



Citrix SD-WAN Orchestrator for On-premises 13.2.1

Contents

Release Notes for SD-WAN Orchestrator for On-premises 13.2.1 Release	3
Release Notes for SD-WAN Orchestrator for On-premises 13.2 Release	4
Release Notes for SD-WAN Orchestrator for On-premises 12.3 Release	10
Release Notes for SD-WAN Orchestrator for On-premises 11.4.0a Release	14
Release Notes for Citrix SD-WAN Orchestrator for On-premises 11.1 Release	19
Release Notes for Citrix SD-WAN Orchestrator for On-premises 10.3 Release	24
Release Notes for Citrix SD-WAN Orchestrator for On-premises 9.6 Release	29
Release Notes for Citrix SD-WAN Orchestrator for On-premises 1.0 Release	31
System requirements and installation	33
Difference between SD-WAN Orchestrator for On-premises and Citrix SD-WAN Orchestrator service	35
Install and configure SD-WAN Orchestrator for On-premises on ESXi Server	36
Install and configure SD-WAN Orchestrator for On-premises on XenServer	44
Onboarding SD-WAN Orchestrator for On-premises	51
Citrix SD-WAN Orchestrator for On-premises log-in	56
Citrix SD-WAN Orchestrator for On-premises licensing	64
Connectivity with Citrix SD-WAN appliances	68
Provider level configuration	81
Network home	87
Configuration difference	94
Deployment	97
Service definitions	114
Routing	128

Inter-link communication	145
Security	147
Site and IP Groups	164
Application settings and groups	174
Profiles and Templates	191
Network location service	197
ECMP load balancing	199
Application rules	203
HDX QoE	209
IP rules	224
QoS policies	231
Site configuration	235
LTE firmware upgrade	272
Address resolution protocol	275
Neighbor discovery protocol	276
Virtual paths	278
Dynamic routing	283
Network address translation	295
Dynamic host configuration protocol	304
Multicast routing	308
Virtual router redundancy protocol	312
Domain Name System settings	316
Prefix delegation groups	319
Link aggregation groups	320

Appliance settings	325
In-band management	349
Provider dashboard	357
Customer/Network dashboard	358
Site dashboard	363
Provider Troubleshooting	367
Network Troubleshooting	368
Site troubleshooting	371
Provider reports	374
Customer/Network reports	379
Site reports	402
Diagnostics	429
Announcements	432
User administration	434
Domain name	441
HTTPS certificate	442
Disk space management	444
Replace an affected Citrix SD-WAN appliance	448
API guide for Citrix SD-WAN Orchestrator for On-premises	452
Orchestrator administration	454
Orchestrator diagnostics	483
Alarms	486

Release Notes for SD-WAN Orchestrator for On-premises 13.2.1 Release

March 14, 2022

This release notes document describes the enhancements and changes, fixed and known issues that exist for the Citrix SD-WAN Orchestrator for On-premises release Build 13.2.1.

Notes

This release notes document does not include security related fixes. For a list of security related fixes and advisories, see the Citrix security bulletin.

Fixed Issues

The issues that are addressed in Build 13.2.1.

Platform and systems

Citrix SD-WAN Orchestrator for On-premises sends TCP synchronization packets to the AWS endpoint.

[SDW-23477]

Known Issues

The issues that exist in release 13.2.1.

Miscellaneous

Some sites are unable to connect to the Citrix SD-WAN Orchestrator for On-premises UI.

Workaround: Use a different subnet other than the 172.17.x.x subnet.

[SDWANHELP-2601]

In some scenarios, after deploying Cloud Direct for the sites and pushing the configurations (Staging and activation), the Cloud Direct service does not come up.

Workaround: Enable Cloud Direct service manually for each site.

[SDW-22493]

The software version previously selected on the **Deployment > Settings > Partial Site Upgrade > Software Version** page of the UI is not being retained when the users come back to this page.

Workaround: Select the partial site upgrade software version manually for each site by navigating to **Deployment > Select Sites**.

[SDW-22374]

Sometimes, the UI displays an error after a configuration of management interface settings is performed. However, the configuration is successful and a refresh is required for the updated settings to appear on the UI.

[SDW-22139]

In a provider managed setup, the announcements added by the provider administrators are not getting displayed to customers at their login.

[SDW-18491]

Platform and systems

The UI 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]

On the Citrix SD-WAN 210 appliance, if you remove the SE add-on license, the services get disabled.

Workaround: Before removing an SE add-on license (or) moving from an AE to an 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]

Release Notes for SD-WAN Orchestrator for On-premises 13.2 Release

February 10, 2022

This release notes document describes the enhancements and changes, fixed and known issues that exist for the Citrix SD-WAN Orchestrator for On-premises release Build 13.2.

Notes

This release notes document does not include security related fixes. For a list of security related fixes and advisories, see the Citrix security bulletin.

What's New

The enhancements and changes that are available in Build 13.2.

Configuration and Management

Restore previous version

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

[SDW-22042]

Licensing Enhancements

After the licenses are retrieved and upgraded to production, the **Upgrade to Production** button label changes to **Upgraded to production** indicating that the license upgrade is already done.

[SDW-20674]

API - Site address resolution:

When a site is created using an API, the site address is automatically obtained using the latitude and longitude values, passed as part of site creation, using Google Maps API.

[SDW-20654]

Network menu restructure

The Citrix SD-WAN Orchestrator for On-premises Global Configuration menu has been restructured to aid better categorization and discoverability of the key functions of Citrix SD-WAN. Also, each delivery service is now available in both the delivery channels and in every key function page to cater admin configuration from global or per function context. For example, an admin can configure Citrix SIA service globally under a delivery channel on Day 0 and can also perform Day N functions under Security under Cloud Security Services to make any changes.

The configuration pages at the network level are enhanced as follows:

- **Network Config Home** is renamed to **Network Home**.
- **Delivery Services** under **Configuration > Delivery Channels** is now renamed to **Service Definitions**.
- Under **Configuration > Security**, the **Network Encryption** page is renamed to **Network Security**.
- The pages under **Configuration > Security** are logically grouped as follows for easy discoverability:

Group	Menu options
SD-WAN Overlay Security	Network Security
	Virtual Path IPsec
Base Firewall	Firewall Zone
	Firewall Defaults
	Firewall Policies
IPsec & GRE	Certificates
	IPsec Encryption Profiles
	IPsec Service
	GRE Service
Wi-Fi Security	RADIUS Profiles
	SSID Profiles

- You can configure the following services either from **Configuration > Delivery Channels > Service Definition** or from **Configuration > Security**:
 - IPsec
 - GRE
- The **ECMP Groups** page is moved under **Configuration > Routing**.
- You can configure **BGP, OSPF, Multicast Groups, and VRRP** at the network level under **Configuration > Routing**. You can select a site and click **Go**. It takes you to the specific configuration page at the site level. Previously, these configurations were available only at the site level.
- You can configure the Cloud Direct service either from **Configuration > Delivery Channels > Service Definition** or from **Configuration > Routing > SaaS & Cloud On Ramp**
- The **Application and DNS settings** page is renamed to **App Settings and Groups**.
- DPI related settings which were earlier under **Configuration > App & DNS Settings > Application Settings** is moved under **Configuration > App Settings & Groups > DPI Settings**.
- **Network Location Service** page which was under **Configuration > Delivery Services** is placed directly under **Configuration**.

[SDW-14698]

[Rollback on error](#)

During network deployment (activation), sites that fail to connect to Citrix SD-WAN Orchestrator for

On-premises are rolled back to the previous version to try and restore the connectivity. Rollback in such sites is initiated post being offline for a certain specified time (currently 30 mins).

If any one of the sites in the network is trying to rollback, then a pop-up box appears with two options to either Rollback the entire network or ignore those sites and end the deployment.

The Rollback on Error feature must be enabled before initiating a network deployment.

[SDW-11153]

Miscellaneous

IP Rules

The Override Service option is added under the **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]

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 view the configurations both at the global and site levels.

[SDW-4563]

Appliance settings

Citrix SD-WAN Orchestrator for On-premises 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]

Platform and systems

Certificate authentication

Citrix SD-WAN Orchestrator for On-premises supports appliance authentication for static and dynamic virtual paths using Public Key Infrastructure (PKI) as an extra 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]

Provider audit log and Network audit log enhancements

The **Provider Audit logs** and **Network Audit logs** pages are enhanced with the following options:

- **Source IP** - This field displays the IP address of the endpoint from which an SD-WAN feature is configured. This field is displayed on the **Audit logs** page and the **Audit Info** page.
- **Export as CSV** - This option enables you to export the audit logs to a CSV format.
- **What changed** - This section displays the logs of all the changes made to the features through the UI. Enable the **Log Payloads** toggle button to view this section on the **Audit Info** page. Currently, this section is available on the Network Audit Info page.

[SDW-19219]

Custom Ports, Protocol Configuration for Domain Name Based Applications

The Domain name-based applications now support configurable ports and protocol in Citrix SD-WAN Orchestrator for On-premises. When you select the **Configure Port** check box, you can edit, add, or delete any port or the port range as required. Also, you can change/select the protocol as TCP, UDP, or Any. Previously (and with the configure port check box disabled), only ports 80 and 443, and protocol **Any** were supported for domains grouped under an application.

[NSSDW-29930]

Fixed Issues

The issues that are addressed in Build 13.2.

Miscellaneous

The Citrix SD-WAN Orchestrator for On-premises UI is inaccessible. This issue occurs when services running in {page.productname}} fail to respond to heartbeat requests and the restart limit has exceeded.

[SDWANHELP-2544]

Upload of the software upgrade package fails on Citrix SD-WAN Orchestrator for On-premises. This issue occurs when a user moves away from the upload page when the upload of the software package is in progress.

[SDWANHELP-2495]

Platform and systems

An SD-WAN appliance running a software version of 11.4.1 goes into Grace mode when licenses are assigned to the appliance from Citrix SD-WAN Orchestrator for On-premises.

[SDW-23171]

Known Issues

The issues that exist in release 13.2.

Configuration and Management

On a newly imported Citrix SD-WAN Orchestrator for On-premises instance, staging gets stuck in the **Preparing package** state. This issue occurs when the staging process is initiated shortly after creating a new virtual machine.

Workaround: Retry the staging process.

[SDW-20863]

Miscellaneous

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 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 for On-premises.

Workaround: Reboot the SD-WAN appliance.

[SDW-23322]

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.

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

[SDW-23227]

In some scenarios, after deploying Cloud Direct for the sites and pushing the configurations (Stage and activate), the Cloud Direct service does not come up.

Workaround: Enable Cloud Direct service manually for each site.

[SDW-22493]

The software version previously selected on the **Deployment > Settings > Partial Site Upgrade > Software Version** page of the UI is not being retained when the users come back to this page.

Workaround: Select the partial site upgrade software version manually for each site by clicking navigating to **Deployment > Select Sites**.

[SDW-22374]

Sometimes, the UI displays an error after a configuration of management interface settings is performed. However, the configuration is successful and a refresh is required for the updated settings to appear on the UI.

[SDW-22139]

In a provider managed setup, the announcements added by the provider administrators are not getting displayed to customers at their login.

[SDW-18491]

Platform and systems

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

[SDW-23134]

Release Notes for SD-WAN Orchestrator for On-premises 12.3 Release

October 18, 2021

This release notes document describes the enhancements and changes, fixed and known issues that exist for the Citrix SD-WAN Orchestrator for On-premises release Build 12.3.

Note

This release notes document does not include security related fixes. For a list of security related fixes and advisories, see the Citrix security bulletin.

What's New

The enhancements and changes that are available in Build 12.3.

Miscellaneous

Purge settings

Citrix SD-WAN Orchestrator for On-premises enables you to clear historical data older than the purge statistics interval days (30 days by default). When the data is cleared, the historical data older than the selected number of days is removed and is no longer available. The purging process happens sometime around 12:48 AM daily based on the time zone set on your SD-WAN appliance.

[SDW-20402]

Zero-touch Deployment Interface

You can enable a Zero Touch Deployment (ZTD) interface on Citrix SD-WAN Orchestrator for On-premises. The ZTD Interface that is secured by two-way authentication provides a secure communication interface for SD-WAN appliances and Citrix SD-WAN Orchestrator for On-premises.

[SDW-19152]

Virtual path settings for the link

You can customize bandwidths for virtual paths and dynamic virtual paths associated with a WAN link. This feature is useful when some sites display performance degradation signs due to bandwidth issues.

[SDW-9760]

SD-WAN Orchestrator

Syslog server settings

Citrix SD-WAN Orchestrator for On-premises supports the configuration of Syslog server settings for SD-WAN appliances. By enabling Syslog settings, you can send system alerts and event details of the SD-WAN appliances to an external syslog server.

[SDW-13990]

Fixed Issues

The issues that are addressed in Build 12.3.

Miscellaneous

Under certain conditions, the SD-WAN appliance fails to communicate with Citrix SD-WAN Orchestrator for On-premises over In-band management when In-band management is enabled and the Out-of-band management is plugged in.

[SDWANHELP-2368]

The UI incorrectly displays an error when the dynamic virtual paths value is set to more than 8, although the maximum allowed limit is 32. This issue is observed on VPXL and 4100 SE appliances.

[SDWANHELP-2354]

The **Software Version** drop-down list under Partial Site Upgrade settings shows all the supported software versions instead of showing only those versions that are published under **Infrastructure > Orchestrator Administration > Software Images > Appliance**.

If a software version listed in Partial Site Upgrade is not available for publish under **Infrastructure > Orchestrator Administration > Software Images > Appliance**, then Partial Site Upgrade cannot be performed for that release.

[SDW-20992]

Known Issues

The issues that exist in release 12.3.

Configuration and Management

On a newly imported Citrix SD-WAN Orchestrator for On-premises instance, staging gets stuck in the **Preparing package** state. This issue occurs when the staging process is initiated shortly after creating a new virtual machine.

Workaround: Retry the staging process.

[SDW-20863]

Miscellaneous

Citrix SD-WAN Orchestrator for On-premises running VMware ESXi 13 fails to reboot and goes into a bad state.

Workaround: Use VMware ESXi version 9.

[SDWANHELP-2182]

In some scenarios, after deploying Cloud Direct for the sites and pushing the configurations (Stage and activate), the Cloud Direct service does not come up.

Workaround: Enable Cloud Direct service manually for each site.

[SDW-22493]

The Staging process fails intermittently when users perform a partial site upgrade. The UI displays the error message **Staging failure due to exception**.

Workaround: Retry the staging process.

[SDW-22398]

The software version previously selected on the **Deployment > Settings > Partial Site Upgrade > Software Version** page of the UI is not being retained when the users come back to this page.

Workaround: Select the partial site upgrade software version manually for each site by clicking navigating to **Deployment > Select Sites**.

[SDW-22374]

Sometimes, the UI displays an error after a configuration of management interface settings is performed. However, the configuration is successful and a refresh is required for the updated settings to appear on the UI.

[SDW-22139]

Users are unable to delete the Citrix SD-WAN Orchestrator for On-premises **tar.gz** image file uploaded on the **Infrastructure > Orchestrator Administration > Software Images** page of the UI. The error message displayed is **Error occurred while deleting the software package**.

Workaround: Upload a new software package. The previously uploaded file gets automatically deleted.

[SDW-22137]

On the **Configuration > Network Config Home** page of the UI, the Orchestrator connectivity status for a secondary SD-WAN appliance appears online immediately after the configuration file is uploaded. However, the correct status is displayed after the configuration is saved for the site.

[SDW-20913]

In a provider managed setup, the announcements added by the provider administrators are not getting displayed to customers at their login.

[SDW-18491]

When the database backup of an appliance is restored on another appliance having the same release of Citrix SD-WAN Orchestrator for On-premises, the user details are not restored. On the restored appliance, if you create a user with the same user name as in the backed-up database, the following error is displayed:

User has a role already assigned.

Workaround: Create a user with a different user name that did not exist on the backed-up database.

[SDW-15984]

Platform and systems

In the Citrix SD-WAN 210 appliance, if you remove the add-on license, the services get disabled.

Workaround: Remove the firewall policy having security profile, stage, and activate the changes to convert the appliance to standard edition.

[SDW-18031]

Release Notes for SD-WAN Orchestrator for On-premises 11.4.0a Release

September 2, 2021

This release notes document describes the enhancements and changes, fixed and known issues that exist for the Citrix SD-WAN Orchestrator for On-premises release Build 11.4.0a.

Notes

- Citrix SD-WAN Orchestrator for On-premises 11.4.0a addresses the issue described in SDWANHELP-2317 and replaces release 11.4.
- This release notes document does not include security related fixes. For a list of security related fixes and advisories, see the Citrix security bulletin.

What's New

The enhancements and changes that are available in Build 11.4.0a.

Configuration and Management

HTTP Proxy

You can configure HTTP proxy settings on Citrix SD-WAN Orchestrator for On-premises. This feature centralizes the management of all the outgoing requests made to Citrix Cloud. The administrators can route the outgoing requests from Citrix SD-WAN Orchestrator for On-premises to Citrix Cloud through an HTTP proxy server.

[SDW-20247]

Cloud Direct service

Citrix SD-WAN Orchestrator for On-premises supports Cloud Direct service.

Cloud Direct service delivers SD-WAN functionalities as a cloud service through reliable and secure delivery for all internet-bound traffic regardless of the host environment (data center, cloud, and Internet).

Cloud Direct service improves network visibility and management. It enables partners to offer managed SD-WAN services for business critical SaaS applications to their end customers.

[SDW-16396]

Storage management - General Availability

The Storage management feature now supports General Availability.

Citrix SD-WAN Orchestrator for On-premises supports migrating the configuration and data from one disk to another. You can perform disk migration either to increase the disk space or for disaster recovery.

- **Add a new disk:** You can add a new disk with a storage size at least twice as that of the current data consumed by Citrix SD-WAN Orchestrator for On-premises.
- **Disaster recovery:** In the event of a disaster, you can attach the disk containing the Citrix SD-WAN Orchestrator for On-premises configuration and data to a new instance of Citrix SD-WAN Orchestrator for On-premises virtual machine.

[SDW-21316]

[Cloud brokered zero-touch deployment - General Availability](#)

The Cloud brokered zero-touch deployment feature now supports General Availability.

Cloud brokered zero-touch deployment is an automated process that involves Citrix SD-WAN Orchestrator for On-premises as a broker to establish connectivity between Citrix SD-WAN Orchestrator for On-premises and the Citrix SD-WAN appliances.

[SDW-21312]

[Citrix SD-WAN 11.4.1 release](#)

Citrix SD-WAN 11.4.1 release is supported on Citrix SD-WAN Orchestrator for On-premises 11.4.

[SDW-21082]

Platform and systems

[ICMP probing](#)

Citrix SD-WAN Orchestrator for On-premises supports ICMP probing. It enables administrators to determine the Internet reachability to/from the SD-WAN appliance and the destination host. The following ICMP services are introduced in the UI:

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

[SDW-19292]

[Override global transit node settings](#)

You can now override the global transit node settings and choose to enable or disable spoke to spoke forwarding and route export only on selected control transit nodes.

[SDW-19276]

Member path statistics API (Preview):

Member path statistics API is modified to allow the API client to specify the fields of interest. The specified fields are returned in the response payload.

[SDW-18903]

Site Reports: VRRP

The VRRP report provides a real-time report of the configured VRRP groups.

[SDW-12082]

Site Reports: IGMP

The IGMP reports table provides a real-time report of the IGMP statistics and IGMP Proxy groups.

[SDW-12077]

Site Reports: IPsec

The IPsec reports provide the real-time report of the IPsec tunnel configurations on your network.

[SDW-12076]

Site Reports: Routing Protocols

The **Routing Protocols** report provides the details of the parameters associated with the routing protocols. You can choose the protocol from **View** drop-down list a routing domain from **Routing Domain** drop-down list as needed. To view the current data, click **Retrieve Latest Data**.

[SDW-12075]

Provider audit logs, Network audit logs

The provider level and network level audit log pages have been enhanced with the following capabilities:

- **Search:** Ability to search for an audit activity based on a keyword.
- **Filtering:** Run an audit log search by filtering based on user, feature, and time range. For network level logs, you can also filter by the site.
- **Audit Info:** Select the info 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. You see an error message when the API request fails.
 - **Payload message:** Body of the request message sent through API.
 - **URL:** HTTP URL of the revoked API.
 - **Log payloads:** By default, this option is disabled. When enabled, the request body of the API message is displayed in the **Audit Info** section.

[SDW-18937]

Site selection component

Usability of the site selection component in the following configurations is improved for its usability:

1. [Partial site upgrade](#)
2. [Network location service](#)
3. [Routing policies](#)
4. [QoS Policies](#)
5. [Import route filters](#)
6. [Export route filters](#)
7. [Proxy Auto Config](#)
8. [Intrusion prevention](#)
9. [Firewall policies](#)
10. [Application settings](#)

[SDW-16895]

Fixed Issues

The issues that are addressed in Build 11.4.

Miscellaneous

Cloud brokered ZTD feature has a dependency on SD-WAN Orchestrator service, for it to work. This will be addressed in an upcoming SD-WAN Orchestrator release. However, customers need not upgrade their Citrix SD-WAN Orchestrator for On-premises.

[SDW-20307]

SD-WAN cloud ZTD configuration fails to work for HA Sites if the cloud ZTD is already configured on a primary site.

[SDW-20208]

Citrix SD-WAN Orchestrator for On-premises displays the status as **Not Connected** although the SD-WAN appliance is connected to Citrix SD-WAN Orchestrator for On-premises.

[SDW-18280]

Known Issues

The issues that exist in release 11.4.

Configuration and Management

On a newly imported Citrix SD-WAN Orchestrator for On-premises instance, staging gets stuck in the **Preparing package** state. This issue occurs when the staging process is initiated shortly after creating a new virtual machine.

Workaround: Retry the staging process.

[SDW-20863]

Miscellaneous

The Staging process fails when users running Citrix SD-WAN Orchestrator for On-premises 11.4 upgrade their Citrix SD-WAN appliances to the 11.4.1 version. The UI displays the status as **Staging Failed (Failed to download script files)**. This issue occurs when the bandwidth between the Citrix SD-WAN appliance and Citrix SD-WAN Orchestrator for On-premises is less.

[SDWANHELP-2317]

Citrix SD-WAN Orchestrator for On-premises running VMware ESXi 13 fails to reboot and goes into a bad state.

Workaround: Use VMware ESXi version 9.

[SDWANHELP-2182]

The UI displays an incorrect SD-WAN appliance software version on the **Configuration > Network Config Home** and the **Configuration > Deployment** pages. This issue occurs on Citrix SD-WAN Orchestrator for On-premises instances that are newly installed and before users perform a change management.

[SDW-21018]

The UI fails to display an error message when the Cloud Direct site operation fails.

[SDW-21009]

The **Software Version** drop-down list under Partial Site Upgrade settings shows all the supported software versions instead of showing only those versions that are published under **Infrastructure > Orchestrator Administration > Software Images > Appliance**.

If a software version listed in Partial Site Upgrade is not available for publish under **Infrastructure > Orchestrator Administration > Software Images > Appliance**, then Partial Site Upgrade cannot be performed for that release.

[SDW-20992]

On the **Configuration > Network Config Home** page of the UI, the Orchestrator connectivity status for a secondary SD-WAN appliance appears online immediately after the configuration file is uploaded. However, the correct status is displayed after the configuration is saved for the site.

[SDW-20913]

In a provider managed setup, the announcements added by the provider administrators are not getting displayed to customers at their login.

[SDW-18491]

When the database backup of an appliance is restored on another appliance having the same release of Citrix SD-WAN Orchestrator for On-premises, the user details are not restored. On the restored appliance, if you create a user with the same user name as in the backed-up database, the following error is displayed:

User has a role already assigned

Workaround: Create a user with a different user name that did not exist on the backed-up database.

[SDW-15984]

Release Notes for Citrix SD-WAN Orchestrator for On-premises 11.1 Release

July 9, 2021

This release notes document describes the enhancements and changes, fixed and known issues that exist for the Citrix SD-WAN Orchestrator for On-premises release 11.1.

Notes

This release notes document does not include security related fixes. For a list of security related fixes and advisories, see the Citrix security bulletin.

What's New

The enhancements and changes that are available in release 11.1.

[Citrix SD-WAN 11.4.0a Release](#)

Citrix SD-WAN 11.4.0a release is supported in Citrix SD-WAN Orchestrator for On-premises.

[SDW-19785]

[Citrix SD-WAN 11.3.2 Release](#)

Citrix SD-WAN 11.3.2 release is supported in Citrix SD-WAN Orchestrator for On-premises.

[SDW-19038]

Route summarization

Citrix SD-WAN Orchestrator for On-premises introduces an enhancement to the route summarization functionality. With this enhancement, you can add summary routes without specifying the gateway IP address.

[SDW-19404]

ECMP load balancing

Equal Cost Multi-Path (ECMP) groups allow you to group multiple routes, with the same cost, destination, and service type. ECMP load balancing ensures:

- Distribution of traffic over multiple equal-cost connections.
- Optimal usage of available bandwidth.
- Dynamic transfer of traffic to other ECMP member route, if a route becomes unreachable.
- ECMP groups can be formed over Virtual Paths and Intranet services.

[SDW-17452]

Storage management (Preview)

Citrix SD-WAN Orchestrator for On-premises supports migrating the configuration and data from one disk to another. You can perform disk migration either to increase the disk space or for disaster recovery.

- **Add a new disk:** You can add a new disk with a storage size at least twice as that of the current data consumed by Citrix SD-WAN Orchestrator for On-premises.
- **Disaster recovery:** In the event of a disaster, you can attach the disk containing the Citrix SD-WAN Orchestrator for On-premises configuration and data to a new instance of Citrix SD-WAN Orchestrator for On-premises virtual machine.

[SDW-16404]

Cloud brokered zero-touch deployment (Preview)

Cloud brokered zero-touch deployment is an automated process that involves Citrix SD-WAN Orchestrator for On-premises as a broker to establish connectivity between Citrix SD-WAN Orchestrator for On-premises and the Citrix SD-WAN appliances.

[SDW-11614]

Transit node enhancements

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. 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.

[SDW-12443]

IPv6 data plane support

Citrix SD-WAN Orchestrator for On-premises supports IPv6 addresses for the following Citrix SD-WAN appliance configurations with Citrix SD-WAN software version 11.3.1 or above:

- [DNS server](#)
- [Flows](#)
- [Firewall connections](#)
- [IP groups](#)
- [Regions](#)
- [DHCP client](#)
- [IP rules and Application rules](#)
- [Network address translation](#)
- [GRE service](#)
- [Interfaces](#)
- [Internet service](#)
- [Neighbor discovery protocol](#)
- [Prefix delegation group](#)
- [IPsec service](#)
- [HA settings](#)
- [IP routes](#)
- [In-band management](#)
- [DNS settings](#)
- [DHCP server, DHCP relay, and DHCP options set](#)

[SDW-19194]

Fixed Issues

The issues that are addressed in release 11.1.

SD-WAN appliance versions lower than 11.2.0 cannot connect to Citrix SD-WAN Orchestrator for On-premises versions lower than 11.1. Citrix SD-WAN Orchestrator for On-premises 11.1 is the recommended version if users want to connect their SD-WAN appliances running a software version lower than 11.2.0.

[SDW-20220]

When there is a failure in upgrading a customer's account to production, the UI does not display the failure message.

[SDW-19574]

Upgrade to production fails in Citrix SD-WAN Orchestrator for On-premises, for prepaid customers having only perpetual licenses.

[SDW-19558]

Assigning perpetual licenses to sites fails in Citrix SD-WAN Orchestrator for On-premises.

[SDW-19556]

When there is a failure in assigning licenses, the UI does not display the failure message under **Administration > Licensing**.

[SDW-19238]

Even though the customer administrator does not have access to delete the remote authentication servers, the UI displays the delete icon. However, when the customer administrator tries to perform the delete operation, the following error is displayed:

User is not authorized to perform **this** operation.

[SDW-18945]

From the provider level **Administration > Announcements** page, if you choose a customer from the top menu bar, a blank page with **Network Administration** as the heading is displayed.

[SDW-18944]

After importing valid production entitlements, the **Upgrade to production** option is made available under **Licensing** even before assigning the license to the appliance.

[SDW-18721]

Known Issues

The issues that exist in release 11.1.

Cloud brokered ZTD feature has a dependency on SD-WAN Orchestrator service, for it to work. This will be addressed in an upcoming SD-WAN Orchestrator service release. However, customers need not upgrade their Citrix SD-WAN Orchestrator for On-premises.

[SDW-20307]

When Citrix SD-WAN Orchestrator for On-premises is upgraded to the 11.1 version, the audit logs collected during the previous releases display **sdwan-onprem-sp** as the user and the log payloads toggle button is enabled on the UI. These logs are cleared after 92 days.

[SDW-20305]

SD-WAN cloud ZTD configuration fails to work for HA Sites if the cloud ZTD is already configured on a primary site.

Workaround:

1. Delete the primary site cloud ZTD configuration by navigating to **Administration > ZTD Settings > Cloud Brokered ZTD**.
2. Reconfigure the cloud ZTD site for both primary and secondary sites at the same time.

[SDW-20208]

Licensing feature is not supported in the provider managed setup of Citrix SD-WAN Orchestrator for On-premises. Providers can continue with the trial licenses. A grace period of 60 days is provided.

[SDW-18831]

When an appliance loses connectivity to Citrix SD-WAN Orchestrator for On-premises for more than 20 minutes and goes into the re-registration phase, it sends an incorrect serial number in the registration request.

Workaround: Reboot the appliance.

[SDW-18781]

In a provider managed setup, the announcements added by the provider administrators are not getting displayed to customers at their login.

[SDW-18491]

Citrix SD-WAN Orchestrator for On-premises displays the status as **Not Connected** although the SD-WAN appliance is connected to Citrix SD-WAN Orchestrator for On-premises.

Workaround: Navigate to **Configuration > Network Config Home** and verify the connectivity status of the appliance on the Citrix SD-WAN Orchestrator for On-premises UI.

[SDW-18280]

When the database backup of an appliance is restored on another appliance having the same release of Citrix SD-WAN Orchestrator for On-premises, the user details are not restored. On the restored appliance, if you create a user with the same user name as in the backed-up database, the following error is displayed:

User has a role already assigned

Workaround: Create a user with a different user name that did not exist on the backed-up database.

[SDW-15984]

Citrix SD-WAN Orchestrator for On-premises running VMware ESXi 13 fails to reboot and goes into a bad state.

Workaround: Use VMware ESXi version 9.

[SDWANHELP-2182]

Release Notes for Citrix SD-WAN Orchestrator for On-premises 10.3 Release

July 12, 2021

This release notes document describes the enhancements and changes, fixed and known issues that exist for the Citrix SD-WAN Orchestrator for On-premises release 10.3.

Notes

This release notes document does not include security related fixes. For a list of security related fixes and advisories, see the Citrix security bulletin.

What's New

The enhancements and changes that are available in release 10.3.

Configuration and Management

Dynamic Routing

From Citrix SD-WAN 11.3.1 release onwards, you can configure one router ID for the entire protocol and also one router ID per routing domain. With this enhancement, you can enable stable dynamic routing across multiple instances with different router IDs converging in a stable manner.

[SDW-17097]

Retry staging

Retry staging option is now available to reinitiate staging at the sites where the staging process has failed.

[SDW-16538]

Custom application

The **Enable Reporting** check box is newly added for the IP Protocol-based custom applications. Now you can also view the IP protocol and domain name-based custom application-defined traffic under the **Reports > Usage** page. The custom application option is also added as a type under the **Application quality configuration** page.

[SDW-10862]

Miscellaneous

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. If the fallback configuration is disabled at a site, you can enable it through Citrix SD-WAN Orchestrator for On-premises.

[SDW-13978]

Flows

You can now use the Appliance settings **Flows** section to perform the following action:

- Enable/disable Citrix Virtual WAN service
- Restart dynamic routing
- Enable/disable virtual paths
- Enable/disable WAN links

[SDW-13977]

Network Admin and Security Admin roles (Preview)

Citrix SD-WAN Orchestrator for On-premises supports the following roles:

- **Provide-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.
- **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.

[SDW-13845]

Appliance Settings

You can now configure date and time, at the site level, through Citrix SD-WAN Orchestrator for On-premises. You can either configure the date and time manually or through an NTP server and also set the time zone.

[SDW-13321]

Provider level support

Citrix SD-WAN Orchestrator for On-premises supports multitenancy. With the multitenancy feature, multiple customer accounts can be managed using a single Citrix SD-WAN Orchestrator for On-premises instance. You can have one of the following types of setups.

- **Provider managed setup:** Customers consume a managed Citrix SD-WAN Orchestrator for On-premises service from Citrix partners using the multitenancy feature.
- **Customer managed setup:** Customers manage their Citrix SD-WAN Orchestrator for On-premises as a self-managed service for their enterprise.

As part of provider managed setup support, the following capabilities are introduced:

- **Roles:** The following provider level roles are added:
 - Provider-Master-Admin-All
 - Provider-Master-Admin-Tenant
 - Provider-Master-ReadOnly-All
- **Dashboard:** A new UI page is added that provides a birds eye view of all the SD-WAN customers managed by a provider.
- **Connectivity with SD-WAN appliances:** In a provider managed setup, only providers have the ability to enable authentication type and regenerate the Citrix SD-WAN Orchestrator for On-premises certificate. Customers have the ability to upload the appliance certificate.
- **Site profile templates and WAN link templates:** The templates enable the creation of **site profiles** and **WAN link profiles** at a customer level.
- **Publish software:** Citrix SD-WAN Orchestrator for On-premises allows provider administrators to download Citrix SD-WAN appliance software version required for all the appliances in your network. Providers can publish the downloaded software version. The published software is downloaded and stored in Citrix SD-WAN Orchestrator for On-premises. Customer administrators can deploy the published software to all the appliances managed by Citrix SD-WAN Orchestrator for On-premises.
- **Administration:** Provider administrators can configure management IP, DNS, NTP servers, and remote authentication servers.
- **Announcements:** Providers can use the **Announcements** option to send out announcements or notifications to their customers.
- **Reports:** The **Provider Reports** provide visibility into alerts, usage trends, and inventory aggregated across all the customers managed by a Provider.

[SDW-12589]

[Zero Touch Deployment - Batch Sites](#)

You can now import a CSV file to add multiple sites simultaneously for Zero Touch Deployment. A sample downloadable template is available in the UI, download it and provide all the site details.

[SDW-12249]

Platform and systems

[Site Reports: WAN Link Metering](#)

The **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.

[SDW-8892]

Known Issues

The issues that exist in release 10.3.

Configuration and Management

For In-band HA, the GUI does not have an option to select the direction of the Destination Rule with Service Type as Any resulting in failure of outbound rules. The error message [EC818] At Site site-name: service type 'any' may not be used when direction is outbound.

[SDW-16968]

Miscellaneous

Even though the customer administrator does not have access to delete the remote authentication servers, the GUI displays the delete icon. However, when tried to perform the delete operation, the following error is displayed:

User is not authorized to perform **this** operation

[SDW-18945]

From the provider level **Administration > Announcements** page, if you choose a customer from the top menu bar, a blank page with **Network Administration** as the heading is displayed.

[SDW-18944]

You cannot restore the database backup taken in a provider managed setup on a customer managed setup. Similarly, you cannot restore the database backup taken in a customer managed setup on a provider managed setup.

[SDW-18904]

When the customer-security-admin role having read-only access to the site configuration tries to edit the configuration, instead of displaying unauthorized access, a red banner with an error message is displayed.

[SDW-18840]

Licensing feature is not supported in the provider managed setup of Citrix SD-WAN Orchestrator for On-premises. Providers can continue with the trial licenses. A grace period of 60 days will be provided.

[SDW-18831]

When an appliance loses connectivity to Citrix SD-WAN Orchestrator for On-premises for more than 20 minutes and goes into the re-registration phase, it sends an incorrect serial number in the registration request.

Workaround: Reboot the appliance.

[SDW-18781]

After importing valid production entitlements, **Upgrade to production** option is made available under Licensing even before assigning the license to the appliance.

Workaround: Click **Upgrade to Production** only after the license is assigned to the appliance.

[SDW-18721]

Network Address Translation (NAT) is not supported between Citrix SD-WAN Orchestrator for On-premises and the appliance.

[SDW-18703]

In a provider managed setup, the announcements added by the provider administrators are not getting displayed to customers at their login.

[SDW-18491]

The CLI allows users to create a password out of the allowed 8–128 length range but the GUI login fails if the password length is out of the allowed range.

Workaround: On logging into the GUI, the user is forced to change the length of the password to the allowed range.

[SDW-16068]

When a user tries to log in, a red banner might display at the top of the page for a fraction of a second before displaying the login page.

[SDW-16024]

When the database backup of an appliance is restored on another appliance having the same release of Citrix SD-WAN Orchestrator for On-premises, the user details are not restored. On the restored appliance, if you create a user with the same user name as in the backed-up database, the following error is displayed:

User has a role already assigned

Workaround: Create a user with a different user name that did not exist on the backed-up database.

[SDW-15984]

Release Notes for Citrix SD-WAN Orchestrator for On-premises 9.6 Release

July 12, 2021

This release notes document describes the enhancements and changes, fixed and known issues that exist for the Citrix SD-WAN Orchestrator for On-premises release 9.6.

Note

This release notes document does not include security related fixes. For a list of security related fixes and advisories, see the Citrix security bulletin.

What's New

The enhancements and changes that are available in release 9.6.

Configuration and Management

Dynamic Routing

From Citrix SD-WAN 11.3.1 release onwards, you can configure one router ID for the entire protocol and also one router ID per routing domain. With this enhancement, you can enable stable dynamic routing across multiple instances with different router IDs converging in a stable manner.

[SDW-17097]

Miscellaneous

HTTPS Certificate

HTTPS Certificate is required for establishing secure management HTTPS connection to Citrix SD-WAN Orchestrator for On-premises. You can use the default certificate available on the Citrix SD-WAN Orchestrator for On-premises GUI or upload a custom HTTPS certificate generated from any other framework such as OpenSSL. Custom HTTPS certificate allows you to have control over the security and the other subject parameters related to the certificate.

[SDW-16359]

Interfaces

From Citrix SD-WAN 11.3.1 release onwards, you can enable or disable a virtual interface using the **Enabled** check box.

[SDW-15993]

Fixed Issues

The issues that are addressed in release 9.6.

Configuration and Management

For Citrix SD-WAN 6100 SE appliance, the UI does not display **LAG** page under **Configuration > Advanced Settings**.

[SDWANHELP-1895]

Miscellaneous

Citrix SD-WAN Orchestrator for On-premises GUI prompts the users to log in every one hour even when the GUI is in continuous use and not left idle.

[SDWANHELP-1902]

When you create a site by cloning an existing site **Deploy Config/Software > Verify Config** fails.

[SDW-16103]

Known Issues

The issues that exist in release 9.6.

Miscellaneous

If you open Citrix SD-WAN Orchestrator for On-premises GUI in a new tab while authentication token refresh is in progress, all existing sessions in the browser get logged out.

[SDW-17719]

If the disk is resized to more than 1.8 TB, resizing of the disk does not happen.

