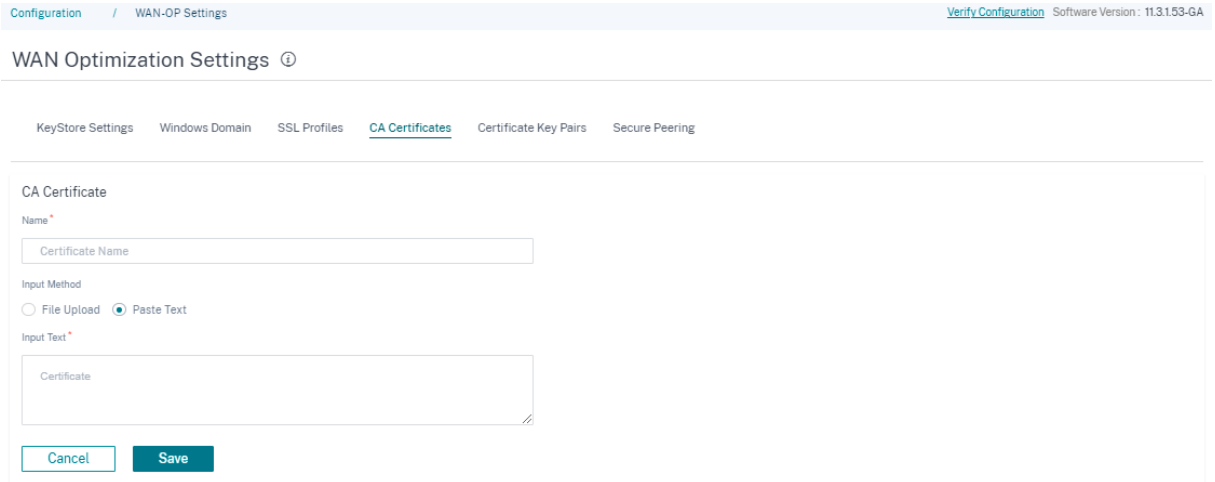
Limitation

While configuring an SSL profile, the SSL profile gets attached to all rules in a service class. If you need to attach the SSL profile selectively to a particular rule, the service class configuration is split into detailed rules for further selection.

CA Certificates

You can install CA certificates through Citrix SD-WAN Orchestrator service. To add a CA certificate:

1. In the **CA Certificates** section, click **Add**.
2. Update the **Certificate Key Pair Names** field.
3. Choose an input method –File Upload or Paste Text based on your requirement.
4. Click **Save**.



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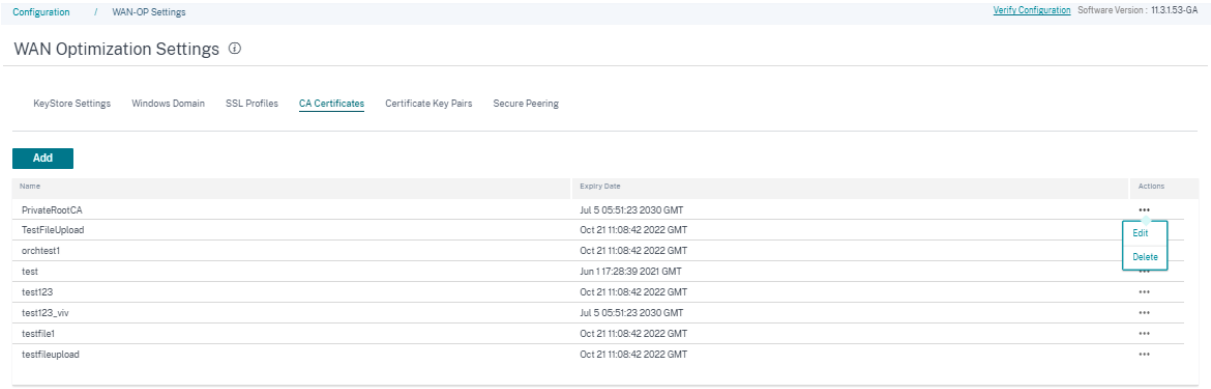
You can also edit or remove a CA certificate by navigating to the **Actions** column and clicking the 3 dots.



Certificate Key Pairs

You can add Certificate Key pairs through Citrix SD-WAN Orchestrator service.

To add an SSL Certificate key pair:

1. In the **Certificate Key Pairs** section, click **Add**.
2. Update the **Certificate Key Pair Names** and the **Key Password** fields.
3. Choose an input method –File Upload or Paste Text based on your requirements.
   When you select the **File Upload** method, you can select a configuration file to upload the Certificate key and the Private key. The allowed file types are `.pem`, `.der`, `.pfx`, and `.crt`.

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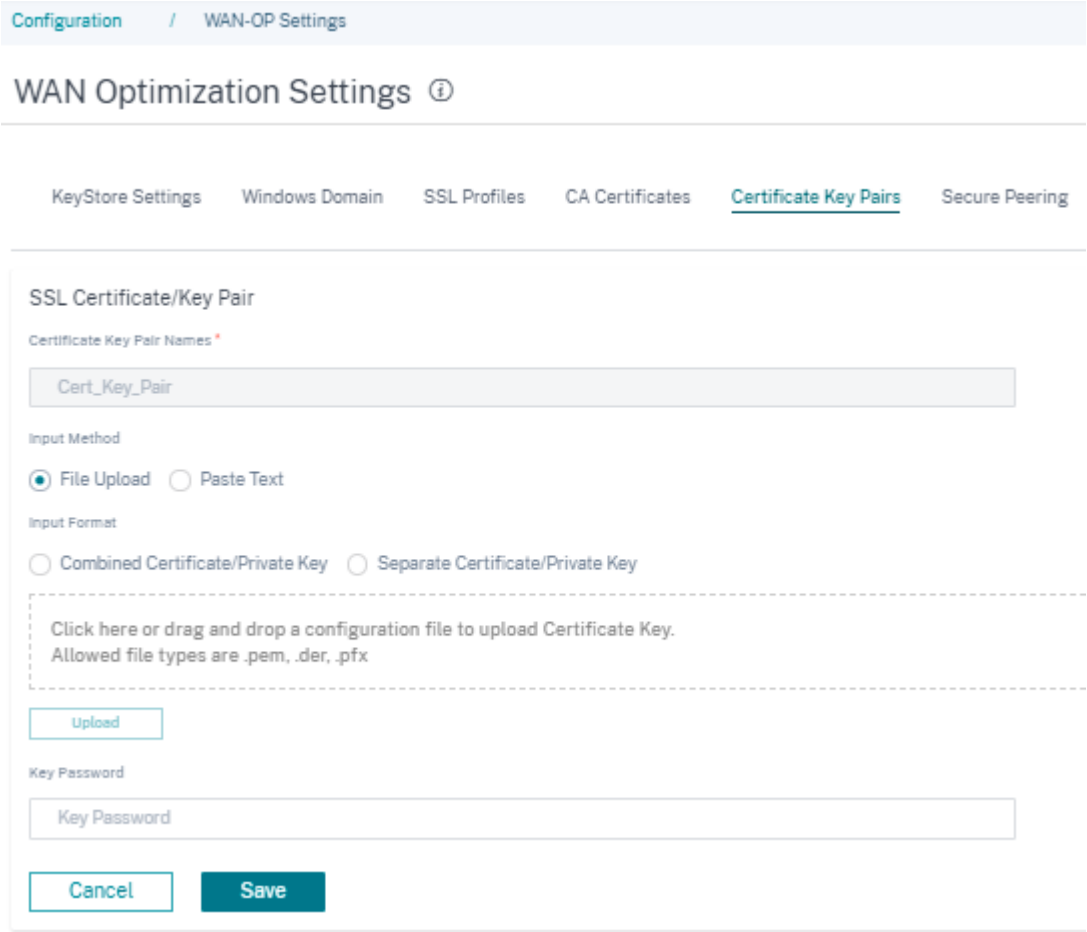

When you choose the **Paste Text** method, you can update the Certificate key and the Private key details manually.

4. Choose an input format –**Combined Certificate/Private Key** or **Separate Certificate/Private Key** based on your requirement. In case of `.pem` and `.der` file formats, there are separate upload boxes for certificate and key.
5. Click **Save**.

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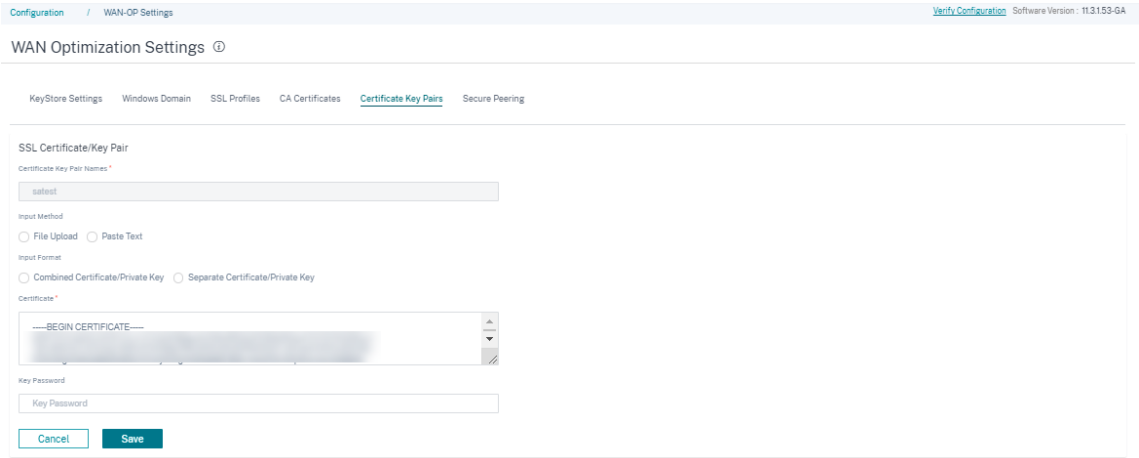
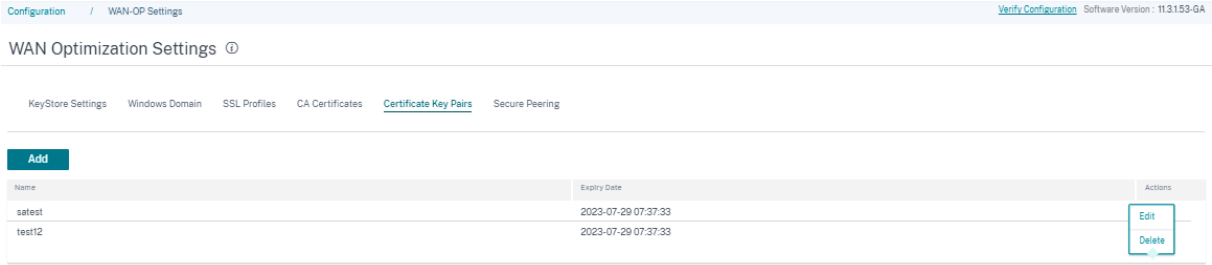


You can also edit or remove a Certificate-key pair by navigating to the **Actions** column and clicking the 3 dots.



Secure Peering

Secure communications with the Citrix SD-WAN WANOP appliances require that you generate OpenSSL credentials, including a CA Certificate and a Certificate/Key pair, and select a verification method. You can optionally change the OpenSSL cipher specification.

You can enable the secure peering settings by clicking the edit icon in the **Secure Peering Certificate and Keys** section and selecting the **Enable Secure Peering** check box.

- **Certificate Configuration**
  - **Private CA**: When you choose this option, Citrix SD-WAN Orchestrator service automatically generates the certificates and keys. You can securely connect to the peer SD-WAN appliances of other sites by providing the appliance details in the **Connected Peers** section.

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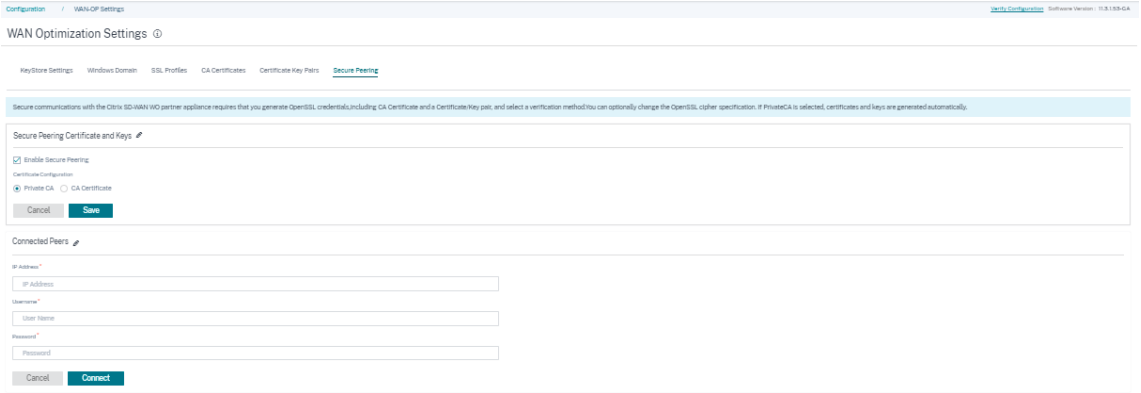
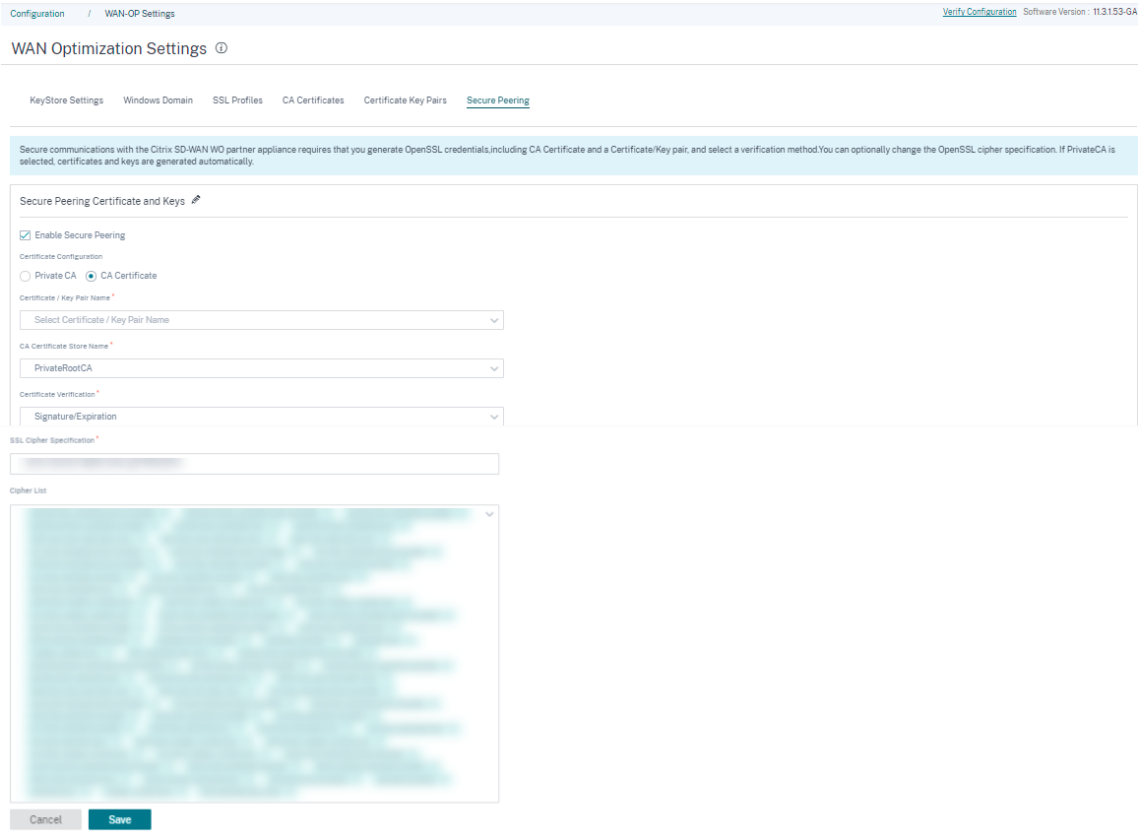


- **CA Certificate**: When you choose this option, you can install the certificates and keys as per your requirements.



In the **Listen On and Connect To** section, you can connect multiple SD-WAN appliances by providing the IP address and port details. Click **+Connect To** and provide the details as required, and click **Connect**.

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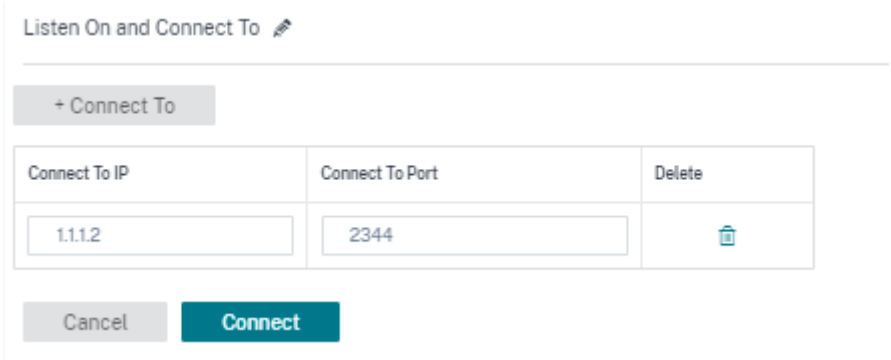
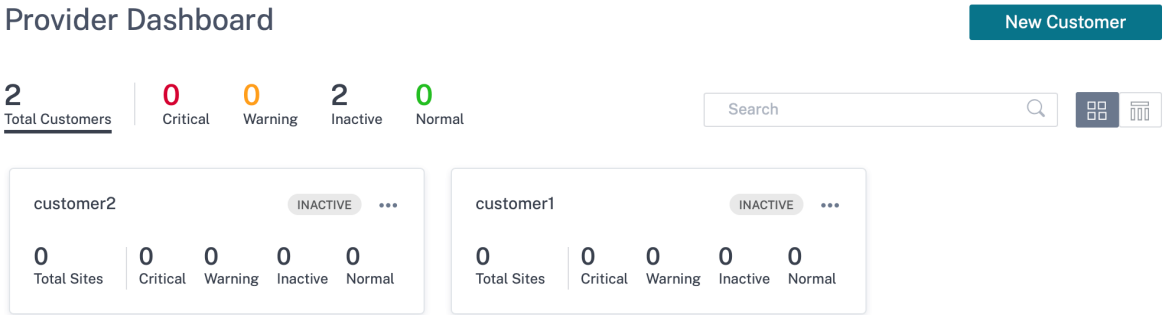


Provider dashboard

September 27, 2025

When you log in as a Citrix® partner, the **Provider Dashboard** appears. It offers a bird's eye view of all the SD-WAN customers managed by a service provider.



A color-coded health snapshot of each customer's SD-WAN network is provided, with a provision to drill down into any of them for customer specific details. The dashboard is available in both **Tile View** and **List View**.

The color-coding criteria used for the customer's network are:

- Critical (Red): One or more sites are down
- Warning (Orange): No sites are down but there are one or more critical alerts.
- Normal (Green): No sites are down and there are no critical alerts.
- Inactive (Gray): The network is being configured, but has not been deployed yet.

The color-coding criteria allows administrators to focus on the customers that need their attention.

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Customer/Network dashboard

September 27, 2025

The Network Dashboard provides a bird's eye view of an organization's SD-WAN network in terms of health and usage across all the sites. The dashboard captures a summary of the network-wide alerts, uptime of the overlay and underlay paths, highlights usage trends, and provides a global view of the network.

The dashboard summarizes the following aspects of a network, with a provision to drill down for more details.

- **Critical Alerts**: Running count of the critical health alerts, if any, popping up on the network.
- **Uptime**: Side-by-side comparison of the average uptime offered by the SD-WAN virtual overlay network v/s the physical underlay network
- **Usage Trends**: Top Apps - based on traffic volume and Top Sites - based on capacity utilization.
- **Network View**: A visual representation of all the sites across a network, available in both Map View and List View.

The dashboard lists the total number sites in the network and also segregates the sites based on their connectivity status. Select the numbered links to view the sites based on the following status categories:

- **Critical** –Sites that have all the associated virtual paths down.
- **Warning** - Sites that have at least one virtual path down.
- **Normal** - All virtual paths and associated member paths of the site are up.
- **Inactive** - Sites that are in the undeployed and inactive state.
- **Unknown** - Status of the site is unknown.

Clicking the status filters the sites based on their status and displays the details. You can also use the **Search** bar to view the details of a site based on the site name, role, overlay connectivity, model, bandwidth tier, and the serial number parameters.

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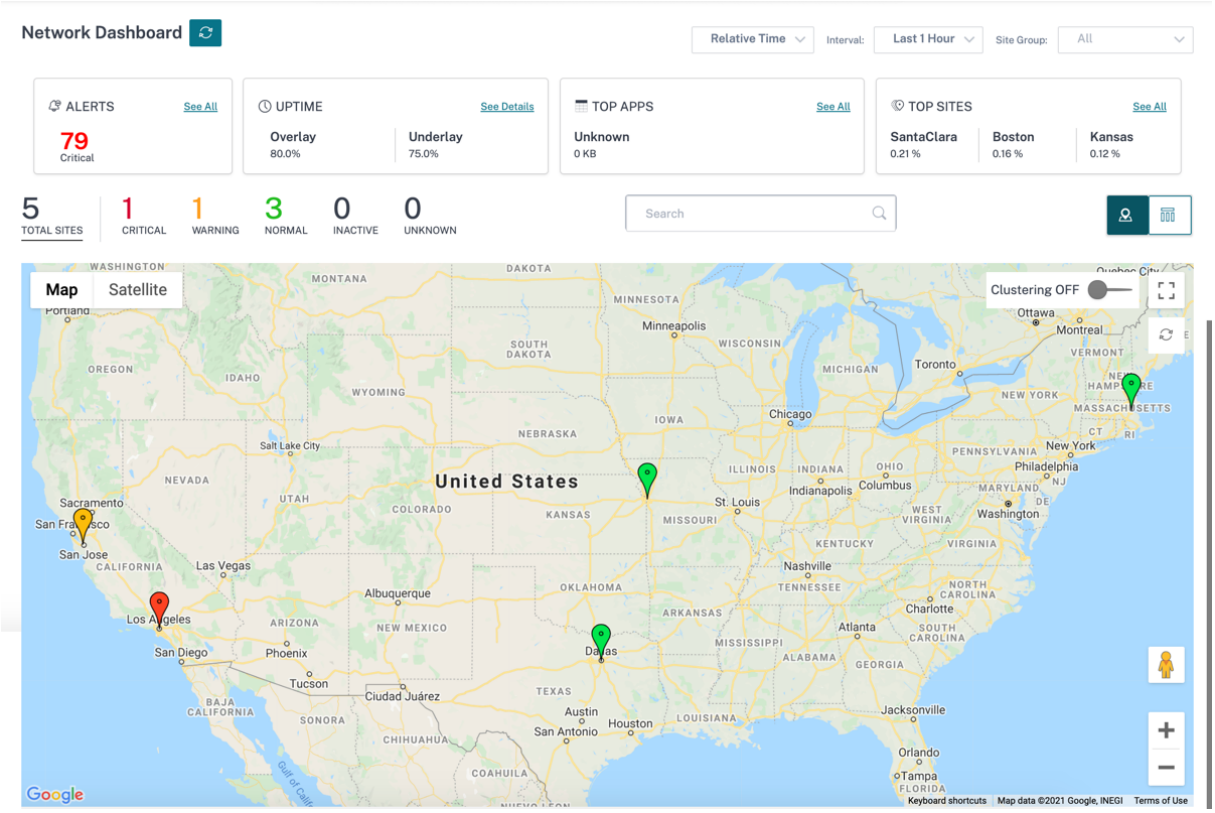

The map provides a real-time view of the global network with all the organization's sites depicted on a world map, based on their locations. The color of each site reflects its current health.

Following are the color-coding criteria used for each site:

- **Critical (Red)**: At least one overlay virtual path associated with a site is DOWN.
- **Warning (Orange)**: At least one underlay member path is DOWN, but all the overlay virtual paths are UP.
- **Normal (Green)**: All overlay virtual paths and the associated underlay member paths are UP.
- **Inactive (Grey)**: Site is under-configuration and has not been deployed yet.

On hovering over any site, some of the key site-specific details such as the site role, device model, bandwidth tier is displayed. The virtual paths associated with a site show up with suitable color codes that reflect their health. The **List View** provides the same details for each site, summarized as entries in a table.

Clustering

The **Clustering ON** feature monitors the consistency, status, and health of various sites of a cluster or a combination of clusters. The Clustering ON service provides a real-time view of sites that help to monitor the failover and the current state of the site.

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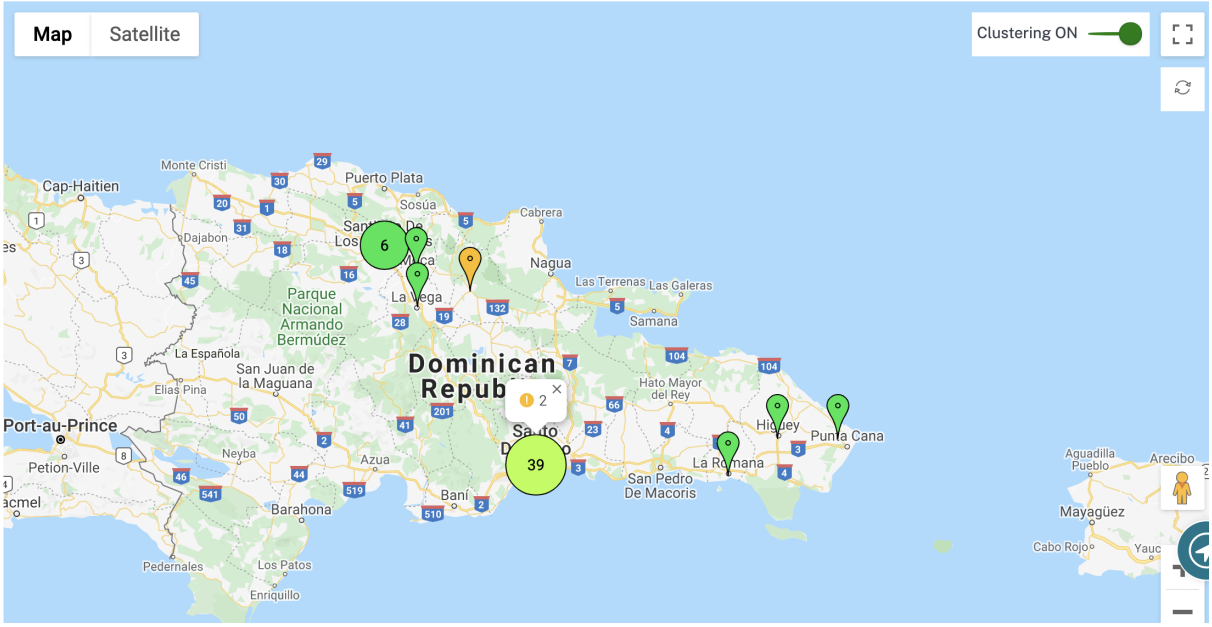
This **Clustering ON** feature is introduced to manage the high density of sites. It is not recommended to use the clustering off option when there are thousands of sites and it also brings down the performance.



The following table describes the five colors shade that is used for clusters to represent the health of sites:

Color Legends	Description
	All sites in the cluster are green. That means each site has all the virtual paths, and the associated member paths UP
	All sites in the cluster are orange. That means each site has at least one member path DOWN, but all virtual paths UP
	All sites in the cluster are red. That means each site has at least one virtual path DOWN
	The cluster has a combination of green and orange sites
	The cluster has a combination of red and non-red sites

You can also verify the network aspect by hovering your mouse on any cluster. The critical or warning alerts are visible on top of the cluster as a pop-up.

If you click the cluster, it zooms into that cluster and shows other clusters. You can see a view bar with

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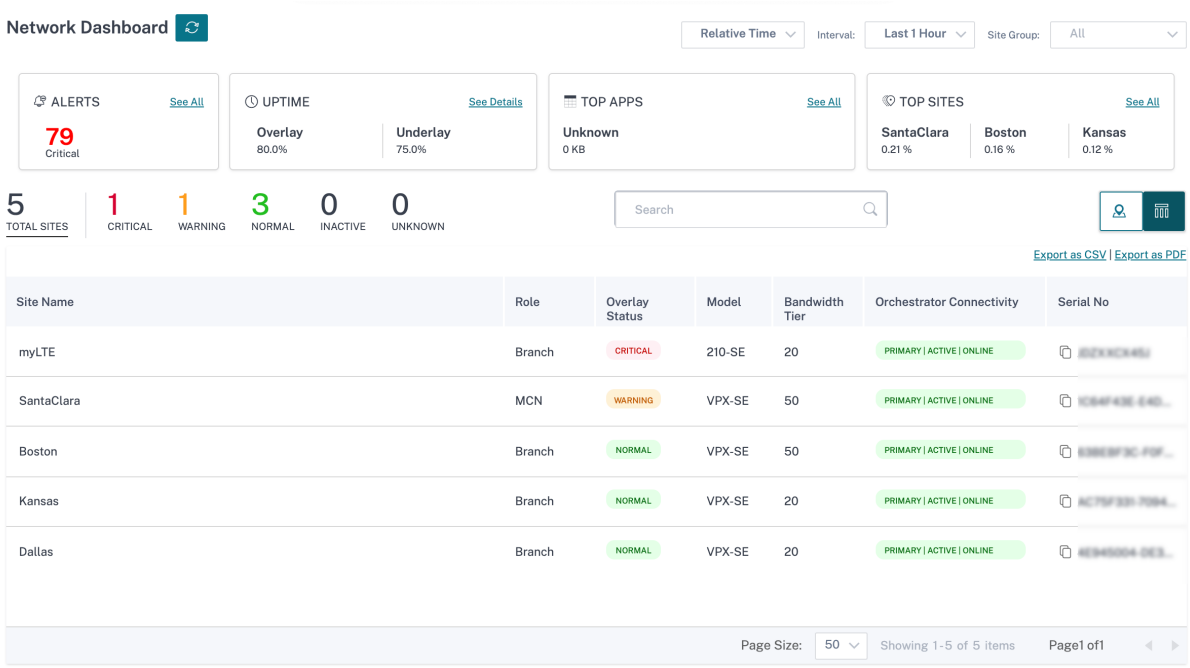
the number of clusters. The arrow option helps to bring you back one step. Click the **Close (X)** button to resume to the original page.

Alternatively, you can view the network summary in **List View**.



- Clicking any inactive “under-configuration”site that is yet to be deployed, would take you to the site configuration workflow.
- Clicking any active site, which has already been deployed, would take you to the **Site Dashboard**.

> **Note**
>
> Citrix SD-WAN overlay tunnels are called Virtual Paths. You would typically have one virtual path tunnel between each site and the Master Control Node (MCN), and extra site-site virtual paths as needed. Virtual paths are formed by bonding together the underlay WAN links / paths. So, each virtual path comprises multiple member paths.
>
> This can be shown when a user hovers over the term virtual path or member path.

You can drag the **Pegman** onto the map to open the street view.

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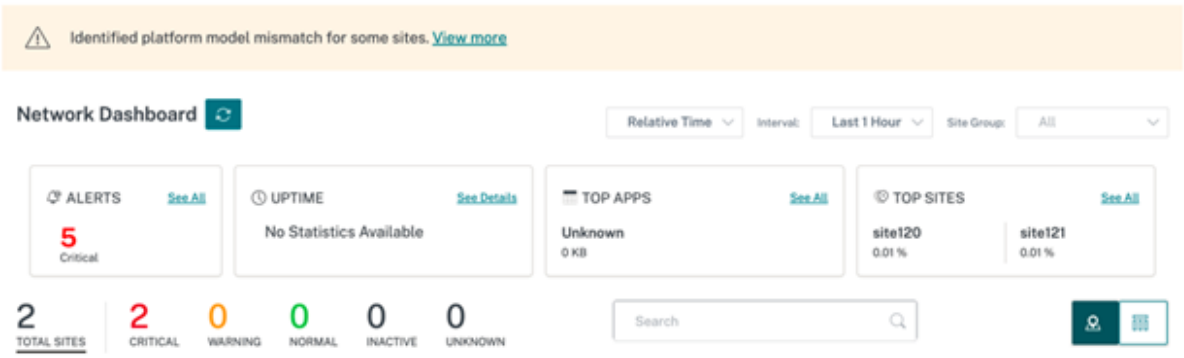
Record device mismatch

Citrix SD-WAN Orchestrator service reports a mismatch that is identified between the appliance reported platform model and the user reported platform model.

When the platform model and the sub-model provided by a user during site configuration does not match the platform model and sub-model provided by the appliance during the initial registration with Citrix SD-WAN Orchestrator service, a notification about the mismatch is displayed on the network dashboard. In such a scenario, ensure to configure the platform model reported by the appliance.

Click **View more** for a tabular representation of the platform model mismatch for each site.



The **Platform Mismatch Details** provides information such as site name, appliance reported platform model and sub-model, and user reported platform model and sub-model.

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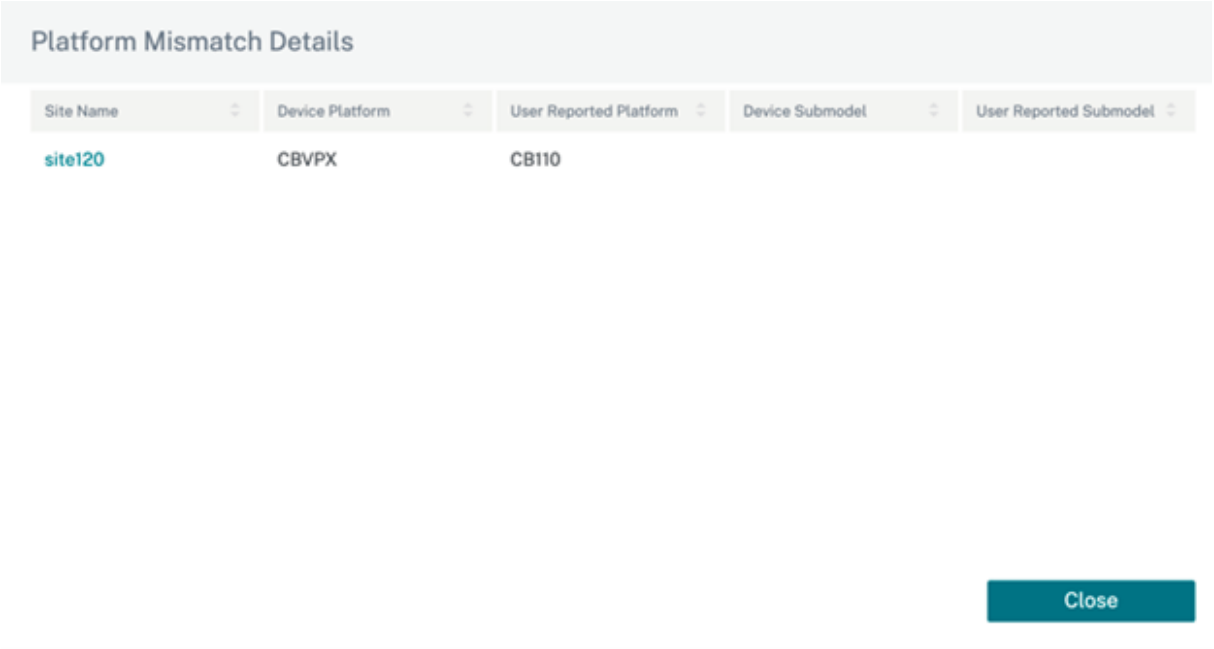

Site dashboard

September 27, 2025

The Site Dashboard provides an overview of a site's health and usage trends.

The dashboard summarizes the following aspects of a site, with a provision to drill down for more details.

- **Critical Alerts**: Running count of the critical health alerts, if any, popping up on the site.
- **Uptime**: Side-by-side comparison of the average uptime offered by the SD-WAN virtual overlay paths v/s the physical underlay paths, associated with a site
- **Usage Trends**: Top Apps and App Categories associated with a site, based on traffic volume
- **Site Details**: WAN Connections, and Devices associated with a site

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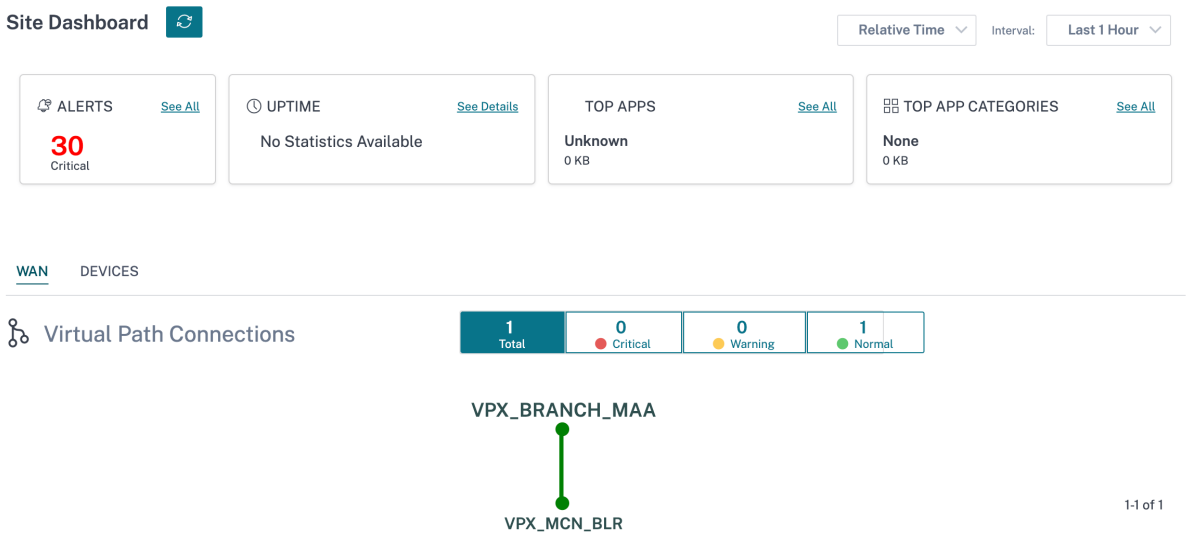

> **Tip**
>
> Click **See All** or **See Details** to view statistics that are more detailed.

All the overlay virtual path connections associated with a site are displayed with suitable color-coding to reflect the health of each connection.

You can select any virtual path connection, to review the corresponding health metrics and trends.

The color-coding criteria used for virtual path connections are:

- **Critical (Red)**: Virtual path is DOWN.
- **Warning (Orange)**: Virtual path is UP, but at least one member path is DOWN.
- **Normal (Green)**: Virtual path and all member paths are UP.

Health metrics

Health metrics and graphical trends around availability, latency, loss, jitter, and throughput are displayed for the selected virtual path connection. These statistics are available in both the directions: **WAN to LAN** and **LAN to WAN**. All the metrics can be reviewed against a common timeline, to help quickly narrow down the problem domain while troubleshooting.

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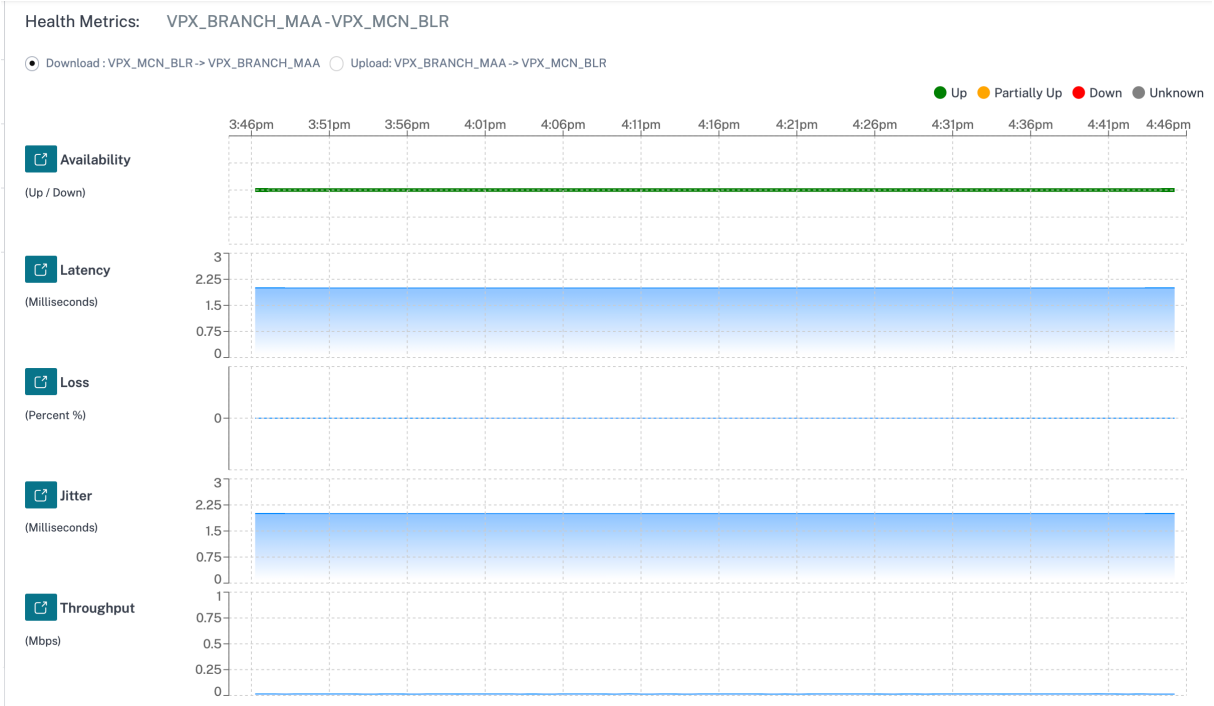
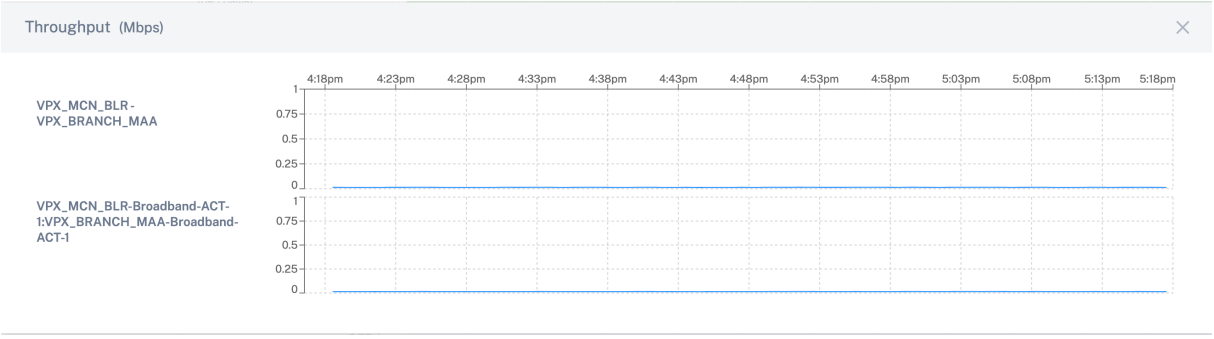


You can further drill down into each health metric to get a comparative view of the overlay virtual path and the underlay member paths for the same metric. This would aid in troubleshooting overlay versus underlay issues.



Devices

The **Devices** tab displays details associated with the site's devices, interfaces, and disk temperature. You can also reboot the appliance, reset the appliance configuration or download device logs.

The **Temperature** section displays the temperature of the system, CPU, and the disks in degree Celsius.

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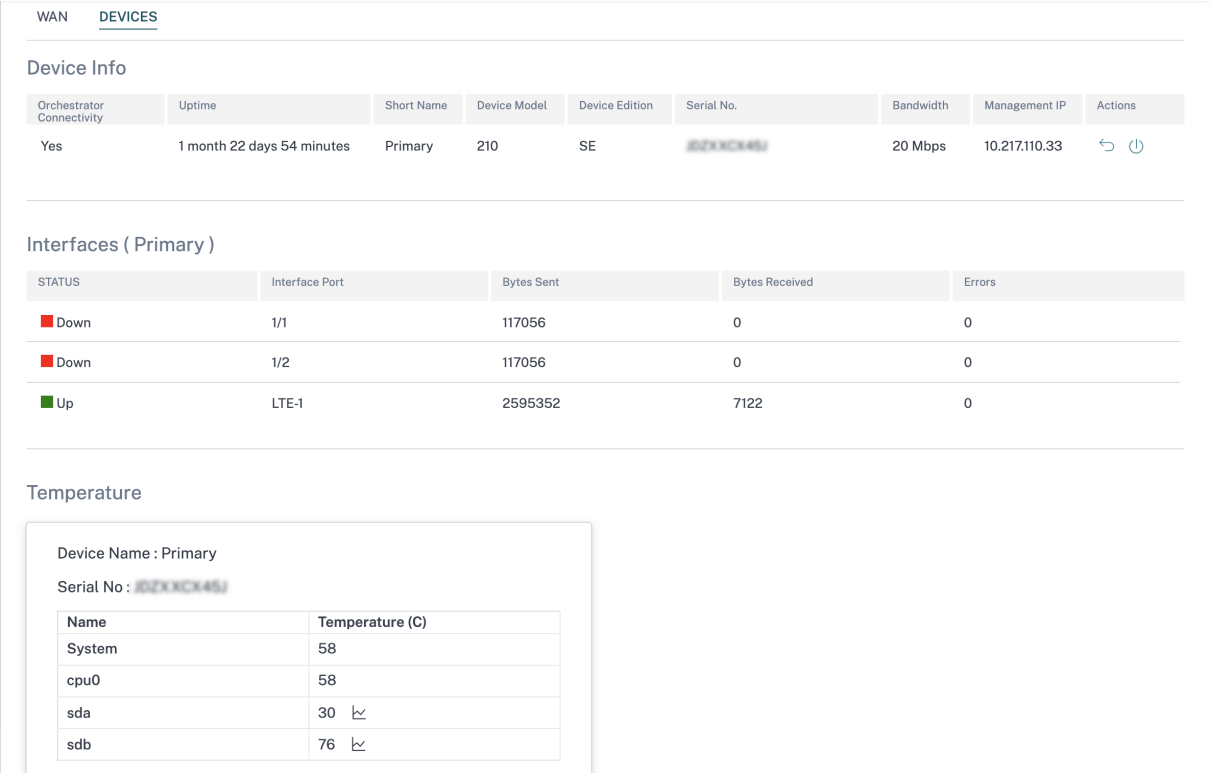

You can also click the graph icon in the **Temperature (C)** column and view the information in graphical form.

Provider Troubleshooting

September 27, 2025

The Provider audit logs page displays provider-level logs and device logs, enabling quick troubleshooting.

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Audit logs

Audit logs capture the action, time, and result of the action performed by the providers. Navigate to **Troubleshooting** > **Audit Logs** to view the **Provider Troubleshooting: Audit Logs** page.

The Provider Audit logs page displays the following information:

- **Search bar**: Search for an audit activity based on a keyword.
- **Filtering options**: Run an audit log search by filtering based on the following criteria:
  - User
  - Feature
  - Time range
- **Export as CSV**: When you click this option, the audit log entries are exported to a CSV file.
- **Audit Info**: Click the icon on the **Action** column to navigate to the **Audit Info** section. This section provides the following information:
  - **Method**: HTTP request method of the invoked API.
  - **Status**: Result of the API request.
  - **Response**: Error response when the API request fails. This field is displayed only when the API request fails.
  - **Payload**: Body of the request sent through API.
  - **URL**: HTTP URL of the revoked API.
  - **Source IP**: The IP address of the endpoint from which the SD-WAN features are configured. This field is displayed on the **Provider Troubleshooting: Audit logs** page and on the **Audit Info** page.

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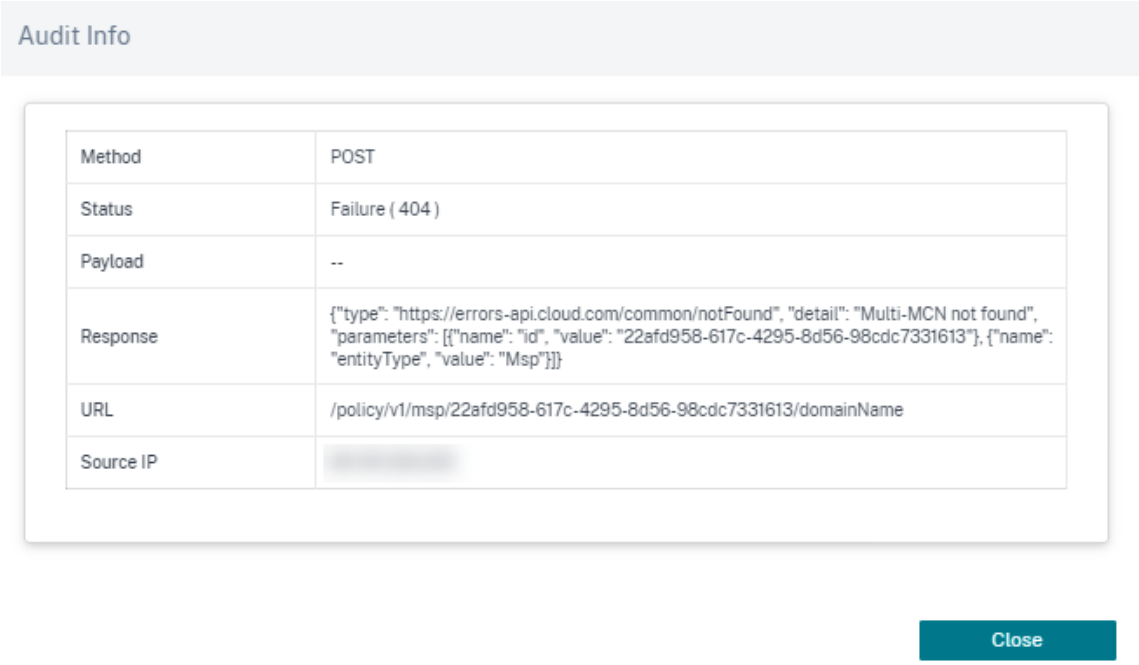
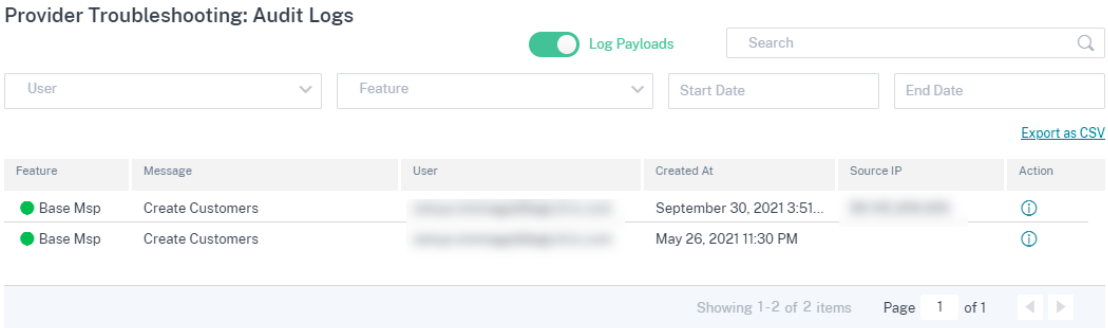


- **Log payloads**: By default, this option is disabled. When enabled, the request body of the API message is displayed in the **Audit Info** section. For more information about API, refer to API guide for Citrix SD-WAN Orchestrator.



Device logs

Providers can view the device logs that are specific to customers. You can also filter device logs by site name.

You can select specific device logs, download it, and share it with customers if necessary.

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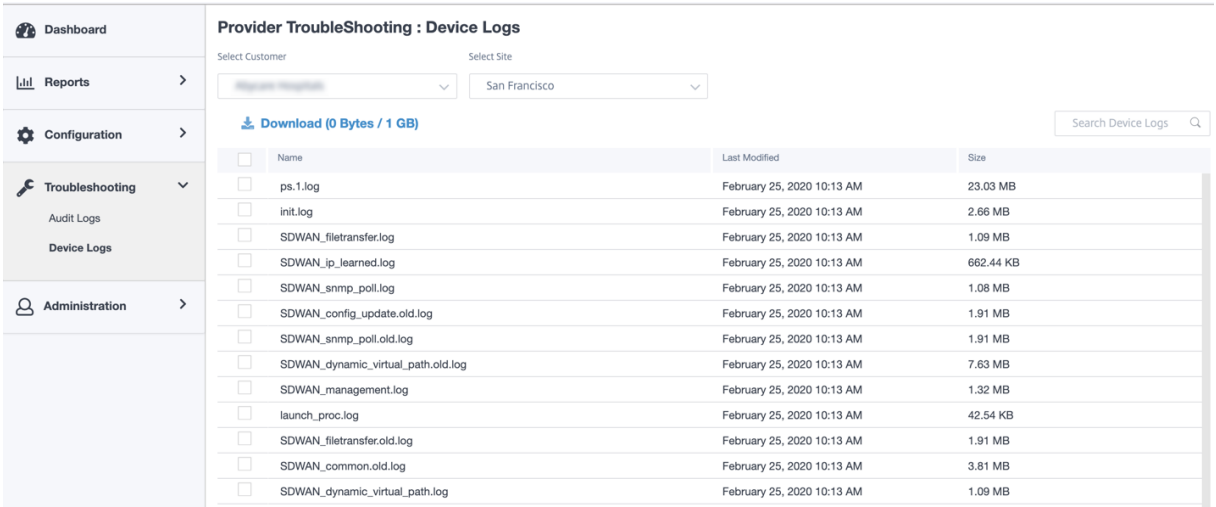

Network Troubleshooting

September 27, 2025

Customers can view logs of all the network appliances, enabling quick troubleshooting.

Audit logs

Audit logs capture the action, time, and result of the action performed by users on a customer network. Navigate to **Troubleshooting** > **Audit Logs** to view the **Audit Logs** page.

The Audit logs page displays the following information:

- **Search bar**: Search for an audit activity based on a keyword.
- **Filtering options**: Run an audit log search by filtering based on the following criteria:
  - User
  - Feature
  - Site
  - Time range
- **Export as CSV**: When you click this option, the audit log entries are exported to a CSV file.
- **Audit Info**: Click the icon on the **Action** column to navigate to the **Audit Info** section. This section provides the following information:
  - **Method**: HTTP request method of the invoked API.

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- **Status**: Result of the API request. You see the following error response when the API request fails.
- **Response**: Error response when the API request fails. This field is displayed only when the API request fails.
- **Payload**: Body of the request sent through API.
- **URL**: HTTP URL of the revoked API.

Audit Info

Method	PUT
Status	Success (200)
Payload	{"gre": [{"greService": {"mtu": 1500, "checksum": false, "serviceName": "GRELan", "serviceType": "lan", "firewallZone": "", "routingDomain": "Default_RoutingDomain", "keepalivePeriod": 10, "keepaliveRetries": 3}, "greSiteBindings": []}, {"greService": {"mtu": 1500, "checksum": false, "serviceName": "GREINtranet", "serviceType": "intranet", "firewallZone": "", "routingDomain": "Default_RoutingDomain", "keepalivePeriod": 10, "keepaliveRetries": 3}, "greSiteBindings": []}]}
URL	/policy/v1/customer/3102986d-26ab-48cd-ae22-ee126dbcb341/config/gre

- **Source IP**: The IP address of the endpoint from which the SD-WAN features are configured. This field is available on the **Audit logs** page and the **Audit Info** page.
- **What Changed**: This section displays the logs of all the changes made to the SD-WAN features through the UI. Enable the Log Payloads toggle button to view the changes on the **Audit Info** page.

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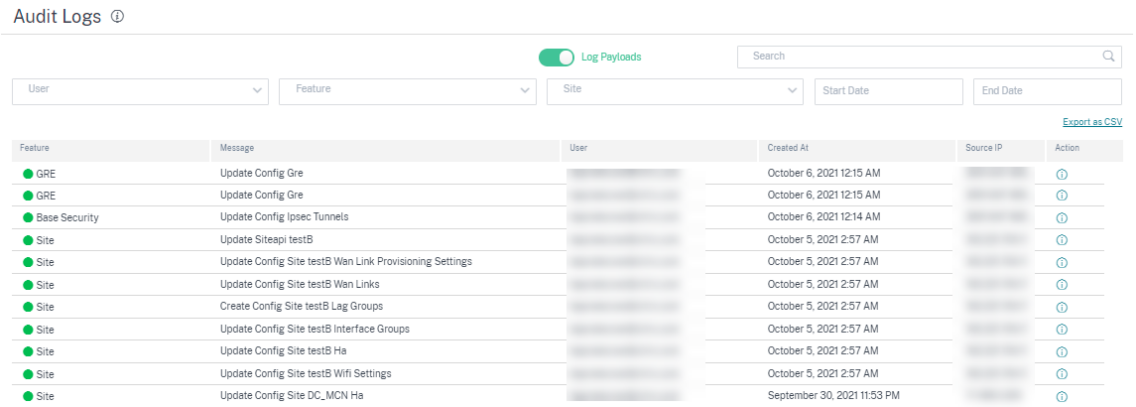
- **Log payloads**: By default, this option is disabled. When enabled, the request body of the API message is displayed in the **Audit Info** section. For more information about API, see API guide for Citrix SD-WAN Orchestrator.



Device logs

Customers can view the device logs that are specific to sites.

You can select specific device logs, download it, and share it with site admins if necessary.

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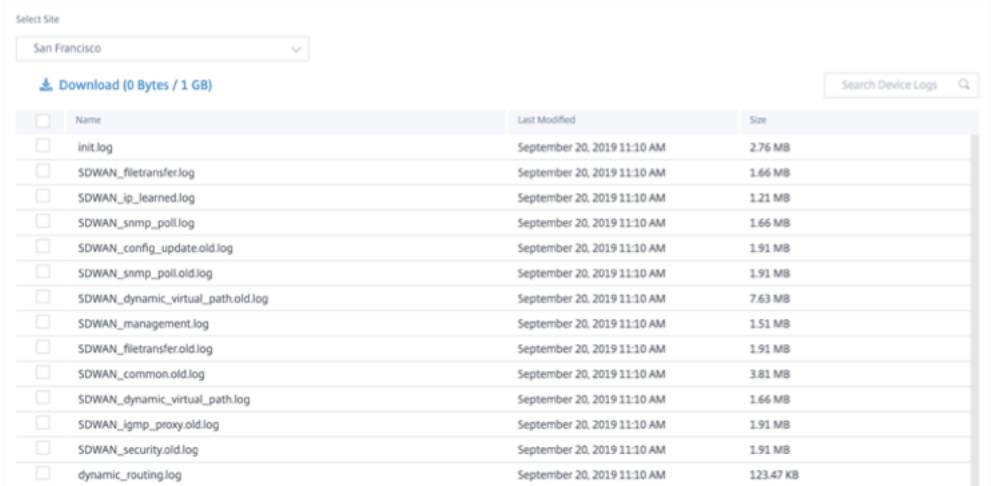

Security Logs

In the Citrix SD-WAN appliance, the Edge Security events are logged in the *SDWAN_advanced_firewall.log* file. The log file is periodically rotated based on the size, with up to 23 archives or a day's worth of logs remaining, whichever is less. For example, consider the following two use cases:

- If the log file fills up at a rate of 1 GB per 20 transactions (log entries), logs for approximately 8 hours is available, in the appliance, at any given time.
- If the log file fills up at a rate of 1 GB per hour or slower, logs for exactly a day are available in the appliance.

> **Note**
>
> - The size threshold for log rotation depends on the appliance. For the Citrix SD-WAN™ 1100 appliance the log rotation size threshold is 1 GB.
> - The log file SDWAN_advanced_firewall.log is available for Citrix SD-WAN 1100 appliance only. It is not available on Citrix SD-WAN 210 SE and Citrix SD-WAN 210 SE LTE appliances.

To receive the security logs from the Citrix SD-WAN appliance, in the appliance UI, navigate to **Configuration** > **Appliance Settings** > **Logging/Monitoring** > **Syslog Server** and ensure that the **Firewall Logs to Syslog** option is enabled.

Retrieval from Citrix SD-WAN Orchestrator service

Similar to other appliance log files, you can retrieve the Edge Security firewall logs from the Citrix SD-WAN Orchestrator service. At the network level, navigate to **Troubleshooting** > **Device Logs**, select a site with Edge Security enabled, select the Advanced Firewall logs you want to download and click **Download**.

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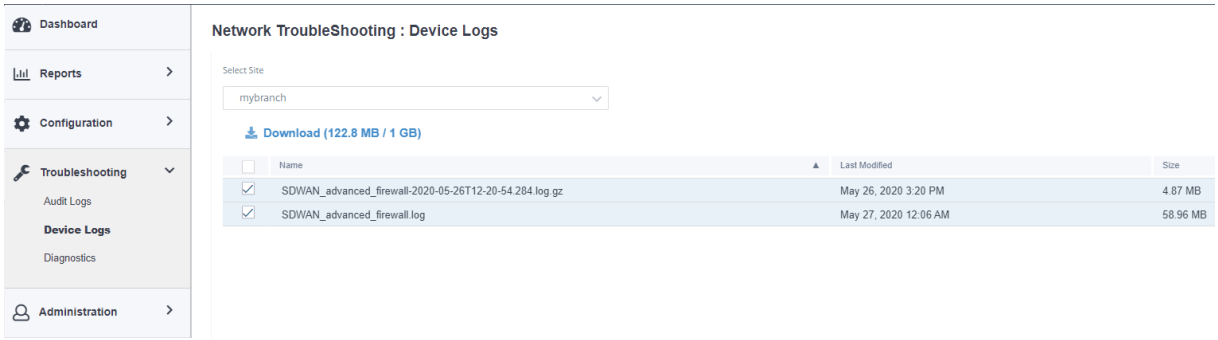

Exporting to external syslog server

If an external syslog server is configured on the appliance UI (**Appliance Settings** > **Logging/Monitoring** > **Syslog server**) Edge Security logs are generated and offloaded to this server.

Log entries

Edge Security log entries follow the Common Event Format (CEF). CEF is a standard that defines the syntax of log messages and therefore allows the interoperability of multiple devices generating log messages in a solution.

CEF consists of a standard header and a variable extension. The header format is as follows:

```
Timestamp host CEF:Version|Device Vendor|Device Product|Device Version|
    Device Event Class ID|Name|Severity|[Extension]
```

Example:

```
Jan 18 11:07:53 sd-wan CEF:0|Citrix|SD-WAN|11.2.2.7|EdgeSec|Name|
    Severity|Extension
```

The following fields are common to all edge security logs generated by SD-WAN:

- **Timestamp**: The time when the log message is generated.

  > **Note**
  >
  > This time can be different from the time of the event the message corresponds to.

- **Host**: The name of the host that generates the log file. For example, **mybranch**.
- **CEF**: A fixed string, indicating that the remainder of the message follows the CEF format.

  > **Note**
  >
  > No other format is supported.

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- **Version**: Identifies the version of the CEF format. The current CEF version is 0.
- **Device Vendor**: The vendor of the instance or appliance generating the CEF message. The field is always **Citrix®**.
- **Device Product**: The product, **SD-WAN**.
- **Device Version**: The software version of the SD-WAN appliance in **major.minor.patch.buildnumber** format. For example, 11.2.0.88.
- **Device Event Class ID**: A unique identifier for every event-type. For Edge security logs, it is always **EdgeSec**.
- **Name**: A human-readable description of the Edge Security event-type. For example, HTTP, FTP, and so on.
- **Severity**: Reflects the security criticality of the event. The severity levels defined in the CEF standard are as follows:
  - **0-3**=Low
  - **4-6**=Medium
  - **7-8**=High
  - **9-10**=Very-High

  For Citrix SD-WAN Edge Security events, the following criteria are used to determine the severity level:

Severity level	Description
0	All SESSION events and all allowed HTTP Web filtering events
3	All clean (allowed) FTP, SMTP, and HTTP Anti-Malware events
4	Logged IPS events
6	Blocked HTTP Web filtering events
7	Blocked IPS events
8	Blocked (infected) FTP, SMTP, and HTTP Anti-Malware events

- **Extensions**: A collection of key-value pairs that provide more details on the event. For example, “rt=Aug 13 2020 11:46:55”, where “rt”is the key for the event timestamp and “Aug 13 2020 11:46:55”is the value. The key-value pairs used depend on the event type the CEF message corresponds to. The detailed descriptions of the event types are provided in the following sections.

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HTTP(S) HTTP(S) log entries capture events related to HTTP or HTTPS traffic. Such events can be generated by either the web-filtering component, which performs URL categorization on HTTP(S) requests, or the Anti-Malware component, which scans HTTP responses for malware infections. The following table describes the various extensions in an HTTP log entry:

Field	Description
rt	The time of the event, without time zone. The time is expressed in UTC.
cn1	The session identifier, allows correlation with session events
cn1Label	Descriptive text for the cn1 field. The value is **session_Id**.
cs1	The configured security policy
cs1Label	Descriptive text for the cs1 field. The value is **Security profile**.
src	The source IP address (client-side)
spt	The source port (client-side)
dst	The destination IP address (server-side)
dpt	The destination port address (server-side)
requestMethod	The HTTP request (for example, GET, POST)
request	The HTTP URL
dhost	The HTTP host name
act	The action for the HTTP event. For an allowed HTTP event, the value is **allowed** and for a blocked HTTP event, the value is **blocked**.
reason	The component that generated the event. Valid values are **web_filter** and **anti_malware**.
cs2	The category name of the URL category matched
cs2Label	Descriptive text for the cs2 field. The value is **URL Category**.
cs3	The name of the malware identified in the payload (if any)
cs3Label	Descriptive text for the cs3 field. The value is **Malware name**.

HTTP events can be generated by either the web-filtering or Anti-Malware components. For web-

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filtering events, the value for cs3 key is blank, whereas for Anti-Malware events, the value for cs2 key is blank.