[SDW-16404]

The CLI allows users to create a password out of the allowed 8–128 length range. However, the GUI login fails if the password length is out of the allowed range.

Workaround: On logging into the GUI, the user is forced to change the length of the password to the allowed range.

[SDW-16068]

When a user tries to log in, a red banner might display at the top of the page for a fraction of a second before displaying the login page.

[SDW-16024]

When the database backup of an appliance is restored on another appliance having the same release of Citrix SD-WAN Orchestrator for On-premises, the user details are not restored. On the restored appliance, if you create a user with the same user name as in the backed-up database, the following error is displayed:

User has a role already assigned

Workaround: Create a user with a different user name that did not exist on the backed-up database.

[SDW-15984]

Release Notes for Citrix SD-WAN Orchestrator for On-premises 1.0 Release

July 12, 2021

Citrix SD-WAN Orchestrator for On-premises is a self-hosted, management service available as separate instance for each customer. It provides a single-pane of glass management platform that enables you to configure, monitor, and analyze all the SD-WAN appliances on your SD-WAN network.

Citrix SD-WAN Orchestrator for On-premises is recommended for customers with strong regulatory requirements around data sovereignty and data privacy.

The following are some of the key capabilities:

- **Authentication:** Supports local and RADIUS / TACACS+ authentication.
- **Centralized configuration:** Centralized configuration of SD-WAN networks, with guided workflows, visual aids, and profiles.
- **Zero touch provisioning:** Seamless bring up of the network and connections.
- **Application-centric policies:** Application based traffic steering, Quality of Service (QoS), and Firewall policies, configurable globally or per site.
- **Hierarchical summarization of health:** Ability to centrally monitor the health, usage, quality, and performance of a network as a whole, with the ability to drill down into individual sites and associated connections.
- **Troubleshooting:** Device & Audit Logs, Diagnostic utilities such as Ping, Traceroute, Packet Capture to troubleshoot network connectivity issues.

Prerequisites

- **Appliances:** A minimum of two appliances. Each SD-WAN appliance or virtual instance must have an IP address configured.

- **Citrix SD-WAN Orchestrator service account:** To use Citrix SD-WAN Orchestrator for On-premises, you must have an account in the Citrix SD-WAN Orchestrator service. For more information, see [Onboarding Citrix SD-WAN Orchestrator service](#).

Citrix SD-WAN Orchestrator for On-premises 1.0.1

Fixed Issues

- **SDW-16456:** Any to any routing domain is not supported in Citrix SD-WAN Orchestrator for On-premises.
- **SDW-16063:** At the network level, the Wi-Fi summary reports are unavailable.
- **SDW-16054:** If a customer account is created outside of the US region on the Citrix SD-WAN Orchestrator service, then the API token obtained by the Identity and Management (IDAM) page from Citrix Cloud does not work. The customer's login to Citrix SD-WAN Orchestrator for On-premises fails with the following error message: "Invalid Customer ID, Client ID, or Client Secret".
You can now select the **POP** in which your cloud account was on-boarded, on booting up the Citrix SD-WAN Orchestrator for On-premises for the first time.

Known issues

- **SDW-16068:** The CLI allows users to create a password out of the allowed 8–128 length range but the GUI login fails if the password length is out of the allowed range.
 - **Workaround:** On logging into the GUI, the user is forced to change the length of the password to the allowed range.
- **SDW-16024:** When a user logs in to the UI, a red banner might display at the top of the page for a fraction of a second before displaying the login page.
- **SDW-15984:** When the database backup of an appliance is restored on another appliance having the same release of Citrix SD-WAN Orchestrator for On-premises, the user details are not restored. On the restored appliance, if you create a user with the same user name as in the backed-up database, the following error is displayed:
User has a role already assigned
 - **Workaround:** Create a user with a different user name that did not exist on the backed-up database.
- **SDW-16103:** When you create a site by cloning an existing site, **Deploy Config/Software > Verify Config** fails.
 - **Workaround:** Do not create a site by cloning an existing site.
- **SDW-16404:** If the disk is resized to more than 1.8 TB, resizing of the disk does not happen.

System requirements and installation

June 16, 2022

Before you install Citrix SD-WAN Orchestrator for On-premises on a Virtual Machine (VM), ensure that you must understand the hardware and software requirements and have met the prerequisites.

Note

The system requirements are common for both single-region network and multi-region network.

Hardware requirements

The following are the hardware requirements for Citrix SD-WAN Orchestrator for On-premises to store data of 1 month or statistics for two WAN links per site on an average:

Number of sites	Processor	RAM	Storage
2000	256 vCPUs 3 GHz or higher	512 GB	2 TB
1000	128 vCPUs 3 GHz or higher	256 GB	1 TB
500	64 vCPUs 3 GHz or higher	128 GB	500 GB
256	32 vCPU 3 GHz or higher	64 GB	256 GB
128	8 vCPUs 3 GHz or higher	16 GB	256 GB

Software

Citrix SD-WAN Orchestrator for On-premises VPX can be configured on the following platforms:

Hypervisor

- VMware ESXi 7.0 Update 1.
- VMware ESXi server, version 6.5.
- Citrix XenServer 6.5 or higher.

Browsers must have cookies enabled, and JavaScript installed and enabled.

Citrix SD-WAN Orchestrator for On-premises Web Interface is supported on the following browsers:

- Google Chrome 40.0+
- Microsoft Internet Explorer 11+
- Mozilla Firefox 41.0+

Prerequisites

Following are the prerequisites for installing and deploying Citrix SD-WAN Orchestrator for On-premises:

- The SD-WAN Master Control Node (MCN) and existing client nodes must be upgraded to the latest Citrix SD-WAN software version.
- It is recommended to have a DHCP server available and configured in the SD-WAN network.
- You must have the Citrix SD-WAN Orchestrator for On-premises installation files.

Note

You cannot customize or install any third party software on Citrix SD-WAN Orchestrator for On-premises. However, you can modify the vCPU, memory, and storage settings.

Download Citrix SD-WAN Orchestrator for On-premises software

Download the Citrix SD-WAN Orchestrator for On-premises Management Console software installation files, for the required release and platform, from the [Downloads](#) page.

Citrix SD-WAN Orchestrator for On-premises installation files use the following naming convention:

- ctx-sdw-onprem-build.extension
- ctx-onprem-build.extension
- ctx-onprem-build.extension

Platform	Extension
Citrix XenServer	.xva
VMware ESXi	-vmware.ova

Installation and configuration checklist

This section provides a checklist of the information you need to complete your Citrix SD-WAN Orchestrator for On-premises installation and deployment.

Gather or determine the following information:

- The IP address of the ESXi server and XenServer that hosts the Citrix SD-WAN Orchestrator for On-premises Virtual Machine (VM).

- A unique name to assign to the Citrix SD-WAN Orchestrator for On-premises VM.
- The amount of memory to allocate for the Citrix SD-WAN Orchestrator for On-premises VM.
- The amount of disk capacity to allocate for the virtual disk for the VM.
- The Gateway IP Address the Citrix SD-WAN Orchestrator for On-premises use to communicate with external networks.
- The subnet mask for the network in which the Citrix SD-WAN Orchestrator for On-premises VM is installed.

Difference between SD-WAN Orchestrator for On-premises and Citrix SD-WAN Orchestrator service

August 23, 2021

Features

Features	Citrix SD-WAN Orchestrator service	SD-WAN Orchestrator for On-premises
Advanced Edition Platform	Yes	No
Premium Edition Platform	Yes	No
Zscaler Service	Yes	No
Azure Virtual WAN Service	Yes	No
Citrix Secure Internet Access Service	Yes	No
Hosted Firewall	Yes	No
Application Routing on preset DPI apps and custom apps (FQDN or IP based)	Yes	Yes
Application Routing on apps that require dynamic signature updates (Like Office 365, Citrix Cloud, and newly supported apps).	Yes	No
Orchestrator - High Availability	Yes	No

Requirements

Requirements	Citrix SD-WAN Orchestrator service	SD-WAN Orchestrator for On-premises
SD-WAN Factory Image required	All (Factory Shipping release)	Citrix SD-WAN 10.2.7, 11.1.1, 11.2.0, 11.2.2, 11.3.0 and above.*
Appliance Deployed in the Network	All	Citrix SD-WAN 11.2.2, 11.3.0 and above.*
SD-WAN appliance internet connectivity	Required	Not Required
Firewall ports to be open	443	443, 22, ICMP
Licensing	Postpaid and Prepaid models	Prepaid model only

- The supported Citrix SD-WAN software version depends on the SD-WAN Orchestrator for On-premises software version.

Install and configure SD-WAN Orchestrator for On-premises on ESXi Server

December 23, 2021

Install the VMware vSphere client

Following are the basic instructions for downloading and installing the VMware vSphere client that you use to create and deploy the Citrix SD-WAN Orchestrator for On-premises Virtual Machine (VM).

To download and install the VMware vSphere Client, do the following:

1. Open a browser and navigate to the ESXi server that hosts your vSphere Client and Citrix SD-WAN Orchestrator for On-premises virtual machine instance. The VMware ESXi Welcome page appears.
2. Click the **Download vSphere Client** link to download the vSphere Client installation file.
3. Install the vSphere Client.

Run the vSphere Client installer file that you downloaded, and accept each of the default options when prompted.

- After the installation completes, start the vSphere Client program.

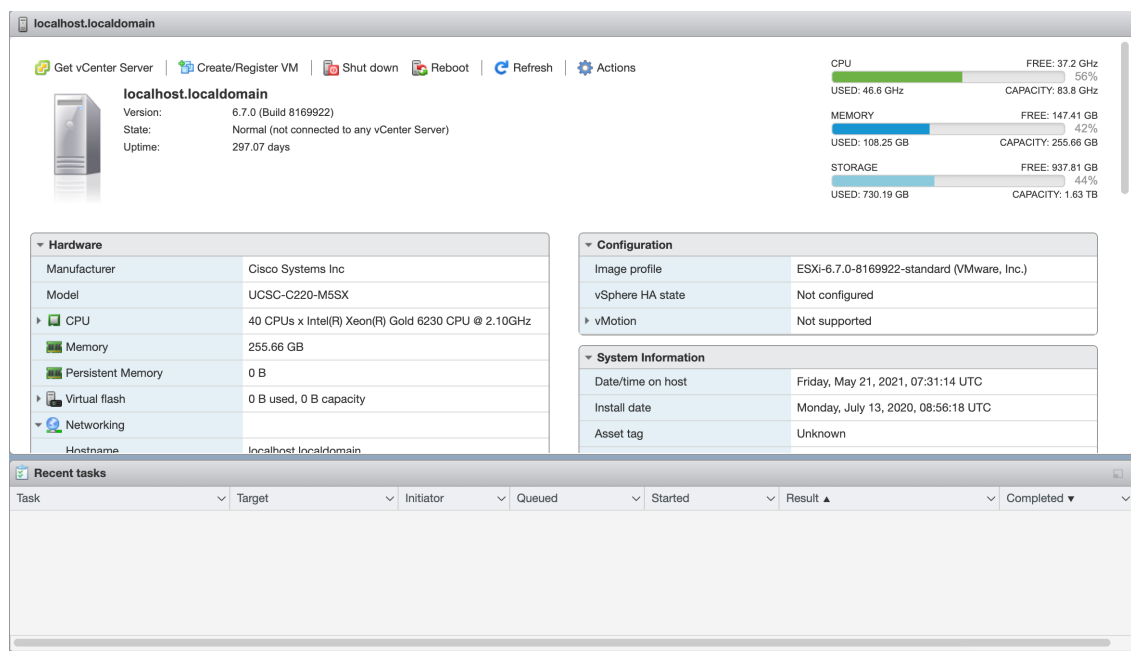
The VMware vSphere Client login page appears, prompting you for the ESXi server login credentials.

- Enter the ESXi server login credentials:

- **IP address/Name:** Enter the IP Address or Fully Qualified Domain Name (FQDN) for the ESXi server that hosts your Citrix SD-WAN Orchestrator for On-premises virtual machine instance.
- **User name:** Enter the server administrator account name. The default is root.
- **Password:** Enter the password associated with this administrator account.

- Click **Login**.

The vSphere Client main page appears.



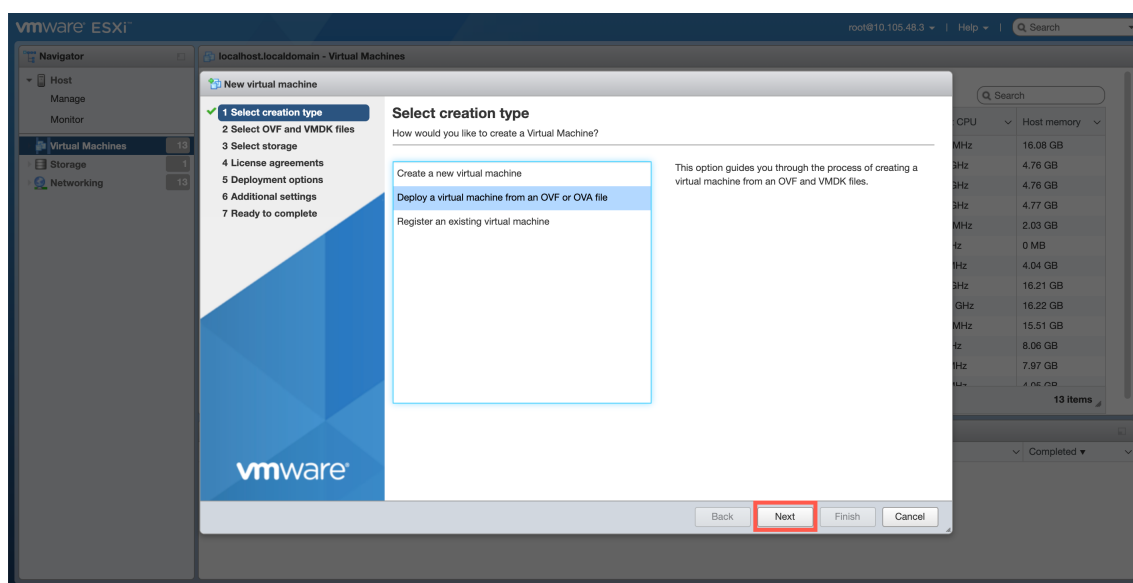
Creating the Citrix SD-WAN Orchestrator for On-premises virtual machine using the OVF template

After installing the VMware vSphere client, create the Citrix SD-WAN Orchestrator for On-premises virtual machine.

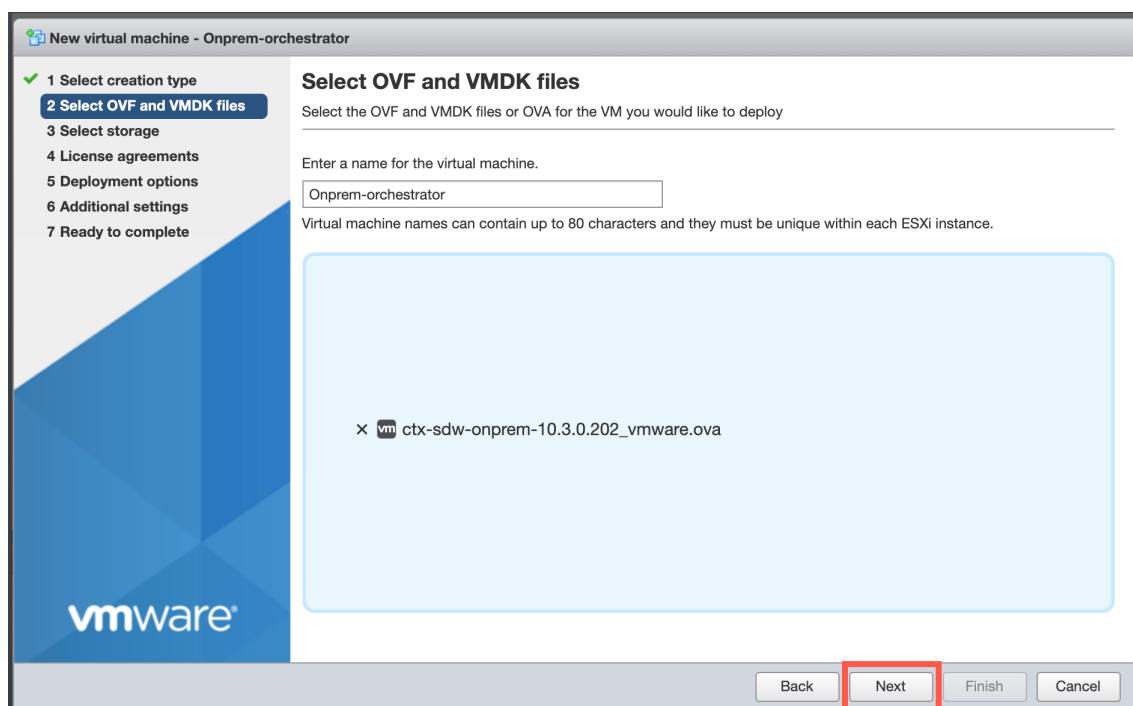
- If you have not already done so, download the Citrix SD-WAN Orchestrator for On-premises OVF template file (.ova file) to the local PC.

For more information, see [System requirements and installation](#).

- In the vSphere Client, click **Create/Register VM**, and then select **Deploy a virtual machine from an OVF or OVA file** from the list. Click **Next**.



3. Enter a unique name for the new virtual machine.
4. Click inside the box and select the Citrix SD-WAN Orchestrator for On-premises OVF template (.ova file) that you want to install or you can drag the file inside the box.
5. Click **Next**.



6. Click **Next**.
The Storage page appears.
7. Accept the default storage resource by clicking **Next**.

Select storage

Select the storage type and datastore

Standard Persistent Memory

Select a datastore for the virtual machine's configuration files and all of its' virtual disks.

Name	Capacity	Free	Type	Thin pro...	Access
datastore1	1.63 TB	937.81 GB	VMFS6	Supported	Single

1 items

Back Next Finish Cancel

8. On the EULA page, click **I Agree**, and click **Next**.

License agreements

Read and accept the license agreements

Licensing agreement

CITRIX LICENSE AGREEMENT

This is a legal agreement ("AGREEMENT") between the end-user customer ("you"), and the providing

- PRODUCT LICENSES.
 - End User Licenses. The PRODUCT is made available by CITRIX under the license models identifier Your license to the PRODUCT will be activated by license keys that allow use of the PRODUCT in i
 - Partner Demo. If the PRODUCT is labeled "Partner Demo," notwithstanding any term to the
 - Evaluation. If the PRODUCT is labeled "Evaluation," notwithstanding any term to the cont
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Back Next Finish Cancel

I agree

9. On the Deployment option page, select the VM Network from the drop-down list and accept the default settings for other fields. Click **Next**.

New virtual machine - Onprem-orchestrator

✓ 1 Select creation type

✓ 2 Select OVF and VMDK files

✓ 3 Select storage

✓ 4 License agreements

✓ 5 **Deployment options**

6 Ready to complete

Deployment options

Select deployment options

Network mappings	VM Network	VM Network ▼
Disk provisioning	☒ Thin ☐ Thick	
Power on automatically	☒	

Back

Next

Finish

Cancel

10. On the Ready to Complete page, click **Finish** to create the virtual machine.

Note

Decompressing the disk image onto the server can take several minutes.

New virtual machine - Onprem-orchestrator

✓ 1 Select creation type

✓ 2 Select OVF and VMDK files

✓ 3 Select storage

✓ 4 License agreements

✓ 5 Deployment options

✓ 6 **Ready to complete**

Ready to complete

Review your settings selection before finishing the wizard

Product	Citrix SD-WAN Onprem
VM Name	Onprem-orchestrator
Disks	ctx-sdw-onprem-10.3.0.202_vmware.vmdk
Datastore	datastore1
Provisioning type	Thin
Network mappings	VM Network: VM Network
Guest OS Name	Unknown

 Do not refresh your browser while this VM is being deployed.

Back

Next

Finish

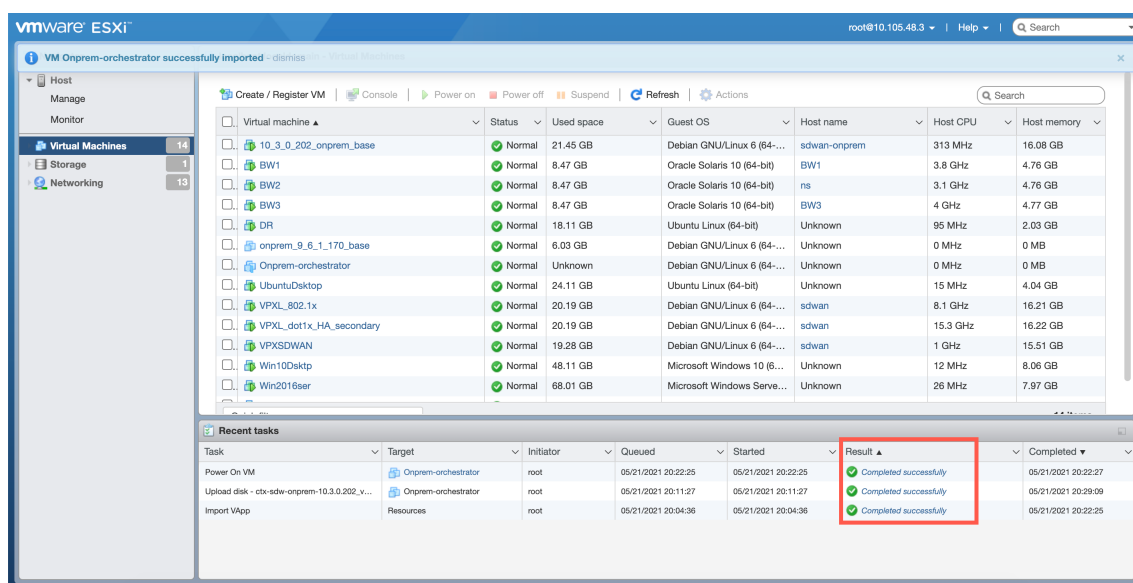
Cancel

View and record the management IP address on the ESXi server

The management IP address is the IP address of the Citrix SD-WAN Orchestrator for On-premises virtual machine, use this IP address to log into the Citrix SD-WAN Orchestrator for On-premises Web UI.

To display the management IP address, do the following:

1. On the vSphere client Inventory page, select the new Citrix SD-WAN Orchestrator for On-premises virtual machine.
2. On the Citrix SD-WAN Orchestrator for On-premises page, under Recent Tasks, wait for the result to show completed.

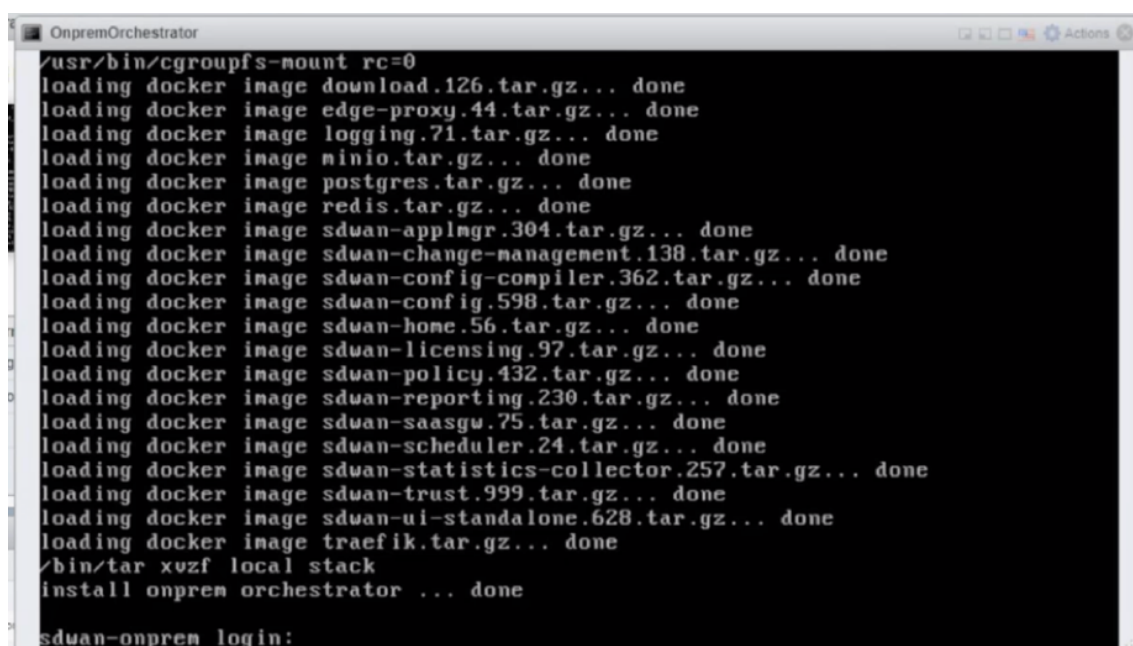


3. Select the **Console** tab, and then click anywhere inside the console area to enter console mode.

Note

To release console control of your cursor, press the <Ctrl> and <Alt> keys simultaneously.

4. Press **Enter** to display the console login prompt.



```

/usr/bin/cgroupfs-mount rc=0
loading docker image download.126.tar.gz... done
loading docker image edge-proxy.44.tar.gz... done
loading docker image logging.71.tar.gz... done
loading docker image minio.tar.gz... done
loading docker image postgres.tar.gz... done
loading docker image redis.tar.gz... done
loading docker image sduan-applmgr.304.tar.gz... done
loading docker image sduan-change-management.138.tar.gz... done
loading docker image sduan-config-compiler.362.tar.gz... done
loading docker image sduan-config.598.tar.gz... done
loading docker image sduan-home.56.tar.gz... done
loading docker image sduan-licensing.97.tar.gz... done
loading docker image sduan-policy.432.tar.gz... done
loading docker image sduan-reporting.230.tar.gz... done
loading docker image sduan-saasgw.75.tar.gz... done
loading docker image sduan-scheduler.24.tar.gz... done
loading docker image sduan-statistics-collector.257.tar.gz... done
loading docker image sduan-trust.999.tar.gz... done
loading docker image sduan-ui-standalone.628.tar.gz... done
loading docker image traefik.tar.gz... done
/bin/tar xvzf local stack
install onprem orchestrator ... done

sduan-onprem login:

```

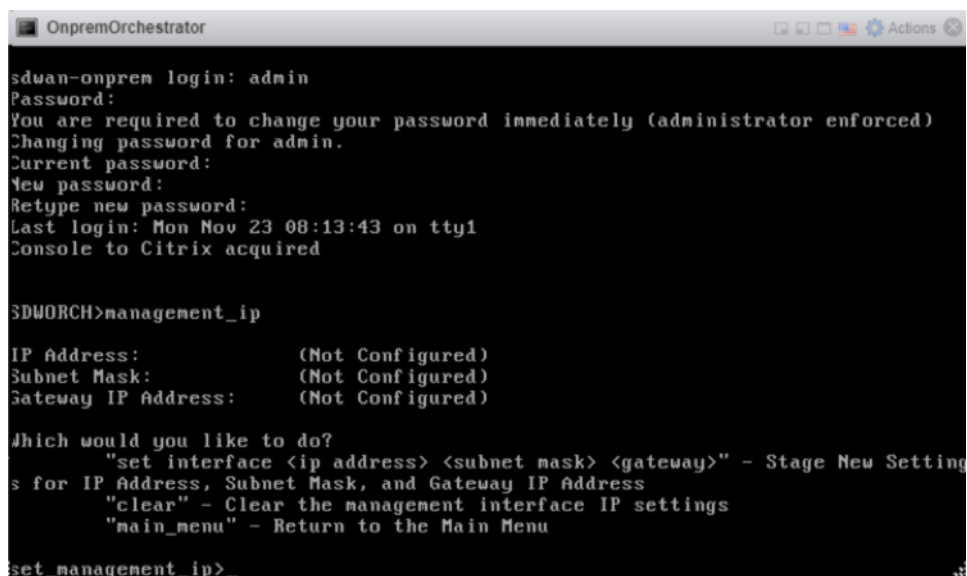
5. Log into the virtual machine console.

The default login credentials for the new Citrix SD-WAN Orchestrator for On-premises virtual machine are as follows:

- **Login:** admin
- **Password:** password

Note

It is mandatory to change the default admin user account password on a first time login. This change is enforced using both CLI and UI.



```

sduan-onprem login: admin
Password:
You are required to change your password immediately (administrator enforced)
Changing password for admin.
Current password:
New password:
Retype new password:
Last login: Mon Nov 23 08:13:43 on tty1
Console to Citrix acquired

SDWORCH>management_ip

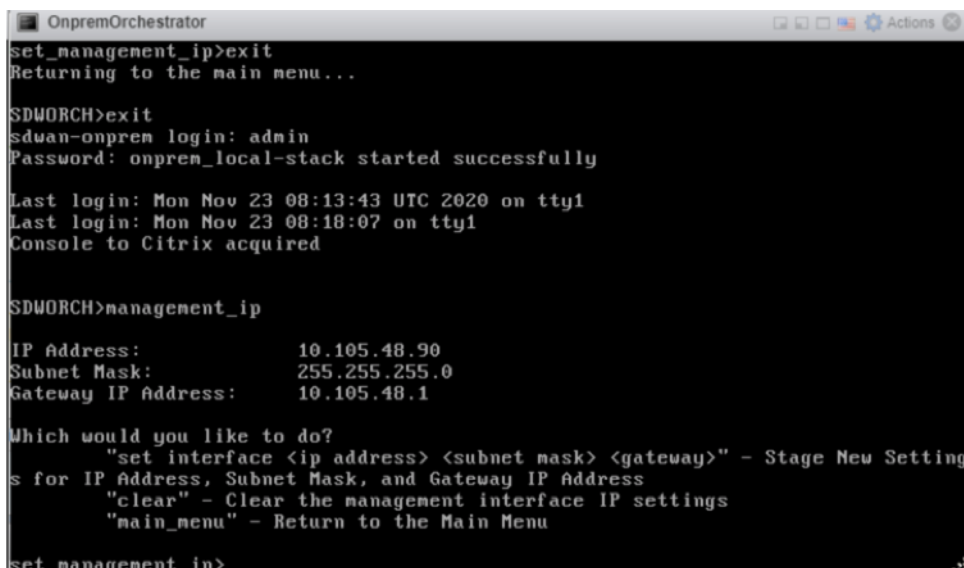
IP Address:          (Not Configured)
Subnet Mask:         (Not Configured)
Gateway IP Address:  (Not Configured)

Which would you like to do?
    "set interface <ip address> <subnet mask> <gateway>" - Stage New Settings for IP Address, Subnet Mask, and Gateway IP Address
    "clear" - Clear the management interface IP settings
    "main_menu" - Return to the Main Menu

set management ip>

```

- Record the Citrix SD-WAN Orchestrator for On-premises virtual machine's management IP address, which is shown as the Host IP address in a welcome message that appears when you log on.



```

OnpremOrchestrator
set_management_ip>exit
Returning to the main menu...

SDWORCH>exit
sdwan-onprem login: admin
Password: onprem_local-stack started successfully

Last login: Mon Nov 23 08:13:43 UTC 2020 on tty1
Last login: Mon Nov 23 08:18:07 on tty1
Console to Citrix acquired

SDWORCH>management_ip

IP Address:          10.105.48.90
Subnet Mask:         255.255.255.0
Gateway IP Address:  10.105.48.1

Which would you like to do?
  "set interface <ip address> <subnet mask> <gateway>" - Stage New Settings for IP Address, Subnet Mask, and Gateway IP Address
  "clear" - Clear the management interface IP settings
  "main_menu" - Return to the Main Menu

set_management_ip>

```

Note

- The DHCP server must be present and available in the SD-WAN network, or this step cannot be completed.
- In the console, enter the CLI command `set_dns` to confirm the current DNS server setting and reconfigure the DNS server if the existing DNS server is unable to provide the DNS service. For more information about the usage of the `set_dns` command, see [Citrix SD-WAN Orchestrator for On-premises log-in](#).

If the DHCP server is not configured in the SD-WAN network, you have to manually enter a static IP address.

To configure a static IP address as the management IP address:

- When the virtual machine is started, click the **Console** tab.
- Log into the virtual machine. The default login credentials for the new Citrix SD-WAN Orchestrator for On-premises virtual machine are as follows:
 - Login:** admin
 - Password:** password
- In the console enter the CLI command `management_ip`.
- Enter the command `set interface <ipaddress> <subnetmask> <gateway>`, to configure management IP.
- Are you sure you want to change your Management Interface IP settings?

You may lose connectivity to the appliance. <y/n>?

Press “y” to change the IP and access the new management IP configured after nearly 6–7 minutes.

Install and configure SD-WAN Orchestrator for On-premises on XenServer

January 20, 2021

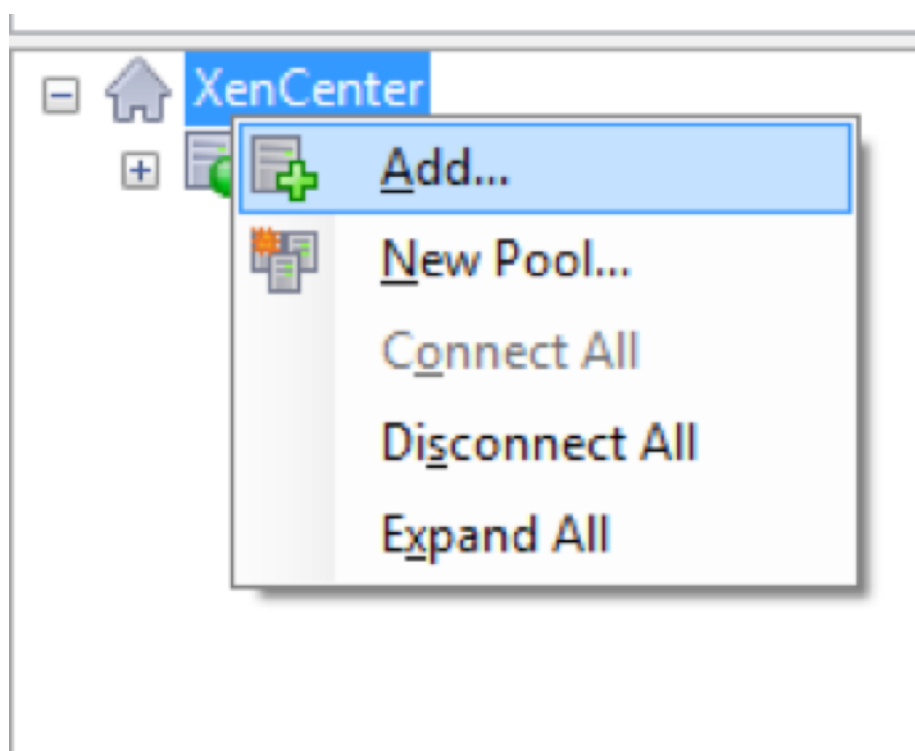
Before installing the Citrix SD-WAN Orchestrator for On-premises virtual machine on a XenServer server, gather the necessary information as described in [Installation and configuration checklist](#).

Install the XenServer server

To install the Citrix XenServer server on which you deploy the Citrix SD-WAN Orchestrator for On-premises virtual machine, you must have XenCenter installed on your computer. If you have not already done so, download and install XenCenter.

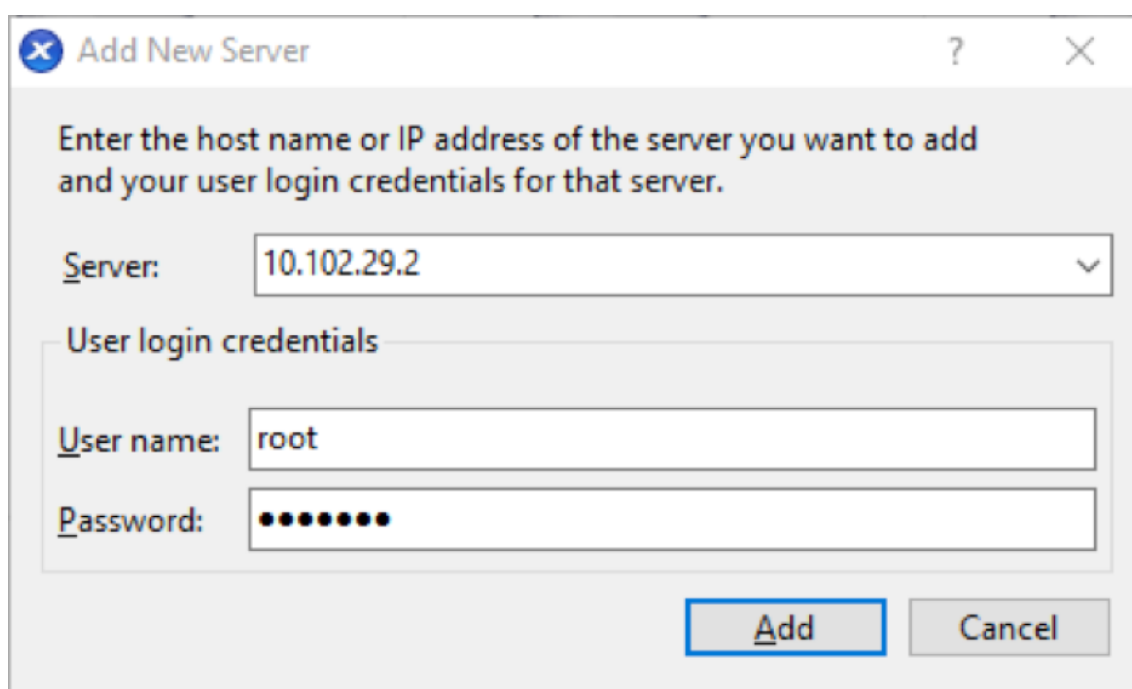
To install a XenServer server:

1. Open the XenCenter application on your computer.
2. In the left tree pane, right-click on **XenCenter** and select **Add**.



3. In the **Add New Server** window, enter the required information in the following fields:

- **Server:** Enter the IP Address or Fully Qualified Domain Name (FQDN) of the XenServer server that hosts your Citrix SD-WAN Orchestrator for On-premises virtual machine instance.
- **User name:** Enter the server administrator account name. The default is root.
- **Password:** Enter the password associated with this administrator account.



The screenshot shows a Windows-style dialog box titled "Add New Server". Inside the dialog, there is a prompt: "Enter the host name or IP address of the server you want to add and your user login credentials for that server." Below this prompt are three input fields. The first field is labeled "Server:" and contains the text "10.102.29.2". The second field is labeled "User name:" and contains the text "root". The third field is labeled "Password:" and contains a series of dots, indicating a masked password. At the bottom right of the dialog are two buttons: "Add" and "Cancel".

4. Click **Add**.

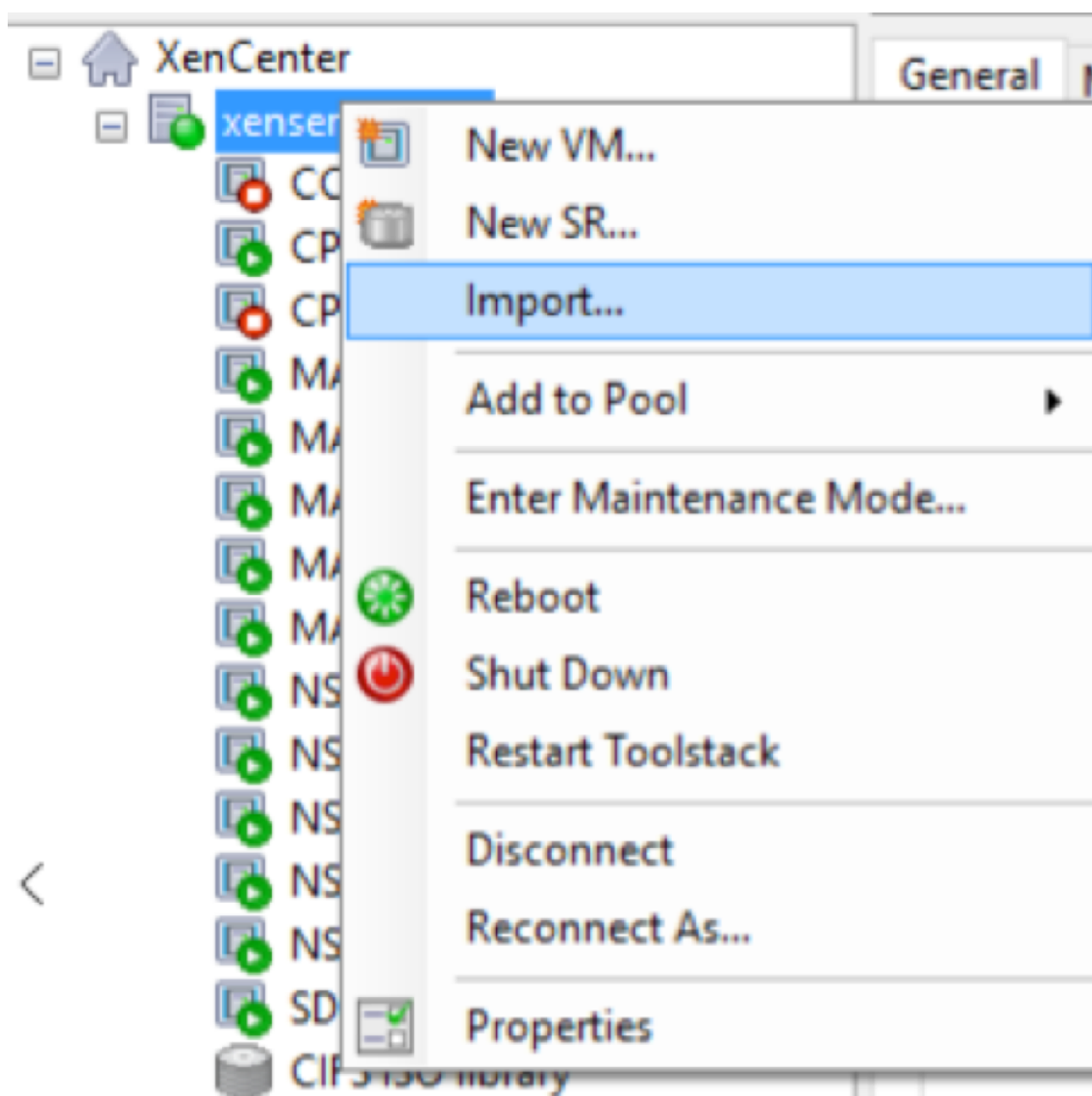
The new server's IP address appears in the left pane.

Create the Citrix SD-WAN Orchestrator for On-premises virtual machine using the XVA file

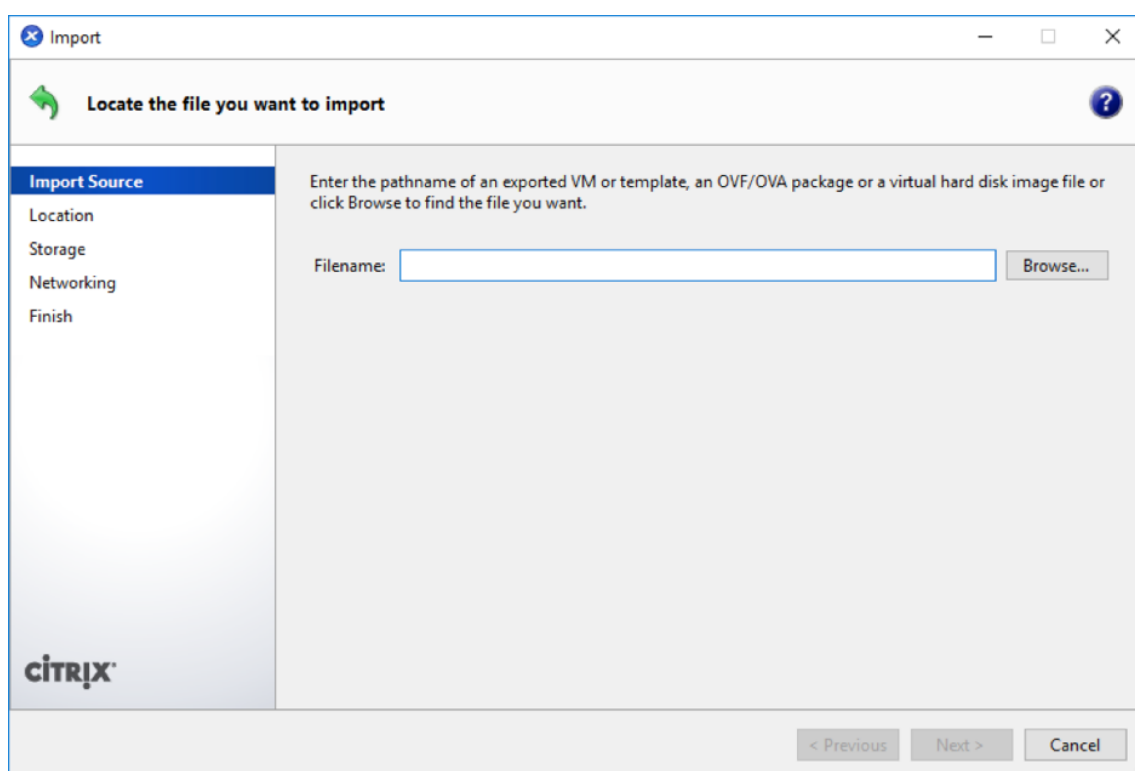
The Citrix SD-WAN Orchestrator for On-premises virtual machine software is distributed as an XVA file. If you have not already done so, download the .xva file. For more information, see [System requirements and installation](#).

To create the Citrix SD-WAN Orchestrator for On-premises virtual machine:

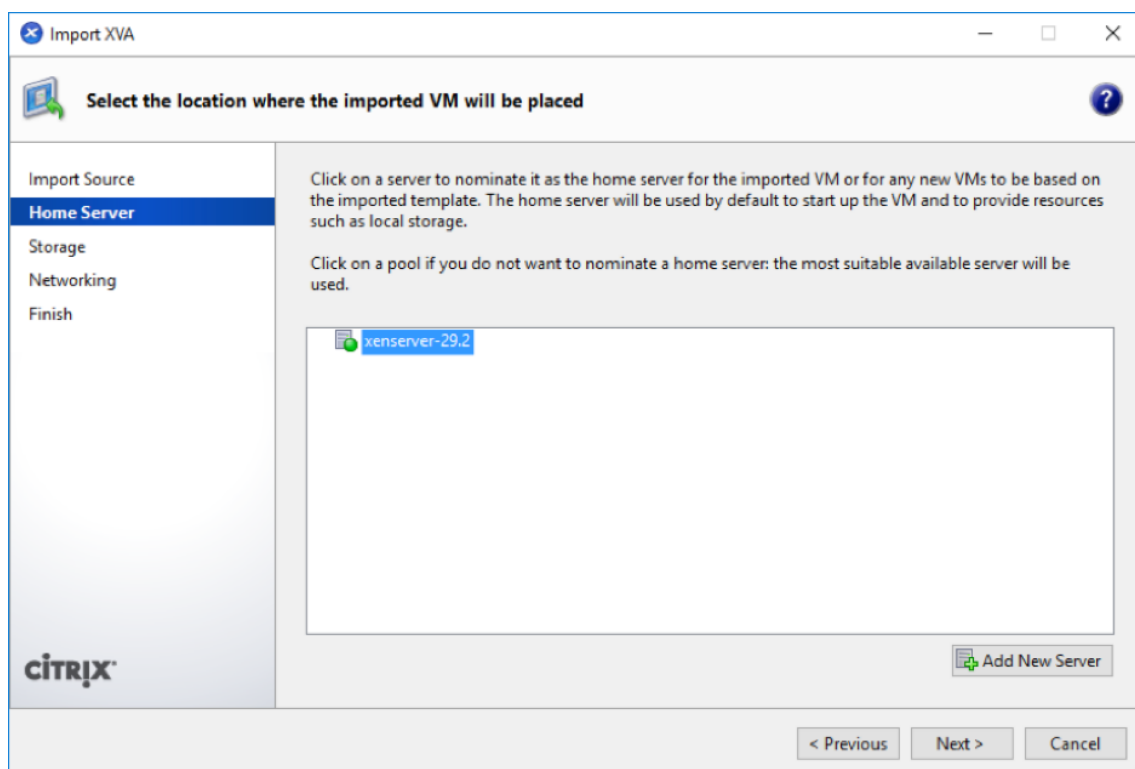
1. In XenCenter, right-click **XenServer** and click **Import**.



2. Browse to the downloaded .xva file, select it, and click **Next**.



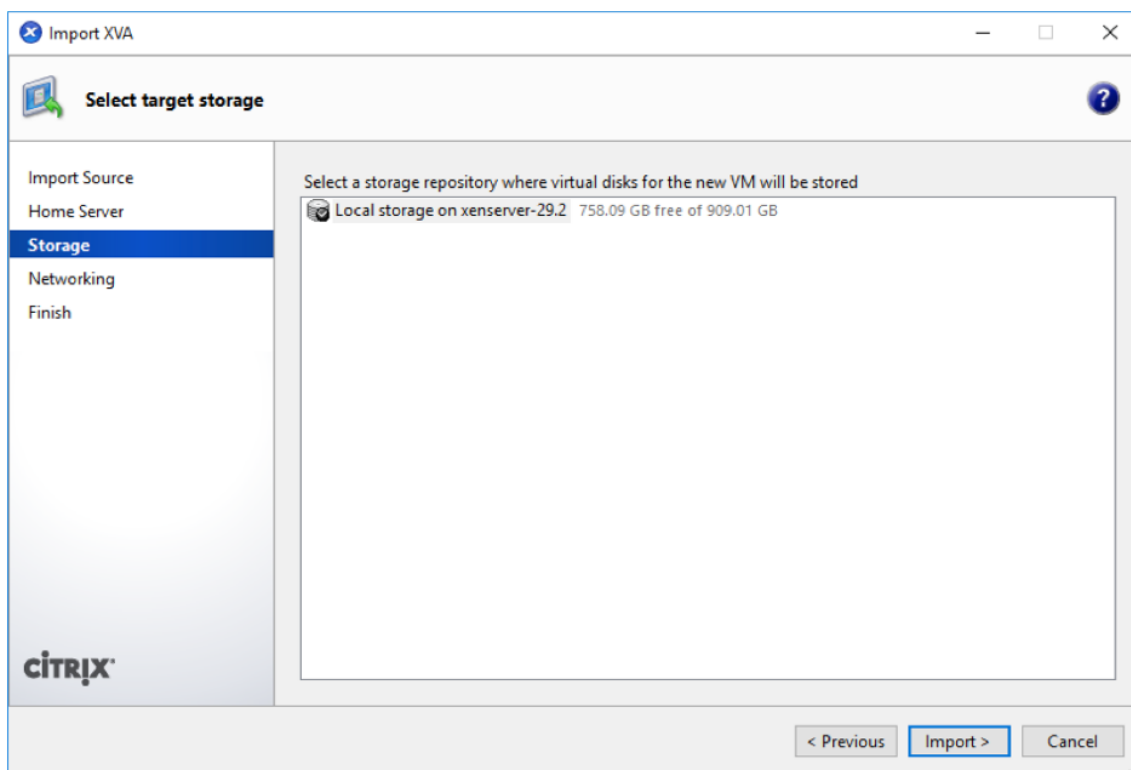
3. Select a previously created XenServer server as the location to which to import the virtual machine, and click **Next**.



4. Select a storage repository where the virtual disk for the new virtual machine is stored, and click

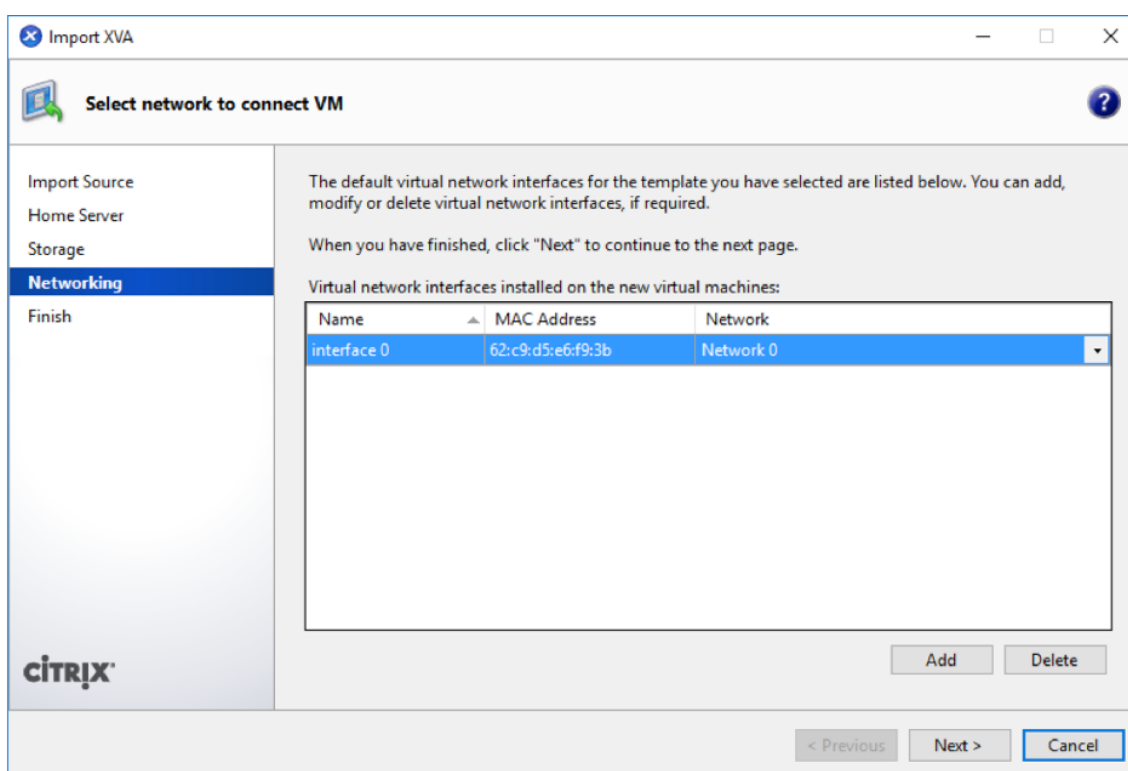
Import.

For now, you can accept the default storage resource. Or you can configure the datastore.



The imported Citrix SD-WAN Orchestrator for On-premises virtual machine appears in the left pane.

5. Select a network to which to connect the virtual machine, and click **Next**.



6. Click **Finish**.

View and record the management IP address on XenServer

The management IP address is the IP address of the Citrix SD-WAN Orchestrator for On-premises virtual machine, use this IP address to log into the Citrix SD-WAN Orchestrator for On-premises Web UI.

Note

The DHCP server must be present and available in the SD-WAN network.

To display the management IP Address:

1. In the XenCenter interface, in the left pane, right-click the new Citrix SD-WAN Orchestrator for On-premises virtual machine and select **Start**.
2. When the virtual machine is started, click the **Console** tab.

```
sduan-onprem login: admin
Password:
You are required to change your password immediately (administrator enforced)
Changing password for admin.
Current password:
New password:
Retype new password:
Last login: Wed Nov 25 09:13:56 on tty1
Console to Citrix acquired

SDWORCH>management_ip

IP Address:          10.105.59.125
Subnet Mask:         255.255.255.0
Gateway IP Address:  10.105.59.1

Which would you like to do?
  "set interface <ip address> <subnet mask> <gateway>" - Stage New Setting
s for IP Address, Subnet Mask, and Gateway IP Address
  "clear" - Clear the management interface IP settings
  "main_menu" - Return to the Main Menu

set_management_ip>_
```

3. Make a note of the management IP address.

Note

The DHCP server must be present and available in the SD-WAN network, or this step cannot be completed.

4. Log into the virtual machine. The default login credentials for the new Citrix SD-WAN Orchestrator for On-premises virtual machine are as follows:

Login: admin

Password: password

Note

It is mandatory to change the default admin user account password on a first time logon. This change is enforced using both CLI and UI.

If the DHCP server is not configured in the Citrix SD-WAN network, you have to manually enter a static IP address.

To configure a static IP address as the management IP address:

1. When the virtual machine is started, click the Console tab.
2. Log into the virtual machine. The default login credentials for the new Citrix SD-WAN Orchestrator for On-premises virtual machine are as follows:

Login: admin

Password: password

3. In the console enter the CLI command `management_ip`.

4. Enter the command `set interface <ipaddress> <subnetmask> <gateway>`, to configure management IP.

5. Are you sure you want to change your Management Interface IP settings?

You may lose connectivity to the appliance. <y/n>?

Press “y” to change the IP and access the management IP configured after nearly 6–7 minutes.

Onboarding SD-WAN Orchestrator for On-premises

May 17, 2021

Here is an overview of the Citrix SD-WAN Orchestrator for On-premises 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.

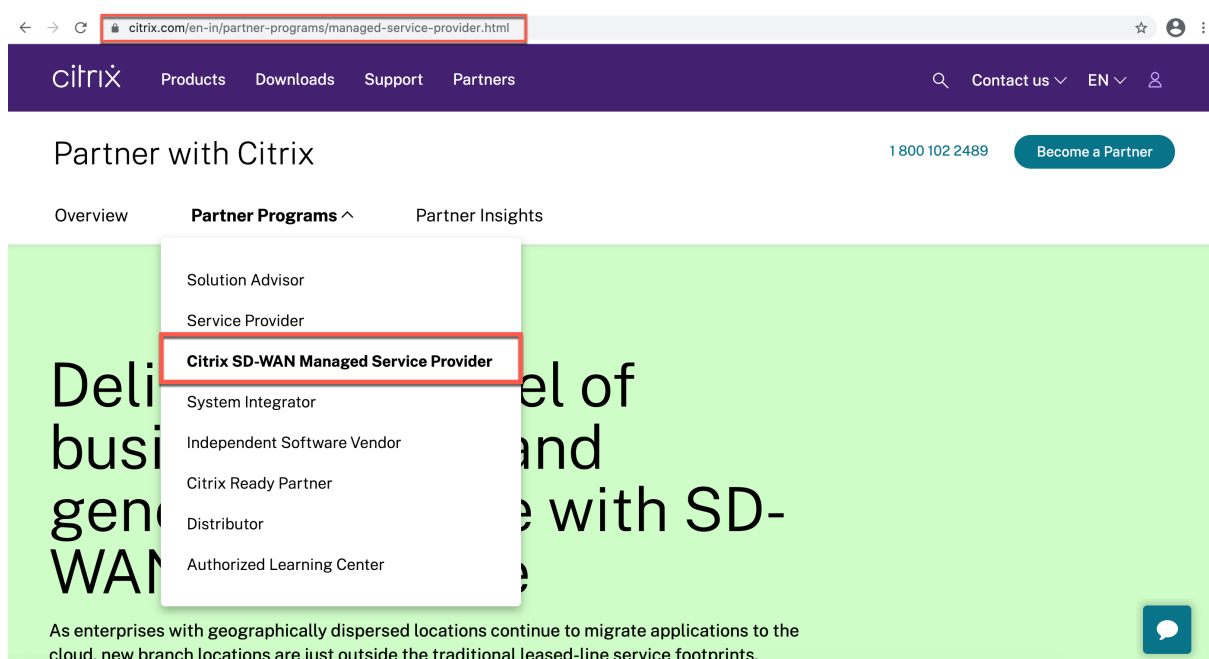
Here is a summary of the onboarding process:

1. A prospective partner sign up as a Citrix Partner.
2. Citrix Partner registers as a Citrix SD-WAN Reseller.

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](#).

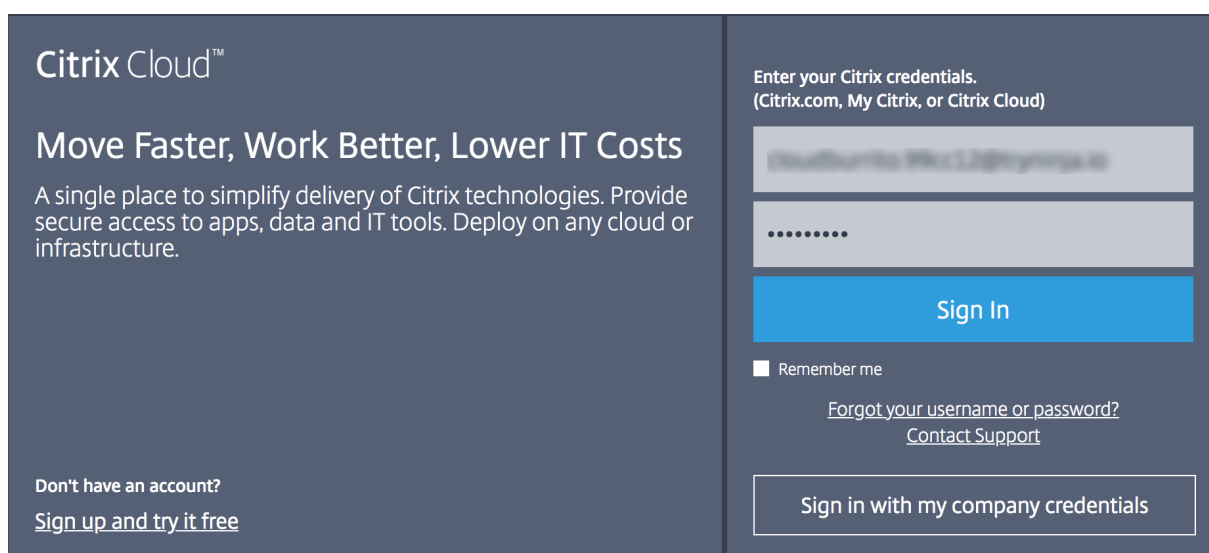
A partner can also sign up for the Citrix SD-WAN Managed Service Provider Program, which has been specially crafted for Citrix SD-WAN partners - [SD-WAN MSP Sign Up](#).



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

Available Services (15)



Analytics

Security, performance and usage insights.

Manage

[Learn more](#)



Application Delivery Management

Hybrid management and analytics service for Citrix Networking on-premises and cloud.

Manage

[Learn more](#)



Content Collaboration

Secure data access on any device.

Resell Content Collaboration

[How to Resell](#) | [Learn more](#)



Endpoint Management

Enable subscribers to use corporate or BYO devices.

Request Demo

[Learn more](#)



Gateway

SSO to SaaS, web and VDI apps.

Request Trial

[Learn more](#)



ITSM Adapter

Provision and manage Virtual Apps and Desktops.

Request Demo

[Learn more](#)



Intelligent Traffic Management

Optimize application routing with network experience metrics.

Request Trial

[Learn more](#)



Microapps

Streamline workflows and deliver actionable notifications using behavioral insights

Request Demo

[Learn more](#)



SD-WAN Orchestrator

Centralized cloud management service for SD-WAN

Resell SD-WAN

[How to Resell](#) | [Learn more](#)



Secure Browser

Protect corporate network from web based attacks.

Request Trial

[Learn more](#)



Secure Internet Access

Comprehensive cloud security services for SaaS and Cloud apps

Request Demo

[Learn more](#)



Secure Workspace Access

Security controls for VPN-less access to intranet web apps and SaaS apps.

Request Demo

[Learn more](#)



Virtual Apps and Desktops

Deliver virtual apps and desktops on any device.

Request Demo

[Learn more](#)



Virtual Apps and Desktops for Azure

Simplest, fastest way to deliver Windows Apps and Desktops from Azure

Request Demo

[Learn more](#)



Workspace Environment Management

Optimized resources, user environment and profile management.

Request Demo

[Learn more](#)



Your account has been provisioned and is being validated

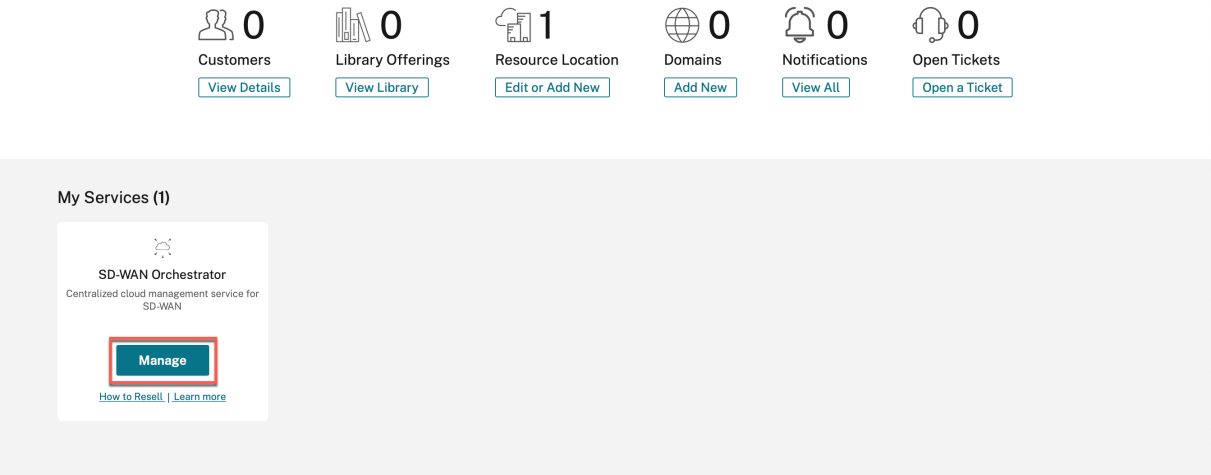
This can take a moment. Please click on the link below to check the provisioning status on the SD-WAN Orchestrator tile. Once done, you can see “Manage” option showing up on the SD-WAN Orchestrator tile

[Go back to Launchpad](#)

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

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55

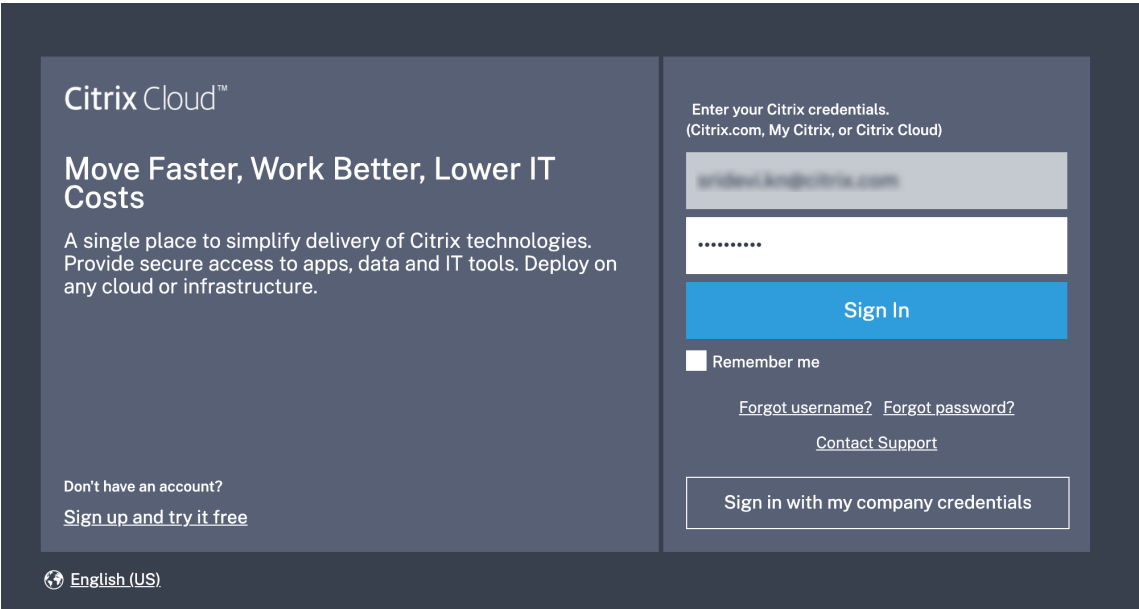


Onboarding DIY Enterprise Customers

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

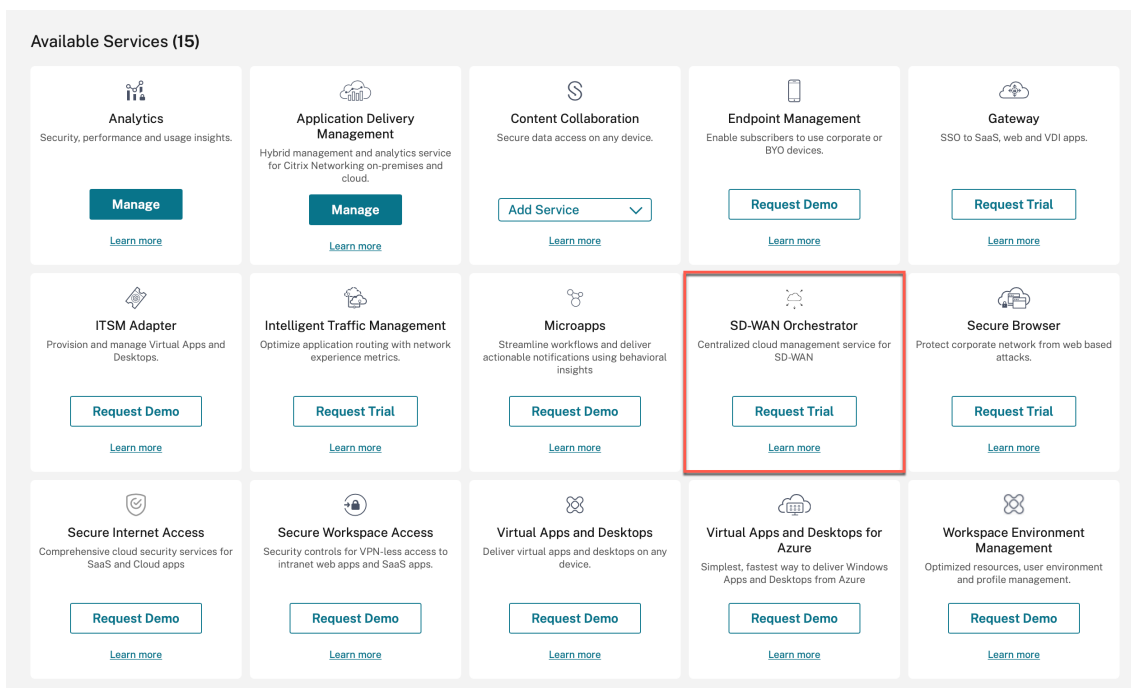
1. Customer logs into Citrix Cloud account.



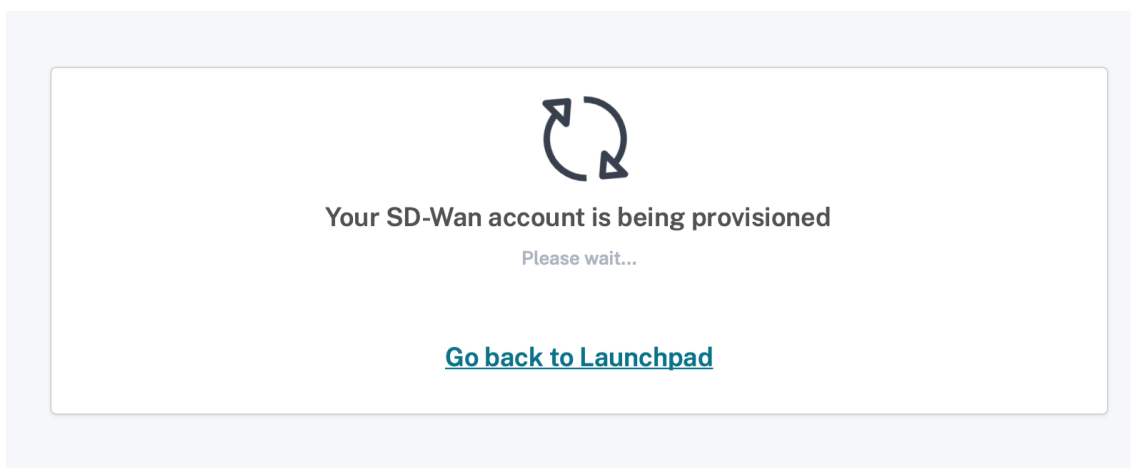
A menu of all the available services offered on Citrix Cloud is displayed on the home page. The **Citrix SD-WAN Orchestrator service** tile can be found in the **Available Services** section.

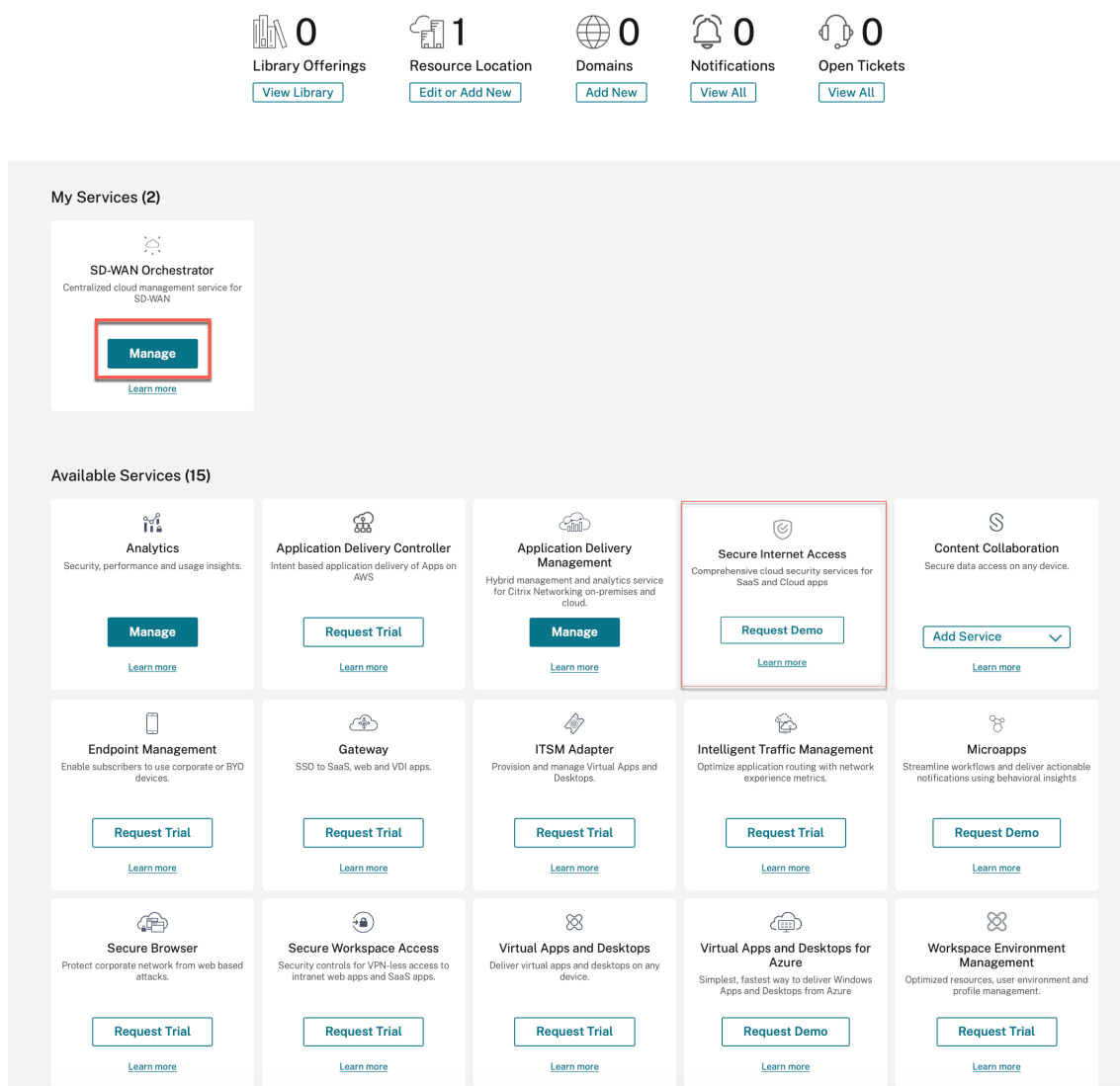
Note

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.**



Citrix SD-WAN Orchestrator for On-premises log-in

July 9, 2021

This article describes how a customer can first time log in to the Citrix SD-WAN Orchestrator for On-premises.

Following are the prerequisites that you need to have before login to the Citrix SD-WAN Orchestrator for On-premises:

- You must have a Citrix Cloud Account. For more information, see [Customer accesses SD-WAN Orchestrator](#).

- To use Citrix SD-WAN Orchestrator for On-premises, you must have an account in the Citrix SD-WAN Orchestrator service. For more information, see [Onboarding Citrix SD-WAN Orchestrator service](#).
- Create an administrator with custom privileges.
- Create a client from the API Access page to get the customer ID, ID, and Secret detail. These details are needed during the Citrix SD-WAN Orchestrator for On-premises log in

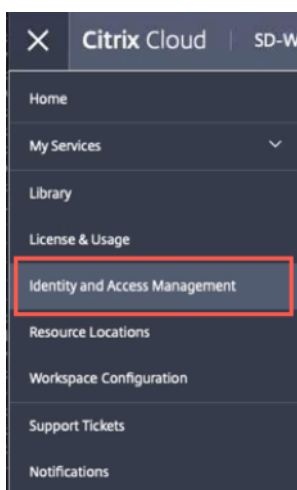
Note

Without the Cloud login, you cannot proceed to the local login.