A typical log entry for an allowed HTTP web-filtering event is as follows:

```
Oct 8 2020 09:51:01 mybranch CEF:0|Citrix|SD-WAN|11.2.2.2|EdgeSec|HTTP
    |0|rt=Oct 8 2020 09:51:01 cn1=104946811893306 cn1Label=session_id
    cs1=Test_Prof1 cs1Label=Security profile src=192.168.0.2 spt=54749
    dst=192.168.1.2 dpt=80 requestMethod=GET request=http://192.168.1.2/
    eicar.exe dhost=192.168.1.2 act=allowed reason=web_filter cs2=
    Uncategorized cs2Label=URL Category cs3= cs3Label=Malware name
```

A typical log entry for a Blocked HTTP web-filtering event is as follows:

```
Oct 8 2020 09:46:57 mybranch CEF:0|Citrix|SD-WAN|11.2.2.2|EdgeSec|HTTP
    |6|rt=Oct 8 2020 09:46:57 cn1=104946811893249 cn1Label=session_id
    cs1=Test_Prof1 cs1Label=Security profile src=192.168.0.2 spt=59543
    dst=192.168.1.2 dpt=443 requestMethod=GET request=http://www.
    randomadultsite.com/ dhost=www.randomadultsite.com act=blocked
    reason=web_filter cs2=Adult and Pornography cs2Label=URL Category
    cs3= cs3Label=Malware name
```

A typical log entry for an allowed HTTP Anti-Malware event is as follows:

```
Oct 8 2020 11:49:09 mybranch CEF:0|Citrix|SD-WAN|11.2.2.2|EdgeSec|HTTP
    |3|rt=Oct 8 2020 11:49:08 cn1=104946811893527 cn1Label=session_id
    cs1=Test_Prof1 cs1Label=Security profile src=192.168.0.2 spt=34143
    dst=192.168.1.2 dpt=80 requestMethod=GET request=http://192.168.1.2/
    harmless.exe dhost=192.168.1.2 act=allowed reason=anti_malware cs2=
    cs2Label=URL Category cs3= cs3Label=Malware name
```

A typical log entry for a blocked HTTP Anti-Malware event is as follows:

```
Oct 8 2020 11:45:43 mybranch CEF:0|Citrix|SD-WAN|11.2.2.2|EdgeSec|HTTP
    |8|rt=Oct 8 2020 11:45:43 cn1=104946811893520 cn1Label=session_id
    cs1=Test_Prof1 cs1Label=Security profile src=192.168.0.2 spt=37702
    dst=192.168.1.2 dpt=80 requestMethod=GET request=http://192.168.1.2/
    eicar.exe dhost=192.168.1.2 act=blocked reason=anti_malware cs2=
    cs2Label=URL Category cs3=EICAR-Test-File cs3Label=Malware name
```

FTP events The FTP log entries capture user activity related to FTP requests. The following table describes the various fields in an FTP log entry:

Field	Description
rt	The time of the event, without Time Zone
cn1	The session identifier, allows correlation with session events

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Field	Description
cn1Label	Descriptive text for the cn1 field. The value is **session_Id**.
cs1	The configured security policy
cs1Label	Descriptive text for the cs1 field. The value is **Security profile**.
src	The source IP address (client-side)
dst	The destination IP address (server-side)
request	The FTP URI
act	The action for the FTP event. For an allowed FTP event, the value is **allowed** and for a blocked FTP event, the value is **blocked**.
reason	The component that generated the event. The only component generating FTP events are currently **anti_malware**.
cs3	The name of the malware identified in the payload (if any)
cs3Label	Descriptive text for the cs3 field. The value is **Malware name**.

A typical log entry for an allowed FTP Anti-Malware event is as follows:

```
Oct 8 2020 09:49:56 mybranch CEF:0|Citrix|SD-WAN|11.2.2.2|EdgeSec|FTP
|3|rt=Oct 8 2020 09:49:56 cn1=104946811893256 cn1Label=session_id
cs1=Test_Prof1 cs1Label=Security profile src=192.168.0.2 dst
=192.168.1.2 request=harmless.exe act=allowed reason=anti_malware
cs3= cs3Label=Malware name
```

A typical log entry for a blocked FTP Anti-Malware event is as follows:

```
Oct 8 2020 09:50:06 mybranch CEF:0|Citrix|SD-WAN|11.2.2.2|EdgeSec|FTP
|8|rt=Oct 8 2020 09:50:06 cn1=104946811893276 cn1Label=session_id
cs1=Test_Prof1 cs1Label=Security profile src=192.168.0.2 dst
=192.168.1.2 request=eicar.exe act=blocked reason=anti_malware cs3=
EICAR-Test-File cs3Label=Malware name
```

SMTP events The SMTP log entries capture user activity related to unencrypted email, sent using the SMTP protocol. The following table describes the various fields in an SMTP log entry:

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Field	Description
rt	The time of the event, without Time Zone
cn1	The session identifier, allows correlation with session events
cn1Label	Descriptive text for the cn1 field. The value is **session_Id**.
cs1	The configured security policy
cs1Label	Descriptive text for the cs1 field. The value is **Security profile**.
src	The source IP address (client-side)
spt	The source port (client-side)
dst	The destination IP address (server-side)
dpt	The destination port address (server-side)
cn2	The message identifier
cn2Label	Descriptive text for the cn2 field. The value is **Message identifier**.
cs4	The email subject
cs4Label	Descriptive text for the cs4 field. The value is **Message subject**.
suser	The address of the sender
duser	The address of the receiver
act	The action for the SMTP event. The value is **allowed**, for an allowed SMTP email message, **blocked**, for a blocked SMTP email message, and **remove** for an SMTP email message that was allowed after a malware payload was removed.
reason	The reason for the action. The value is **anti_malware**.
cs3	The name of the malware identified in the payload (if any)
cs3Label	Descriptive text for the cs3 field. The value is **Malware name**.

A typical log entry for an SMTP event with virus is as follows:

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```
Oct 8 2020 11:51:31 mybranch CEF:0|Citrix|SD-WAN|11.2.2.2|EdgeSec|SMTP
    |8|rt=Oct 8 2020 11:51:31 cn1=104946811893617 cn1Label=session_id
    cs1=Test_Prof1 cs1Label=Security profile src=192.168.0.2 spt=36097
    dst=192.168.1.2 dpt=25 cn2=104946811893546 cn2Label=message
    identifier cs4=Test email cs4Label=subject suser=sender@sender.com
    suserLabel=sender duser=receiver@receiver.com duserLabel=receiver
    act=remove reason=anti_malware cs3=EICAR-Test-File cs3Label=Malware
    name
```

A typical log entry for an SMTP event without virus is as follows:

```
Oct 8 2020 11:50:50 mybranch CEF:0|Citrix|SD-WAN|11.2.2.2|EdgeSec|SMTP
    |3|rt=Oct 8 2020 11:50:50 cn1=104946811893573 cn1Label=session_id
    cs1=Test_Prof1 cs1Label=Security profile src=192.168.0.2 spt=52737
    dst=192.168.1.2 dpt=25 cn2=104946811893537 cn2Label=message
    identifier cs4=Test email cs4Label=subject suser=sender@sender.com
    suserLabel=sender duser=receiver@receiver.com duserLabel=receiver
    act=allowed reason=anti_malware cs3= cs3Label=Malware name
```

IPS/IDS

Field	Description
rt	The time of the event, without Time Zone
cn3	The IPS/IDS signature identifier that triggered the event
cn3Label	Descriptive text for cn3. The value is **signature_id**.
src	The source IP address of the packet
spt	The source port of the packet (if applicable)
dst	The destination IP address of the packet
dpt	The destination port of the packet (if applicable)
proto	The protocol of the packet (TCP, UDP)
act	The action for the IPS/IDS event. For an allowed IPS/IDS event the value is **logged**, whereas for a blocked IPS/IDS event, the value is **blocked**.
cs5	The class-type of the IPS/IDS signature that triggered the event
cs5Label	Descriptive text for cs5. The value is **class-type**
msg	The IPS message associated with the event

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A typical log entry for a blocked IPS event is as follows:

```
Aug 14 2020 14:58:59 mybranch CEF:0|Citrix|SD-WAN|11.2.2.53|EdgeSec|
    HTTP|7|rt=Aug 14 2020 14:58:59 cn3=2210051 cn3Label=signature_id src
    =192.168.0.2 spt=1944 dst=192.168.1.2 dpt=22 proto=TCP act=blocked
    cs5=protocol-command-decode cs5Label=class-type msg=SURICATA STREAM
    Packet with broken ack
```

A typical log entry for a logged IPS event is as follows:

```
Oct 8 2020 12:57:36 mybranch CEF:0|Citrix|SD-WAN|11.2.2.2|EdgeSec|IPS
    |4|rt=Oct 8 2020 12:57:36 cn3=2210051 cn3Label=signature_id src
    =192.168.0.2 spt=1076 dst=192.168.1.2 dpt=22 proto=TCP act=logged
    cs5=protocol-command-decode cs5Label=class-type msg=SURICATA STREAM
    Packet with broken ack
```

Session Events The Session log entries capture user activity at the TCP layer. They complement HTTP, FTP, and SMTP events by providing insight about TCP session duration, and start and stop timestamps. Session log entries can refer to session start, session end, or update events.

Field	Description
rt	The time of the event, without Time Zone. For session start events, the timestamp is when the session was established.
cn1	The session identifier
cn1Label	Descriptive text for the cn1 field. The value is **session_Id**.
cs1	The configured security policy
cs1Label	Descriptive text for the cs1 field. The value is **Security profile**.
src	The source IP address (client-side)
spt	The source port (client-side)
dst	The destination IP address (server-side)
dpt	The destination port address (server-side)
act	The type of the session event. It can be **new_session** for events referring to a newly established session, **session_update**, for events referring to existing long-lived sessions, and **session_closed**, for events referring to sessions closing.

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Field	Description
end	The time the session closed without time zone. The field is only applicable to **session_closed** events.

A typical log entry for a session start event is as follows:

```
Oct 7 2020 23:46:44 mybranch CEF:0|Citrix|SD-WAN|11.2.2.2|EdgeSec|
    Session|0|rt=Oct 7 2020 23:46:44 cn1=104946811892916 cn1Label=
    session_id cs1=Test_Prof1 cs1Label=Security profile src=192.168.0.2
    spt=43838 dst=10.78.242.11 dpt=53 act=new_session
```

A typical log entry for a session end event is as follows:

```
Oct 7 2020 23:46:46 mybranch CEF:0|Citrix|SD-WAN|11.2.2.2|EdgeSec|
    Session|0|rt=Oct 7 2020 23:46:45 cn1=104946811892917 cn1Label=
    session_id cs1=1 cs1Label=Security profile end=1602114405989 src
    =192.168.0.2 spt=42253 dst=10.78.242.11 dpt=53 act=session_closed
```

Session Updates The Session updates log entries capture user activity at the TCP layer for long-running sessions on a per-minute basis. Session updates help identify existing log entries (HTTP, SMTP, FTP, and session events) that correspond to still open sessions. The corresponding events can either be ignored, or treated as **tentative**, since session closure might update certain attributes (that is, session end time). Contrary to session_start and session_closed events, the session_update events only have a limited subset of the fields.

Field	Description
rt	The time of the event, without Time Zone
cn1	The session identifier
cn1Label	Descriptive text for the cn1 field. The value is **session_Id**.
act	The action for the IPS/IDS event. For a session update, the value is **session_update**.

A typical log entry for a session update event is as follows:

```
Oct 7 2020 23:47:00 mybranch CEF:0|Citrix|SD-WAN|11.2.2.2|EdgeSec|
    Session|0|rt=Oct 7 2020 23:47:00 cn1=104946811892912 cn1Label=
    session_id act=session_update
```

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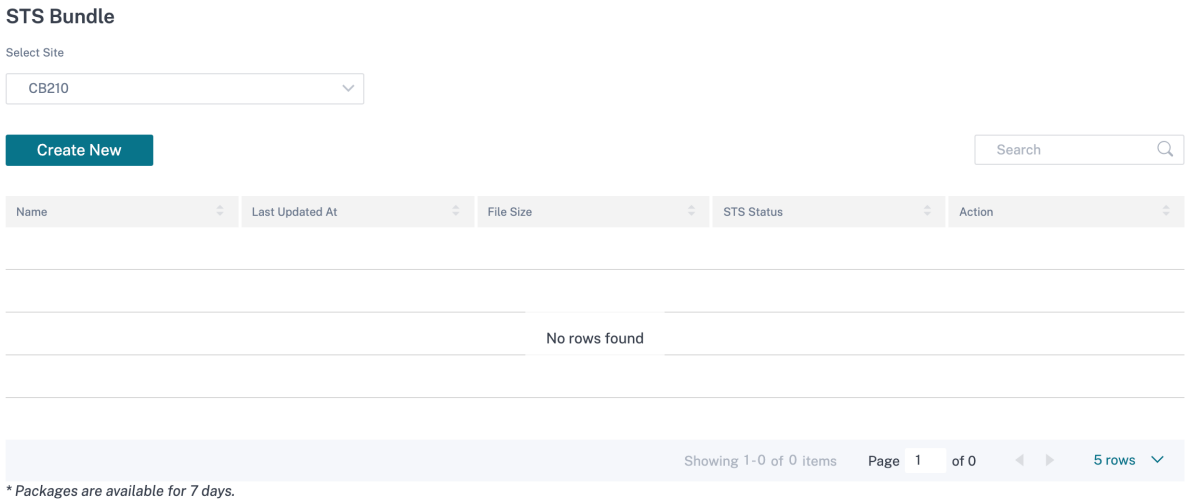
Show Tech Support Bundle

The Show Tech Support (STS) Bundle contains important real-time system information such as access logs, diagnostics logs, firewall logs. The STS bundle is used to troubleshoot issues in the SD-WAN appliances. You can create, download the STS bundle, and share it with Citrix Support Representatives.

Select a site for which to create or download the STS bundle. If a site is configured in HA deployment mode, you can select the active or standby appliance for which to create or download the STS bundle.

To create an STS bundle, at the network level, navigate to **Troubleshooting > STS Bundle**, select a site, and click **Create New**.



Provide a name for the STS bundle. The name must begin with a letter and can contain letters, numbers, dashes, and under-scores. The maximum allowed length of the name is 32 characters. The user provided name is used as a prefix in the final name. To ensure that the file names are unique (timestamp) and to help recognize the device from the STS package (serial number), the service generates a full name. If no name is provided, a name is auto-generated while creating the bundle.

You can request for a new STS only when the device is online and no STS process is running on the appliance. You can download an already available STS from the Citrix SD-WAN Orchestrator service even if the device is offline.

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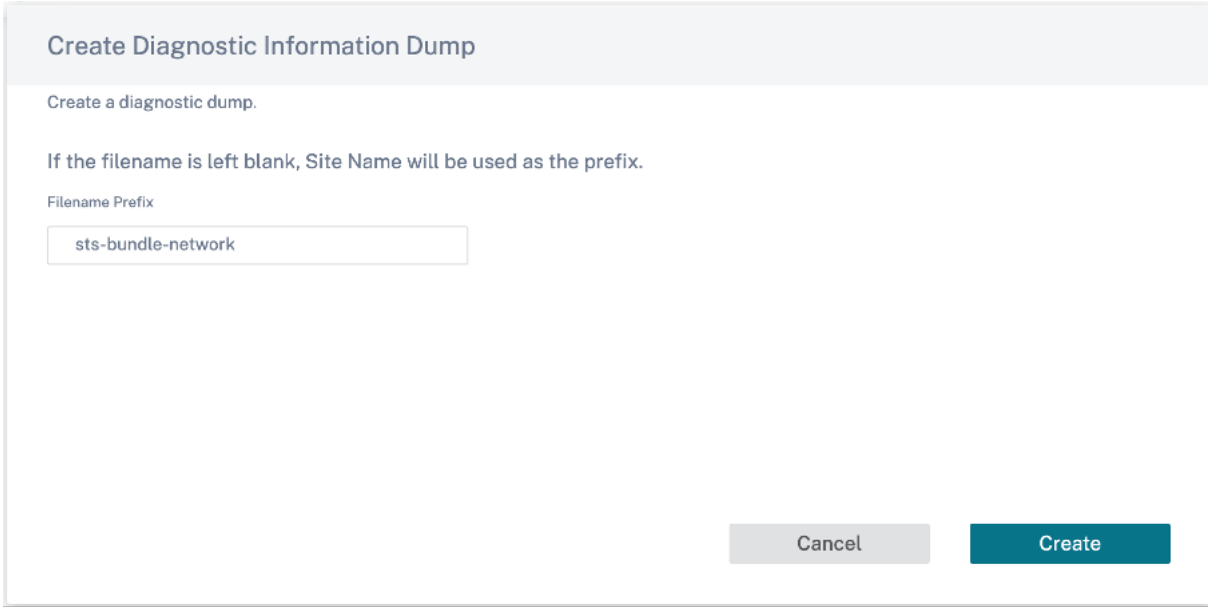

At any given time, the STS process is in one of the following states:

STS Status	Description
Requested	A new STS bundle is requested. The request takes a few minutes to get processed. You can choose to cancel the STS creation process, if necessary.
Uploading	The created STS package is uploaded to the cloud service. The duration depends on the size of the package. The status is updated every 5 seconds. You cannot cancel the STS upload process.
Failure	The STS process has failed during creation or upload. You can delete the entries of failed STS operations.
Available for download	The STS creation and upload process are successful. You can now download or delete the STS packages.

Once the STS process starts on the appliance, the progress is updated under the status column at regular intervals. For example, **Requested (Collecting log files)**.

The STS bundles and failure records are maintained for 7 days, post which they are auto-deleted.

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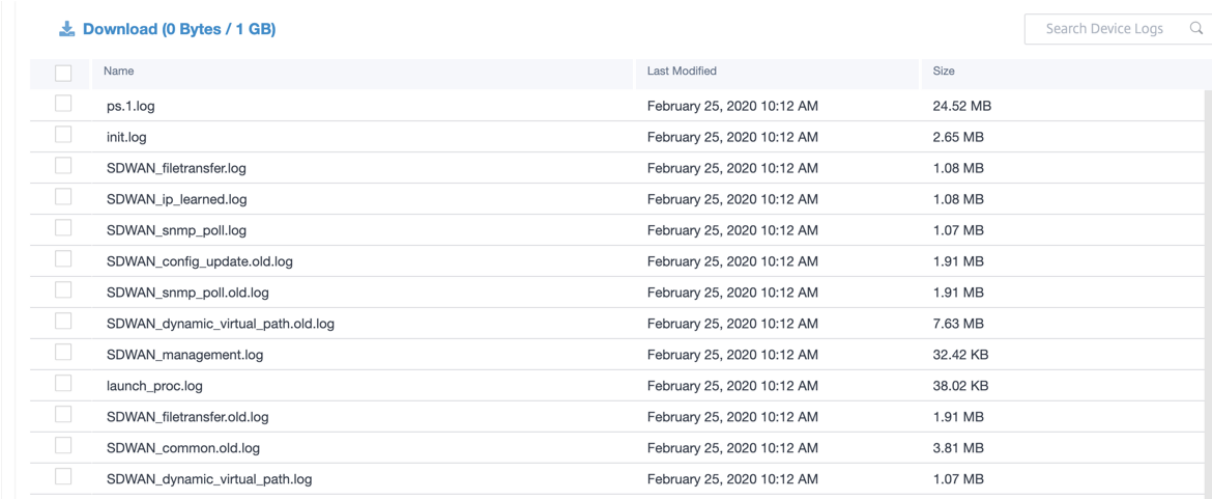
Site troubleshooting

September 27, 2025

Device logs

Logs are useful to troubleshoot issues. The site administrator can view a list of all the logs that are captured across all the devices at the site. You can also download logs for further verification.



Name	Last Modified	Size
ps.1.log	February 25, 2020 10:12 AM	24.52 MB
init.log	February 25, 2020 10:12 AM	2.65 MB
SDWAN_filetransfer.log	February 25, 2020 10:12 AM	1.08 MB
SDWAN_ip_learned.log	February 25, 2020 10:12 AM	1.08 MB
SDWAN_snmp_poll.log	February 25, 2020 10:12 AM	1.07 MB
SDWAN_config_update.old.log	February 25, 2020 10:12 AM	1.91 MB
SDWAN_snmp_poll.old.log	February 25, 2020 10:12 AM	1.91 MB
SDWAN_dynamic_virtual_path.old.log	February 25, 2020 10:12 AM	7.63 MB
SDWAN_management.log	February 25, 2020 10:12 AM	32.42 KB
launch_proc.log	February 25, 2020 10:12 AM	38.02 KB
SDWAN_filetransfer.old.log	February 25, 2020 10:12 AM	1.91 MB
SDWAN_common.old.log	February 25, 2020 10:12 AM	3.81 MB
SDWAN_dynamic_virtual_path.log	February 25, 2020 10:12 AM	1.07 MB

Show Tech Support Bundle

The Show Tech Support (STS) Bundle contains important real-time system information such as access logs, diagnostics logs, firewall logs. The STS bundle is used to troubleshoot issues in the SD-WAN appliances. You can create, download the STS bundle, and share it with Citrix® Support Representatives.

If a site is configured in HA deployment mode, you can select the active or standby appliance for which to create or download the STS bundle.

To create an STS bundle for a site appliance, at the site level, navigate to **Troubleshooting** > **STS bundle** and click **Create New**.

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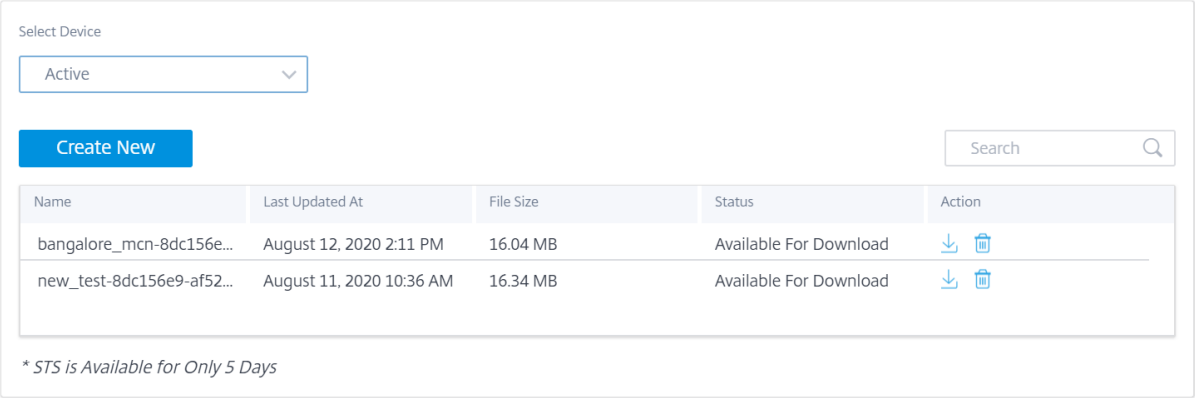
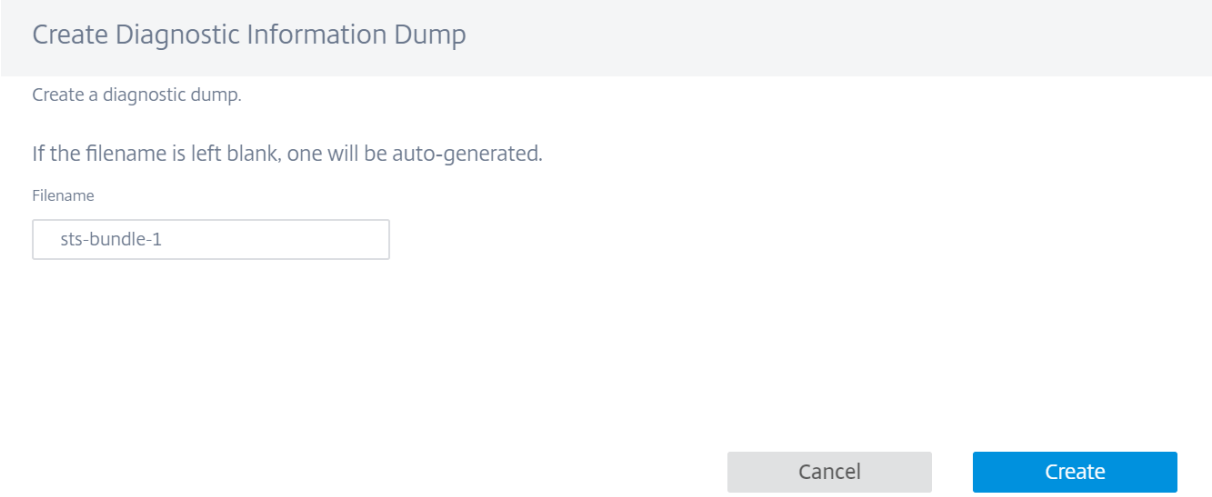


Provide a name for the STS bundle. The name must begin with a letter and can contain letters, numbers, dashes, and under-scores. The maximum allowed length of the name is 32 characters. The user provided name is used as a prefix in the final name. To ensure that the file names are unique (time-stamp) and to help recognize the device from the STS package (serial number), the service generates a full name. If no name is provided, a name is auto-generated while creating the bundle.

You can request for a new STS only when the device is online and no STS process is currently running on the appliance. You can download an already available STS from the Citrix SD-WAN Orchestrator service even if the device is offline.



At any given time, the STS process is in one of the following states:

STS Status	Description
Requested	A new STS bundle is requested. The request takes a few minutes to get processed. You can choose to cancel the STS creation process, if necessary.

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STS Status	Description
Uploading	The created STS package is uploaded to the cloud service. The duration depends on the size of the package. The status is updated every 5 seconds. You cannot cancel the STS upload process.
Failure	The STS process has failed during creation or upload. You can delete the entries of failed STS operations.
Available for download	The STS creation and upload process are successful. You can now download or delete the STS packages.

Once the STS process starts on the appliance, the progress is updated under the status column at regular intervals. For example, **Requested (Collecting log files)**.

The STS bundles and failure records are maintained for 7 days, post which they are auto-deleted.

AppFlow® and IPFIX

September 27, 2025

AppFlow and IPFIX are flow export standards used to identify and collect application and transaction data in the network infrastructure. This data gives better visibility into application traffic utilization and performance.

The collected data, called flow records are transmitted to one or more IPv4 or IPv6 collectors. The collectors aggregate the flow records and generate real-time or historical reports.

AppFlow

AppFlow exports flow level data for HDX / ICA connections only. You can enable either the TCP only for HDX dataset template or the HDX dataset template. The TCP only for HDX dataset provides multi-hop data. The HDX dataset provides HDX insight data.

> **Note**

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> HDX template is available for Citrix SD-WAN™ PE edition and Two-box appliances only. It should be enabled on the Data Center appliance.

AppFlow Collectors like Splunk and Citrix® ADM have dashboards to interpret and present these templates.

IPFIX

IPFIX is a collector export protocol used for exporting flow level data for all connections. For any connection, you can view information such as packet count, byte count, type of service, flow direction, routing domain, application name and so on. IPFIX flows are transmitted through the management interface. Most collectors can receive IPFIX flow records, but may need to build a custom dashboard to interpret IPFIX template.

The IPFIX template defines the order in which the data stream is to be interpreted. The collector receives a template record, followed by the data records. Citrix SD-WAN uses templates 611 and 613 to export IPv4 IPFIX flow data, 615 and 616 to export IPv6 IPFIX flow data along with Options template 612.

Application Flow Info (IPFIX) exports data sets as per templates 611 for IPv4 flows, 615 for IPv6 flows and 612 options Template with Application info.

Basic Properties (IPFIX) exports data sets as per templates 613 for IPv4 flows and 616 for IPv6 flows.

The following tables provide the detailed list of flow data associated with each IPFIX template.

Application Flow Info (IPFIX) - V10 templates

Template ID - 611

Info Element (IE)	IE name & ID	Type and len	Description
Observation point ID	observationPointId, 138	Unsigned32, 4	
Export process ID	exportingProcessId, 144	Unsigned32, 4	
Flow ID	flowId, 148	Unsigned64, 8	
Ipv4 SRC IP	sourceIPv4Address, 8	Ipv4address, 4	
Ipv4 DST IP	destinationIpv4Addres, 12	Ipv4address, 4	
Ipversion	ipVersion, 60	Unsigned8, 1	Set to 4.

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Info Element (IE)	IE name & ID	Type and len	Description
IP protocol number	protocoldentifier,4	Unsigned8, 1	
Padding	N/A	Unsigned16, 2	
SRC Port	sourceTransportPort, 7	Unsigned16, 2	
DST Port	destinationTransportPort, 11	Unsigned16, 2	
Pkt Count	packetDeltaCount, 2	Unsigned64, 8	
Byte Count	octetDeltaCount, 1	Unsigned64, 8	
Time for first pkt in microseconds	flowStartMicroseconds, 154	dateTimeMicroseconds, 8	
Time for lastpkt in microseconds	flowEndMicroseconds, 155	dateTimeMicroseconds, 8	
IP ToS	ipClassOfService, 5	Unsigned8, 1	
Flow Flags	tcpControlBits, 6	Unsigned8, 2	Currently set to 0.
Flow Direction	flowDirection, 61	Unsigned8, 1	0x00: ingress flow0x01: egress flowWAN-WAN and LAN-LAN flows are a possibility in SDWAN
Input Interface	ingressInterface, 10	Unsigned32, 4	Citrix SD-WAN load balances data flows through multiple member paths, hence a single data flow can have multiple input/output interface combinations.
Output Interface	egressInterface, 14	Unsigned32, 4	Citrix SD-WAN load balances data flows through multiple member paths, hence a single data flow can have multiple input/output interface combinations.
Input Vlan ID	vlanId, 58	Unsigned16, 2	
Output Vlan ID	postVlanId, 59	Unsigned16, 2	

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Info Element (IE)	IE name & ID	Type and len	Description
VRF ID	ingressVRFID, 234	Unsigned32, 4	
Flow Key Indicator	flowKeyIndicator, 173	Unsigned64, 8	Set to 0x1E037F.
Application ID	applicationId, 95	octetArray, variable	The Application ID is same as the ID of the applications classified by the DPI engine. The application IDs remain constant. The application IDs for Custom domain name based applications change with every configuration update.

Template ID –615 (IPv6 flows)

Info Element (IE)	IE name & ID	Type and len	Comment
Observation point ID	observationPointId, 138	Unsigned32, 4	
Export process ID	exportingProcessId, 144	Unsigned32, 4	
Flow ID	flowId, 148	Unsigned64, 8	
Ipv6 SRC IP	sourceIPv6Address, 27	Ipv6address, 16	
Ipv6 DST IP	destinationIpv6Address, 28	Ipv6address, 16	
Ipversion	ipVersion, 60	Unsigned8, 1	Set to 6
IP protocol number	protocoldentifier, 4	Unsigned8, 1	
Padding	N/A	Unsigned16, 2	
SRC Port	sourceTransportPort, 7	Unsigned16, 2	
DST Port	destinationTransportPort, 11	Unsigned16, 2	

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Info Element (IE)	IE name & ID	Type and len	Comment
Pkt Count	packetDeltaCount, 2	Unsigned64, 8	
Byte Count	octetDeltaCount, 1	Unsigned64, 8	
Time for first pkt in microseconds	flowStartMicroseconds, 154	dateTimeMicroseconds, 8	
Time for lastpkt in microseconds	flowEndMicroseconds, 155	dateTimeMicroseconds, 8	
IP ToS	ipClassOfService, 5	Unsigned8, 1	
Flow Flags	tcpControlBits, 6	Unsigned8, 2	Currently set to 0.
Flow Direction	flowDirection, 61	Unsigned8, 1	0x00: ingress flow0x01: egress flowWAN-WAN and LAN-LAN flows are a possibility in SDWAN
Input Interface	ingressInterface, 10	Unsigned32, 4	Citrix SD-WAN load balances data flows through multiple member paths, hence a single data flow can have multiple input/output interface combinations.

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Info Element (IE)	IE name & ID	Type and len	Comment
Output Interface	egressInterface, 14	Unsigned32, 4	Citrix SD-WAN load balances data flows through multiple member paths, hence a single data flow can have multiple input/output interface combinations.
Input Vlan ID	vlanId, 58	Unsigned16, 2	
Output Vlan ID	postVlanId, 59	Unsigned16, 2	
VRF ID	ingressVRFID, 234	Unsigned32, 4	
Flow Key Indicator	flowKeyIndicator, 173	Unsigned64, 8	Set to 0x1E037F.
Application ID	applicationId, 95	octetArray, variable	The Application ID is same as the ID of the applications classified by the DPI engine. The application IDs remain constant. The application IDs for Custom domain name based applications change with every configuration update.

Template 612 (Options Template)

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Info Element (IE)	IE name & ID	Type	Comment
Application ID	applicationId, 95	octetArray	The Application ID is same as the ID of the applications classified by the DPI engine. The application IDs remain constant. The application IDs for Custom domain name based applications change with every configuration update.
Application Name	applicationName, 96	string	Specifies the name of the Citrix SDWAN specific proprietary application.
Application Description	applicationDescription, 94	string	Specifies the description of the application.

Basic Properties (IPFIX) –V9 compliant template - Template 613 (IPv4 flows)

Info Element (IE)	IE name & ID	Type and len	Comment
Ipv4 SRC IP	sourceIPv4Address, 8	Ipv4address, 4	
Ipv4 DST IP	destinationIpv4Addres, 12	Ipv4address, 4	
Ipversion	ipVersion, 60	Unsigned8, 1	
IP protocol number	protocoldentifier, 4	Unsigned8, 1	
IP ToS	ipClassOfService, 5	Unsigned8, 1	
Flow Direction	flowDirection, 61	Unsigned8, 1	0x00: ingress flow0x01: egress flowWAN-WAN and LAN-LAN flows are a possibility in SDWAN
SRC Port	sourceTransportPort, 7	Unsigned16, 2	
DST Port	destinationTransportPort, 11	Unsigned16, 2	

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Info Element (IE)	IE name & ID	Type and len	Comment
Pkt Count	packetDeltaCount, 2	Unsigned64, 8	
Byte Count	octetDeltaCount, 1	Unsigned64, 8	
Input Interface	ingressInterface, 10	Unsigned32, 4	Citrix SD-WAN load balances data flows through multiple member paths, hence a single data flow can have multiple input/output interface combinations.
Output Interface	egressInterface, 14	Unsigned32, 4	Citrix SD-WAN load balances data flows through multiple member paths, hence a single data flow can have multiple input/output interface combinations.
Input Vlan ID	vlanId, 58	Unsigned16, 2	
Output Vlan ID	postVlanId, 59	Unsigned16, 2	

Template ID –616 (IPv6 flows)

Info Element (IE)	IE name & ID	Type and len	Comment
Ipv6 SRC IP	sourceIPv6Address, 27	Ipv6address, 16	
Ipv6 DST IP	destinationIpv6Address, 28	Ipv6address, 16	
Ipversion	ipVersion, 60	Unsigned8, 1	Set to 6
IP protocol number	protocoldentifier,4	Unsigned8, 1	
IP ToS	ipClassOfService, 5	Unsigned8, 1	

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Info Element (IE)	IE name & ID	Type and len	Comment
Flow Direction	flowDirection, 61	Unsigned8, 1	0x00: ingress flow0x01: egress flowWAN-WAN and LAN-LAN flows are a possibility in SDWAN
SRC Port	sourceTransportPort, 7	Unsigned16, 2	
DST Port	destinationTransportPort, 11	Unsigned16, 2	
Pkt Count	packetDeltaCount, 2	Unsigned64, 8	
Byte Count	octetDeltaCount, 1	Unsigned64, 8	
Input Interface	ingressInterface, 10	Unsigned32, 4	Citrix SD-WAN load balances data flows through multiple member paths, hence a single data flow can have multiple input/output interface combinations.
Output Interface	egressInterface, 14	Unsigned32, 4	Citrix SD-WAN load balances data flows through multiple member paths, hence a single data flow can have multiple input/output interface combinations.
Input Vlan ID	vlanId, 58	Unsigned16, 2	

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Info Element (IE)	IE name & ID	Type and len	Comment
Output Vlan ID	postVlanId, 59	Unsigned16, 2	

Limitations

- AppFlow does not support IPv6 collector and flow records.
- The export interval for Net Flow is increased from 15 seconds to 60 seconds.
- AppFlow/IPFIX flows are transmitted over UDP, on connection loss not all data is retransmitted. If the export interval is set to X minutes, the appliance stores X minutes of data only. Which is retransmitted after X minutes of connection loss.
- In Citrix SD-WAN, release 10 version 2 the **AppFlow** settings are made local to every appliance, while in the previous releases it was a global setting. If the SD-WAN software release is downgraded to any of the previous releases and if AppFlow is configured on any one of the appliances, it will be applied globally to all alliances.

Configuring AppFlow/IPFIX

To configure AppFlow Host Settings, navigate to **Configuration** > **Appliance Settings** > **AppFlow Host Settings** and click **Enable**. Specify the data update interval, in minutes, at which the AppFlow reports are exported to the AppFlow / IPFIX collector.

Choose one of the following AppFlow dataset templates:

- **TCP only for HDX™**: Collects and sends multi-hop data of ICA connections to the AppFlow collector.
- **HDX**: Collects and sends HDX insight data of ICA® connections to the AppFlow collector.

You can configure up to four AppFlow / IPFIX collectors. For each collector specify the following parameters:

- **IP Address**: The IP address of the external AppFlow / IPFIX collector system.
- **Port**: The port number on which the external AppFlow / IPFIX collector system listens. The default value is 4739. You can change the port number depending on the collector used.
- **AppFlow**: Sends flow records, as per IPFIX template 613, to IPFIX collectors.
- **Application Flow Info**: Sends flow records, as per IPFIX templates 611 and 612, to IPFIX collectors.
- **Citrix ADM**: Use Citrix ADM as the AppFlow collector. Provide the user name and password to seamlessly log in into Citrix ADM and store flow data.

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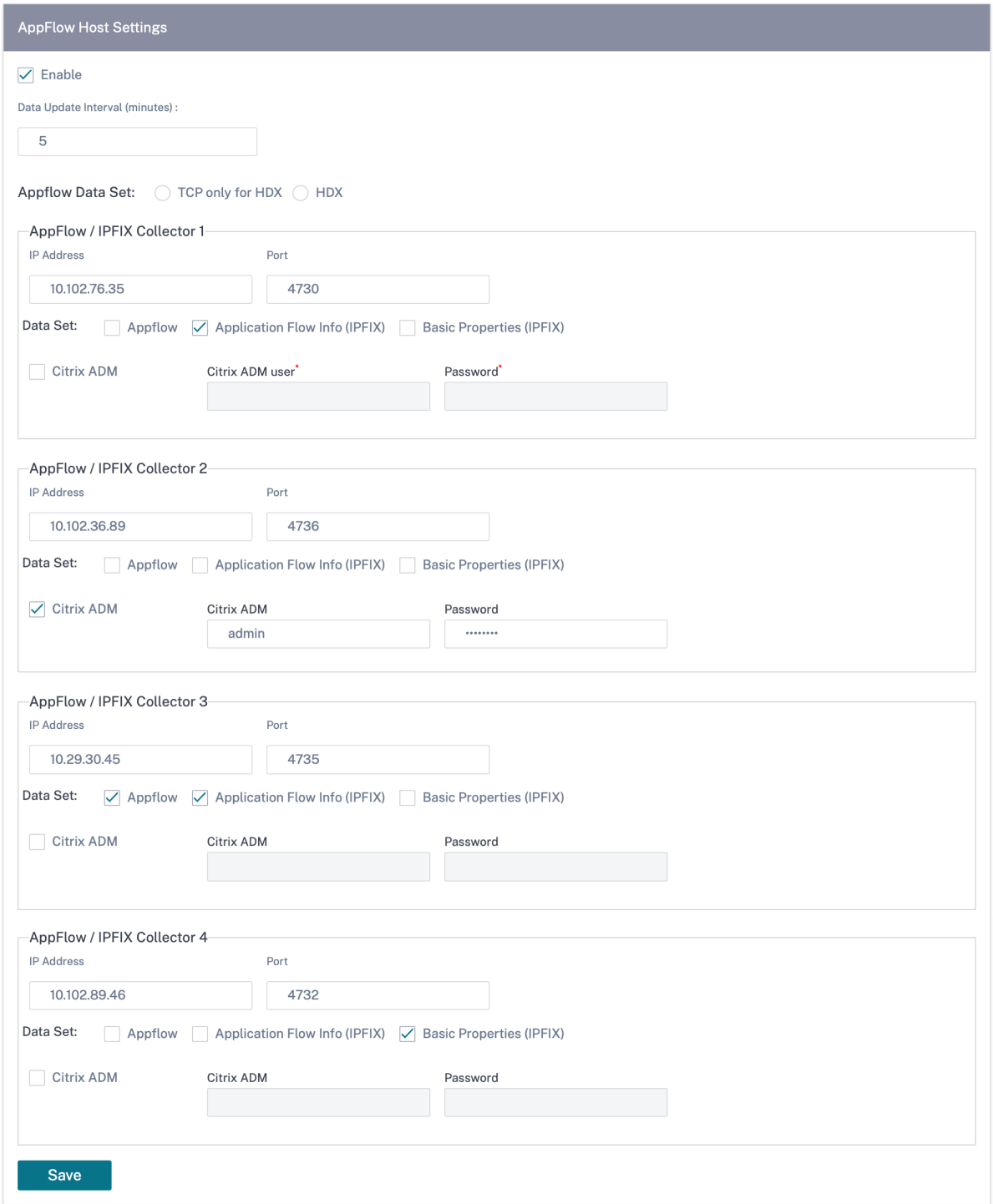
> **Note**
>
> Citrix ADM currently does not support IPFIX collection.



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Log files

For troubleshooting issues related to AppFlow / IPFIX export protocols, you can view and download the SDWAN_export.log files from Site logs

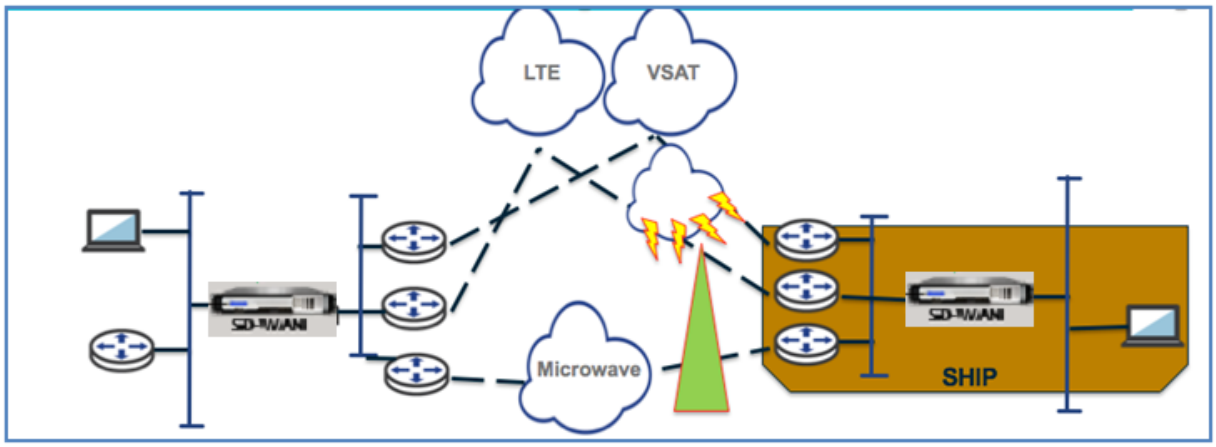
Adaptive bandwidth detection

September 27, 2025

Adaptive bandwidth detection is applicable to networks with VSAT, LOS, Microwave, 3G/4G/LTE WAN Links, where the available bandwidth varies based on weather, atmosphere conditions, location, and line of site obstructions.

You can adjust the bandwidth rate on the WAN Link dynamically based on a defined bandwidth range (minimum and maximum WAN link rate) to use the maximum amount of available bandwidth without marking the paths BAD.

- Greater bandwidth reliability (Over VSAT, Microwave, 3G/4G, and LTE)
- Greater predictability of adaptive bandwidth over user configured settings



This feature needs the Bad loss sensitivity option to be enabled (default/custom) as a prerequisite. You can enable the Bad Loss Sensitivity option under Path or Autopath group.

To enable adaptive bandwidth detection, while configuring sites, navigate to **Configuration** > **Site Configuration** > **WAN Links** > **Advanced WAN Options**. Select **Adaptive Bandwidth Detection** and enter a value in the **Minimum Acceptable Bandwidth** field.

When there is varying bandwidth rate, the percentage of WAN to LAN permitted rate below which the path is marked as BAD. The minimum kbps is different on each side of a virtual path. The value can be in the range 10%-50% and the default being 30%.

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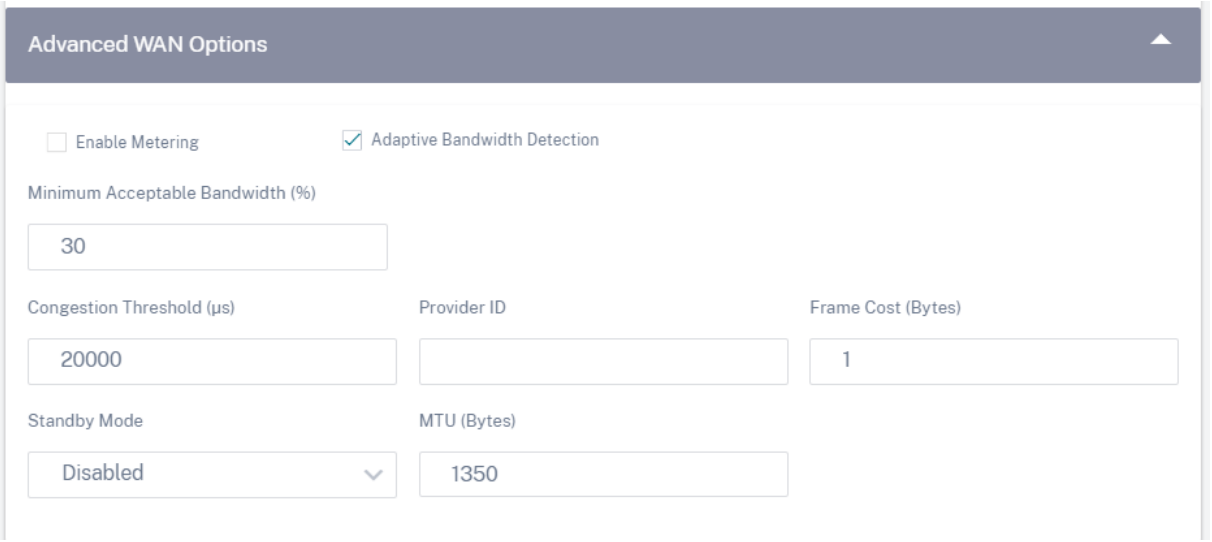


Provider reports

September 27, 2025

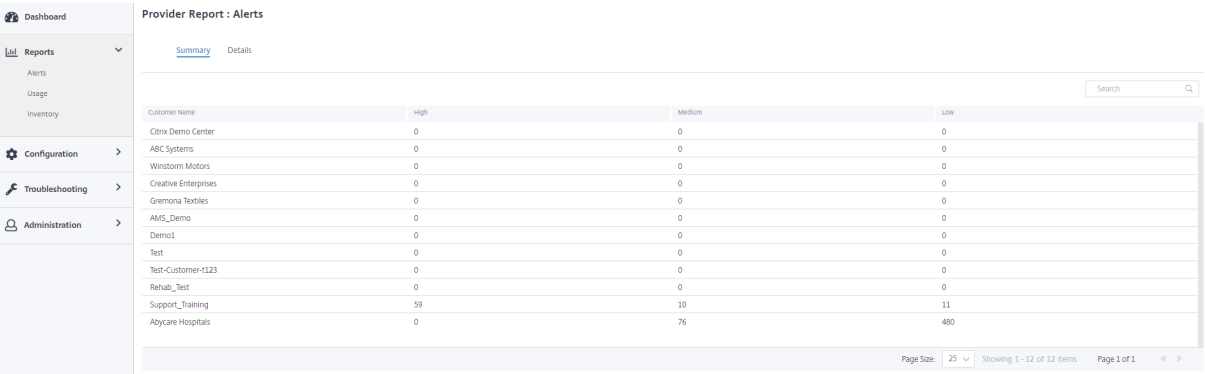
The **Provider Reports** provide visibility into alerts, usage trends, and inventory aggregated across all the customers managed by a Provider.

In the Citrix SD-WAN Orchestrator service provider level UI, navigate to **Reports**.

Alerts

The provider can review all the events and alerts generated across all the customer networks.

The **Summary** view displays the number of high, medium, and low alerts for each customer.



You can also view the severity, site at which the alert originated, alert message, time, and other information under **Details**.

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Provider Report : Alerts

Summary Details

Delete Alerts Search 54 TOTAL 4 HIGH 8 MEDIUM 42 LOW

Severity	Customer Name	Site	Source	Message	Time
Low	Abycare Hospitals	San Francisco	APPLIANCE	Virtual Path San_Francisco-Madrid Path Madrid-DSL-ono-1->San_Francisco-Broadband-AMIS-2 state has changed from BAD to GOOD .	Jun 21st 2020, 5:40 am
Low	Abycare Hospitals	San Francisco	APPLIANCE	The state of Virtual Path San_Francisco-Madrid has changed from BAD to GOOD	Jun 21st 2020, 5:40 am
Low	Abycare Hospitals	Madrid	APPLIANCE	Virtual Path San_Francisco-Madrid Path Madrid-DSL-ono-1->San_Francisco-Broadband-AMIS-2 state has changed from BAD to GOOD because notified by peer.	Jun 21st 2020, 5:40 am
Low	Abycare Hospitals	Madrid	APPLIANCE	Virtual Path San_Francisco-Madrid Path Madrid-DSL-ono-1->San_Francisco-Broadband-AMIS-2 state has changed from GOOD to BAD because notified by peer.	Jun 21st 2020, 5:40 am
Low	Abycare Hospitals	San Francisco	APPLIANCE	Virtual Path San_Francisco-Madrid Path Madrid-DSL-ono-1->San_Francisco-Broadband-AMIS-2 state has changed from GOOD to BAD because silence time exceeds threshold.	Jun 21st 2020, 5:40 am
Medium	Abycare Hospitals	San Francisco	APPLIANCE	The state of Virtual Path San_Francisco-Madrid has changed from GOOD to BAD	Jun 21st 2020, 5:40 am
Low	Abycare Hospitals	Madrid	APPLIANCE	WAN Link Madrid-DSL-ono-1 is now up.	Jun 19th 2020, 12:29 pm
Low	Abycare Hospitals	London	APPLIANCE	Ethernet link on device 2 changed from ETH_LINK_DOWN to ETH_LINK_UP.	Jun 19th 2020, 12:29 pm
Medium	Abycare Hospitals	London	APPLIANCE	The Citrix SD-WAN service has restarted.	Jun 19th 2020, 12:29 pm
Low	Abycare Hospitals	London	APPLIANCE	Ethernet link on device 1 changed from ETH_LINK_DOWN to ETH_LINK_UP.	Jun 19th 2020, 12:29 pm
Low	Abycare Hospitals	San Francisco	APPLIANCE	Virtual Path San_Francisco-Madrid Path Madrid-DSL-ono-1->San_Francisco-Broadband-AMIS-2 state has changed from DEAD to BAD because packet loss exceeds threshold.	Jun 19th 2020, 12:29 pm
High	Abycare Hospitals	San Francisco	APPLIANCE	The Virtual Path San_Francisco-Madrid is no longer DEAD	Jun 19th 2020, 12:29 pm

Suitable filtering options can be used as needed for example: Look for the high severity alerts across all the customers, or the alerts for a given customer and so on.

You can also select and delete alerts.

Usage

The provider can review cross-customer usage trends such as **Top Applications**, **Top Application Categories**, **Application Bandwidth**, and **Top Sites**.

Top application and application categories

The **Top Applications** and **Top Application Categories** chart shows the applications and application families that are widely used across all customer networks. This allows you to analyze the data consumption pattern and reassign the bandwidth limit for each class of data, if necessary.

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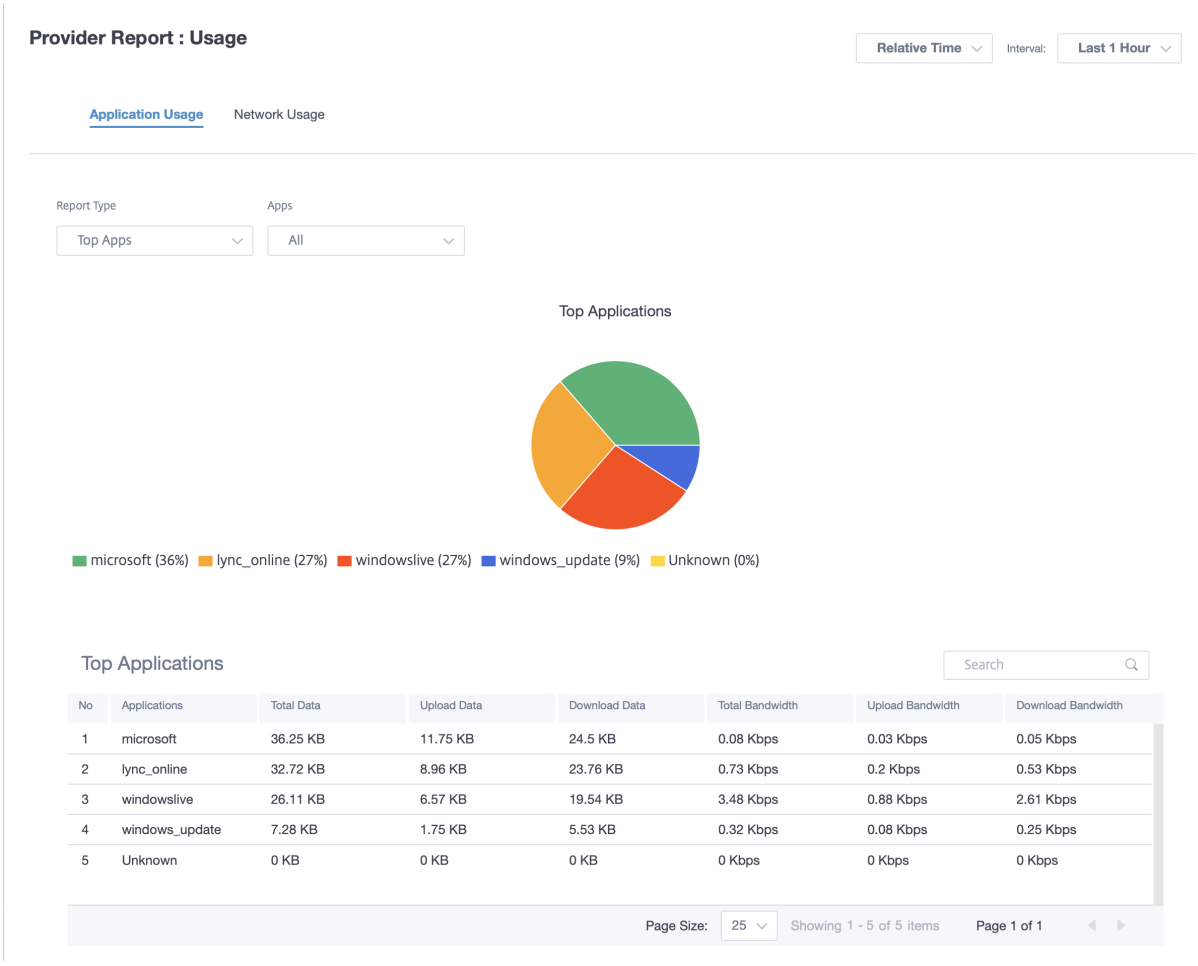

No	Applications	Total Data	Upload Data	Download Data	Total Bandwidth	Upload Bandwidth	Download Bandwidth
1	microsoft	36.25 KB	11.75 KB	24.5 KB	0.08 Kbps	0.03 Kbps	0.05 Kbps
2	lync_online	32.72 KB	8.96 KB	23.76 KB	0.73 Kbps	0.2 Kbps	0.53 Kbps
3	windowslive	26.11 KB	6.57 KB	19.54 KB	3.48 Kbps	0.88 Kbps	2.61 Kbps
4	windows_update	7.28 KB	1.75 KB	5.53 KB	0.32 Kbps	0.08 Kbps	0.25 Kbps
5	Unknown	0 KB	0 KB	0 KB	0 Kbps	0 Kbps	0 Kbps

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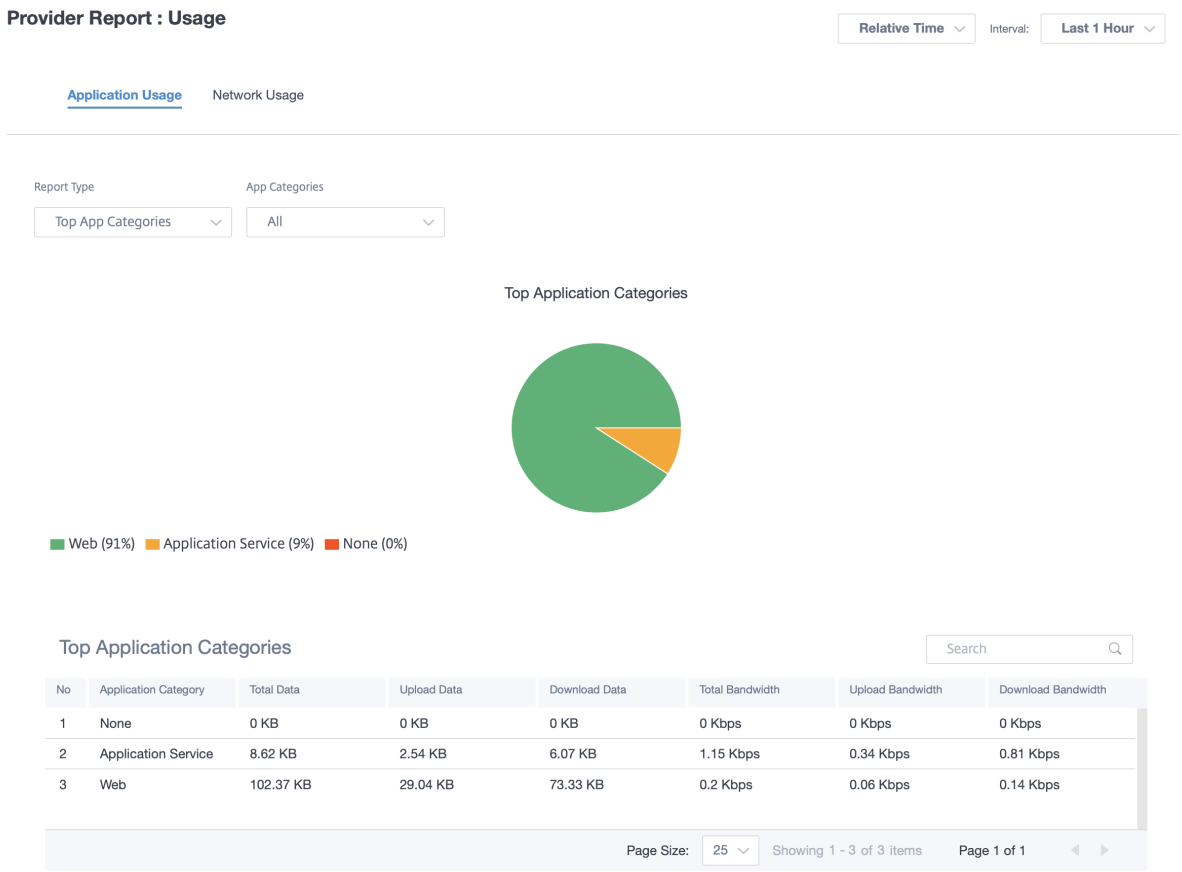
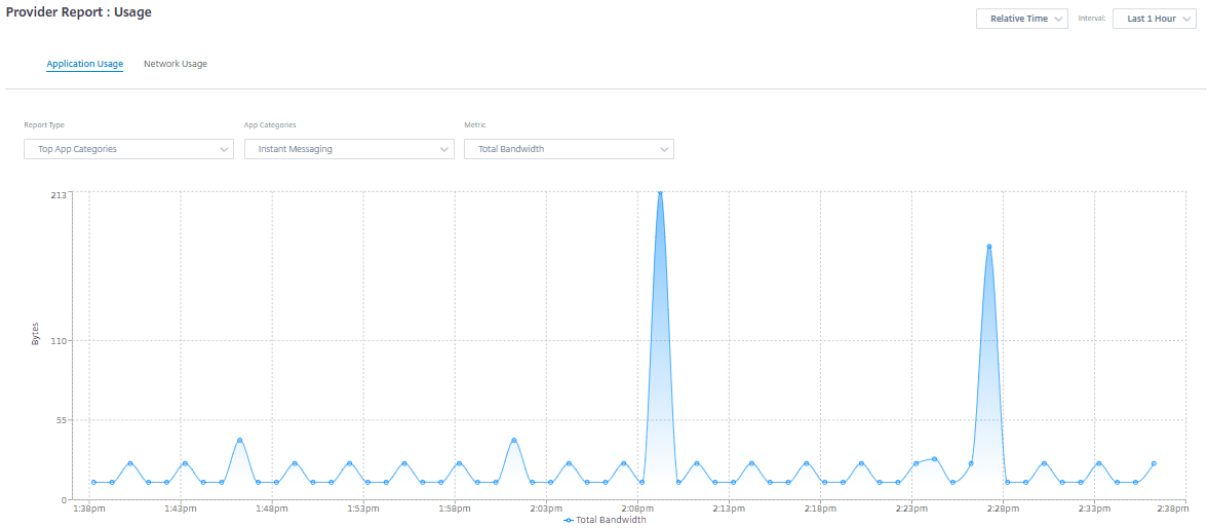


You can view the bandwidth usage statistics. The bandwidth statistics are collected for the selected time interval. You can filter the statistics report based on the **Report Type, Apps or Apps Categories,** and **Metrics**.



- **Report Type:** Select **Top App or App Categories** from the list.
- **Apps/App Categories:** Select top application or categories from the list.

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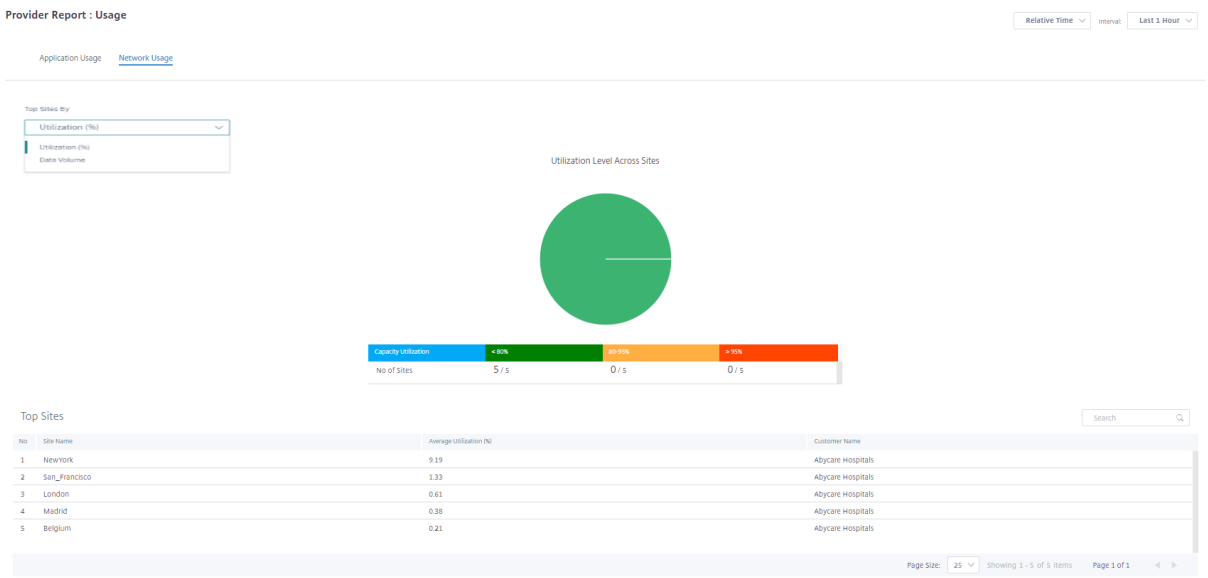
- **Metric:** Select the bandwidth metric (such as Total Data, Incoming Data, Total Bandwidth) from the list.

Network usage

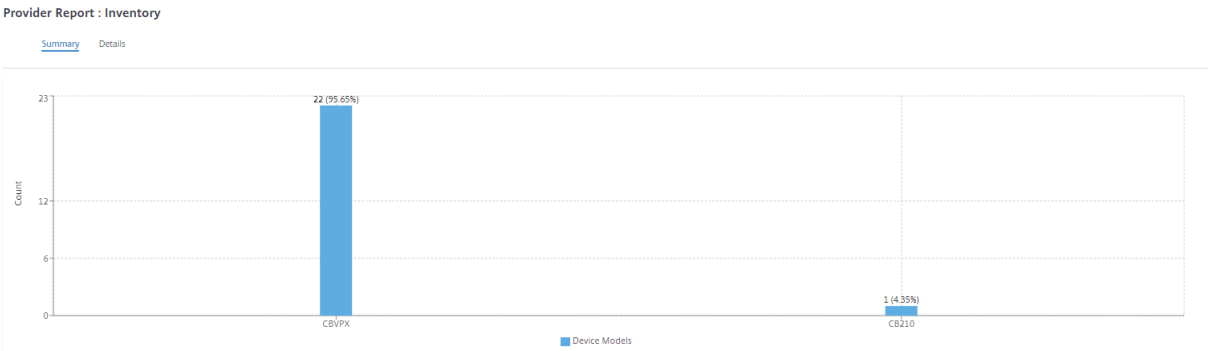
The network usage chart depicts the top 10 sites across all the customers that have the highest bandwidth usage. You can view the Sites by Utilization (%) or Data Volume (MB).



Inventory

The provider can view the entire device inventory across all the customers. You can choose to view an inventory summary or a detailed view.

The inventory summary view provides a chart of the inventory spread, depicting the various appliance models and the number of each type of appliances used across customer networks.



Suitable filtering options can be used as needed for example: Look for all appliances belonging to a specific customer, or all appliances with a certain device model and so on

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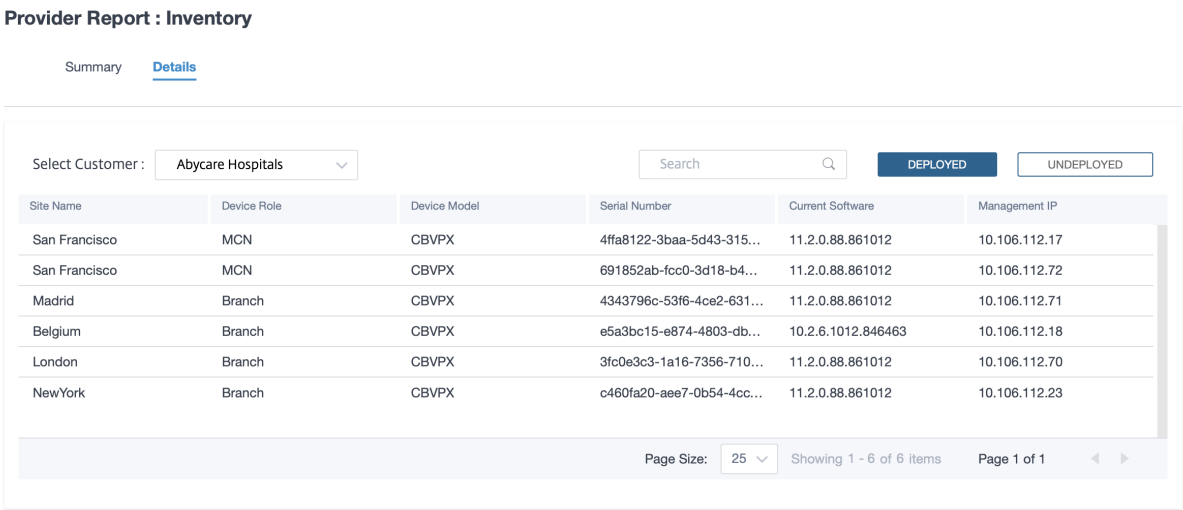
The inventory detailed view provides a list of all the appliances that are deployed and those appliances that are configured but not deployed yet. Choose a customer from the **Select Customer** drop-down list. You can view the site name, device role, device model, device serial number, current software, and device management IP address.



Site Name	Device Role	Device Model	Serial Number	Current Software	Management IP
San Francisco	MCN	CBVPX	4ffa8122-3baa-5d43-315...	11.2.0.88.861012	10.106.112.17
San Francisco	MCN	CBVPX	691852ab-fcc0-3d18-b4...	11.2.0.88.861012	10.106.112.72
Madrid	Branch	CBVPX	4343796c-53f6-4ce2-631...	11.2.0.88.861012	10.106.112.71
Belgium	Branch	CBVPX	e5a3bc15-e874-4803-db...	10.2.6.1012.846463	10.106.112.18
London	Branch	CBVPX	3fc0e3c3-1a16-7356-710...	11.2.0.88.861012	10.106.112.70
NewYork	Branch	CBVPX	c460fa20-aee7-0b54-4cc...	11.2.0.88.861012	10.106.112.23

Customer/Network reports

September 27, 2025

The **Customer Reports** provide visibility into network-wide alerts, usage trends, inventory, quality, diagnostics, and firewall status aggregated across all the sites in a customer network.

To view the reports, navigate to **Partner > Provider > Customer > Reports**.

Alerts

The customer can review a detailed report of all the events and alerts generated across all the sites in the network.

It includes the severity, site at which the alert originated, alert message, time, and other details.

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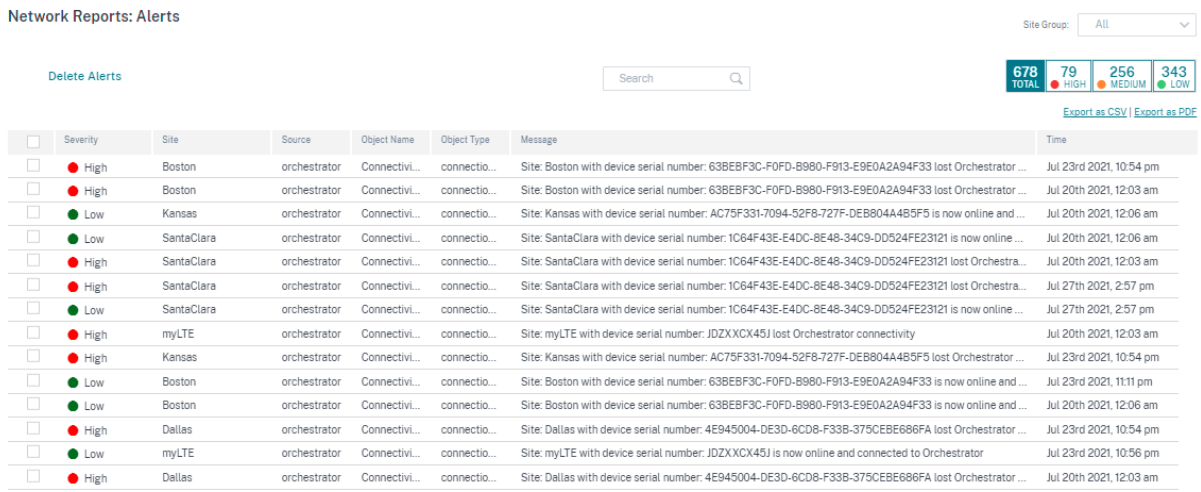

Severity	Site	Source	Object Name	Object Type	Message	Time
High	Boston	orchestrator	Connectivi...	connectio...	Site: Boston with device serial number: 63BEBF3C-F0FD-B980-F913-E9E0A2A94F33 lost Orchestrator ...	Jul 23rd 2021, 10:54 pm
High	Boston	orchestrator	Connectivi...	connectio...	Site: Boston with device serial number: 63BEBF3C-F0FD-B980-F913-E9E0A2A94F33 lost Orchestrator ...	Jul 20th 2021, 12:03 am
Low	Kansas	orchestrator	Connectivi...	connectio...	Site: Kansas with device serial number: AC75F331-7094-52F8-727F-DEB804A4B5F5 is now online and ...	Jul 20th 2021, 12:06 am
Low	SantaClara	orchestrator	Connectivi...	connectio...	Site: SantaClara with device serial number: 1C64F43E-E4DC-8E48-34C9-DD524FE23121 is now online ...	Jul 20th 2021, 12:06 am