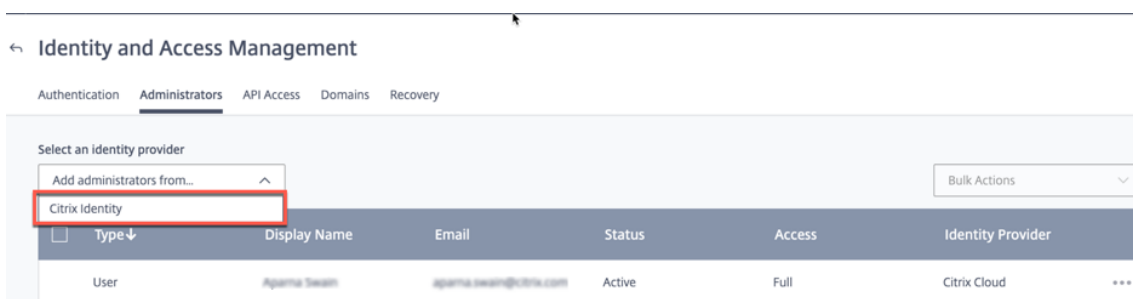
Create Administrator

A provider or an enterprise customer can invite an administrator to manage their SD-WAN network. Perform the following steps to invite an administrator:

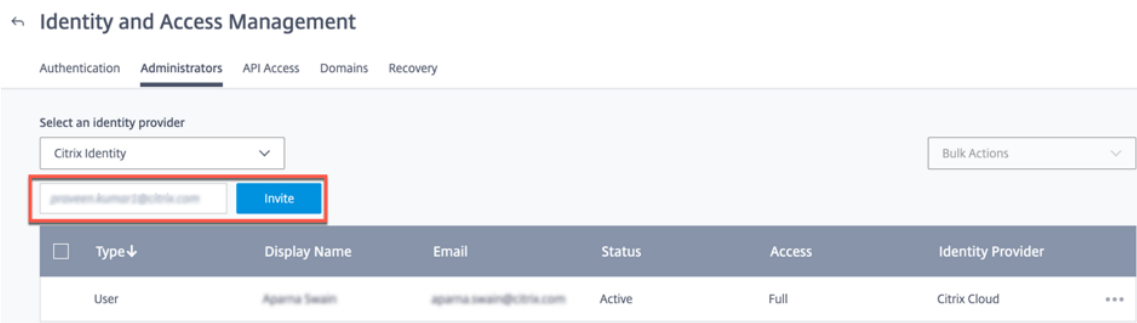
1. Log in to the Citrix Cloud and navigate to **Identity and Access Management**.



2. Go to **Administrators** page and select **Citrix Identity** from the identity provider drop-down list.



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



4. You can choose either **Full access** or **Custom access**. It is recommended to set the custom access for the administrator managing only SD-WAN services. When the **Custom access** radio button is selected, you must also select the **Secure Client** check box from the **General Management** section and **SD-WAN** check box.



[Redacted] will be added to Citrix Systems Inc.

Before sending the invite, set the access for this administrator.

☐ Full access
Full access allows administrators management control of Citrix Cloud and its services, as well as adding or removing other administrators.

☒ Custom access
 Switching to custom access will remove management access to certain services.
Custom access allows you to determine exactly which part of Citrix Cloud your administrators can manage.
[Select all](#) | [Deselect All](#)

☐ General Management

☐ Domains

☐ Library

☐ Notifications

☐ Resource Location

☒ Secure Client

☐ Workspace Configuration

☒ SD-WAN

☒ Customer Admin: Full Access

☒ Customer: Read Only Access

[Cancel](#) [Send Invite](#)

5. Click **Send Invite**.

Once you created the administrator account, login through the administrator account to generate the **API** keys.

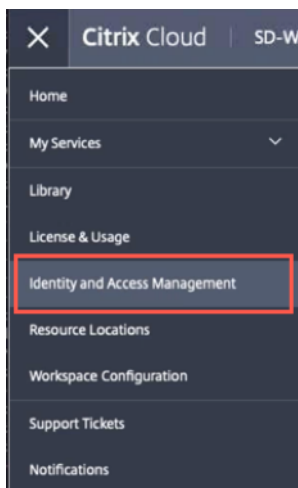
Note

If you already have a custom administrator role, then you can use it to create the API token.

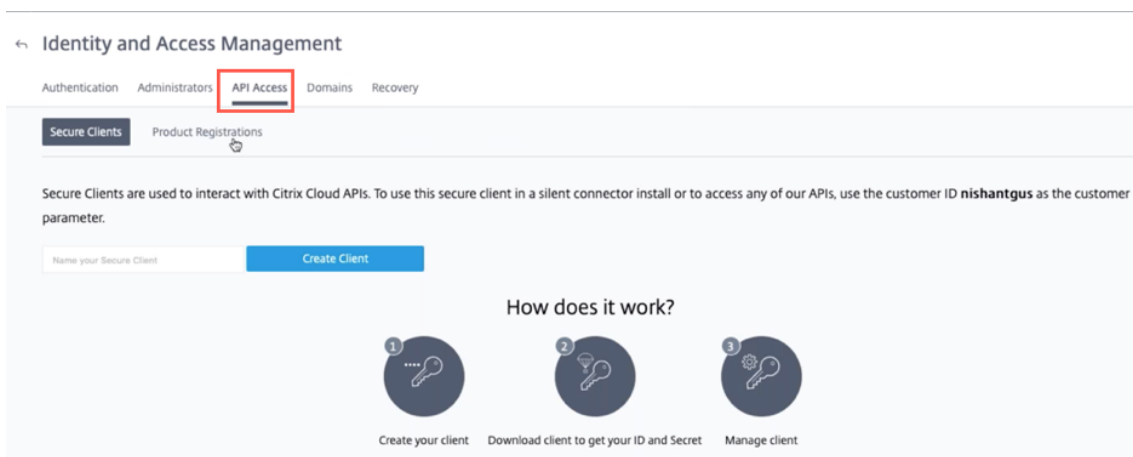
Generate API token

Perform the following steps to log in to Citrix SD-WAN Orchestrator for On-premises.

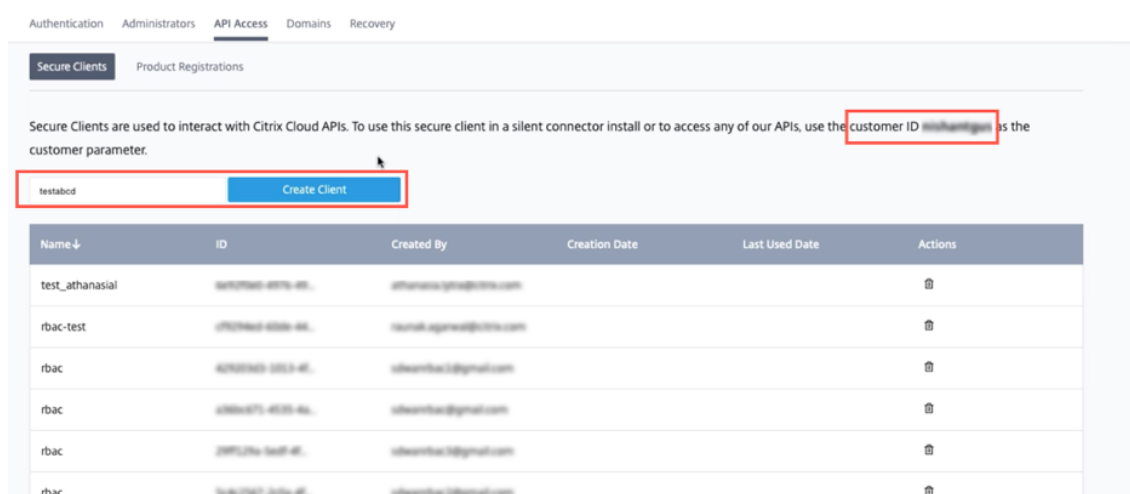
1. Log in to the Citrix Cloud and navigate to **Identity and Access Management**.



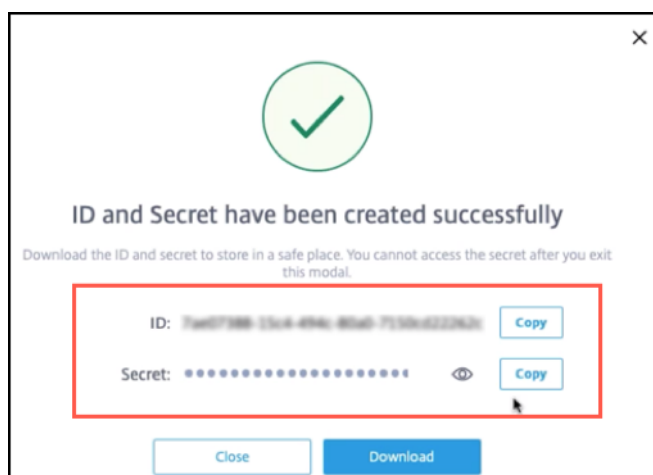
2. Go to **API Access** page.



3. Create a client. Note down the **Customer ID** that you need later to login to Citrix SD-WAN Orchestrator for On-premises.



- On click of **Create Client**, it provides you the **ID** and a **Secret key** that you can copy and save, or download.



- Go to your Citrix Hypervisor (XenServer/VMware) and boot up Citrix SD-WAN Orchestrator for On-premises.
- Once the Citrix SD-WAN Orchestrator for On-premises is booted up, provide the default user name (admin) and Password (password).

Note

It is mandatory to change the default admin user account password on a first time login. This change is enforced using both CLI and UI.

- If the DHCP server is not configured in the SD-WAN network, you have to manually enter a static IP address. To configure a static IP address as the management IP address:
 - In the console, enter the CLI command `management_ip`.
 - Enter the command `set interface <ipaddress> <subnetmask> <gateway>`.

Note

- The management IP address is the IP address of the Citrix SD-WAN Orchestrator for On-premises virtual machine, use this IP address to log into the Citrix SD-WAN Orchestrator for On-premises Web UI.
- The management interface can be configured via the two methods – CLI and DHCP.

8. Once the Citrix SD-WAN Orchestrator for On-premises is booted up, by default it is configured with DNS servers 9.9.9.9 and 149.112.112.112 as primary and secondary respectively. If necessary, you can change the DNS server IP address using the following commands:

- In the console, enter the CLI command `set_dns`.
- Enter the command `set primary <ipaddress>` and then enter `y` to confirm the change.
- Enter the command `set secondary <ipaddress>` and enter `y` to confirm the change.

```
SDWORCH>set_dns

Primary :          nameserver 9.9.9.9
Secondary :        nameserver 149.112.112.112

Which would you like to do?
  "set primary <ip address>" - Stage New Primary DNS IP Address
  "set secondary <ip address>" - Stage New Primary DNS IP Address
  "clear" - Clear all DNS IP Address
  "main_menu" - Return to the Main Menu

set_dns>set primary 8.8.8.8

Are you sure you want to change your Domain Name Server IP settings? <y/n>?
y

Primary :          nameserver 8.8.8.8
Secondary :        nameserver 149.112.112.112

Which would you like to do?
  "set primary <ip address>" - Stage New Primary DNS IP Address
  "set secondary <ip address>" - Stage New Primary DNS IP Address
  "clear" - Clear all DNS IP Address
  "main_menu" - Return to the Main Menu

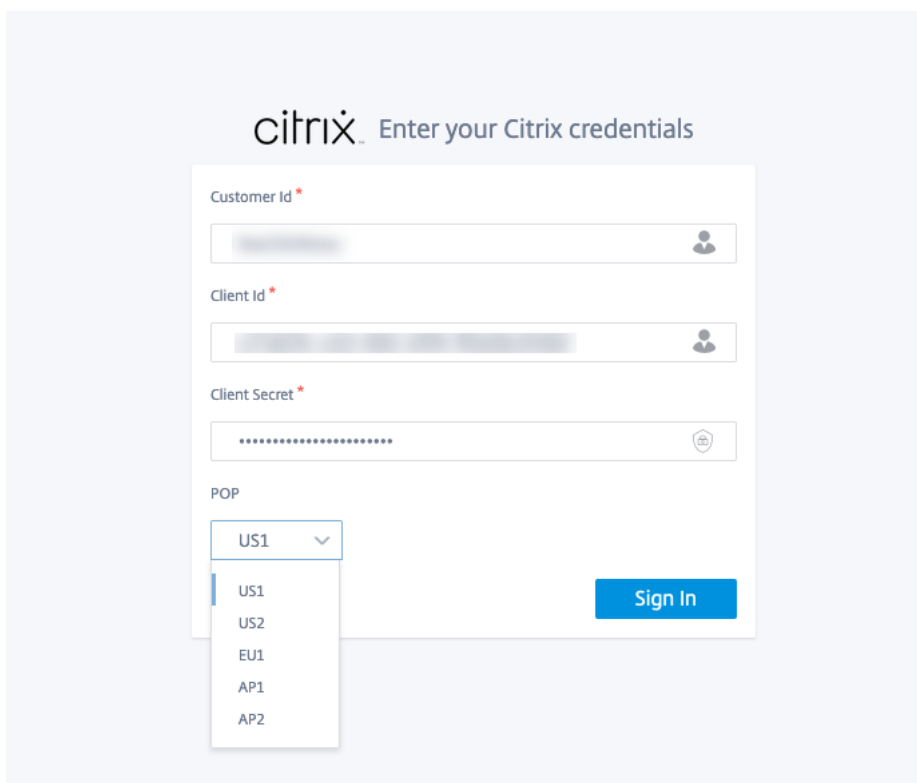
set_dns>set secondary 9.9.9.9

Are you sure you want to change your Domain Name Server IP settings? <y/n>?
y

Primary :          nameserver 8.8.8.8
Secondary :        nameserver 9.9.9.9

Which would you like to do?
  "set primary <ip address>" - Stage New Primary DNS IP Address
  "set secondary <ip address>" - Stage New Primary DNS IP Address
  "clear" - Clear all DNS IP Address
  "main_menu" - Return to the Main Menu
```

9. Open a new browser using the management IP. The following screen appears:

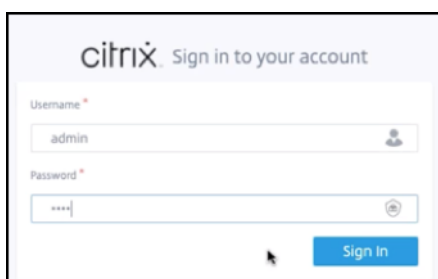
The image shows the Citrix login page for a cloud account. The header says "citrix Enter your Citrix credentials". There are four input fields: "Customer Id" with a red asterisk, "Client Id" with a red asterisk, "Client Secret" with a red asterisk, and "POP" with a dropdown menu. The "Client Secret" field is masked with dots. The "POP" dropdown menu is open, showing options: US1, US2, EU1, AP1, and AP2. A blue "Sign In" button is located to the right of the input fields.

10. Provide the **Customer ID**, **Client ID**, and **Client Secret** that you saved or downloaded earlier while creating the client from the cloud Orchestrator. Select the POP in which your cloud account was on boarded. You cannot change the POP after a successful login.

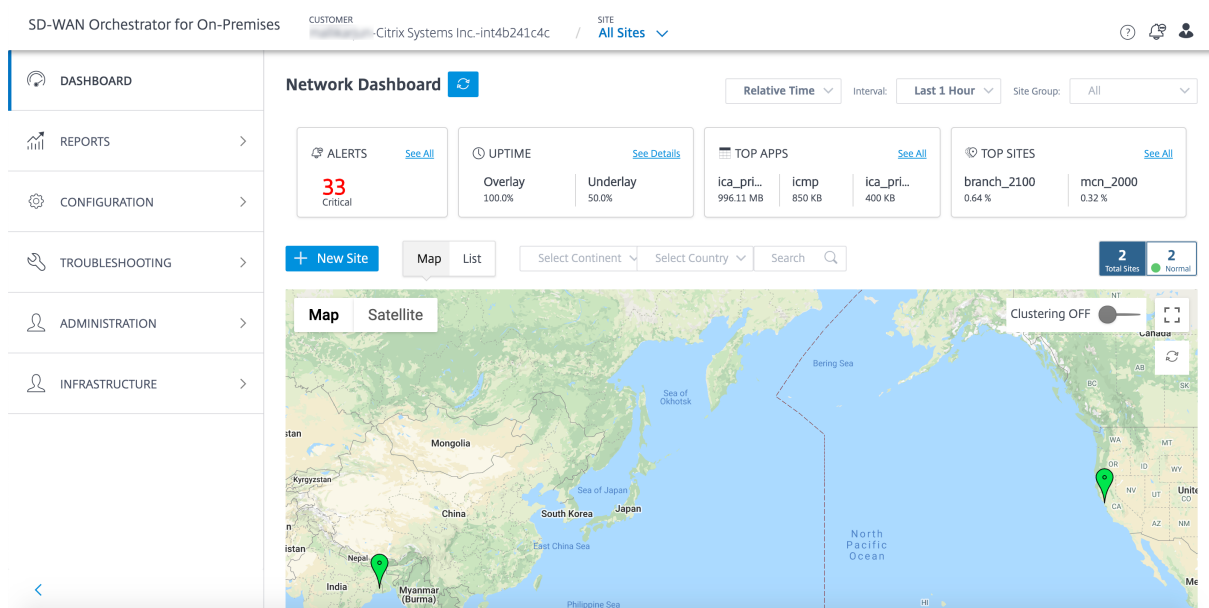
Note

This screen appears once in 15 days. For the subsequent log on/out, you see only the local login page.

11. Provide the default user name and password on the local login page.

The image shows the Citrix local login page. The header says "citrix Sign in to your account". There are two input fields: "Username" with a red asterisk and "Password" with a red asterisk. The "Username" field contains the text "admin". The "Password" field is masked with dots. A blue "Sign In" button is located to the right of the input fields.

You can see that the Citrix SD-WAN Orchestrator for On-premises Dashboard page appears.



Citrix SD-WAN Orchestrator for On-premises licensing

July 9, 2021

Citrix SD-WAN Orchestrator for On-premises licensing is applicable for Do It Yourself (DIY) customers – Direct Enterprise Customers.

As a prerequisite for Citrix SD-WAN Orchestrator for On-premises licensing ensure that you are logged into the Citrix Cloud. For more information, see [Citrix SD-WAN Orchestrator for On-premises login](#).

Citrix SD-WAN Orchestrator for On-premises deployment is available free of charge, but the customer needs to bear the cost of management server infrastructure and maintenance.

Trial Mode

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

After the trial period 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 for On-premises changes from Trial to Production when the first valid license is hosted on it. 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 Orchestrator 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](#).

Prepaid Billing Model

A prepaid billing model is provided for Citrix SD-WAN Orchestrator for On-premises 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. All the appliances in the customer network have a prepaid annual subscription. Maintenance licenses are included in the subscription package and provide the ability to upgrade appliances to newer software versions.
- **Prepaid perpetual:** With prepaid perpetual the licenses have no time limit, restricted duration, or expiration. However, the hardware maintenance license is available as a paid add-on and must be purchased separately. All the appliances in the customer network have a prepaid perpetual subscription.

To view the billing model in Citrix SD-WAN Orchestrator for On-premises, at the network level navigate to **Administration > Licensing > Select Billing Model**. The billing model is displayed as **Prepaid Annual and Perpetual**.

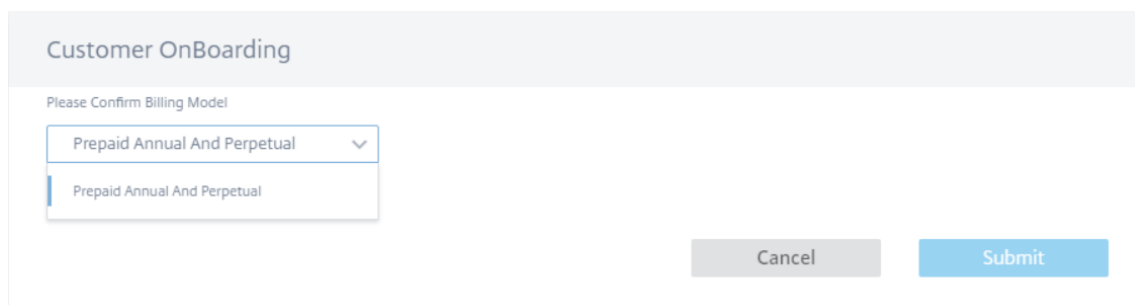
Upload the licenses to all the customer sites. For more information, see Retrieve and assign entitlements for prepaid billing model.

Retrieve and assign entitlements for prepaid billing model

You can retrieve the license entitlements using the Access Code provided by Citrix via email. Alternatively, the customer can also view the Access Code in the [license management portal](#) within Citrix Cloud. The customer can have either **Prepaid Perpetual**, or **Prepaid Annual Subscription** billing model in the network.

Prerequisite: Ensure that the Citrix SD-WAN Orchestrator for On-premises 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 the Citrix SD-WAN Orchestrator for On-premises product.

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



Customer OnBoarding

Please Confirm Billing Model

Prepaid Annual And Perpetual

Prepaid Annual And Perpetual

Cancel Submit

2. Click **Retrieve Licenses**.

Network Administration : Licensing Licensing Model: None

Retrieve Licenses Upgrade to Production

License View Site View

Search

SDWAN Entitlements

Device Model	Software Edition	Bandwidth	Expiration Date	License Type	License Access Code	Licenses Available	Assigned To Sites	Actions
--------------	------------------	-----------	-----------------	--------------	---------------------	--------------------	-------------------	---------

Page Size: 25 Showing 0 - 0 of 0 items Page 1 of 1

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

Retrieve Licenses

+ License Access Code

Enter License Access Cc

Enter License Access Cc

Submit Cancel

The Citrix SD-WAN Orchestrator for On-premises retrieves the entitlements and populates the license table.

License View Site View

Search

SDWAN Entitlements

Device Model	Software Edition	Bandwidth	Expiration Date	License Type	Activation Code	Licenses Available	Assigned To Sites	Actions
CB210	SE	20	PERPETUAL	SD-WAN software Perpetual		1	1	Assign/Unassign
CB210	SE	20	PERPETUAL	SD-WAN software Perpetual		1	1	Assign/Unassign
CB210	SE	20	PERPETUAL	SD-WAN software Perpetual		1	1	Assign/Unassign
CB210	SE	50	PERPETUAL	SD-WAN software Perpetual		1	1	Assign/Unassign
CB210	SE	50	PERPETUAL	SD-WAN software Perpetual		1	1	Assign/Unassign
CB210	SE	50	PERPETUAL	SD-WAN software Perpetual		1	1	Assign/Unassign
CB210	SE	20	PERPETUAL	SD-WAN software Perpetual		1	1	Assign/Unassign
CB210	SE	50	PERPETUAL	SD-WAN software Perpetual		1	1	Assign/Unassign
CB1100	SE	200	PERPETUAL	SD-WAN software Perpetual		1	1	Assign/Unassign
CB1100	SE	200	PERPETUAL	SD-WAN software Perpetual		1	1	Assign/Unassign
CB210	SE	20	PERPETUAL	SD-WAN software Perpetual		1	1	Assign/Unassign
CB210	SE	20	PERPETUAL	SD-WAN software Perpetual		1	1	Assign/Unassign
CB210	SE	20	PERPETUAL	SD-WAN software Perpetual		1	0	Assign/Unassign
CB210	SE	20	PERPETUAL	SD-WAN software Perpetual		1	0	Assign/Unassign
CB210	SE	50	PERPETUAL	SD-WAN software Perpetual		1	1	Assign/Unassign
CB210	SE	50	PERPETUAL	SD-WAN software Perpetual		1	1	Assign/Unassign
CB210	SE	50	PERPETUAL	SD-WAN software Perpetual		1	1	Assign/Unassign
CB210	SE	20	PERPETUAL	SD-WAN software Perpetual		1	1	Assign/Unassign

4. Click **Assign/Unassign** and select **All Unlicensed**. All the unlicensed sites with configured bandwidth equal to or less than the license bandwidth is displayed.

Details of UnLicensed Sites

View: ☐ All Licensed ☒ All Unlicensed

☐	Site	Device	Platform	Configured Bandwidth
☒	Test_MCN	primary	VPX	200

Page Size: 25 Showing 1 - 1 of 1 items Page 1 of 1

Cancel Assign

5. Select the sites, click **Assign** and then click **Upgrade to Production**.

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.

Details of Licensed Sites

View: ☒ All Licensed ☐ All Unlicensed

☐	Site	Device	Platform	Configured Bandwidth	Expiration Date
☒	Test_MCN	primary	VPX	200	
☒	Test_Branch1	primary	VPX	20	

Page Size: 25 Showing 1 - 2 of 2 items Page 1 of 1

Cancel UnAssign

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.

License View **Site View**

Search

Site	License Status	HA Role	Device Model	Configured Bandwidth	Licensed Bandwidth	License Expiration	Software Maintenance	License Type	Action
Test_MCN	Active	primary	CBVPX	200	200	PERPETUAL	May 25, 2020 5:...	SD-WAN softwar...	Unassign
Test_Branch1	Active	primary	CBVPX	20	200	PERPETUAL	May 25, 2020 5:...	SD-WAN softwar...	Unassign

Page Size: 25 Showing 1 - 2 of 2 items Page 1 of 1

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 customer's network data paths are brought down, and additional changes cannot be deployed until the licenses are renewed.

Connectivity with Citrix SD-WAN appliances

May 24, 2022

After configuring sites on Citrix SD-WAN Orchestrator for On-premises, establish connectivity between Citrix SD-WAN appliances on the sites with Citrix SD-WAN Orchestrator for On-premises. You can establish connectivity in one of the following ways:

- **One-way Authentication:** The SD-WAN appliance authenticates Citrix SD-WAN Orchestrator for On-premises. On enabling one-way authentication, you must download the Citrix SD-WAN Orchestrator for On-premises certificate and upload it on the SD-WAN appliance.
- **Two-way Authentication:** The SD-WAN authenticate each other using the exchanged certificates. On enabling two-way authentication, you must upload the SD-WAN appliance certificate on Citrix SD-WAN Orchestrator for On-premises and also Citrix SD-WAN Orchestrator for On-premises certificate on the SD-WAN appliance.
- **No Authentication:** The connectivity is established between the Citrix SD-WAN Orchestrator for On-premises and SD-WAN appliances with no authentication. You need not use the SD-WAN Appliance or Citrix SD-WAN Orchestrator for On-premises Certificate. You can use No Authentication when you have a secure network such as MPLS.

Note

It is recommended to use only **one-way authentication** or two-way authentication. In the case of no Authentication, you have to choose the secure DNS server.

You can configure connectivity with each site manually or use the automated zero-touch deployment.

Note

Citrix SD-WAN 11.3.0 is the minimum software version required for an appliance to connect to Citrix SD-WAN Orchestrator for On-premises.

Zero-touch deployment

Zero-touch deployment is an automated process to configure connectivity between the appliances and Citrix SD-WAN Orchestrator for On-premises. You can establish the connectivity automatically using non-cloud zero-touch deployment or cloud brokered zero-touch deployment settings.

Non-Cloud zero-touch deployment

Non-Cloud zero-touch deployment settings allow you to configure Citrix SD-WAN Orchestrator for On-premises information on SD-WAN appliances. The NITRO API running in the back-end handles download and upload of certificates. It downloads the certificate from Citrix SD-WAN Orchestrator for On-premises, logs in to the SD-WAN appliance, and uploads the certificate. It also downloads the SD-WAN appliance certificate and uploads it on Citrix SD-WAN Orchestrator for On-premises.

Note

Non-Cloud zero-touch deployment is supported on SD-WAN appliances running with the 11.3.0 release or later.

Zero-touch deployment supports only **one-way authentication** and **two-way authentication**. **No authentication** is not supported. If **Authentication Type** is enabled on **Administration > Certificate Authentication** page, then two-way authentication is established. If **Authentication Type** is disabled, then one-way authentication is established.

You can either add sites manually or import a CSV file to add multiple sites simultaneously.

To configure Non-cloud zero-touch deployment settings, navigate to **Administration > ZTD Settings > Non-Cloud ZTD**, and click **+ Site**.

[Non-Cloud ZTD](#)

Cloud Brokered ZTD (Preview)



- Non-Cloud ZTD Settings helps to configure On-prem SD-WAN Orchestrator Information on SD-WAN Appliances running 11.3.0 and above releases.
- Multiple sites can also be added by importing a .csv file with all the site details.
[Click here](#) to download a sample .csv file.

Non-Cloud ZTD Settings

+ Site

Import

Delete All

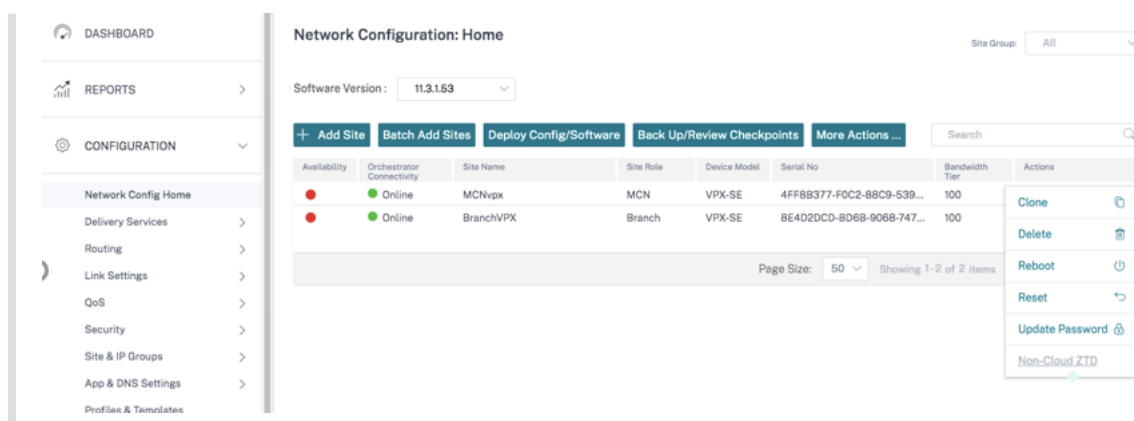
Refresh

Search

Site Name	Management IP	Configuration Status	Actions
Page Size: 50 Showing 0 - 0 of 0 items Page 1 of 1			

Note

You can also access Non-cloud zero-touch deployment settings for each site from **Network Configuration Home** page. Click the action icon for the site and select **Non-cloud ZTD**.



Select a site from the **Site Name** drop-down list and enter the **Management IP** address of the Citrix SD-WAN appliance.

Enabling the **Use ZTD Interface** option ensures that the ZTD interface is used for Non-cloud ZTD, if the ZTD interface is enabled on SD-WAN Orchestrator for On-premises.

Note

- Ignore the **Use ZTD Interface** option, if ZTD interface is not enabled on SD-WAN Orchestrator for On-premises.
- Enable the **Use ZTD Interface** option when SD-WAN appliance can access the ZTD interface IP address but cannot access the Management IP address.
- Not selecting the **Use ZTD Interface** option after enabling ZTD interface, does not mean that the Management Interface IP address is used for communication between SD-WAN appliance and SD-WAN Orchestrator for On-premises. The **Use ZTD Interface** option is used only for initial configuration of the appliance using Non-Cloud ZTD.

Provide the appliance user name and Password. Select the **Freshly Provisioned** check box if you are adding a newly provisioned site on which the default password has not been changed. Provide the **New Password**. The default password is changed to the new password during this zero-touch deployment process.

Note

For a newly provisioned site, it is mandatory to change the default password at the time of first login.

Add Sites

• The 'Use ZTD Interface' checkbox will allow the initial transport and all the subsequent requests via ZTD interface if configured. By default, the behavior does not use ZTD interface for initial communication to the appliance

Site Name	Management IP	Use ZTD Interface	Username	Freshly Provisioned	Password	New Password	
BRANCHVPX ▾	10.102.29.220	☒	admin	☐	*****	New password	+ -

Add **Cancel**

Click **+** to continue to add more sites.

You can also import a CSV file to add multiple sites simultaneously. A sample downloadable template is available in the UI. Download it and provide the site details.

[Non-Cloud ZTD](#) [Cloud Brokered ZTD \(Preview\)](#)

• Non-Cloud ZTD Settings helps to configure On-prem SD-WAN Orchestrator Information on SD-WAN Appliances running 11.3.0 and above releases.

• Multiple sites can also be added by importing a .csv file with all the site details.

[Click here](#) to download a sample .csv file.

onprem-orchestrator-sample-template - Excel

	A	B	C	D	E	F	G	H	I	J
1	no	applianceName	applianceUserName	appliancePassword	applianceManagementIP	isPasswordExpired	applianceNewPassword	isPrimaryAppliance		
2		1 Site1Primary	site1admin	site1password	10.102.78.154	FALSE		TRUE		
3		2 Site1Secondary	site1admin	site1password	10.102.78.155	TRUE	site1newpassword	FALSE		
4		3 Site2	site2admin	site2password	10.102.78.156	FALSE		TRUE		
5										
6										
7										
8										
9										

- **Appliance Name:** The site name configured during site configuration. For more information, see [Site Configuration](#).
- **Appliance Username:** The user name configured on the site appliance.
- **Appliance Password:** The corresponding password for the site appliance.
- **Is password expired:** Determines if the appliance is freshly provisioned. If the value is **True**, provide the **Appliance New Password**.
- **Appliance New Password:** The password for freshly provisioned appliances. If the **Is password expired** value is **True**, provide the **Appliance new password**.
- **Is Primary Appliance:** If High Availability (HA) is configured, the active appliance must have the

value True and standby appliance must have the value False. If HA is not configured, the value must be True.

Click **Import**, select the CSV file and click **Upload**.

Non-Cloud ZTD Settings

+ Site **Import** **Delete All** **Refresh**

Site Name	Management IP	Configuration Status	Actions
BR0_110	10.105.1...	Site is ...	
MCN_211	10.102....	Initiate...	

Page Size: 50 Showing 1-2 of 2 items Page 1 of 1

Import Sites

Click here to select the file or drag and drop the selected file.
Allowed file type is .csv

onprem-orchestrator-sample-template.csv

Upload
Cancel

The configuration status of the sites is displayed, you can choose to delete sites individually or Delete All if sites are not required for zero-touch deployment.

+ Site **Import** **Delete All** **Refresh**

Site Name	Management IP	Configuration Status	Actions
MCN_23	10.102.78.154	Site is configured successfully	
Site1	10.102.78.156	Site is configured successfully	

Page Size: 50 Showing 1-2 of 2 items Page 1 of 1

Cloud brokered zero-touch deployment

Cloud brokered zero-touch deployment uses Citrix SD-WAN Orchestrator service as a broker between Citrix SD-WAN Orchestrator for On-premises and the Citrix SD-WAN appliances. Citrix SD-WAN Orchestrator for On-premises sends a cloud zero-touch deployment configuration package to Citrix SD-WAN Orchestrator service. The cloud zero-touch deployment configuration package consists of the following information:

- On-prem identity information
- Authentication type
- On-prem certificate
- Appliance details (List of serial numbers)

Citrix SD-WAN Orchestrator service stores the information received from Citrix SD-WAN Orchestrator for On-premises. When an appliance contacts the Citrix SD-WAN Orchestrator service with its serial number, the acquired intelligence of Citrix SD-WAN Orchestrator service determines that the appliance has to be managed by Citrix SD-WAN Orchestrator for On-premises. Citrix SD-WAN Orchestrator service passes on the Citrix SD-WAN Orchestrator for On-premises details to the appliance. Citrix SD-WAN appliance sends its certificate to Orchestrator service. Citrix SD-WAN Orchestrator service receives and stores the appliance certificate.

Citrix SD-WAN Orchestrator for On-premises periodically fetches the appliance certificate from Citrix SD-WAN Orchestrator service. Once a secure connection is established between Citrix SD-WAN Orchestrator for On-premises and the appliance, the Citrix SD-WAN Orchestrator for On-premises pushes the configuration and relevant files to the appliances.

Cloud brokered zero-touch deployment settings are available only for customers in a customer managed setup. Provider managed setup does not support cloud brokered zero-touch deployment settings.

Prerequisites

- Appliances need access to the following domain names to establish connection with Citrix SD-WAN Orchestrator service:
 - `sdwanzt.citrixnetworkapi.net`
 - `download.citrixnetworkapi.net`
 - `trust.citrixnetworkapi.net`
 - `sdwan-home.citrixnetworkapi.net`
- Ensure that Citrix SD-WAN Orchestrator for On-premises always has connectivity to Citrix SD-WAN Orchestrator service to onboard SD-WAN appliances.
- Ensure that Citrix SD-WAN appliance has connectivity to SD-WAN Orchestrator service during the initial on-boarding process and if factory reset is done on the SD-WAN appliance.

To configure Cloud brokered zero-touch deployment settings:

1. In Citrix SD-WAN Orchestrator for On-premises, create and define sites using the guided workflow. For more information, see [Site configuration](#).
2. Verify and compile the configuration using the deployment tracker. For more information, see the Deployment Tracker section in [Network configuration](#) topic.
3. Navigate to **Administration > ZTD Settings > Cloud Brokered ZTD** and click **+ Site**.

Network Administration: ZTD Settings

Non-Cloud ZTD Cloud Brokered ZTD

Cloud Brokered ZTD Status

+ Site Pull Appliance Certificates Delete Cloud Brokered ZTD Settings

Site Name	Configuration Status	Actions
-----------	----------------------	---------

Page Size: 50 Showing 0 - 0 of 0 items Page 1 of 1

4. From the drop-down list select a site name and click **Add**. The sites are listed based on your configuration. You can select a single site or multiple sites.

Add Sites

Site Name *

Site1 X MCN_23 X

Add Cancel

5. The cloud zero-touch deployment configuration is created and sent to Citrix SD-WAN Orchestrator service.

Non-Cloud ZTD Cloud Brokered ZTD

Cloud Brokered ZTD Status

+ Site Pull Appliance Certificates Delete Cloud Brokered ZTD Settings

Site Name	Configuration Status	Actions
Site1	Cloud ZTD Site Configuration is created	
MCN_23	Cloud ZTD Site Configuration is created	

Page Size: 50 Showing 1 - 2 of 2 items Page 1 of 1

6. Cable up and power on the SD-WAN appliances at the Data Center and branch sites.
7. The appliances contact the Citrix SD-WAN Orchestrator service with their serial number.
8. The Citrix SD-WAN Orchestrator service acts as broker between Citrix SD-WAN Orchestrator for On-premises and the appliances. It allows exchange of certificates and Citrix SD-WAN appliance establishes a secure connection with Citrix SD-WAN Orchestrator for On-premises. Once

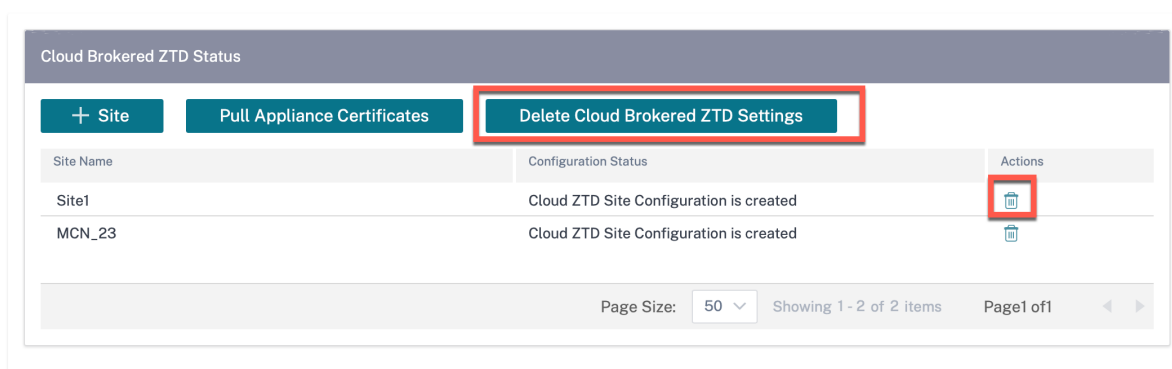
zero-touch deployment is successful, the configured site comes online and is displayed in the **Orchestrator Connectivity** column under **Configuration > Network Config Home**.

9. **Activate** and **Stage** the configuration to push the configuration and software to the appliances.
10. Once the configuration/software is applied, virtual paths get established and the **Availability** column under **Configuration > Network Config Home** gets updated with the appropriate virtual path status.

NOTE

Citrix SD-WAN Orchestrator for On-premises takes about 30 minutes to fetch the appliance certificate and onboard the appliances completely. To pull the appliance certificates immediately (without waiting for 30 minutes), click **Pull Appliance certificates**.

If necessary, you can choose to click **Delete Cloud Brokered ZTD Settings**. It removes information related to all sites. If you need to delete a particular site information, then click the delete icon corresponding to that site.



Limitations

- SD-WAN appliances cannot connect to multiple instances of Citrix SD-WAN Orchestrator for On-premises that share cloud login credentials. For example, an SD-WAN appliance remains connected to Citrix SD-WAN Orchestrator for On-premises configured for the first time. The Citrix SD-WAN Orchestrator for On-premises details that are configured next are not pushed to the SD-WAN appliance.
- SD-WAN appliances connected over LTE cannot establish a connection with Citrix SD-WAN Orchestrator for On-premises hosted on a private network.

ZTD Interface Settings

You can enable a Zero Touch Deployment (ZTD) interface on SD-WAN Orchestrator for On-premises. The ZTD Interface that is secured by two-way authentication provides a secure communication inter-

face for SD-WAN appliances and SD-WAN Orchestrator for On-premises.

After enabling the ZTD Interface, new D-WAN appliances deployed through Non-Cloud ZTD and Cloud-Brokered ZTD use the ZTD Interface IP address to communicate with SD-WAN Orchestrator for On-premises.

As a prerequisite, ensure that SD-WAN Orchestrator for On-premises Virtual Machine has an additional interface, apart from the Management Interface.

General	Memory	Storage	Networking	Console	Performance	Snapshots	Search
Virtual Network Interfaces							
Networks							
Device	MAC	Limit	Network	IP Address		Active	
0	7a:2b:48:ed:14:7b		Network 0	10.105.172.131, fe80::782b:48ff:feed:147b		Yes	
1	0e:01:54:f4:ad:95		ZTD_Interface_Network	Unknown		Yes	

Note

For the VMware ESXi Virtual Machine, ensure that the Virtual Machine is rebooted after adding an extra interface for ZTD.

Hardware Configuration	
CPU	8 vCPUs
Memory	16 GB
Hard disk 1	64.97 GB
Network adapter 1	VM Network (Connected)
Network adapter 2	VM Network (Connected)
Video card	4 MB
CD/DVD drive 1	Remote device CD/DVD drive 0
Others	Additional Hardware

Enabling ZTD Interface

In SD-WAN Orchestrator for On-premises GUI, navigate to **Administration > ZTD Settings** and select **Enable ZTD Interface** to enable ZTD interface. Provide the ZTD interface IP address, Subnet Mask, and Gateway IP address.

Select **Use Management Interface for Existing Sites** to ensure that SD-WAN appliances already deployed through the Non-Cloud ZTD or the Cloud Brokered-ZTD continue to connect with SD-WAN Orchestrator for On-premises using the Management Interface IP address.

Warning

If **Use Management Interface for Existing Sites** is not selected, SD-WAN appliances that are already deployed through the Non-Cloud ZTD or the Cloud Brokered-ZTD, lose connection to SD-WAN Orchestrator for On-premises.

Network Administration: ZTD Settings

Non-Cloud ZTD Cloud Brokered ZTD ZTD Interface Settings

ZTD Interface Settings

☒ Enable ZTD Interface

A Selecting the below option will allow the previously configured sites to continue using already configured Management IP on eth0. Deselecting it would cause the previously configured sites to lose management connectivity with OnPrem Orchestrator.

☒ Use Management Interface For Existing Sites

IPv4 Interface

☒ Enable IPv4

IP Address *

172.13.187.57

Subnet Mask *

255.255.255.0

Gateway IP Address *

172.13.187.1

Configuring Non-Cloud ZTD using ZTD interface

If the **Use Management Interface for Existing Sites** option is selected, the appliances that are already deployed using Non-Cloud ZTD continue to use the Management Interface IP address to connect with SD-WAN Orchestrator for On-premises. Initiate Non-Cloud ZTD on the appliances to establish a connection with SD-WAN Orchestrator for On-premises using the ZTD Interface IP address.

Note

You can disable the Use Management Interface for Existing Sites option after all SD-WAN appliances have established connection with SD-WAN Orchestrator for On-premises through the ZTD Interface IP address.

If the **Use Management Interface for Existing Sites** option is not selected, SD-WAN appliances already deployed using Non-Cloud ZTD loses the connection to SD-WAN Orchestrator for On-premises. Initiate Non-Cloud ZTD on SD-WAN appliances to restore connection with SD-WAN Orchestrator for On-premises using the ZTD Interface IP address.

Configuring Cloud Brokerd ZTD using ZTD Interface

If the **Use Management Interface for Existing Sites** option is selected, the appliances that are already deployed using Cloud Brokered ZTD continue to use the Management Interface IP address to connect

with SD-WAN Orchestrator for On-premises. To establish a connection with SD-WAN Orchestrator for On-premises using the ZTD Interface IP address, do one of the following:

- On the SD-WAN appliances, update the IP address and certificate of SD-WAN Orchestrator for On-premises.

Note

Update the certificate only if the certificates are regenerated manually, you need not update the certificate if the appliances already have the certificates.

- Perform a factory reset and initiate Cloud Brokered-ZTD on the appliances, to establish a connection with SD-WAN Orchestrator for On-premises using the ZTD Interface IP address.

Note

You can disable the **Use Management Interface for Existing Sites** option after all SD-WAN appliances have established connection with SD-WAN Orchestrator for On-premises through the ZTD Interface IP address.

If the **Use Management Interface for Existing Sites** option is not selected, SD-WAN appliances that are already deployed using Cloud brokered ZTD lose the connection to SD-WAN Orchestrator for On-premises. To restore connection with SD-WAN Orchestrator for On-premises using the ZTD Interface IP address, do one of the following:

- On the SD-WAN appliances, update the IP address and certificate of SD-WAN Orchestrator for On-premises.
- Perform a factory reset and initiate Cloud Brokered-ZTD on the appliances, to establish a connection with SD-WAN Orchestrator for On-premises using the ZTD Interface IP address.

Manual Connectivity Configuration

While configuring connectivity manually, you must download the Citrix SD-WAN Orchestrator for On-premises certificate and upload it on each appliance in the network. It involves logging into each appliance manually for uploading the certificates.

To configure connectivity manually-

1. Navigate to **Administration > Certificate Authentication** and enable **Authentication Type**.

When Authentication Type is enabled, the SD-WAN appliance can connect to Citrix SD-WAN Orchestrator for On-premises only through Two-way Authentication. When Authentication Type is disabled, the SD-WAN appliance can connect to Citrix SD-WAN Orchestrator for On-premises either through No Authentication, One-way Authentication, or Two-way Authentication.

Note

In a provider managed setup, only providers can enable authentication type and regenerate the Citrix SD-WAN Orchestrator for On-premises certificate.

2. Click **Regenerate** and **Download** the Citrix SD-WAN Orchestrator for On-premises certificate.
3. Choose an appliance from the **Appliance Certificate** section and upload the corresponding certificate downloaded from the SD-WAN appliance. For detailed information on downloading the appliance certificate, see [Citrix SD-WAN Orchestrator on-premises configuration on SD-WAN appliance](#).

NOTE

- Only .pem file type is supported.
- Only customer administrators can upload the appliance certificate.

4. Log on to the SD-WAN appliance UI, navigate to **Configuration > Virtual WAN > On-prem SD-WAN Orchestrator**. Upload the certificate downloaded from Citrix SD-WAN Orchestrator for On-premises. For detailed information, see [Citrix SD-WAN Orchestrator for On-premises configuration on SD-WAN appliance](#).

☒ Authentication Type

On-prem Orchestrator Certificate

Certificate Details:	
Certificate Fingerprint:	F2:3F: [redacted] E:9F
Start Date:	January 09 05:45:54 2021 GMT
End Date:	January 07 05:45:54 2031 GMT

Regenerate
Download

Appliance Certificate

Select an appliance ▼

Click here to select the file or drag and drop the selected file.
Allowed file type is .pem

Upload

Verify Connectivity

To verify the connectivity status of the appliance, navigate to **Configuration > Network Configuration Home**, and check the **Cloud Connectivity** column corresponding to your site.

Network Dashboard 

Relative Time Interval: Last 1 Hour Site Group: All

 ALERTS [See All](#)

0
Critical

 UPTIME [See Details](#)

No Statistics Available

 TOP APPS [See All](#)

No Statistics Available

 TOP SITES [See All](#)

No Statistics Available

[+ New Site](#) Map List Select Continent Select Country Search

Availability	Cloud Connectivity	Site Name	Site Role	Device Model	Serial Number	Bandwidth Tier	Management IP
●	Online	test	Branch	210		20	Unknown

Page Size: 25 Showing 1 - 1 of 1 items Page 1 of 1

Note

You can publish the desired software to upgrade the appliances under **Infrastructure > Orchestrator Administration > Software Images > Appliance**. For more information, see [Publish software](#).

Fallback configuration

Fallback configuration ensures that the Citrix SD-WAN Orchestrator for On-premises connectivity that you have established with the Citrix SD-WAN appliance is retained through the appliance's in-band management IP.

You can enable fallback configuration on Citrix SD-WAN Orchestrator for On-premises at the site level by navigating to **Configuration > Appliance Settings > Fallback** and click **Enable Fallback Configuration**.

DASHBOARD

REPORTS

CONFIGURATION

- Site Configuration
- Advanced Settings
- Appliance Settings**
- WAN-OP Settings

TROUBLESHOOTING

Administrator Interface NetFlow Host Settings Network Adapters AppFlow Host Settings SNMP **Fallback** DateTime Syslog Flows Mobile Broadband Status

'Day 0' Default / 'Day N' Fallback Config

The fallback configuration provides basic network functionality when a critical failure occurs and the system can no longer function.

☒ **Enable Fallback Configuration** Reset

LAN Settings

VLAN ID: 0 IP Address: 192.168.101.1/24

☐ Enable DHCP Server

DHCP Start: 192.168.101.50 DHCP End: 192.168.101.250

☒ Dynamic DNS Servers

DNS Server: All DNS Server

☐ Internet Access

For detailed information about fallback configuration, see [Inband management](#).

Note

If you are using an appliance other than Citrix SD-WAN 110 SE, ensure that you are running SD-WAN 11.2 or a later version to enable default fallback configuration.

The following table provides the details of pre-designated WAN and LAN ports for fallback configuration on different platforms:

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)

Port Settings

Port
Mode

1

☐ WAN
☒ LAN
☐ Disabled

2

☒ WAN
☐ LAN
☐ Disabled

3

☐ WAN
☐ LAN
☒ Disabled

4

☐ WAN
☐ LAN
☒ Disabled

5

☐ WAN
☐ LAN
☒ Disabled

6

☐ WAN
☐ LAN
☒ Disabled

7

☐ WAN
☐ LAN
☒ Disabled

8

☐ WAN
☐ LAN
☒ Disabled

MGT

☐ WAN
☐ LAN
☒ Disabled

Unassigned Port Bypass Mode

Fail to Block

Provider level configuration

July 16, 2020

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**.

Provider Configuration:Site Profile Templates

+ Site Profile Template

Site Profile Templates	Actions

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](#).

Provider Configuration:Site Profile Templates

01 Site Details 02 Interfaces 03 WAN Links

Profile Information

Site Profile Template Name *

Florida

Site & Device Details

Device Model *

Device Edition *

Sub-Model *

Site Role *

210

SE

BASE

Select Site Role

Cancel

Prev

Next

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](#).

Provider Configuration:Site Profile Templates

01 Site Details

02 Interfaces

03 WAN Links

Interface Attributes

Deployment Mode *

Interface Type *

Security *

Interface Name

Edge (Gateway) ▾

LAN ▾

Trusted ▾

LAN-1

Physical Interface

Select Interface *

1/1

1/2

1/3

1/4

1/5

Virtual Interfaces

VLAN ID *

Virtual Interface Name

☐ DHCP Client

0

VIF-1-LAN-1

Routing Domain *

Firewall Zones

Default_RoutingDomain ▾

<Default> ▾

Save

Cancel

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

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 *

☐ Public IP Address Auto Detect

Broadband-Verizon_Comm-1

Egress

Speed *

Mbps

100

Ingress

Speed *

Mbps

100

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)

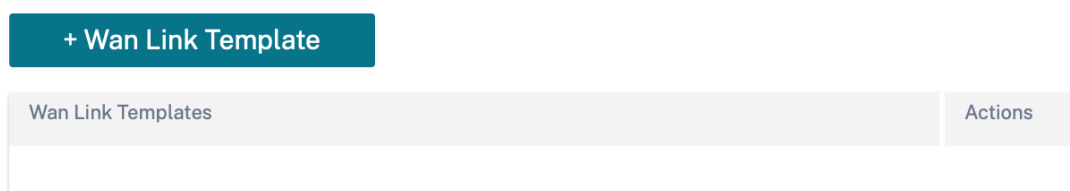
1350

Cancel

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.

Provider Configuration:WAN Link Templates



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](#).

February 8, 2022

Network home

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.

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.

Configuration / Network Home

Verify Configuration Software Version : 11.4.13-6A

Network Sites

Site Group: All Add Site More ...

5 TOTAL SITES

1 CRITICAL

1 WARNING

3 NORMAL

0 INACTIVE

0 UNKNOWN

Search

Export as CSV | Export as PDF

Site Name	Role	Overlay Connectivity	Model	Bandwidth Tier	Orchestrator Connectivity	Serial No	Actions
myLTE	Branch	CRITICAL	210-SE	20	PRIMARY ACTIVE ONLINE	822XN2N461	...
SantaClara	MCN	WARNING	VPX-SE	50	PRIMARY ACTIVE ONLINE	1C84F43E-246...	...
Boston	Branch	NORMAL	VPX-SE	50	PRIMARY ACTIVE ONLINE	6386B73C-F0F...	...
Kansas	Branch	NORMAL	VPX-SE	20	PRIMARY ACTIVE ONLINE	AC78F32D-708A...	...
Dallas	Branch	NORMAL	VPX-SE	20	PRIMARY ACTIVE ONLINE	4E34535A-DE5...	...

Page Size: 50 Showing 1-5 of 5 items Page1 of1

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.

Configuration / Network Home

Verify Configuration Software Version : 11.4.13-6A

Network Sites

Site Group: All Add Site More ...

5 TOTAL SITES

1 CRITICAL

1 WARNING

3 NORMAL

0 INACTIVE

0 UNKNOWN

Search

Export as CSV | Export as PDF

Site Name	Role	Overlay Connectivity	Model	Bandwidth Tier	Orchestrator Connectivity	Serial No	Actions
myLTE	Branch	CRITICAL	210-SE	20	PRIMARY ACTIVE ONLINE	822XN2N461	...
SantaClara	MCN	WARNING	VPX-SE	50	PRIMARY ACTIVE ONLINE	1C84F43E-246...	...
Boston	Branch	NORMAL	VPX-SE	50	PRIMARY ACTIVE ONLINE	6386B73C-F0F...	...
Kansas	Branch	NORMAL	VPX-SE	20	PRIMARY ACTIVE ONLINE	AC78F32D-708A...	...
Dallas	Branch	NORMAL	VPX-SE	20	PRIMARY ACTIVE ONLINE	4E34535A-DE5...	...

Page Size: 50 Showing 1-5 of 5 items Page1 of1

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. 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.

Network Sites

5
TOTAL SITES
1
CRITICAL
1
WARNING
3
NORMAL
0
INACTIVE
0
UNKNOWN

Site Group: All Add Site More ...

[Export as CSV](#) | [Export as PDF](#)

Site Name	Role	Overlay Connectivity	Model	Bandwidth Tier	Orchestrator Connectivity	Serial No	Actions
myLTE	Branch	CRITICAL	210-SE	20	PRIMARY ACTIVE ONLINE	X-CX45J	***
SantaClara	MCN	WARNING	VPX-SE	50	PRIMARY ACTIVE ONLINE	4-4	
Boston	Branch	NORMAL	VPX-SE	50	PRIMARY ACTIVE ONLINE	3E3F	
Kansas	Branch	NORMAL	VPX-SE	20	PRIMARY ACTIVE ONLINE	75-3	
Dallas	Branch	NORMAL	VPX-SE	20	PRIMARY ACTIVE ONLINE	34-30	

- View Details
- Edit
- Clone
- Delete
- Reboot
- Reset
- Update Password

Page Size: 50
Showing 1-5 of 5 items
Page 1 of 1

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

Network Sites

Site Group: All Add Site More ...

5 TOTAL SITES | 1 CRITICAL | 1 WARNING | 3 NORMAL | 0 INACTIVE | 0 UNKNOWN

Search

Site Name	Role	Overlay Connectivity	Model	Bandwidth Tier	Orchestrator Connectivity	Serial No.
myLTE	Branch	CRITICAL	210-SE	20	PRIMARY ACTIVE ONLINE	[Icon]
SantaClara	MCN	WARNING	VPX-SE	50	PRIMARY ACTIVE ONLINE	[Icon]
Boston	Branch	NORMAL	VPX-SE	50	PRIMARY ACTIVE ONLINE	[Icon]
Kansas	Branch	NORMAL	VPX-SE	20	PRIMARY ACTIVE ONLINE	[Icon]
Dallas	Branch	NORMAL	VPX-SE	20	PRIMARY ACTIVE ONLINE	[Icon]

Page Size: 50 Showing 1-5 of 5 items Page 1 of 1

- Deploy config/software
- Upload Config
- Backup Config
- Download JSON
- Download DB
- Batch Add Sites
- Add Region
- Add Group
- Upload Config DB

Add site

Use the **+Add Site** option to add a new site. For more information on site configuration workflow, see [Site Configuration](#).

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.

Load Configuration

Choose File

Browse

No File Selected

Valid Extension:json

Cancel

Proceed

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.

BackUps / Checkpoints ⓘ

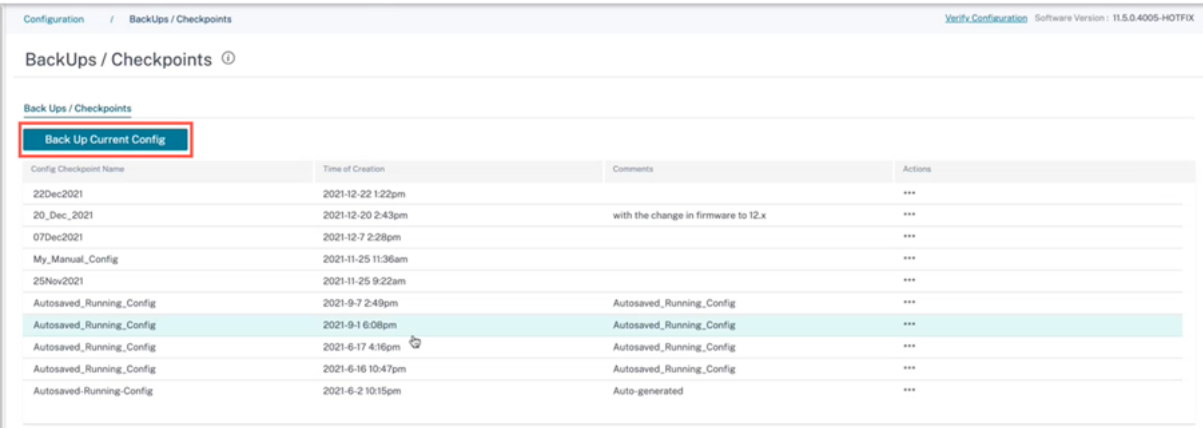
Back Ups / Checkpoints

Back Up Current Config

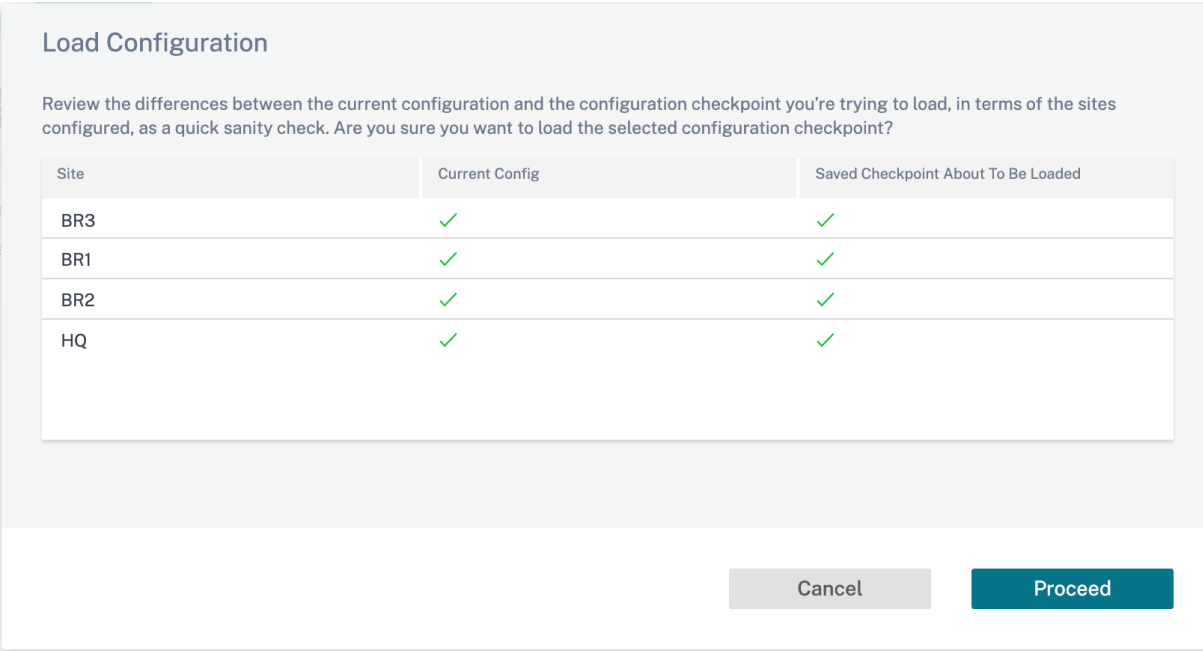
Config Checkpoint Name	Time of Creation	Comments	Actions
Autosaved_Running_Config	2022-4-22 12:27pm	Autosaved_Running_Config	***
Autosaved_Running_Config	2022-3-26 3:45pm	Autosaved_Running_Config	***
Autosaved_Running_Config	2022-3-25 4:40pm	Autosaved_Running_Config	***
Autosaved_Running_Config	2022-3-21 10:2pm	Autosaved_Running_Config	***

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

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



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.

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.

Network Configuration: Home Site Group: All ▾

of Sites 10 +

Site Profile: None ▾

☐ Show Lat/Lng

Site Name	Site Address	Site Profile (Optional)	Actions
Enter a Site Name	Search for a Site Address	None ▾	
Enter a Site Name	Search for a Site Address	None ▾	
Enter a Site Name	Search for a Site Address	None ▾	
Enter a Site Name	Search for a Site Address	None ▾	
Enter a Site Name	Search for a Site Address	None ▾	
Enter a Site Name	Search for a Site Address	None ▾	
Enter a Site Name	Search for a Site Address	None ▾	
Enter a Site Name	Search for a Site Address	None ▾	
Enter a Site Name	Search for a Site Address	None ▾	
Enter a Site Name	Search for a Site Address	None ▾	

CancelSave

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 for On-premises.

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

Network Sites Site Group: All Add Site More ...

5 TOTAL SITES 1 CRITICAL 1 WARNING 3 NORMAL 0 INACTIVE 0 UNKNOWN

Search

[Export as CSV](#) [Export as PDF](#)

Site Name	Role	Overlay Connectivity	Model	Bandwidth Tier	Orchestrator Connectivity	Serial No	Actions
myLTE	Branch	CRITICAL	210-SE	20	PRIMARY ACTIVE ONLINE	CX45J	...
SantaClara	MCN	WARNING	VPX-SE	50	PRIMARY ACTIVE ONLINE	4	View Details
Boston	Branch	NORMAL	VPX-SE	50	PRIMARY ACTIVE ONLINE	3F	Edit
Kansas	Branch	NORMAL	VPX-SE	20	PRIMARY ACTIVE ONLINE	FS	Clone
Dallas	Branch	NORMAL	VPX-SE	20	PRIMARY ACTIVE ONLINE	CO	Delete
							Reboot
							Reset
							Update Password

Page Size: 50 Showing 1-5 of 5 items Page1 of1

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.

Update Device Password

User Name *

admin ▼

Current Password *

.....

New Password *

.....

Confirm Password *

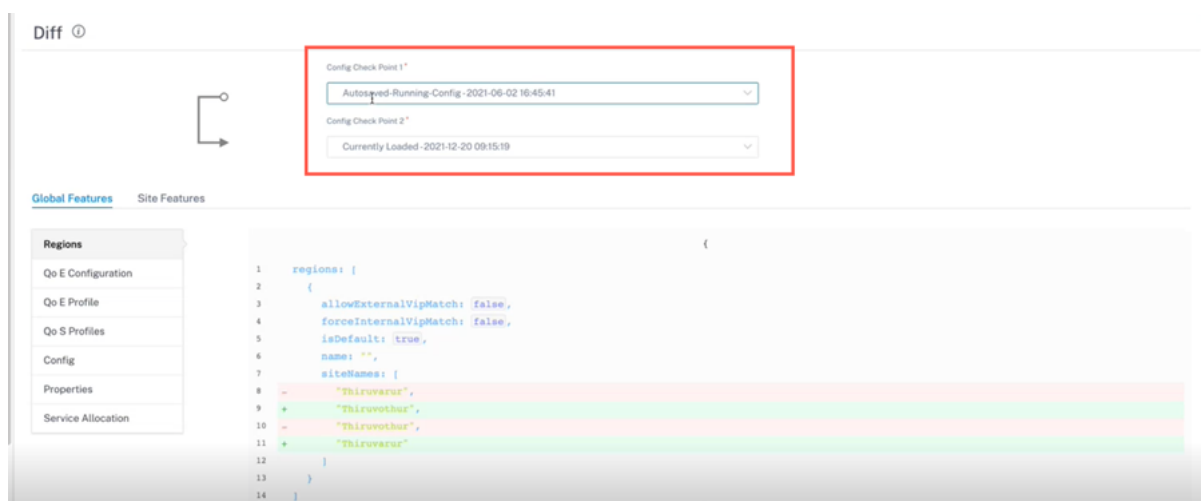
.....

Cancel Save

Configuration difference

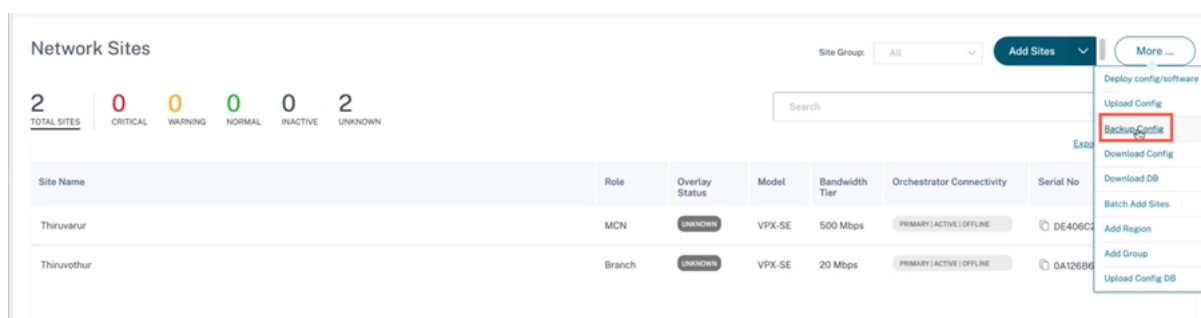
January 27, 2022

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**.

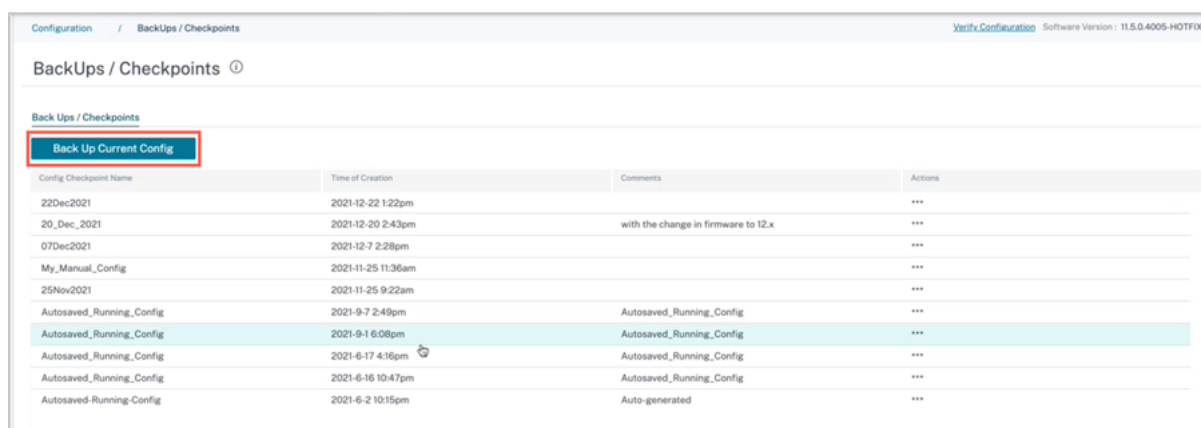


During deployment, you can save a configuration with a suitable name. The saved configurations are known as checkpoints. While comparing the difference between the two configurations, you need to select the required configurations from the **Config Check Point 1/2** drop-down lists.

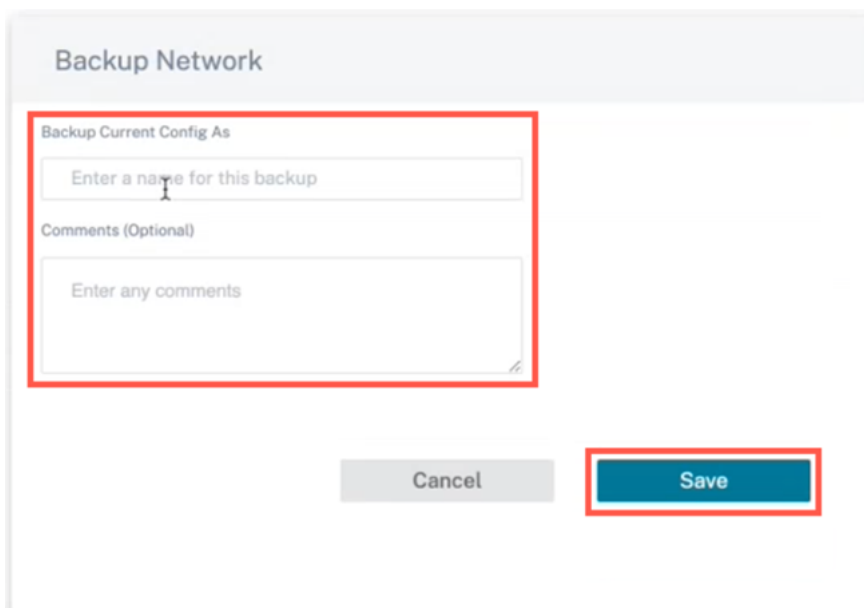
You can view the list of saved configurations backups/check points under **Configuration > Network Home > select Backup Config** from the **More** drop-down list.



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.



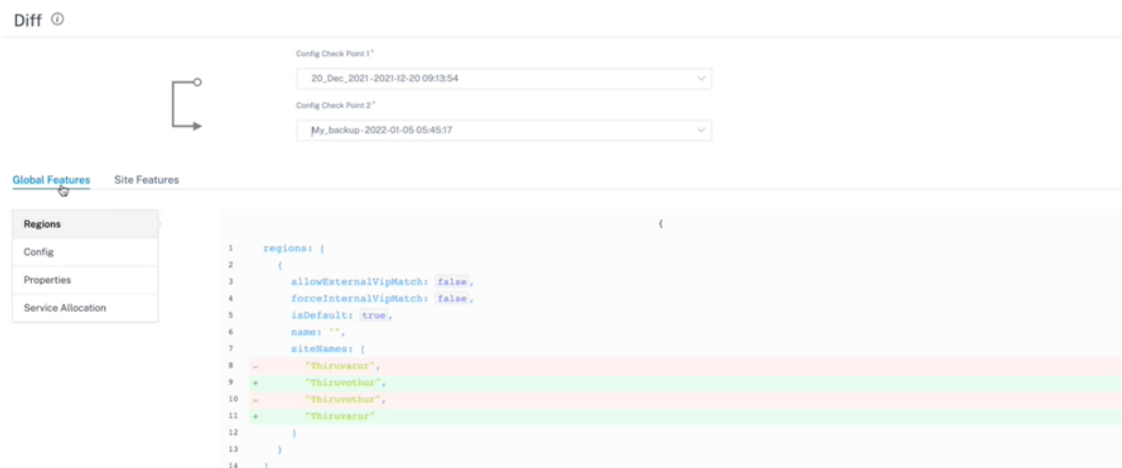
Provide a name to save your configuration along with comments (optional). Click **Save**.

**Note**

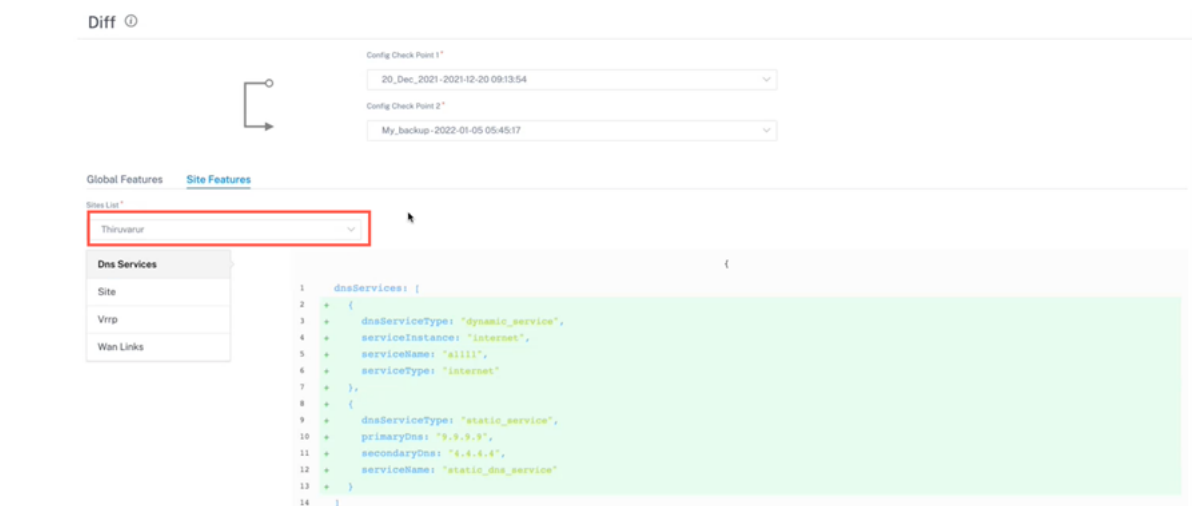
You can save/create a maximum of five configuration backups. Creating a new backup automatically deletes the oldest backup configuration.

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.



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

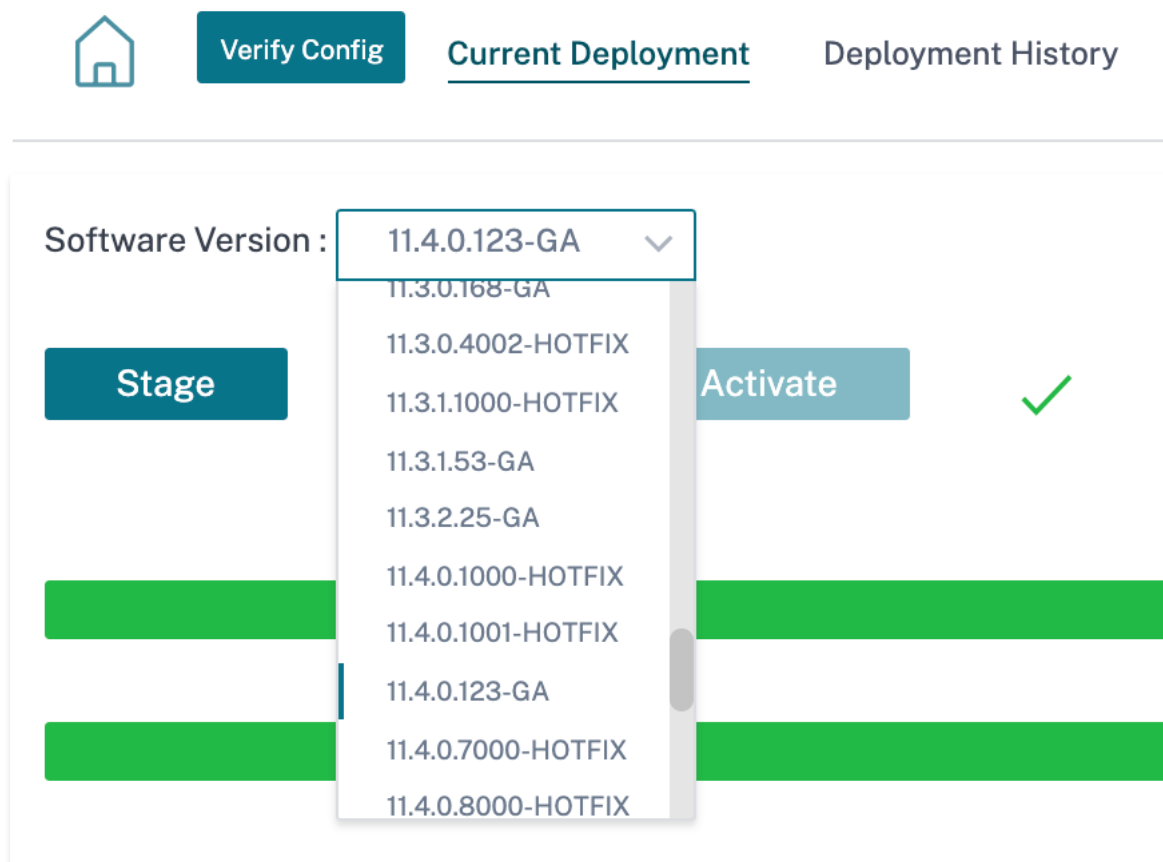


May 4, 2022

Deployment

After the sites are configured, the **Deployment** page allows you to change the software version, stage, and deploy the configuration across the network.

You can upgrade the SD-WAN software on all the appliances across the network, by selecting an appliance software version in the **Software Version** field.