High	SantaClara	orchestrator	Connectivi...	connectio...	Site: SantaClara with device serial number: 1C64F43E-E4DC-8E48-34C9-DD524FE23121 lost Orchestra...	Jul 20th 2021, 12:03 am
High	SantaClara	orchestrator	Connectivi...	connectio...	Site: SantaClara with device serial number: 1C64F43E-E4DC-8E48-34C9-DD524FE23121 lost Orchestra...	Jul 27th 2021, 2:57 pm
Low	SantaClara	orchestrator	Connectivi...	connectio...	Site: SantaClara with device serial number: 1C64F43E-E4DC-8E48-34C9-DD524FE23121 is now online ...	Jul 27th 2021, 2:57 pm
High	myLTE	orchestrator	Connectivi...	connectio...	Site: myLTE with device serial number: JDZXXCX45J lost Orchestrator connectivity	Jul 20th 2021, 12:03 am
High	Kansas	orchestrator	Connectivi...	connectio...	Site: Kansas with device serial number: AC75F331-7094-52F8-727F-DEB804A4B5F5 lost Orchestrator ...	Jul 23rd 2021, 10:54 pm
Low	Boston	orchestrator	Connectivi...	connectio...	Site: Boston with device serial number: 63BEBF3C-F0FD-B980-F913-E9E0A2A94F33 is now online and ...	Jul 23rd 2021, 11:11 pm
Low	Boston	orchestrator	Connectivi...	connectio...	Site: Boston with device serial number: 63BEBF3C-F0FD-B980-F913-E9E0A2A94F33 is now online and ...	Jul 20th 2021, 12:06 am
High	Dallas	orchestrator	Connectivi...	connectio...	Site: Dallas with device serial number: 4E945004-DE3D-6CD8-F33B-375CEBE686FA lost Orchestrator ...	Jul 23rd 2021, 10:54 pm
Low	myLTE	orchestrator	Connectivi...	connectio...	Site: myLTE with device serial number: JDZXXCX45J is now online and connected to Orchestrator	Jul 23rd 2021, 10:56 pm
High	Dallas	orchestrator	Connectivi...	connectio...	Site: Dallas with device serial number: 4E945004-DE3D-6CD8-F33B-375CEBE686FA lost Orchestrator ...	Jul 20th 2021, 12:03 am

Suitable filtering options can be used as needed for example: Look for all the high severity alerts across all the sites, or all the alerts for a particular site and so on.

You can export the filtered results in to a CSV or PDF file by using the **Export as CSV** and **Export as PDF** options. The CSV and PDF file name is prefixed with **Alerts List** followed by the date and time when the file is exported.

The maximum events that each page can contain is 100. For example, if 9 events are available on the table, all the 9 events are exported to PDF or CSV. However, if more than 100 events are available on the table, you will still be able to export only 100 events each time because of the page capacity.

You can also select and clear alerts.

Security alerts

Edge Security resource alerts A set amount of system resources such as CPU, Memory, and Hard disk is allocated to the Edge security subsystem. Whenever a resource usage exceeds the set amount, the respective alerts are generated every minute. The following are the Edge security resource alerts:

- *Edge security subsystem exceeds typical CPU allotment*
- *Edge security subsystem exceeds typical Memory allotment*
- *Edge security subsystem exceeds typical Hard Disk allotment*

If one of these alerts is encountered consider revising the **Intrusion Prevention** settings to exclude low-priority rules and free up resources.

Edge Security system alert The following Edge Security system alerts are generated:

- *State changed to UP*: When the Edge Security processing state is changed to UP.

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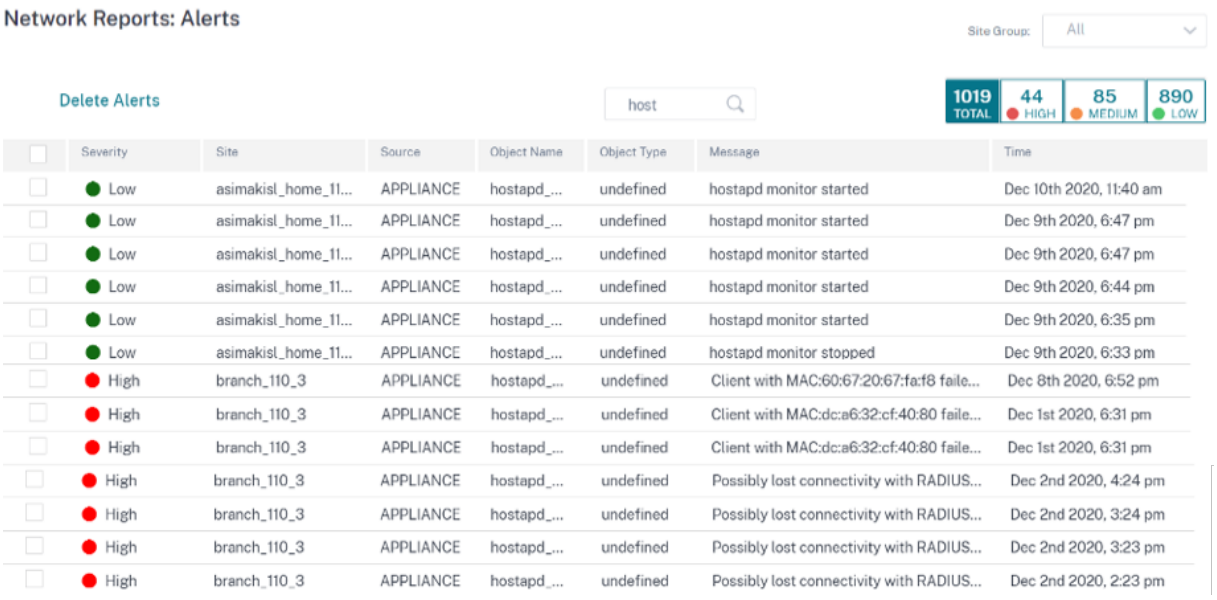
- *State changed to DOWN*: When the Edge Security processing state is changed to DOWN.
- *State changed to DISABLED*: When the Edge Security is disabled.
- *Policies are configured but service is not initialized*: When the Edge Security is not initialized but INSPECT policies are configured.

Wi-Fi alerts

The customer can review a detailed report of all Wi-Fi events and alerts generated across all the sites in the network. It includes the severity, site at which the alert originated, alert message, time, and other details. To view the Wi-Fi alerts, at the network level, navigate to **Reports > Alerts** and search for **hostapd**.

The following Wi-Fi alerts are generated:

- `hostapd monitor started`: When the Wi-Fi service starts.
- `hostapd monitor stopped`: When the Wi-Fi service stops.
- `Client with MAC:<MAC> failed to authenticate with RADIUS on SSID:<SSID>`: When a client fails to get authenticated using WPA2 Enterprise security protocol.
- `Client with MAC:<MAC> failed to authenticate on SSID:<SSID>`: When a client fails to get authenticated using WPA2 Personal security protocol.
- `Possibly lost connectivity with RADIUS <IP>:<Port> on SSID:<SSID>`: When network connectivity with the RADIUS server is lost.
- `RADIUS bad authenticators on SSID:<SSID>`: When bad authenticators are received from a RADIUS server.
- `RADIUS malformed packets on SSID:<SSID>`: When malformed packets are received from a RADIUS server.



Severity	Site	Source	Object Name	Object Type	Message	Time
Low	asimakisl_home_11...	APPLIANCE	hostapd_...	undefined	hostapd monitor started	Dec 10th 2020, 11:40 am
Low	asimakisl_home_11...	APPLIANCE	hostapd_...	undefined	hostapd monitor started	Dec 9th 2020, 6:47 pm
Low	asimakisl_home_11...	APPLIANCE	hostapd_...	undefined	hostapd monitor started	Dec 9th 2020, 6:47 pm
Low	asimakisl_home_11...	APPLIANCE	hostapd_...	undefined	hostapd monitor started	Dec 9th 2020, 6:44 pm
Low	asimakisl_home_11...	APPLIANCE	hostapd_...	undefined	hostapd monitor started	Dec 9th 2020, 6:35 pm
Low	asimakisl_home_11...	APPLIANCE	hostapd_...	undefined	hostapd monitor stopped	Dec 9th 2020, 6:33 pm
High	branch_110_3	APPLIANCE	hostapd_...	undefined	Client with MAC:60:67:20:67:fa:f8 faile...	Dec 8th 2020, 6:52 pm
High	branch_110_3	APPLIANCE	hostapd_...	undefined	Client with MAC:dc:a6:32:cf:40:80 faile...	Dec 1st 2020, 6:31 pm
High	branch_110_3	APPLIANCE	hostapd_...	undefined	Client with MAC:dc:a6:32:cf:40:80 faile...	Dec 1st 2020, 6:31 pm
High	branch_110_3	APPLIANCE	hostapd_...	undefined	Possibly lost connectivity with RADIUS...	Dec 2nd 2020, 4:24 pm
High	branch_110_3	APPLIANCE	hostapd_...	undefined	Possibly lost connectivity with RADIUS...	Dec 2nd 2020, 3:24 pm
High	branch_110_3	APPLIANCE	hostapd_...	undefined	Possibly lost connectivity with RADIUS...	Dec 2nd 2020, 3:23 pm
High	branch_110_3	APPLIANCE	hostapd_...	undefined	Possibly lost connectivity with RADIUS...	Dec 2nd 2020, 2:23 pm

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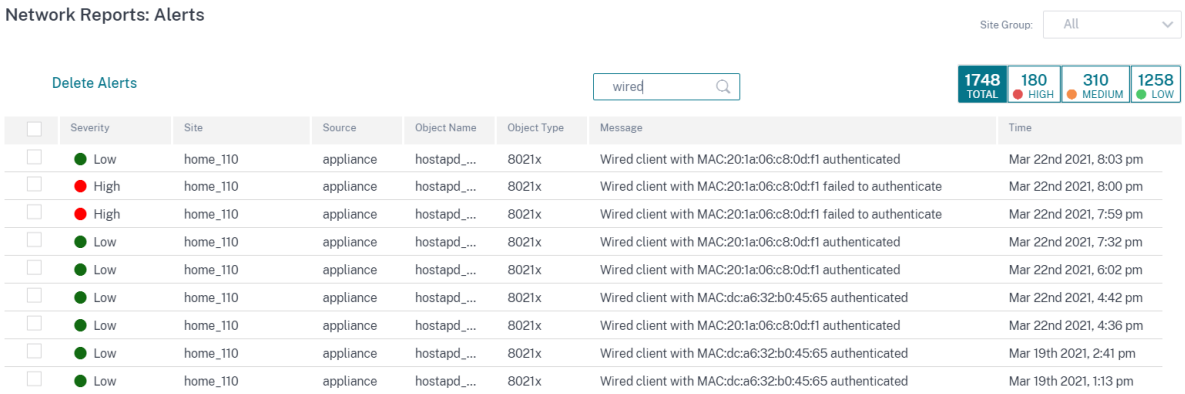
Wired 802.1X alerts

The customers can view a detailed report of all the unique wired 802.1X authentication attempts across all the sites in the network. In 90 seconds, a client can try as many authentications attempts as possible. All the attempts create the following alerts. The alerts include the severity, site at which the alert originated, alert message, time, and other details. To view the wired 802.1X alerts, at the network level, navigate to **Reports > Alerts** and search for **wired**.

- Wired client with MAC<`mac address`> authenticated: When the authentication attempt is successful.
- Wired client with MAC<`mac address`> failed to authenticate: When the authentication attempt has failed.



Severity	Site	Source	Object Name	Object Type	Message	Time
Low	home_110	appliance	hostapd_...	8021x	Wired client with MAC:20:1a:06:c8:0d:f1 authenticated	Mar 22nd 2021, 8:03 pm
High	home_110	appliance	hostapd_...	8021x	Wired client with MAC:20:1a:06:c8:0d:f1 failed to authenticate	Mar 22nd 2021, 8:00 pm
High	home_110	appliance	hostapd_...	8021x	Wired client with MAC:20:1a:06:c8:0d:f1 failed to authenticate	Mar 22nd 2021, 7:59 pm
Low	home_110	appliance	hostapd_...	8021x	Wired client with MAC:20:1a:06:c8:0d:f1 authenticated	Mar 22nd 2021, 7:32 pm
Low	home_110	appliance	hostapd_...	8021x	Wired client with MAC:20:1a:06:c8:0d:f1 authenticated	Mar 22nd 2021, 6:02 pm
Low	home_110	appliance	hostapd_...	8021x	Wired client with MAC:dc:a6:32:b0:45:65 authenticated	Mar 22nd 2021, 4:42 pm
Low	home_110	appliance	hostapd_...	8021x	Wired client with MAC:20:1a:06:c8:0d:f1 authenticated	Mar 22nd 2021, 4:36 pm
Low	home_110	appliance	hostapd_...	8021x	Wired client with MAC:dc:a6:32:b0:45:65 authenticated	Mar 19th 2021, 2:41 pm
Low	home_110	appliance	hostapd_...	8021x	Wired client with MAC:dc:a6:32:b0:45:65 authenticated	Mar 19th 2021, 1:13 pm

Usage

Customers can review usage trends such as **Top Applications**, **Top Application Categories**, **App Bandwidth**, and **Top Sites** across all the sites in their network.

Top application and application categories

The **Top Applications** and **Top Application Categories** chart shows the top applications and top application families that are widely used across all the sites. This allows you to analyze the data consumption pattern and reassign the bandwidth limit for each class of data within the network.

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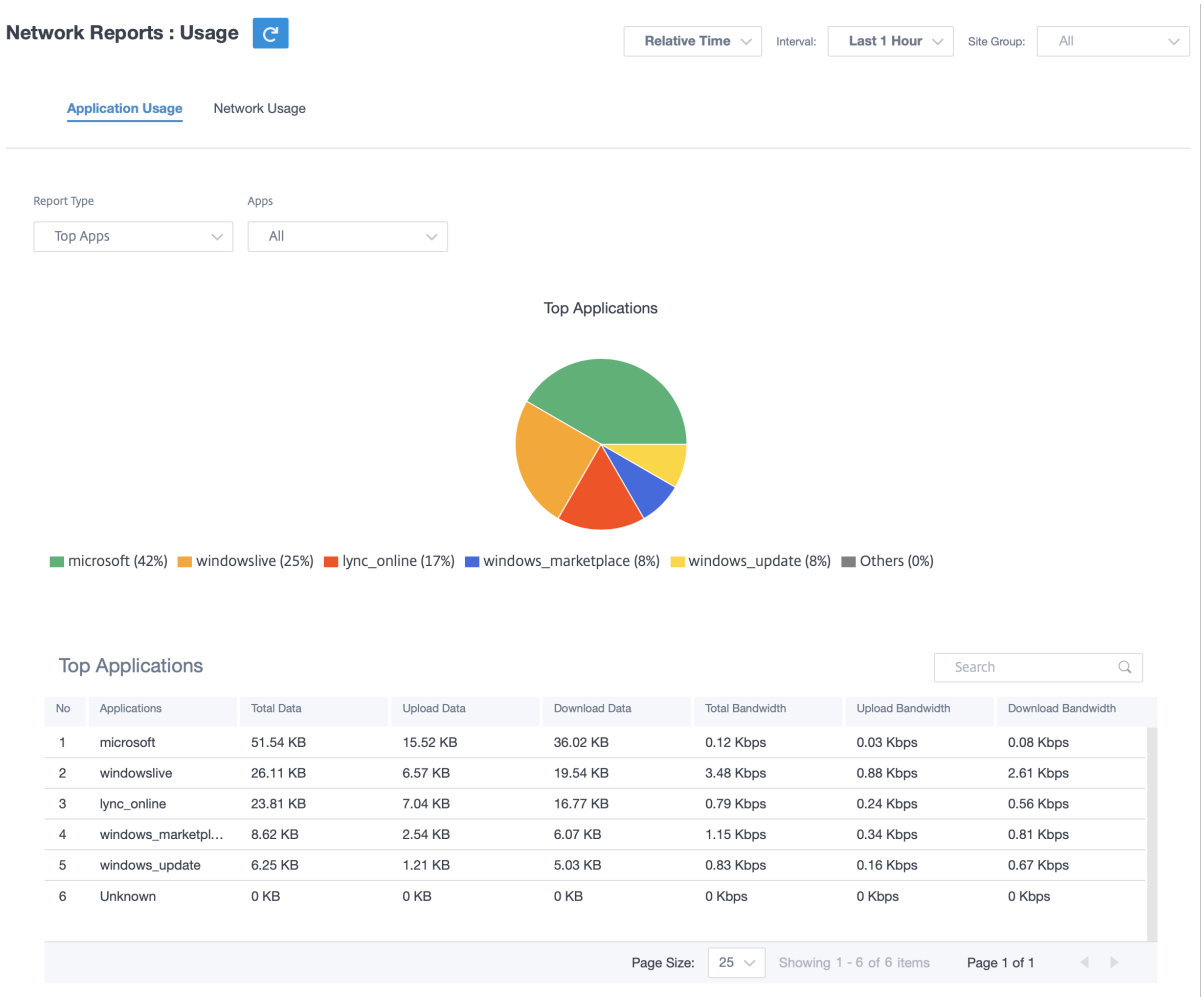

No	Applications	Total Data	Upload Data	Download Data	Total Bandwidth	Upload Bandwidth	Download Bandwidth
1	microsoft	51.54 KB	15.52 KB	36.02 KB	0.12 Kbps	0.03 Kbps	0.08 Kbps
2	windowslive	26.11 KB	6.57 KB	19.54 KB	3.48 Kbps	0.88 Kbps	2.61 Kbps
3	lync_online	23.81 KB	7.04 KB	16.77 KB	0.79 Kbps	0.24 Kbps	0.56 Kbps
4	windows_marketpl...	8.62 KB	2.54 KB	6.07 KB	1.15 Kbps	0.34 Kbps	0.81 Kbps
5	windows_update	6.25 KB	1.21 KB	5.03 KB	0.83 Kbps	0.16 Kbps	0.67 Kbps
6	Unknown	0 KB	0 KB	0 KB	0 Kbps	0 Kbps	0 Kbps

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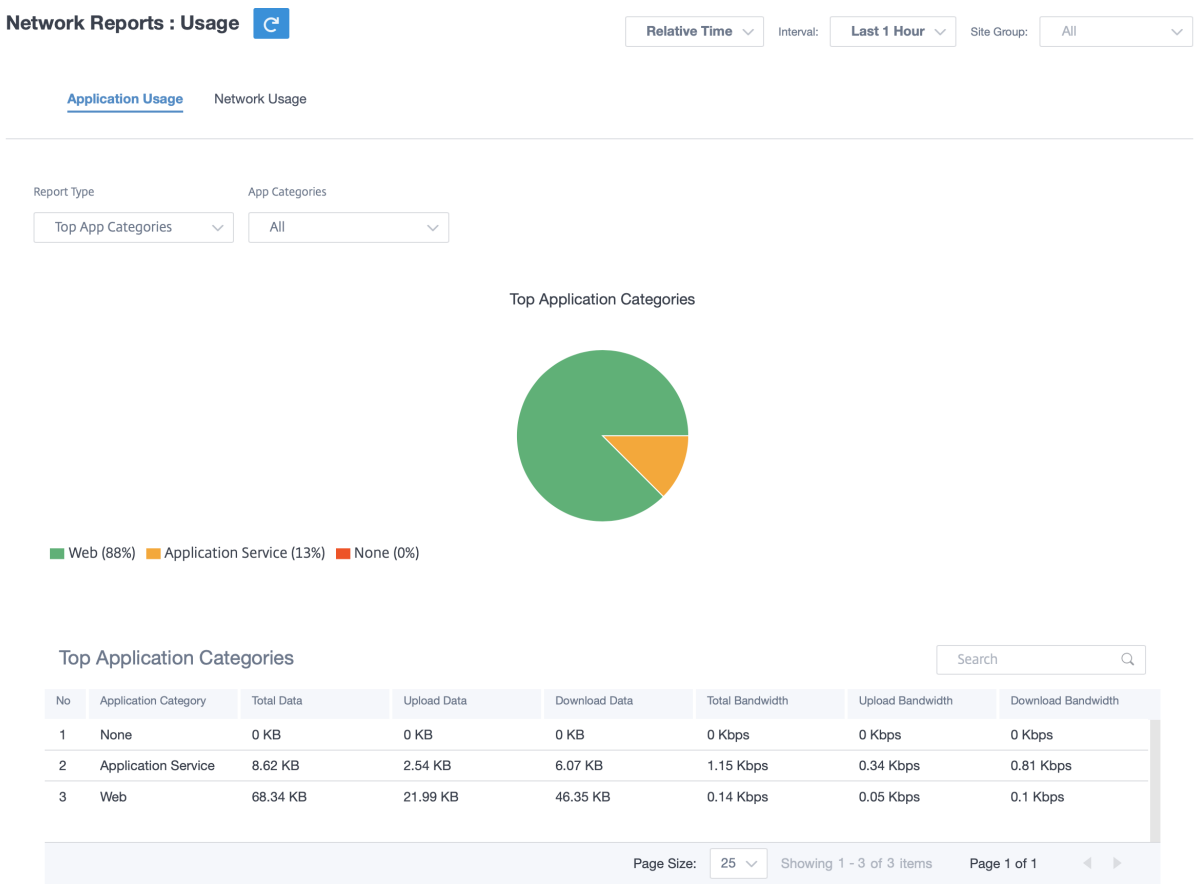

Application bandwidth

You can view the bandwidth usage statistics for the selected site group or for all sites. The bandwidth statistics are collected for the selected time interval. You can filter the statistics report based on the **Report Type, Apps or Apps Categories,** and **Metrics**.

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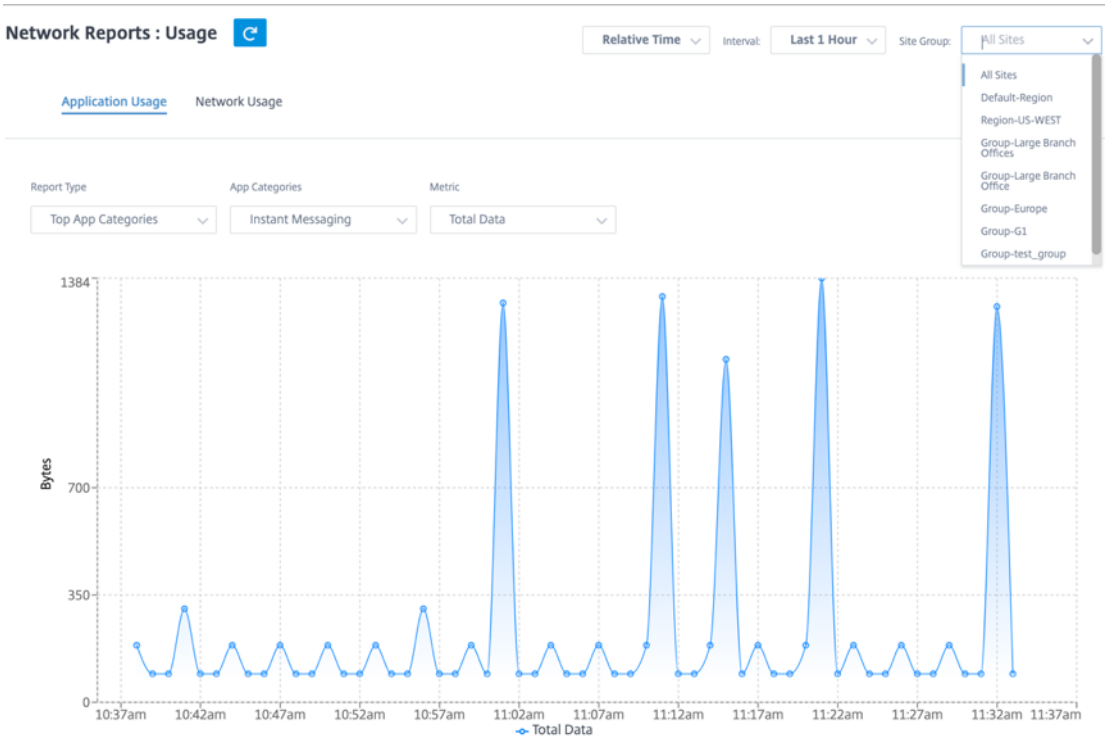

- **Report Type:** Select **Top App or App Categories** from the list.
- **Apps/App Categories:** Select top application or categories from the list.
- **Metric:** Select the bandwidth metric (such as Total Data, Incoming Data, Total Bandwidth) from the list.

Network usage

The **Top Sites** chart depicts the top sites in the customer network that have the highest bandwidth usage. You can view the Sites by Utilization (%) or Data Volume (MB).

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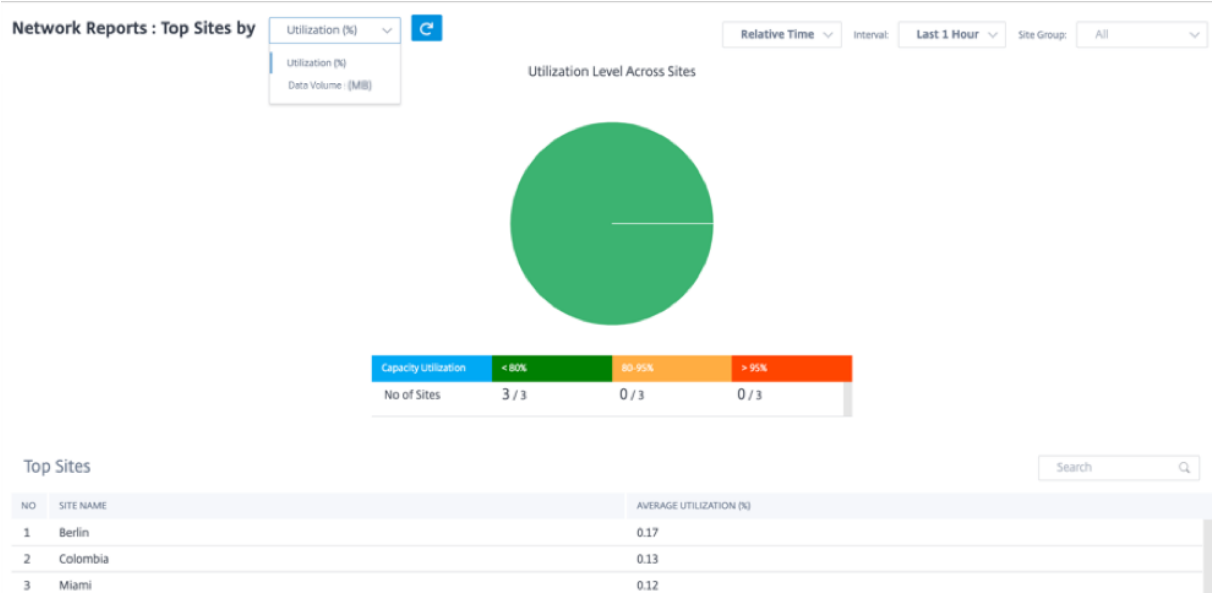
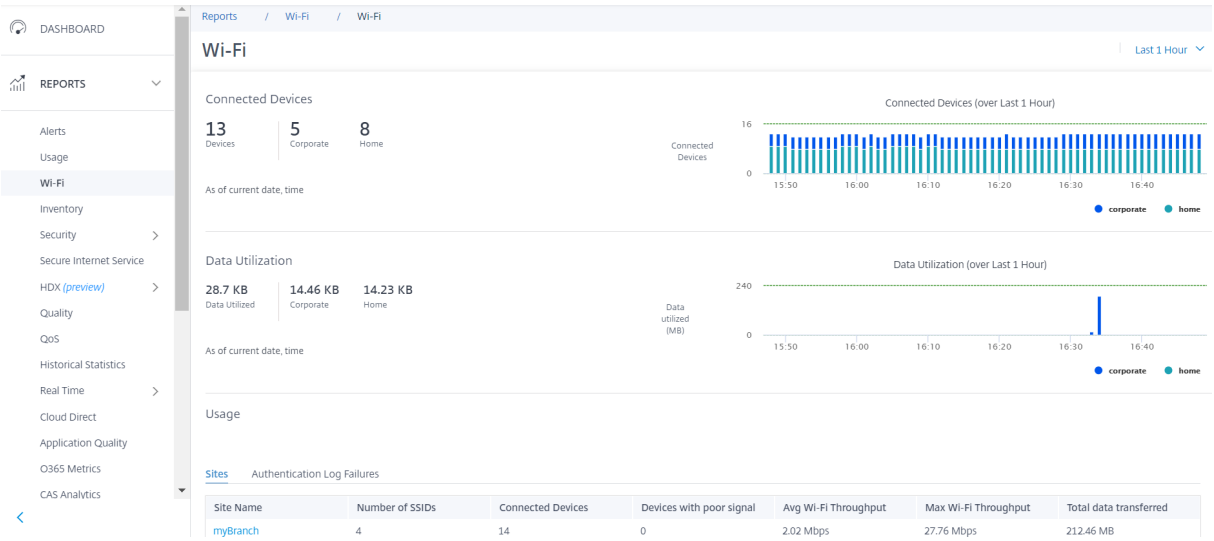


Wi-Fi

Citrix SD-WAN Orchestrator service allows you to view the Wi-Fi summary reports. It provides an overview of the number of devices connected to Wi-Fi networks and the Wi-Fi data used within your network.

To view a Wi-Fi report, at the network level, navigate to **Reports** > **Wi-Fi**.



Connected devices

The **Connected devices** section displays the total number of devices, in your network, that are currently connected to Wi-Fi. You can also see the number of appliances connected to the corporate

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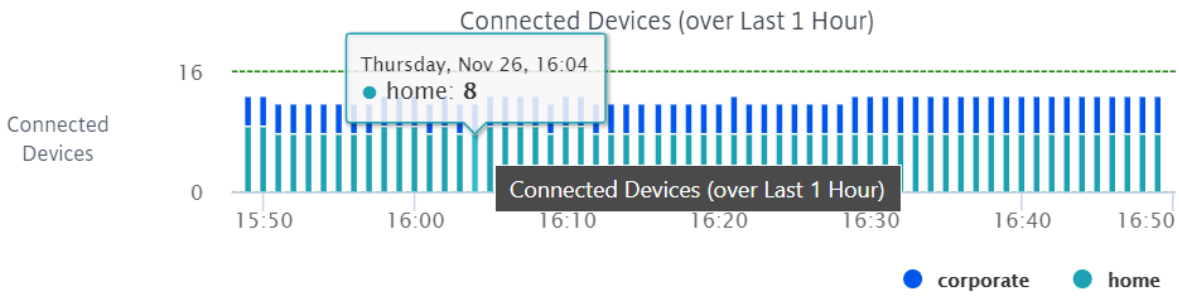
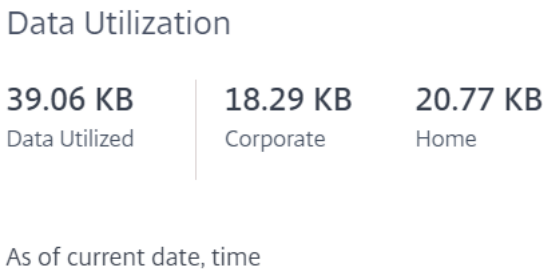
network or home network based on the SSID it is connected to.

You can also select the timeline to view a graphical representation of the historic data. The graph shows the number of corporate and home devices connected over the selected period. Hover the mouse over a bar to view the exact number of devices connected to corporate and home networks at specific time.



Data utilization

The **Data utilization** section displays the total amount of Wi-Fi data used by the connected appliances at the current moment. You can also view the data used by devices connected to the corporate or home network.



You can also select the timeline to view a graphical representation of the historic data. The graph shows the amount of data used by the corporate and home devices over the selected period. Hover the mouse over a bar to view the exact data utilization of the corporate and home network users at specific time.

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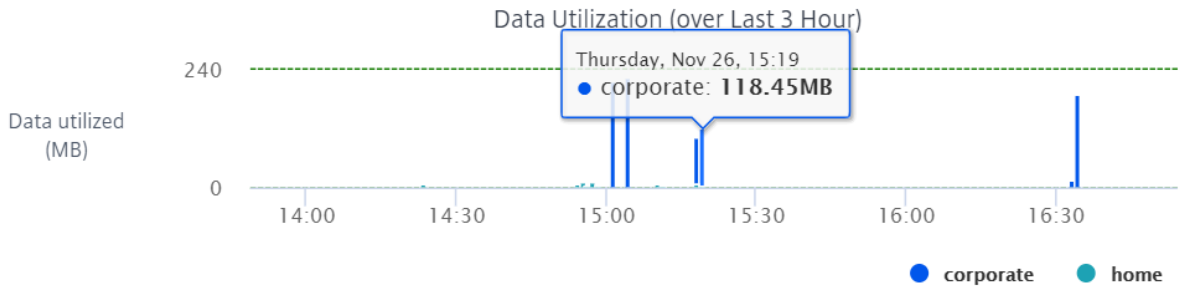
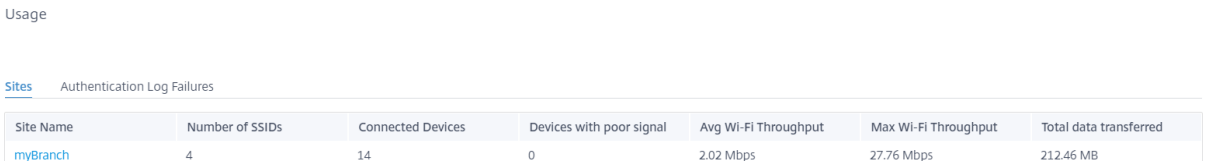


Usage

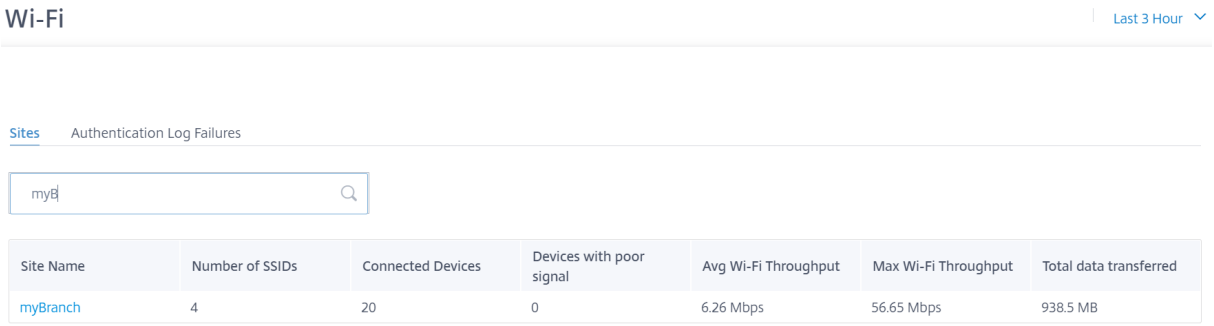
The usage table is a leaderboard that lists the top five Wi-Fi sites and Wi-Fi authentication failure logs in your network.

Sites The Sites table lists the top five Wi-Fi sites in your network based on the parameters such as average Wi-Fi throughput, maximum Wi-Fi throughput, total data transferred, and devices with poor signal. Click the parameter header to sort the column in descending order.

The network administrator can use this information to identify and troubleshoot issues in the network. For example, you can identify the sites with the most number of devices with poor signal and try to resolve the issue on the SD-WAN appliance at that site.



Click **View more** to view the Wi-Fi details for all the sites in the network. You can select the period or search the list by site name.



Click a site name to view site level Wi-Fi reports. For more information, see Site Wi-Fi reports.

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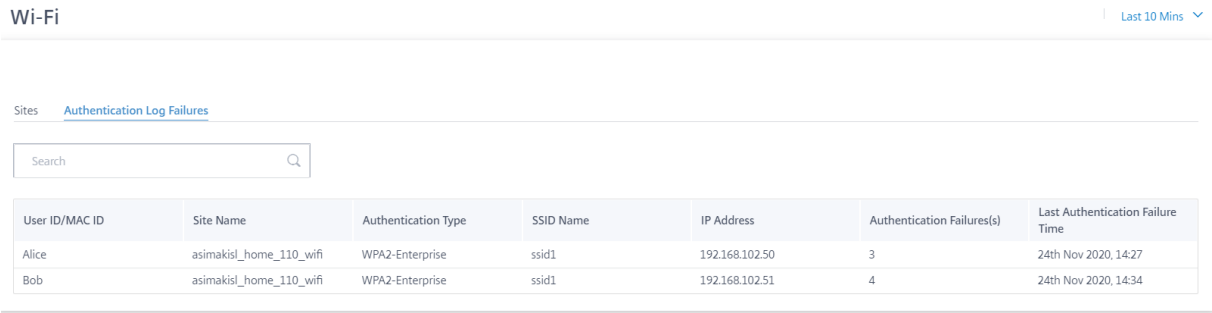
Authentication failure logs The authentication failure logs table displays the recent five authentication failures to the Wi-Fi network. You can view the site name, MAC address and IP address of the clients that are trying to connect to specific SSID along with authentication failure time.

Click **View more** to view all the authentication failure logs. You can select the period or search the list by site name.



Click a site name to view site level authentication failure logs. For more information, see Site Wi-Fi reports.

Inventory

The customer can view the entire device inventory across all the sites in the network. You can choose to view an inventory summary or a detailed view.

The inventory summary view provides a chart of the inventory spread, depicting the various appliance models and the number of each type of appliances used across all sites in the customer network.

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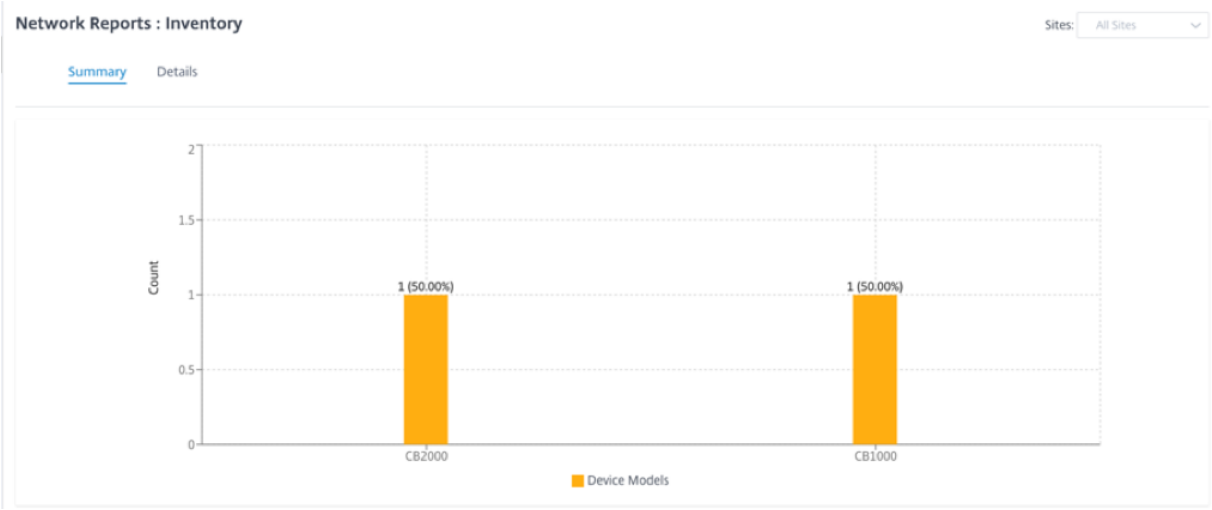
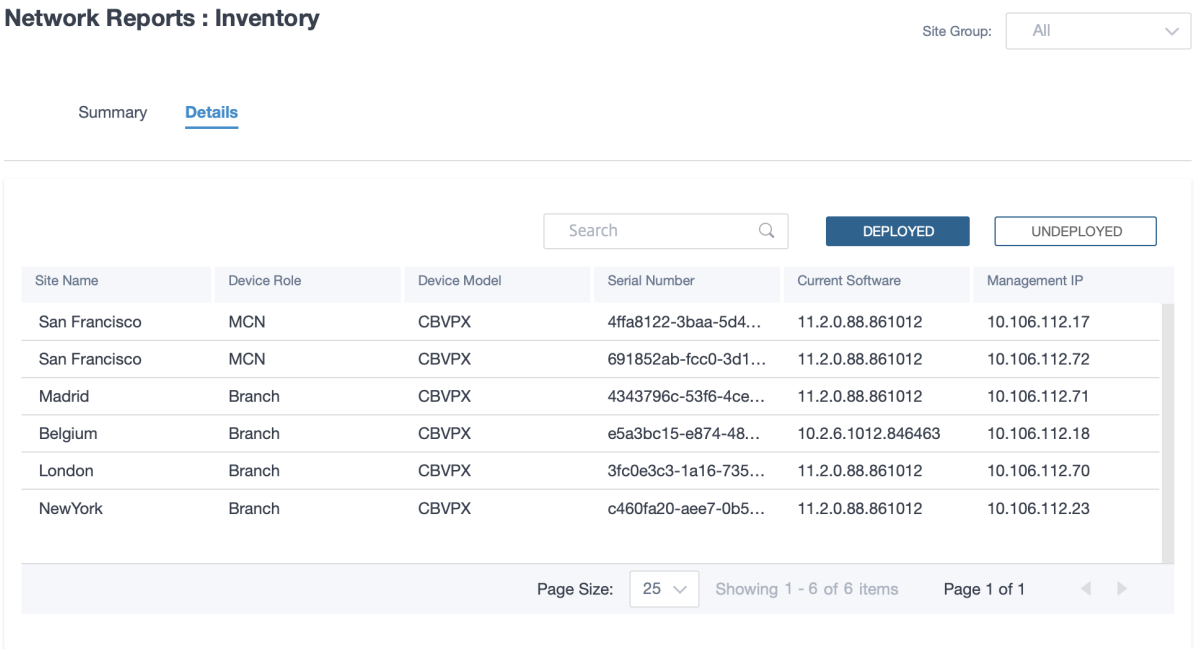


Suitable filtering options can be used as needed for example: Look for all appliances belonging to a specific site, or all appliances with a certain device model and so on

The inventory detailed view provides a list of all the appliances that are deployed and those appliances that are configured but not deployed yet. Along with the customer, site name, device role, device serial number, current software, and device management IP address.



Site Name	Device Role	Device Model	Serial Number	Current Software	Management IP
San Francisco	MCN	CBVPX	4ffa8122-3baa-5d4...	11.2.0.88.861012	10.106.112.17
San Francisco	MCN	CBVPX	691852ab-fcc0-3d1...	11.2.0.88.861012	10.106.112.72
Madrid	Branch	CBVPX	4343796c-53f6-4ce...	11.2.0.88.861012	10.106.112.71
Belgium	Branch	CBVPX	e5a3bc15-e874-48...	10.2.6.1012.846463	10.106.112.18
London	Branch	CBVPX	3fc0e3c3-1a16-735...	11.2.0.88.861012	10.106.112.70
NewYork	Branch	CBVPX	c460fa20-aee7-0b5...	11.2.0.88.861012	10.106.112.23

Security reports

Citrix SD-WAN Orchestrator service allows you to view summary reports for the Web filtering, Anti-Malware, and Intrusion Prevention security features. You can view the reports for the last 5 mins, 10 mins, 30 mins, 1 hr., 3 hr., day, week, or month.

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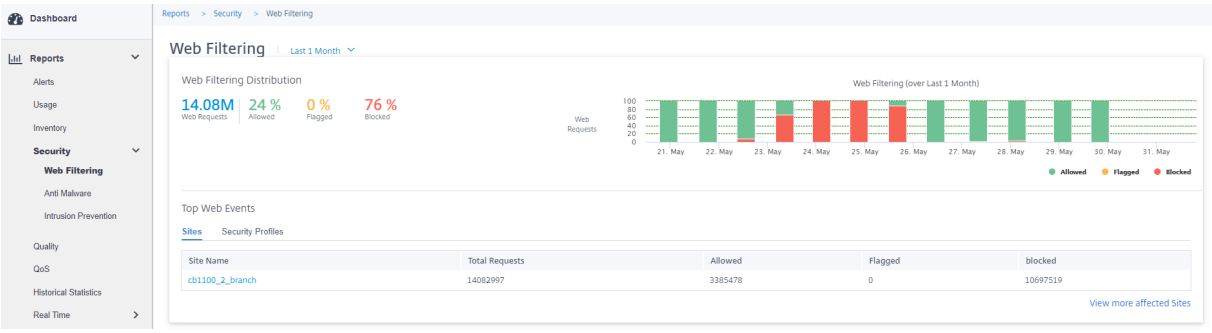
Web filtering

To view the web filtering report, at the network level navigate to **Reports** > **Security** > **Web Filtering** and select the timeline for which you want to view the report.

The **Web Filtering Distribution** section displays the following information:

- Total number of web requests.
- Percentage of web requests allowed.
- Percentage of web requests that were flagged but not blocked.
- Percentage of web requests blocked.

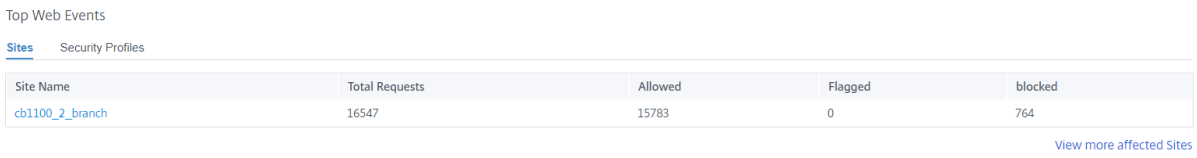


You can also view a graphical representation of the percentage of web requests allowed, flagged, and blocked over the selected time frame.

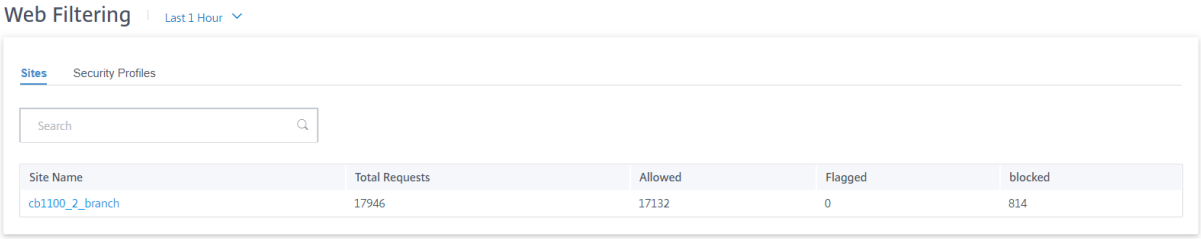
Top web events The Top Web Events table provides web filtering details of the top 5 network sites and security profiles.

Sites:

It displays the total number of requests, the number of requests allowed, the number of requests flagged, and the number of requests blocked at the top 5 sites.



Click **View more affected Sites**, to view the web filtering details of all the affected sites in the network.



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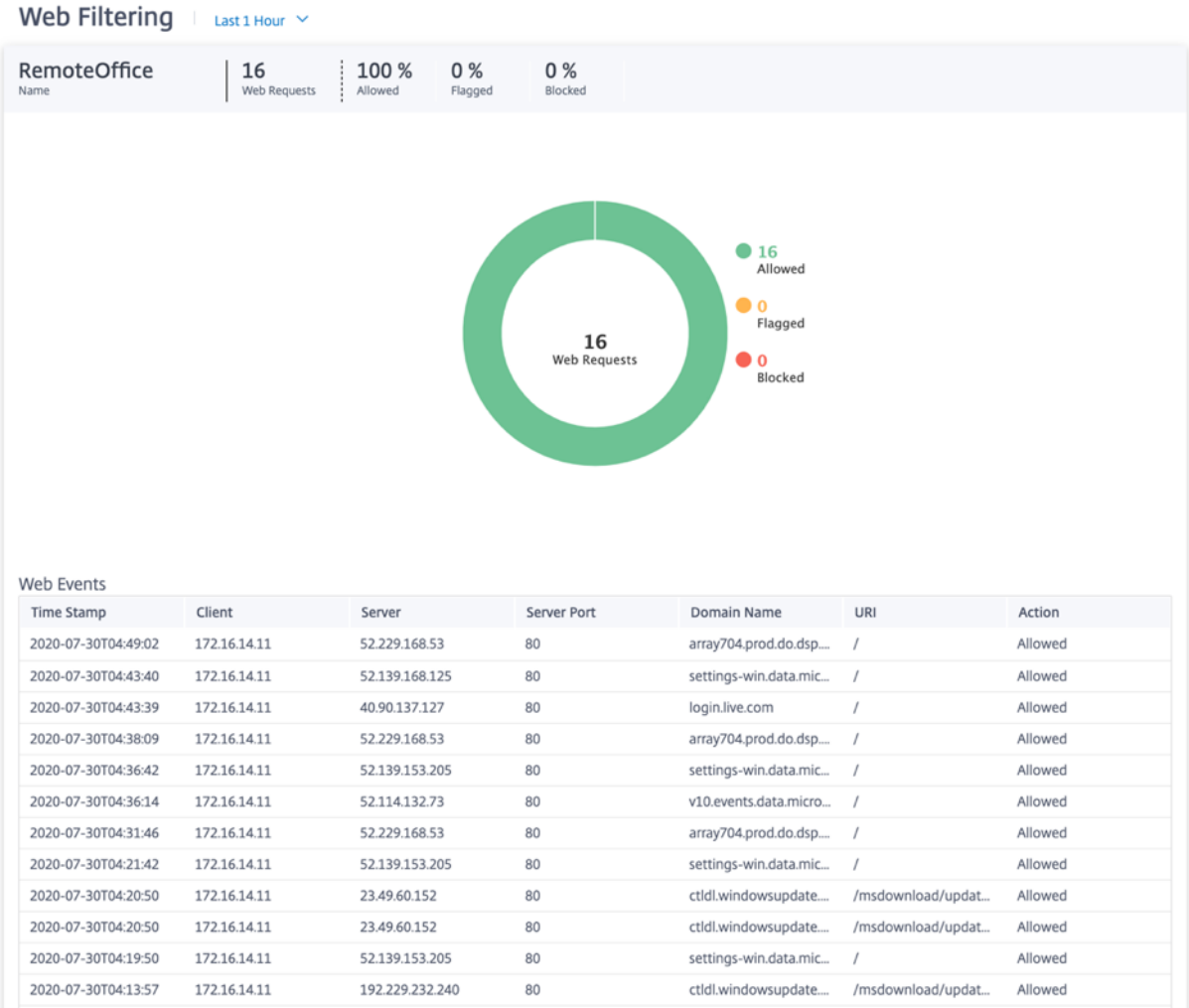
Click an individual site name to view a graphical representation of the web filter details at the site. The **Web Filtering** of the chosen site also provides the real-time report of the last 1000 web (HTTP, HTTPS) events from the total number of the web requests (for the selected timeline).



Time Stamp	Client	Server	Server Port	Domain Name	URI	Action
2020-07-30T04:49:02	172.16.14.11	52.229.168.53	80	array704.prod.do.dsp....	/	Allowed
2020-07-30T04:43:40	172.16.14.11	52.139.168.125	80	settings-win.data.mic...	/	Allowed
2020-07-30T04:43:39	172.16.14.11	40.90.137.127	80	login.live.com	/	Allowed
2020-07-30T04:38:09	172.16.14.11	52.229.168.53	80	array704.prod.do.dsp....	/	Allowed
2020-07-30T04:36:42	172.16.14.11	52.139.153.205	80	settings-win.data.mic...	/	Allowed
2020-07-30T04:36:14	172.16.14.11	52.114.132.73	80	v10.events.data.micro...	/	Allowed
2020-07-30T04:31:46	172.16.14.11	52.229.168.53	80	array704.prod.do.dsp....	/	Allowed
2020-07-30T04:21:42	172.16.14.11	52.139.153.205	80	settings-win.data.mic...	/	Allowed
2020-07-30T04:20:50	172.16.14.11	23.49.60.152	80	ctldl.windowsupdate....	/msdownload/updat...	Allowed
2020-07-30T04:20:50	172.16.14.11	23.49.60.152	80	ctldl.windowsupdate....	/msdownload/updat...	Allowed
2020-07-30T04:19:50	172.16.14.11	52.139.153.205	80	settings-win.data.mic...	/	Allowed
2020-07-30T04:13:57	172.16.14.11	192.229.232.240	80	ctldl.windowsupdate....	/msdownload/updat...	Allowed

You can click the individual slices of the pie chart (demarcated by the color) or the legends beside the pie chart to view the top-10 allowed, flagged, and blocked web request details for clients, URLs, and categories.

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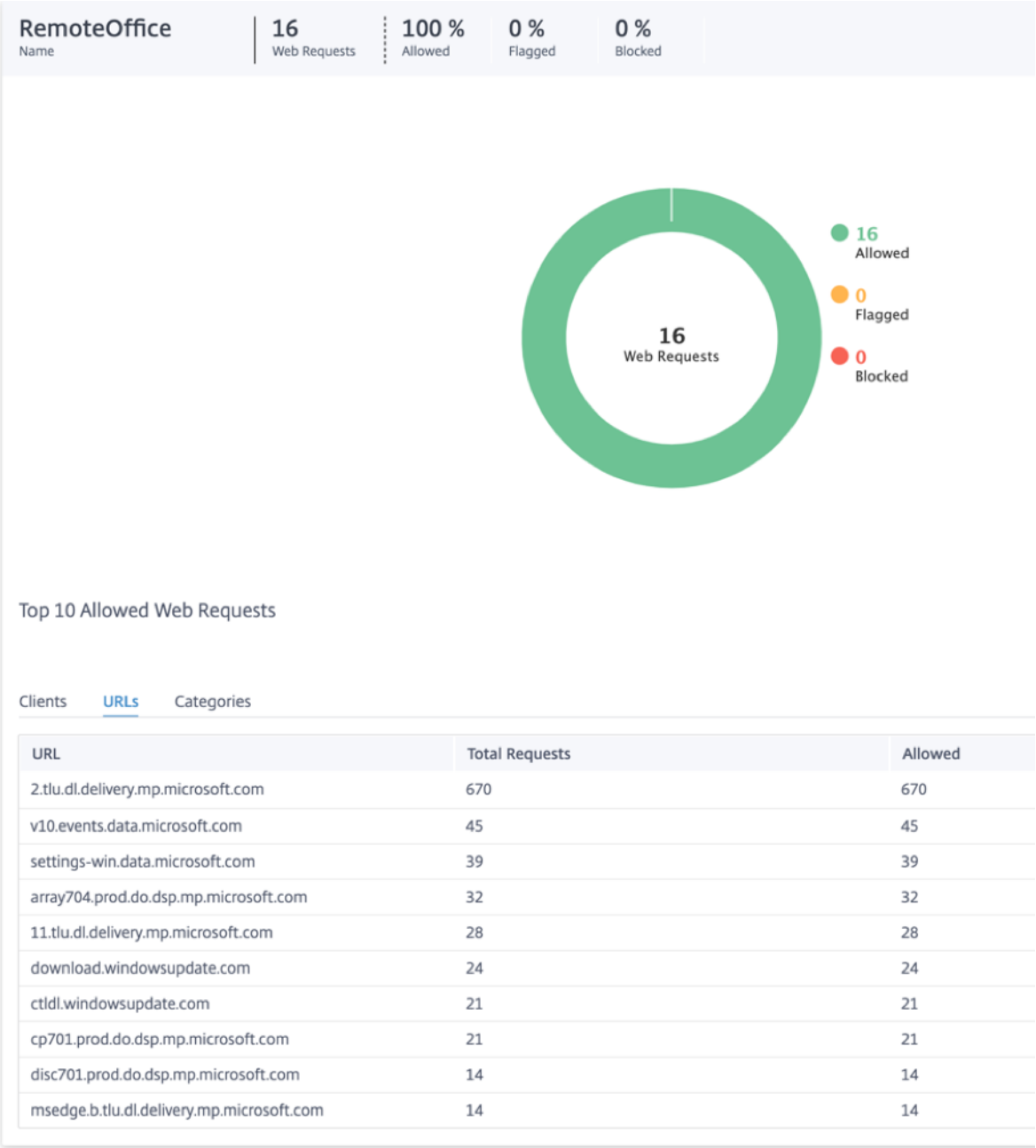

Security profiles:

It displays the total number of requests, the number of requests allowed, the number of requests flagged, and the number of requests blocked by the top 5 Security profiles.

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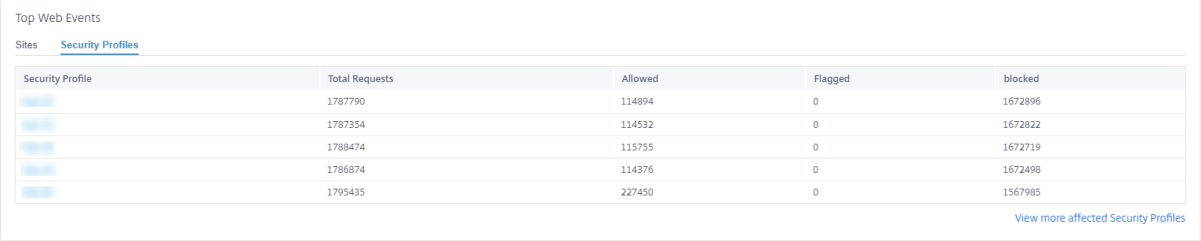
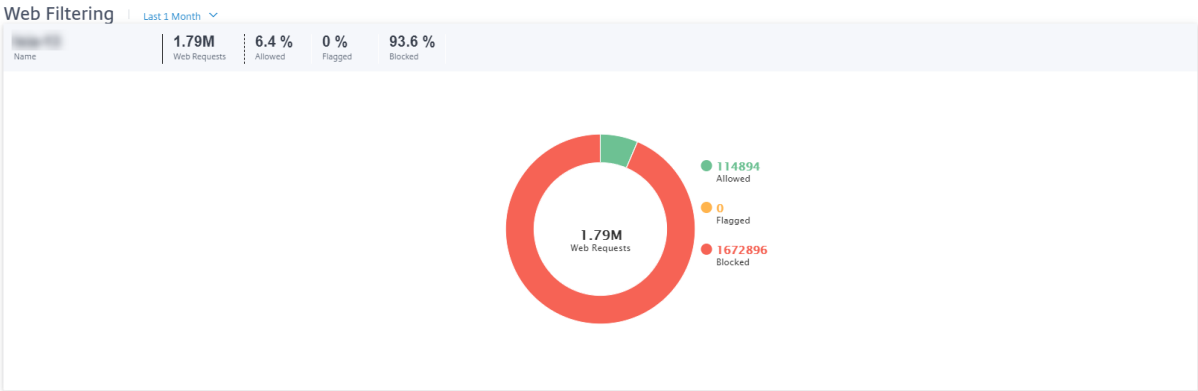


Security Profile	Total Requests	Allowed	Flagged	blocked
	1787790	114894	0	1672896
	1787354	114532	0	1672822
	1788474	115755	0	1672719
	1786874	114376	0	1672498
	1795435	227450	0	1567985

Click **View more affected Security Profiles**, to view the web filtering details of all the security profiles.

Security Profile	Total Requests	Allowed	Flagged	blocked
	1787790	114894	0	1672896
	1787354	114532	0	1672822
	1788474	115755	0	1672719
	1786874	114376	0	1672498
	1795435	227450	0	1567985

Click an individual Security profile name to view a graphical representation of its web filter details.



Anti-malware

To view Anti-Malware reports, at the network level navigate to **Reports** > **Security** > **Anti-Malware** and select the timeline for which you want to view the reports.

The **Event Distribution** section displays the following information:

- Total number of files scanned.
- Percentage of files that were clean.
- Percentage of files that were infected.

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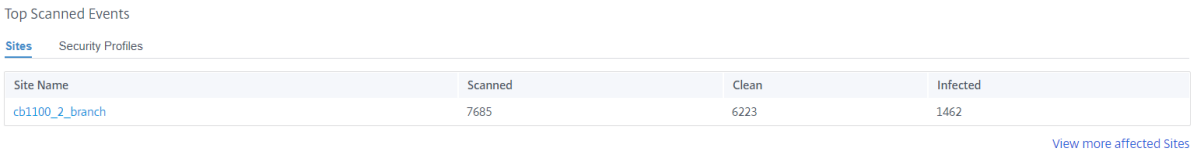
You can also view a graphical representation of the percentage of files that were clean or infected over the selected time frame.

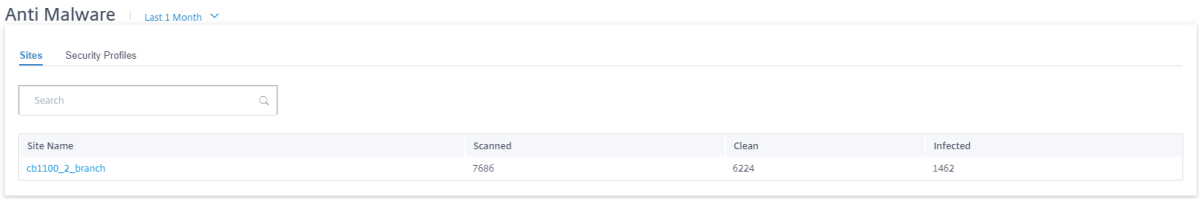
Top scanned events The **Top Scanned Events** table provides the Anti-Malware scan details at the top 5 sites and security profiles.

Sites:

It displays the total number of scanned files, the number of clean files, and the number of infected files at the top 5 sites.



Click **View more affected Sites**, to view the Anti-Malware scan details of all the affected sites in the network.



Click an individual site name to view a graphical representation of the Anti-Malware scan details at the site. The **Anti-Malware** of the chosen site also provides the real-time report of the last 1000 Anti-Malware events from the total number of the files scanned (for the selected timeline).

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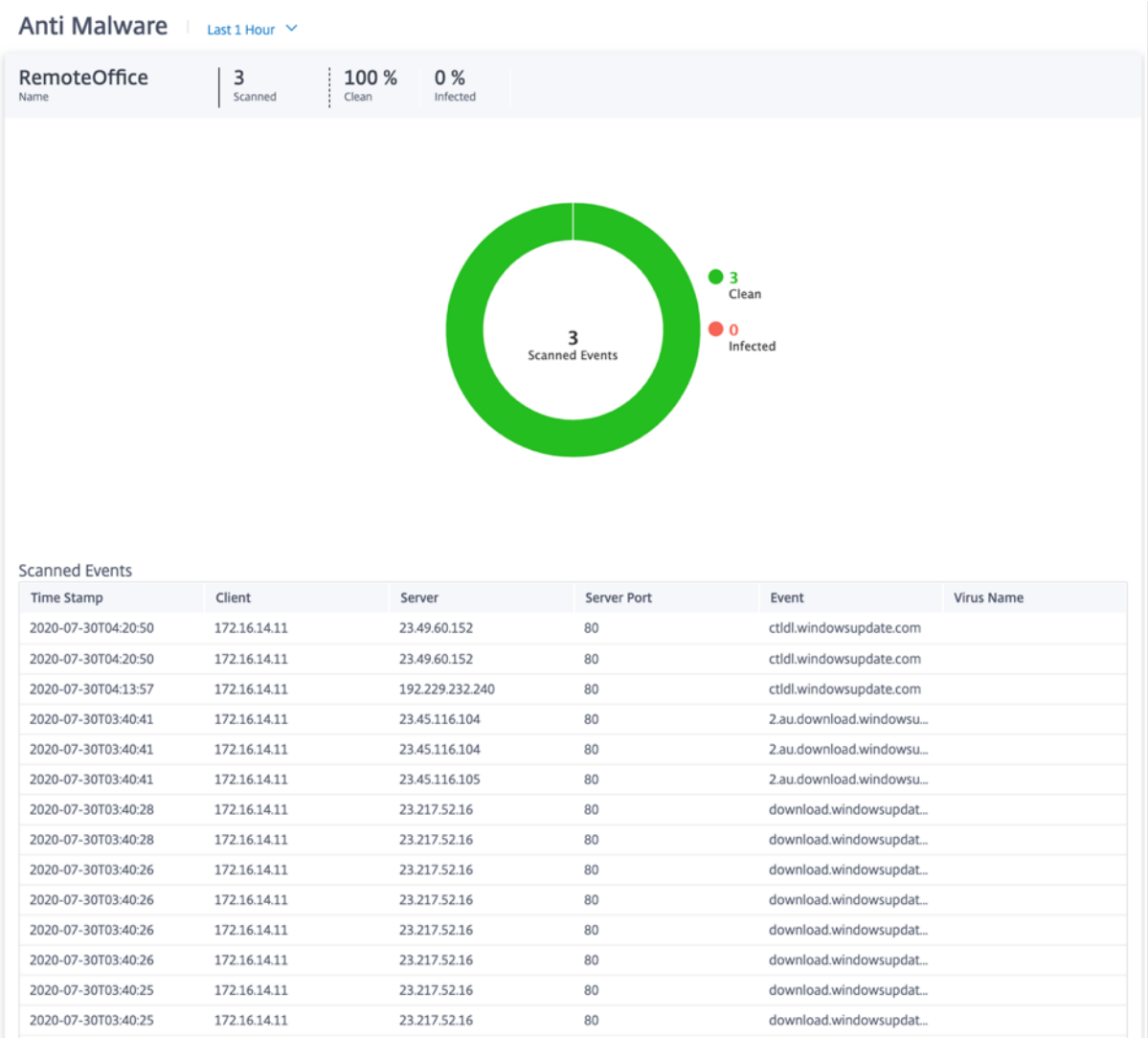

Time Stamp	Client	Server	Server Port	Event	Virus Name
2020-07-30T04:20:50	172.16.14.11	23.49.60.152	80	ctldl.windowsupdate.com	
2020-07-30T04:20:50	172.16.14.11	23.49.60.152	80	ctldl.windowsupdate.com	
2020-07-30T04:13:57	172.16.14.11	192.229.232.240	80	ctldl.windowsupdate.com	
2020-07-30T03:40:41	172.16.14.11	23.45.116.104	80	2.au.download.windowsu...	
2020-07-30T03:40:41	172.16.14.11	23.45.116.104	80	2.au.download.windowsu...	
2020-07-30T03:40:41	172.16.14.11	23.45.116.105	80	2.au.download.windowsu...	
2020-07-30T03:40:28	172.16.14.11	23.217.52.16	80	download.windowsupdat...	
2020-07-30T03:40:28	172.16.14.11	23.217.52.16	80	download.windowsupdat...	
2020-07-30T03:40:26	172.16.14.11	23.217.52.16	80	download.windowsupdat...	
2020-07-30T03:40:26	172.16.14.11	23.217.52.16	80	download.windowsupdat...	
2020-07-30T03:40:26	172.16.14.11	23.217.52.16	80	download.windowsupdat...	
2020-07-30T03:40:26	172.16.14.11	23.217.52.16	80	download.windowsupdat...	
2020-07-30T03:40:25	172.16.14.11	23.217.52.16	80	download.windowsupdat...	
2020-07-30T03:40:25	172.16.14.11	23.217.52.16	80	download.windowsupdat...	

You can click the individual slices of the pie chart (demarcated by the color) or the legends beside the pie chart to view the top-10 clean and infected event details for Web, FTP, and Email. You can further drilldown to verify the top-10 visited websites / FTP sites / email from, clients, virus.

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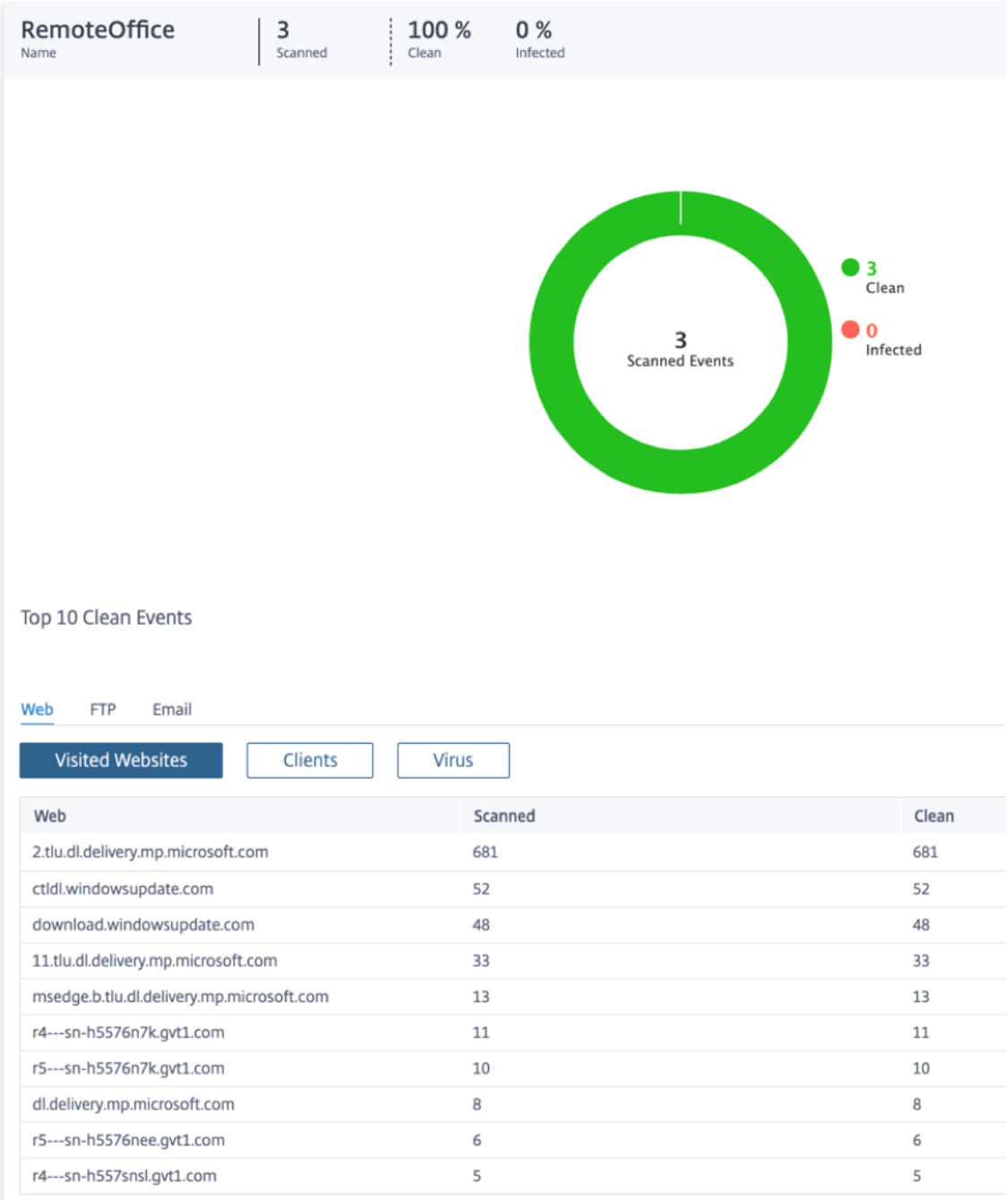

Security profiles:

It displays the total number of scanned files, the number of clean files, and the number of infected files scanned by the top 5 security profiles.

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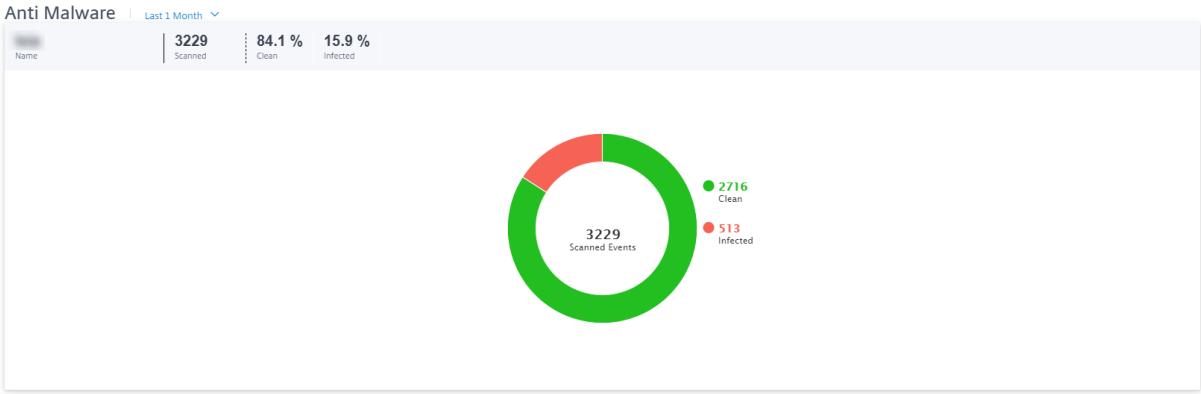
Click **View more affected Security Profiles**, to view the Anti-Malware scan details of all the security profiles.

Click an individual Security Profile name to view a graphical representation of its Anti-Malware scan details.



Intrusion Prevention

To view the Intrusion Prevention report, at the network level navigate to **Reports** > **Security** > **Intrusion Prevention** and select the timeline for which you want to view the report.

The **Intrusion Distribution** section displays the following information:

- Total number of intrusion events
- Percentage of intrusion events logged
- Percentage of intrusion events blocked

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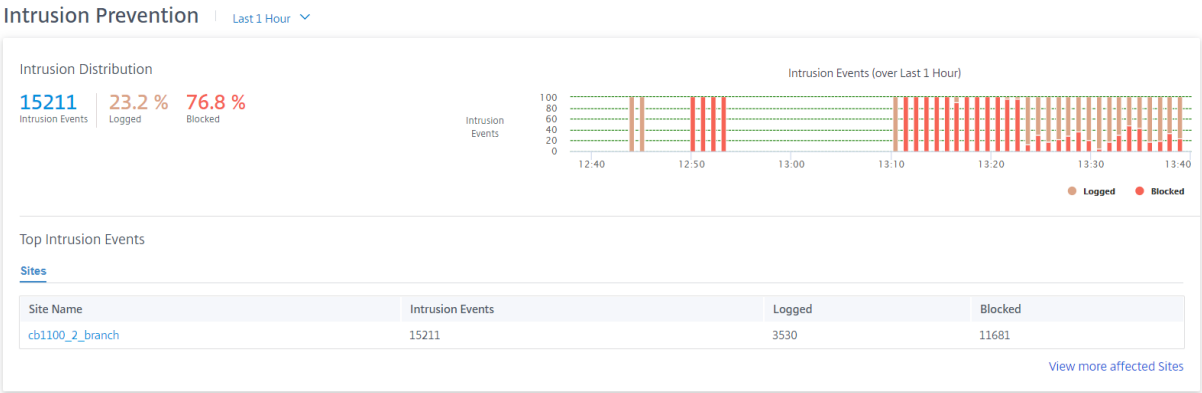
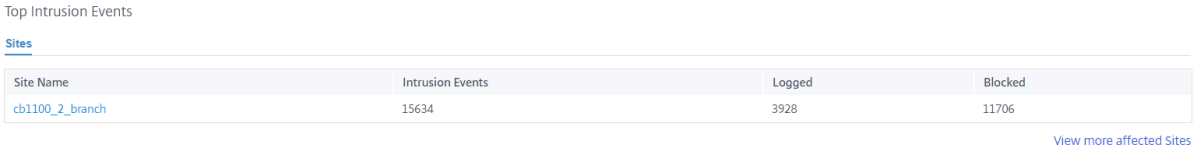
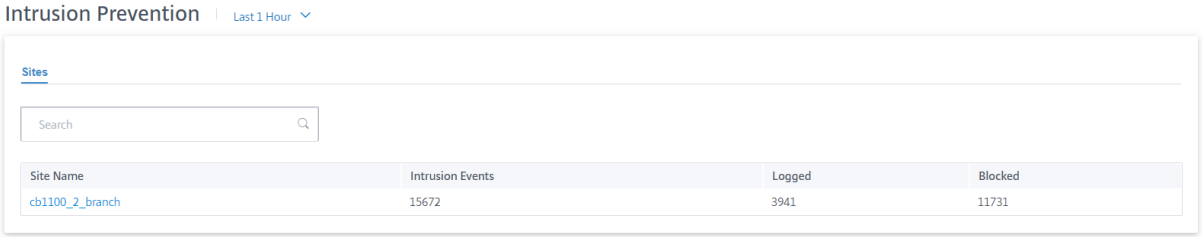


You can also view a graphical representation of the percentage of intrusion events logged or blocked over the selected time frame.

Top intrusion events The **Top Intrusion Events** table provides the intrusion prevention details at the top 5 sites. It displays the total number of intrusion events, the number of intrusion events logged, and the number of intrusion events blocked at the top 5 sites.



Click **View more affected Sites**, to view the Intrusion Prevention details of all the affected sites in the network.



Click an individual site name to view a graphical representation of the Intrusion Prevention details at the site. The **Intrusion Prevention** of the chosen site also provides the real-time report of the last 1000 logged and blocked intrusion prevention system events from the total number of intrusion events (for the selected timeline).

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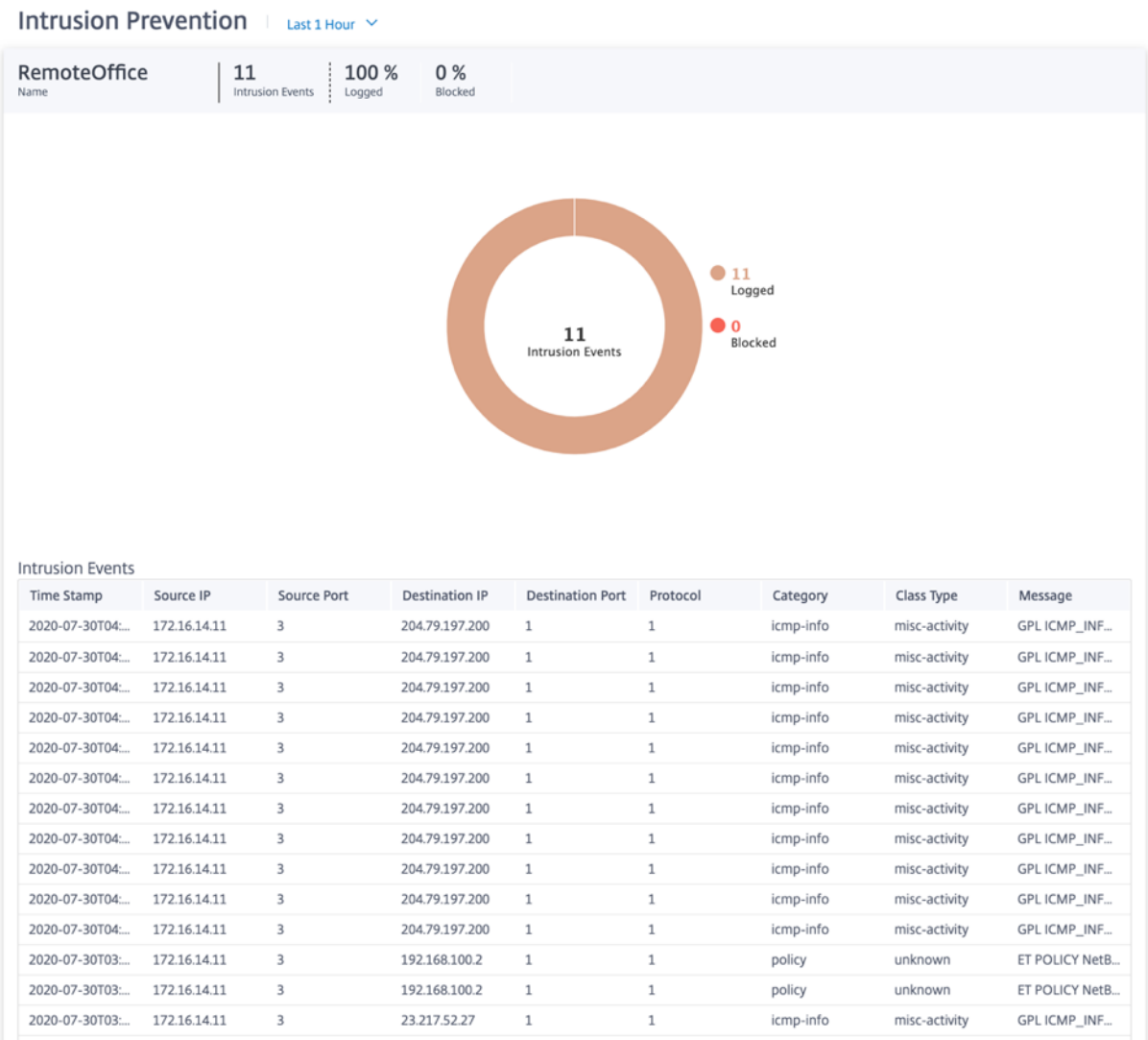

Time Stamp	Source IP	Source Port	Destination IP	Destination Port	Protocol	Category	Class Type	Message
2020-07-30T04:...	172.16.14.11	3	204.79.197.200	1	1	icmp-info	misc-activity	GPL ICMP_INF...
2020-07-30T04:...	172.16.14.11	3	204.79.197.200	1	1	icmp-info	misc-activity	GPL ICMP_INF...
2020-07-30T04:...	172.16.14.11	3	204.79.197.200	1	1	icmp-info	misc-activity	GPL ICMP_INF...
2020-07-30T04:...	172.16.14.11	3	204.79.197.200	1	1	icmp-info	misc-activity	GPL ICMP_INF...
2020-07-30T04:...	172.16.14.11	3	204.79.197.200	1	1	icmp-info	misc-activity	GPL ICMP_INF...
2020-07-30T04:...	172.16.14.11	3	204.79.197.200	1	1	icmp-info	misc-activity	GPL ICMP_INF...
2020-07-30T04:...	172.16.14.11	3	204.79.197.200	1	1	icmp-info	misc-activity	GPL ICMP_INF...
2020-07-30T04:...	172.16.14.11	3	204.79.197.200	1	1	icmp-info	misc-activity	GPL ICMP_INF...
2020-07-30T04:...	172.16.14.11	3	204.79.197.200	1	1	icmp-info	misc-activity	GPL ICMP_INF...
2020-07-30T04:...	172.16.14.11	3	204.79.197.200	1	1	icmp-info	misc-activity	GPL ICMP_INF...
2020-07-30T04:...	172.16.14.11	3	204.79.197.200	1	1	icmp-info	misc-activity	GPL ICMP_INF...
2020-07-30T03:...	172.16.14.11	3	192.168.100.2	1	1	policy	unknown	ET POLICY NetB...
2020-07-30T03:...	172.16.14.11	3	192.168.100.2	1	1	policy	unknown	ET POLICY NetB...
2020-07-30T03:...	172.16.14.11	3	23.217.52.27	1	1	icmp-info	misc-activity	GPL ICMP_INF...

You can click the individual slices of the pie chart (demarcated by the color) or the legends beside the pie chart to view the top-10 logged and blocked event details for class types, categories, source/destination IPs and ports, and Protocols along with the timestamp.

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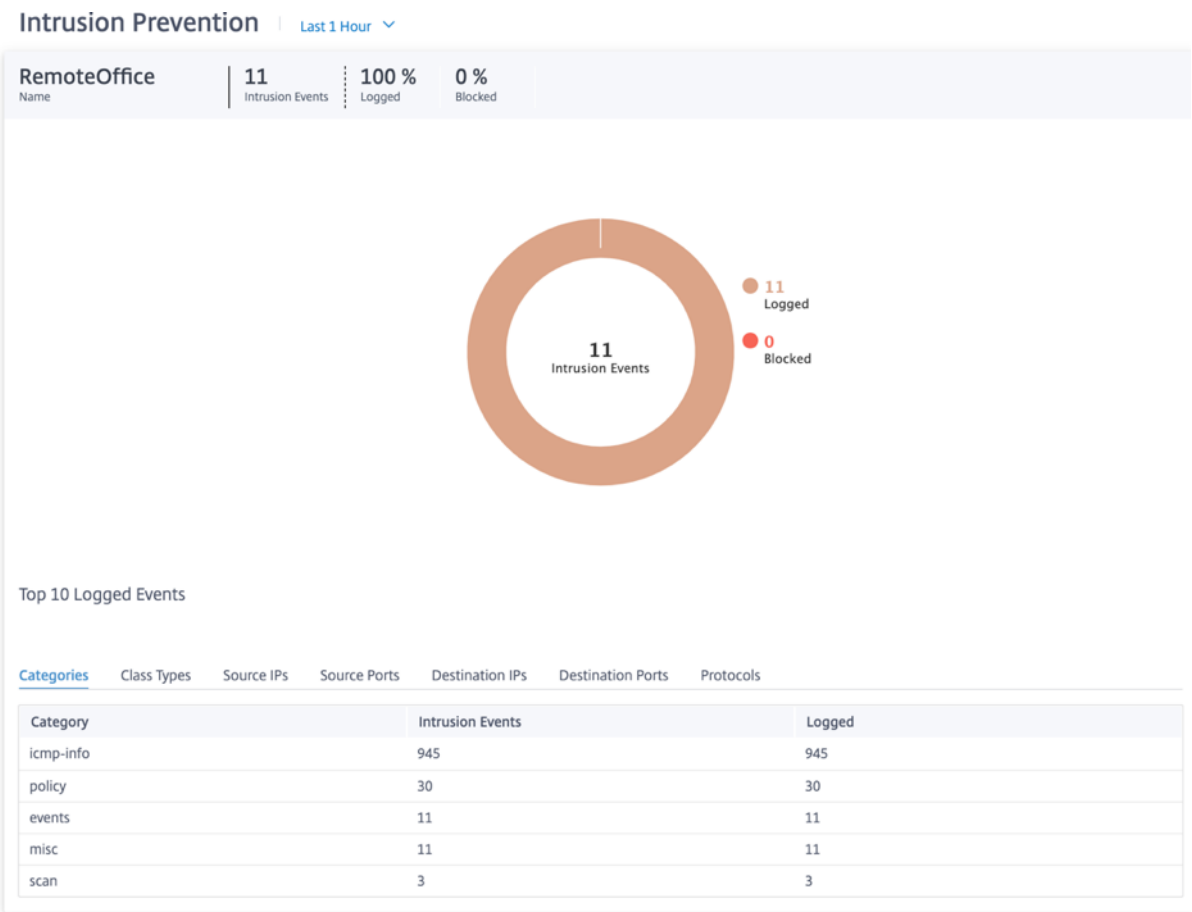

SSL inspection

To view the SSL inspection report, at the network level navigate to **Reports > Security > SSL Inspection** and select the timeline for which you want to view the report.

The **SSL Inspection** section displays the following information:

- Total number of SSL inspection events
- Percentage of SSL inspection events inspected
- Percentage of SSL inspection events bypassed

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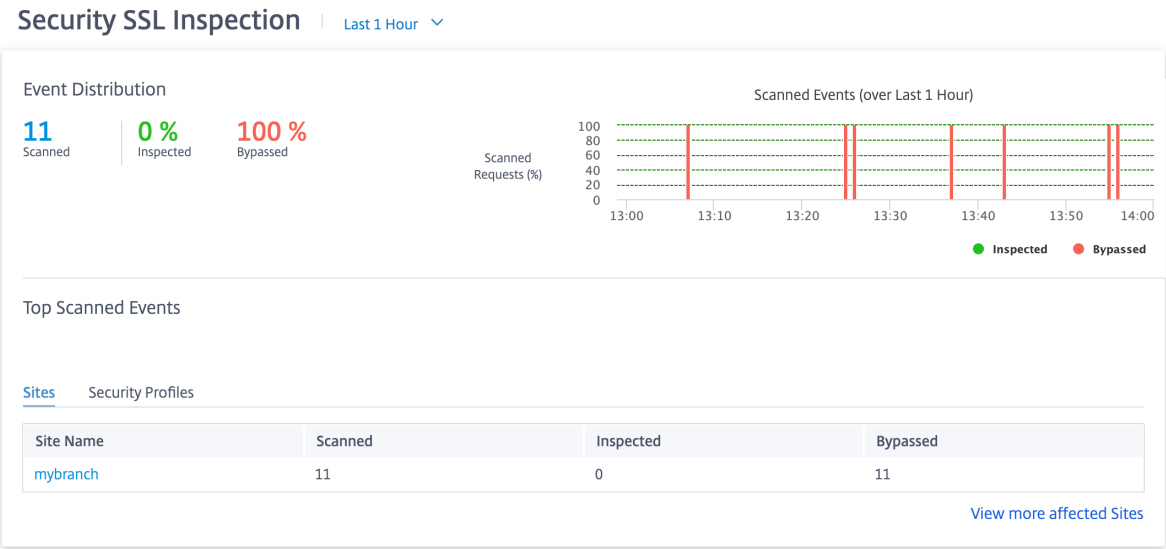
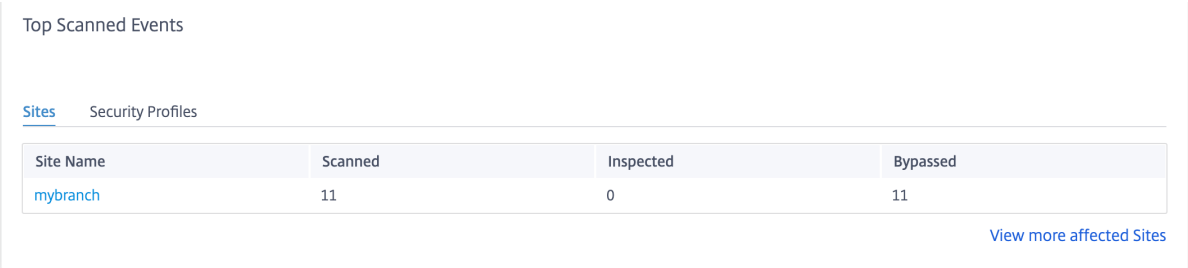
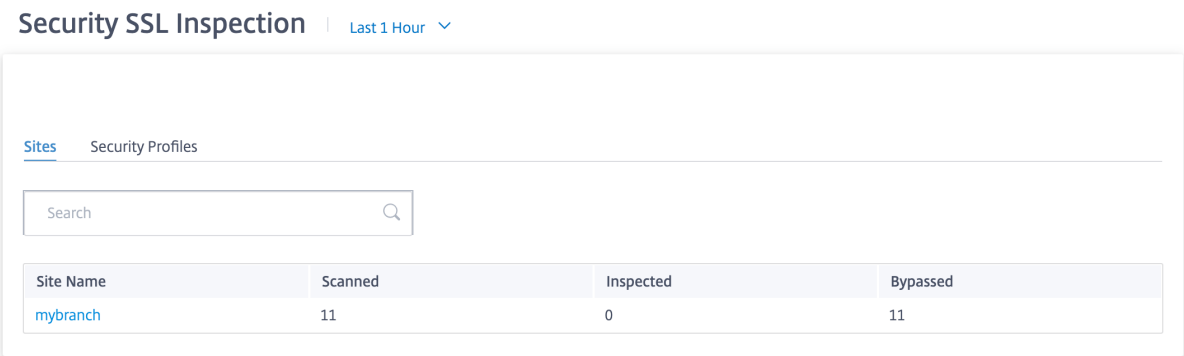


You can also view a graphical representation of the percentage of SSL inspection events inspected or bypassed over the selected time frame.

Top scanned events The **Top Scanned Events** table provides the SSL inspection details at the top 5 sites. It displays the total number of SSL inspection events, the number of events scanned, and the number of events bypassed at the top 5 sites.



Click **View more affected Sites**, to view the SSL inspection details of all the affected sites in the network.



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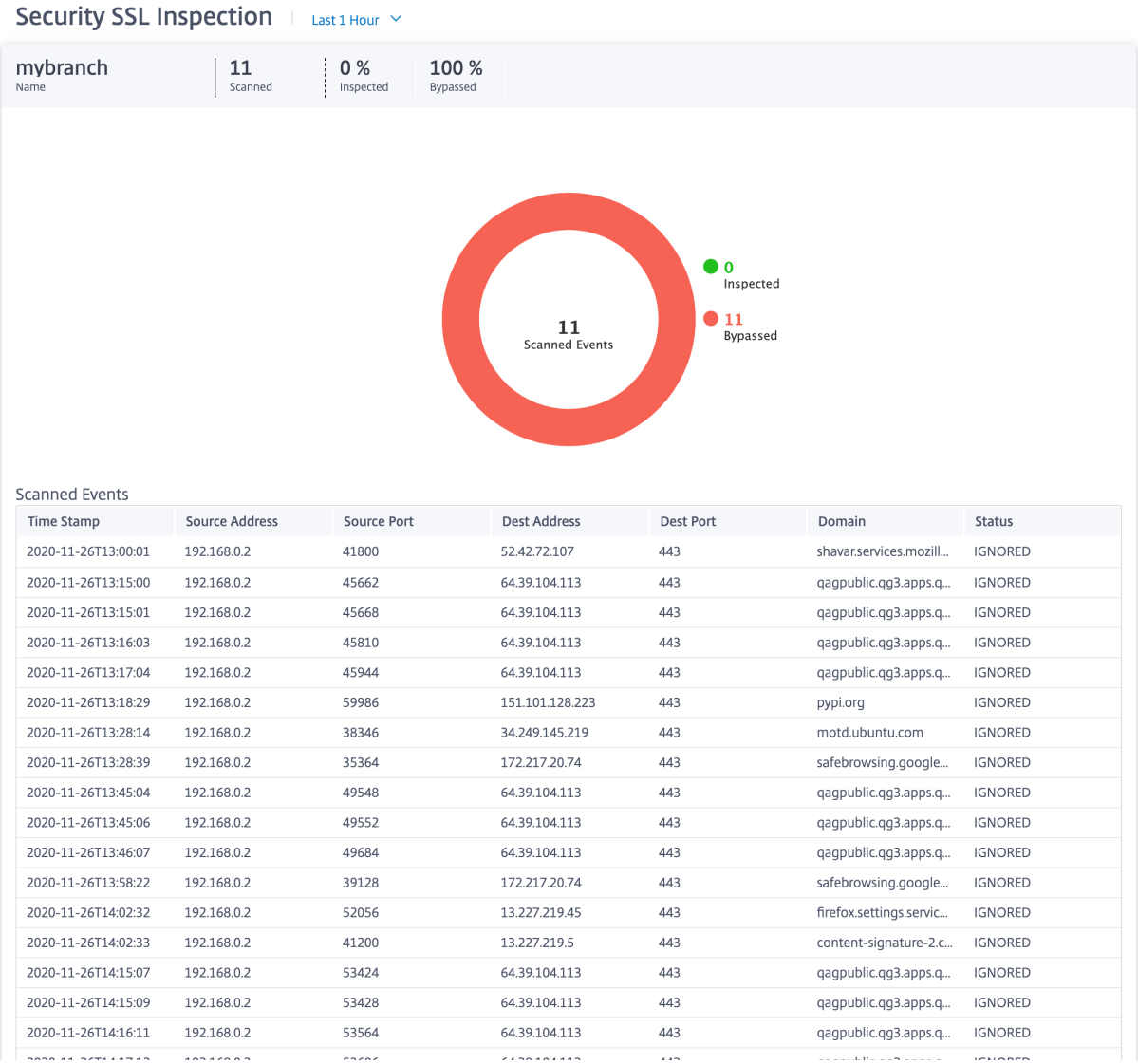
Click an individual site name to view a graphical representation of the SSL inspection details at the site. The **SSL Inspection** of the chosen site also provides the real-time report of the last 1000 scanned and bypassed SSL inspection events from the total number of SSL inspection events (for the selected timeline).



Time Stamp	Source Address	Source Port	Dest Address	Dest Port	Domain	Status
2020-11-26T13:00:01	192.168.0.2	41800	52.42.72.107	443	shavar.services.mozill...	IGNORED