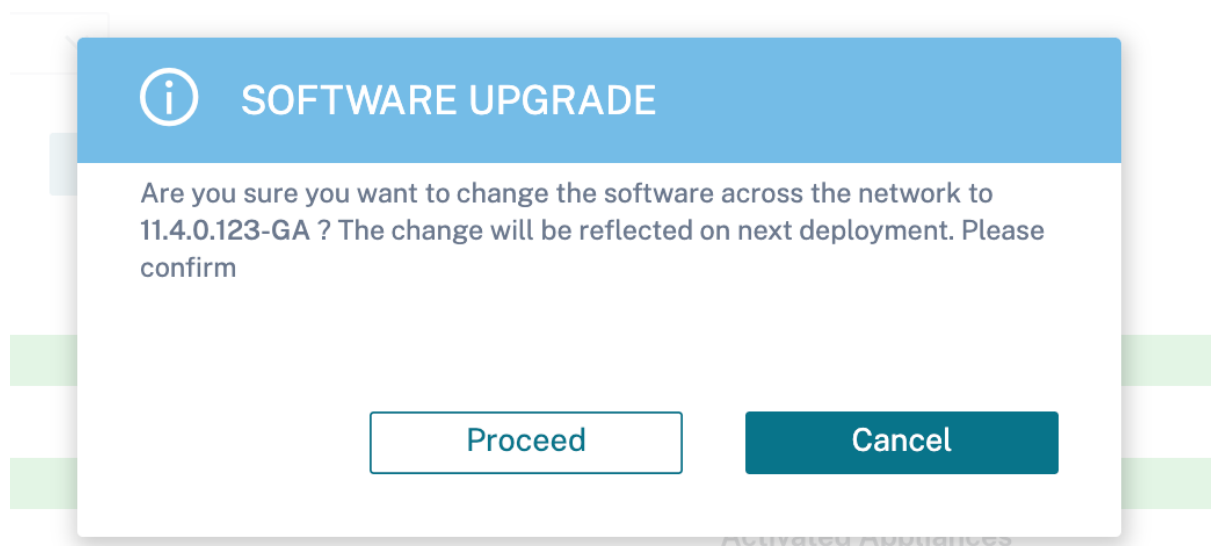
Home Verify Config Current Deployment Deployment History

Software Version : 11.4.0.123-GA ▼

- 11.3.0.168-GA
- 11.3.0.4002-HOTFIX
- 11.3.1.1000-HOTFIX
- 11.3.1.53-GA
- 11.3.2.25-GA
- 11.4.0.1000-HOTFIX
- 11.4.0.1001-HOTFIX
- 11.4.0.123-GA
- 11.4.0.7000-HOTFIX
- 11.4.0.8000-HOTFIX

Stage Activate ✓

A confirmation message appears. Click **Proceed**.



i SOFTWARE UPGRADE

Are you sure you want to change the software across the network to 11.4.0.123-GA ? The change will be reflected on next deployment. Please confirm

Proceed Cancel

Software Version : 11.4.0.123-GA

Stage ☒ Activate ☒ Ignore Incomplete ☐ Settings ...

3/7 Staged Appliances

3/7 Activated Appliances

Total Appliances	Ready For Activation	Activated	Failed	Offline
7	0	3	0	4

Search

[Export as CSV](#) [Export as PDF](#)

Online	Site	Status	HA State	Software Version	Actions
Yes	Sanjose	Activation Complete	Not Configured	11.4.0.123.888881	
No	branchHaNew (primary)	Staging Pending	Unknown	10.1.0.151	
No	branchHaNew (secondary)	Staging Pending	Unknown	10.1.0.151	
Yes	Home210	Activation Complete	Not Configured	11.4.0.123.888881	
No	LosAngeles	Staging Pending	Unknown	10.1.0.151	
Yes	Raleigh	Activation Complete	Not Configured	11.4.0.123.888881	
No	testvm	Staging Pending	Unknown	10.1.0.151	

Page Size: 50 Showing 1-7 of 7 items Page 1 of 1

Rollback on Error

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

Note

The automatic rollback is only for the site that failed to connect to Citrix SD-WAN Orchestrator for On-premises and not for the entire network.

The rollback only triggers if the appliance loses Citrix SD-WAN Orchestrator for On-premises connectivity, not in other scenarios such as, virtual path status goes down or so on.

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

To enable the rollback on error feature, navigate to **Configuration > Deployment > Settings > Roll-**

back on Error.

Deployment ⓘ

Current Deployment Deployment History Change Management Settings Site Details

Software Version: 11.4.1.27-GA

Stage ✓ Activate ✗ ☐ Ignore Incomplete

Settings ...

Stage All Failed Sites

Partial Site Upgrade 2/2

Rollback On Error

Staged Appliances

0/2

Activated Appliances

Total Appliances	Ready For Activation	Activated	Failed	Offline
2	0	0	2	0

You can select the **Rollback on Error** check box to enable automatic rollback of sites which have failed to connect to Citrix SD-WAN Orchestrator for On-premises post activation. The **Rollback on Error** feature must be enabled before you start the deployment to enable its functionality.

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

Deployment ⓘ

Current Deployment Deployment History Change Management Settings Site Details

☒ Rollback the Sites which failed to connect to Orchestrator during deployment, to attempt restoration of connectivity

Minimum time that Appliance has to be offline before triggering Rollback (Minutes) *

30

Cancel Done

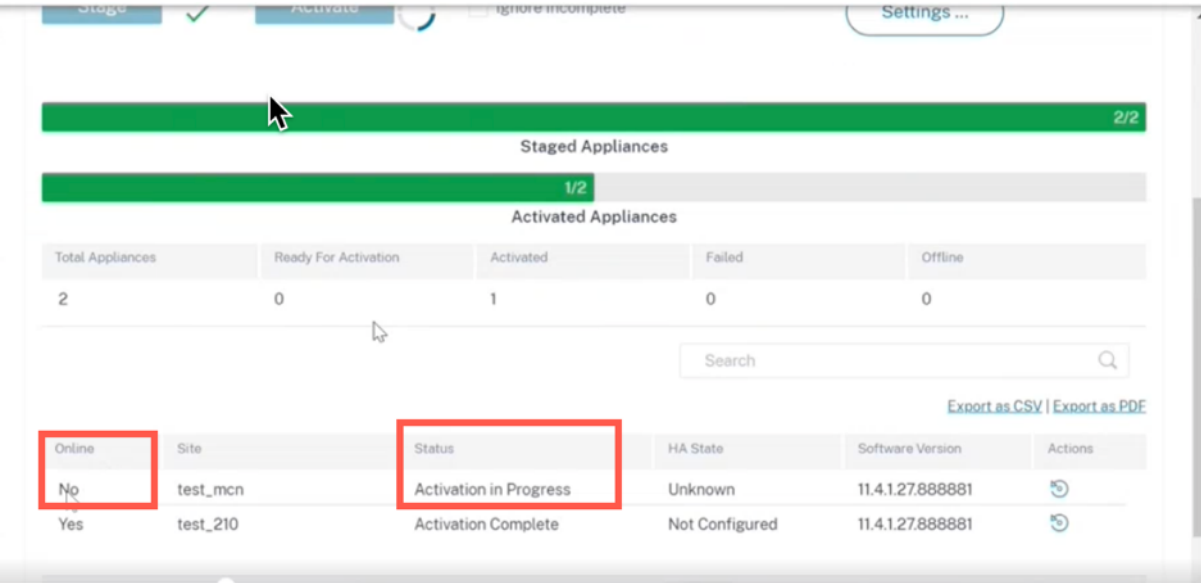
Note

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.

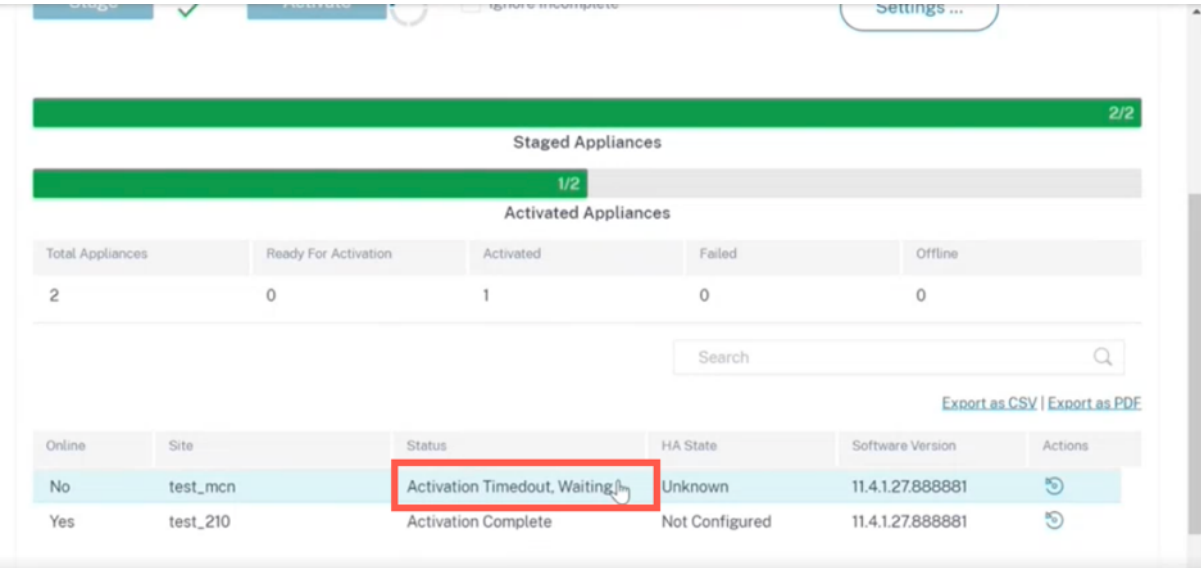
Click **Done** once you set the **Rollback on Error** enabled.

Use case 1: Non-hitless Upgrade

A site waits for activation to complete for a specified time with a status as **Activation in progress**.



Post that timeout, if the Site is still offline, Citrix SD-WAN Orchestrator for On-premises 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 mins)**.



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

Staged Appliances					
1/2					
Activated Appliances					
Total Appliances	Ready For Activation	Activated	Failed	Offline	
2	0	1	0	0	

Online	Site	Status	HA State	Software Version	Actions
No	test_mcn	Rollback in Progress(19 Mins)	Unknown	11.4.1.27.888881	
Yes	test_210	Activation Complete	Not Configured	11.4.1.27.888881	

Page Size: 50 Showing 1-2 of 2 items Page 1 of 1

If the appliance fails to connect back, in this 20 minutes, Citrix SD-WAN Orchestrator for On-premises marks the rollback operation as failed and status is shown as **Device Rollback Failed**.

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

Current Deployment | Deployment History | Change Management Settings | Site Details

Software Version: 11.4.1.27-GA

One (or more) Sites in the Network have lost connectivity to Orchestrator after Activation and are attempting to Rollback to the previous configuration or(and) software to try and restore the connection. To view these Site(s) and take appropriate action [Click here](#). You can also select the below operations directly.

☒ Stage ☐ Activate ☐ Ignore Incomplete

Staged Appliances					
0/2					
Activated Appliances					
Total Appliances	Ready For Activation	Activated	Failed	Offline	
2	0	0	2	0	

Based on the stage in Network Activation, the displayed options perform the following operations:

- Ignore Network Rollback:
 - **For non-Hitless upgrade scenario:** End the current deployment.
 - **First step in Hitless upgrade scenario:** Deployment proceeds to second step of Activation.
 - **Second step in Hitless upgrade scenario:** End the current deployment.
- Rollback entire Network:
 - **For non-Hitless upgrade scenario:** Trigger rollback on all online sites in the network.

- **First step in Hitless upgrade scenario:** Trigger 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.

You can click the more **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.

Deployment ⓘ

Current Deployment Deployment History Change Management Settings Site Details

← Deployment Page

The following Sites in the Network have lost connectivity to the Orchestrator as part of this deployment and are attempting to Rollback to try and restore the connection. The following options are available for this deployment, depending on the state of Network activation specified operations are performed:

1. Ignore Network Rollback:
For non-Hitless upgrade scenario: This will end the current Deployment.
First step in Hitless upgrade scenario: Deployment will proceed to Second step of Activation
Second step in Hitless upgrade scenario: This will end the current Deployment.

2. Rollback entire Network:
For non-Hitless upgrade scenario: This will trigger Rollback on all Online sites in the network.
First step in Hitless upgrade scenario: This will trigger Rollback on all Online Standby devices in the network.
Second step in Hitless upgrade scenario: This will trigger Rollback on all Online sites (Active and Standby). Near-hitless software upgrade for HA devices will not be applicable in this scenario.

Note: You can go back to the Deployment page to check the progress of the Sites and decide on the operation.

Search

Online	Site	Status	HA State	Software Version
Yes	GeoMCN_104_21	Device Rolledback Successfully	Not Configured	11.4.2.42.888881

Showing 1-1 of 1 items Page 1 of 1 5 rows

Ignore Network Rollback Rollback entire Network

If you select the **Rollback entire Network** option, the following pop-up box appears.

Rollback entire Network

This operation will trigger a Rollback (Activate the Staged version) on all Online Sites.
Note: Near-hitless software upgrade for HA devices will not be applicable in this scenario

Proceed Cancel

Note

The Near-hitless software upgrade for high availability appliance is not applicable in this sce-

nario, 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:** Ignore the standby appliances which are offline and proceed with the activation of the active appliances.
- **Rollback entire Network:** 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.

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 the above [non-hitless upgrade](#) section. 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 for On-premises, the status for that site shows **Device Rollback Successfully** and the sites are online.

Staged Appliances					
8/8					
Activated Appliances					
6/6					
Total Appliances	Ready For Activation	Activated	Failed	Offline	
8	1	6	0	0	
Configuration Changes did not affect 2 sites. Sites displayed in the below table are being staged and the rest would just receive a timestamp update.					
Search					
Export as CSV / Export as PDF					
Online	Site	Status	HA State	Software Version	Actions
Yes	GeoMCN_194_21	Device Rolledback Successfully	Not Configured	11.4.2.42.888881	
Yes	MCN_194_20 (primary)	Activation Complete	Active	11.4.2.42.888881	
Yes	MCN_194_20 (secondary)	Activation Complete	Standby	11.4.2.42.888881	
Yes	RCN_194_23	Staging Complete	Not Configured	11.4.2.42.888881	
Yes	BR_194_22 (primary)	Activation Complete	Standby	11.4.2.42.888881	
Yes	RCN_BR_194_26 (primary)	Activation Complete	Active	11.4.2.42.888881	

Limitations

Autocorrection for Rolling back or Rolled back appliances and network is not supported.

Note

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

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 **Deployment Site List** followed by the date and time when the file is exported.

- **Stage:** Once the verification of configuration is successful, click **Stage** to distribute the configuration files to all the appliances in your network. By default Citrix SD-WAN Orchestrator for On-premises 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.

If the staging process fails at any site, use the **Retry Staging** option, under the **Actions** column, to reinitiate the staging process.

- **Activate:** Click **Activate** to activate the staged configuration on all the sites across the network.
- **Ignore Incomplete:** When selected, the **Activate** check box is enabled only after all the online control nodes (MCN, RCN, Geo MCN, Geo RCN) get staged. You can choose to activate even if some of the online branch appliances are not staged. The online branch appliances that fail to get staged are ignored.
- **Partial Site Upgrade Setting:** The **Partial Site Upgrade** option is added to upgrade or downgrade the selected sites with a different version. The **Partial Site Upgrade** feature provides the ability to test a new version before deploying to 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

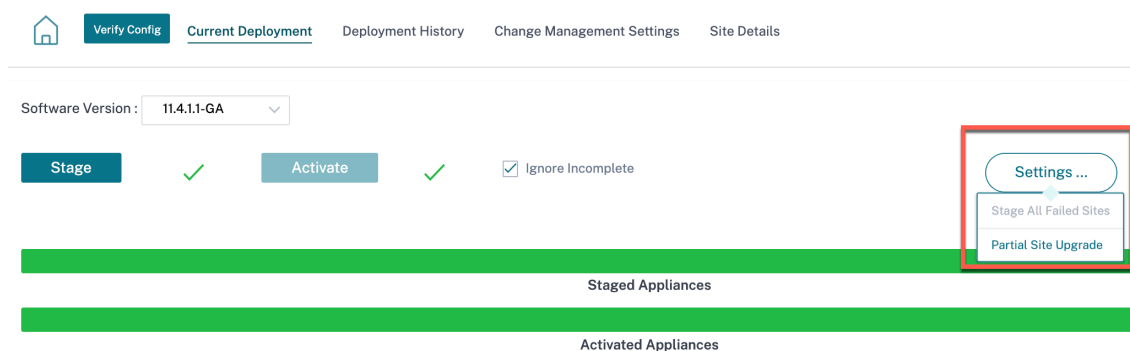
Partial Site Upgrade can be performed only when all the sites in the network are running Citrix SD-WAN software version 11.2.2 or above.

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.

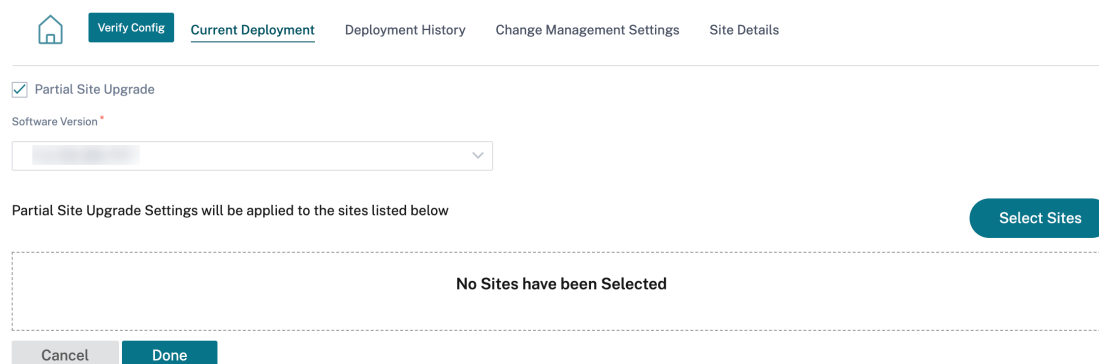
When you are downgrading from a newer to older version using the **Partial Site Upgrade**, if a feature which is supported only in the newer version (with the similar configuration present both in the new and older version), audit errors occur. For example, a new platform is selected which is only supported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

To perform the partial site upgrade:

1. Click the **Setting ...** icon and select the **Partial Site Upgrade** option.



2. Select the Partial Site Upgrade check box, choose the software version, and click **Select Sites** to add new sites.



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

Site Selector

Browse or search the list of sites, regions and groups below. You can add/remove entire Regions and Groups, or click into them and choose a subset of its members to add/remove.

Search

Filter By Region / Custom Groups

Available (2 sites)

Name

Branch_2

MCN_1

→

←

Selected (1 sites)

Name

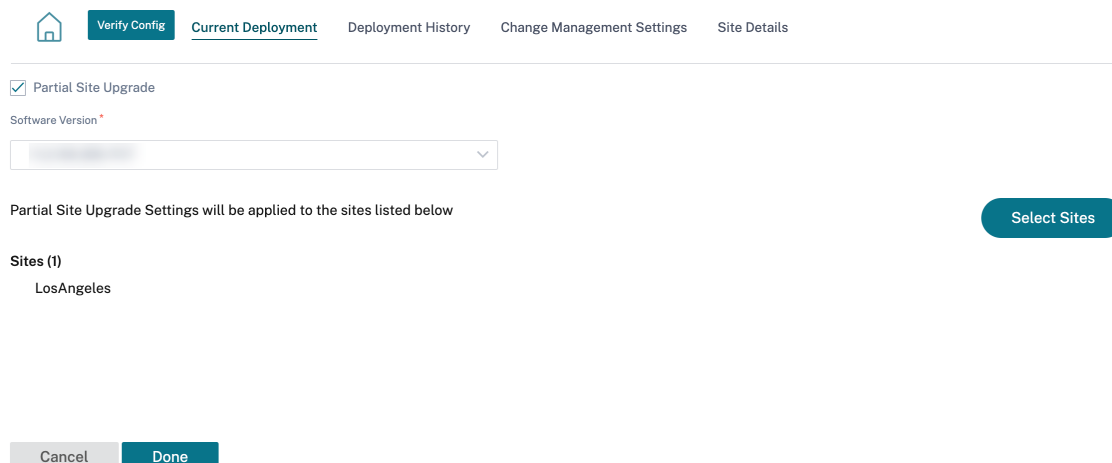
Branch_1

Save

Cancel

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109



[Verify Config](#)
[Current Deployment](#)
[Deployment History](#)
[Change Management Settings](#)
[Site Details](#)

☒ Partial Site Upgrade

Software Version *

Partial Site Upgrade Settings will be applied to the sites listed below

[Select Sites](#)

Sites (1)

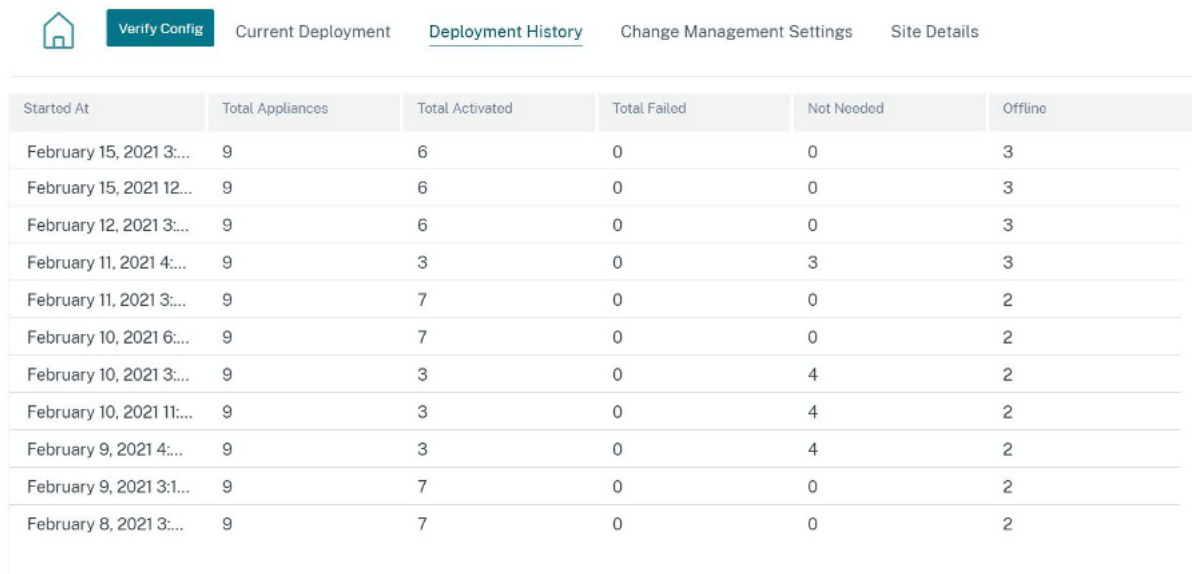
Los Angeles

[Cancel](#)
[Done](#)

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.

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

The **Deployment History** section helps to review the previous deployment operations and results.



Started At	Total Appliances	Total Activated	Total Failed	Not Needed	Offline
February 15, 2021 3:...	9	6	0	0	3
February 15, 2021 12:...	9	6	0	0	3
February 12, 2021 3:...	9	6	0	0	3
February 11, 2021 4:...	9	3	0	3	3
February 11, 2021 3:...	9	7	0	0	2
February 10, 2021 6:...	9	7	0	0	2
February 10, 2021 3:...	9	3	0	4	2
February 10, 2021 11:...	9	3	0	4	2
February 9, 2021 4:...	9	3	0	4	2
February 9, 2021 3:1...	9	7	0	0	2
February 8, 2021 3:...	9	7	0	0	2

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 for On-premises ensures that the downtime during the software upgrade (11.1.x and above) process is

not more than the HA switch over time.

Note

The HA near-hitless software upgrade is applicable for the following:

- The sites that are deployed in High Availability (HA) mode. It is not applicable for Non-HA sites.
- Citrix SD-WAN Orchestrator for On-premises 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 for On-premises does not perform HA near-hitless software upgrade and continues to upgrade in the earlier fashion (single-step upgrade).

The upgrade sequence summary:

1. Citrix SD-WAN Orchestrator for On-premises 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 11.1 release, the Citrix SD-WAN Orchestrator for On-premises 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 **Deployment Tracker > Current deployment**.

Software Version :

[Stage](#) ✓
 [Activate](#) ✓
 [Restore previous version](#)
☐ Ignore Incomplete
 [Settings...](#)

Staged Appliances 1/1

Activated Appliances 1/1

Total Appliances	Staged	Activated	Failed	Offline	Not Needed
3	1	1	0	0	2

Configuration Changes did not affect 2 sites. Sites displayed in the below table are being staged and the rest would just receive a timestamp update.

Online	Site	Status	HA State	Software Version
Yes	mcn1	Activation Complete	Not Configured	11.3.2.25.8888881

- **Stage:** Click **Stage** to distribute the configuration files to all the appliances in your network. By default the Citrix SD-WAN Orchestrator for On-premises 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.
- **Activate:** Click **Activate** to activate the staged configuration on all the sites across the network.
- **Restore previous version:** Click **Restore previous version** to roll back to the previously activated configuration on your network. The HA near-hitless software upgrade is applicable when you restore the previous version if the previously active version is just a software version change and not a configuration change. For more information about this functionality, see [Restore previous version](#).
- **Ignore Incomplete:** When selected, the **Activate** check box is enabled only after all the online control nodes (MCN, RCN, Geo MCN, Geo RCN) get staged. You can choose to activate even if some of the online branch appliances are not staged. The online branch appliances that fail to get staged are ignored.

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 **Not Needed** column lists the number of sites that do not have any configuration change.

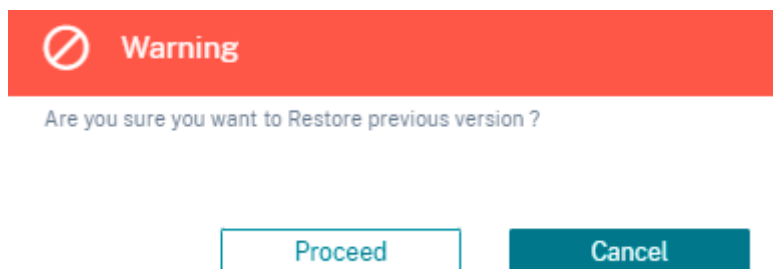
If the software version is being changed, both configuration and software package are staged and activated on all the sites in the network.

Restore previous version

In the restore previous version functionality, Citrix SD-WAN Orchestrator for On-premises initiates a network wide activation of the previous configuration and restores the previously activated configu-

ration (and/or software) on your network.

When you select the **Restore previous version** option, the following confirmation message is displayed:



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.

Auto-correction for configuration and software upgrade

In the Citrix SD-WAN Orchestrator for On-premises, the auto-correction feature is implemented in the change management workflow.

When the staging failed for one site, and if the site that had failed staging is a control node, you need to restage after getting the staging failure message. The **Activate** button will not be enabled if the staging fails for the control nodes. If the site that had failed staging is a branch node, you are still allowed to move ahead 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** button has been clicked and stops once the next stage is issued from the Citrix SD-WAN Orchestrator for On-premises UI.
- 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:

- In the Citrix SD-WAN Orchestrator for On-premises deployment tracker UI, 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 didn't come up with the expected software and configuration version, the Citrix SD-WAN Orchestrator for On-premises 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 the **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.

[Home](#)
[Verify Config](#)
[Current Deployment](#)
[Deployment History](#)
[Change Management Settings](#)

Scheduling Information				
Site Name	HA State	Scheduling Information	Maintenance Mode	Actions
HQ (Primary)	Active	2021-02-09 at 21:20:00 (Maintenance window of 1 hours and repeated every 1 day)	☐	
HQ (Secondary)	Standby	2021-02-09 at 21:20:00 (Maintenance window of 1 hours and repeated every 1 day)	☐	
BR2	Not Configured	2021-02-09 at 21:20:00 (Maintenance window of 1 hours and repeated every 1 day)	☐	
BR1 (Primary)	Standby	2021-02-09 at 21:20:00 (Maintenance window of 1 hours and repeated every 1 day)	☐	
BR1 (Secondary)	Active	2021-02-09 at 21:20:00 (Maintenance window of 1 hours and repeated every 1 day)	☐	
BR3	Not Configured	2021-02-09 at 21:20:00 (Maintenance window of 1 hours and repeated every 1 day)	☐	

Site details

The **Site Details** tab under the Deployment Tracker provides information about all the devices in the network. The table contains the appliance name, Citrix SD-WAN Orchestrator for On-premises connectivity, High Availability (HA) state, and currently running software version.

[Home](#)
[Verify Config](#)
[Current Deployment](#)
[Deployment History](#)
[Change Management Settings](#)
[Site Details](#)

Online	Site	HA State	Software Version
Yes	site1(primary)	Standby	11.2.1.56.864672
Yes	site1(secondary)	Active	11.2.1.56.864672
Yes	mcn1	Not Configured	11.2.1.56.864672

Verify Configuration

You can click **Verify Config** to validate the network configuration and check for any audit error or warning. When you click **Verify Config**, the **Configuration results** page is displayed. This page contains details of audit errors and warnings.

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, then **Global Error** or **Global Warning** is displayed respectively. 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.

Configuration results
×

Search

4
TOTAL MESSAGES

0
ERRORS

4
WARNINGS

Type	Audit Scope	Audit Message
	SantaClara	(EC723) At Site 'SantaClara', Dynamically learned routes will not be imported into Virtual WAN route table since no route learning filters exist to include routes.
	Global Warning	(EC450) in Virtual Path Default Set 'Standard' -> add Rule [Src IP:0.0.0.0/Dst IP:20.20.20.0/24]: if Protocol is TCP-based or not set, cannot set 'Transmit Mode'='Load Balance Paths' and 'Retransmit Lost Packets'=no. 'Retransmit Lost Packets' has been set to yes.
	Kansas	(EC723) At Site 'Kansas', Dynamically learned routes will not be imported into Virtual WAN route table since no route learning filters exist to include routes.
	Global Warning	(EC450) in Virtual Path Default Set 'test' -> add Rule [Src IP:0.0.0.0/Dst IP:20.20.20.0/24]: if Protocol is TCP-based or not set, cannot set 'Transmit Mode'='Load Balance Paths' and 'Retransmit Lost Packets'=no. 'Retransmit Lost Packets' has been set to yes.

When you click **Verify Config** for the second time, the **Configuration results** page opens up displaying the same results when the configuration was last verified along with the date and time stamp. If necessary, you can click **Verify Again** to rerun the validation.

Last verified result
July 28, 2021 4:54 PM

Verify Again

×

Search

4
TOTAL MESSAGES

0
ERRORS

4
WARNINGS

Type	Audit Scope	Audit Message
	SantaClara	(EC723) At Site 'SantaClara', Dynamically learned routes will not be imported into Virtual WAN route table since no route learning filters exist to include routes.
	Global Warning	(EC450) in Virtual Path Default Set 'Standard' -> add Rule [Src IP:0.0.0.0/Dst IP:20.20.20.0/24]: if Protocol is TCP-based or not set, cannot set 'Transmit Mode'='Load Balance Paths' and 'Retransmit Lost Packets'=no. 'Retransmit Lost Packets' has been set to yes.
	Kansas	(EC723) At Site 'Kansas', Dynamically learned routes will not be imported into Virtual WAN route table since no route learning filters exist to include routes.
	Global Warning	(EC450) in Virtual Path Default Set 'test' -> add Rule [Src IP:0.0.0.0/Dst IP:20.20.20.0/24]: if Protocol is TCP-based or not set, cannot set 'Transmit Mode'='Load Balance Paths' and 'Retransmit Lost Packets'=no. 'Retransmit Lost Packets' has been set to yes.

February 8, 2022

Service definitions

Delivery Channels are broadly categorized into Services Definitions and Bandwidth Allocation.

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. You can configure delivery services such as the Internet, Intranet, Virtual Paths, IPsec, and LAN GRE. The delivery services are defined globally and are applied to WAN links at individual sites, as applicable.

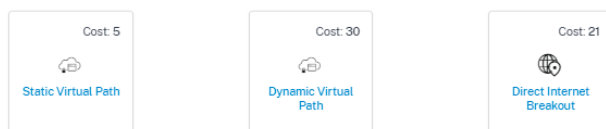
Each WAN link can apply all or a subset of the relevant services, and setup relative shares of bandwidth (%) among all the delivery services.

Virtual Path service is available on all the links by default. The other services can be added as needed. To configure Delivery Services, at the customer level, navigate to **Configuration > Delivery Channels > Service Definitions**.

Delivery Services

Delivery Services empower enterprises to flexibly choose an intent centric steering of On premises, Virtual, Cloud and SaaS Business applications using apt SD-WAN delivery methods

SD-WAN Services

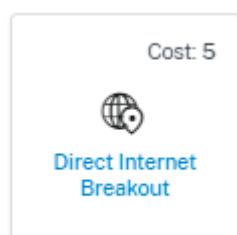


Delivery Services can be broadly categorized as the following:

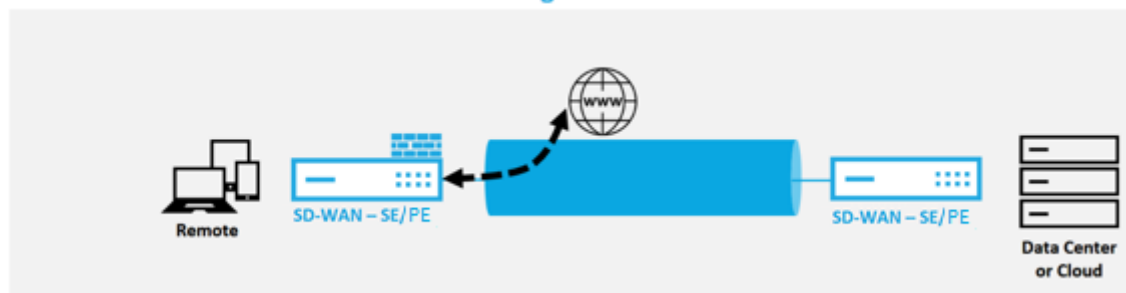
- **Virtual Path Service:** The dual-ended overlay SD-WAN tunnel that offers secure, reliable, and high-quality connectivity between two sites hosting SD-WAN appliances or virtual instances. Set the minimum reserved bandwidth for each virtual path in Kbps. This setting is applied to all the WAN links across all sites in the network.
- **Internet Service:** 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.
- **Intranet Service:** Underlay link based connectivity from an SD-WAN site to any non-SD-WAN site. The traffic is unencapsulated or can use any non-virtual path encapsulation such as IPsec, GRE. You can set up multiple Intranet services.

Internet service

Internet Service is available by default as part of the Delivery services. To configure an Internet service, from the customer level, navigate to **Configuration > Delivery Channels > Service Definitions**. In the **SD-WAN Services** section, select the **Direct Internet Breakout** tile and then click **Add**.



Direct Internet Breakout at Branch with Integrated Firewall



You can configure the following Internet services:

- **Preserve route to Internet from link even if all associated paths are down:** You can configure the Internet service route cost relative to other delivery services. With this service, you can preserve the route to the Internet from the link even if all the associated paths are down. If all paths associated with a WAN link are dead, then the SD-WAN appliance uses this route to send/receive Internet traffic.
- **Determine Internet reachability from link using ICMP probes:** You can enable ICMP probes for specific Internet WAN links to an explicit server on the Internet. With the ICMP probe setting, the SD-WAN appliance treats the Internet link as up when either the link's member paths are up or when the ICMP probe response is received from the server.
- **IPv4 ICMP endpoint address:** The destination IPv4 address or the server address.
- **Probe interval (in seconds):** Time interval at which the SD-WAN appliance sends probes on the Internet configured WAN links. By default, the SD-WAN appliance sends probes on the configured WAN links every 5 seconds.
- **Retries:** Number of retries that you can attempt before determining whether the WAN link is up or not. After 3 consecutive probe failures, the WAN link is considered dead. Maximum retries allowed are 10.

← Edit Internet Service

Service Name	Cost
Internet	21

Advanced Settings

☒ Preserve route to Internet from link even if all associated paths are down

☒ Enable Primary Reclaim

☒ Determine Internet reachability from link using ICMP probes

IPv4 ICMP endpoint Address

Probe Interval(in seconds)

Retries

5

5

[Save](#) [Cancel](#)

Supported deployment modes

Internet service can be utilized in the following deployment modes:

- Inline Deployment Mode (SD-WAN Overlay)

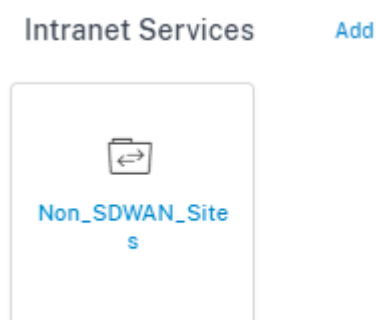
Citrix SD-WAN can be deployed as an overlay solution in any network. As an overlay solution, SD-WAN generally is deployed behind existing edge routers and/or firewalls. If SD-WAN is deployed behind a network firewall, the interface can be configured as trusted and Internet traffic can be delivered to the firewall as an Internet gateway.

- Edge or Gateway Mode

Citrix SD-WAN can be deployed as the edge device, replacing existing edge router and/or firewall devices. Onboard firewall feature allows SD-WAN to protect the network from direct internet connectivity. In this mode, the interface connected to the public internet link is configured as untrusted, forcing encryption to be enabled, and firewall and Dynamic NAT features are enabled to secure the network.

Intranet service

You can create multiple intranet services. To add an Intranet service, from the customer level, navigate to **Configuration > Delivery Channels > Service Definitions**. In the **Intranet Services** section, click **Add**.



Once the intranet service is created at the global level, you can reference it at the WAN Link level. Provide a **Service Name**, select the desired **Routing Domain** and **Firewall Zone**. Add all the intranet IP addresses across the network, that other sites in the network might interact. You can also preserve the route to intranet from the link even if all the associated paths are down.

[← Edit Intranet Service](#)

Note: Make sure to allocate bandwidth globally or specific to site

Non SDWAN Sites

Service Name	Routing Domain	Firewall Zone
Non_SDWAN_Sites	Default_RoutingDomain	<Default>

Intranet Subnets on a given Non SDWAN Site [Add Network](#)

Network IP / Prefix	Cost	Actions

Advanced Settings

☒ Preserve route to Intranet from link even if all associated paths are down

☒ Enable Primary Reclaim

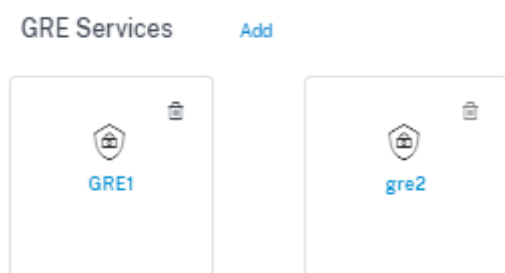
[Save](#) [Cancel](#)

GRE service

You can configure SD-WAN appliances to terminate GRE tunnels on the LAN.

To add a GRE service, from the customer level, navigate to **Configuration > Delivery Channels > Service Definitions**. You can also navigate to **GRE services** configuration page from **Configuration > Security**.

In the **IPsec & GRE** section, navigate to **IPsec Services** and click **Add**.



GRE details:

- **Service Type:** Select the service that the GRE tunnel uses.
- **Name:** Name of the LAN GRE service.
- **Routing Domain:** The routing domain for the GRE tunnel.
- **Firewall Zone:** The firewall zone chosen for the tunnel. By default, the tunnel is placed into the Default_LAN_Zone.
- **MTU:** Maximum transmission unit — the size of the largest IP datagram that can be transferred through a specific link. The range is from 576 to 1500. Default value is 1500.
- **Keep alive:** The period between sending keep alive messages. If configured to 0, no keep alive packets is sent, but the tunnel stays up.
- **Keep alive Retries:** The number of times that the Citrix SD-WAN Appliance sends keep alive packets without a response before it brings the tunnel-down.
- **Checksum:** Enable or disable Checksum for the tunnel's GRE header.

← Edit GRE Service

GRE Details

Name	Service Type	Routing Domain	Firewall Zone
GRE1	LAN	Default_RoutingDomain	<Default>
MTU *	Keepalive (sec) *	Keepalive Retries (sec) *	
1500	30	10	

☒ Checksum

Site bindings:

- **Site Name:** The site to map the GRE tunnel.
- **Source IP:** The source IP address of the tunnel. This is one of the Virtual Interfaces configured at this site. The selected routing domain determines the available Source IP addresses.
- **Public Source IP:** The source IP if the tunnel traffic is going through NAT.

- **Destination IP:** The destination IP address of the tunnel.
- **Tunnel IP/Prefix:** The IP address and Prefix of the GRE Tunnel.
- **Tunnel Gateway IP:** The next hop IP Address to route the Tunnel traffic.
- **LAN Gateway IP:** The next hop IP Address to route the LAN traffic.

Add Bindings

Site Name	Source IP *	Public Source IP
CB2100site		
Destination IP *	Tunnel IP/Prefix *	Tunnel Gateway IP *
LAN Gateway IP		
Add Cancel		

IPsec service

Citrix SD-WAN appliances can negotiate fixed IPsec tunnels with third-party peers on the LAN or WAN side. You can define the tunnel end-points and map the sites to the tunnel end-points.

You can also select and apply an IPsec security profile that define the security protocol and IPsec settings.

To configure Virtual Path IPsec Settings:

- Enable Virtual Path IPsec Tunnels for all Virtual Paths where FIPS compliance is required.
- Configure message authentication by changing the IPsec Mode to AH or ESP+Auth and use a FIPS approved hashing function. SHA1 is accepted by FIPS, but SHA256 is highly recommended.
- IPsec lifetime should be configured for no more than 8 hours (28,800 seconds).

Citrix SD-WAN uses IKE version 2 with pre-shared-keys to negotiate IPsec tunnels through the Virtual Path using the following settings:

- DH Group 19: ECP256 (256-bit Elliptic Curve) for key negotiation
- 256-bit AES-CBC Encryption
- SHA256 hashing for message authentication
- SHA256 hashing for message integrity
- DH Group 2: MODP-1024 for Perfect Forward Secrecy

To configure IPsec Tunnel for a third party:

- Configure FIPS approved DH Group. Groups 2 and 5 are permissible under FIPS, however groups 14 and above are highly recommended.
- Configure FIPS approved hash function. SHA1 is accepted by FIPS, however SHA256 is highly recommended.

- If using IKEv2, configure a FIPS approved integrity function. SHA1 is accepted by FIPS, however SHA256 is highly recommended.
- Configure an IKE lifetime, and max lifetime, of no more than 24 hours (86,400 seconds).
- Configure IPsec message authentication by changing the IPsec Mode to AH or ESP+Auth and use a FIPS approved hashing function. SHA1 is accepted by FIPS, but SHA256 is highly recommended.
- Configure an IPsec lifetime, and max lifetime, of no more than eight hours (28,800 seconds).

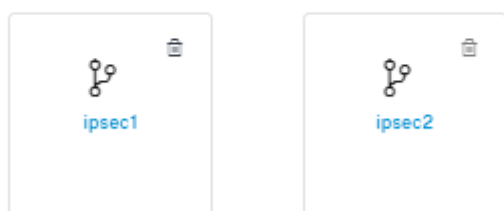
Configuring an IPsec tunnel

From the customer level, navigate to **Configuration > Delivery Channels > Service Definitions**. You can also navigate to **IPsec services** page from **Configuration > Security**.

In the **IPsec & GRE > IPsec Services** section, click **Add**. The **Edit IPsec Service** page is displayed.

IPsec & GRE

IPsec Services [Add](#) | [Manage Encryption IPsec Profiles](#)



1. Specify the service details.

- **Service Name:** The name of the IPsec service.
- **Service Type:** Select the service that the IPsec tunnel uses.
- **Routing Domain:** For IPsec tunnels over LAN, select a routing domain. If the IPsec Tunnel uses an intranet service, the intranet service determines the routing domain.
- **Firewall Zone:** The firewall zone for the Tunnel. By default, the Tunnel is placed into the Default_LAN_Zone.
- **Enable ECMP:** When the **Enable ECMP** check box is selected, ECMP load balancing is enabled for the IPsec tunnel.
- **ECMP Type:** Select the type of ECMP load balancing mechanism as required. For more details about ECMP types, see [ECMP load balancing](#).

2. Add the tunnel end-point.

- **Name:** When **Service Type** is Intranet, choose an Intranet Service the tunnel protects. Otherwise, enter a name for the service.
- **Peer IP:** The IP address of the remote peer.

- **IPsec Profile:** IPsec security profile that define the security protocol and IPsec settings.
- **Pre Shared Key:** The pre-shared key used for IKE authentication.
- **Peer Pre Shared Key:** The pre-shared key used for IKEv2 authentication.
- **Identity Data:** The data to be used as the local identity, when using manual identity or User FQDN type.
- **Peer Identity Data:** The data to be used as the peer identity, when using manual identity or User FQDN type.
- **Certificate:** If you choose Certificate as the IKE authentication, choose from the configured certificates.

3. Map sites to the tunnel end-points.

- **Choose Endpoint:** The end-point to be mapped to a site.
- **Site Name:** The site to be mapped to the end-point.
- **Virtual Interface Name:** The virtual interface at the site to be used as the end-point.
- **Local IP:** The local virtual IP address to use as the local tunnel end-point.
- **Gateway IP:** The next hop IP address.

4. Create the protected network.

- **Source Network IP/Prefix:** The source IP address and Prefix of the network traffic that the IPsec tunnel protects.
- **Destination Network IP/Prefix:** The destination IP address and Prefix of the network traffic that the IPsec tunnel protects.

5. Ensure that the IPsec configurations are mirrored on the peer appliance.

← Edit IPsec Service

Service Details

Name ipsec2	Service Type Intranet	Routing Domain Default_RoutingDomain	Firewall Zone Internet_Zone
----------------	--------------------------	---	--------------------------------

ECMP Type*
☒ Enable ECMP Session

Tunnel End Points Across Network [Add Endpoint](#)

Name	Peer IP	IPsec Profile	Actions
endpoint2	1.1.1.1	ipsec_profile2	+

Map Sites to Tunnel End Points [Add Endpoint Mapping](#)

Name	No of Sites	Actions
endpoint2	1	+

[Save](#) [Cancel](#)

For more information about FIPS compliance, see [Network security](#).

Note

Citrix SD-WAN Orchestrator for On-premises supports connectivity to Oracle Cloud Infrastructure (OCI) through IPsec.

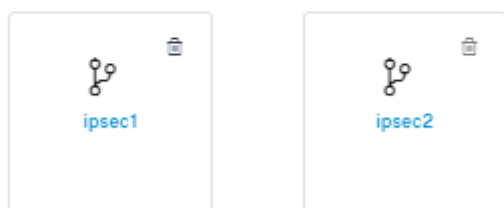
IPsec encryption profiles

To add an IPsec encryption profile, at the customer level, navigate to **Configuration > Delivery Channels > Service Definitions**. You can also navigate to **IPsec encryption profiles** configuration page from **Configuration > Security**.

In the **IPsec & GRE** section, select **Manage Encryption IPsec Profiles**.

IPsec & GRE

IPsec Services [Add](#) | [Manage Encryption IPsec Profiles](#)



IPsec provides secure tunnels. Citrix SD-WAN supports IPsec virtual paths, enabling third-party devices to terminate IPsec VPN Tunnels on the LAN or WAN side of a Citrix SD-WAN appliance. You can secure site-to-site IPsec Tunnels terminating on an SD-WAN appliance by using a 140-2 Level 1 FIPS certified IPsec cryptographic binary.

Citrix SD-WAN also supports resilient IPsec tunneling using a differentiated virtual path tunneling mechanism.

IPsec profiles are used while configuring IPsec services as delivery service sets. In the IPsec security profile page, enter the required values for the following **IPsec Encryption Profile**, **IKE Settings**, and **IPsec Settings**.

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

IPsec encryption profile information:

- **Profile Name:** Provide a profile name.
- **MTU:** Enter the maximum IKE or IPsec packet size in bytes.
- **Keep Alive:** Select the check box to keep the tunnel active and enable route eligibility.
- **IKE Version:** Select an IKE protocol version from the drop-down list.

Manage Encryption IPSec Profiles

IPSec Encryption Profile Information

Profile Name *	MTU	
zscalerService	1500	☒ Keep Alive
IKE Version		
IKEv2		

IKE settings

- **Mode:** Select either Main mode or Aggressive mode from the drop-down list for the IKE Phase 1 negotiation mode.
 - **Main:** No information is exposed to potential attackers during negotiation, but is slower than Aggressive mode. **Main** mode is FIPS compliant.
 - **Aggressive:** Some information (for example, the identity of the negotiating peers) is exposed to potential attackers during negotiation, but is faster than Main mode. **Aggressive** mode is Non-FIPS compliant.
- **Authentication:** Choose the authentication type as Certificate or Pre-shared Key from the drop-down menu.
- **Peer Authentication:** Choose the peer authentication type from the drop-down list.
- **Identity:** Select the identity method from the drop-down list.
- **Peer Identity:** Select the peer identity method from the drop-down list.
- **DH Group:** Select the Diffie-Hellman (DH) group that are available for IKE key generation.
- **DPD timeout (s):** Enter the Dead Peer Detection timeout (in seconds) for VPN connections.
- **Hash Algorithm:** Choose a hashing algorithm from the drop-down list to authenticate IKE messages.
- **Integrity Algorithm:** Choose the IKEv2 hashing algorithm to use for HMAC verification.
- **Encryption Mode:** Choose the Encryption Mode for IKE messages from the drop-down list.
- **Security Association Lifetime (s):** Enter the amount of time, in seconds, for an IKE security association to exist.
- **Security Association Lifetime (s) Max:** Enter the maximum amount of time, in seconds, to allow an IKE security association to exist.

IKE Settings

Authentication		Peer Authentication	
Pre-Shared Key		Mirrored	
Identity	Peer Identity	DH Group	
User FQDN	Disabled	Group2(MODP1024)	
DPD timeout (s)	Hash Algorithm	Integrity Algorithm	Encryption Mode
300	SHA-256	SHA-256	AES 256-Bit
Security Association Lifetime (s)		Security Association Lifetime (s) Max	
3600		86400	

IPsec settings

- **Tunnel Type:** Choose **ESP**, **ESP+Auth**, **ESP+NULL**, or **AH** as the tunnel encapsulation type from the drop-down list. These are grouped under FIPS compliant and Non-FIPS compliant categories.
 - **ESP:** Encrypts the user data only
 - **ESP+Auth:** Encrypts the user data and includes an HMAC
 - **ESP+NULL:** Packets are authenticated but not encrypted
 - **AH:** Only includes an HMAC
- **PFS Group:** Choose the Diffie-Hellman group to use for perfect forward secrecy key generation from the drop-down menu.
- **Encryption Mode:** Choose the Encryption Mode for IPsec messages from the drop-down menu.
- **Hash Algorithm:** The MD5, SHA1, and SHA-256 hashing algorithms are available for HMAC verification.
- **Network Mismatch:** Choose an action to take if a packet does not match the IPsec Tunnel's Protected Networks from the drop-down menu.
- **Security Association Lifetime (s):** Enter the amount of time (in seconds) for an IPsec security association to exist.
- **Security Association Lifetime (s) Max:** Enter the maximum amount of time (in seconds) to allow an IPsec security association to exist.
- **Security Association Lifetime (KB):** Enter the amount of data (in kilobytes) for an IPsec security association to exist.

- **Security Association Lifetime (KB) Max:** Enter the maximum amount of data (in kilobytes) to allow an IPsec security association to exist.

IPSec Settings

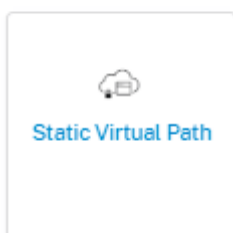
Tunnel Type	PFS Group	Encryption Mode
ESP	None	AES 256-Bit GCM 128-Bit
Hash Algorithm	Network Mismatch	
SHA-256	Drop	
Security Association Lifetime (s)	Security Association Lifetime (s) Max	
3600	86400	
Security Association Lifetime (KB)	Security Association Lifetime (KB) Max	
0	0	

Static virtual path

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 customer level, navigate to **Configuration > Delivery Channels**, and click the **Static Virtual Path** tile.

Static VP Cost: 5



The following are some of the supported settings:

- **On-demand Bandwidth List:**
 - **Override global on-demand bandwidth limit:** When enabled, the global bandwidth limit values are replaced by site-specific values.

- **Maximum total WAN-to-LAN bandwidth, as a percentage of bandwidth provided by non-standby WAN links in the Virtual Path (%):** Update the maximum bandwidth limit, in %.
- **Global Default per Link: Relative Bandwidth Provisioning across Virtual Paths:**
 - **Enable Auto-Bandwidth Provisioning across Virtual Paths:** When enabled, the bandwidth for all the services are automatically calculated and applied according to the magnitude of bandwidth consumed by the remote sites.
 - **Minimum Reserved Bandwidth for each Virtual Path (Kbps):** The maximum bandwidth to be reserved exclusively for each service on every WAN link.

Edit Static Virtual Path

On-Demand Bandwidth Limit

☐ Override global on-demand bandwidth limit

Maximum total WAN-to-LAN bandwidth, as a percentage of bandwidth provided by non-standby WAN links in the Virtual Path (%) *

120

Global Default per Link: Relative Bandwidth Provisioning across Virtual Paths

☐ Enable Auto-Bandwidth Provisioning across Virtual paths

Minimum Reserved Bandwidth for each Virtual Path (Kbps) : *

80

Save

Cancel

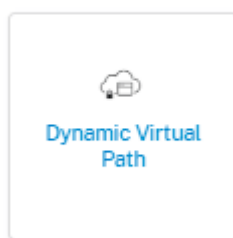
Dynamic virtual path settings

The global dynamic virtual path settings allow admins to configure dynamic virtual path defaults across the network.

A dynamic virtual path is instantiated dynamically between two sites to enable direct communication, without any intermediate SD-WAN node hops. Similarly, the dynamic virtual path connection is removed dynamically too. Both the creation and removal of dynamic virtual paths are triggered based on bandwidth thresholds and time settings.

To configure dynamic virtual paths, from the customer level, navigate to **Configuration > Delivery Channels > Service Definitions**, and click the **Dynamic Virtual Path** tile.

Dynamic VP Cost: 5



The following are some of the supported settings:

- Provision to enable or disable dynamic virtual paths across the network
- The route cost for dynamic virtual paths
- The QoS Profile to be used – **Standard** by default.
- Dynamic Virtual Path Creation Criteria:
 - **Measurement interval (seconds)**: The amount of time over which the packet count and bandwidth are measured to determine if the dynamic virtual path must be created between two sites – in this case, between a given Branch and the Control Node.
 - **Throughput threshold (kbps)**: The threshold of total throughput between two sites, measured over the **Measurement interval**, at which the Dynamic Virtual Path is triggered. In this case the threshold applies to the Control Node.
 - **Throughput threshold (pps)** - The threshold of total throughput between two sites, measured over the **Measurement interval**, at which the Dynamic Virtual Path is triggered.
- Dynamic Virtual Path Removal Criteria:
 - **Measurement interval (minutes)**: The amount of time over which the packet count and bandwidth are measured to determine if a Dynamic Virtual Path must be removed between two sites – in this case, between a given Branch and the Control Node.
 - **Throughput threshold (kbps)** - The threshold of total throughput between two sites, measured over the **Measurement interval**, at which the Dynamic Virtual Path is removed.
 - **Throughput threshold (pps)** - The threshold of total throughput between two sites, measured over the **Measurement interval**, at which the Dynamic Virtual Path is removed.
- Timers
 - **Wait time to flush dead virtual paths (m)**: The time after which a DEAD Dynamic Virtual Path is removed.
 - **Hold time before the recreation of dead virtual paths (m)**: The time after which a Dynamic Virtual Path removed for being DEAD can be recreated.
- On-demand Bandwidth List

- **Override global on-demand bandwidth limit:** When enabled, the global bandwidth limit values are replaced by site-specific values.
- **Maximum total WAN-to-LAN bandwidth, as a percentage of bandwidth provided by non-standby WAN links in the Virtual Path (%):** Update the maximum bandwidth limit, in %.

← Edit Dynamic Virtual Path

☒ Enable Dynamic Virtual Paths Across the Network

Route Cost

5

Max Paths Per Site

4

QoS Profile

Standard-HDX-Multistream

Dynamic Virtual Path Creation Criteria

Measurement interval (s)

1

Throughput threshold (kbit/s)

600

Throughput threshold (pps)

45

Dynamic Virtual Path Removal Criteria

Measurement interval (m)

2

Throughput threshold (kbit/s)

45

Throughput threshold (pps)

35

Timers

Wait Time to flush dead virtual paths (m)

1

Hold Time before recreation of dead virtual paths (m)

10

On-Demand Bandwidth Limit

☒ Override global on-demand bandwidth limit

Maximum total WAN-to-LAN bandwidth, as a percentage of bandwidth provided by non-standby WAN links in the Virtual Path (%)

120

Save

Cancel

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

February 8, 2022

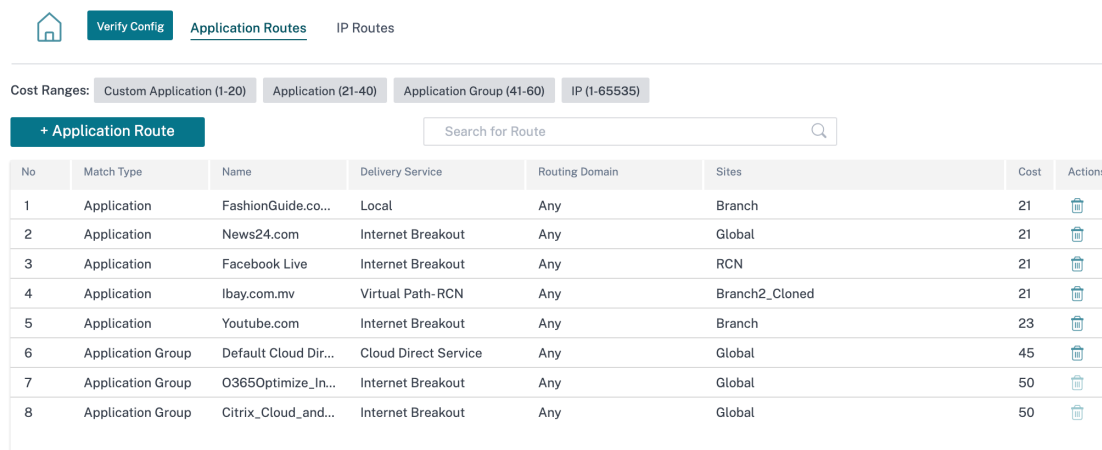
Routing

The **Routing** section provides the following options:

- Routing Policies
- Route Summarization
- 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.



No	Match Type	Name	Delivery Service	Routing Domain	Sites	Cost	Actions
1	Application	FashionGuide.co...	Local	Any	Branch	21	
2	Application	News24.com	Internet Breakout	Any	Global	21	
3	Application	Facebook Live	Internet Breakout	Any	RCN	21	
4	Application	Ibay.com.mv	Virtual Path-RCN	Any	Branch2_Cloned	21	
5	Application	Youtube.com	Internet Breakout	Any	Branch	23	
6	Application Group	Default Cloud Dir...	Cloud Direct Service	Any	Global	45	
7	Application Group	O365Optimize_In...	Internet Breakout	Any	Global	50	
8	Application Group	Citrix_Cloud_and...	Internet Breakout	Any	Global	50	

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 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, the 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.

The screenshot shows the 'Application Routes' configuration page in the Citrix SD-WAN Orchestrator. At the top, there is a navigation bar with a home icon, a 'Verify Config' button, and tabs for 'Application Routes' (selected) and 'IP Routes'. Below the navigation bar, there are four tabs for 'Cost Ranges': 'Custom Application (1-20)', 'Application (21-40)', 'Application Group (41-60)', and 'IP (1-65535)'. The main configuration area is divided into several sections: 'Application Match Criteria' (a dark grey header), 'Match Type' (with a dropdown set to 'Application'), 'Application' (with a dropdown set to 'King Digital Entertainment'), 'Routing Domain' (with a dropdown set to 'Any'), 'Scope' (a dark grey header), 'Global Route' (selected) and 'Site / Group Specific Route' (radio buttons), 'Traffic Steering' (a dark grey header), 'Delivery Service' (with a dropdown set to 'Internet Breakout'), and 'Cost' (with a text input set to '21'). At the bottom, there are 'Cancel' and 'Save' buttons.

Cost Ranges: Custom Application (1-20) Application (21-40) Application Group (41-60) IP (1-65535)

Application Match Criteria

Match Type Application Application * Routing Domain

Application King Digital Entertainment Any

Scope

☒ Global Route ☐ Site / Group Specific Route

Traffic Steering

Delivery Service Cost *

Internet Breakout 21

Cancel Save

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

IP Routes

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

[Verify Config](#)
[Application Routes](#)
[IP Routes](#)

Cost Ranges: [Custom Application \(1-20\)](#) [Application \(21-40\)](#) [Application Group \(41-60\)](#) [IP \(1-65535\)](#)

IP Protocol Match Criteria

Destination Network *
☐ Use IP Group
 Routing Domain

Scope

☒ Global Route
 ☐ Site / Group Specific Route

Traffic Steering

Delivery Service
 Cost *

Eligibility Criteria

☒ Export Route

- **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.

- **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:** Reflects the relative priority of each route. Lower the cost, the higher the priority.

If a new IP route gets added, then the route cost must be in the 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.

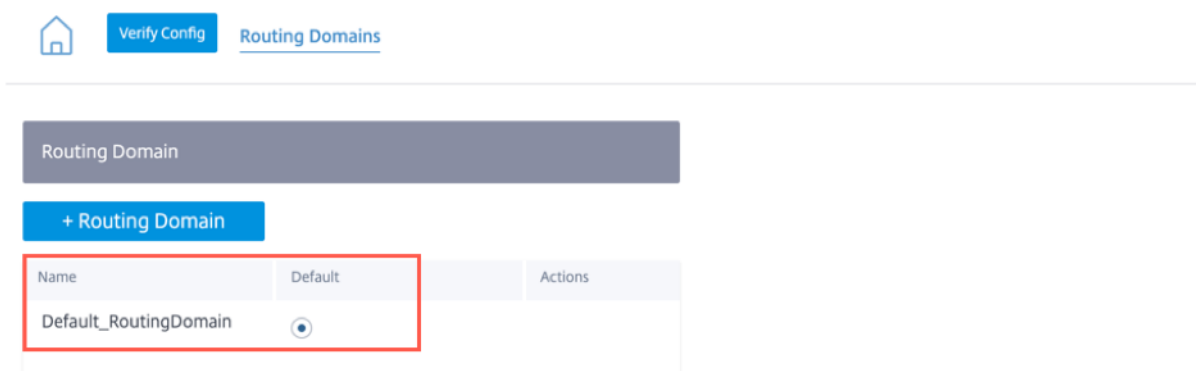
Route Summarization

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. It saves bandwidth by sending a single route advertisement, reducing the number of links between routers. It saves memory because only one route address is maintained. The CPU resources are used more efficiently by avoiding recursive lookups. You can add summary routes without specifying the gateway IP address.

Routing domains

Routing Domains are used for segregate traffic through VLAN. 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**.

Network Configuration : Routing Domains

[Verify Config](#)[Routing Domains](#)

Routing Domain

Routing Domain Name

site1

VirtualInterface-1

MCN-2100

MCN-DC1

ServerVPX197

DC-410

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

For more information, see [Routing Domain](#).

Inter-routing domain service

Citrix SD-WAN Orchestrator for On-premises 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](#).

To configure the Inter-Routing Domain service through the Citrix SD-WAN Orchestrator for On-premises:

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.

Routing Domains ⓘ

Routing Domain

+ Routing Domain

Name	Default	Actions
Default_RoutingDomain	☒	
Domain1	☐	

Inter Routing Domain Service

Name	Routing Domain1	Routing Domain2	Firewall Zone
Interroutedomain1	Default_RoutingDomain	Domain1	Default_LAN_Zone

Cancel

Save

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](#).

Routing Policies ⓘ

Application Routes **IP Routes**

Cost Ranges: Custom Application (1-20) Application (21-40) Application Group (41-60) IP (1-65535)

IP Protocol Match Criteria

Destination Network *

☐ Use IP Group

Routing Domain

172.16.18.0/24

Domain1

Scope

☒ Global Route ☐ Site / Group Specific Route

Traffic Steering

Delivery Service

Service Name *

Cost *

Inter Routing Domain

interoutedomain1

5

Eligibility Criteria

☒ Export Route

Cancel

Save

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](#).

Firewall Policies ⓘ

Policy Information

Policy Name *
 ☐ Active Policy

Firewall Type

Match Criteria

Match Type Routing Domain

Apps & Domains * [+ New Domain App](#)

Filtering Criteria

Source Zone Destination Zone

Source Service Type

Source Service Name *

Dest Service Type

Dest Service Name *

Source IP

Source Port

Dest IP

Dest Port

IP Protocol DSCP ☒ Allow Fragments ☐ Reverse Also ☐ Match Established

Actions

Action

☒ Connection State Tracking

☒ Log Connection Start & End Events

☒ Log Packet Statistics

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.

Import filter rules are rules that have to be met before importing dynamic routes into the SD-WAN route database. By default, no routes are imported.

[Verify Config](#)[Import Route Profiles](#)[+ Import Filter Profile](#)

Profile Name	Actions
Default	
one	

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.

Verify Config

Import Route Profiles

Import Filter Profile

Import Profile Name *

Sample-import-filter-profile

Import Filters

Protocol	Routing Domain	Source Router	Destination IP	☐ Use IP Group	Prefix	Next Hop	Route Tag
Any	Default_RoutingDomain	*	*		eq	*	*

☒ Include ☒ Export Route to Citrix SD-WAN Appliances

Citrix SD-WAN Cost *

6

Service Type

Local

Cancel

Done

Profile Availability

Import Filter Profile Settings will be applied to the sites listed below

Select Sites

Sites (2)

Boston

Dallas

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.

The screenshot shows the 'Export Route Profiles' configuration page in the Citrix SD-WAN Orchestrator. At the top, there is a navigation bar with a home icon, a 'Verify Config' button, and the 'Export Route Profiles' link. The main content area is divided into three sections: 'Export Filter Profile', 'Export Filters', and 'Profile Availability'.
1. 'Export Filter Profile' section: Contains a text input field for 'Export Profile Name' with the value 'sample-export-filter-profile'.
2. 'Export Filters' section: Contains several configuration fields: 'Routing Domain' (dropdown menu with 'Default_RoutingDomain'), 'Network Address/Mask' (input field with 'ipg1'), 'Use IP Group' (checked checkbox), 'Prefix' (dropdown menu with 'eq'), 'Cost' (input field with '*'), 'Service Type' (dropdown menu with 'Local'), and 'Gateway IP Address' (input field with '*'). Below these are 'Export OSPF Route Type' (dropdown menu with 'Type 5 AS External') and 'Export OSPF Route Weight' (input field with 'Weight'). There is also an 'Include' checkbox which is checked. At the bottom of this section are 'Cancel' and 'Done' buttons.
3. 'Profile Availability' section: Contains the text 'Export Filter Profile Settings will be applied to the sites listed below' and a 'Select Sites' button. Below this, it shows 'Sites (1)' with 'Boston' listed as a site.

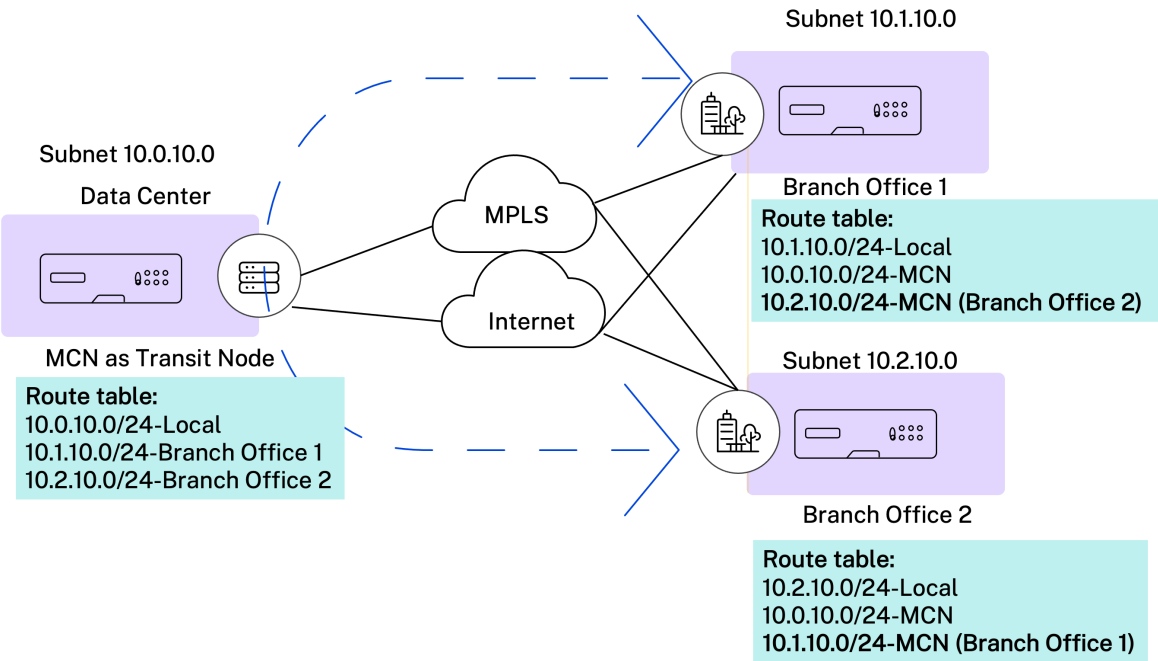
Click **Verify Config** to validate any audit error.

Transit nodes

Virtual overlay Transit Node

Transit nodes are the sites that are able to forward traffic between one or more branches within a region.

The traffic between two nodes can be influenced to pick transit node as an intermediate hop by adjusting the route cost. 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 through 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

You can specify the control nodes (MCN/RCN) and the geo-control nodes (Geo-MCN/RCN) to act as the default global virtual overlay transit nodes in a network. Enabling spoke-and-spoke communication through Hub as part of global settings allows all the sites to use the configured control nodes as transit nodes, by default, for site-to-site communication.

Global Transit Node Settings

☒ Enable Spoke-to-Spoke communication via Hub by default across the network (Recommended)

Restore Default

Control Transit Node Settings

This section hosts the configuration to override the global transit node settings on a specific or a set of control transit nodes in the network. (MCN/RCN and related Geo control nodes)

+ Add Node

Transit on Control Node	Default Virtual Path Cost (Site to Control Node)
Site1 ☒ Override Global Transit Settings Spoke to Spoke Forwarding Route Export	6
SiteRCN ☒ Override Global Transit Settings Spoke to Spoke Forwarding Route Export	6

Save

+ Add Geo-Node

Transit on Geo-Control Node	Default Virtual Path Cost (Site to Geo-Control Node)
S3 ☒ Override Global Transit Settings Spoke to Spoke Forwarding Route Export	6
SiteRegion2 ☐ Override Global Transit Settings	6

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.

You can override the global transit node settings and choose to enable or disable spoke-to-spoke forwarding only on selected control transit nodes. When **Spoke to Spoke Forwarding** is enabled, the transit control node exports routes across the sites connected to it. Site-to-Site communication and Dynamic Virtual path across sites connected to the transit node alone gets enabled.

Enabling **Route Export** enables virtual path-to-virtual path forwarding and route exporting (WAN-to-WAN forwarding) on all the site paths. Disabling the toggle button enables only virtual path-to-virtual path forwarding and disables route exporting on all the site paths. Route Export can be enabled only when **Spoke to Spoke Forwarding** is enabled.

Control Transit Node Settings

This section hosts the configuration to override the global transit node settings on a specific or a set of control transit nodes in the network. (MCN/RCN and related Geo control nodes)

+ Add Node

Transit on Control Node	Default Virtual Path Cost (Site to Control Node)
Site1 ☒ Override Global Transit Settings ☒ Spoke to Spoke Forwarding ☐ Route Export	6 🗑️
SiteRCN ☒ Override Global Transit Settings ☐ Spoke to Spoke Forwarding ☐ Route Export	6 🗑️

+ Add Geo-Node

Transit on Geo-Control Node	Default Virtual Path Cost (Site to Geo-Control Node)
S3 ☒ Override Global Transit Settings ☒ Spoke to Spoke Forwarding ☒ Route Export	6 🗑️
SiteRegion2 ☐ Override Global Transit Settings ☐ Spoke to Spoke Forwarding ☐ Route Export	6 🗑️

Save

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.

Site Specific Preferences for Virtual Overlay Transit Nodes

Primary Transit Node *	Cost	Secondary Transit Node	Cost	Tertiary Transit Node	Cost
Germany_Masternode ▾	6	London_Site ▾	7	Greece_Site_Clone ▾	8

Sites to be Routd via Intermediate Node

Select Region/Groups

☒ Select All
 ☒ default

Select Sites

☒ Select All
 ☒ London_Site

Cancel

Review

Showing 1 - 2 of 2 items

Page 1 of 1

◀ ▶

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.

Verify Config

Virtual Overlay Transit Nodes

Internet Transit Nodes

Intranet Transit Nodes

Primary Default Internet Transit Node for the Network

Transit Node	Description
Virtual Overlay Transit Node	Virtual Overlay Transit routing node for each site doubles up as the primary Internet transit node, if Internet service is enabled on the Virtual Overlay Transit node. If not, the secondary / backup transit nodes provide a route to the Internet

Secondary / Backup Internet Transit Nodes for the Network

Service Name

internet

Transit Node Settings will be applied to the sites listed below

Select Sites

No Sites have been Selected

Save

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.

Verify Config

Virtual Overlay Transit Nodes

Internet Transit Nodes

Intranet Transit Nodes

Primary Default Intranet Transit Node for the Network

Transit Node	Description
Virtual Overlay Transit Node	Virtual Overlay Transit routing node for each site doubles up as the primary Intranet transit node, if Intranet service is enabled on the Virtual Overlay Transit node. If not, the secondary / backup transit nodes provide a route to the Intranet

Secondary / Backup Transit Nodes to reach the subnets selected

Service Name

Non_SDWAN_Sites

Transit Node Settings will be applied to the sites listed below

Select Sites

No Sites have been Selected

Save

BGP

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

BGP ⓘ

Note: BGP settings are available as part of site config. Please choose a site from below dropdown and click Go. This will take you to site level page

Select Site:

branchvpx

[Go](#)

OSPF

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

OSPF ⓘ

Note: OSPF settings are available as part of site config. Please choose a site from below dropdown and click Go. This will take you to site level page

Select Site:

branchvpx

[Go](#)

Multicast groups

You can configure multicast routing for a site by selecting the required site from the drop-down list and clicking **GO**. This takes you to the site level multicast groups configuration page. For detailed information on configuring multicast routing, see [Multicast groups](#).

Multicast Groups ⓘ

Note: Multicast Groups settings are available as part of site config. Please choose a site from below dropdown and click Go. This will take you to site level page

Select Site:

branchvpx

▼

Go

VRRP

You can configure virtual router redundancy protocol (VRRP) for a site by selecting the required site from the drop-down list and clicking **GO**. This takes you to the site level VRRP configuration page. For detailed information on configuring multicast routing, see [VRRP](#).

VRRP ⓘ

Note: VRRP settings are available as part of site config. Please choose a site from below dropdown and click Go. This will take you to site level page

Select Site:

branchvpx

▼

Go

Inter-link communication

March 8, 2022

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.

Default Inter-link Communication Groups

No	Group Name	Description
1	Internet-All	All Internet links can talk to each other by default. If a sub-set of internet links need to talk only among t...
2	MPLS-Same-ISP	All MPLS links belonging to the same ISP can talk to each other by default, through auto-creation of paths
3	Private Intranet-Same-ISP	All Private Intranet links belonging to the same ISP can talk to each other by default, through auto-creati...

Custom Inter-link Communication Groups

MPLS Groups Private Intranet Groups Internet Communication Override Groups

Group the desired MPLS service provider names, to enable the corresponding links to talk to each other.

+ MPLS Inter-link Communication Group

No	Group Name	Service Providers	Actions
----	------------	-------------------	---------

- **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 Group which are sent on the virtual paths are encrypted.

Default Inter-link Communication Groups

No	Group Name	Description
1	Internet-All	All Internet links can talk to each other by default. If a sub-set of internet links need to talk only among themselves and not with the broad...
2	MPLS-Same-ISP	All MPLS links belonging to the same ISP can talk to each other by default, through auto-creation of paths
3	Private Intranet-Same-ISP	All Private Intranet links belonging to the same ISP can talk to each other by default, through auto-creation of paths

Custom Inter-link Communication Groups

MPLS Group Name ^{*}

DSCP Tag

☒ Enable Encryption

+ MPLS Provider

Cancel Save

February 8, 2022

Security

You can configure the security settings such as, network security, 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.

Firewall Zones

+ Firewall Zone	
Name	Actions
Trail-firewall-zone	
Default_LAN_Zone	
Internet_Zone	
Untrusted_Internet_Zone	
Inter_Routing_Domain_Zone	

You can also create your own zones and assign them to the following types of objects:

- Virtual Network Interfaces
- 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.

Firewall Defaults ⓘ

Global Default Firewall Actions

Action When No Firewall Rules Match

Allow

Global Firewall Settings

☐ Default Connection State Tracking

Denied Timeout (s)

30

TCP Initial Timeout (s)

120

TCP Idle Timeout (s)

7440

TCP Closing Timeout

60

TCP Time Wait Timeout (s)

120

TCP closed Timeout (s)

10

UDP Initial Timeout (s)

30

UDP Idle Timeout (s)

300

ICMP Initial Timeout (s)

30

ICMP Idle Timeout (s)

60

Generic Initial Timeout (s)

30

Generic Idle Timeout (s)

300

Save

- **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 inspected 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.
- **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.

- **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 profiles 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.

- **Global Override** – You can override both global and site-specific policies using **Global Override Policy**.