2020-11-26T13:15:00	192.168.0.2	45662	64.39.104.113	443	qagpublic.qg3.apps.q...	IGNORED
2020-11-26T13:15:01	192.168.0.2	45668	64.39.104.113	443	qagpublic.qg3.apps.q...	IGNORED
2020-11-26T13:16:03	192.168.0.2	45810	64.39.104.113	443	qagpublic.qg3.apps.q...	IGNORED
2020-11-26T13:17:04	192.168.0.2	45944	64.39.104.113	443	qagpublic.qg3.apps.q...	IGNORED
2020-11-26T13:18:29	192.168.0.2	59986	151.101.128.223	443	pypi.org	IGNORED
2020-11-26T13:28:14	192.168.0.2	38346	34.249.145.219	443	motd.ubuntu.com	IGNORED
2020-11-26T13:28:39	192.168.0.2	35364	172.217.20.74	443	safebrowsing.google...	IGNORED
2020-11-26T13:45:04	192.168.0.2	49548	64.39.104.113	443	qagpublic.qg3.apps.q...	IGNORED
2020-11-26T13:45:06	192.168.0.2	49552	64.39.104.113	443	qagpublic.qg3.apps.q...	IGNORED
2020-11-26T13:46:07	192.168.0.2	49684	64.39.104.113	443	qagpublic.qg3.apps.q...	IGNORED
2020-11-26T13:58:22	192.168.0.2	39128	172.217.20.74	443	safebrowsing.google...	IGNORED
2020-11-26T14:02:32	192.168.0.2	52056	13.227.219.45	443	firefox.settings.servic...	IGNORED
2020-11-26T14:02:33	192.168.0.2	41200	13.227.219.5	443	content-signature-2.c...	IGNORED
2020-11-26T14:15:07	192.168.0.2	53424	64.39.104.113	443	qagpublic.qg3.apps.q...	IGNORED
2020-11-26T14:15:09	192.168.0.2	53428	64.39.104.113	443	qagpublic.qg3.apps.q...	IGNORED
2020-11-26T14:16:11	192.168.0.2	53564	64.39.104.113	443	qagpublic.qg3.apps.q...	IGNORED

You can click the individual slices of the pie chart (demarcated by the color) or the legends beside the pie chart to view the top-10 scanned, inspected, and bypassed event details for timestamp, source/destination IPs and ports, domain, and status.

Security profiles:

It displays the total number of scanned files, the number of inspected files, and the number of bypassed files scanned by the top 5 security profiles.

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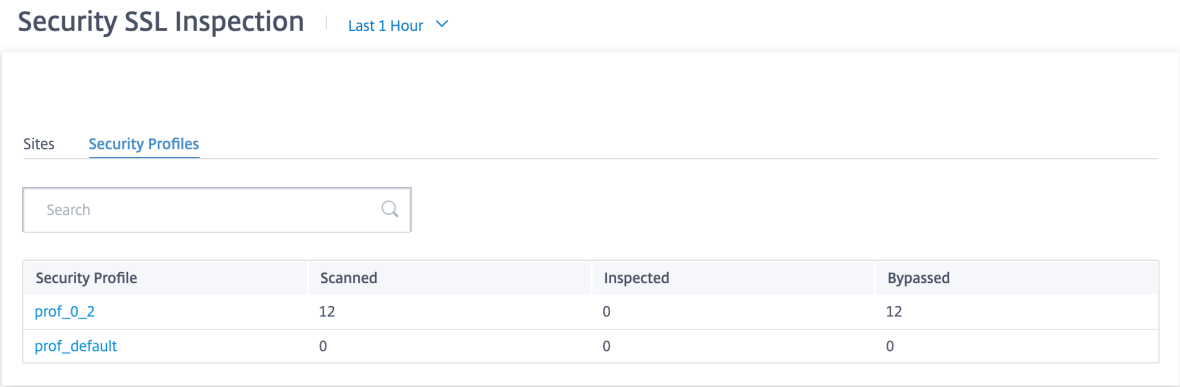
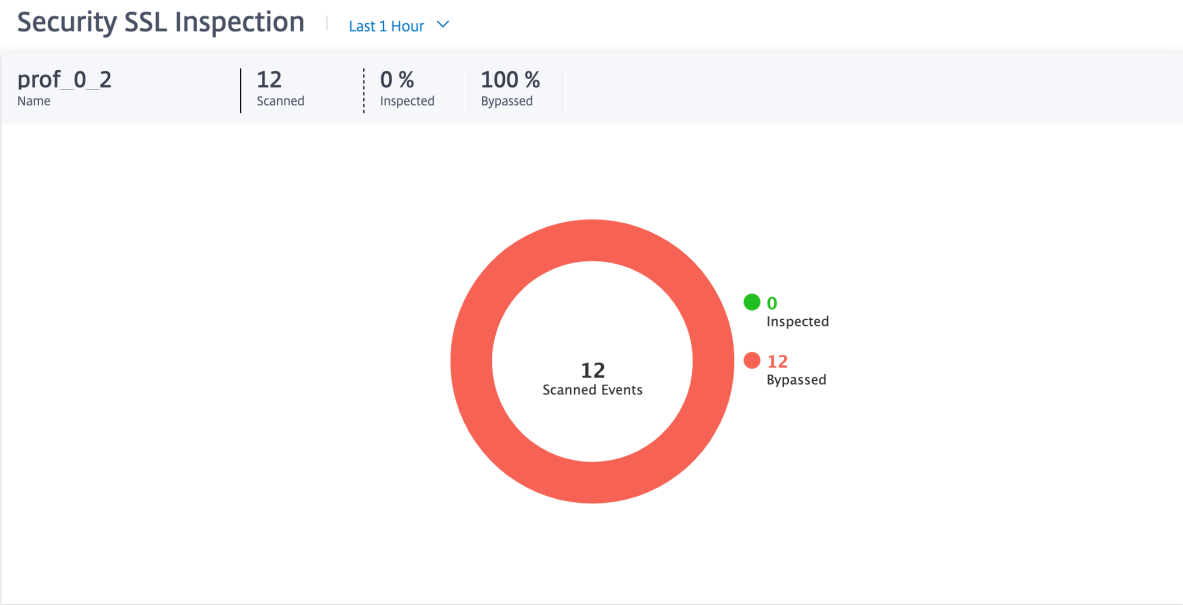
Click **View more affected Security Profiles**, to view the SSL inspection scan details of all the security profiles.



Click an individual Security Profile name to view a graphical representation of its SSL inspection scan details.



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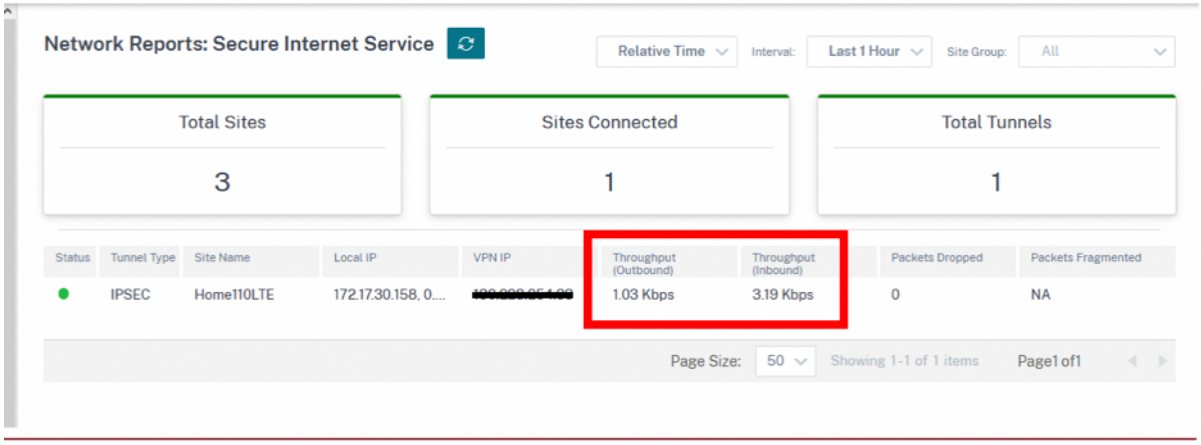
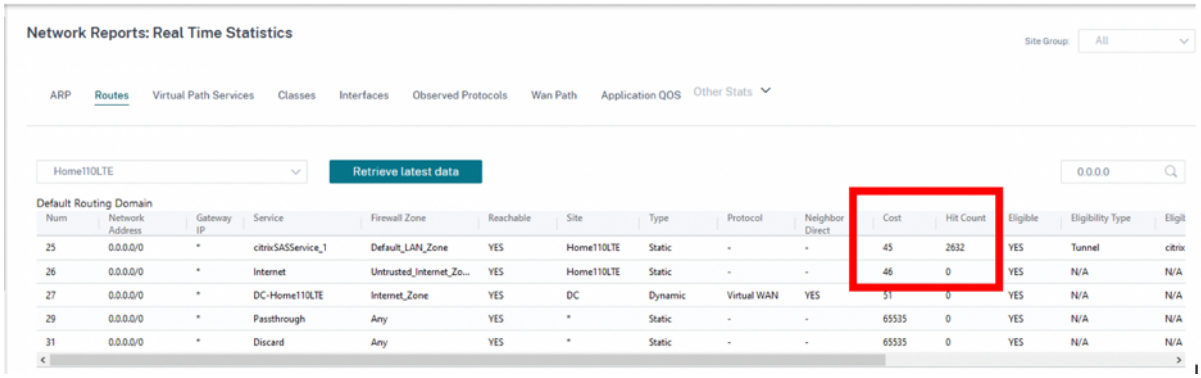
Citrix Secure Internet Access™ report

You can see the CSIA dashboard under the **Reports > Secure Internet Service** page in Citrix SD-WAN™ Orchestrator. In this page you can see the status of the tunnels whether the tunnel is active or not including the total number of sites in your SD-WAN deployment, number of connected sites using the tunnel direction method, and the total number of tunnels. If host machines are actively connected and access internet resources, the outbound and inbound throughput will be measure.



Throughput usage for the tunnels can also be retrieved from the site-level **Reports > Real Time > IPsec Tunnel**.

The site-level Routes table can also confirm that the routes to the CSIA service are being used by incrementing Hit Count. Contending default routes (0.0.0.0/0) have higher cost.



Extra tunnel information can be obtained from the CSIA portal, which was formed during the creation of the CSIA service on SD-WAN. Navigate to **Connect Devices to Cloud > Tunnels > IPSec Tunnels**.

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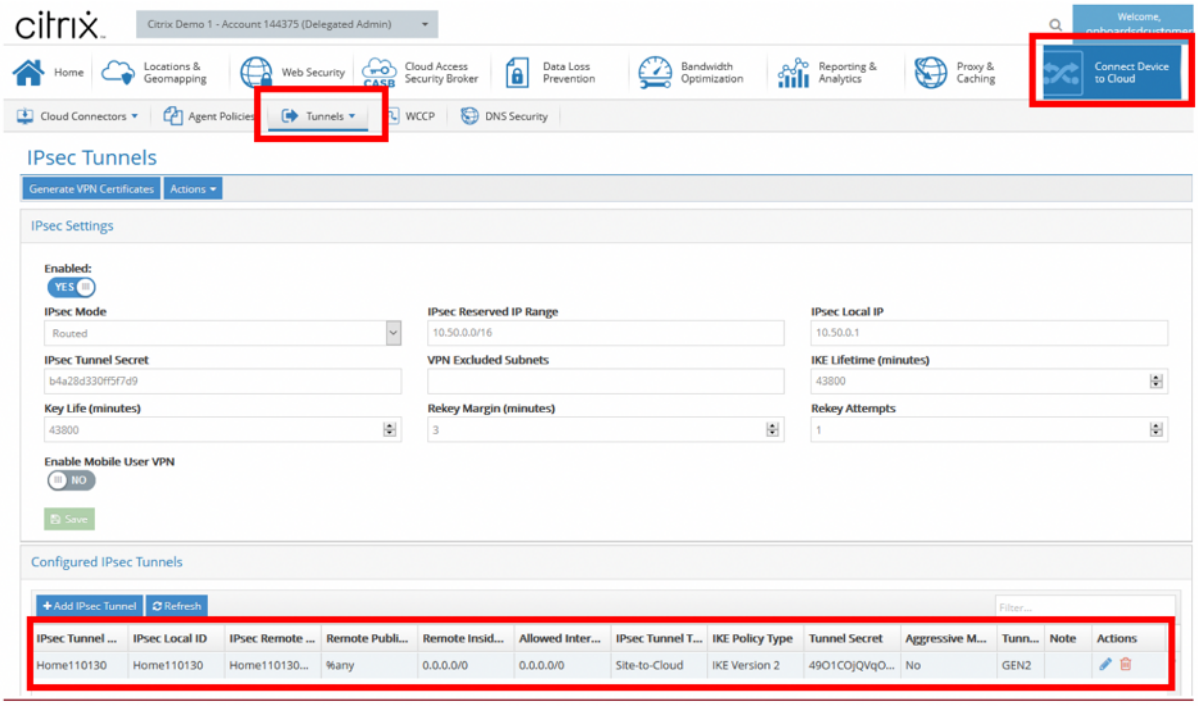
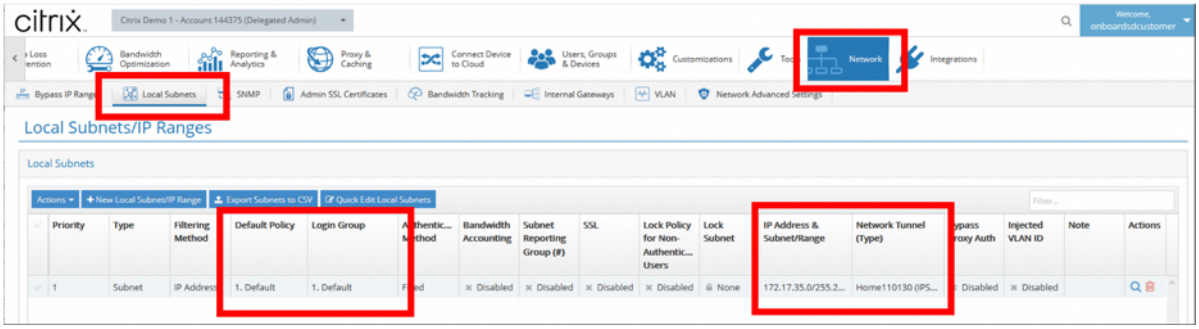


Also, local subnets are automatically defined on the CSIA portal. Navigate to **Network > Local Subnets**. This is the subnet range that is expected from LAN devices connected behind the SD-WAN site and expected to use the tunnel for redirection.



> **Note**
>
> The previsioning of the CSIA service automatically associates the **Local Subnet** with the Default security group. Use this security group to configure desired security policies on CSIA.

HDX™ dashboard and reports

For details on HDX dashboard and reports, see HDX dashboard and reports.

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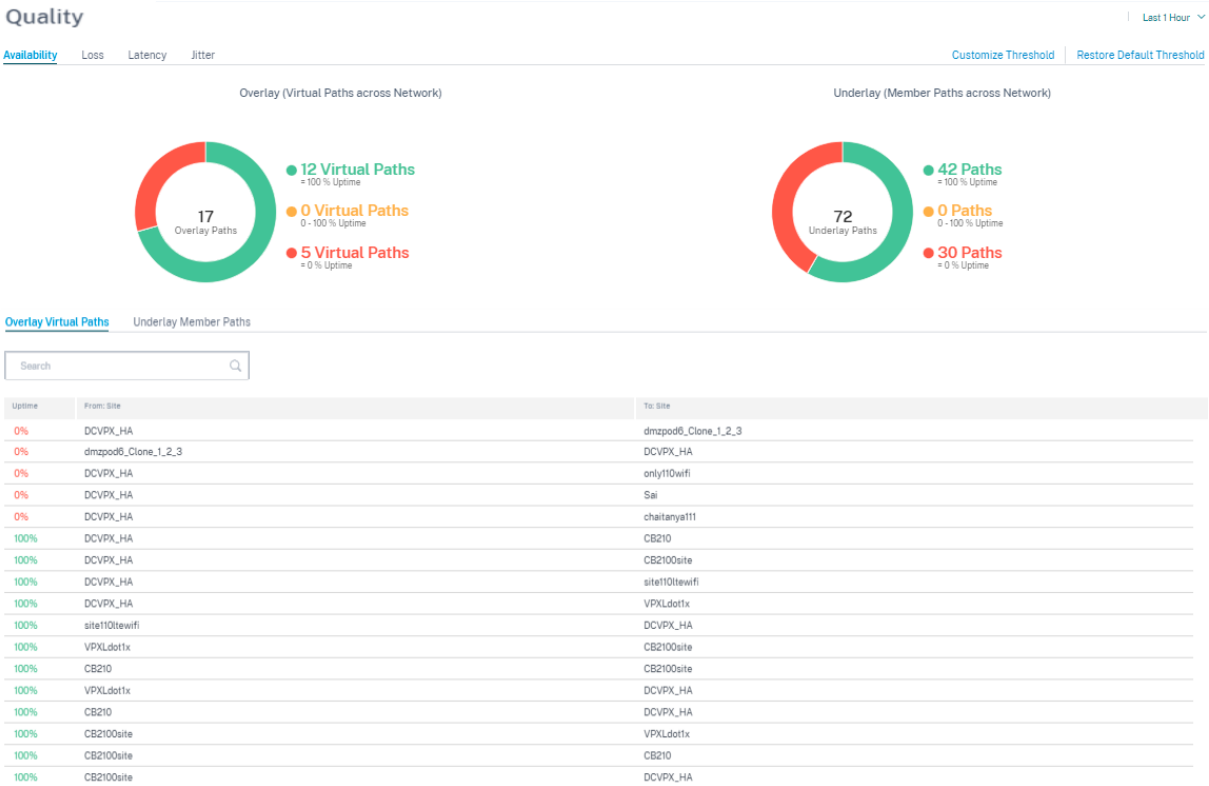
Network Quality

The **Network Quality** report enables a network-level comparison between the virtual overlay and the physical underlay paths in terms of availability and loss, latency, and jitter. This helps to effectively monitor how the overlay is faring relative to the underlay network, and also aids troubleshooting. For Latency and Jitter, only the details of the underlay member paths are displayed.



Click the table entry to see the detailed view.

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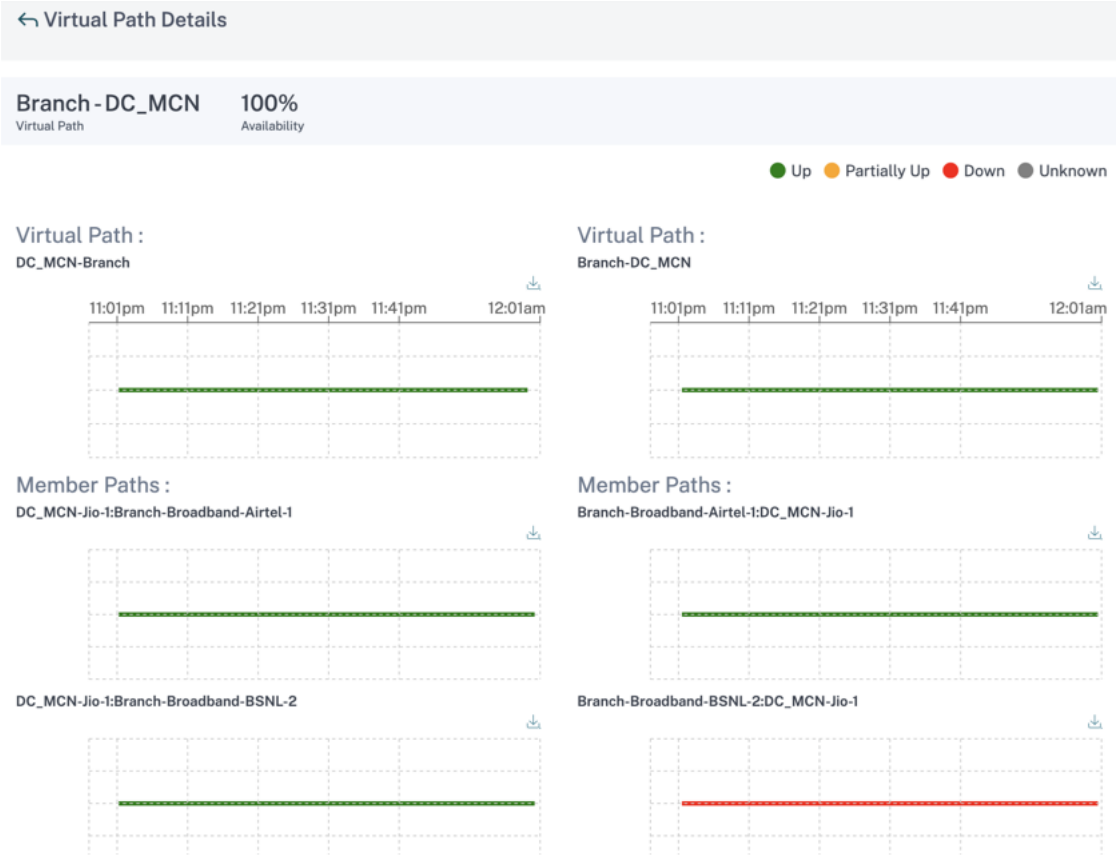
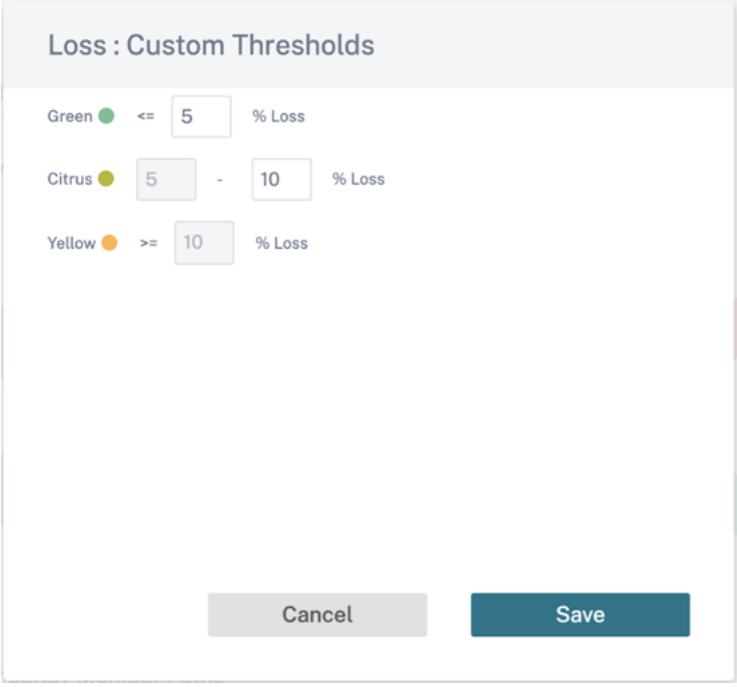


You can customize the threshold for each network quality parameter.



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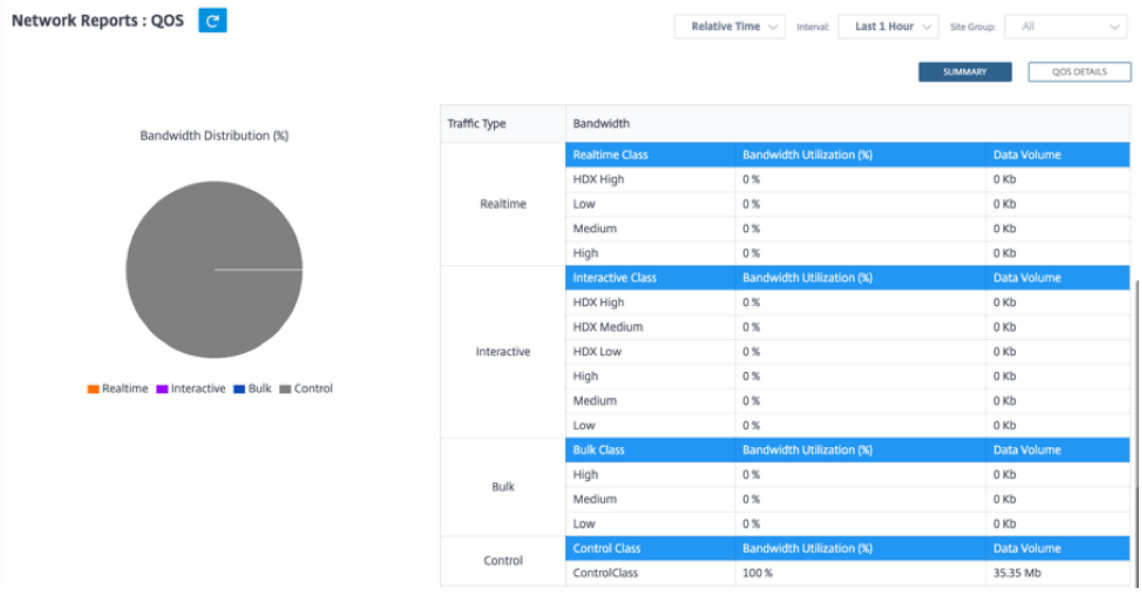
Quality of Service

Quality of Service (QoS) manages data traffic to reduce packet loss, latency, and jitter on the network. For more information, see Quality of Service. The following are two ways to view the Quality-of-Service (QoS) report:

- **Summary View:** Summary view provides an overview of bandwidth consumption across all types of traffic - real-time, interactive, bulk, and control across the network and per site.



Traffic Type	Bandwidth		
Realtime	Realtime Class	Bandwidth Utilization (%)	Data Volume
	HDX High	0 %	0 Kb
	Low	0 %	0 Kb
	Medium	0 %	0 Kb
	High	0 %	0 Kb
Interactive	Interactive Class	Bandwidth Utilization (%)	Data Volume
	HDX High	0 %	0 Kb
	HDX Medium	0 %	0 Kb
	HDX Low	0 %	0 Kb
	High	0 %	0 Kb
	Medium	0 %	0 Kb
	Low	0 %	0 Kb
Bulk	Bulk Class	Bandwidth Utilization (%)	Data Volume
	High	0 %	0 Kb
	Medium	0 %	0 Kb
	Low	0 %	0 Kb
Control	Control Class	Bandwidth Utilization (%)	Data Volume
	ControlClass	100 %	35.35 Mb

  - **Real-time:** Used for low latency, low bandwidth, time-sensitive traffic. Real-time applications are time sensitive but don't really need high bandwidth (for example voice over IP). Real-time applications are sensitive to latency and jitter, but can tolerate some loss.
  - **Interactive:** Used for interactive traffic with low to medium latency requirements and low to medium bandwidth requirements. Interactive applications involve human input in the form of mouse clicks or cursor moves. The interaction is typically between a client and a server. The communication might not need high bandwidth but is sensitive to loss and latency. However, server to client does need high bandwidth to transfer graphical information, which might not be sensitive to loss.
  - **Bulk:** Used for high bandwidth traffic that can tolerate high latency. Applications that handle file transfer and need high bandwidth are categorized as bulk class. These applications involve little human interference and are mostly handled by the systems themselves.
  - **Control:** Used to transfer control packets that contain routing, scheduling, and link statistics information.

- **Detailed View:** The detailed view captures trends around bandwidth consumption, traffic volume, packets dropped and so on for each QoS class associated with an overlay virtual path.

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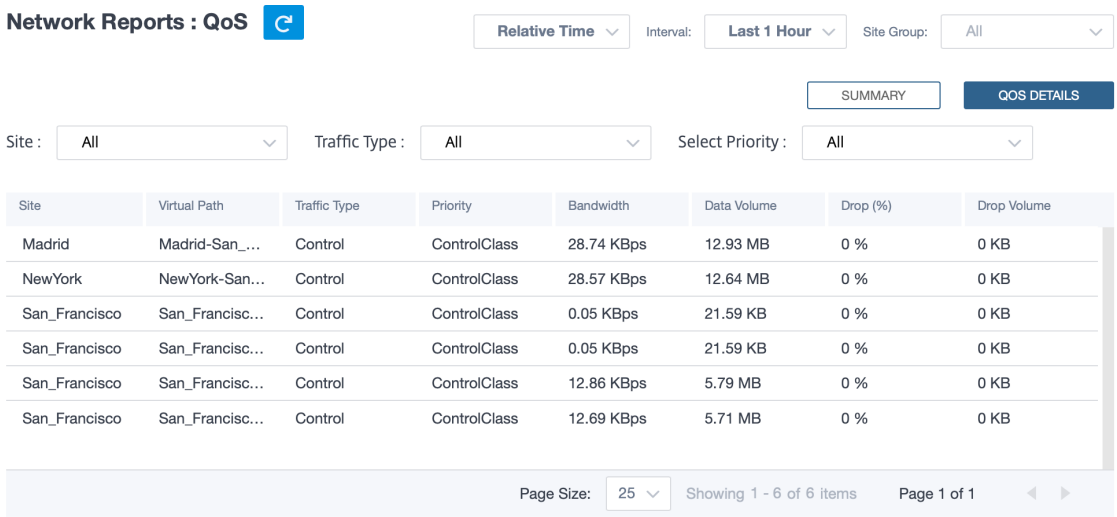

This report is available at the site level where the user can view QoS statistics based on the virtual path between the two sites. For more information see Site reports.

Historical statistics

For each site, you can view the statistics as graphs for the following network parameters:

- Sites
- Virtual Paths
- Paths
- WAN Links
- Interfaces
- Classes
- GRE Tunnels
- IPsec Tunnels

The statistics are collected as graphs. These graphs are plotted as timeline versus usage, allowing you to understand the usage trends of various network object properties. You can view graphs for network-wide application statistics.

You can view or hide the graphs and customize the columns as needed.

Sites

To view the Site statistics, navigate to **Reports > Historical Statistics > Sites** tab.

Select the site name from the list.

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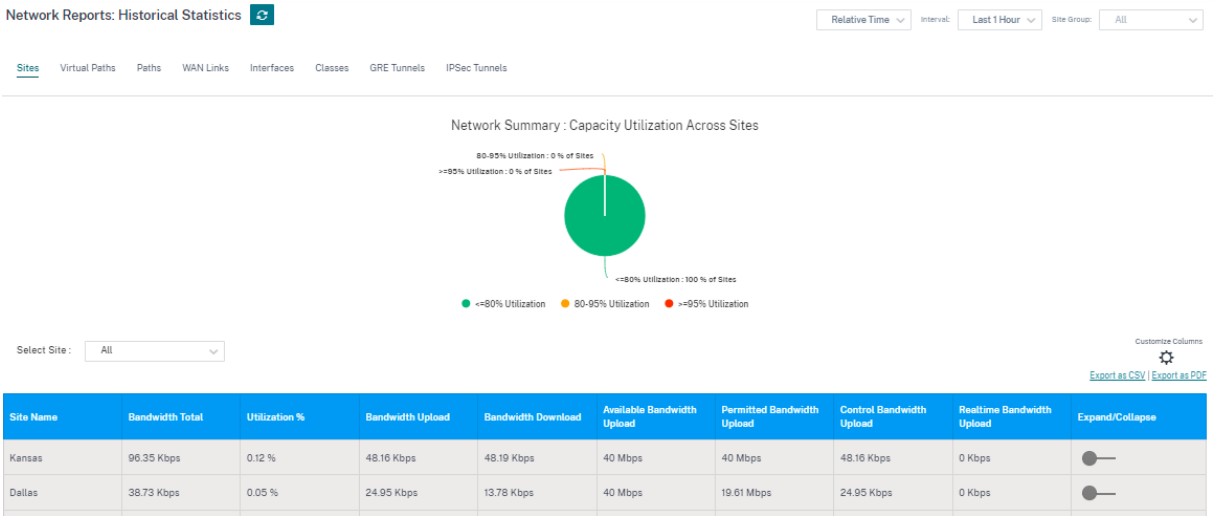

You can view the following metrics:

- **Site Name**: The site name.
- **Bandwidth Total**: Total bandwidth consumed by all packet types. Bandwidth = Control Bandwidth + Real-time Bandwidth + Interactive Bandwidth + Bulk Bandwidth.
- **Utilization %**: You can view the site statistics by Utilization (%).
- **Bandwidth Upload**: The maximum and the minimum upload speed through the WAN port.
- **Bandwidth Download**: The maximum and the minimum download speed through the WAN port.
- **Available Bandwidth Upload**: Total bandwidth allocated to all the WAN links of a site.
- **Permitted Bandwidth Upload**: Bandwidth available for transmitting information.
- **Control Bandwidth Upload**: Bandwidth used to transfer control packets that contain routing, scheduling, and link statistics information.
- **Realtime Bandwidth Upload**: Bandwidth consumed by applications that belong to the real-time class type in the Citrix SD-WAN configuration. The performance of such applications depends on a great extent upon network latency. A delayed packet is worse than a lost packet (for example, VoIP, Skype for Business).
- **Expand/Collapse**: You can expand or collapse the data as needed.

You can also export the filtered results in to a CSV or PDF file by using the **Export as CSV** and **Export as PDF** options. The CSV and PDF file name is prefixed with **Network Performance** followed by the date and time when the file is exported.

Virtual paths

To view the **Virtual Paths** statistics, navigate to **Reports > Historical Statistics > Virtual Paths** tab.

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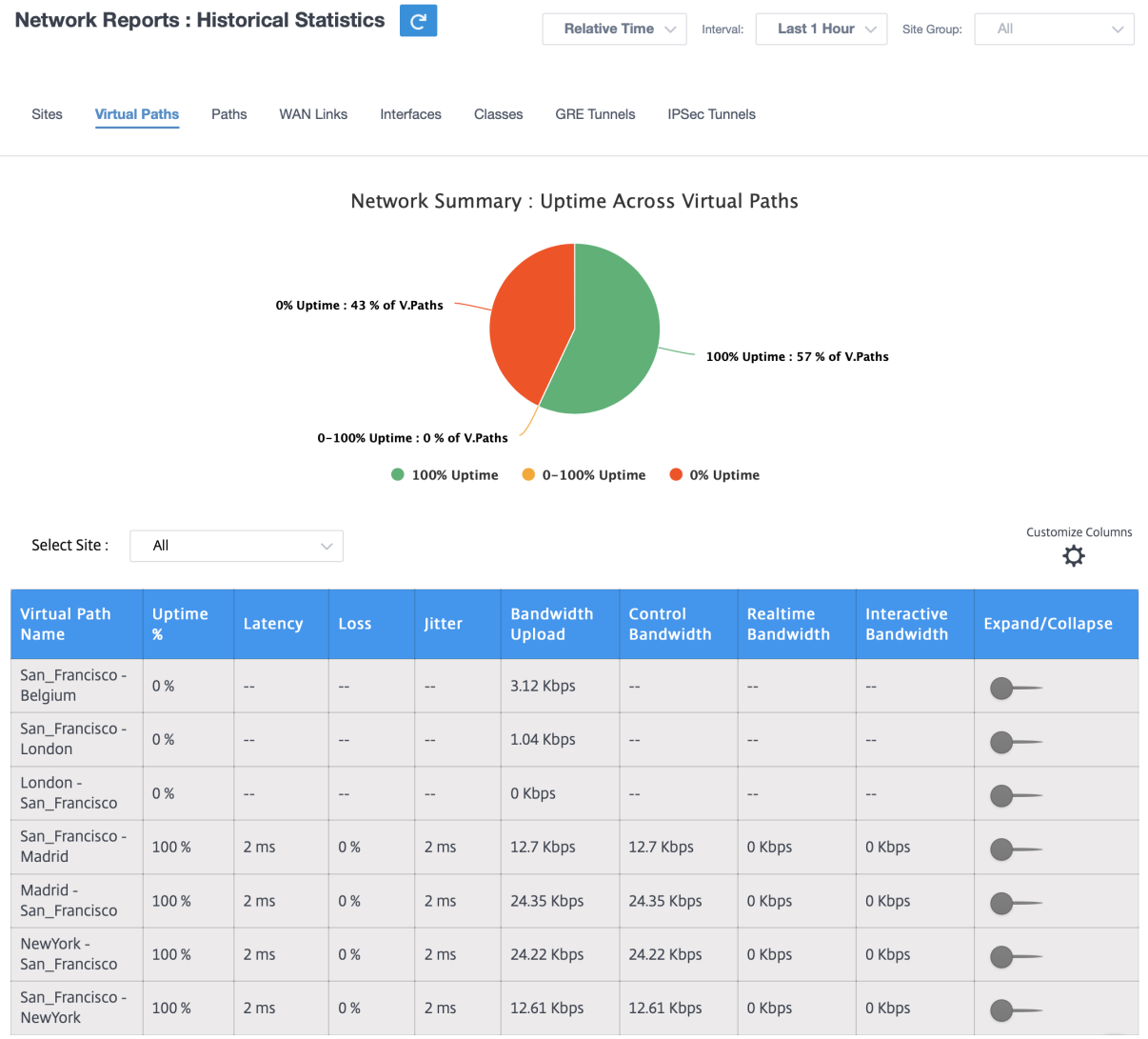

Virtual Path Name	Uptime %	Latency	Loss	Jitter	Bandwidth Upload	Control Bandwidth	Realtime Bandwidth	Interactive Bandwidth	Expand/Collapse
San_Francisco - Belgium	0 %	--	--	--	3.12 Kbps	--	--	--	
San_Francisco - London	0 %	--	--	--	1.04 Kbps	--	--	--	
London - San_Francisco	0 %	--	--	--	0 Kbps	--	--	--	
San_Francisco - Madrid	100 %	2 ms	0 %	2 ms	12.7 Kbps	12.7 Kbps	0 Kbps	0 Kbps	
Madrid - San_Francisco	100 %	2 ms	0 %	2 ms	24.35 Kbps	24.35 Kbps	0 Kbps	0 Kbps	
NewYork - San_Francisco	100 %	2 ms	0 %	2 ms	24.22 Kbps	24.22 Kbps	0 Kbps	0 Kbps	
San_Francisco - NewYork	100 %	2 ms	0 %	2 ms	12.61 Kbps	12.61 Kbps	0 Kbps	0 Kbps	

You can view the following metrics:

- **Virtual Path Name**: The virtual path name.
- **Uptime %**: Rate at which the virtual path is up.
- **Latency**: The latency in milliseconds for real-time traffic.
- **Loss**: Percentage of packets lost.
- **Jitter**: Variation in the delay of received packets, in milliseconds.
- **Bandwidth Upload**: Upload (LAN to WAN) Bandwidth usage for the selected time period.
- **Control Bandwidth**: Bandwidth used to transfer control packets that contain routing, scheduling, and link statistics information.
- **Real-time Bandwidth**: Bandwidth consumed by applications that belong to the real-time class type in the SD-WAN configuration. The performance of such applications depends on a great extent upon network latency. A delayed packet is worse than a lost packet (for example, VoIP, Skype for Business).

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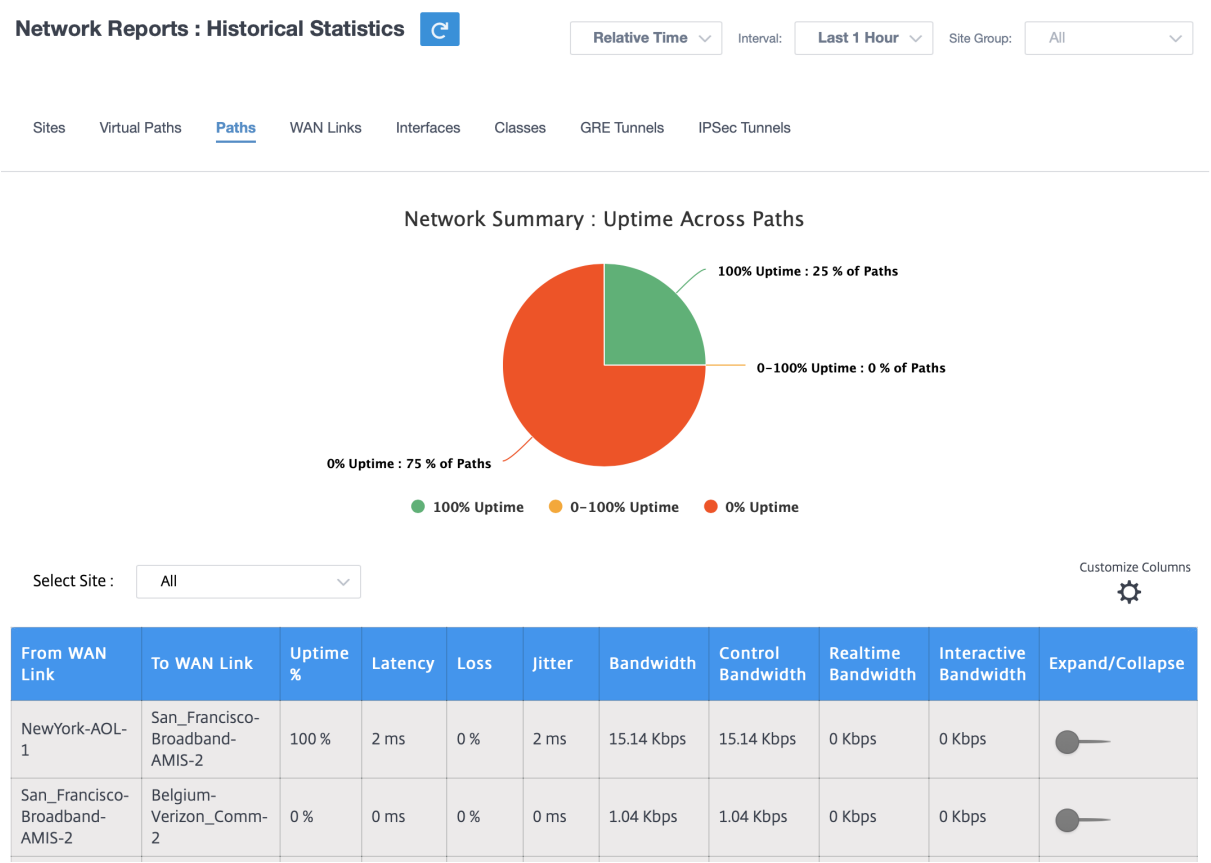
- **Interactive Bandwidth**: Bandwidth consumed by applications that belong to the interactive class type in the SD-WAN configuration. The performance of such applications depends on a great extent upon network latency, and packet loss (for example, XenDesktop®, XenApp).
- **Bulk Bandwidth**: Bandwidth consumed by applications that belong to the bulk class type in the SD-WAN configuration. These applications involve little human intervention and are handled by the systems themselves (for example, FTP, backup operations).
- **Expand/Collapse**: You can expand or collapse the data as needed.

Paths

To view the **Paths** statistics, navigate to **Reports > Statistics > Paths** tab.



From WAN Link	To WAN Link	Uptime %	Latency	Loss	Jitter	Bandwidth	Control Bandwidth	Realtime Bandwidth	Interactive Bandwidth	Expand/Collapse
NewYork-AOL-1	San_Francisco-Broadband-AMIS-2	100 %	2 ms	0 %	2 ms	15.14 Kbps	15.14 Kbps	0 Kbps	0 Kbps	
San_Francisco-Broadband-AMIS-2	Belgium-Verizon_Comm-2	0 %	0 ms	0 %	0 ms	1.04 Kbps	1.04 Kbps	0 Kbps	0 Kbps	

You can view the following metrics:

- **From WAN Link**: The source WAN link.
- **To WAN Link**: The destination WAN link.
- **Uptime %**: Rate at which the path is up.
- **Latency**: The latency in milliseconds for real time traffic.
- **Loss**: Percentage of packets lost.
- **Jitter**: Variation in the delay of received packets, in milliseconds.

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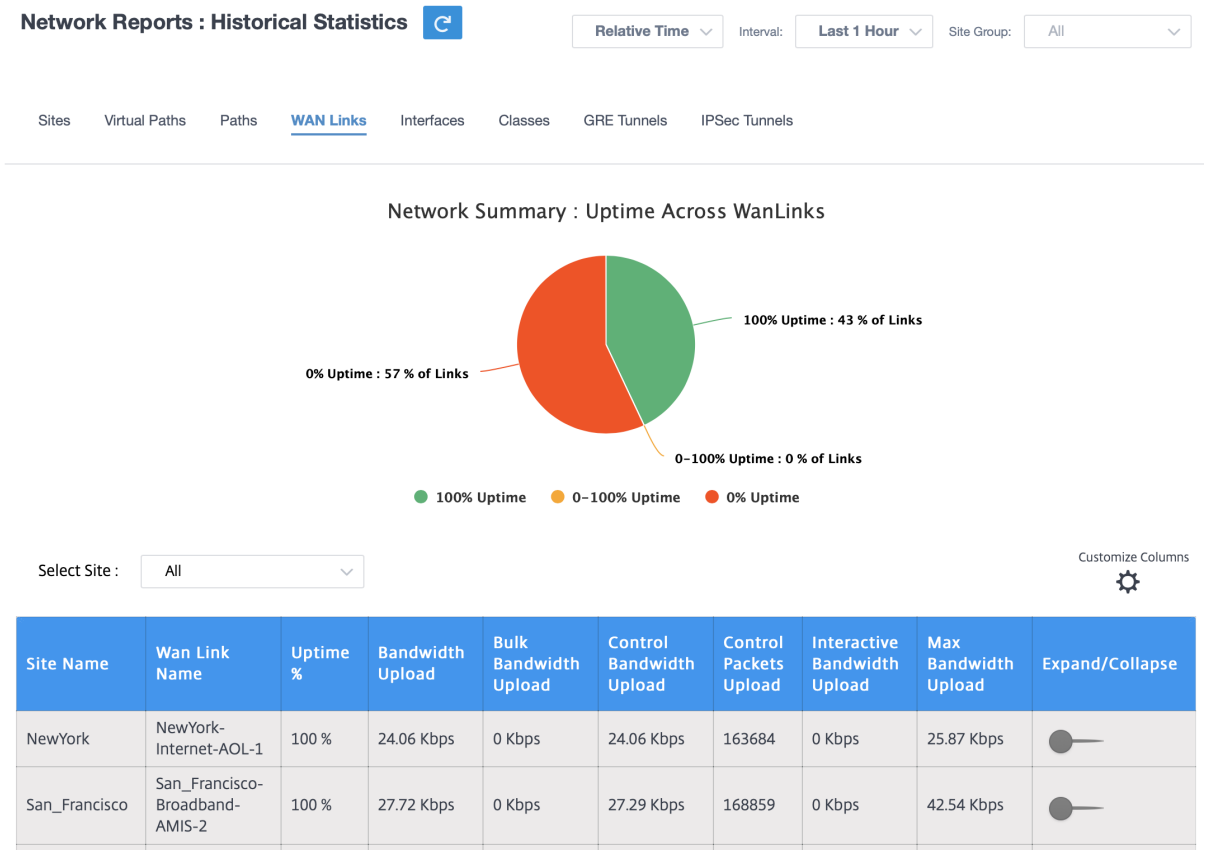
- **Bandwidth**: Total bandwidth consumed by all packet types. Bandwidth= Control Bandwidth + Real-time Bandwidth + Interactive Bandwidth + Bulk Bandwidth.
- **Control Bandwidth**: Bandwidth used to transfer control packets that contain routing, scheduling, and link statistics information.
- **Real-time Bandwidth**: Bandwidth consumed by applications that belong to the real-time class type in the SD-WAN configuration. The performance of such applications depends on a great extent upon network latency. A delayed packet is worse than a lost packet (for example, VoIP, Skype for Business).
- **Interactive Bandwidth**: Bandwidth consumed by applications that belong to the interactive class type in the SD-WAN configuration. The performance of such applications depends on a great extent upon network latency, and packet loss (for example, XenDesktop, XenApp®).
- **Bulk Bandwidth**: Bandwidth consumed by applications that belong to the bulk class type in the SD-WAN configuration. These applications involve little human intervention and are handled by the systems themselves (for example, FTP, backup operations).
- **Expand/Collapse**: You can expand or collapse the data as needed.

WAN links

To view the statistics at **WAN Link** level, navigate to **Reports > Statistics > WAN Links** tab.



Site Name	Wan Link Name	Uptime %	Bandwidth Upload	Bulk Bandwidth Upload	Control Bandwidth Upload	Control Packets Upload	Interactive Bandwidth Upload	Max Bandwidth Upload	Expand/Collapse
NewYork	NewYork-Internet-AOL-1	100 %	24.06 Kbps	0 Kbps	24.06 Kbps	163684	0 Kbps	25.87 Kbps	
San_Francisco	San_Francisco-Broadband-AMIS-2	100 %	27.72 Kbps	0 Kbps	27.29 Kbps	168859	0 Kbps	42.54 Kbps	

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You can view the following metrics:

- **WAN Link Name**: The path name.
- **Uptime %**: Rate at which the WAN link is up.
- **Bandwidth Upload**: Upload (LAN to WAN) Bandwidth usage for the selected time period.
- **Bulk Bandwidth Upload**: Upload (LAN to WAN) Virtual Path Bandwidth used by Bulk traffic for the selected time period.
- **Control Bandwidth Upload**: Upload (LAN to WAN) Virtual Path Bandwidth used by Control traffic for the selected time period.
- **Control Packets Upload**: Upload (LAN to WAN) Virtual Path Control packets for the selected time period.
- **Interactive Bandwidth Upload**: Upload (LAN to WAN) Virtual Path Bandwidth used by Interactive traffic for the selected time period.
- **Max Bandwidth Upload**: Max Upload (LAN to WAN) Bandwidth used in a minute for the selected time period.
- **Expand/Collapse**: You can expand or collapse the data as needed.

Interfaces

The Interfaces statistic report helps you during troubleshooting to quickly see whether any of the ports are down. You can also view the transmitted and received bandwidth, or packet details at each port. You can also view the number of errors that occurred on these interfaces during a certain time period.

To view **Interface** statistics, navigate to **Reports > Statistics > Interfaces** tab.

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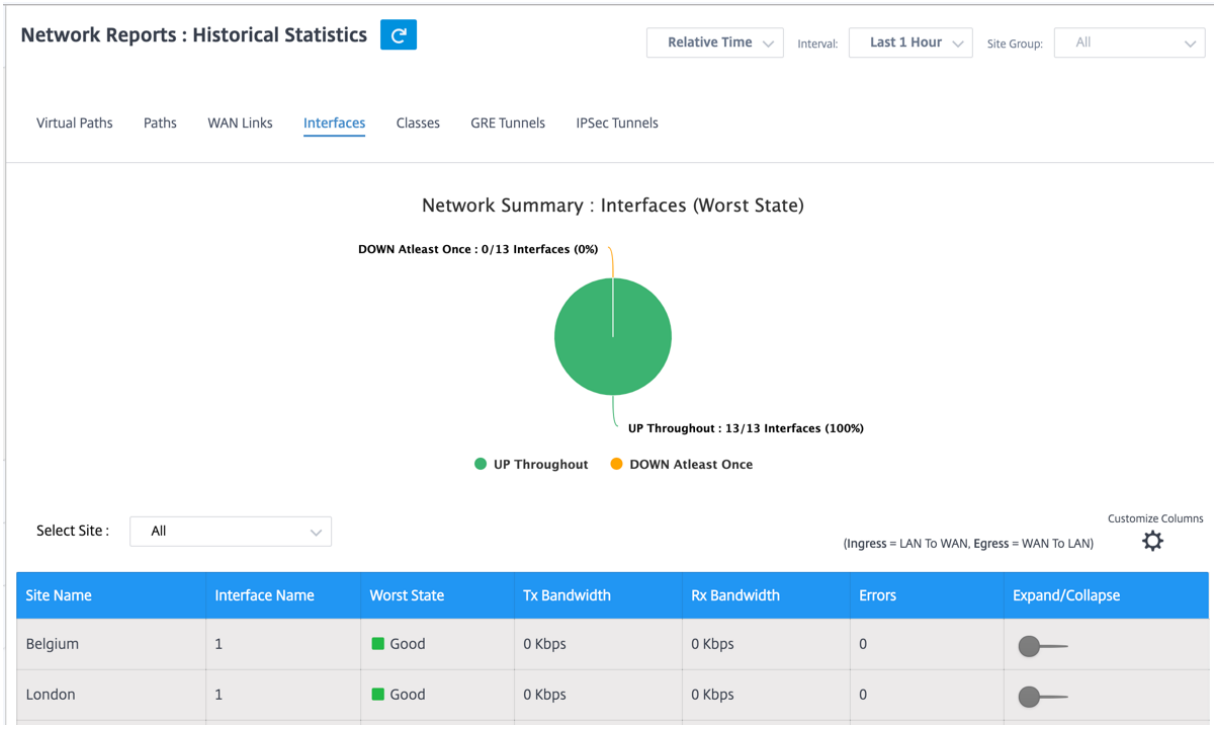

You can view the following metrics:

- **Interface Name**: The name of the Ethernet interface.
- **Tx Bandwidth**: Bandwidth transmitted.
- **Rx Bandwidth**: Bandwidth received.
- **Errors**: Number of errors observed during the selected time period.
- **Expand/Collapse**: You can expand or collapse the data as needed.

Classes

The virtual services can be assigned to particular QoS classes, and different bandwidth restraints can be applied to different classes.

To view **Class** statistics, navigate to **Reports > Statistics > Classes** tab.

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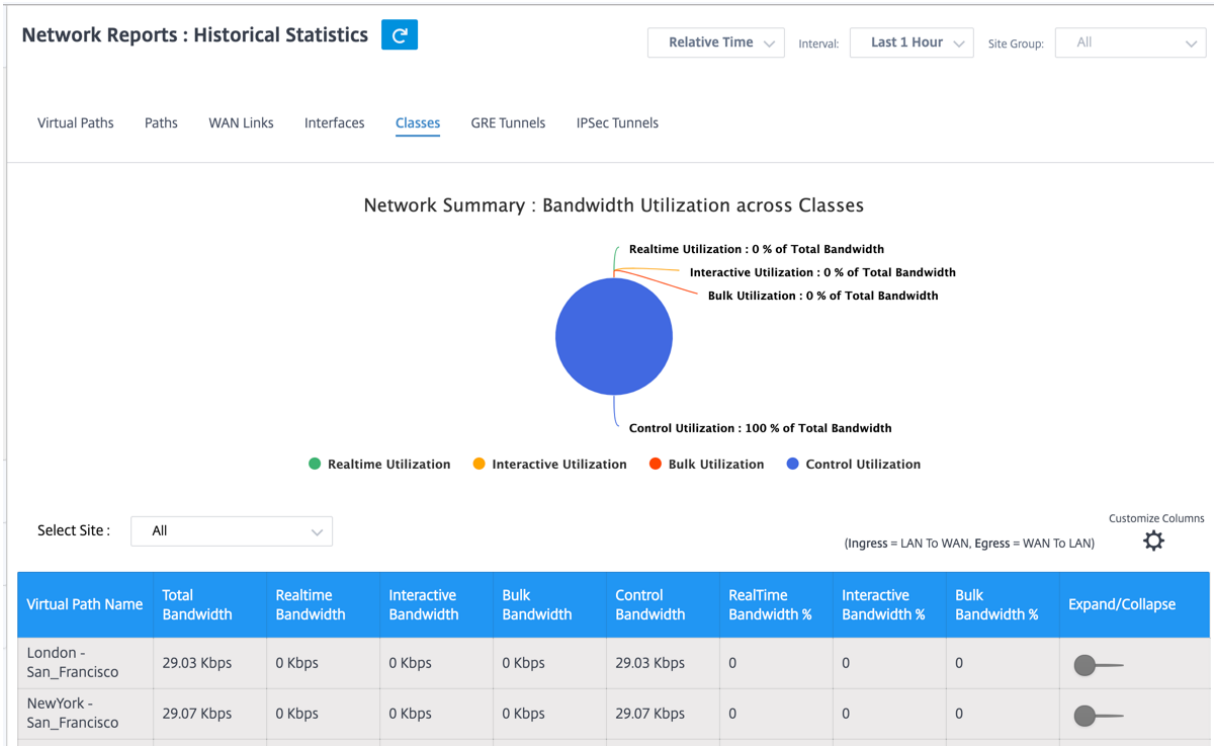

You can view the following metrics:

- **Virtual Path Name**: Name of the virtual path.
- **Total Bandwidth**: Total bandwidth consumed by all packet types. Bandwidth = Control Bandwidth + Real-time Bandwidth + Interactive Bandwidth + Bulk Bandwidth.
- **Realtime Bandwidth**: Bandwidth consumed by applications that belong to the real-time class type in the SD-WAN configuration. The performance of such applications depends on a great extent upon network latency. A delayed packet is worse than a lost packet (for example, VoIP, Skype for Business).
- **Interactive Bandwidth**: Bandwidth consumed by applications that belong to the interactive class type in the SD-WAN configuration. The performance of such applications depends on a great extent upon network latency, and packet loss (for example, XenDesktop, XenApp).
- **Bulk Bandwidth**: Bandwidth consumed by applications that belong to the bulk class type in the SD-WAN configuration. These applications involve little human intervention and are handled by the systems themselves (for example, FTP, backup operations).
- **Control Bandwidth**: Bandwidth used to transfer control packets that contain routing, scheduling, and link statistics information.
- **Realtime Bandwidth %**: Rate at which bandwidth is consumed by applications that belong to the real-time class type in the Citrix SD-WAN configuration.
- **Interactive Bandwidth %**: Rate at which bandwidth is consumed by applications that belong to the interactive class type in the Citrix SD-WAN configuration.
- **Bulk Bandwidth %**: Rate at which bandwidth consumed by applications that belong to the bulk

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class type in the Citrix SD-WAN configuration.
- **Expand/Collapse**: You can expand or collapse the data as needed.

GRE tunnels

You can use a tunneling mechanism to transport packets of one protocol within another protocol. The protocol that carries the other protocol is called the transport protocol, and the carried protocol is called the passenger protocol. Generic Routing Encapsulation (GRE) is a tunneling mechanism that uses IP as the transport protocol and can carry many different passenger protocols.

The tunnel source address and destination address are used to identify the two endpoints of the virtual point-to-point links in the tunnel. For more information about configuring GRE tunnels on Citrix SD-WAN appliances, see GRE Tunnel.

To view **GRE Tunnel** statistics, navigate to **Reports > Statistics > GRE Tunnels** tab.

You can view the following metrics:

- **Site Name**: The site name.
- **Tx Bandwidth**: Bandwidth transmitted.
- **Rx Bandwidth**: Bandwidth received.
- **Packet Dropped**: Number of packets dropped, because of network congestion.
- **Packets Fragmented**: Number of packets fragmented. Packets are fragmented to create smaller packets that can pass through a link with an MTU that is smaller than the original datagram. The fragments are reassembled by the receiving host.
- **Expand/Collapse**: You can expand or collapse the data as needed.

IPsec tunnels

IP Security (IPsec) protocols provide security services such as encrypting sensitive data, authentication, protection against replay, and data confidentiality for IP packets. Encapsulating Security Payload (ESP), and Authentication Header (AH) are the two IPsec security protocols used to provide these security services.

In IPsec tunnel mode, the entire original IP packet is protected by IPsec. The original IP packet is wrapped and encrypted, and a new IP header is added before transmitting the packet through the VPN tunnel.
For more information about configuring IPsec tunnels on Citrix SD-WAN appliances, see IPsec Tunnel Termination.

To view **IPsec Tunnel** statistics, navigate to **Reporting > statistics > IPsec Tunnels** tab.

You can view the following metrics:

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- **Tunnel Name**: The tunnel name.
- **Tunnel State**: IPsec tunnel state.
- **MTU**: Maximum transmission unit—size of the largest IP datagram that can be transferred through a specific link.
- **Packet Received**: Number of packets received.
- **Packets Sent**: Number of packets Sent.
- **Packet Dropped**: Number of packets dropped, because of network congestion.
- **Bytes Dropped**: Number of bytes dropped.
- **Expand/Collapse**: You can expand or collapse the data as needed.

Real time statistics

Network statistics

The Network Statistics page provides the following real time statistics information under **Reports** > **Real Time** > **Network Statistics**:

- Sites
- Virtual Paths
- WAN Member Paths
- WAN Links
- WAN Link Usage
- MPLS Queues
- Access Interfaces
- Interfaces
- Intranet
- IPsec Tunnel
- GRE

To get a real time statistical report, go to the required tab (such as sites, virtual paths, WAN links), select the site from the drop-down list, and click Retrieve latest data.

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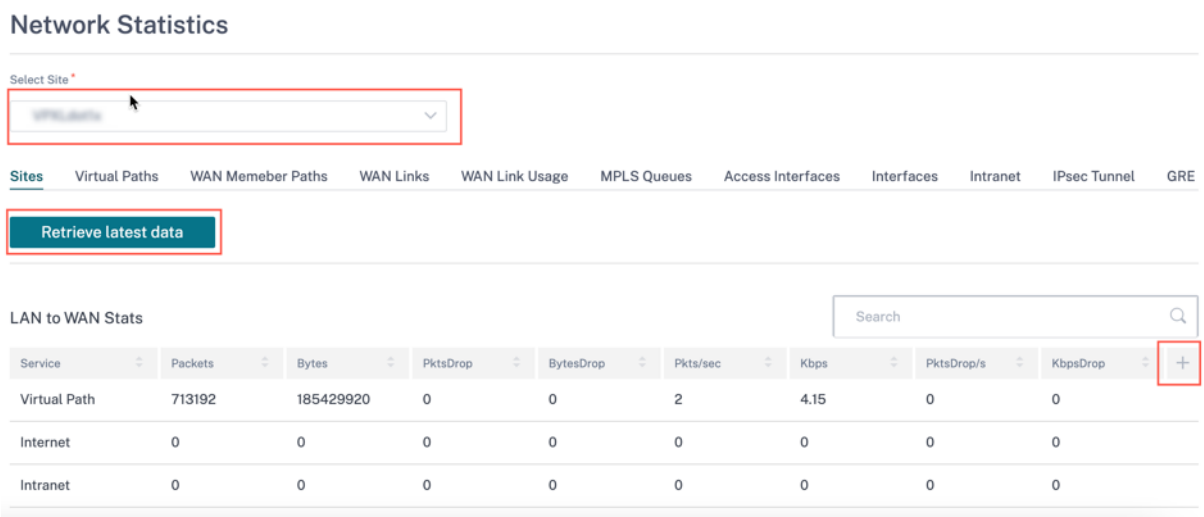
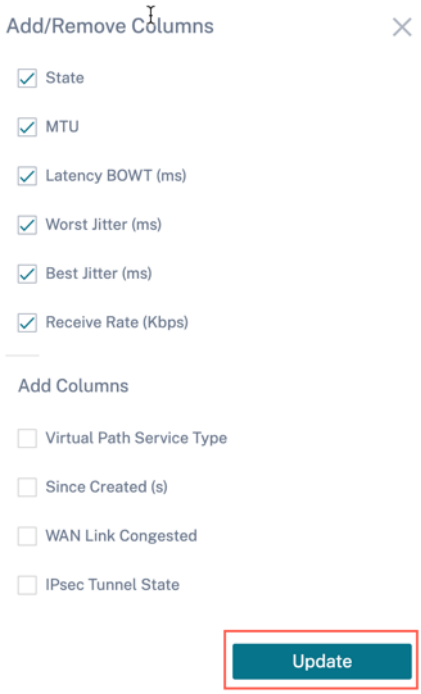


Click the plus (+) symbol if you want to add or remove any column from the statistics table and click **Update**.



Application statistics

The **Application Statistics** page provides the following real time statistics information under **Reports > Real Time > App Statistics**:

- Applications
- App QoS
- QoS Classes

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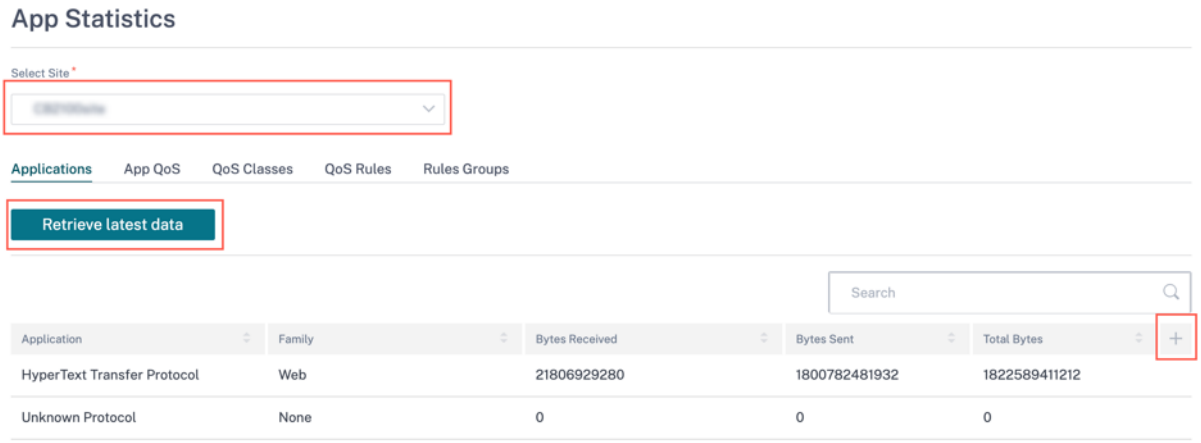
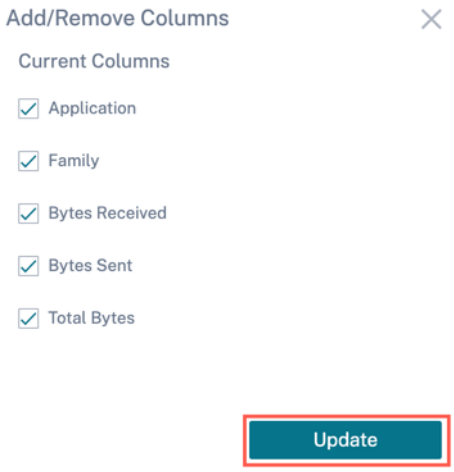
- QoS Rules
- Rule Groups

To get a real time statistical report, go to the required tab (such as applications, QoS rule, QoS classes) select the site from the drop-down list, and click **Retrieve latest data**.



Click the plus (+) symbol if you want to add or remove any column from the statistics table and click **Update**.



Routes statistics

The **Routes Statistics** page provides the following real time statistics information under **Reports > Real Time > Routes Statistics**:

- ARP
- Routes
- Application Routes
- Observed Protocols
- Multicast Group

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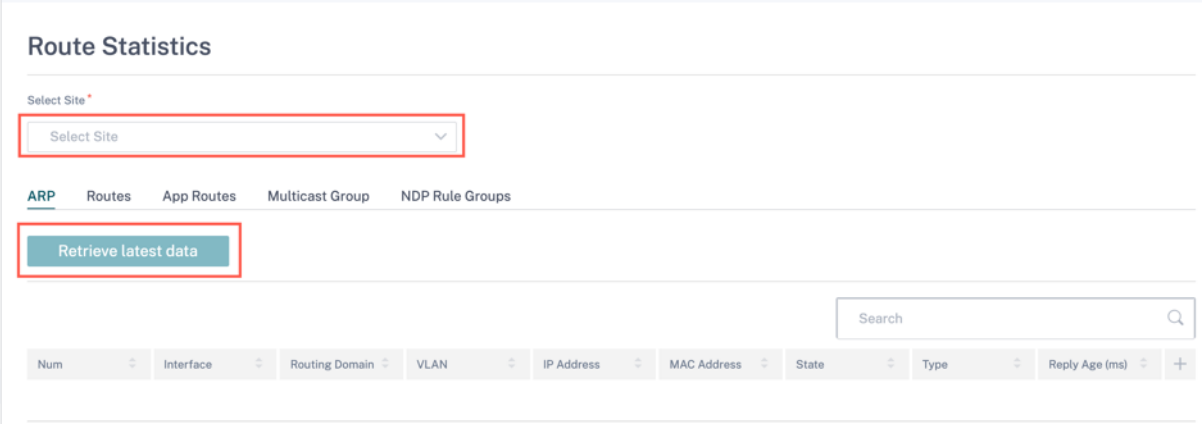
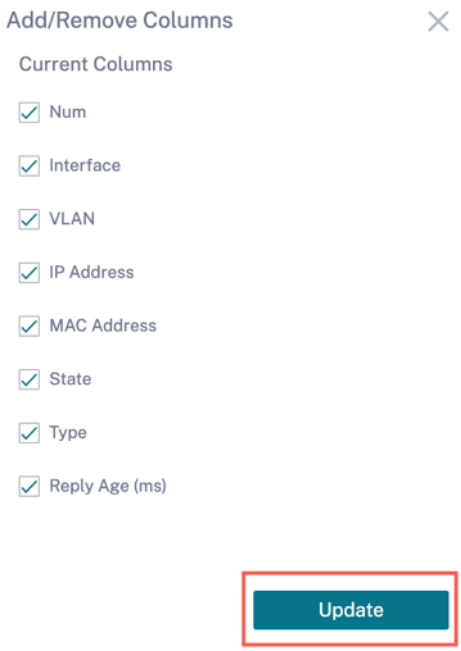
- NDP Rules Groups

To get a real time statistical report, go to the required tab (such as ARP, Routes, Application Routes) select the site from the drop-down list, and click **Retrieve latest data**.



Click the plus (+) symbol if you want to add or remove any column from the statistics table and click **Update**.



Flows

At the network level, select the site from the drop-down list before you can fetch the statistics. The **Flows** feature provides unidirectional flow information related to a particular session going through the appliance. This provides information on the destination service type the flow is falling into and also the information related to the rule and class type and also the transmission mode.

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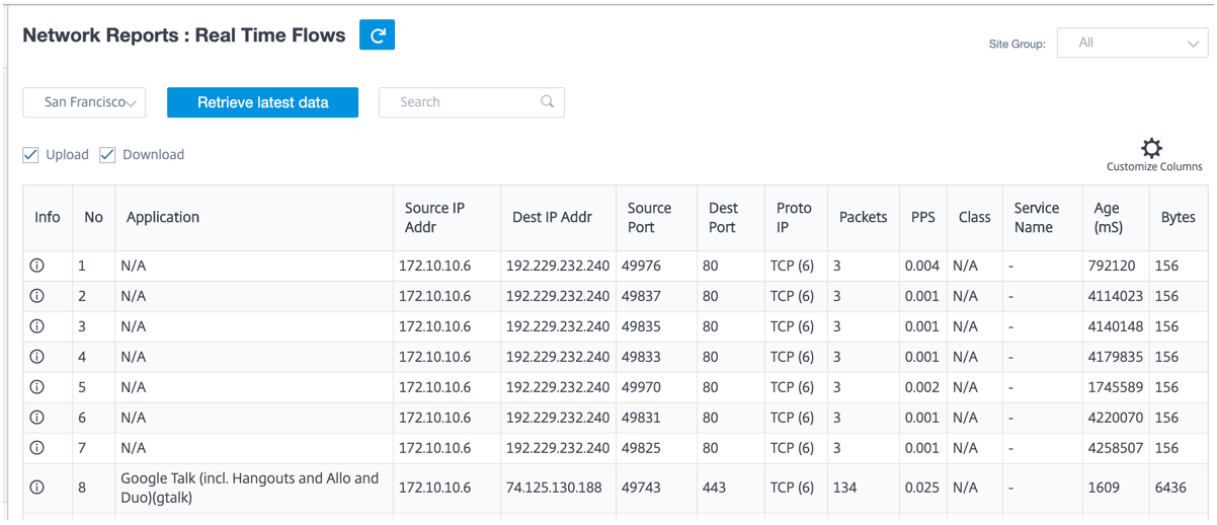
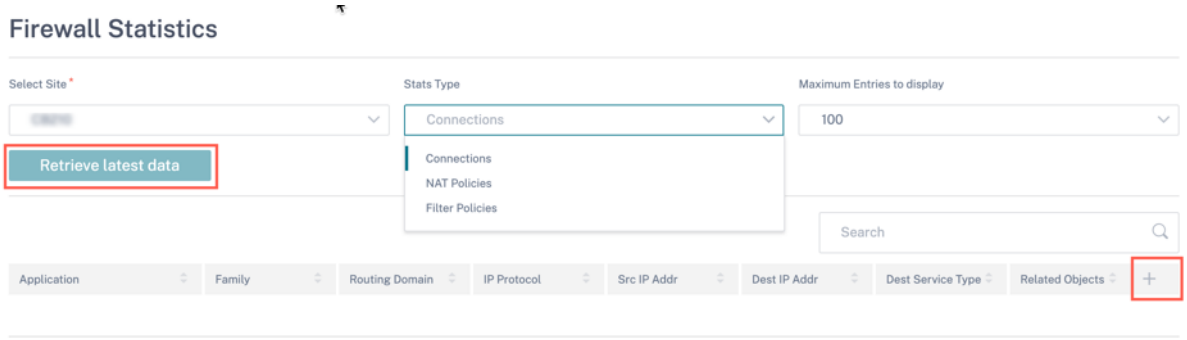


Info	No	Application	Source IP Addr	Dest IP Addr	Source Port	Dest Port	Proto IP	Packets	PPS	Class	Service Name	Age (mS)	Bytes
ⓘ	1	N/A	172.10.10.6	192.229.232.240	49976	80	TCP (6)	3	0.004	N/A	-	792120	156
ⓘ	2	N/A	172.10.10.6	192.229.232.240	49837	80	TCP (6)	3	0.001	N/A	-	4114023	156
ⓘ	3	N/A	172.10.10.6	192.229.232.240	49835	80	TCP (6)	3	0.001	N/A	-	4140148	156
ⓘ	4	N/A	172.10.10.6	192.229.232.240	49833	80	TCP (6)	3	0.001	N/A	-	4179835	156
ⓘ	5	N/A	172.10.10.6	192.229.232.240	49970	80	TCP (6)	3	0.002	N/A	-	1745589	156
ⓘ	6	N/A	172.10.10.6	192.229.232.240	49831	80	TCP (6)	3	0.001	N/A	-	4220070	156
ⓘ	7	N/A	172.10.10.6	192.229.232.240	49825	80	TCP (6)	3	0.001	N/A	-	4258507	156
ⓘ	8	Google Talk (incl. Hangouts and Allo and Duo)(gtalk)	172.10.10.6	74.125.130.188	49743	443	TCP (6)	134	0.025	N/A	-	1609	6436

Firewall statistics

The **Firewall statistics** provide the state of the connection, Network Address Protocol (NAT) policies, and filter policies related to a particular session based on the firewall action configured. Firewall statistics also provide complete details about the source and destination of the connection.

To get the real time statistic report, select the site > select the statistics type from the drop-down list (Connection, NAT Policies, Filter Policies) > select the number for maximum entries to display, and click **Retrieve latest data**.



Click the plus (+) symbol if you want to add or remove any column from the statistics table and click **Update**.

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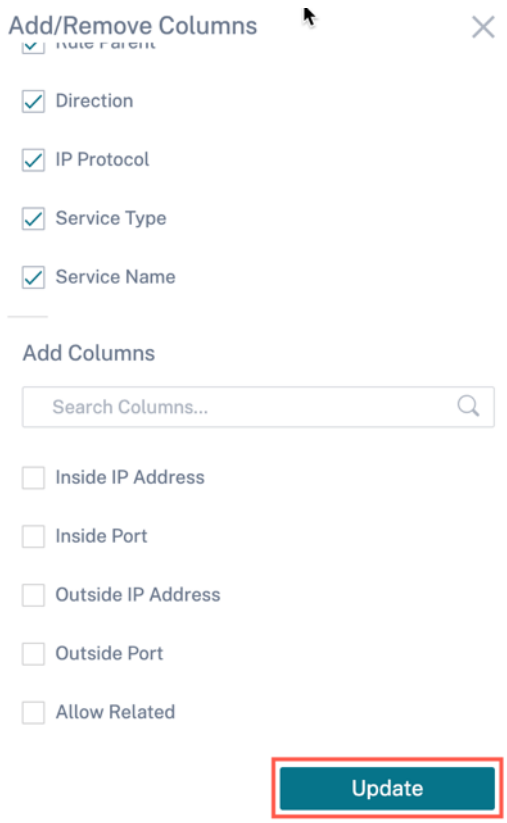

Cloud Direct

The **Cloud Direct** report provides the summary of the Cloud Direct sites that are deployed in the network, along with the details about subscription used and the current operational status of those sites.

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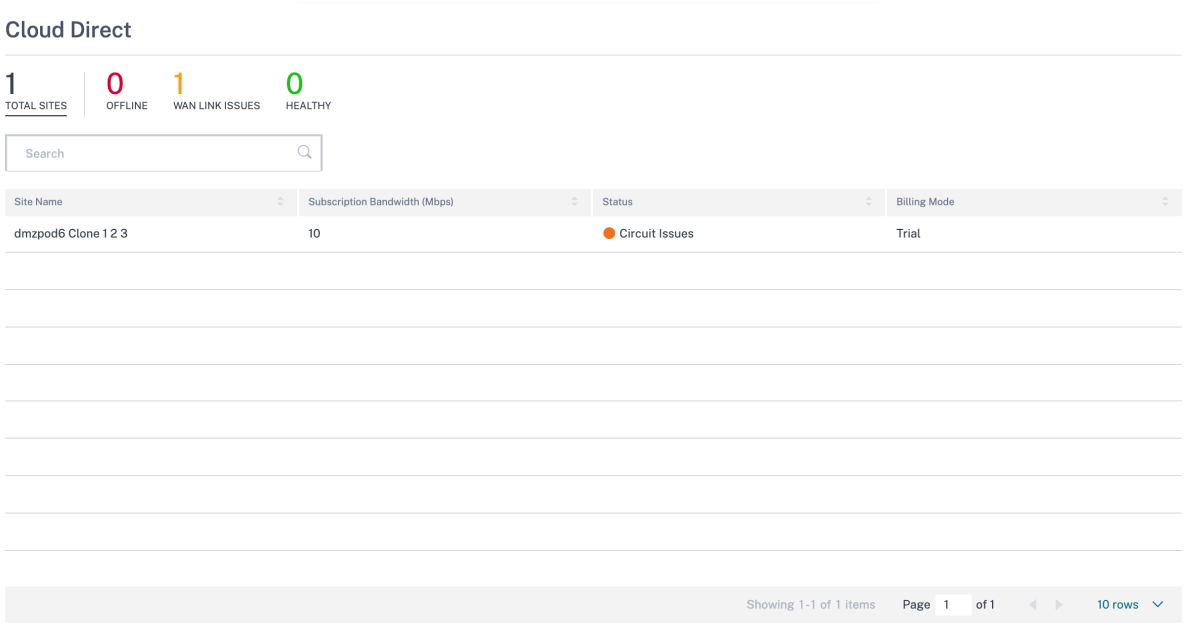

- **Site Name** –Displays the site name.
- **Subscription Bandwidth (Mbps)** –Displays the subscription bandwidth that is associated with the licensing for the Cloud Direct service.
- **Status** –Displays the site status (active/inactive).
- **Billing Mode** –Displays the billing mode (Demo/Production). The **Billing Mode** option enables the use of Cloud Direct trial/evaluation licenses. Sites operating with Cloud Direct evaluation licenses must be set to the **Demo Billing Mode** option. Sites upgrading to full Cloud Direct subscription licenses must be set to the **Production Billing Mode** option.

Application Quality

Application QoE is a measure of Quality of Experience of applications in the SD-WAN network. It measures the quality of applications that flow through the virtual paths between two SD-WAN appliances. The Application QoE score is a value between 0 and 10. The score range that it falls in determines the quality of an application. Application QoE enables network administrators to review the quality of experience of applications and take proactive measures when the quality goes below the acceptable threshold.

Quality	Range	Color Coding
Good	8–10	Green
Fair	4–8	Orange
Poor	0–4	Red

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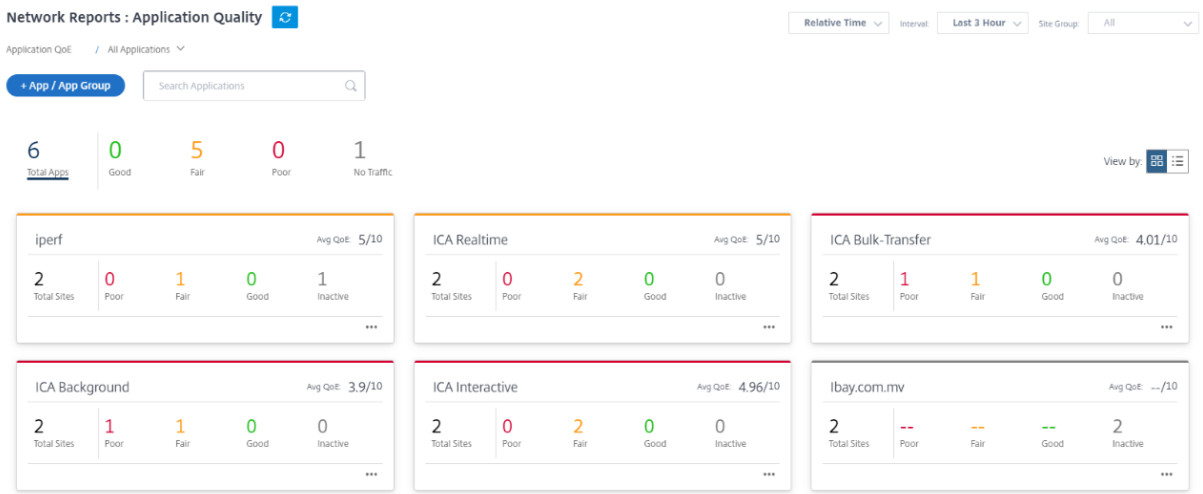
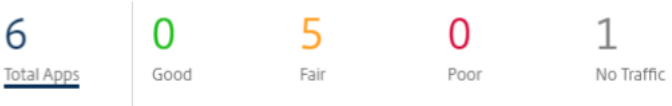
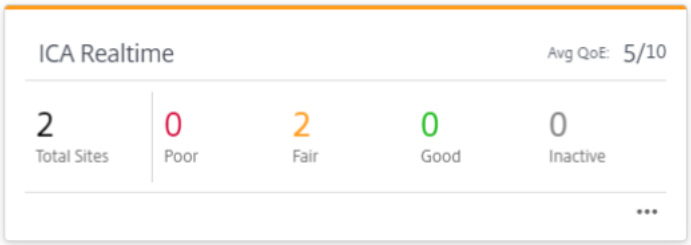


The top of the dashboard displays the overall number of applications and the number of applications that have good, fair, or poor Application QoE in the network. It also displays the number of applications that do not have any traffic.



The individual application card displays the number of sites that have poor, fair, or good Application QoE for the specific application. It also displays the number of sites that are not actively using the application. The Avg QoE is the average QoE score of the application across all the sites in the network.



Click an individual application card to view the details on the number of sites that have good, fair, or poor application QoE for the selected application. A map view of all the sites that is running the selected application is displayed. Click a site in the map to further drill down and view the Application QoE statistics of the various virtual paths at the site.

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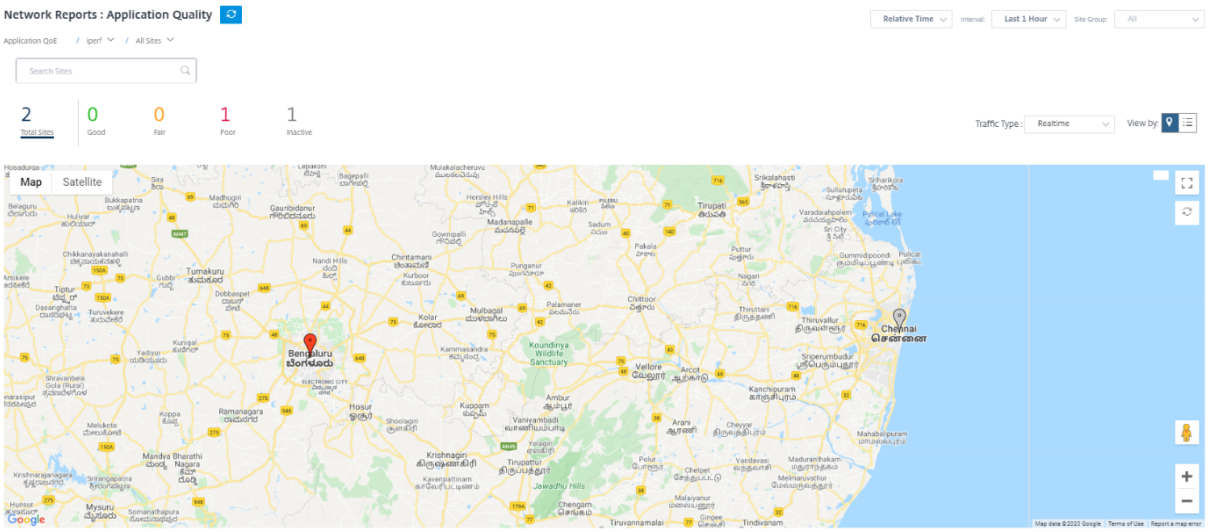
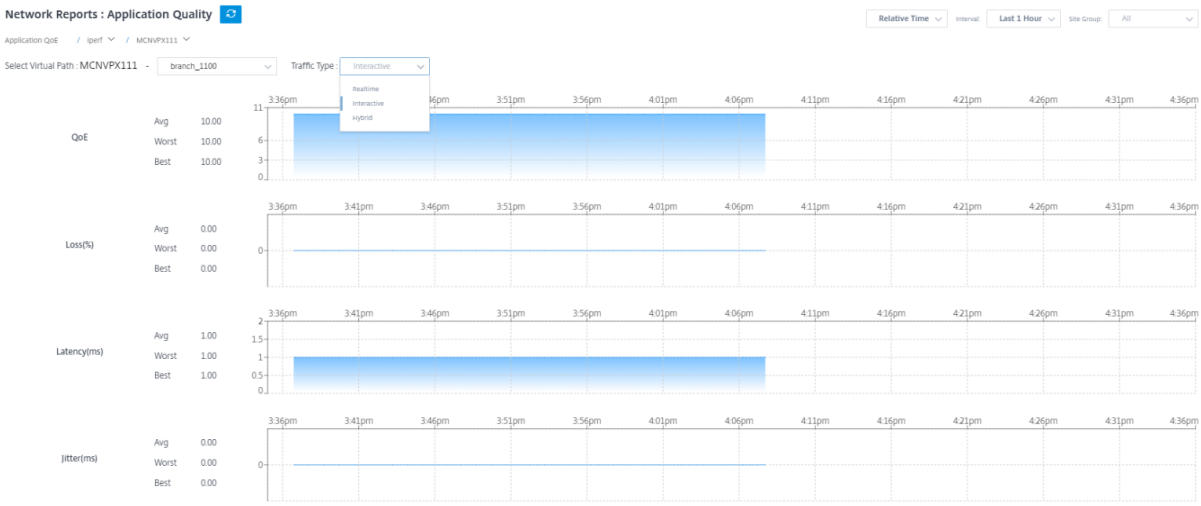


You can view the following metrics for Real-time, Interactive, and Hybrid traffic for the selected time-frame:

- **QoE**: The QoE score for the traffic.
- **Loss**: The loss percentage for the traffic.
- **Latency**: The latency in milliseconds for the traffic.
- **Jitter**: The jitter observed in milliseconds for the traffic.



Application QoE profiles

Click **+ App / App Group** to map applications, custom applications, or application groups to the default or custom QoE profiles.

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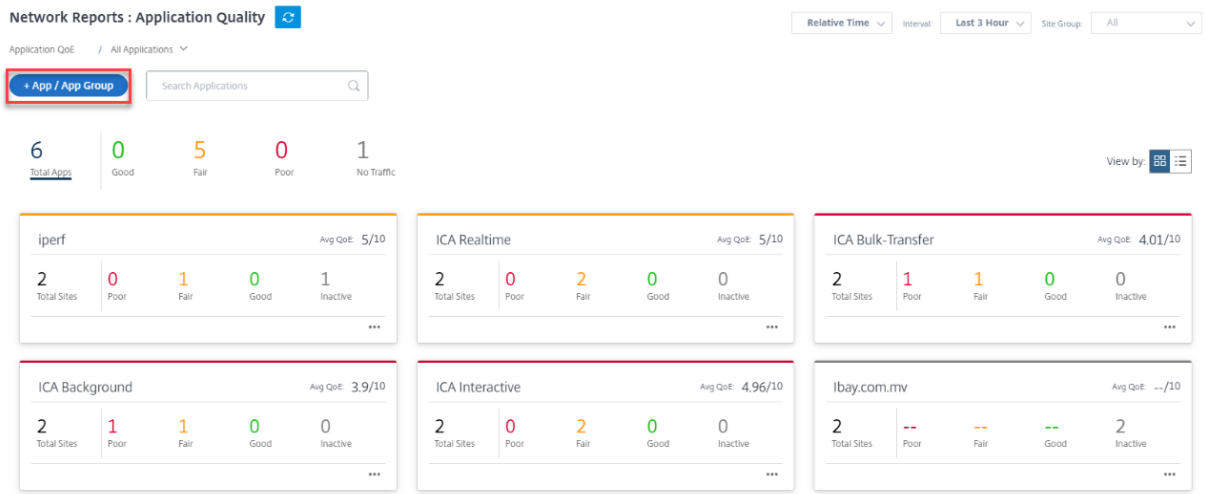
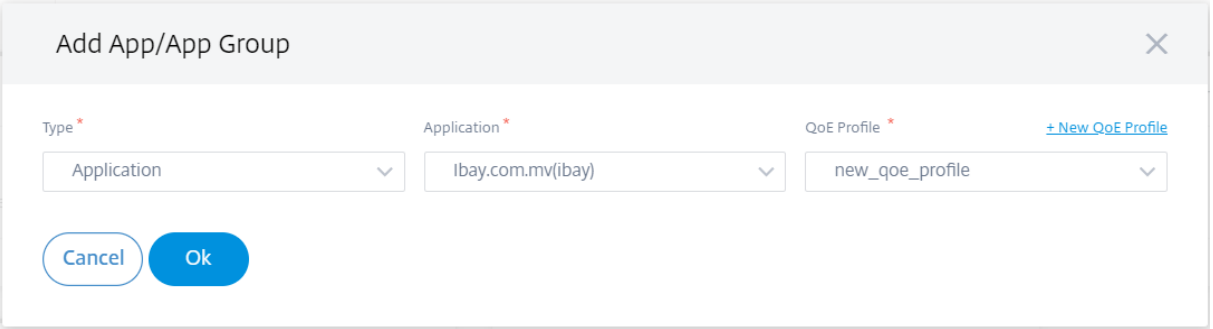


The QoE profiles define the threshold for real-time, interactive, and hybrid traffic. The QoE thresholds as per the QoE profiles are applied to the selected application or application group.



Click **+ New QoE Profile** to create an application QoE profile and enter the value for the following parameters:

- **Profile Name**: A name to identify the profile that sets thresholds for real-time and interactive traffic.
- **Traffic Type**: Choose the type of traffic –Real-time, Interactive, or Hybrid. If the traffic type is Hybrid, you can configure both Real-time and Interactive QoE profile thresholds.
- **Realtime Configuration**: Configure thresholds for traffic flows that select the real-time QoS policy. A flow of a real-time application that meets the following thresholds for latency, loss, and jitter is considered to be of good quality.
    - **One Way latency**: The latency threshold in milliseconds. The default QoE profile value is 160 ms.
    - **Jitter**: The jitter threshold in milliseconds. The default QoE profile value is 30 ms.
    - **Packet Loss**: The percentage of packet loss. The default QoE profile value is 2%.
- **Interactive Configuration**: Configure thresholds for traffic flows that select the interactive QoS

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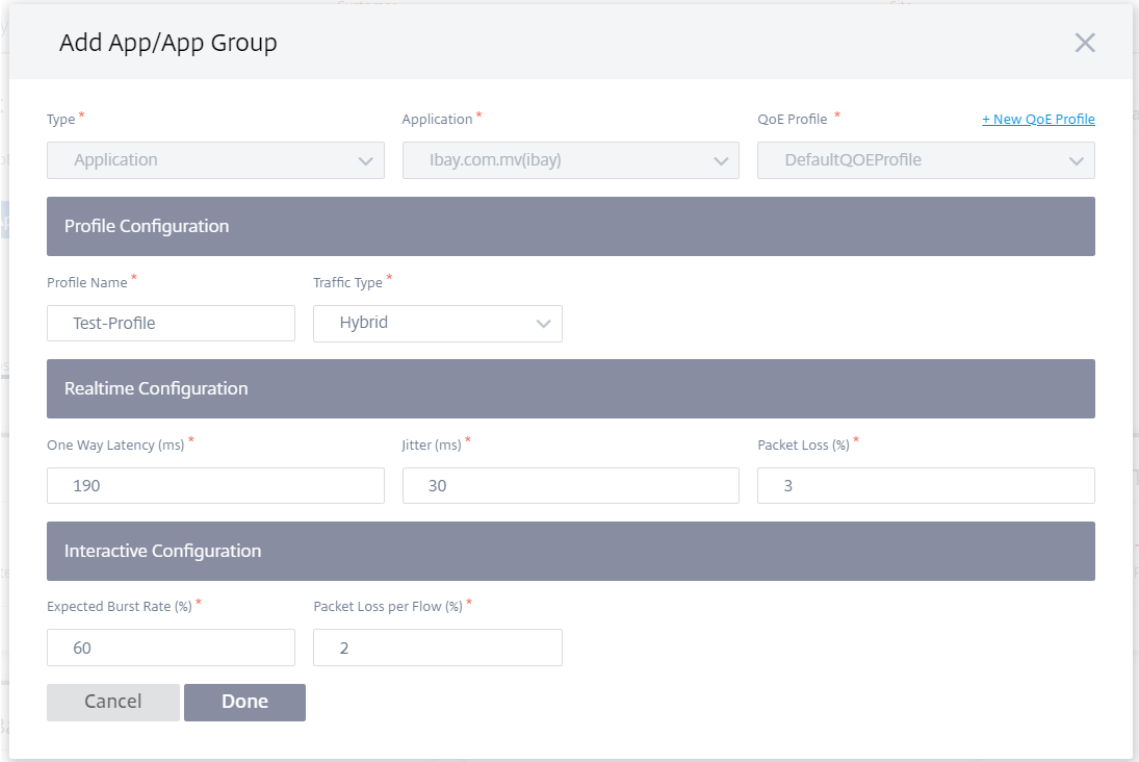
policy. A flow of an interactive application that meets the following threshold for burst ratio and packet loss is considered to be of good quality.

- **Expected Burst Rate**: The percentage of expected burst rate. The egress burst rate must be at least the configured percentage of ingress burst rate. The default QoE profile value is 60%.
- **Packet loss per flow**: The percentage of packet loss. The default QoE profile value is 1%.



The newly added application is displayed in the Application Quality dashboard.

You can also define and configure application QoE from App & DNS Settings for more information see, Application quality profiles and Application quality configuration.

O365 Metrics

Citrix SD-WAN allows you to not only perform beacon probing, but also determines the latency to reach Office 365 endpoints through each WAN link. The latency is the round trip time taken to send a request and get a response from the Office 365 beacon service over a WAN link. This enables network administrators to view the beacon service latency report and manually choose the best internet link for direct Office 365 breakout. Beacon probing is enabled only through the Citrix SD-WAN Orchestrator service. By default, beacon probing is enabled on all Internet enabled WAN links (except metered WAN links) when Office 365 break-out is enabled through the Citrix SD-WAN Orchestrator service.

The O365 Metrics dashboard displays the following information:

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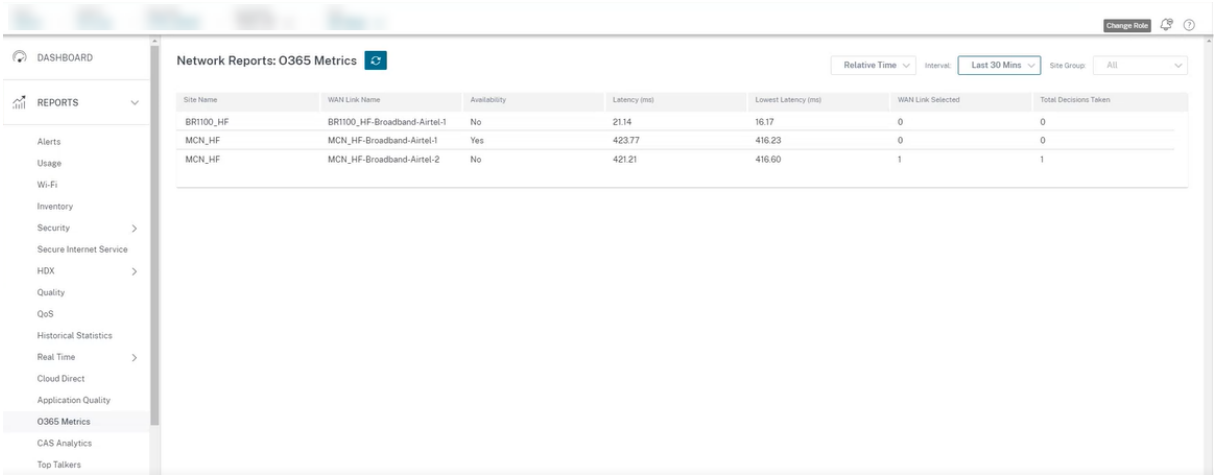
- **Site Name**: Name of the site.
- **WAN Link name**: Name of the WAN link.
- **Availability**: Availability status of the WAN link.
- **Latency (ms)**: Average round trip time through the WAN link.
- **Lowest Latency**: The lowest latency count of the WAN link for a selected time period.
- **WAN Link Selected**: The number of times the WAN link was chosen for Office 365 optimization.
- **Total Decisions taken**: Total number of times a decision to choose a WAN link is taken, for the selected time interval.



The application QoE report displays a dashboard that provides the Application QoE data of all the configured applications at all the sites.

Site reports

September 27, 2025

The **Site Reports** provide visibility into site-level alerts, usage trends, quality, device information, and firewall statistics.

To view the reports, navigate to **Partner > Provider > Customer > Site > Reports**.

Alerts

The site administrator can review a detailed report of all the events and alerts generated at a site.

The Alerts report includes the severity, site at which the alert originated, alert message, time, and other details.

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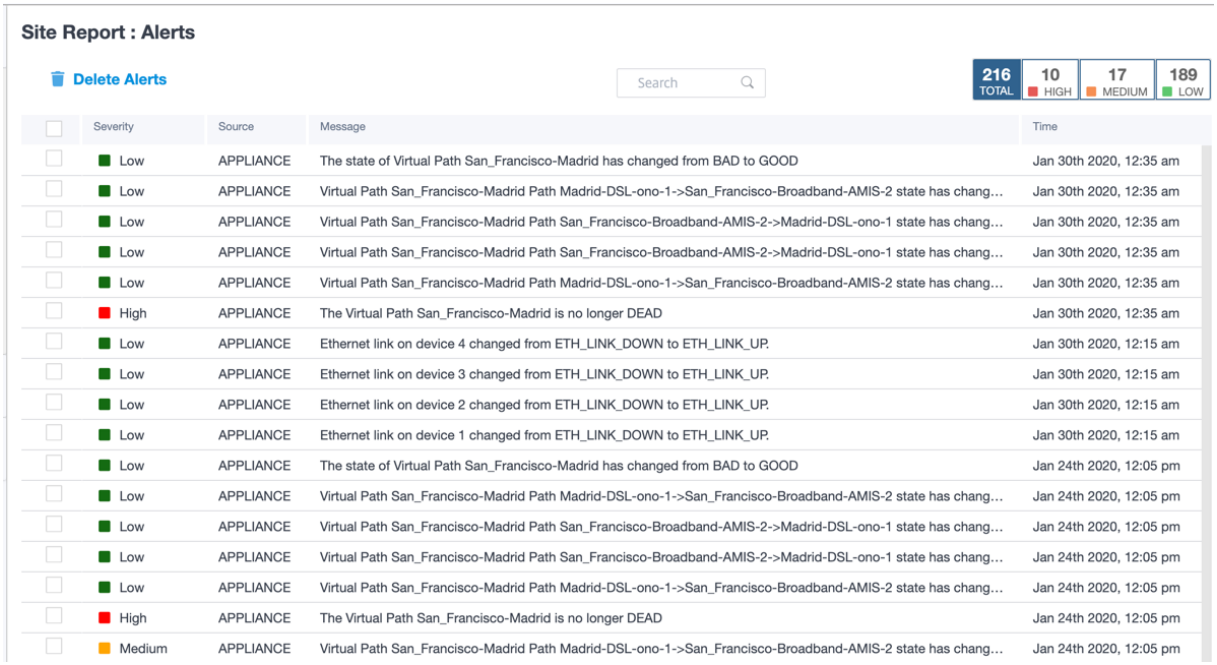

Severity	Source	Message	Time
Low	APPLIANCE	The state of Virtual Path San_Francisco-Madrid has changed from BAD to GOOD	Jan 30th 2020, 12:35 am
Low	APPLIANCE	Virtual Path San_Francisco-Madrid Path Madrid-DSL-ono-1->San_Francisco-Broadband-AMIS-2 state has chang...	Jan 30th 2020, 12:35 am
Low	APPLIANCE	Virtual Path San_Francisco-Madrid Path San_Francisco-Broadband-AMIS-2->Madrid-DSL-ono-1 state has chang...	Jan 30th 2020, 12:35 am
Low	APPLIANCE	Virtual Path San_Francisco-Madrid Path San_Francisco-Broadband-AMIS-2->Madrid-DSL-ono-1 state has chang...	Jan 30th 2020, 12:35 am
Low	APPLIANCE	Virtual Path San_Francisco-Madrid Path Madrid-DSL-ono-1->San_Francisco-Broadband-AMIS-2 state has chang...	Jan 30th 2020, 12:35 am
High	APPLIANCE	The Virtual Path San_Francisco-Madrid is no longer DEAD	Jan 30th 2020, 12:35 am
Low	APPLIANCE	Ethernet link on device 4 changed from ETH_LINK_DOWN to ETH_LINK_UP.	Jan 30th 2020, 12:15 am
Low	APPLIANCE	Ethernet link on device 3 changed from ETH_LINK_DOWN to ETH_LINK_UP.	Jan 30th 2020, 12:15 am
Low	APPLIANCE	Ethernet link on device 2 changed from ETH_LINK_DOWN to ETH_LINK_UP.	Jan 30th 2020, 12:15 am
Low	APPLIANCE	Ethernet link on device 1 changed from ETH_LINK_DOWN to ETH_LINK_UP.	Jan 30th 2020, 12:15 am
Low	APPLIANCE	The state of Virtual Path San_Francisco-Madrid has changed from BAD to GOOD	Jan 24th 2020, 12:05 pm
Low	APPLIANCE	Virtual Path San_Francisco-Madrid Path Madrid-DSL-ono-1->San_Francisco-Broadband-AMIS-2 state has chang...	Jan 24th 2020, 12:05 pm
Low	APPLIANCE	Virtual Path San_Francisco-Madrid Path San_Francisco-Broadband-AMIS-2->Madrid-DSL-ono-1 state has chang...	Jan 24th 2020, 12:05 pm
Low	APPLIANCE	Virtual Path San_Francisco-Madrid Path San_Francisco-Broadband-AMIS-2->Madrid-DSL-ono-1 state has chang...	Jan 24th 2020, 12:05 pm
Low	APPLIANCE	Virtual Path San_Francisco-Madrid Path Madrid-DSL-ono-1->San_Francisco-Broadband-AMIS-2 state has chang...	Jan 24th 2020, 12:05 pm
High	APPLIANCE	The Virtual Path San_Francisco-Madrid is no longer DEAD	Jan 24th 2020, 12:05 pm
Medium	APPLIANCE	Virtual Path San_Francisco-Madrid Path Madrid-DSL-ono-1->San_Francisco-Broadband-AMIS-2 state has chang...	Jan 24th 2020, 12:05 pm

Suitable filtering options can be used as needed for example: Look for all the high severity alerts at the site or the alerts that occurred during a particular period.

You can also select and clear alerts.

Usage

Site administrators can review usage trends such as **Top Applications, Top Application Categories**, and **App Bandwidth** in a particular site.

Top applications and application categories

The **Top Applications** and **Top Application Categories** chart shows the top applications and top application families that are widely used in the site. This allows you to analyze the data consumption pattern and reassign the bandwidth limit for each class of data within the site.

You can also view the bandwidth usage statistics. The bandwidth statistics are collected for the selected time interval. You can filter the statistical report based on the **Report Type, Apps or Apps Categories,** and **Metrics**.

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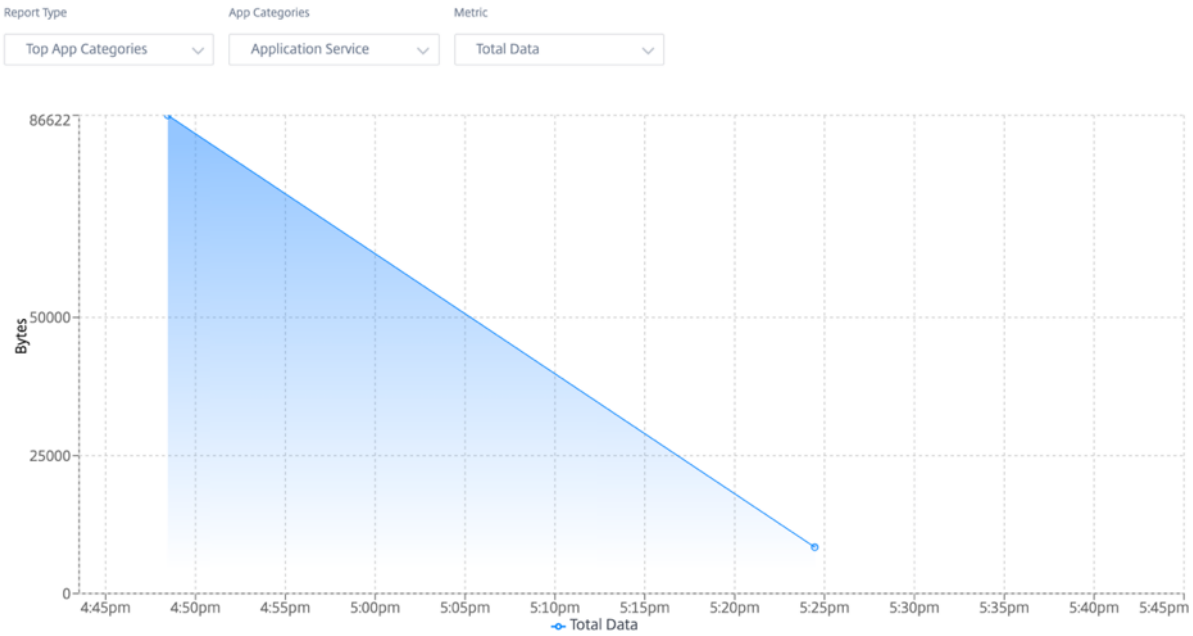

- **Report Type:** Select **Top App or App Categories** from the list.
- **Apps/App Categories:** Select top application or categories (such as network service) from the list.
- **Metric:** Select the bandwidth metric (such as Total Data, Incoming Data, Total Bandwidth) from the list.

Wi-Fi

For an SD-WAN appliance configured as a Wi-Fi access point, the Wi-Fi report provides details about the signal strength, number of devices connected to Wi-Fi and the Wi-Fi data used within the site. To view a Wi-Fi report, at the site level, navigate to **Reports** > **Wi-Fi**.

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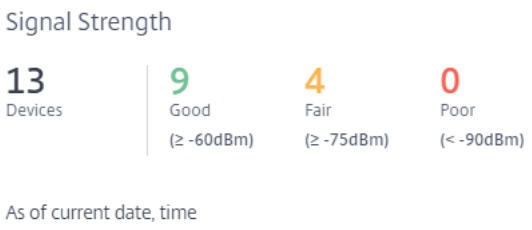
Signal Strength

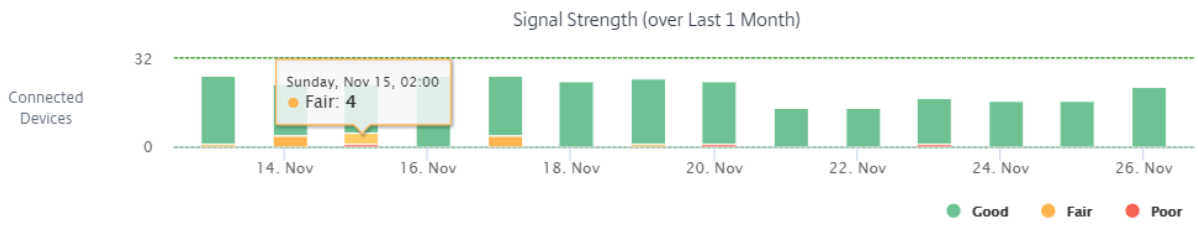
The signal strength determines the wireless signal power level received by the wireless client. Strong signal strength indicates reliable high-speed connection. Signal strength is represented in decibels per milliwatt (dBm). The closer the value is to zero, the stronger the signal.

Signal Strength	dBm
Good	or = -60 dBm
Fair	or = -75 dBm
Poor	or = -90 dBm

You can view the average signal strength, the total number of devices connected, and the number of devices with good, fair, and poor signal strength.



You can also select the timeline to view a graphical representation of the historic data. The graph shows the number of devices that have good, fair, and poor signal strength for the selected period.



Connected devices

The **Connected devices** section displays the total number of devices, at the site, that are currently connected to Wi-Fi. You can also see the number of appliances connected to each corporate or home SSID configured on the appliance. There can be a maximum of four SSIDs.

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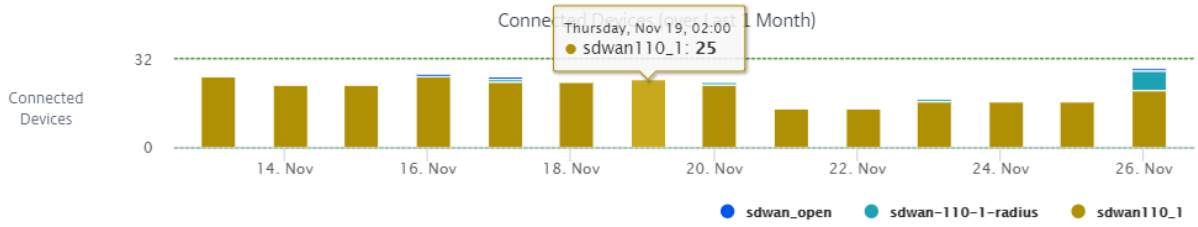
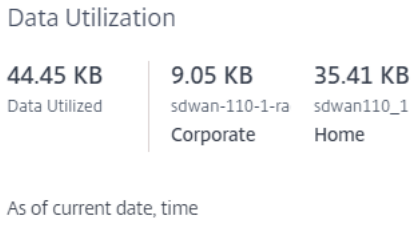
You can also select the timeline to view a graphical representation of the historic data. The graph shows the number of devices connected to each SSID over the selected period. Hover the mouse over a bar to view the exact number of devices connected to each SSID at specific time.

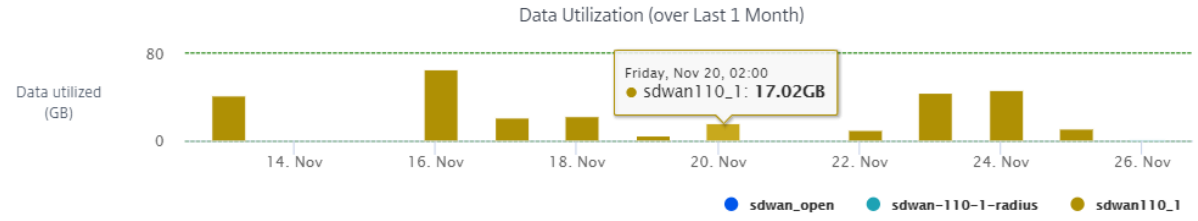


Data utilization

The **Data utilization** section displays the total amount of Wi-Fi data used, at the site, by the connected appliances at the current moment. You can also view the data used by devices connected to each corporate or home SSIDs.



You can also select the timeline to view a graphical representation of the historic data. The graph shows the amount of data used by the devices connected to each SSID over the selected period. Hover the mouse over a bar to view the exact data utilization by devices connected to each SSID for specific time.



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Usage

The usage table lists the Wi-Fi users and Wi-Fi authentication failure logs at the site.

Users The **Users** table lists all the Wi-Fi users at a site along with parameters such as signal strength, upload data, and download data. Click the parameter header to sort the column in descending order.

Users Authentication Log Failures

Username / MAC ID	SSID Name	Authentication Type	IP Address	Signal Strength	Upload Data	Download Data
92:14:99:3f:2d:0b	sdwan110_1	WPA2-Personal	192.168.3.76	-56 dBm	887.64 KB	951.74 KB
a2:ea:f4:19:cf:fb	sdwan110_1	WPA2-Personal	192.168.3.85	-60 dBm	4.01 MB	6.79 MB
a2:f7:69:59:b4:5d	sdwan110_1	WPA2-Personal	192.168.3.98	-53 dBm	3.06 MB	1.94 MB
andreaspo	sdwan-110-1-radius	WPA2-Enterprise	192.168.3.53	-51 dBm	119.89 MB	105.17 MB
andreaspo	sdwan-110-1-radius	WPA2-Enterprise	192.168.3.54	-56 dBm	303.05 KB	228.56 KB
andreaspo	sdwan-110-1-radius	WPA2-Enterprise	192.168.3.56	-36 dBm	82.3 KB	50.93 KB
andreaspo	sdwan-110-1-radius	WPA2-Enterprise	192.168.3.62	-53 dBm	232.22 MB	192.75 MB
andreaspo	sdwan-110-1-radius	WPA2-Enterprise	192.168.3.64	-58 dBm	114.38 MB	100.62 MB
andreaspo	sdwan-110-1-radius	WPA2-Enterprise	192.168.3.85	-56 dBm	1.16 MB	2.41 MB
c2:8f:82:ac:96:33	sdwan-110-1-radius	WPA2-Enterprise	192.168.3.68	-35 dBm	116.75 KB	84.1 KB
dc:a6:32:cf:3e:4c	sdwan110_1	WPA2-Personal	192.168.3.62	-53 dBm	525.48 KB	6.01 MB

Click **View more** to view all the Wi-Fi users at the site. You can select the period or search the list by user name.

Wi-Fi Last 1 Month

Users Authentication Log Failures

m

Username / MAC ID	SSID Name	Authentication Type	IP Address	Signal Strength	Upload Data	Download Data
asiminad	ssid1	WPA2-Personal	192.168.1.2	-78 dBm	22.88 KB	10.95 KB
mariats	sdwan110-3_ssid2	WPA2-Enterprise	192.168.1.20	-23 dBm	491.26 MB	151.26 MB
mariats	ssid3	WPA2-Enterprise	192.168.0.20	-25 dBm	1.03 KB	1.91 MB

Authentication failure logs The authentication failure logs table displays all the Wi-Fi authentication failures at the site. You can view the MAC address and IP address of the client that is trying to connect to a specific SSID along with authentication failure time.

Users Authentication Log Failures

User ID/MAC ID	Authentication Type	SSID Name	IP Address	Authentication Failures(s)	Last Authentication Failure Time
andreaspo	WPA2-Enterprise	sdwan-110-1-radius	192.168.3.56	1	26th Nov 2020, 16:08

Click **View more** to view all the authentication failure logs. You can select the period or search the list by user name.

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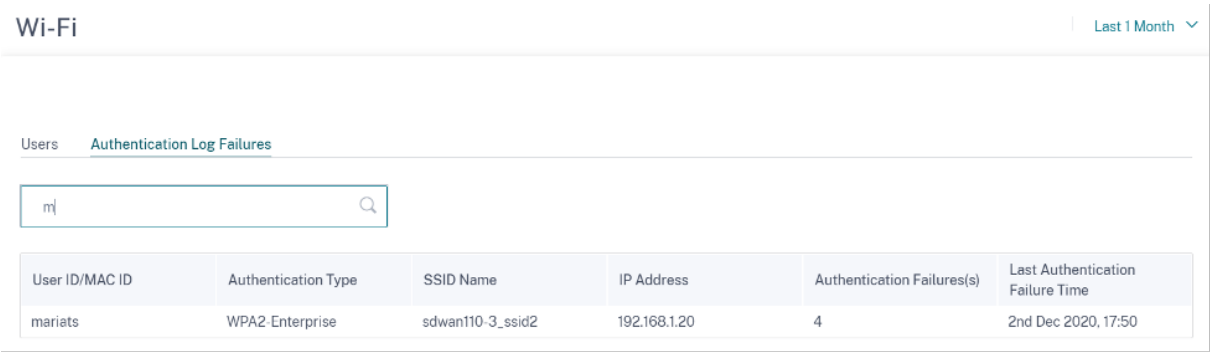
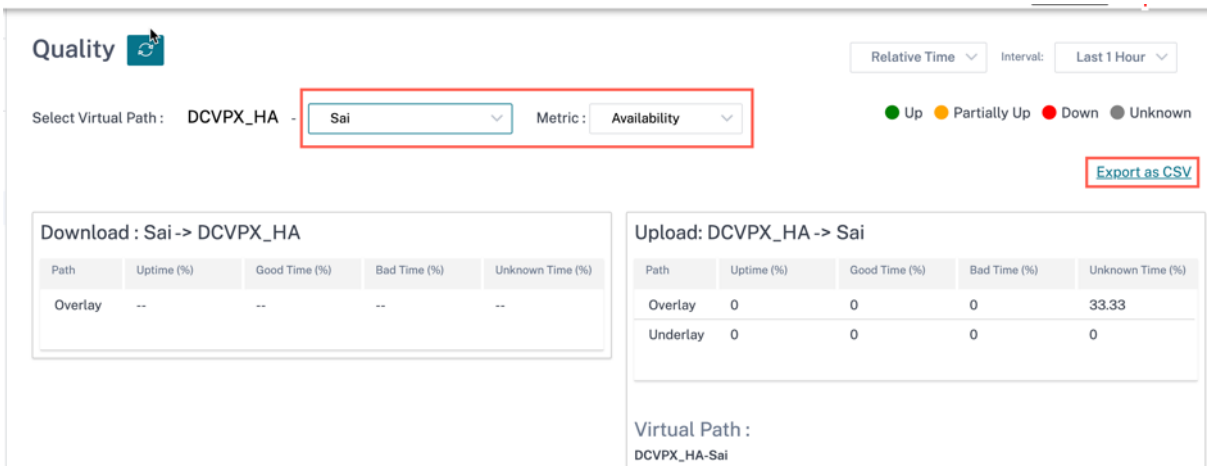


Quality

Site administrators can use the Quality reports to analyze the Quality of Experience (QoE) at the site for each QoS metric such as availability, loss, latency, and jitter. The quality metric is displayed for both the overlay virtual paths and its underlying member paths.

Availability



- CSV export reports

  With the **Export as CSV** capability, you can download the path graph points (virtual/member path) for any time series (hourly, weekly, and so on) as an excel Comma-separated Value (CSV) file and be able to plot all distinct points of data for a particular site report.

  To download/export the path graph as CSV, navigate to **Reports > Quality** at site level. Select the site and metric from the drop-down list and click the **Export as CSV** link.

  Select the path that you want to fetch the data for and click **Download Graph Points**.

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Note: Selected Path Graph points (Time and Value) will be available in the downloaded CSV file

	Path Name
☑	DCVPX_HA - Sai
☑	DCVPX_HA-Broadband-Telerama-1:Sai-Broadband-ACT-1
☑	DCVPX_HA-Broadband-Telerama-1:Sai-Broadband-AOL-2

Download Graph Points

By default, all the path check boxes are auto selected. You can modify it as needed.

> **Note**
>
> If paths are selected, the Download Graph Points button remains disabled.

	Path Name
☐	DCVPX_HA - Sai
☐	DCVPX_HA-Broadband-Telerama-1:Sai-Broadband-ACT-1
☐	DCVPX_HA-Broadband-Telerama-1:Sai-Broadband-AOL-2

Download Graph Points

Currently, the naming convention of the downloaded CSV file is **SiteQuality** followed by the download. You can view each path with a pair of time and value along with a unique identifier. You can see the time in milliseconds and the value as in unit.

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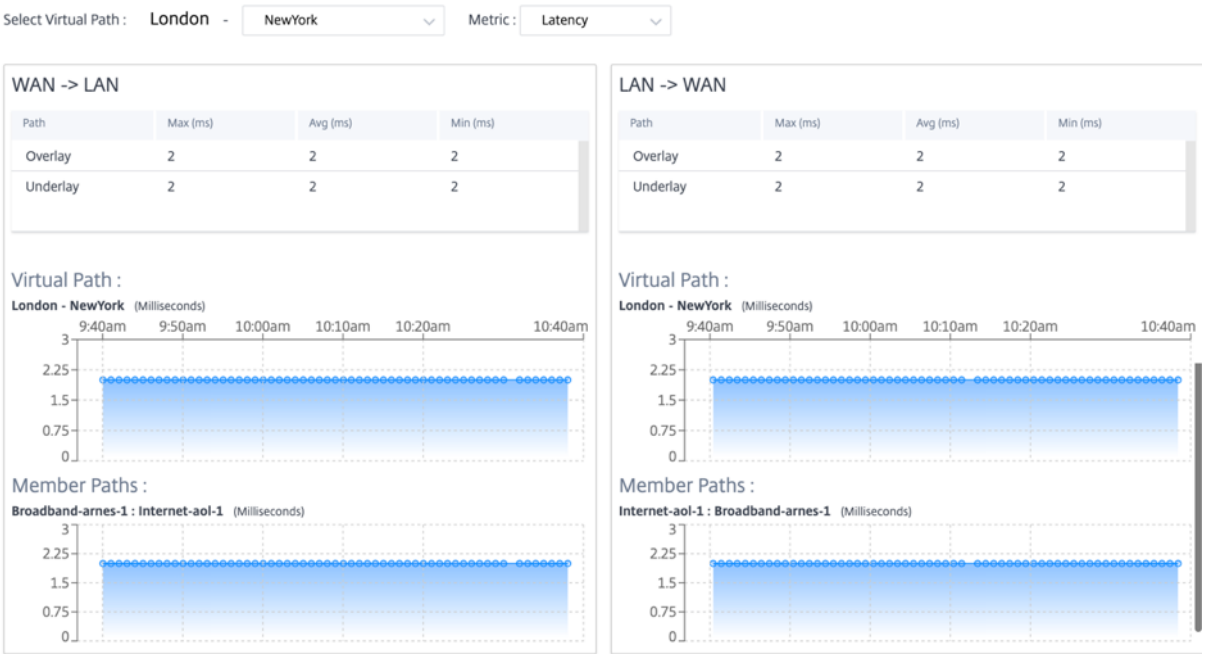
SiteQuality_2022-01-18T13_06_12+05_30

	DCVPX_HA - Sai-time	DCVPX_HA - Sai-value	DCVPX_HA-Broadband-Telerama-1:Sai-Broadband-ACT-1-time	DCVPX_HA-Broadband-Telerama-1:Sai-Broadband-ACT-1-value	DCVPX_HA
2	1642487670572	2	1642487670572	2	
3	1642487730572	2	1642487730572	2	
4	1642487790572	2	1642487790572	2	
5	1642487850572	2	1642487850572	2	
6	1642487970572	2	1642487910572	2	
7	1642488030572	2	1642487970572	2	
8	1642488090572	2	1642488030572	2	
9	1642488150572	2	1642488090572	2	
10	1642488210572	2	1642488150572	2	
11	1642488270572	2	1642488210572	2	

Based on the following metric selection, you can see that different values are getting generated in the excel sheet:

- **Loss:** Value shows in %.
- **Latency and Jitter:** Value shows in milliseconds.
- **Throughput:** Value shows in Kbps.
- **Availability:** Shows the path up, partially up, down, and unknown time.
  - If the value is 4, then the path is in Up state.
  - If the value is 3, then the path is partially Up state.
  - If the value is lesser than 3, then the path is in Bad/down state.

Latency



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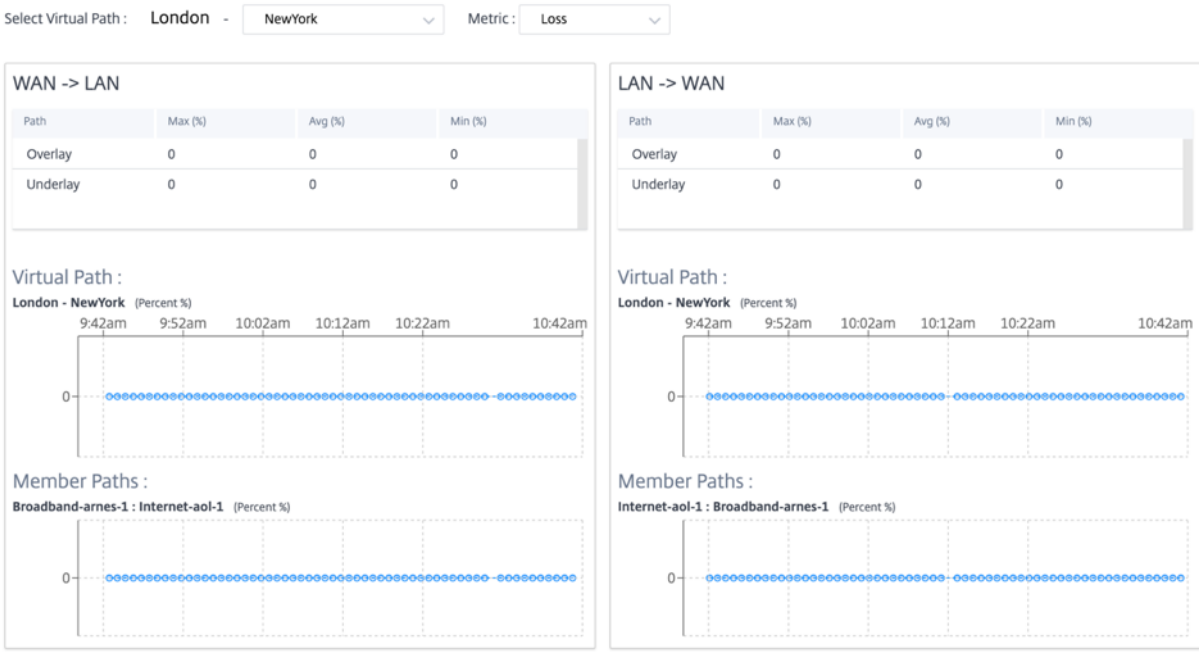
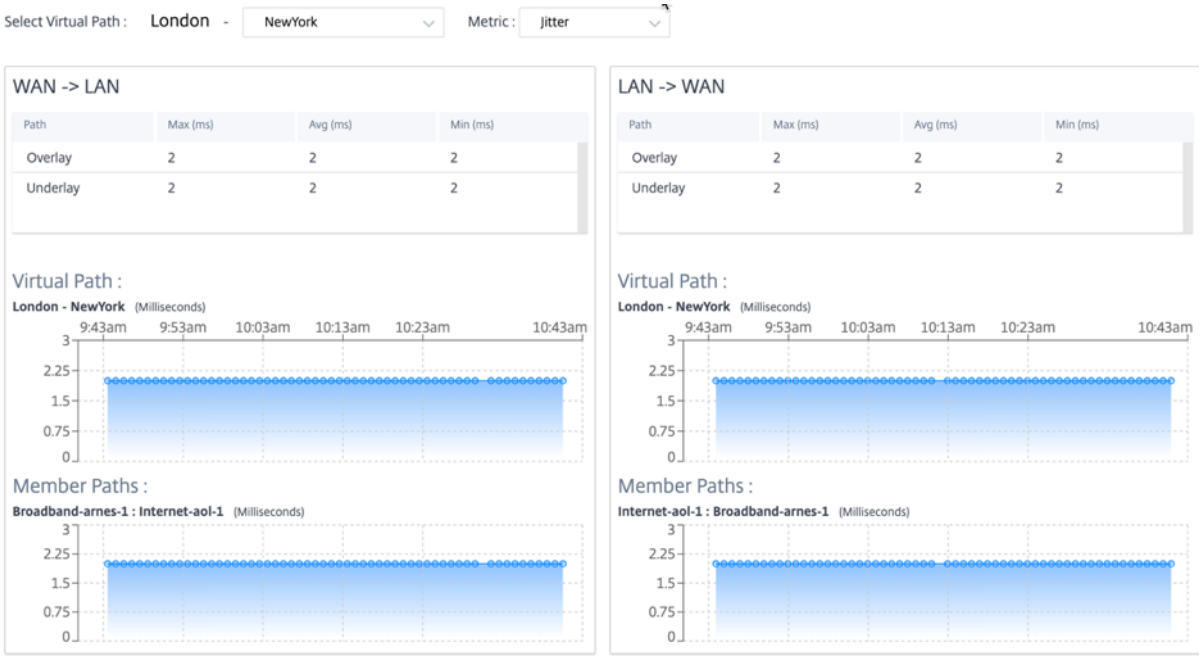
Loss



Jitter



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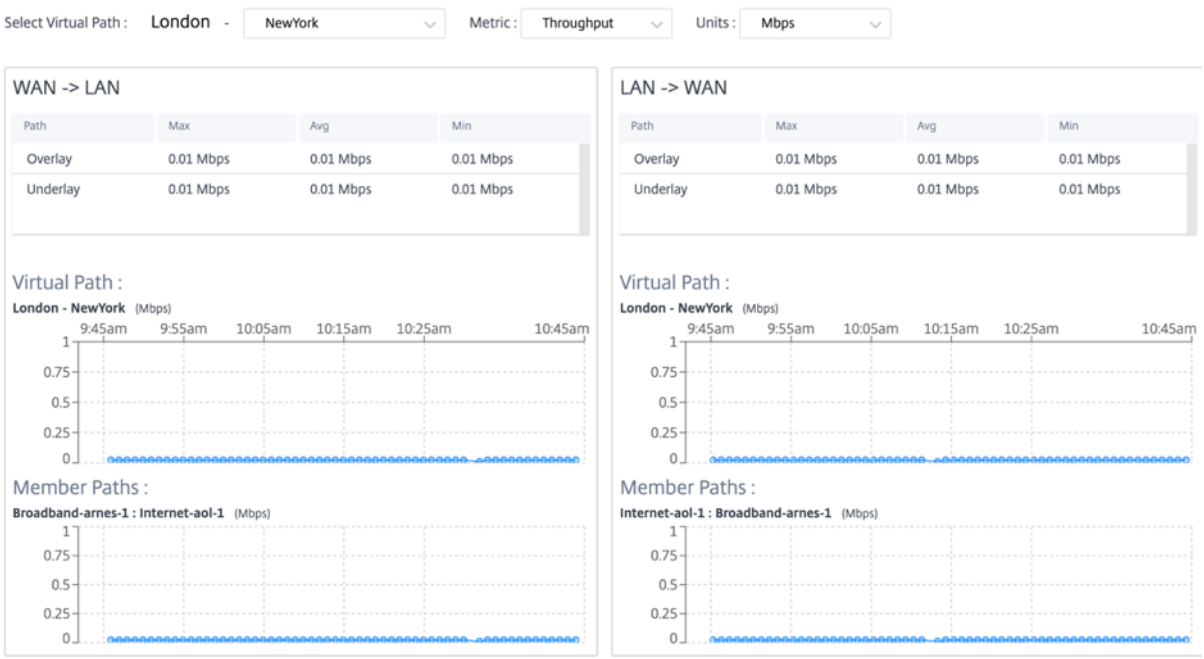
Throughput



Quality of Service

Quality of Service (QoS) manages data traffic to reduce packet loss, latency, and jitter on the network. For more information, see Quality of Service. The following are two ways to view the Quality-of-Service (QoS) report:

- **Summary View:** Summary view provides an overview of bandwidth consumption across all types of traffic - real-time, interactive, bulk, and control across the network and per site.

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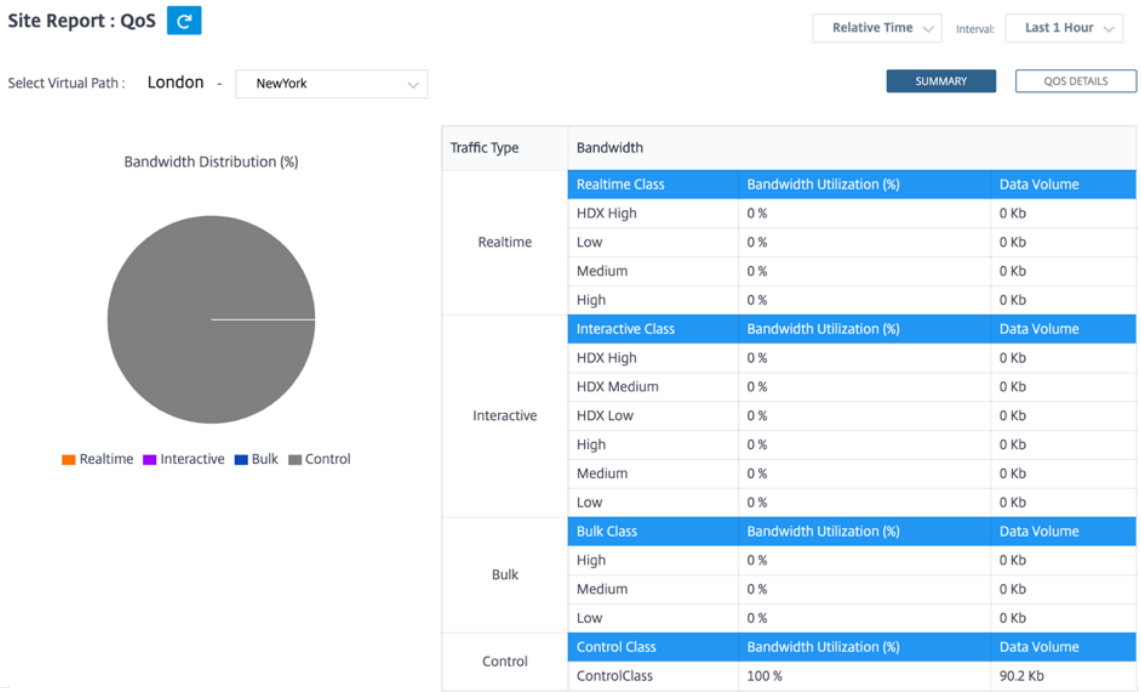

Traffic Type	Bandwidth		
Realtime	Realtime Class	Bandwidth Utilization (%)	Data Volume
	HDX High	0 %	0 Kb
	Low	0 %	0 Kb
	Medium	0 %	0 Kb
	High	0 %	0 Kb
Interactive	Interactive Class	Bandwidth Utilization (%)	Data Volume
	HDX High	0 %	0 Kb
	HDX Medium	0 %	0 Kb
	HDX Low	0 %	0 Kb
	High	0 %	0 Kb
	Medium	0 %	0 Kb
	Low	0 %	0 Kb
Bulk	Bulk Class	Bandwidth Utilization (%)	Data Volume
	High	0 %	0 Kb
	Medium	0 %	0 Kb
	Low	0 %	0 Kb
Control	Control Class	Bandwidth Utilization (%)	Data Volume
	ControlClass	100 %	90.2 Kb

- **Real-time:** Used for low latency, low bandwidth, time-sensitive traffic. Real-time applications are time sensitive but don't really need high bandwidth (for example voice over IP). Real-time applications are sensitive to latency and jitter, but can tolerate some loss.
- **Interactive:** Used for interactive traffic with low to medium latency requirements and low to medium bandwidth requirements. Interactive applications involve human input in the form of mouse clicks or cursor moves. The interaction is typically between a client and a server. The communication might not need high bandwidth but is sensitive to loss and latency. However, server to client does need high bandwidth to transfer graphical information, which might not be sensitive to loss.
- **Bulk:** Used for high bandwidth traffic that can tolerate high latency. Applications that handle file transfer and need high bandwidth are categorized as bulk class. These applications involve little human interference and are mostly handled by the systems themselves.
- **Control:** Used to transfer control packets that contain routing, scheduling, and link statistics information.

- **Detailed View:** The detailed view captures trends around bandwidth consumption, traffic volume, packets dropped and so on For each QoS class associated with an overlay virtual path. You can view QoS statistics based on the virtual path between two sites.

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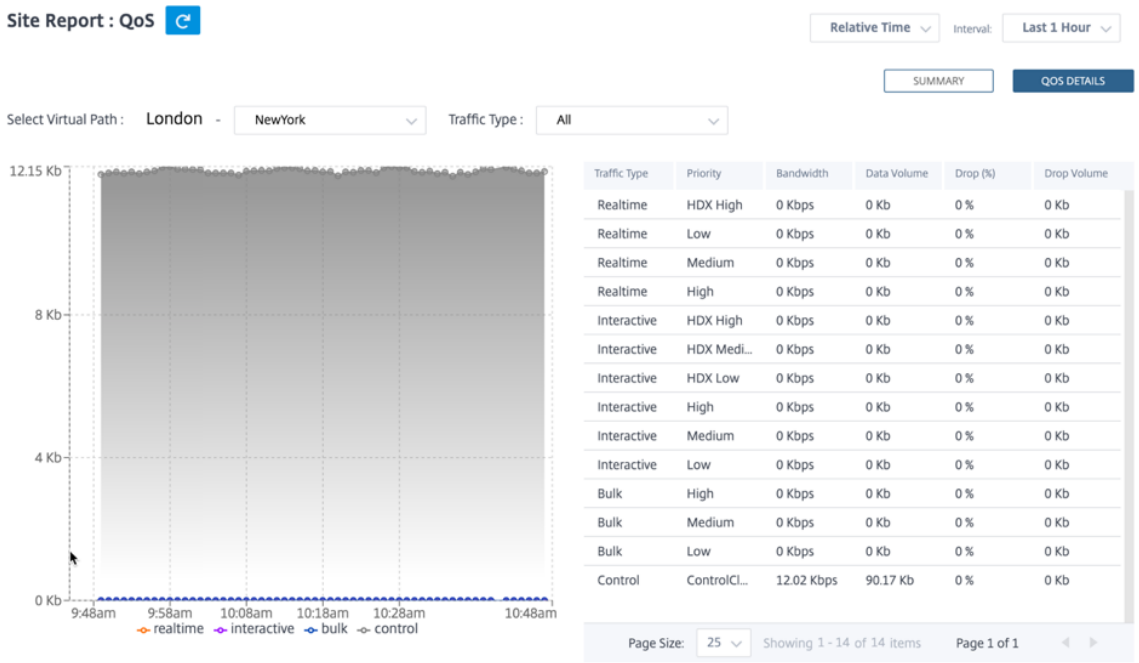

Historical statistics

For each site, you can view the statistics as graphs for the following network parameters:

- Virtual Paths
- Paths
- WAN Links
- Interfaces
- Classes
- Services
- GRE Tunnels
- IPsec Tunnels

The statistics are collected as graphs. These graphs are plotted as timeline versus usage, allowing you to understand the usage trends of various network object properties. You can view graphs for network-wide application statistics.

You can view or hide the graphs and customize the columns as needed.

Virtual paths

To view the **Virtual Paths** statistics, navigate to **Reports > Historical Statistics > Virtual Paths** tab.

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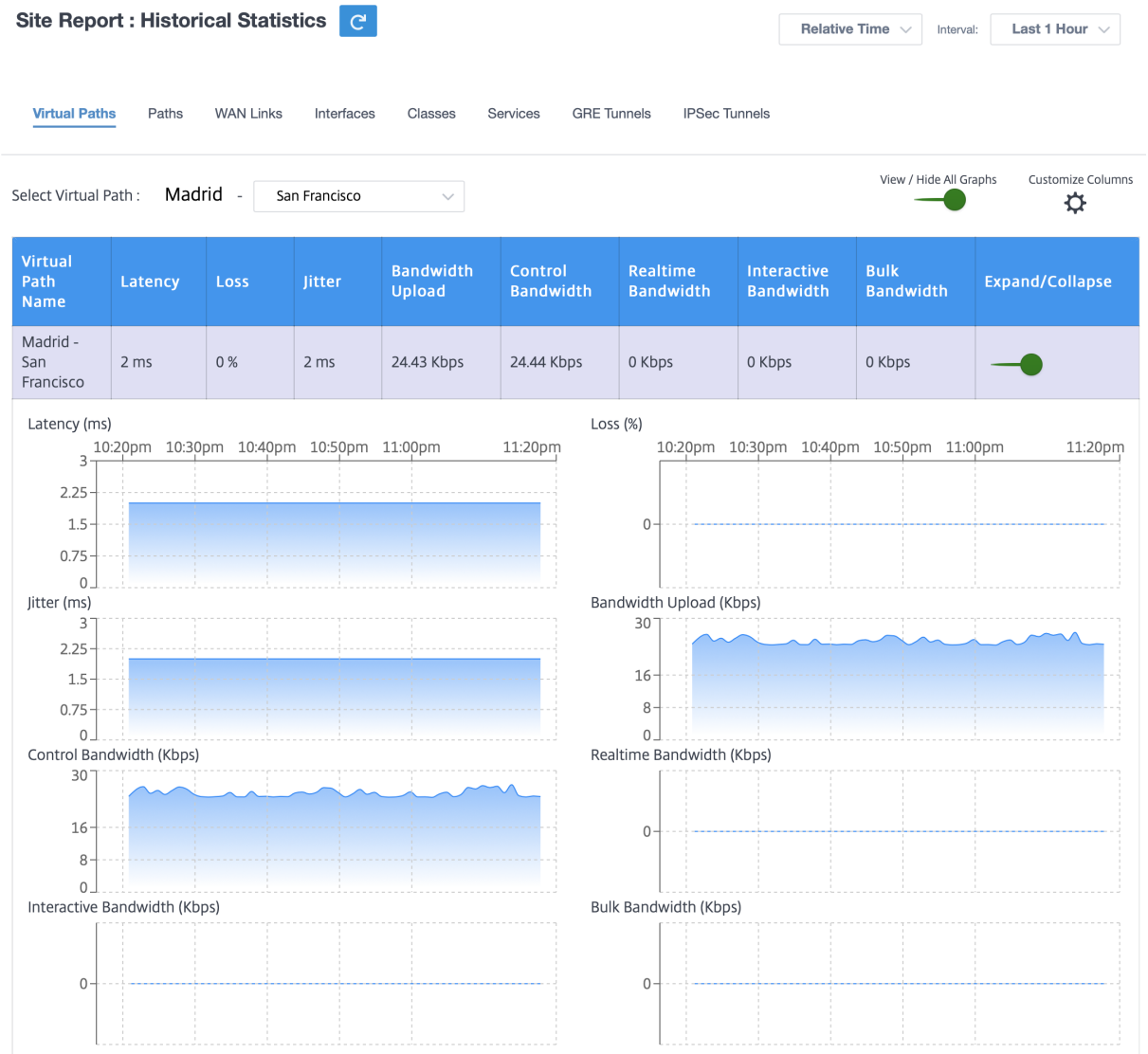

You can view the following metrics:

- **Virtual Path Name**: The virtual path name.
- **Latency**: The latency in milliseconds for real time traffic.
- **Loss**: Percentage of packets lost.
- **Jitter**: Variation in the delay of received packets, in milliseconds.
- **Bandwidth Upload**: **Upload (LAN > WAN) Bandwidth** usage for the selected time period.
- **Control Bandwidth**: Bandwidth used to transfer control packets that contain routing, scheduling, and link statistics information.
- **Realtime Bandwidth**: Bandwidth consumed by applications that belong to the real-time class type in the SD-WAN configuration. The performance of such applications depends on a great extent upon network latency. A delayed packet is worse than a lost packet (for example, VoIP, Skype for Business).

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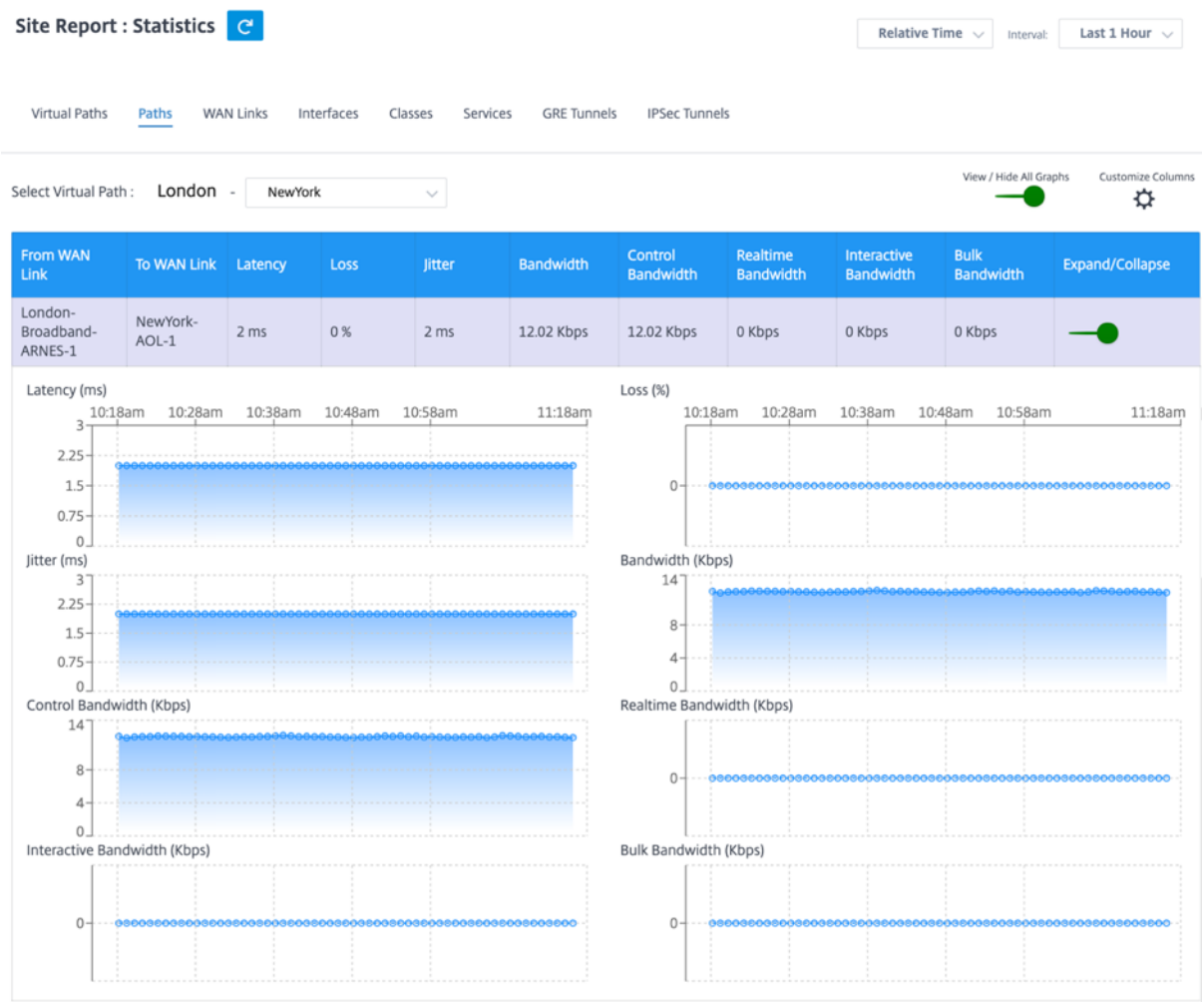
- **Interactive Bandwidth**: Bandwidth consumed by applications that belong to the interactive class type in the SD-WAN configuration. The performance of such applications depends on a great extent upon network latency, and packet loss (for example, XenDesktop®, XenApp).
- **Bulk Bandwidth**: Bandwidth consumed by applications that belong to the bulk class type in the SD-WAN configuration. These applications involve little human intervention and are mostly handled by the systems themselves (for example, FTP, backup operations).
- **Expand/Collapse**: You can expand or collapse the data as needed.

Paths

To view the **Paths** statistics, navigate to **Reports > Statistics > Paths** tab.



You can view the following metrics:

- **From WAN Link**: The source WAN link.
- **To WAN Link**: The destination WAN link.
- **Latency**: The latency in milliseconds for real time traffic.

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- **Loss**: Percentage of packets lost.
- **Jitter**: Variation in the delay of received packets, in milliseconds.
- **Bandwidth**: Total bandwidth consumed by all packet types. Bandwidth= Control Bandwidth + Real-time Bandwidth + Interactive Bandwidth + Bulk Bandwidth.
- **Control Bandwidth**: Bandwidth used to transfer control packets that contain routing, scheduling, and link statistics information.
- **Real-time Bandwidth**: Bandwidth consumed by applications that belong to the real-time class type in the SD-WAN configuration. The performance of such applications depends on a great extent upon network latency. A delayed packet is worse than a lost packet (for example, VoIP, Skype for Business).
- **Interactive Bandwidth**: Bandwidth consumed by applications that belong to the interactive class type in the SD-WAN configuration. The performance of such applications depends on a great extent upon network latency, and packet loss (for example, XenDesktop, XenApp®).
- **Bulk Bandwidth**: Bandwidth consumed by applications that belong to the bulk class type in the SD-WAN configuration. These applications involve little human intervention and are mostly handled by the systems themselves (for example, FTP, backup operations).
- **Expand/Collapse**: You can expand or collapse the data as needed.

WAN links

To view the statistics at **WAN Link** level, navigate to **Reports > Statistics > WAN Links** tab.

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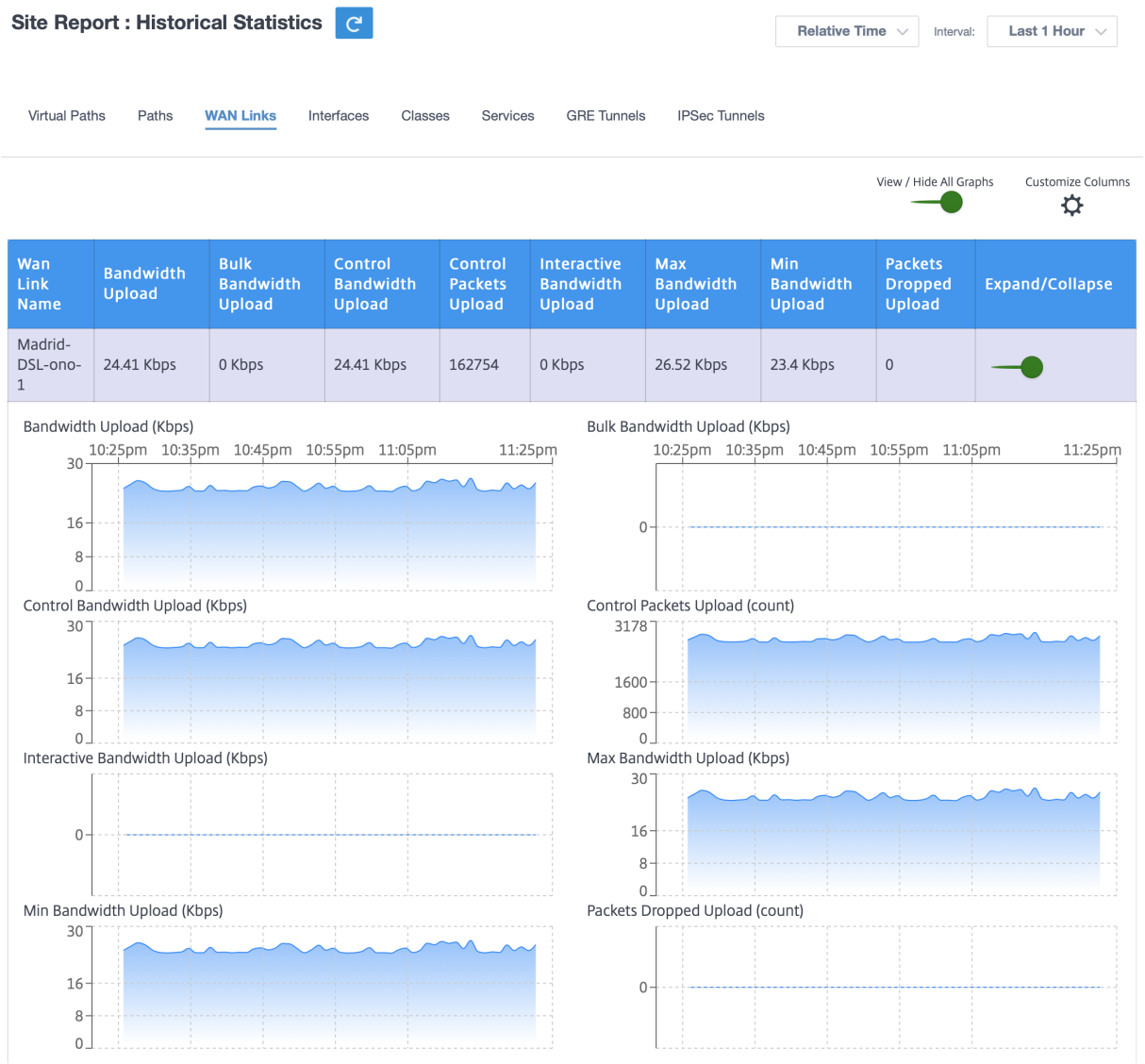

You can view the following metrics:

- **WAN Link Name**: The path name.
- **Bandwidth Upload**: **Upload (LAN > WAN) Bandwidth** usage for the selected time period.
- **Bulk Bandwidth Upload**: **Upload (LAN > WAN) virtual path bandwidth** used by Bulk traffic for the selected time period.
- **Control Bandwidth Upload**: **Upload (LAN > WAN) virtual path bandwidth** used by Control traffic for the selected time period.
- **Control Packet Upload**: **Upload (LAN > WAN) Virtual Path Control packets** for the selected time period.
- **Interactive Bandwidth Upload**: **Upload (LAN > WAN) virtual path bandwidth** used by Interactive traffic for the selected time period.
- **Max Bandwidth Upload**: **Maximum upload (LAN > WAN) bandwidth** used in a minute for the

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selected time period.
- **Min Bandwidth Upload**: **Minimum upload (LAN > WAN) bandwidth** used in a minute for the selected time period.
- **Expand/Collapse**: You can expand or collapse the data as needed.

Interfaces

The Interfaces statistical report helps you during troubleshooting to quickly see whether any of the ports are down. You can also view the transmitted and received bandwidth, or packet details at each port. You can also view the number of errors that occurred on these interfaces during a certain time period.

To view **Interface** statistics, navigate to **Reports > Statistics > Interfaces** tab.

You can view the following metrics:

- **Interface Name**: The name of the Ethernet interface.
- **Tx Bandwidth**: Bandwidth transmitted.
- **Rx Bandwidth**: Bandwidth received.
- **Errors**: Number of errors observed during the selected time period.
- **Expand/Collapse**: You can expand or collapse the data as needed.

Classes

The virtual services can be assigned to particular QoS classes, and different bandwidth restraints can be applied to different classes.

To view **Class** statistics, navigate to **Reports > Statistics > Classes** tab.

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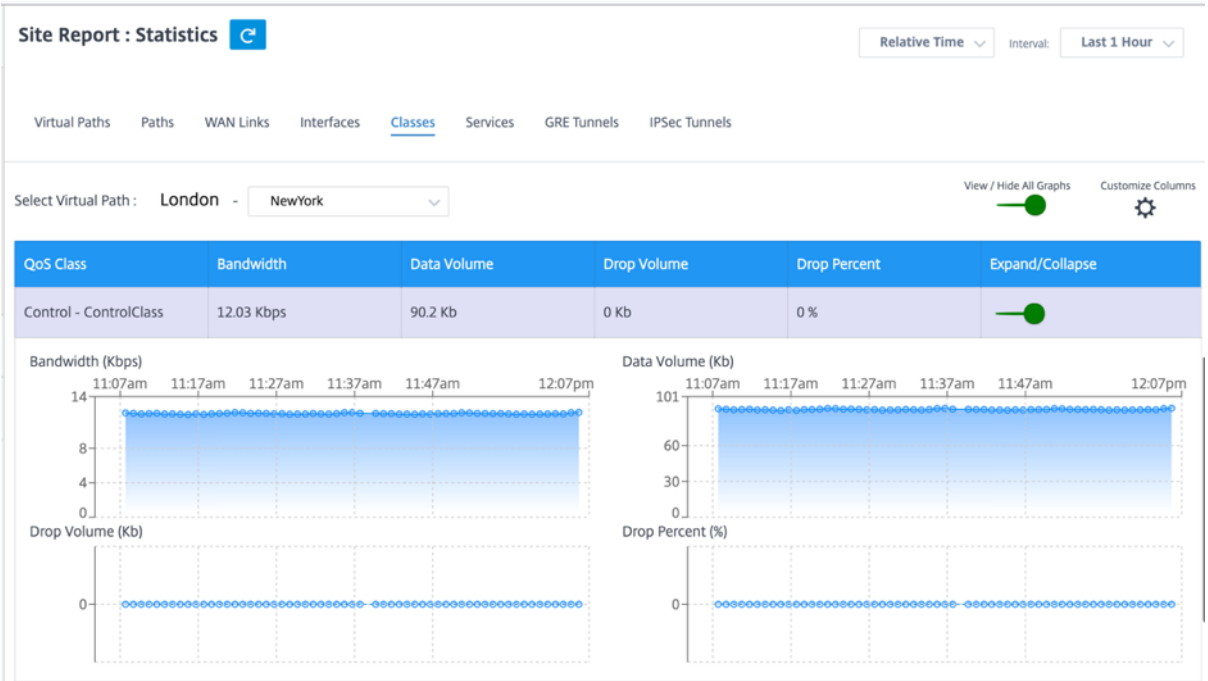

You can view the following metrics:

- **QoS Class**: The class name.
- **Bandwidth**: Transmitted bandwidth.
- **Data Volume**: Data sent, in Kbps.
- **Drop Volume**: Percentage of data dropped.
- **Drop Percent**: Percentage of data dropped.
- **Expand/Collapse**: You can expand or collapse the data as needed.

Services

To view the **Services** statistics, navigate to **Reports > Statistics > Services** tab.

Select the service type from the list. The options are as follows:

- **Passthrough** –This service manages traffic that is not intercepted, delayed, shaped, or changed by the SD-WAN. Traffic directed to the Passthrough Service includes broadcasts, ARPs, and other non-IPv4 traffic, and traffic on the Virtual WAN Appliance local subnet, configured subnets, or Rules applied by the Network Administrator. This traffic is not delayed, shaped, or changed by the SD-WAN. Therefore, you must ensure that Passthrough traffic does not consume substantial resources on the WAN links that the SD-WAN Appliance is configured to use for other services.
- **Intranet** –This service manages Enterprise Intranet traffic that has not been defined for transmission across a Virtual Path. As with Internet traffic, it remains unencapsulated, and the SD-WAN manages bandwidth by rate-limiting this traffic relative to other service types during times

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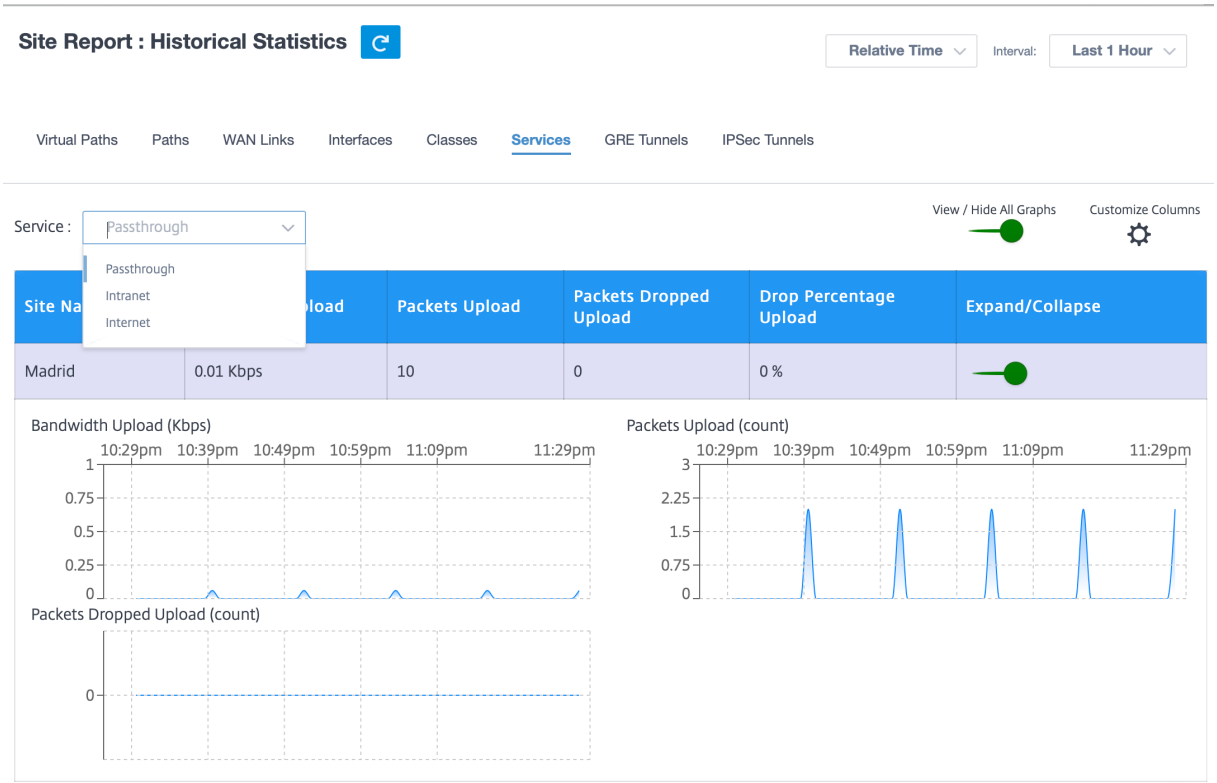
of congestion. Under certain conditions, and if configured for Intranet Fallback on the Virtual Path, traffic that ordinarily travels with a Virtual Path can instead be treated as Intranet traffic, to maintain network reliability.

- **Internet** –This service manages traffic between an Enterprise site and sites on the public Internet. Traffic of this type is not encapsulated. During times of congestion, the SD-WAN actively manages bandwidth by rate-limiting Internet traffic relative to the Virtual Path, and Intranet traffic according to the SD-WAN configuration established by the Administrator.



You can view the following metrics:

- **Site Name**: The site name.
- **Bandwidth Upload**: **Upload (LAN > WAN) Bandwidth** usage for the selected time period.
- **Packets Upload**: **Upload (LAN > WAN) Packets** sent for the selected time interval.
- **Packets Dropped Upload**: Number of upload packets dropped.
- **Drop Percentage Upload**: Percentage of upload data dropped.
- **Expand/Collapse**: You can expand or collapse the data as needed.

GRE tunnels

You can use a tunneling mechanism to transport packets of one protocol within another protocol. The protocol that carries the other protocol is called the transport protocol, and the carried protocol is

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called the passenger protocol. Generic Routing Encapsulation (GRE) is a tunneling mechanism that uses IP as the transport protocol and can carry many different passenger protocols.

The tunnel source address and destination address are used to identify the two endpoints of the virtual point-to-point links in the tunnel. For more information about configuring GRE tunnels on Citrix SD-WAN appliances, see GRE Tunnel.

To view **GRE Tunnel** statistics, navigate to **Reports > Statistics > GRE Tunnels** tab.

You can view the following metrics:

- **Site Name**: The site name.
- **Tx Bandwidth**: Bandwidth transmitted.
- **Rx Bandwidth**: Bandwidth received.
- **Packet Dropped**: Number of packets dropped, because of network congestion.
- **Packets Fragmented**: Number of packets fragmented. Packets are fragmented to create smaller packets that can pass through a link with an MTU that is smaller than the original datagram. The fragments are reassembled by the receiving host.
- **Expand/Collapse**: You can expand or collapse the data as needed.

IPsec tunnels

IP Security (IPsec) protocols provide security services such as encrypting sensitive data, authentication, protection against replay, and data confidentiality for IP packets. Encapsulating Security Payload (ESP), and Authentication Header (AH) are the two IPsec security protocols used to provide these security services.

In IPsec tunnel mode, the entire original IP packet is protected by IPsec. The original IP packet is wrapped and encrypted, and a new IP header is added before transmitting the packet through the VPN tunnel.
For more information about configuring IPsec tunnels on Citrix SD-WAN appliances, see IPsec Tunnel Termination.

To view **IPsec Tunnel** statistics, navigate to **Reporting > statistics > IPsec Tunnels** tab.

You can view the following metrics:

- **Tunnel Name**: The tunnel name.
- **Tunnel State**: IPsec tunnel state.
- **MTU**: Maximum transmission unit—size of the largest IP datagram that can be transferred through a specific link.
- **Packet Received**: Number of packets received.
- **Packets Sent**: Number of packets Sent.
- **Packet Dropped**: Number of packets dropped, because of network congestion.

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- **Bytes Dropped**: Number of bytes dropped.
- **Expand/Collapse**: You can expand or collapse the data as needed.

Real time statistics

Network Statistics

You can get the following real time statistics information under **Reports > Real Time > Network Statistics**:

- Site
- Virtual Paths
- WAN Member Paths
- WAN Links
- WAN Link Usage
- MPLS Queues
- Access Interfaces
- Interfaces
- Intranet
- IPsec Tunnel
- GRE

To get the real time statistical report, go to the required tab (such as site, virtual paths, WAN links) and click **Retrieve latest data**.

Click the plus (+) symbol if you want to add or remove any column from the statistics table and click **Update**.

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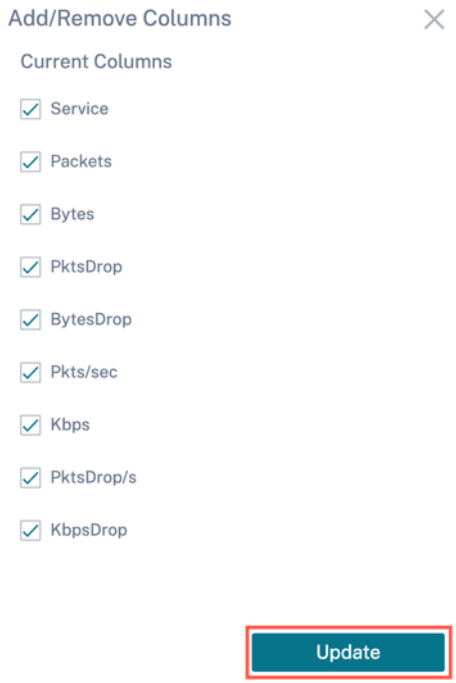
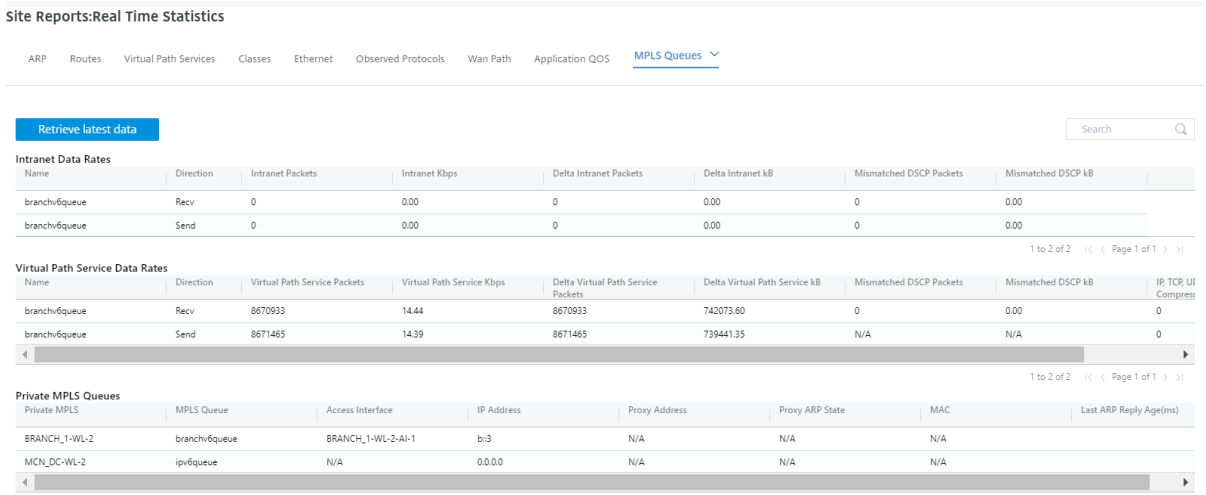


MPLS Queues

MPLS queues allow you to define the queues corresponding to the Service Provider MPLS queues, on the MPLS WAN Links. For information on configuring MPLS queues, see MPLS Queues.

To view MPLS Queue statistics, at the site level, navigate to **Reports** > **Real Time** > **Statistics**. Click **Other Stats**, select **MPLS Queues**, and click **Retrieve latest data**. The latest MPLS queues data is retrieved from the appliance and is displayed in the Citrix SD-WAN Orchestrator service.

You can view the direction, no of packets, delta packets, and mismatched DSCP packets for Intranet and Virtual path services.



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For private MPLS Queues, you can view the following details:

- **Private MPLS**: The private MPLS WAN link.
- **MPLS Queue**: The MPLS queue associated with the MPLS WAN link.
- **Access Interface**: The access interface associated with the MPLS queue.
- **IP Address**: The IP address associated with the MPLS queue.
- **Proxy Address**: The proxy IP address associated with the MPLS queue.
- **Proxy ARP State**: The state of proxy address resolution protocol. Enabled, disabled, or N/A
- **MAC**: The MAC address of the interface associated with the MPLS queue.
- **Last ARP Reply age**: Time in milliseconds when the last ARP reply was received.

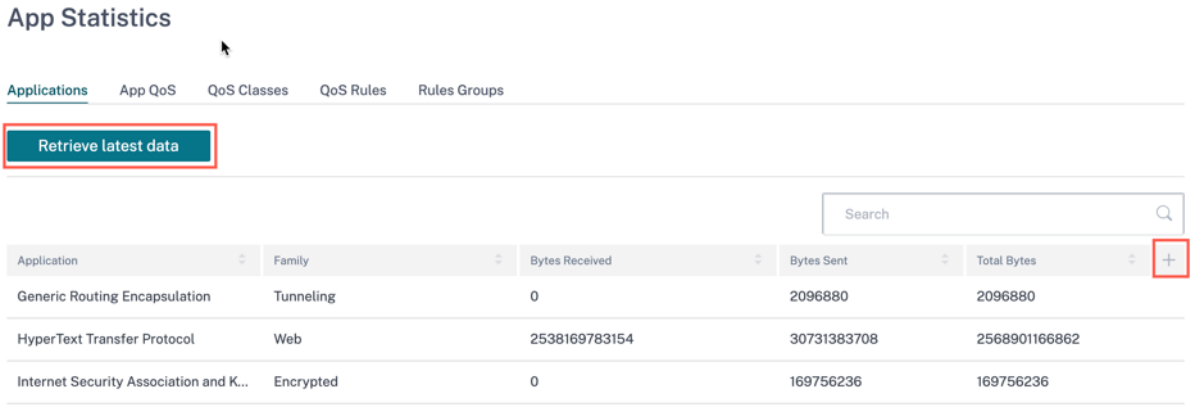
For more details on troubleshooting, see Troubleshooting MPLS queues.

Application statistics

You can get the following real time statistics information under **Reports > Real Time > App Statistics**:

- Applications
- App QoS
- QoS Classes
- QoS Rules
- Rule Groups

To get the real time statistical report, go to the required tab (such as applications, App QoS, QoS rule) and click **Retrieve latest data**.



Click the plus (+) symbol if you want to add or remove any column from the statistics table and click **Update**.

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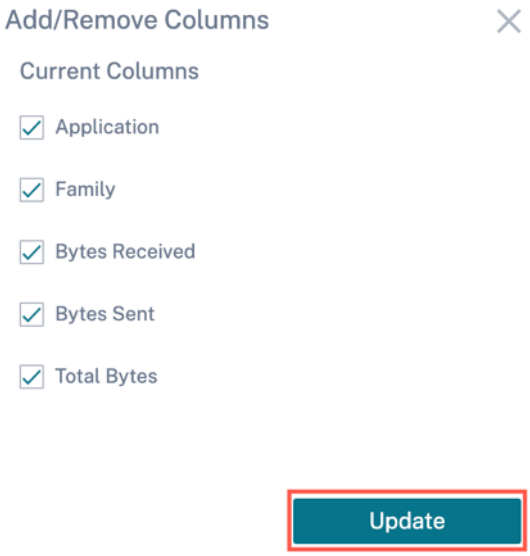
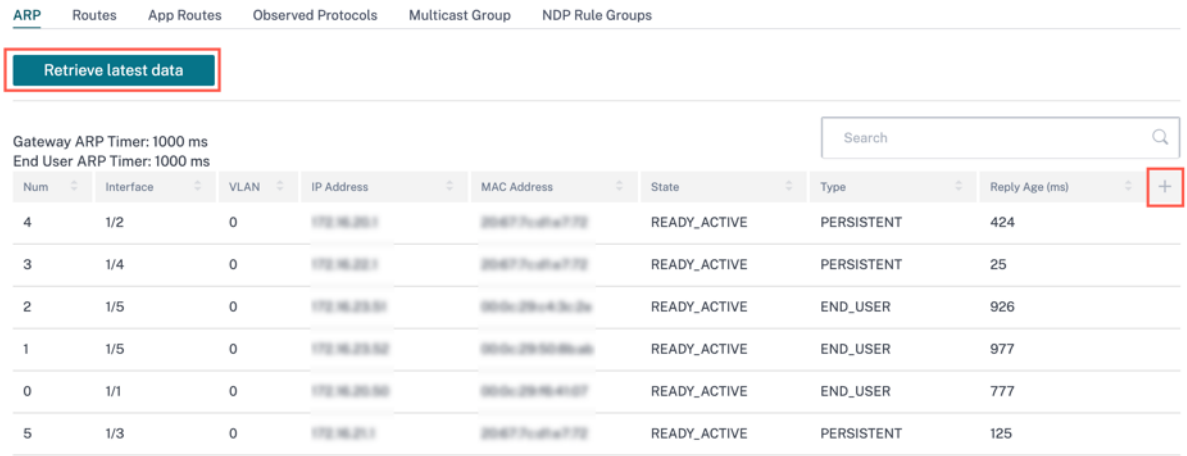


Routes statistics

You can also get the following real time statistics information under **Reports > Real Time > Routes Statistics**:

- ARP (Address Resolution Protocol)
- Routes
- App Routes
- Observed Protocols
- Multicast group
- NDP Rule Groups

To get the real time statistical report, go to the required tab (such as ARP, Routes, App Routes) and click **Retrieve latest data**.



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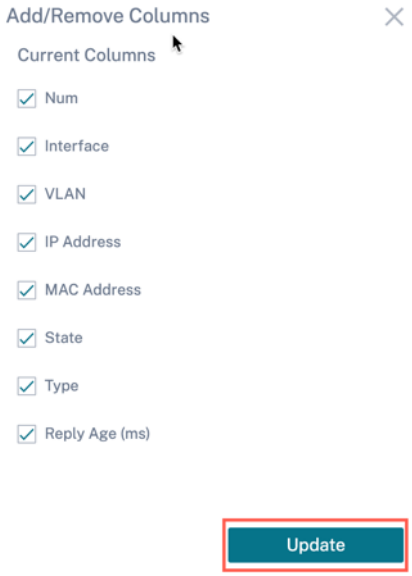
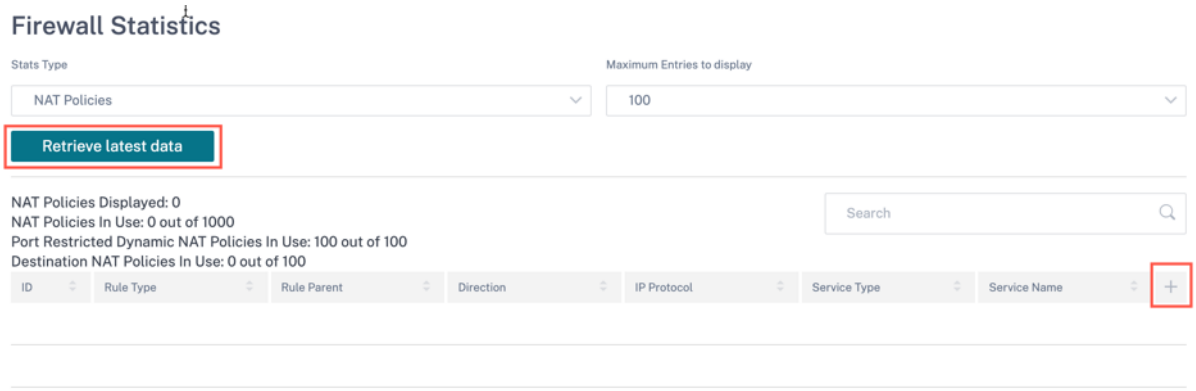
Click the plus (+) symbol if you want to add or remove any column from the statistics table and click **Update**.



Firewall statistics

The **Firewall statistics** provide the state of the connection, Network Address Protocol (NAT) policies, filter policies related to a particular session based on the firewall action configured. Firewall connections also provide complete details about the source and destination of the connection.

To get the real time statistical report, select the statistics type from the drop-down list (Connection, NAT Policies, Filter Policies) > Select the number for maximum entries to display, and click **Retrieve latest data**.



Click the plus (+) symbol if you want to add or remove any column from the statistics table and click **Update**.

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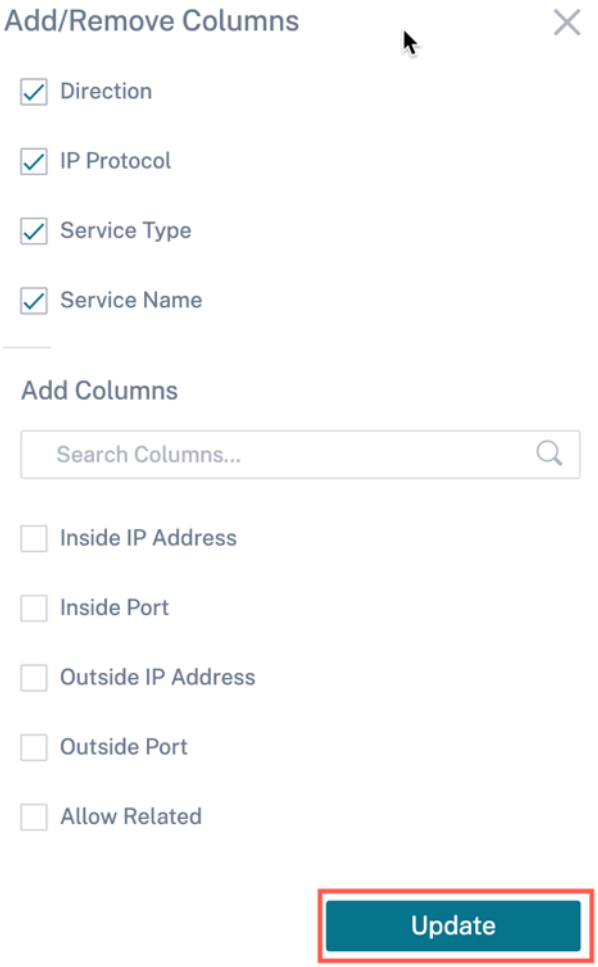

Flows

The **Flows** feature provides unidirectional flow information related to a particular session going through the appliance. This provides information on the destination service type the flow is falling into and also the information related to the rule and class type and also the transmission mode.

The table columns are customizable. Click **Customize Columns** at the right top corner of the table and select/deselect the options that you want to display or hide in the table.

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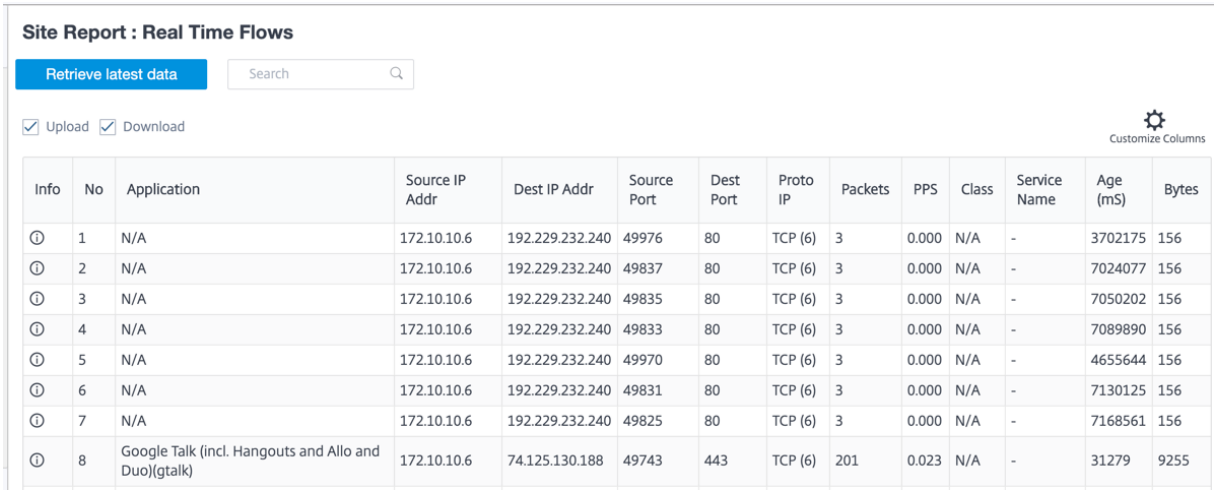

Info	No	Application	Source IP Addr	Dest IP Addr	Source Port	Dest Port	Proto IP	Packets	PPS	Class	Service Name	Age (mS)	Bytes
ⓘ	1	N/A	172.10.10.6	192.229.232.240	49976	80	TCP (6)	3	0.000	N/A	-	3702175	156
ⓘ	2	N/A	172.10.10.6	192.229.232.240	49837	80	TCP (6)	3	0.000	N/A	-	7024077	156
ⓘ	3	N/A	172.10.10.6	192.229.232.240	49835	80	TCP (6)	3	0.000	N/A	-	7050202	156
ⓘ	4	N/A	172.10.10.6	192.229.232.240	49833	80	TCP (6)	3	0.000	N/A	-	7089890	156
ⓘ	5	N/A	172.10.10.6	192.229.232.240	49970	80	TCP (6)	3	0.000	N/A	-	4655644	156
ⓘ	6	N/A	172.10.10.6	192.229.232.240	49831	80	TCP (6)	3	0.000	N/A	-	7130125	156
ⓘ	7	N/A	172.10.10.6	192.229.232.240	49825	80	TCP (6)	3	0.000	N/A	-	7168561	156
ⓘ	8	Google Talk (incl. Hangouts and Allo and Duo)(gtalk)	172.10.10.6	74.125.130.188	49743	443	TCP (6)	201	0.023	N/A	-	31279	9255

Routing Protocols

The Routing Protocols report provides the details of the parameters associated with the routing protocols. In the **Routing Protocols** section, select the appropriate routing protocol, routing domain, and IP address type (IPv4 or IPv6) from the drop-down list. Click **Retrieve Latest Data** to view the current data.

You can view the parameter details associated with the following options:

- BGP State
- OSPF State
- OSPF Topology
- OSPF Interface
- OSPF LSADB
- OSPF Neighbors
- Route Table

From Citrix SD-WAN 11.5 release, IPv4 and IPv6 filter is newly added. Upon selection on IPv6, user receives a new operation name for all the IPv6 data.

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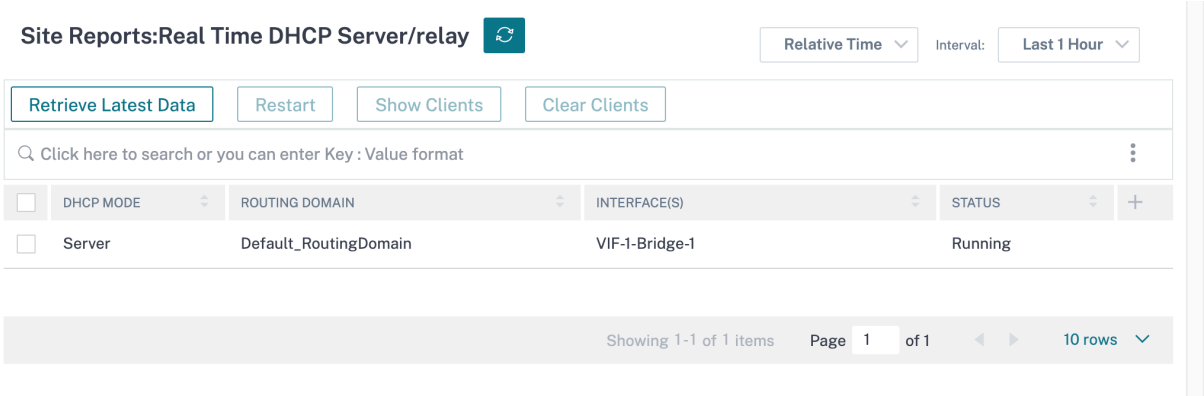
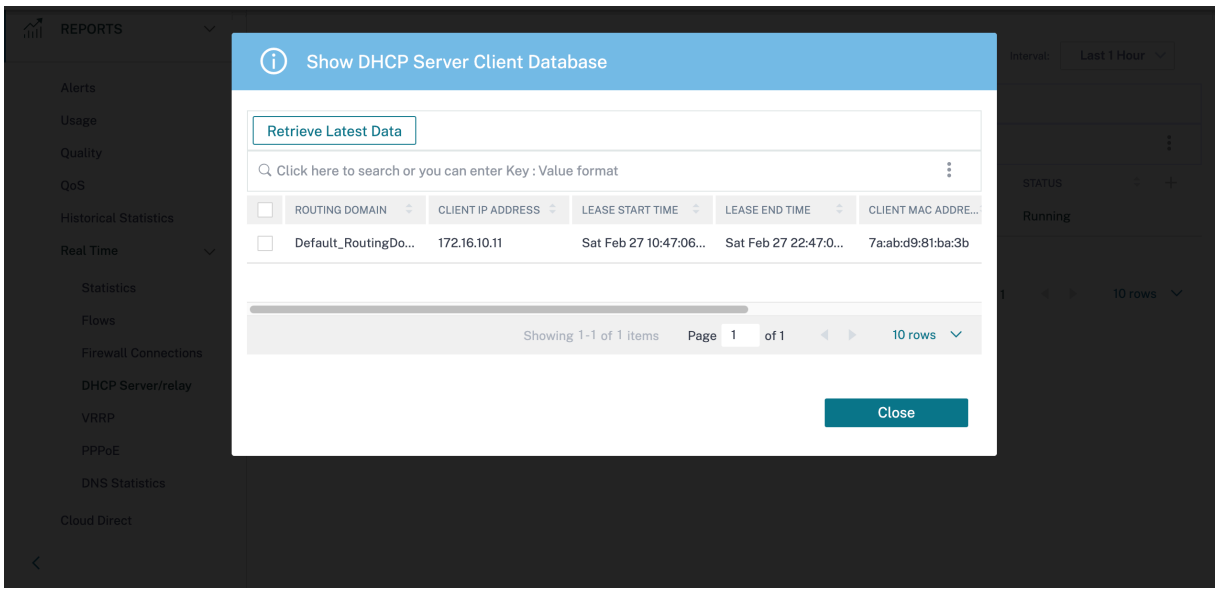
DHCP Server and Relay

The **DHCP Server/Relay** report provides the information on the interfaces configured as DHCP Server or Relay and its associated routing domain and status. You can search for the required DHCP server or relay information using the **Key: Value** format.



If the mode is **Server**, you can click **Show Clients** and view the list of DHCP clients associated with the DHCP server.



Click **Clear Clients** to remove the DHCP clients that are currently associated with the DHCP server.

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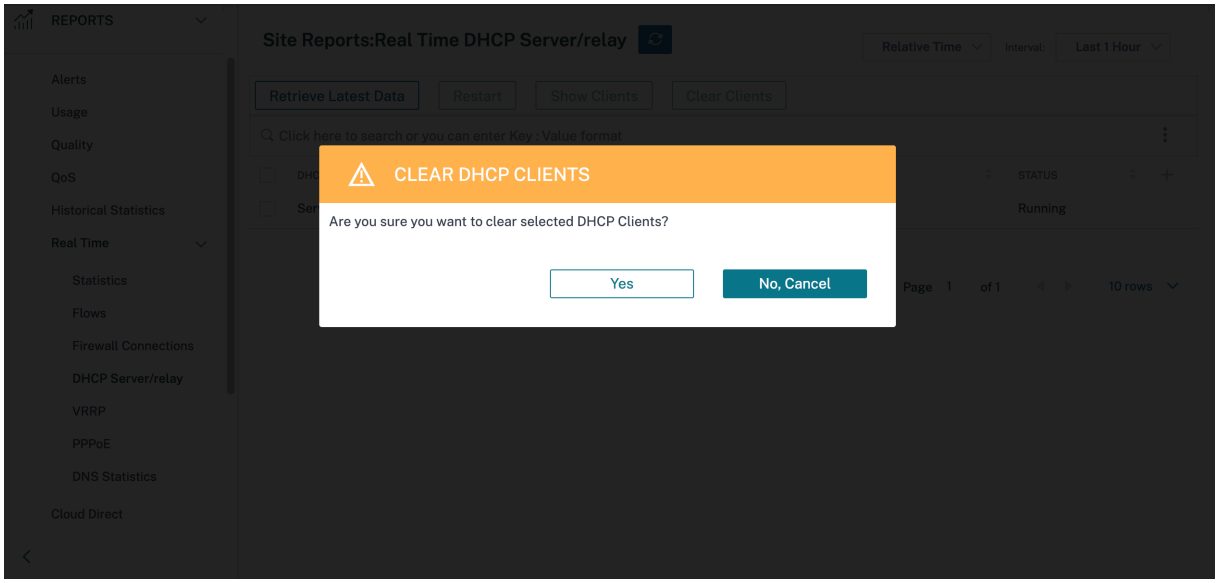
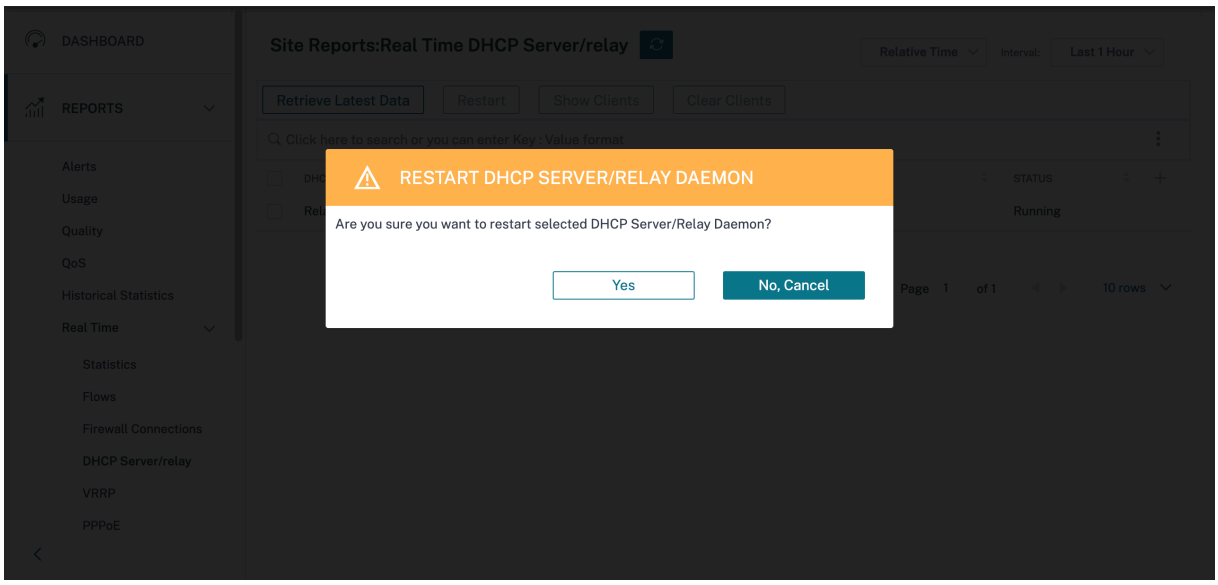


Click **Restart** to restart the DHCP Server or Relay.



VRRP

The VRRP real-time report provides details about the configured VRRP groups.

To view Virtual Router Redundancy Protocol (VRRP) report, navigate to **Reports** > **Real Time** > **VRRP**.

Click **Retrieve Latest Data** to get the current data.

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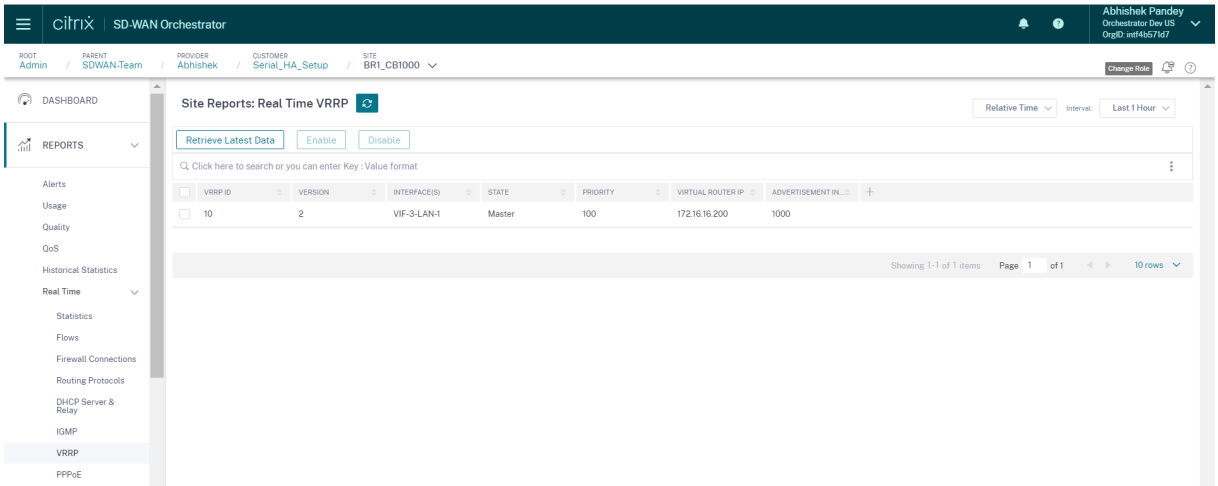

PPPoE

The PPPoE report provides status information of the configured virtual interface with the PPPoE static or dynamic client mode. It allows you to manually start or stop the sessions for troubleshooting purposes.

- **Virtual interface**: The virtual interface associated with PPPoE.
- **IP Address**: The IP address associated with the virtual interface. If the virtual interface is up and ready, display the recently received values. If the virtual interface is stopped or is in failed state, displays the last received values.
- **Gateway IP**: The IP address associated with the Gateway. If the virtual interface is up and ready, display the recently received values. If the virtual interface is stopped or is in failed state, displays the last received values.
- **Session ID**: The unique identifier associated with PPPoE session.
- **State**: The **State** column displays the status of the PPPoE session using three color codes; green, red, yellow. The following table describes the states and descriptions.

PPPoE session type	Status Color	Description
Configured	Yellow	A VNI is configured with PPPoE. This is an initial state.
Dialing	Yellow	After a VNI is configured, the PPPoE session state moves to dialing state by starting the PPPoE discovery. Packet information is captured.

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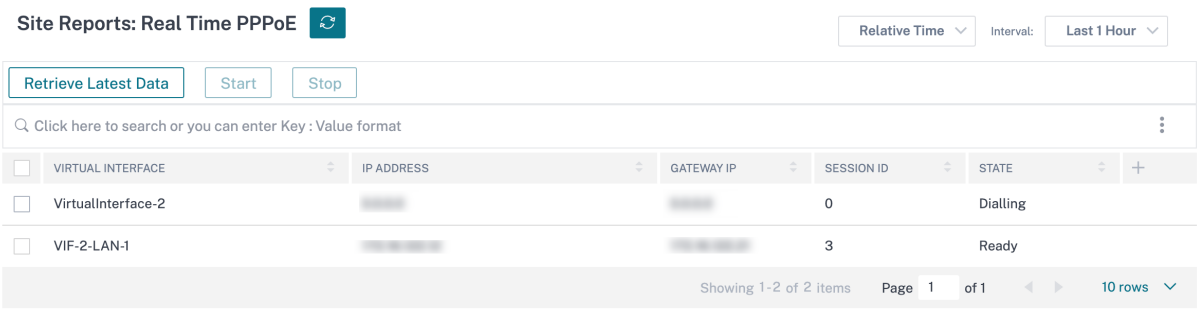
PPPoE session type	Status Color	Description
Session	Yellow	VNI is moved from Discovery state to Session state, waiting to receive IP, if dynamic or waiting for acknowledgment from server for the advertised IP, if static.
Ready	Green	IP packets are received and VNI and associated WAN link is ready for use.
Failed	Red	PPP/PPPoE session is terminated. The reason for the failure can be due to invalid configuration or fatal error. The session attempts to reconnect after 30 seconds.
Stopped	Yellow	PPP/PPPoE session is manually stopped.
Terminating	Yellow	An intermediate state terminating due to a reason. This state automatically starts after certain duration (5 seconds for normal error or 30 secs for a fatal error).
Disabled	Yellow	The SD-WAN service is disabled.



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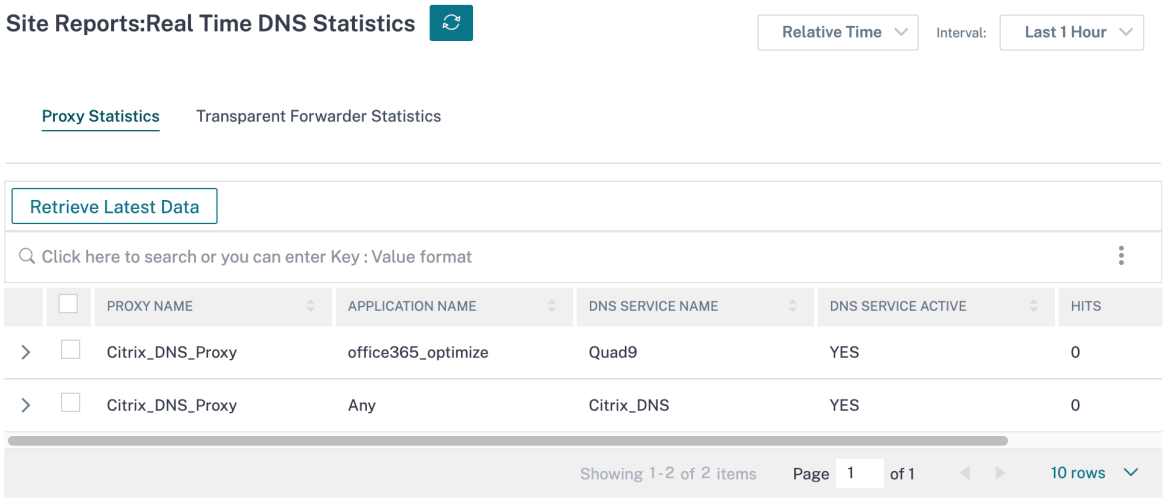
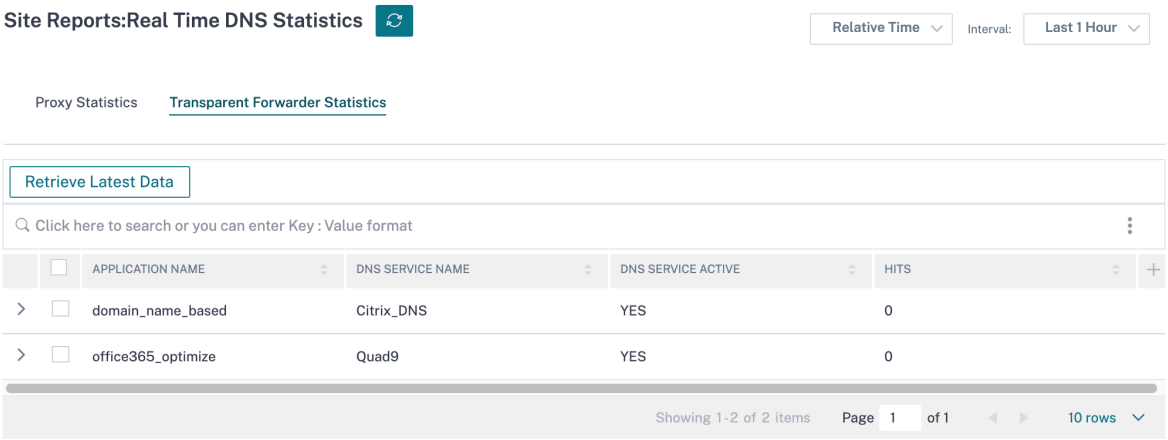
DNS statistics

The **DNS Statistics** provides the information on the application name, DNS service name, DNS service status, and the amount of `hits` to the DNS service. The information for DNS proxy and DNS transparent forwarder is displayed on two different tabs.

Proxy statistics



Transparent forwarder statistics



IPsec

The IPsec real-time report provides details about the **IPsec tunnel** settings on your network.

To view details of IPsec Security Associations (IPsec SAs), navigate to **Reports** > **Real Time** > **IPsec** > **IPsec SAs**. Click **Retrieve latest data** to get the current data.

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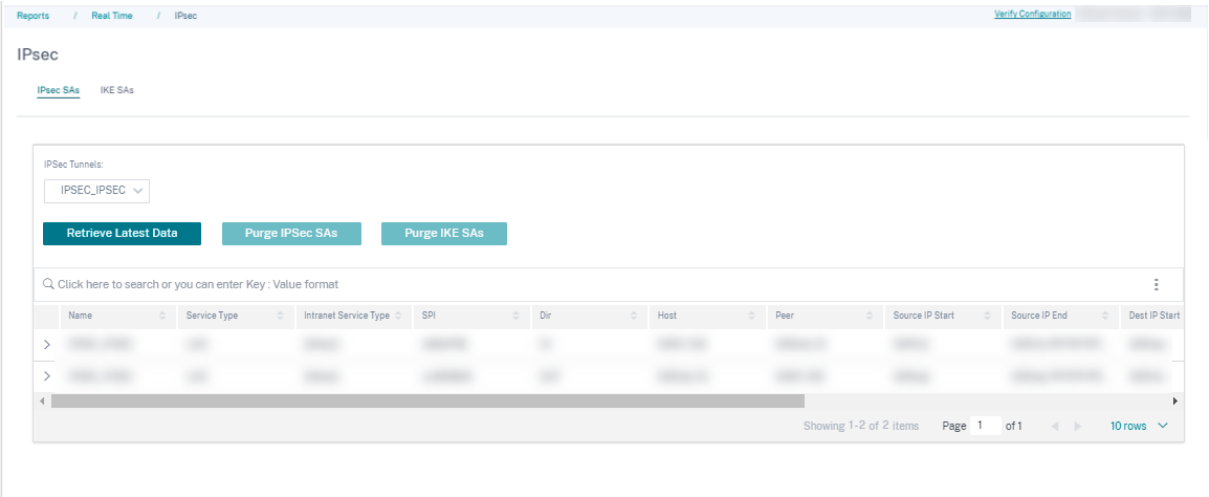
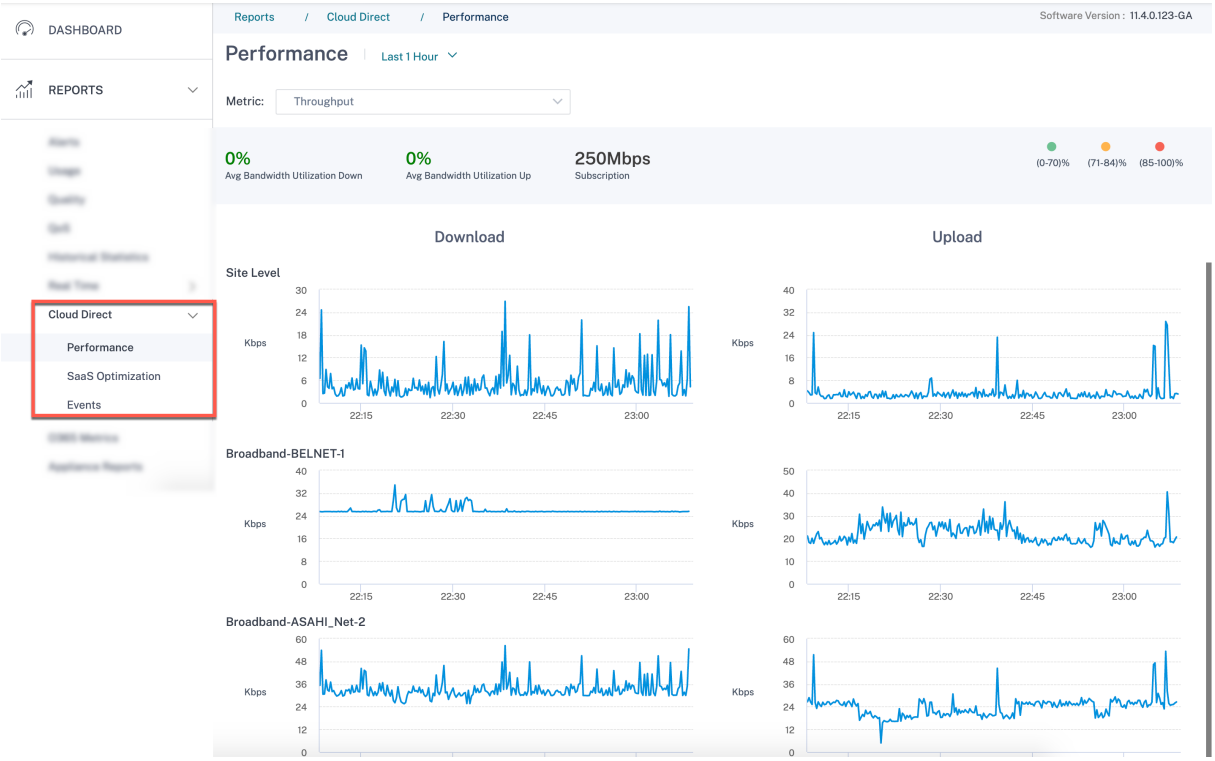
To view details of Internet Key Exchange Security Associations (IKE SAs), navigate to **Reports** > **Real Time** > **IPsec** > **IKE SAs**. Click **Retrieve latest data** to get the current data.

You can also purge the IPsec group data and statistical data by selecting **Purge IPsec Group** and **Purge IKE Stats** respectively.



Cloud Direct

The **Cloud Direct** report provides more granular details about the usage (bandwidth utilization, latency, and packet loss) for each of the participating WAN link and major historical events of the site.



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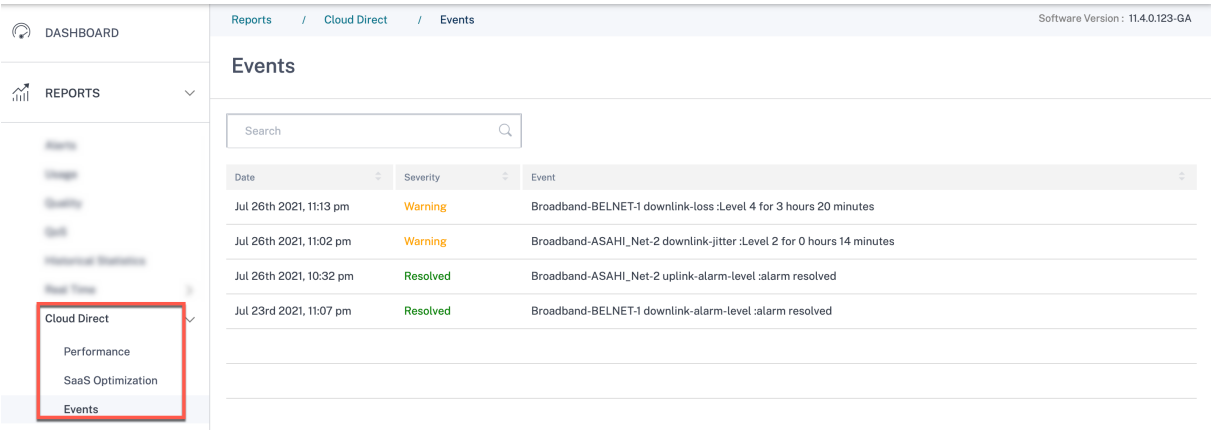
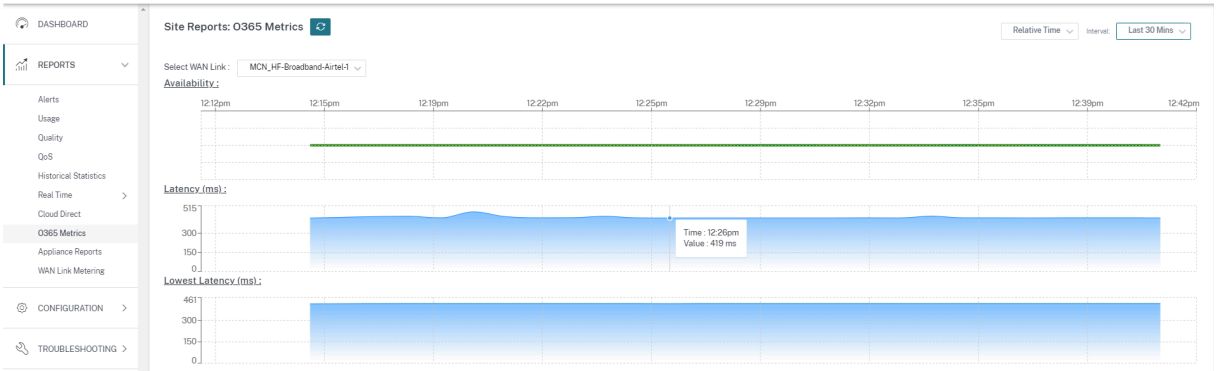


O365 Metrics

Citrix SD-WAN allows you to not only perform beacon probing, but also determines the latency to reach Office 365 endpoints through each WAN link. The latency is the round trip time taken to send a request and get a response from the Office 365 beacon service over a WAN link. This enables network administrators to view the beacon service latency report and manually choose the best internet link for direct Office 365 breakout. Beacon probing is enabled only through the Citrix SD-WAN Orchestrator service. By default, beacon probing is enabled on all Internet enabled WAN links when Office 365 break-out is enabled through the Citrix SD-WAN Orchestrator service.



Appliance reports (Preview)

Appliance reports deliver the network traffic and system usage reports. Using this data you can troubleshoot network issues or analyze the behavior of your Citrix SD-WAN™ devices. You can see the following tabs under Appliance Reports page:

- Interface
- LACP LAG Groups
- Network

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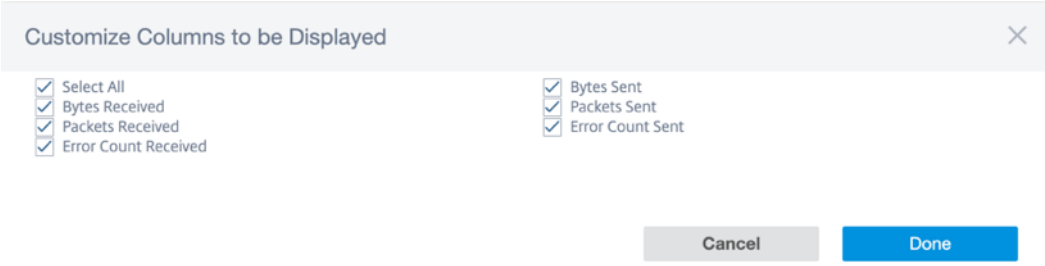
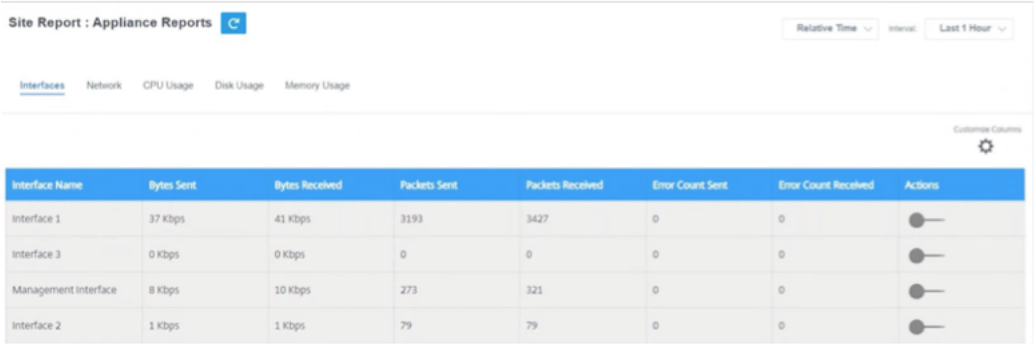
- CPU Usage
- Disk Usage
- Memory Usage
- LTE Signal

Click each tab to view or monitor the appliance graph by hour, day, weekly, and monthly. You can toggle between Absolute and Relative time as required. The table columns are customizable. Click **Customize Columns** at the right top corner of the table and select/deselect the options that you want to display or hide in the table.



Interface

The **Interface** page shows the management interface errors/traffic. All the network is divided into different interface, such as Management Interface, Interface 1/2/3.



- **Interface Name** –Displays the interface name.
- **Bytes Sent** –Average number of bytes sent for the selected duration in Kbps.
- **Bytes Received** –Average number of bytes received for the selected duration in Kbps.
- **Packets Sent** –Number of packets sent for the selected duration.
- **Packets Received** –Number of packets received for the selected duration.
- **Error Count Sent** –Number of errors count sent for the selected duration.
- **Error Count Received** –Number of errors count received for the selected duration.
- **Actions** –You can switch on the action button to view the network graph.

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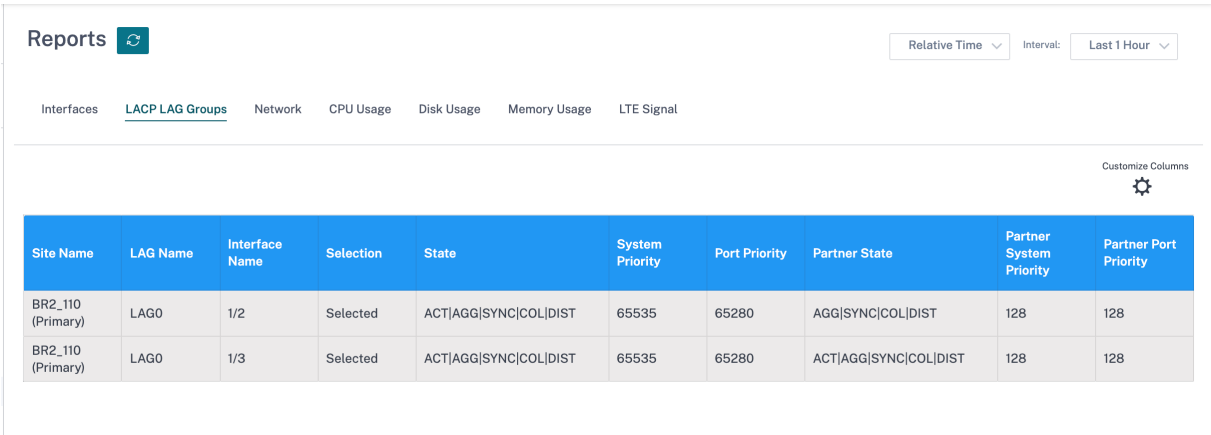
LACP LAG Groups

The **LACP LAG Groups** page shows the details of the interfaces that are configured with LAG and LACP.



Site Name	LAG Name	Interface Name	Selection	State	System Priority	Port Priority	Partner State	Partner System Priority	Partner Port Priority
BR2_110 (Primary)	LAG0	1/2	Selected	ACT|AGG|SYNC|COL|DIST	65535	65280	AGG|SYNC|COL|DIST	128	128
BR2_110 (Primary)	LAG0	1/3	Selected	ACT|AGG|SYNC|COL|DIST	65535	65280	ACT|AGG|SYNC|COL|DIST	128	128

- **Site name**: Name of the site.
- **LAG name**: Name given for LAG.
- **Interface name**: The interface that is configured for LAG.
- **Selection**: The interface selection status.
- **State**: The following flags are displayed to communicate the LACP status between the site that you are using and its connected site:
  - **ACT**: Refers to active. Indicates that LACP is in active mode.
  - **Inactive**: Indicates that LACP is in inactive mode.
  - **TIMEOUT**: Refers to time out. Indicates that the device is requesting a fast (1 s) transmit interval with the site that it is connected with. When the **TIMEOUT** flag is not displayed, it indicates that a slow (30s) transmit interval is requested.
  - **AGG**: Refers to aggregation. Indicates that the port is configured for aggregation (typically always set).
  - **SYNC**: Refers to synchronization. When **SYNC** is displayed, it indicates that the device is ready to use this link in the bundle to carry traffic. When **SYNC** is not displayed, it indicates that the link is not usable or is in standby mode.
  - **COL**: Refers to collection. Indicates that the traffic received on this interface will be processed by the device.
  - **DIST**: Refers to distribution. Indicates that the device is using this link to transmit the traffic.
  - **EXP**: Refers to expired. Indicates that no LACPDUs are received by the device during the past 3 intervals. When **EXP** is not displayed, it indicates that at least one LACPDU has been received within the past three intervals.
  - **DEF**: Refers to default. Indicates that no LACPDUs are received during the past 6 intervals. When **DEF** is not displayed, it indicates that at least one LACPDU is received within the past

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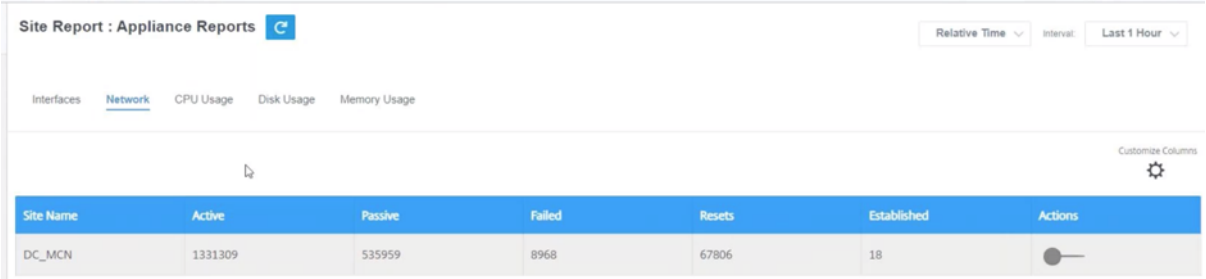
6 intervals. Once the default flag is displayed, any stored information of the connected site is removed.

- **System Priority**: The priority of the LACP system associated with the site.
- **Port Priority**: The priority of the interface configured for LAG.
- **Partner State**: The state of the site the LACP system is connected to.
- **Partner System Priority**: The priority of the LACP system associated with the connected site.
- **Partner Port Priority**: The priority of the interface configured for LAG on the connected site.

Network

The **Network** page shows the number of TCP connections for each configured site.



- **Site Name** –Displays the site name.
- **Active** –Average number of active TCP connection counts for the selected duration.
- **Passive** –Average number of passive TCP connection counts for the selected duration.
- **Failed** –Average number of failed TCP connection counts for the selected duration.
- **Resets** –Average number of reset TCP connection counts for the selected duration.
- **Established** –Average number of established TCP connection counts for the selected duration.
- **Actions** –You can switch on the action button to view the network graph.

CPU usage

The **CPU Usage** page shows the CPU utilization of the SD-WAN device as a percentage. The CPU graph shows the average CPU consumption for the regular intervals over the selected time.

- **Site Name** –Displays the site name.

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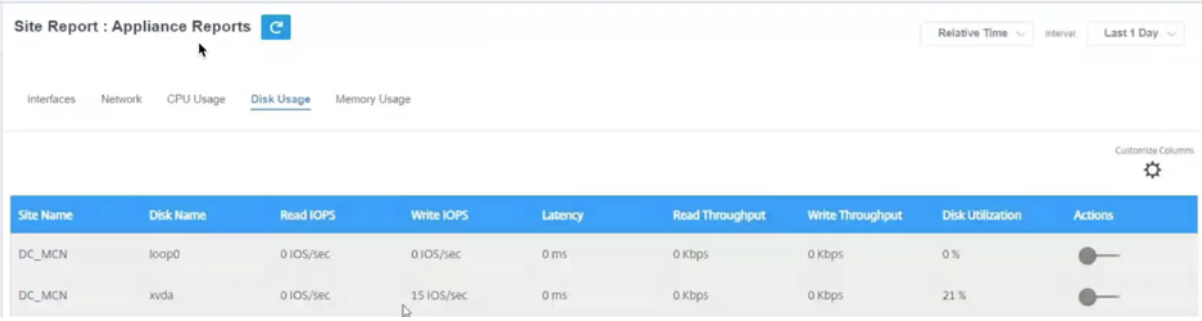
- **System** –Percentage of total time the CPU spent processing system-space programs.
- **Users** –Percentage of total time the CPU spent processing user-space programs.
- **Nice** –Nice is when the CPU is running a user task having below-normal priority.
- **Idle** –Percentage of total time the CPU was in Idle mode.
- **Io Wait** –Percentage of total time the CPU spent waiting for I/O operations.
- **Irq** –The interrupt requests (IRQs) value that the kernel serves.
- **Steal** - When running in a virtualized environment, the hypervisor might steal cycles that are meant for your CPUs and give them to another, for various reasons. This time is known as steal.
- **Actions** –You can switch on the action button to view the network graph.

Disk usage

The **Disk Usage** page shows the amount of hard disk space used by the operating system and data partition in an I/O per second (IOPS) value.



- **Site Name** –Displays the site name.
- **Disk Name** –Displays the hard disk name.
- **Read IOPS** –Displays the average number of read IOPS per second over the selected time frame.
- **Write IOPS** –Displays the average number of write IOPS per second over the selected time frame.
- **Latency** –Displays the latency value of the successful read and write requests from the selected volume workload over the selected time frame. It is recommended that below 10 ms latency value is best for I/O performance.
- **Read Throughput** –Displays the average disk throughput value of the disk read operation over the selected time in Kbps.
- **Write Throughput** –Displays the average disk throughput value of the disk write operation over the selected time in Kbps.
- **Disk Utilization** –Displays the average disk utilization value in percentage over the selected time frame.
- **Actions** –You can switch on the action button to view the network graph.

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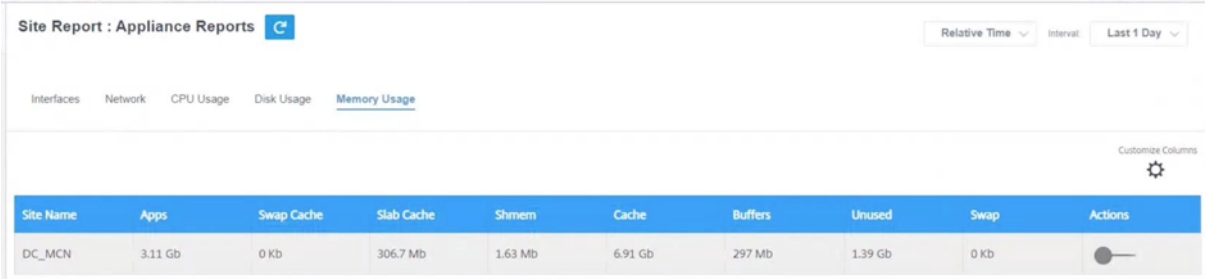
Memory usage

The **Memory Usage** page shows the report of the amount of memory used.



- **Site Name** –Displays the site name.
- **Apps** –Displays the used application value in Gb.
- **Swap Cache** –Displays the swap cache number in Mb. Swap cache is a list of page table entries with one entry per physical page.
- **Slab Cache** –Displays the number of pre-allocated slabs of memory. In Mb
- **Shmem** –Displays the total used shared memory value in Mb.
- **Cache** –Displays the number of cache memories used in Gb.
- **Buffers** –Displays the number of the physical memory that is used by the buffer cache.
- **Unused** –Displays the number of unused memories for cache.
- **Swap** –Displays the number of swap spaces. The swap space is used if you need some space extension for your physical memory.
- **Actions** –You can switch on the action button to view the network graph.

LTE signal

The **LTE Signal** page shows the signal strength of internal and external LTE modems.

Signal strength is measured in decibels (dB) and the values are classified as follows:

- **Excellent**: >-65 dB
- **Good**: -65 dB to -75 dB
- **Fair**: -75 dB to –85 dB
- **Poor**: < -85 dB

> **NOTE**
>
> The **LTE Signal** page is available only for Citrix SD-WAN 110 and 210 appliances.

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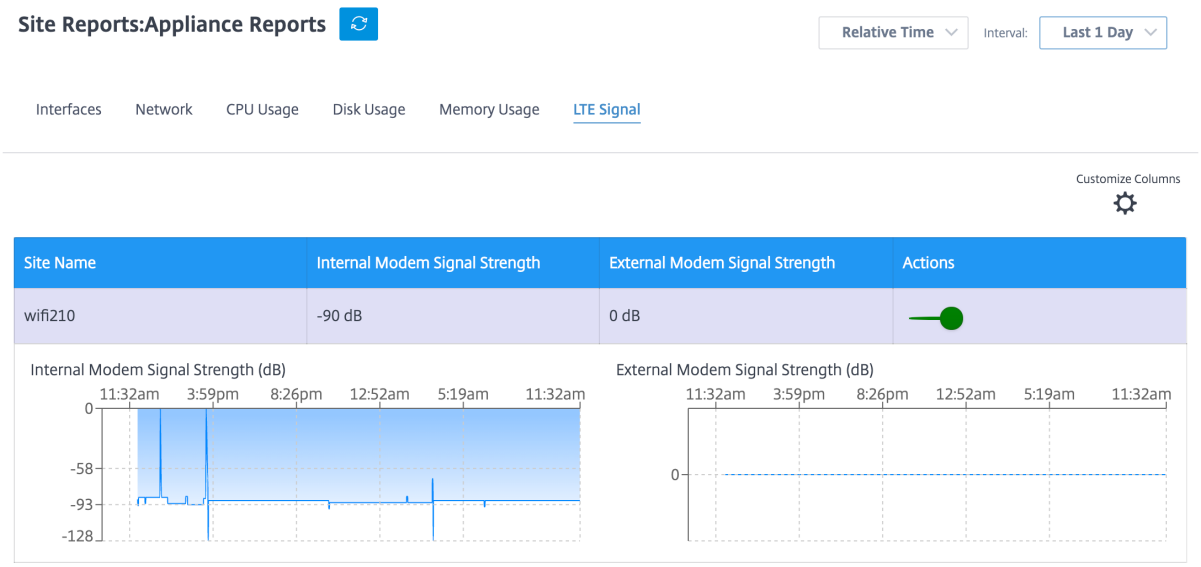
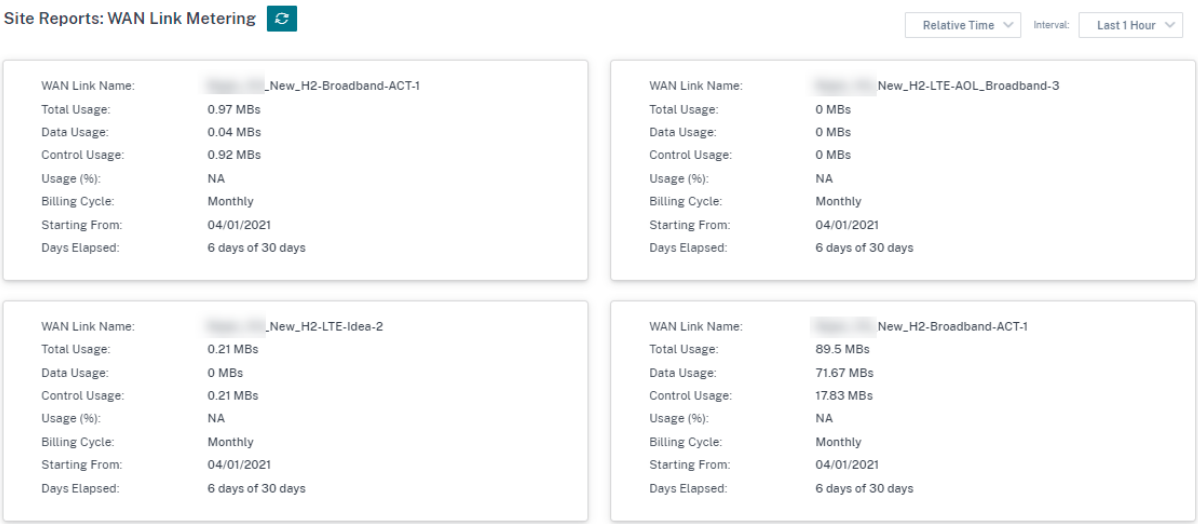


- **Site Name**: Displays the site name.
- **Internal Modem Signal Strength**: Displays the strength of the LTE signal on the internal modem.
- **External Modem Signal Strength**: Displays the strength of the LTE signal on the external modem.
- **Actions**: You can switch on the action button to view the network graph.

WAN Link Metering

WAN link metering reports provide details about the metered WAN link usage. You can view the reports to get insights into the data consumption of the metered WAN links. To view WAN link metering reports, navigate to **Reports** > **WAN Link Metering**.



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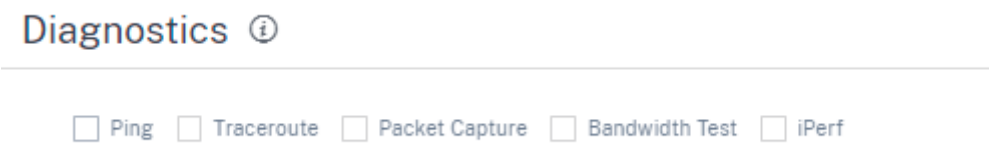
Diagnostics

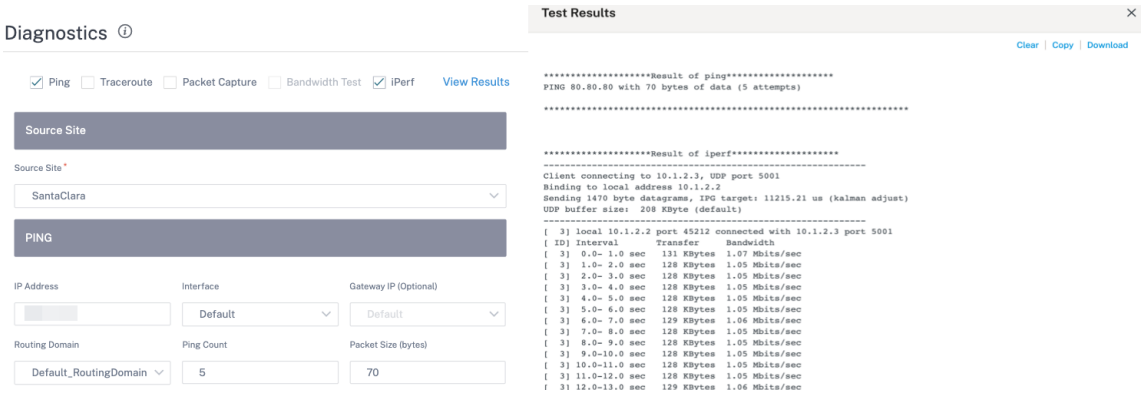
September 27, 2025

You can use Ping, Traceroute, Packet Capture, Bandwidth test, and iPerf diagnostic utilities to test and investigate network connectivity issues on your SD-WAN network. To view the Diagnostics page, navigate to **Troubleshooting** > **Diagnostics**.

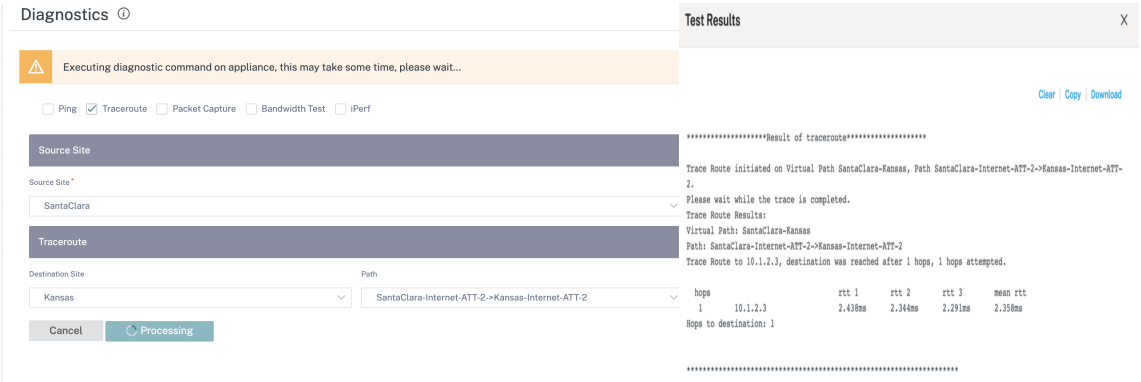
To view the diagnostics results, click **View Results** on the top right corner of the Diagnostics page. You can **Download**, **Copy**, and **Clear** the report results as needed.



- **Ping** –You can check network connectivity by pinging a remote host or a site. Enter the destination details, specify the number of times to send the ping request and the number of data bytes. Provide the destination **IP Address** and click **Run**.



- **Traceroute** - You can trace the route and the number of hops between sites. Select the source and destination site along with the path to trace and click **Run**.



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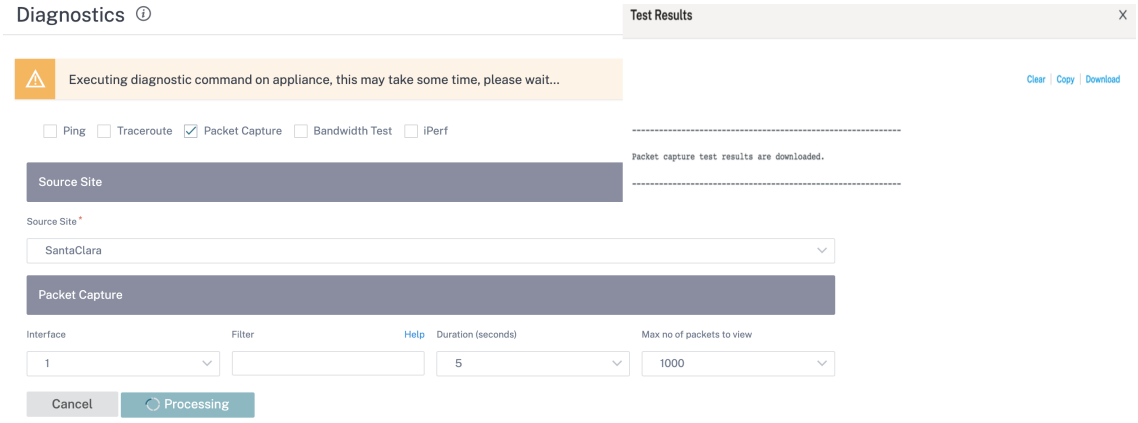
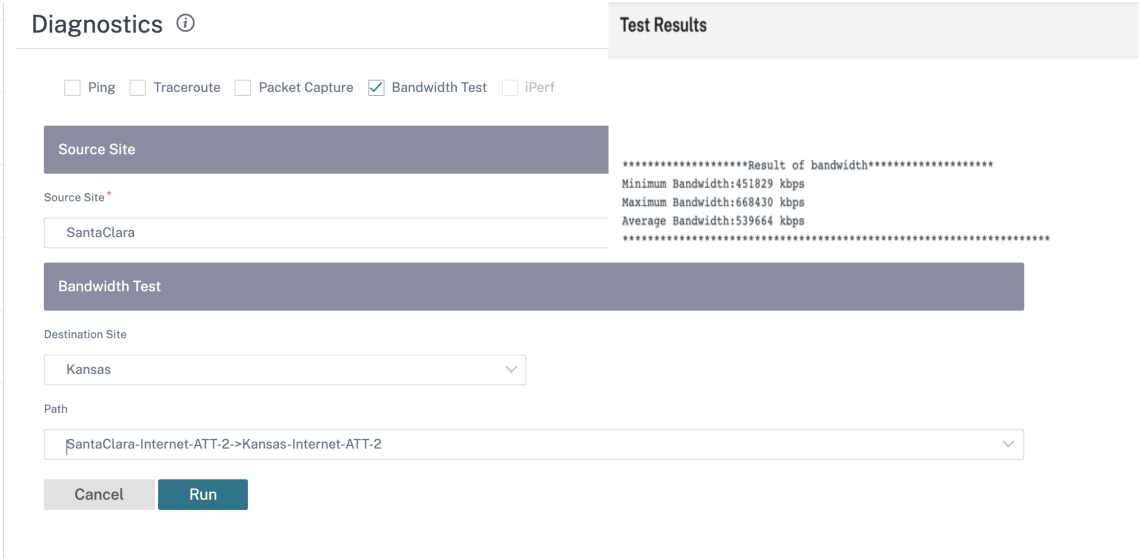
- **Packet Capture** –You can intercept the data packet that is traversing over the selected active interface present in the selected site. You can view the source and destination details.



The **Help** option provides more detail on the **Filter Options**.

- **Bandwidth Test** –You can run a bandwidth test on a specific path of a site to view the maximum, minimum and average bandwidth usage. Enter the source site, destination site, and select the path. Click **Run**.



- **iPerf** –You can run an iPerf test on a specific path of a site. The iPerf diagnostic tool is used to generate test traffic which allows you to troubleshoot network issues that might result in:

  - Frequent change in path state from Good to Bad
  - Poor application performance
  - Higher packet loss

  To run an iPerf diagnostic test, from the customer level, navigate to **Troubleshooting** > **Diagnostics** and select the **iPerf** check box. Enter the transport protocol, time interval, port number, server, bandwidth measurement mode, path to test, server iPerf options, and click **Run**.

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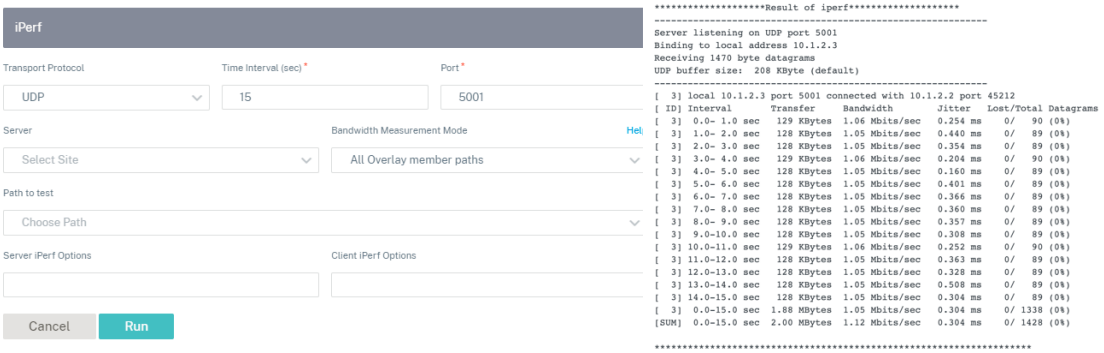

User settings

September 27, 2025

Role-based access control (RBAC) regulates access to Citrix SD-WAN™ Orchestrator service resources based on the roles assigned to individual users. RBAC allows users to access only the data that their role demands and restricts any other data.

A role defines the permissions to view and perform various activities on the Citrix SD-WAN Orchestrator service. Roles can be assigned at Provider and Customer level. Users can be assigned a role from the list of predefined roles or custom roles.

If a customer has Citrix Secure Internet Access™ subscription along with Citrix SD-WAN subscription, then the **Administration > User Setting** is common between Citrix Secure Internet Access and Citrix SD-WAN Orchestrator service. **Provider-Master-Admin-All** or **Customer-Master-Admin** role defined for Citrix SD-WAN can assign Citrix SD-WAN access level role (pre-defined or custom role) for other admin users. Similarly Customer-Master-Admin role defined for Citrix Secure Internet Access service can assign Citrix® SIA level role (pre-defined or custom role) to other admin users.

Add users

New users can be added on Citrix Cloud. Navigate to **Identity and Access Management** > **Administration** tab and select **Citrix Identity** from the **Select an identity provider** drop-down list.

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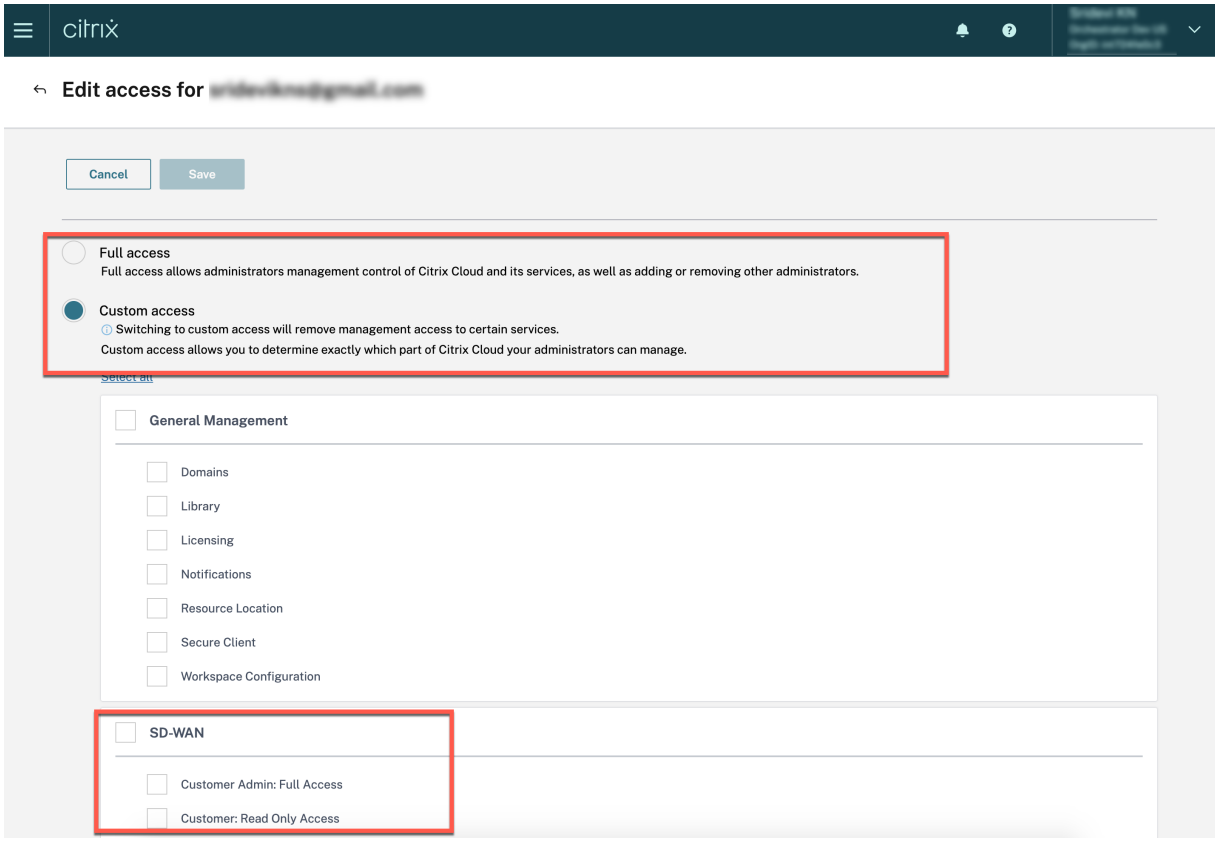

While adding users at the provider level, you can set “Full access”or “Custom access”. Users with “Full access”get **Provider-Master-Admin-All** role on Citrix SD-WAN Orchestrator service. If you choose “Custom access”you are prompted to select the access level again. Users with “Customer Admin: Full Access”get **Provider-Master-Admin-All** role. Users with “Customer: Read Only Access”get **Provider-Master-Admin-ReadOnly-All** role on Citrix SD-WAN Orchestrator service.

While adding users at the customer level, you can set “Full access”or “Custom access”. Users with “Full access”get Customer-Master-Admin role on Citrix SD-WAN Orchestrator service. If you choose “Custom access”you are prompted to select the access level again. Users with “Customer Admin: Full Access”get Customer-Master-Admin role. Users with “Customer: Read Only Access”get Customer-Master-ReadOnly-Admin role.

Provider roles

The following table lists the predefined provider roles.

Provider role	Description
Provider-Master-Admin-All	An administrator who can manage the provider and all of its customer information

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Provider role	Description
Provider-Master-Admin-Tenant	An administrator who can manage the provider and a subset of its customer information
Provider-Master-ReadOnly-All	An administrator who can only view provider and customer information
Provider-Network-Admin	An administrator who can only view and edit the network related information
Provider-Security-Admin	An administrator who can only view and edit the security related information

The **Provider-Master-Admin-All** role can perform the following:

- Assign roles to users in Provider and Customer network
- Manage access to customers for all other admin roles
- Edit or delete assigned roles
- Create custom roles

Customer roles

The following table lists the predefined customer roles.

Customer role	Description
Customer-Master-Admin	A customer administrator who can view and edit customer information
Customer-Master-ReadOnly-Admin	A customer administrator who can only view customer information
Customer-Network-Admin	A customer administrator who can only view and edit network related information
Customer-Security-Admin	A customer administrator who can only view and edit security related information

The **Customer-Master-Admin** role can perform the following:

- Assign customer roles
- Edit or delete assigned roles within the customer network
- Create custom roles

Customers can view the list of provider roles who have access to their network under **Administration > User Settings**. **Customer-Master-Admin** can assign a customer role to an existing provider role.

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Once a customer role is assigned to an existing provider role, the customer role takes precedence and overrides the provider role.

> **Note**
>
> The **Customer Master-Admin** cannot delete or override **Provider-Master-Admin-All**, **Provider-Master-Admin-Tenant**, and **Provider-Master-ReadOnly** roles.

Support roles

For troubleshooting purposes, Providers and Customers can assign support roles and provide Support Team members the ability to view and edit their information.

Support roles have a validity period that is defined while assigning the role. The default validity period is for two weeks from the date the role is assigned. After the validity period expires, the support user loses access to Provider/Customer information. However, the support user details continue to appear under the **Administration > User Settings**. Based on the need, the Provider/Customer administrator can either delete or extend the validity of the support role.

You can assign support roles under **Administration > User Settings**.

Role	Description
Provider-Support-ReadWrite	A support team member who can view and edit the provider information
Provider-Support-ReadOnly	A support team member who can only view the provider information
Customer-Support-ReadWrite	A support team member who can view and edit the customer information
Customer-Support-ReadOnly	A support team member who can only view the customer information

Change user roles

If a user is an administrator for more than one customer or provider, then the user is assigned with multiple roles. In such scenarios, the user can change the role and switch to the desired account for which the user is an administrator.

To change the role, click **Change Role** option at the top right portion of the screen. Select a role, and click **Confirm**.

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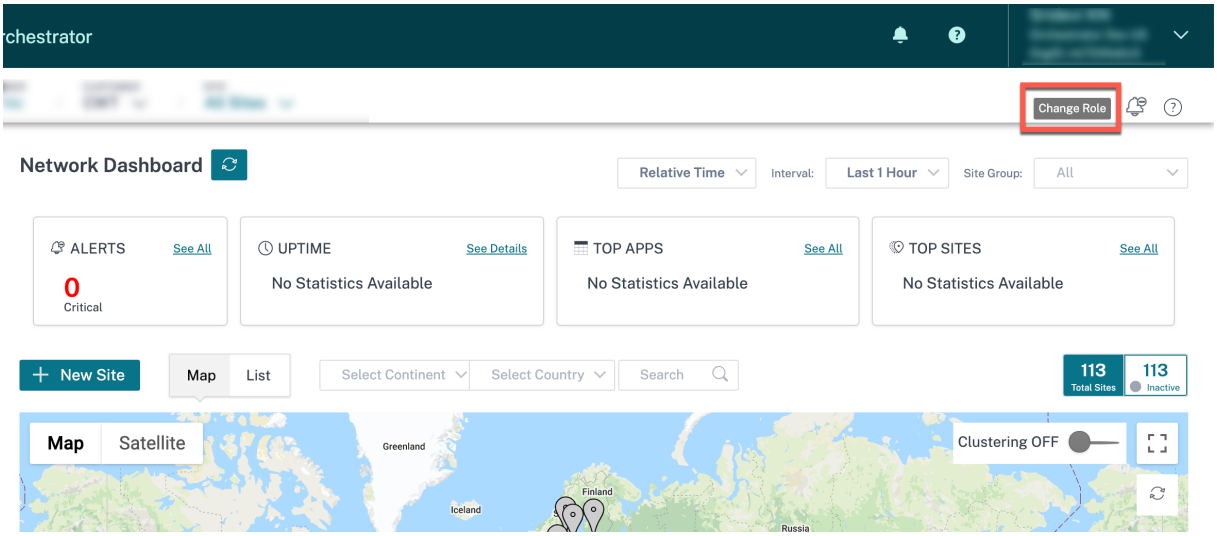

Role settings

September 27, 2025

Citrix SD-WAN Orchestrator™ service allows providers and customers to create custom roles and provide access to specific features. Custom roles help to set up role-based access to manage different aspects of their network.

Only the users with **Provider-Master-Admin-All** or **Customer-Master-Admin-All** role can create custom roles.

Users with the **Provider-Master-Admin-All** role can create and assign custom roles at the customer level. The customer administrators can assign these custom roles created by the provide administrator to its users.

To create a custom role, navigate to **Administration > Role Settings** and click **New Custom Role**.

Provide a name and description for the custom role. If you are a provider administrator, then choose the scope of the custom role.

- **Provider**: The custom role can only be assigned to users at the provider level.
- **Customer**: The custom role is created at the provider level but can only be assigned to users at the customer level.

Choose the access associated with the features and categories.

- **Full Access**: Provides access to view and edit the configuration.
- **Read Only**: Provides access to view the configuration.
- **No Access**: Does not provide access to view or edit the configuration.

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The following is an example where a custom role is created at the provider level:

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New Custom Role

Custom Role Name

test-custom-role-1

Description

test role created

Scope

Provider Customer

SD-WAN Permissions

Feature	Category	Full Access	Read Only	No Access
Advance Delivery Service	CONFIG			●
Appliance	REPORT			●
Appliance	CONFIG			●
Application Quality	REPORT			●
Application Quality	CONFIG			●
Apps	CONFIG			●
Apps	REPORT			●
Azure	CONFIG			●
Base Network	CONFIG			●
Base Network	REPORT			●
Base Security	CONFIG			●
Base Security	REPORT			●
Cloud Direct	REPORT			●
Cloud Direct	CONFIG			●
Customer Admin	CONFIG			●
Customer Admin	REPORT			●
GRE	REPORT			●
HDX	REPORT			●
Licensing	CONFIG			●
MSP Admin	CONFIG			●
MSP Admin	REPORT			●
QoS	CONFIG			●
QoS	REPORT			●
Routing	CONFIG			●
Site	CONFIG			●
MSP-Site	CONFIG			●
Troubleshooting	CONFIG			●
UTM	CONFIG			●
UTM	REPORT			●
WAN Opt	CONFIG			●
Base Customer	CONFIG		●	
Base Msp	CONFIG		●	
GRE	CONFIG			●
AWS	CONFIG			●
Licensing	CONFIG			●
User Settings	CONFIG			●

Save Cancel

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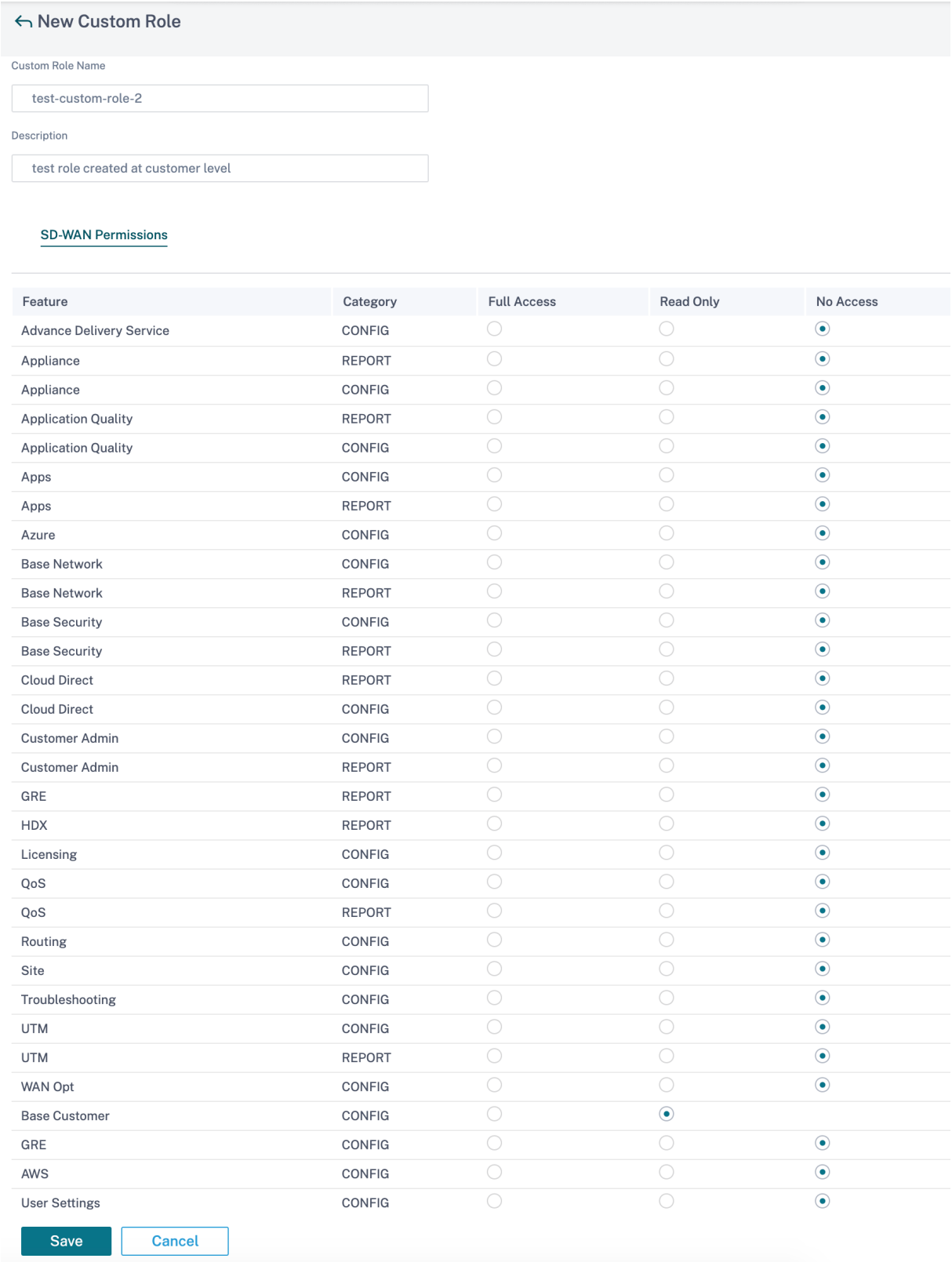
The following is an example where a custom role is created at the customer level:



Feature	Category	Full Access	Read Only	No Access
Advance Delivery Service	CONFIG	○	○	◉
Appliance	REPORT	○	○	◉
Appliance	CONFIG	○	○	◉
Application Quality	REPORT	○	○	◉
Application Quality	CONFIG	○	○	◉
Apps	CONFIG	○	○	◉
Apps	REPORT	○	○	◉
Azure	CONFIG	○	○	◉
Base Network	CONFIG	○	○	◉
Base Network	REPORT	○	○	◉
Base Security	CONFIG	○	○	◉
Base Security	REPORT	○	○	◉
Cloud Direct	REPORT	○	○	◉
Cloud Direct	CONFIG	○	○	◉
Customer Admin	CONFIG	○	○	◉
Customer Admin	REPORT	○	○	◉
GRE	REPORT	○	○	◉
HDX	REPORT	○	○	◉
Licensing	CONFIG	○	○	◉
QoS	CONFIG	○	○	◉
QoS	REPORT	○	○	◉
Routing	CONFIG	○	○	◉
Site	CONFIG	○	○	◉
Troubleshooting	CONFIG	○	○	◉
UTM	CONFIG	○	○	◉
UTM	REPORT	○	○	◉
WAN Opt	CONFIG	○	○	◉
Base Customer	CONFIG	○	◉	
GRE	CONFIG	○	○	◉
AWS	CONFIG	○	○	◉
User Settings	CONFIG	○	○	◉

The features available at the provider, network, and site level are different. The following is the list of

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features, categories, and the corresponding GUI pages available at the provider level:

Feature	Category	GUI Pages
Base Msp	CONFIG	Dashboard, Alerts, Usage, Inventory, Announcements
Site	CONFIG	Site Profile Templates, WAN Link Templates
Troubleshooting	CONFIG	Audit Logs, Device Logs
User Settings	CONFIG	User Settings, Role Settings
Licensing	CONFIG	Licensing, License Usage Insights

The following is the list of features, categories, and the corresponding GUI pages available at the customer level:

Feature	Category	GUI pages
Base Customer	CONFIG	Dashboard, Network Home
Base Network	CONFIG	Delivery Services Internet / Intranet / Virtual Paths, Bandwidth Allocation, Dynamic Virtual Paths, Network Location Service, Intermediate Nodes, Interlink Communication, Link Sensitive profile, DNS Servers, proxy Auto Config
Base Network	REPORT	Usage, WiFi, Quality, Historical Statistics, O365 Metrics, ADM Events
Base Security	CONFIG	IPSec Encryption profiles, Network Security, SSID Profiles, Radius Profiles, Firewall Zones, Firewall Defaults, Firewall Policies, Security Profiles, SSL Inspection, Intrusion Prevention, Virtual Path IPSec, Certificates, Hosted Firewall
Customer Admin	CONFIG	Alerts

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Feature	Category	GUI pages
Customer Admin	REPORT	Inventory
UTM	REPORT	WebFiltering, AntiMalware, Intrusion Prevention, SSL Inspection
HDX	REPORT	HDX Sites, HDX Users, HDX Sessions
QoS	CONFIG	QoS Policies, QoS Profiles
QoS	REPORT	QoS
Appliance	REPORT	Realtime Statistics, Realtime Flows, Realtime Firewall Connections
Cloud Direct	REPORT	Cloud Direct
Application Quality	CONFIG	App Quality profiles, App Quality Config
Application Quality	REPORT	Application Quality
Advance Delivery Service	CONFIG	Zscaler / Secure Internet Access
Routing	CONFIG	Routing Policies, Routing Domains, Import Route Profiles, Export Route Profiles
Site	CONFIG	Regions, Custom Groups, IP Groups, Profiles & Templates
Apps	CONFIG	Custom Apps, App Groups, Application Settings
WAN opt	CONFIG	WAN Optimization features, WAN Optimization Tuning, WAN Optimization Apps, WAN Optimization App Groups, WAN Optimization Rules
Troubleshooting	CONFIG	Audit Logs, Device Logs, Diagnostics
User Settings	CONFIG	User Settings, Role Settings
Licensing	CONFIG	Licensing, License Usage Insights

The following is the list of features, categories, and the corresponding GUI pages available at the site

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level:

Feature	Category	GUI pages
Site	CONFIG	Dashboard, Alerts, Advance Settings Delivery Services, Advance Settings DHCP, Advance Settings DNS Settings, Advance Settings NAT, Advance Settings Dynamic Routing, Advance Settings Multicast Groups, Advance Settings LAG, Advance Settings VRRP, Advance Settings WAN Optimization, Site Configuration, Advance Settings ARP, Advance Settings Prefix Delegation Group
Base Network	CONFIG	Advance Settings NDP, Advance Settings Fallback Configuration
Base Network	REPORT	Usage, Quality, Historical Statistics, O365 Metrics, WAN Link Metering
QoS	REPORT	QoS
Appliance	REPORT	Realtime Statistics, Realtime Flows, Realtime Firewall Connections, Realtime Routing Protocols, Realtime DHCP Server & Relay, Realtime IGMP, Realtime VRRP, Realtime PPPoE, Realtime DNS, Realtime IPSec, Appliance Reports
Cloud Direct	REPORT	Cloud Direct
Appliance	CONFIG	Appliance Settings, WAN Optimization Settings
Troubleshooting	CONFIG	Audit Logs, Device Logs, STS Bundles

Once the custom role is successfully created, you can assign the custom role while creating users. Se-

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lect the newly created custom role from the **Role** drop-down list under **Administration > User Settings**.

IP access list

September 27, 2025

The IP access list page enables administrators to configure a list of enterprise-specific user source IP addresses, to allow IP address-based access to Citrix SD-WAN Orchestrator service. Configuring IP addresses on the **Network Administration: IP Access List** page enhances IP security as administrators can control the tenant access for users based on their IP address. This configuration is supported only for users with role-based access to a tenant.

> **Note**
>
> The IP addresses must be static public IPs to facilitate consistent access. Dynamic addresses cannot be configured on the **IP Access List** page.

To configure an IP address, at the customer level, navigate to **Administration** > **IP Access List**.

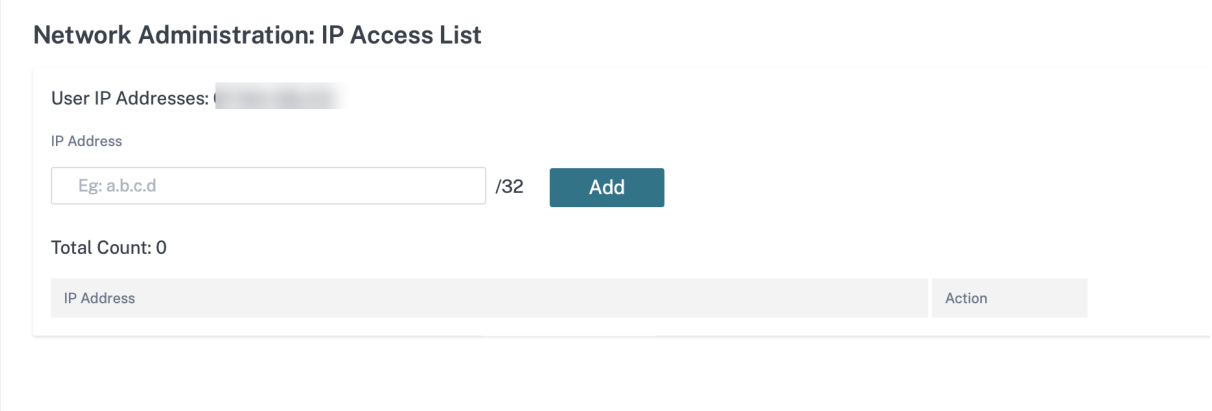
On the **Network Administration: IP Access List** page, click **Add**. You can configure up to 16 IP addresses.

To remove an IP address, navigate to the **Actions** column and click the delete icon.

The **User IP Addresses** section displays the IP addresses of users accessing the Citrix SD-WAN Orchestrator service tenant.

If an administrator configures an IP address of a user who is not a part of a tenant, then the user gets locked out of the tenant where the IP address is configured.

When an administrator attempts to remove their IP address from the Citrix SD-WAN Orchestrator service tenant, then they get locked out of the tenant.



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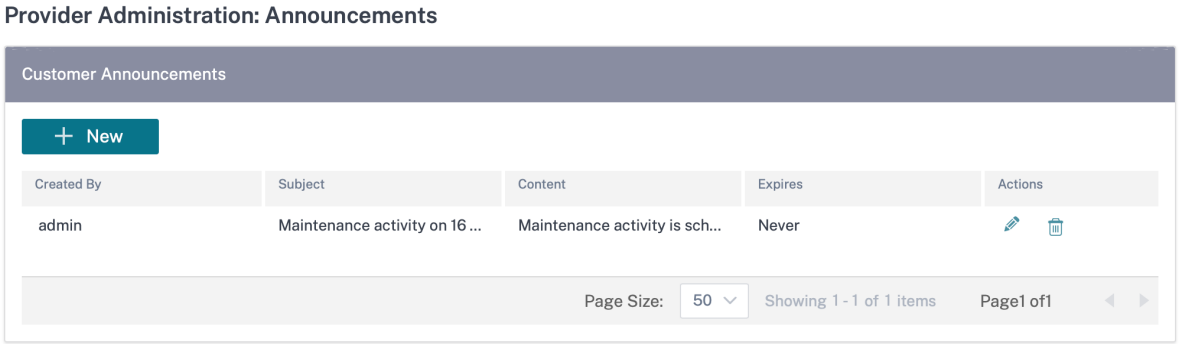
Announcements

September 27, 2025

Providers can use the **Announcements** option to send out announcements or notifications to their customers.

You can create a provider announcement by navigating to **Administration > Announcements** and clicking the **+ New** option.



Provide a subject line and enter content in HTML or plain text format. You can also set the announcement expiration.

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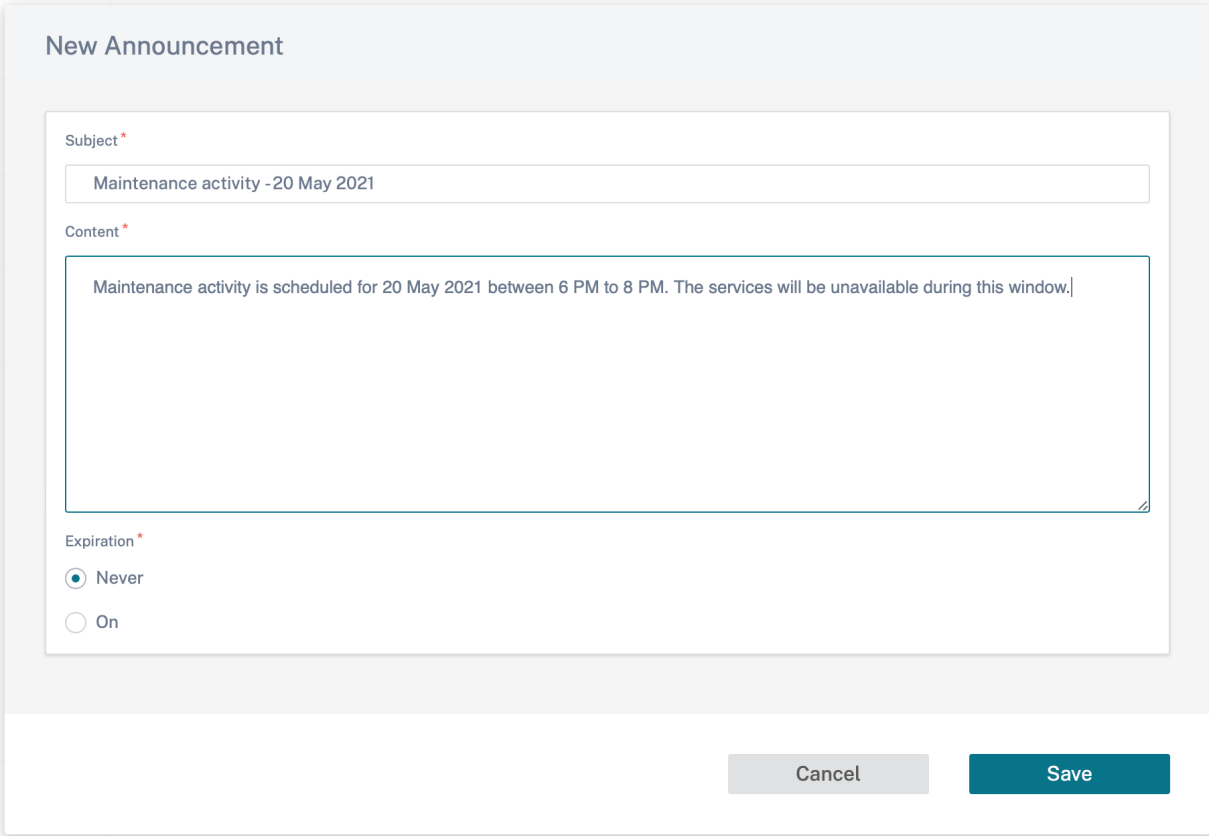
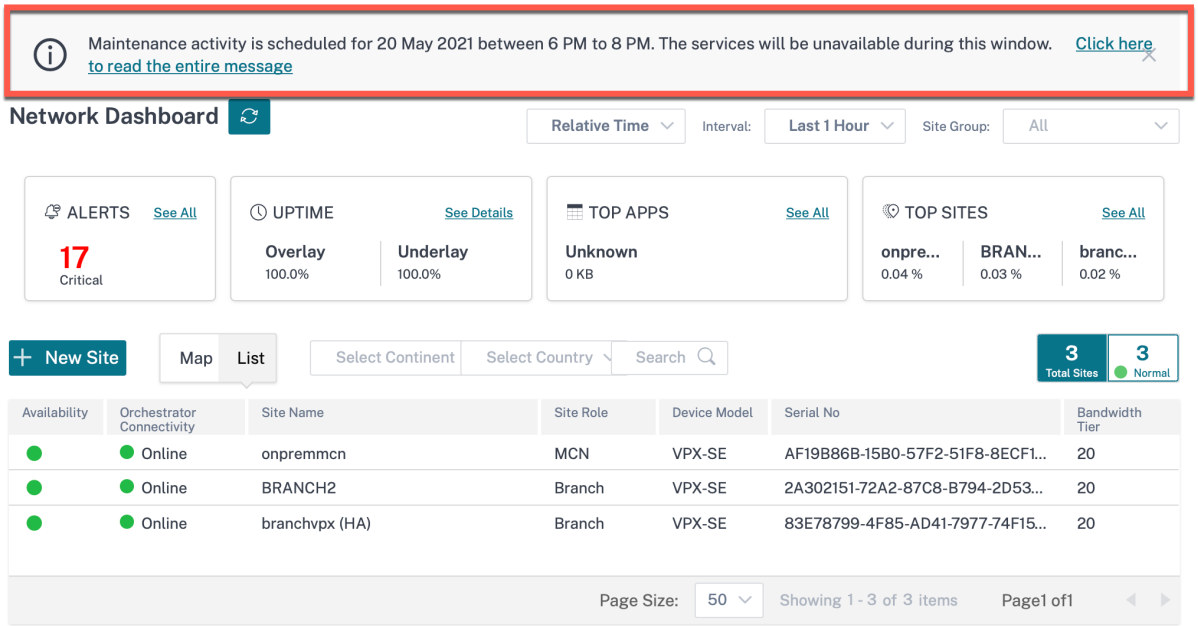


The saved announcements are displayed to all the customers.



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API guide for Citrix SD-WAN Orchestrator™

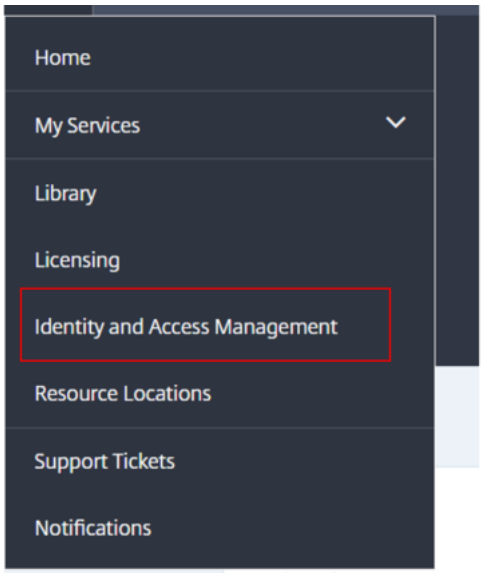
September 27, 2025

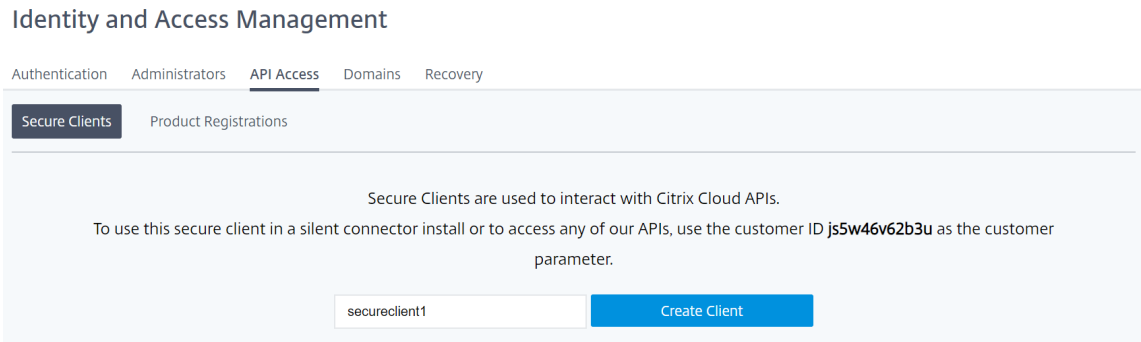
To access the Citrix SD-WAN Orchestrator service API Guide on the Swagger UI, you need to authenticate yourself using an API key.

The following procedure provides instructions on generating an API key and using it for authentication.

1. Log into your Citrix Cloud™ account and navigate to **Identity and Access management** > **API Access**.

   > **Note**
   >
   > If you are a partner running APIs on behalf of your customer, log into the customer's Citrix Cloud account using the **Change Customer** option or obtain the authentication and relevant API parameters from the customer.





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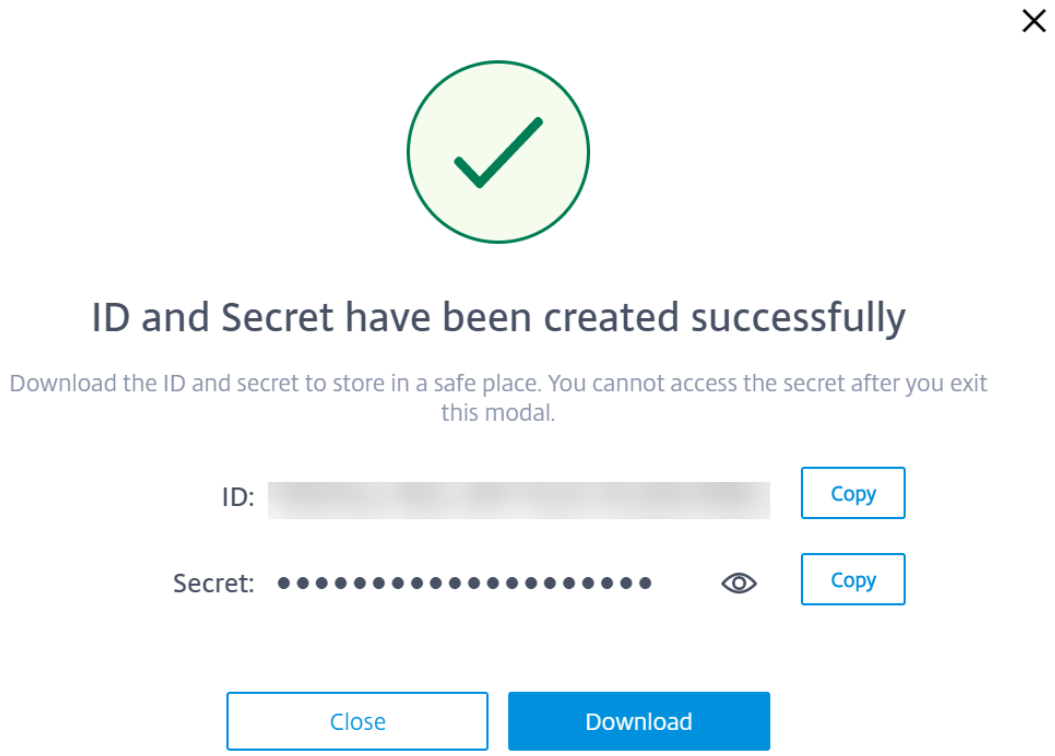
2. Provide a name for your secure client and click **Create Client**. An ID and secret key is generated. Use the ID and secret to authenticate yourself when using APIs to manage your network.

> **Note**
>
> Download the ID and the Secret and store it securely. You cannot access the secret after closing the window.



> **Note**
>
> For security reasons, it is advised to delete the API Key entries from Citrix Cloud when you are done using the APIs.

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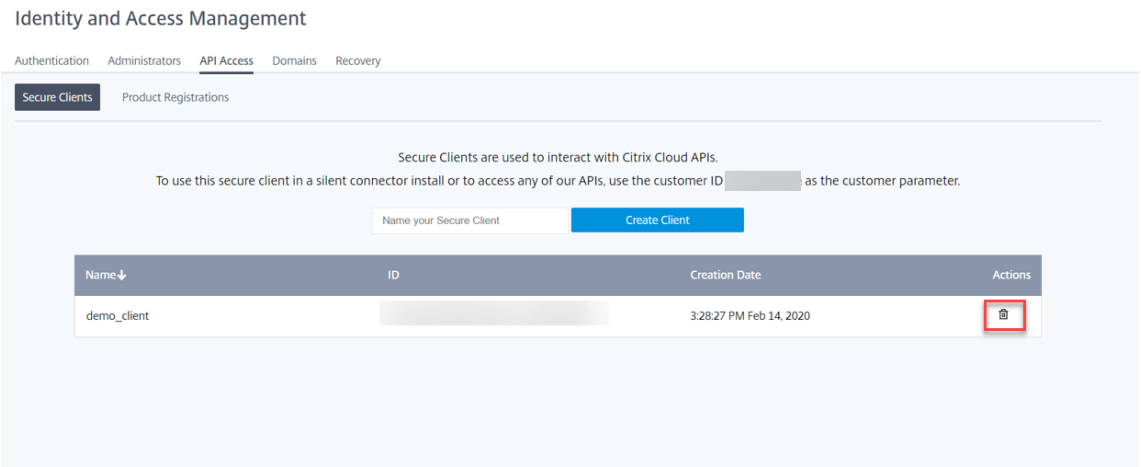
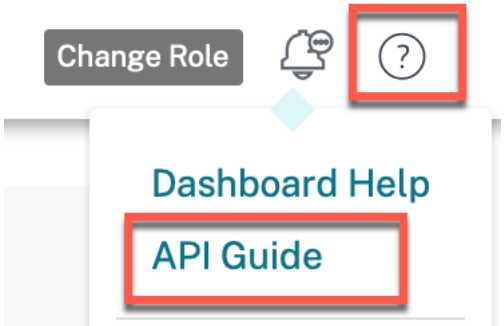
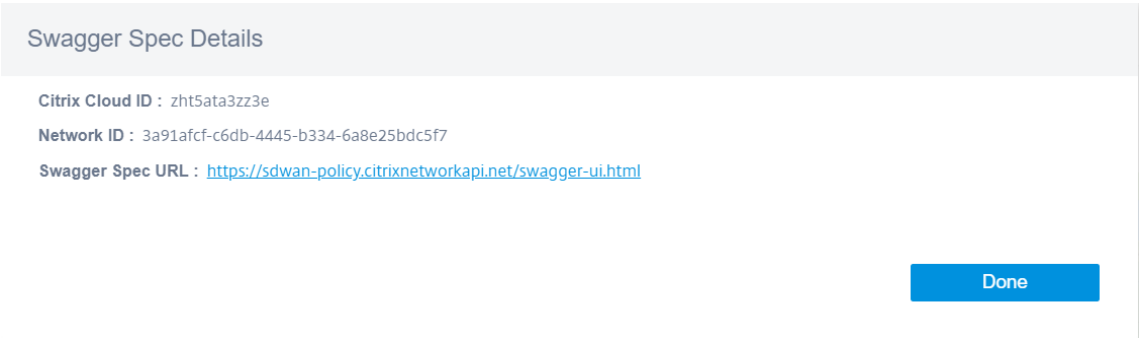


3. Log in to the Citrix SD-WAN Orchestrator service and click **?** at the top-right corner of the UI and then click **API Guide**.



The Swagger spec details are displayed.



4. Click the Swagger spec URL to access the API guide.
5. In the API page, navigate to **auth-controller** > **/{ccId}/api/v1/logon** > **Try it out**.

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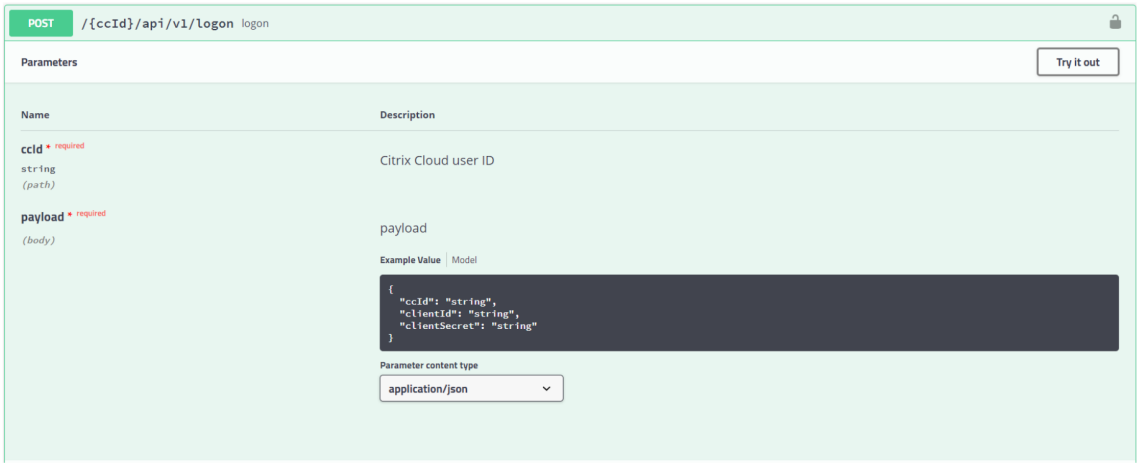
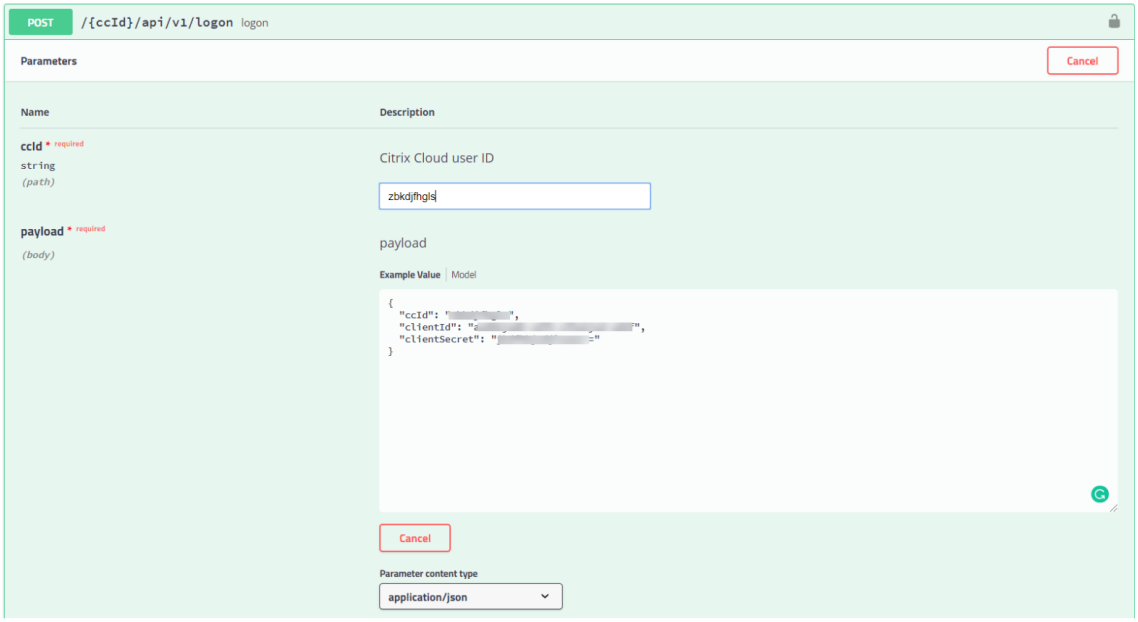
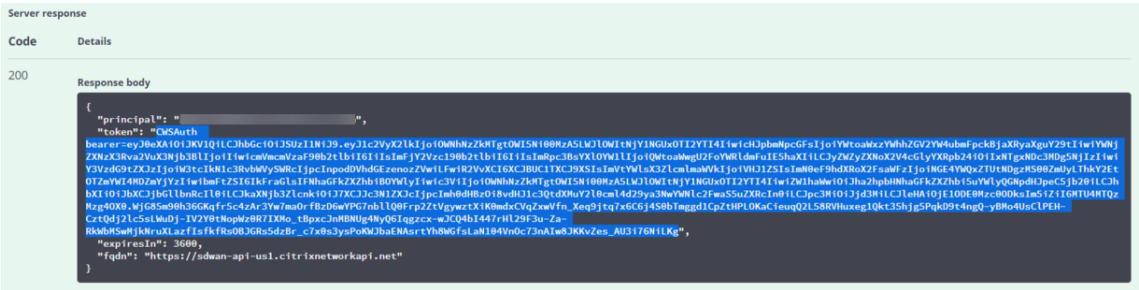


6. From the Citrix SD-WAN Orchestrator service **Swagger Spec Details**, copy the **Citrix Cloud ID** and paste it in the textbox under **Citrix Cloud user ID**.

7. Similarly, copy and paste the Client ID, Client secret and Citrix Cloud ID in the respective payload fields and click **Execute**.



8. Copy the **token** value from the **Server response**.



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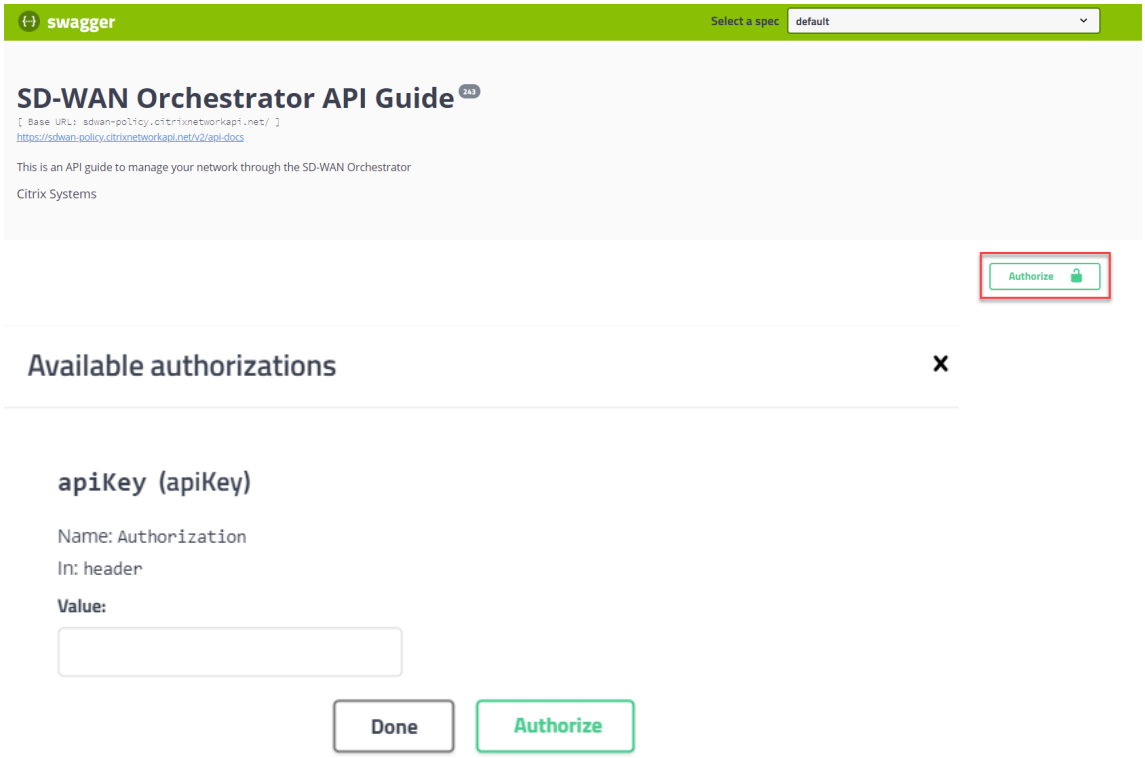
9. Click **Authorize** on the top of the API page and paste the **token** value in the **Value** field. Click **Authorize**.



This completes the authorization process and you must now be able to access and use Citrix SD-WAN Orchestrator service APIs.

Best practices

September 27, 2025

The following topics provide the best practices to be followed when the Citrix SD-WAN™ solution is being designed, planned, and executed on your network.

- Routing
- QoS
- WAN links

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Routing

September 27, 2025

This article outlines routing best practices for the Citrix SD-WAN™ solution.

Internet/Intranet routing service

When the Internet service is not configured to Internet bound traffic and instead, either a **Local** route or a **Passthrough** route is configured to reach the gateway router. The router uses the WAN links configured on the SD-WAN appliance, leading to a link over-subscription issue.

If an Internet route is configured as **Local** at the MCN, it is learned by all the branch SD-WAN sites and configured as **Virtual Path Route** by default. This implies that Internet bound traffic at the branch appliance is routed through the Virtual Path to MCN.

Routing precedence

The order of routing precedence:

- Prefix Match: Longest prefixes match.
- Service: Local, Virtual Path service, Internet, Intranet, Passthrough
- Route Cost

Routing asymmetry

Ensure that there is no routing asymmetry on the network (SD-WAN appliance is transmitting traffic in only one direction). This creates issues with Firewall connection tracking and deep packet inspection.

QoS

September 27, 2025

Consider the following practices when configuring QoS:

- Understand your network traffic patterns and requirement. You might have to observe the **QoS class statistics**, and change queue depths, and/or change the default QoS class share percentage to avoid tail-drops as shown in QoS statistics.

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- Sometimes, the entire subnet is added to a Rule for ease of configuration instead of creating Rules for particular application IP addresses. Adding an entire subnet to a rule incorrectly maps all the traffic in the subnet to one Rule. So, the QoS classes associated with that Rule might lead to tail drop and poor application performance or user experience.

WAN Links

September 27, 2025

Citrix SD-WAN™ platforms support upto 8 public internet connections and 32 Private MPLS connections. This article outlines WAN link configuration best practices for the Citrix SD-WAN solution.

Points to remember while configuring WAN links:

- Configure the **Permitted and Physical** rate as the actual WAN link bandwidth. In cases where the entire WAN link capacity is not supposed to be used by the SD-WAN appliance, change the **Permitted** rate accordingly.
- When you are unsure of the bandwidth and if the links are non-reliable, you can enable the **Auto Learn** feature. The **Auto Learn** feature learns the underlying link capacity only, and uses the same value in the future.
- If the underlying link is not stable and does not guarantee fixed bandwidth (for example; 4G links), use the **Adaptive Bandwidth Detection** feature.
- It is not recommended to enable **Auto Learn** and **Adaptive Bandwidth Detection** on the same WAN link.
- Manually configure the MCN/RCN with the Ingress/Egress physical rate for all the WAN links since it is the central point of bandwidth distribution among multiple branches.
- For increased reliability of important data center workloads/services, when auto-learn is not used, use reliable links with SLAs that does not have random variation of capacity.
- If the underlying link is not stable, change the following Path settings:
    - Loss Settings
    - Disable Instability Sensitive
    - Silence time
- Use **Diagnostic tool** to check the link health/capacity.
- If SD-WAN is deployed in **one-arm** mode, ensure that you do not overrun the physical capacity of the underlying link.

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Verifying ISP link Health

For new deployments, earlier than SD-WAN deployment and when adding new ISP link to the existing SD-WAN deployment:

- Verify the link type. For example; MPLS, ADSL, 4G.
- Network characteristics. For example - bandwidth, loss, latency, and jitter.

This information helps in configuring the SD-WAN network as per your requirements.

Network topology

It is commonly observed that specific network traffic bypasses the Citrix SD-WAN appliances, and uses the same underlying link configured in the SD-WAN network. Because SD-WAN does not have complete visibility over link utilization, there are chances that SD-WAN oversubscribes the link leading to performance and PATH issues.

Provisioning

Points to consider while provisioning SD-WAN:

- By default, all branches and WAN services (Virtual Path/Internet/Intranet) receive an equal share of the bandwidth.
- Provisioning sites must be changed, when there is high disparity in terms of bandwidth requirement or availability between the connecting sites.
- When dynamic virtual paths are enabled between maximum available sites, the WAN link capacity is shared between the static virtual path to DC and the dynamic virtual paths.

FAQs

September 27, 2025

HA near-hitless software upgrade

1. What is the difference between High Availability and Secondary (Geo) appliance?
    - High Availability ensures fault tolerance. Secondary (Geo) appliance enables disaster recovery.

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- High Availability can be configured for the MCN, RCN, and branch appliances. Secondary (Geo) appliance can be configured for MCN and RCNs only.
- High Availability appliances are configured within the same site or geographical location. A branch appliance in a different geographical location is configured as Secondary (Geo) MCN/ RCN appliance.
- High Availability primary and secondary appliance should be the same platform models. The Secondary (Geo) appliance might or might not be the same platform model as the primary MCN/RCN.
- High Availability has higher priority over secondary (Geo). If an appliance (MCN/RCN) is configured with High Availability and Secondary (Geo) appliance, when the appliance fails the secondary high availability appliance becomes active. If both the high availability appliances fail or if the Data Center site crashes, the secondary (Geo) appliance becomes active.
- In High Availability, the primary/secondary switchover happens instantaneously or within 10-12 seconds depending upon the high availability deployment. The primary MCN/RCN to secondary (Geo) MCN/RCN switch over, happens after 15 seconds of the primary being inactive.
- High Availability configuration allows you to configure primary reclaim. You cannot configure primary reclaim for Secondary (Geo) appliance, the primary reclaim happens automatically after the primary appliance is back and the hold timer expires.

2. What are the prerequisites for the HA near-hitless software upgrade?

   The existing customer network must already be running on Citrix SD-WAN 11.1 or higher release which supports the near-hitless upgrade procedure for HA.

3. Is this functionality enabled by default or is there some setting to enable this?

   It is enabled by default.

4. What if there are a few sites with Non-HA deployment?

   The sites with non-HA deployment are activated at the second step of activation. If the entire network does not have HA deployment then the single step upgrade is activated.

5. What if the activation fails either on the Standby or Active appliance?

   The software has a timeout implementation. If the activation on the Standby appliance fails, after the timeout period, activation on the Active appliances is initiated.

6. What is the duration of the timeout period?

   The timeout periods for the following upgrade activations are:

   - Configuration update activation: 5 minutes
   - Near hitless software upgrade for HA Step 1: 20 minutes

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- Near hitless software upgrade for HA Step 2: 20 minutes
- Single step software upgrade activation: 20 minutes

7. What if Active and Standby are in different software versions because of error/issues during upgrade?

   The HA pair continues to work in different software versions. Another Change Management Activation is required to bring the HA pair to the same software version.

8. What if the standby appliance is down when we initiate software upgrade?

   Citrix SD-WAN Orchestrator service cannot complete the first step of near hitless upgrade activation process, which is upgrading the standby appliances and switching the standby appliances to active. It waits for the timeout period to get over and then transitions to the second step. As part of the second step, Citrix SD-WAN Orchestrator service upgrades the active appliances. The standby appliances get upgraded once they come back online.

9. Can we time schedule software Upgrade/Activation?

   This functionality is not available currently.

10. Does this process apply to RCN based deployments?

    Yes.

11. Do we support partial site upgrade?

    Yes. Citrix SD-WAN Orchestrator service supports partial site upgrade from Citrix SD-WAN release 11.2.2 onwards. Even for the partial software upgrade scenarios, HA hitless upgrade is effective.

12. Do we support revert-on error functionality?

    This functionality is not available currently.

13. How are non-SD-WAN components such as LTE Firmware, SVM, and Citrix Hypervisor™ Hotfixes upgraded? Can we have scheduled installation of these non-SD-WAN components?

    This functionality is not available currently.

14. What if there is any configuration change during the software upgrade? Are we going to inform the user/admin that we are not going to apply the HA near-hitless software upgrade?

    Yes. User/Admin is informed that there is a configuration change during current software upgrade activity. The user is given a choice to continue with the normal single step software upgrade procedure, instead of near-hitless upgrade.

2100 Premium (Enterprise) Edition

What does the following message indicate when a 2100 EE appliance is upgraded to release 10.0?

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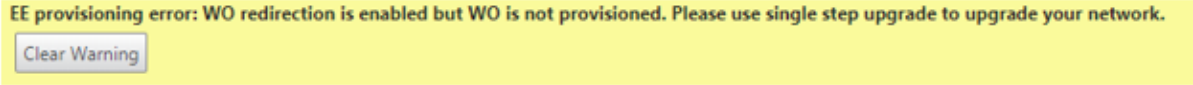

Appliance has EE license or WANOP redirection is enabled from MCN. You can schedule installation of WANOP components to start provisioning WANOP features on this platform.

Related information

- Zero touch deployment over LTE
- Configure the secondary MCN in HA

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