Firewall Policies

Global Default

Site Specific

Global Override

+ Global Default Policy

No	Name	Active	Actions
----	------	--------	---------

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.

Firewall Policies

Policy Information

Policy Name *

☐ Active Policy

Firewall Rules

Create New Rule

☒ Top of List

☐ Bottom of List

☐ Specify Row Number

Row number

No	Match Type	Application	Src Zone	Dst Zone	Src Network	Dst Network	Action	Actions
----	------------	-------------	----------	----------	-------------	-------------	--------	---------

Cancel

Save

To create a firewall rule, click **Create New Rule**.

Firewall Policies

Policy Information

Policy Name *

FIREWALL-13

☐ Active Policy

Firewall Type

Built-in Firewall

Match Criteria

Match Type

Apps & Domains

Routing Domain

Default_RoutingDomain

Apps & Domains *

[+ New Domain App](#)

Ecommerce

Filtering Criteria

Source Zone

Any X

Destination Zone

Any X

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

Allow

Schedule

Always On (Default)

[Add Schedule](#)

☒ Connection State Tracking

☒ Log Connection Start & End Events

☒ Log Packet Statistics

Every 5 mins

Cancel

Done

- Provide a policy name and select the **Active Policy** check box if you want to apply all the firewall rules.

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154

- The match criteria defines the traffic for the rule such as, an 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.

- **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.

Network Security ⓘ

Network Security Settings

Encryption

AES-128

- ☒ Enable Encryption Key Rotation
- ☐ Enable Extended Packet Encryption Header
- ☐ Enable Extended Packet Authentication Trailer

Extended Packet Authentication Trailer Type

- ☐ Enable FIPS Mode
- ☐ Enable Appliance Authentication

Network Secure Key

Regenerate

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 for On-premises 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.

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, TLSv1.1, TLSv1.2, and TLSv1.3.
- **Server Connection Protocols:** Select the required server protocols. The protocols available are SSLvHello, SSLv3, TLSv1, TLSv1.1, 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.

SSL Inspection ⓘ

Configuration

Root Certificate

Trusted Server Certificates

☒ Enable SMTPS Traffic Processing

☒ Enable HTTPS Traffic Processing

☐ Block Invalid HTTPS Traffic

Client Connection Protocols

☐ SSLvHello

☐ SSLv3

☐ TLSv1

☐ TLSv1.1

☐ TLSv1.2

☐ TLSv1.3

Server Connection Protocols

☐ SSLvHello

☐ SSLv3

☐ TLSv1

☐ TLSv1.1

☐ TLSv1.2

☐ TLSv1.3

Save

Cancel

On the **Root Certificate** tab, copy and paste the root certificate and key of your organization root certificate authority (CA). 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.

SSL Inspection ⓘ

Configuration

Root Certificate

Trusted Server Certificates

Root Certificate and Key

Import the files or copy paste the Root Certificate and Key

Root Certificate

Root Key

Save

Cancel

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.

SSL Inspection ⓘ

Configuration Root Certificate **Trusted Server Certificates**

Trusted Server Certificates

☐ Trust all server certificates

☒ Trust all server certificates signed by root authority and certificates listed below

Add Certificate

Certificate Name	Issued to	Issued by	Valid date	Expire date
------------------	-----------	-----------	------------	-------------

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.

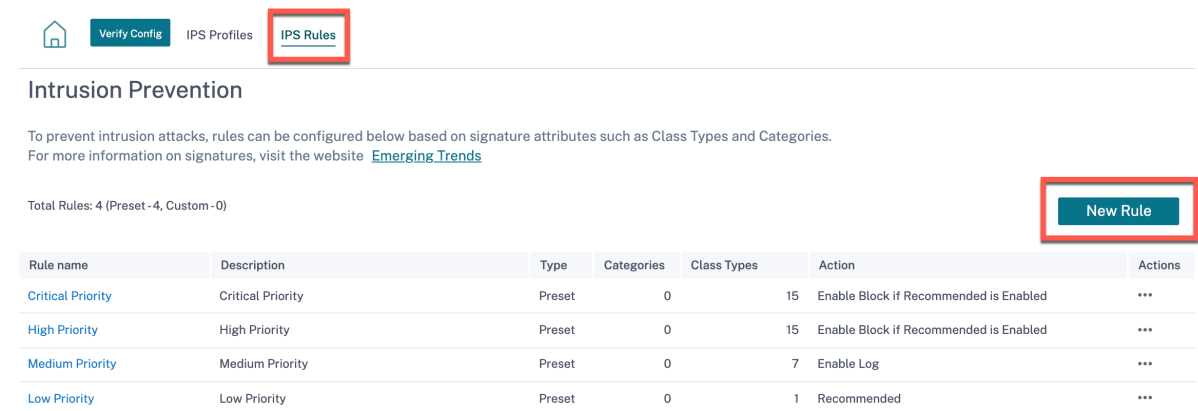
IPS uses signature based detection, which matches the incoming packets against a database of uniquely identifiable exploit and attack patterns. The signature database is automatically updated daily. Since there are thousands of signatures, the signatures are grouped into Category and Class types.

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.

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.

Verify Config

IPS Profiles

IPS Rules

← Rule

Rule Name *

rule-block-chrome-dos

Description

Block denial of service through chrome browser.

IF THE FOLLOWING CONDITION IS MET*

Category

is

browser-chrome X

OR

Class Type

is

denial-of-service X

THEN DO THE FOLLOWING*

Enable Block

Create Rule

Cancel

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**.

Verify Config

IPS Profiles

IPS Rules

Each IPS Profile contains one or many IPS Rules applied to sites

Total Profiles: 1

New Profile

Profile name	Description	Status	Rules	Sites	
Profile-1				4	1 ...

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**.

Verify Config

IPS Profiles

IPS Rules

← New IPS Profile

Profile Name *

Profile-2

Description

IPS Rules

Sites

Rule name	Description	Type	Status	Categories	Class Type	Action
Critical Priority	Critical Priority	Preset	☒	0	15	blocklog
High Priority	High Priority	Preset	☒	0	15	blocklog
Medium Priority	Medium Priority	Preset	☐	0	7	log
Low Priority	Low Priority	Preset	☐	0	1	default

☒ Enable IPS Profile

Create Profile

Cancel

On the **Sites** tab, click **Select Sites**. Select the sites and click **Save**. Click **Create Profile**.

Verify Config

IPS Profiles

IPS Rules

← New IPS Profile

Profile Name *

Profile-2

Description

IPS Rules

Sites

Profile Name *

Profile-2

Description

IPS Rules

Sites

☐ Global(All Sites)

☒ Specific Sites

Intrusion Prevention Settings will be applied to the sites listed below

☒ Enable IPS Profile

Create Profile

Cancel

Site Selector

Browse or search the list of sites, regions and groups below. You can add/remove entire Regions and Groups, or click into them and choose a subset of its members to add/remove.

Search

Filter By Region / Custom Groups

Available (5 sites)

☐ Name

☐ Boston

☐ Dallas

☐ Kansas

☐ SantaClara

☐ myLTE

→

←

Selected (0 sites)

☐ Name

Save

Cancel

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](#).

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](#).

Virtual Path IPsec ⓘ

Static Virtual Paths IPsec

Dynamic Virtual Paths IPsec

Dynamic Virtual Path IPsec Settings

☒ Encrypt Dynamic Virtual Path with IPsec

Encapsulation Type *

ESP

Encryption Mode *

AES 128-Bit

Hash Algorithm *

SHA1

Lifetime (s) *

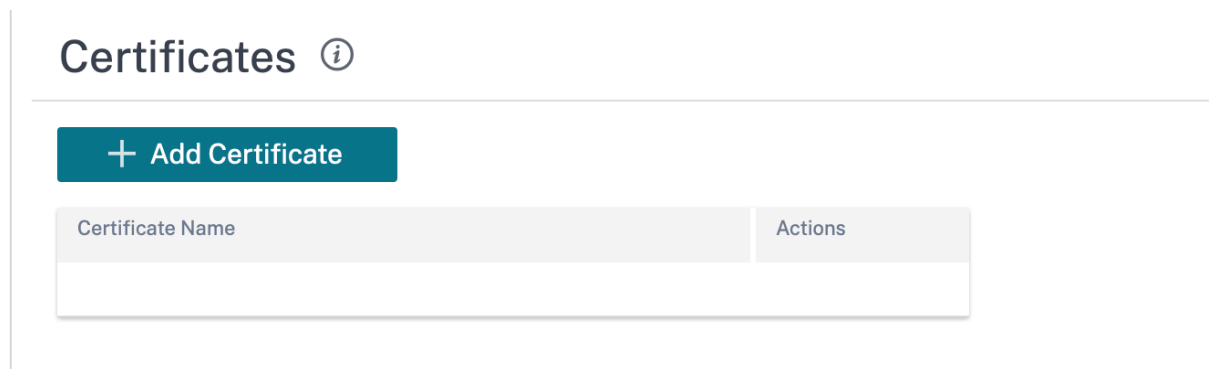
28800

Save

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

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 the certificate's private key to 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.

Certificates ⓘ

Certificate

Certificate Name *

Enter Name

Certificate Type

Trusted

Trusted
Identity

Base64 Certificate *

Base64 Key

Cancel

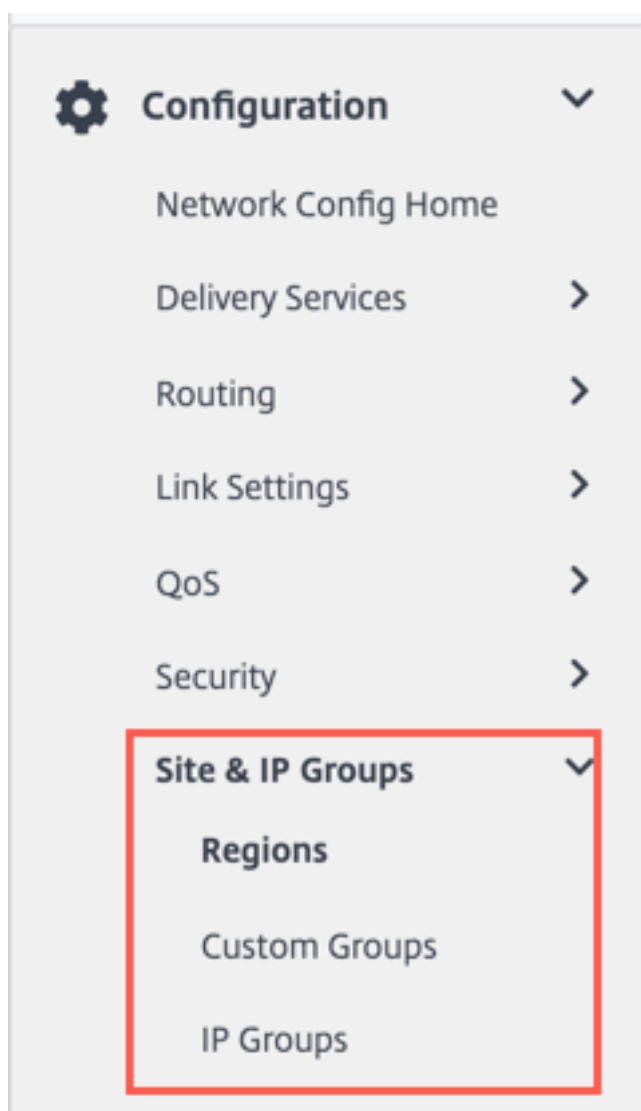
Save

Site and IP Groups

November 24, 2021

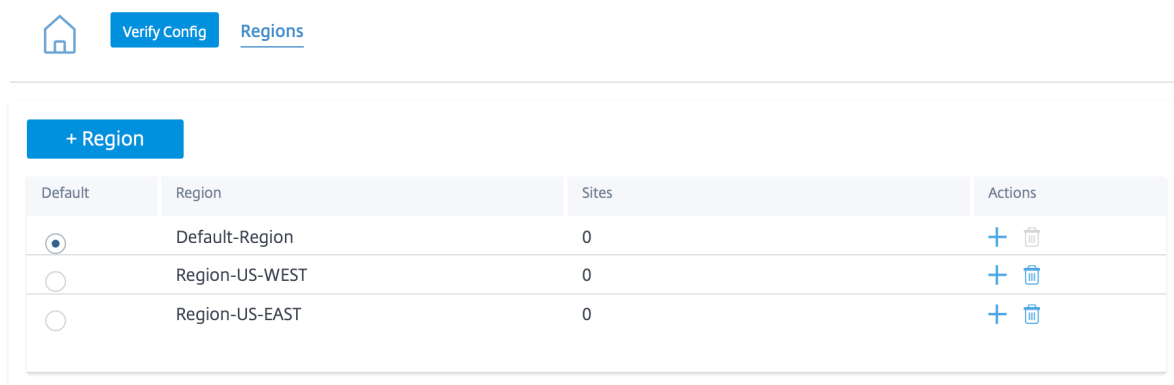
Administrators can group sites or IP addresses to simplify common application policies across multiple sites or network addresses, and also serve as filters for reports.

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



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.



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.

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.

[Verify Config](#)[Regions](#)

Region Attributes

Region Name: Region-

Description

☐ Force Internal VIP Matching ☐ Allow External VIP Matching

+ Subnets

Network	Delete
Eg: a.b.c.d/e	

Sites

☒ Import Sites from other Regions

Search Sites

Select Region(s) to Import from

☒ Select All☒ Default-Region

Select Sites to be Imported

Cancel

Review

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

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.

Network Configuration : Custom Groups

 [Verify Config](#) [Custom Groups](#)

[+ Custom Group](#)

Group	Sites	Actions
Group-Large Branch Offices	3	+ -
Group-Large Branch Office	3	+ -
Group-Europe	3	+ -
Group-G1	2	+ -
Group-test_group	0	+ -

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**.

Network Configuration : Custom Groups

Group Attributes

Group Name: Group-

Sites

☒ + Sites Search Sites

Select Group(s) to pick from

- ☒ Select All
- ☒ Default-Region
- ☒ Region-Main_Office
- ☒ Region-Sales_office
- ☒ Group-Large Branch O
- ☒ Group-Large Branch O
- ☒ Group-Europe
- ☒ Group-G1
- ☒ Group-test_group

Select Sites to be Added

- ☐ Select All
- ☐ Bangalore
- ☐ Belgium
- ☐ London
- ☐ Madrid
- ☐ NewYork
- ☐ San Francisco

Showing 1 - 6 of 6 items Page 1 of 1

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

IP groups

Citrix SD-WAN Orchestrator for On-premises 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.

IP Groups ⓘ

+ IP Group	
Name	Actions
MCN-GROUP1	
BR1_GROUP1	
BR2_Group1	

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.

IP Groups ⓘ

IP Group Identifiers

IP Group Name *

IP Addresses

+ IP Address

Network Address/Prefix

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](#).

The screenshot shows the 'IP Routes' configuration page in the Citrix SD-WAN Orchestrator. At the top, there is a navigation bar with a home icon, a 'Verify Config' button, and tabs for 'Application Routes' and 'IP Routes'. Below the navigation bar, there are four tabs for 'Cost Ranges': 'Custom Application (1-20)', 'Application (21-40)', 'Application Group (41-60)', and 'IP (1-65535)'. The main configuration area is divided into several sections: 'IP Protocol Match Criteria' (a dark grey bar), 'Destination Network' (with a text input 'Any' and a 'Use IP Group' checkbox), 'Routing Domain' (with a dropdown menu 'Any'), 'Scope' (a dark grey bar), 'Global Route' (selected radio button) and 'Site / Group Specific Route' (unselected radio button), 'Traffic Steering' (a dark grey bar), 'Delivery Service' (dropdown menu 'Internet Breakout') and 'Cost' (text input '5'), 'Eligibility Criteria' (a dark grey bar), and 'Export Route' (checked checkbox). At the bottom, there are 'Cancel' and 'Save' buttons.

Verify Config Application Routes IP Routes

Cost Ranges: Custom Application (1-20) Application (21-40) Application Group (41-60) IP (1-65535)

IP Protocol Match Criteria

Destination Network * ☐ Use IP Group Routing Domain

Any Any

Scope

☒ Global Route ☐ Site / Group Specific Route

Traffic Steering

Delivery Service Cost *

Internet Breakout 5

Eligibility Criteria

☒ Export Route

Cancel Save

- **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](#).



Verify Config

Import Route Profiles

Import Filter Profile

Import Profile Name *

Sample-import-filter-profile

Import Filters

Protocol	Routing Domain	Source Router	Destination IP	☐ Use IP Group	Prefix	Next Hop	Route Tag
Any	Default_RoutingDomain	*	*	☐	eq	*	*

☒ Include ☒ Export Route to Citrix SD-WAN Appliances

Citrix SD-WAN Cost *

6

Service Type

Local

Cancel

Done

Profile Availability

Import Filter Profile Settings will be applied to the sites listed below

Select Sites

Sites (2)
Boston
Dallas

- **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](#).

Verify Config

Export Route Profiles

Export Filter Profile

Export Profile Name *
sample-export-filter-profile

Export Filters

Routing Domain

Network Address/Mask

☒ Use IP Group

Prefix

Cost

Service Type

Gateway IP Address

Default_RoutingDomain

ipg1

eq

*

eq

*

Local

*

Export OSPF Route Type

Export OSPF Route Weight

☒ Include

Type 5 AS External

Weight

Cancel

Done

Profile Availability

Export Filter Profile Settings will be applied to the sites listed below

Select Sites

Sites (1)

Boston

- **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](#).

Dynamic Routing ⓘ

OSPF **BGP** Import Filters Export Filters

Neighbor Information

Routing Domain *

Default_RoutingDomain

Virtual Interface *

Neighbor IP *

Neighbor AS *

1

Hold Time *

180

Local Preference *

100

Password

☒ IGP Metric
 ☒ Multi Hop

Neighbor Policies

Order

100

Network Address

*

☐ Use IP Group

Community String list

Manual

BGP Community(AA:NN)

*

*

AS Path

*

BGP Policy *

Direction *

Cancel

Done

February 4, 2022

Application settings and groups

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**.

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.

Domains & Apps ⓘ

Domain Name Based Apps Pre-classified Apps

Domain based App Name *

Ecommerce

☐ Configure Ports

Add Domains

Domain Name/Pattern	Delete
www.amazon.com	
www.flipkart.com	

Cancel Save

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.

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**.

Domains & Apps ⓘ

Domain Name Based Apps

Pre-classified Apps

Domain based App Name *

Ecommerce

☒ Configure Ports

Select Protocol

TCP

Add Ports

Port / Port Range	Delete
80	
443	
500-4000	

Add Domains

Domain Name/Pattern	Delete
www.amazon.com	
www.flipkart.com	

Cancel

Save

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

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

Domains & Apps ⓘ

Domain Name Based Apps Pre-classified Apps

Filter Based on App Family: All X Search

App Name	App Family	Description
Base virtual protocol	Standard	Base is a virtual protocol, specific to ixEngine, that is always present at the beginning of the protocol path (e.g. base.
Unclassified Protocol	Standard	Unclassified is a virtual protocol created for DPI that represents flows that are not recognized by the system. Most of
Malformed virtual protocol	Standard	A packet belongs to the protocol 'malformed' if the protocol announced by the lower level protocol does not correspo
Incomplete virtual protocol	Standard	Incomplete is used when the protocol signature is too long.
802.1Q Ethernet VLAN	Network Service	802.1Q is a protocol which allows sending VLAN membership information of a frame.
AOL Instant Messenger (formerly O...	Instant Messaging	AIM (originally AOL Instant Messenger) is an instant messaging application. The protocol name is OSCAR (Open Syst
Advance Message Queuing Protocol	Middleware	AMQP (Advanced Message Queuing Protocol) is an open standard application layer protocol for message-oriented m
Apollo Domain:XEROX	Routing	Apollo is the routing protocol implemented natively in Apollo workstations.
Address Resolution Protocol	Network Service	The ARP protocol is used to determine the MAC Address of a PC for which the IP address is known.
AppleTalk	Network Service	The AppleTalk Protocol Suite implements services for routing, file transfer, printer sharing and emails in Apple envirc

Showing 1-10 of 3585 items Page 1 of 359 10 rows

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.

[Verify Config](#)[Custom Apps](#)

Custom App Name *

HTTP_SERVER_INTERNAL

☒ Enable Reporting

Reporting Priority

100

Match Criteria

Add Match Criteria

Application	Protocol	Network IP	Port	DSCP	Actions
Any	TCP (6)	*	80	DEFAULT	

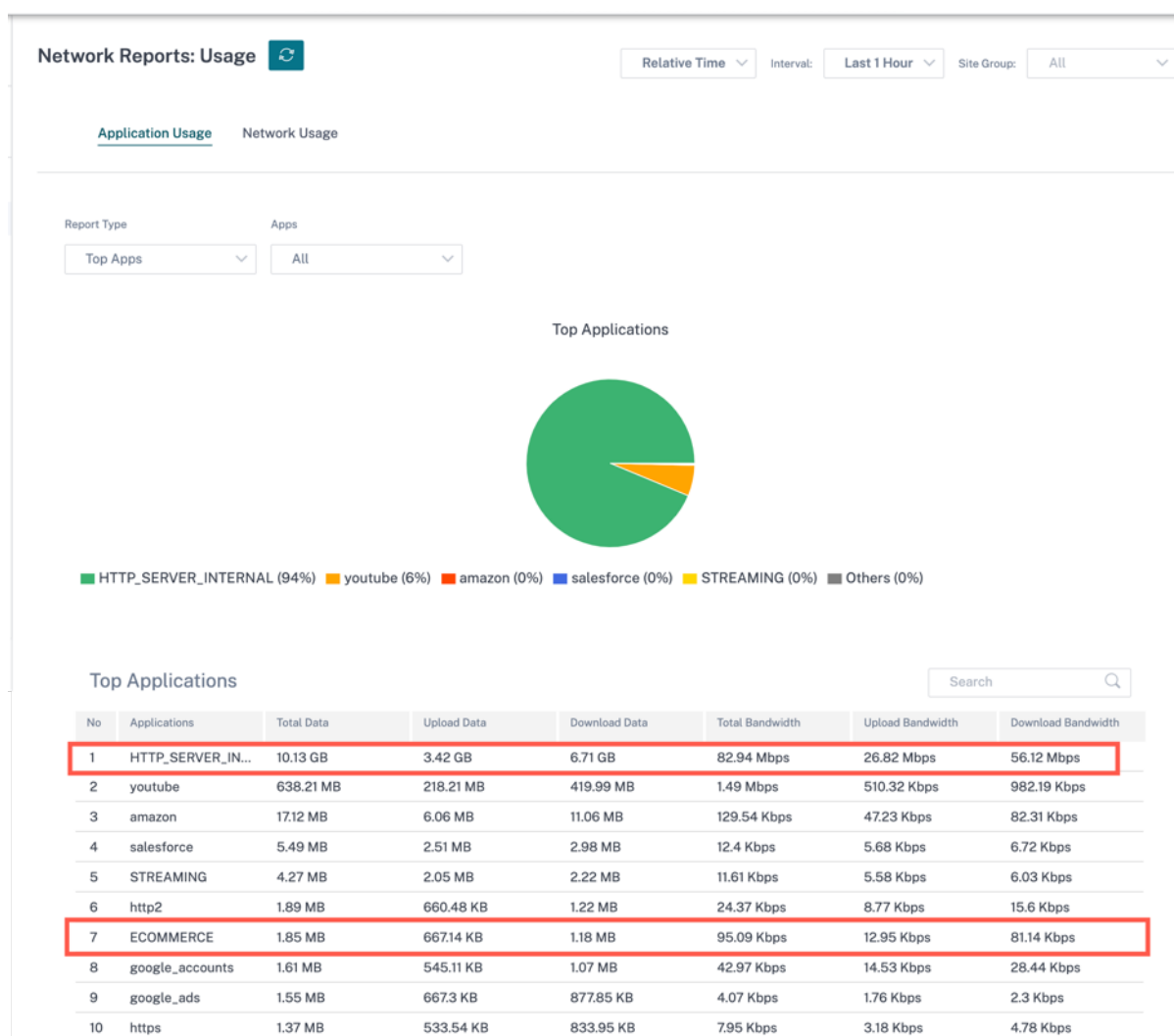
CancelSave

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.



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.

Home Verify Config Application Routes IP Routes

Cost Ranges: Custom Application (1-20) Application (21-40) Application Group (41-60) IP (1-65535)

Apps & Domains Match Criteria

Match Type: Apps & Domains

Apps & Domains: ecom

Routing Domain: Any

Scope: Global Route (selected), Site / Group Specific

Traffic Steering

Delivery Service: Internet Breakout, 21

Cancel Save

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

Home Verify Config Custom Apps

Custom App Name: Enter Name

Enable Reporting: ☐

Reporting Priority

Match Criteria

Application: Ecommerce

Protocol: Any

Network IP/Prefix: *

Port: 1-2

DSCP: any

Cancel Done

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.

Firewall Policies

Policy Information

Policy Name *

FIREWALL-12

☐ Active Policy

Firewall Type

Built-in Firewall

Match Criteria

Match Type

Apps & Domains

Routing Domain

Default_RoutingDomain

Apps & Domains *

[+ New Domain App](#)

Ecommerce

Filtering Criteria

Source Zone

Destination Zone

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.



[Verify Config](#)[QoS Policies](#)

Global Rules : Apps & Domains

Apps & Domains Match Criteria

Apps & Domains *[+ New Domain App](#)

ecom

DrukNet.bt (Bhutan Telecom)
Bhutan Telecom (bt.bt)
Manx Telecom
Chunghwa Telecom
Empresa de Telecomunicaciones de Cuba S.A.
Earthlink Telecom
Ecommerce

Routing Domain

Any

☐ Src = Dest

☐ Src = Dest

Virtual Path Traffic Policy

☒ Enable Virtual Path Traffic Policy

Virtual Path Remote Site

Traffic Policy

Any (determined by routing)

Load Balance Paths

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.

App Groups ⓘ

+ Application Group

Application Group Name	Actions
0365Optimize_InternetBreakout	
Citrix_Cloud_and_Gateway_service	
test	

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

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.

App Groups ⓘ

App Group Name *

Enter Name

☐ Enable Reporting

Reporting Priority

Applications

Search Apps Add

Application Name	Actions
ibay.com.mv	
Yahoo.com	
Gsshop.com	

Cancel Save

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

[Verify Configuration](#) Software Version: 13.2.25-GA

App Groups ⓘ

+ Application Group

Application Group Name	Actions
03050optimize_InternetBreakout	
Citrix_Cloud_and_Gateway_service	
test	

Application quality profiles

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

Network Configuration : App Quality Profiles

[Verify Config](#) [App Quality Profiles](#)

+ QoE Profile

Profile Name	One Way Latency (ms)	Jitter (ms)	Packet Loss (%)	Expected Burst Rate (%)	Packet Loss Per Flow (%)	Actions
DefaultQOEP...	160	30	2	60	1	

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.

[Verify Config](#)
[App Quality Profiles](#)

Network Configuration : App Quality Profiles

Profile Configuration

Profile Name *

Traffic Type *

Hybrid

Realtime Configuration

One Way Latency (ms) *

Jitter (ms) *

Packet Loss (%) *

160

30

2

Interactive Configuration

Expected Burst Rate (%) *

Packet Loss per Flow (%) *

60

1

Cancel

Done

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.

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 than 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.

Application QoE Configuration

Type * Application * QoE Profile *

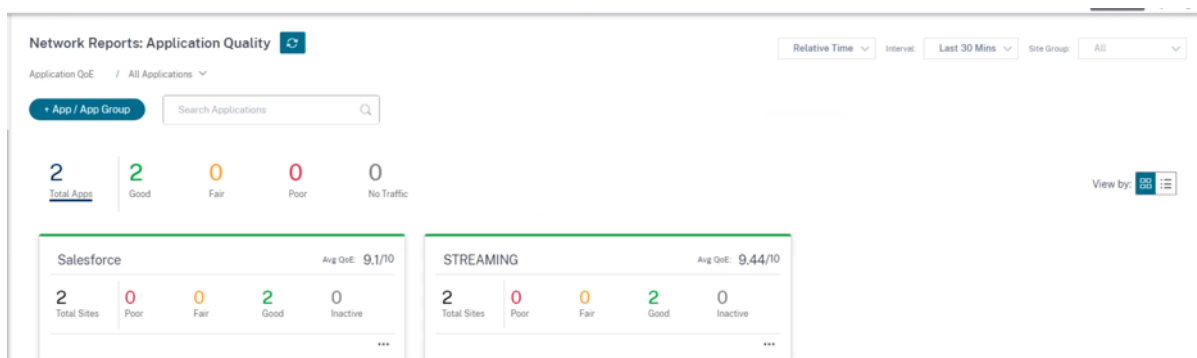
Application Custom Apps Application Groups

DefaultQOEProfile

Click **Done**.

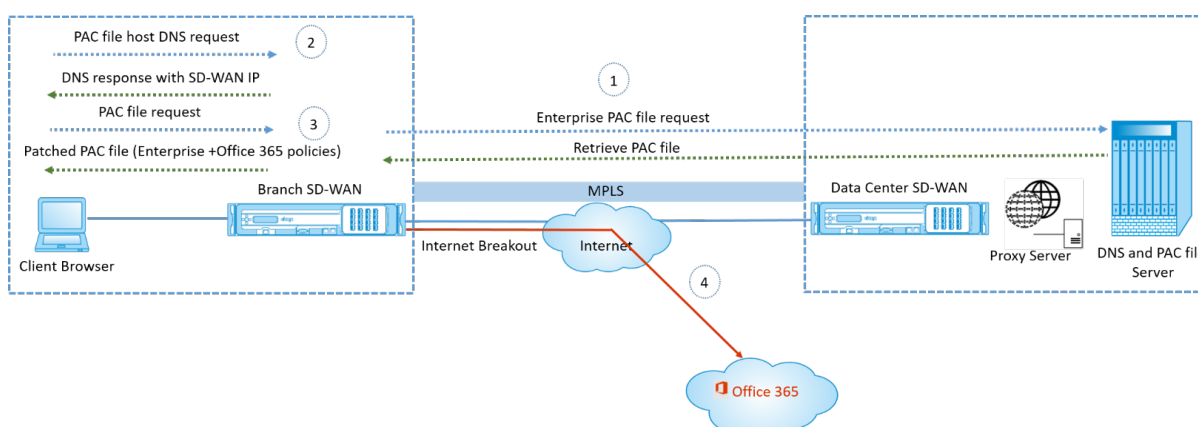
Click **Verify Config** to validate any audit error.

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.



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.

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

Home Verify Config Proxy Auto Config

Profile Information

Profile Name * PAC File URL *

PAC1ht http://www.testpac.com/test.pac

Select Site(s)

Proxy Auto Config Settings will be applied to the sites listed below

Select Sites

Sites (2)

- Boston
- Dallas

Cancel Save

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.

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.

Home Verify Config Application Settings

Global Application Settings

☒ Enable Global DPI

Site Overrides

Application Settings will be applied to the sites listed below [Select Sites](#)

Sites (1)

Boston

Save

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

May 5, 2022

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.

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.

Network Configuration : Profiles & Templates

Home Profiles Templates

Site Profiles

+ Site Profile

Site Profile	Site Count	Actions
test	0 / 6	
Internetsite	0 / 6	
testdhcp	0 / 6	
Test_service	0 / 6	

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.

Site Profile

☒ Create New ☐ Use a Profile ▼

Cancel Done

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.

Network Configuration : Profiles & Templates

[Profiles](#)[Templates](#)

01 Site Details02 Interfaces03 WAN Links

Profile Information

Site Profile Name *

Site & Device Details

Device Model *

Device Edition *

Sub-Model *

Site Role *

Cancel

PrevNext

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](#).

01 Site Details

02 Interfaces

03 WAN Links

Interface Attributes

?

Deployment Mode *

Interface Type *

Security *

Interface Name

Edge (Gateway) ▾

LAN ▾

Trusted ▾

LAN-1

Physical Interface

?

Select Interface *

12345678

☐ LSP

Virtual Interfaces

?

VLAN ID *

Virtual Interface Name

0

VIF-2-LAN-1

Routing Domain *

Firewall Zones

Default_RoutingDomain ▾

<Default> ▾

Save

Cancel

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

For detailed description of configuring WAN links, see [WAN links](#).

01 Site Details

02 Interfaces

03 WAN Links

WAN Link Attributes

Access Type *

ISP Name *

☐ Custom

Internet Category

Link Name

Egress Speed *

Mbps

Ingress Speed *

Mbps

☐ Public IP Address Auto Learn

Access Interfaces

Add Access Interface

Name	Virtual Interface	VIF Path Mode	Actions
AIF-1	VIF-Bridge-1-VLAN-0	Primary	

Advanced WAN Options

☐ Active MTU detect

☐ Enable Metering

Congestion Threshold (µs)

Provider ID

Frame Cost (Bytes)

Standby Mode

Tunnel Header Size

MTU (Bytes)

Priority

Active Heartbeat Interval

Standby Heartbeat Interval

Cancel

Done

Templates

Citrix SD-WAN Orchestrator for On-premises 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**.

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.

Configuration / Profiles & Templates / Templates Verify Configuration

New Site Template

SiteTemplate Details

Site Template Name *
SiteA

Site Address * ☐ Lat/Lng
San Francisco, CA, USA

Notes (Optional)
Enter Notes for this Site

Cancel Next

WAN link template

WAN link templates help you to easily and quickly configure WAN links. You can create a WAN link template once and reuse it multiple times while configuring WAN links.

Network Configuration : Profiles & Templates

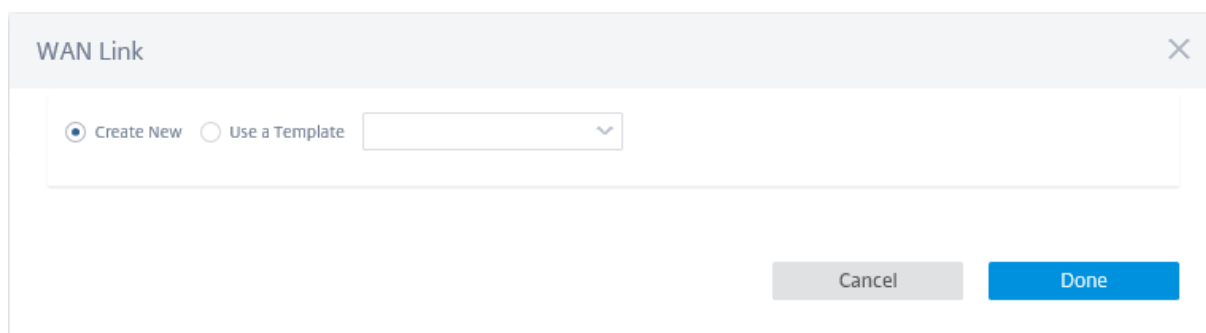
Home Profiles Templates

WAN Link Templates ?

+ Wan Link Template

Wan Link Templates	Actions

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.

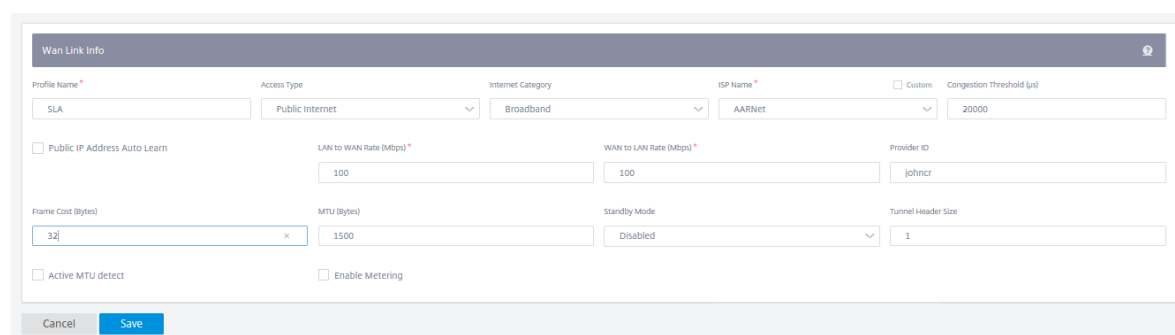


The dialog box titled "WAN Link" has a close button (X) in the top right corner. It contains two radio buttons: "Create New" (selected) and "Use a Template" (unselected). To the right of the "Use a Template" radio button is a dropdown menu. At the bottom right, there are two buttons: "Cancel" (grey) and "Done" (blue).

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](#).

Network Configuration : Profiles & Templates

[Profiles](#) [Templates](#)



The "WAN Link Info" form contains the following fields and options:

- Profile Name ***: Text input field with "SLA" entered.
- Access Type**: Dropdown menu with "Public Internet" selected.
- Internet Category**: Dropdown menu with "Broadband" selected.
- ISP Name ***: Text input field with "AARNET" entered.
- ☐ **Custom** checkbox.
- Congestion Threshold (kb)**: Text input field with "20000" entered.
- ☐ **Public IP Address Auto Learn** checkbox.
- LAN to WAN Rate (Mbps) ***: Text input field with "100" entered.
- WAN to LAN Rate (Mbps) ***: Text input field with "100" entered.
- Provider ID**: Text input field with "johncr" entered.
- Frame Cost (Bytes)**: Text input field with "32" entered.
- MTU (Bytes)**: Text input field with "1500" entered.
- Standby Mode**: Dropdown menu with "Disabled" selected.
- Tunnel Header Size**: Text input field with "1" entered.
- ☐ **Active MTU detect** checkbox.
- ☐ **Enable Metering** checkbox.

At the bottom, there are "Cancel" and "Save" buttons.

Network location service

September 30, 2021

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**.

The screenshot shows the 'Network Location Service' configuration page. At the top, there are tabs for 'Verify Config' and 'Network Location Service'. Below the tabs, there is a checkbox labeled 'Enable' which is checked. A message states 'Network Location Service Settings will be applied to the sites listed below'. Below this message is a large dashed box containing the text 'No Sites have been Selected'. To the right of this box is a red-bordered button labeled 'Select Sites'. At the bottom left of the dashed box is a blue 'Deploy' button.

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**.

The screenshot shows the 'Site Selector' dialog box. It has a search bar at the top and a dropdown menu labeled 'Filter By Region / Custom Groups'. Below the search bar, there are two columns: 'Available (3 sites)' and 'Selected (2 sites)'. The 'Available' column lists three sites: Kansas, SantaClara, and myLTE. The 'Selected' column lists two sites: Boston and Dallas. Between the two columns are two buttons with arrows, one pointing right and one pointing left. At the bottom of the dialog box, there are two buttons: 'Save' and 'Cancel'. The 'Save' button is highlighted with a red border.

ECMP load balancing

October 26, 2021

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
- 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.

ECMP Groups

ECMP Group

Name *

Type *

ECMP_Group_1

Src/Dst IP Address

Save

Cancel

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.

[← Edit Intranet Service](#)

Note: Make sure to allocate bandwidth globally or specific to site

Intranet Service Info

Service Name

Routing Domain

ECMP Group

Firewall Zone

Intranet-service-1

Default_RoutingDomain

ECMP_Group_1

<Default>

Intranet Subnets [Add Network](#)

Network IP / Prefix	Cost	Actions
---------------------	------	---------

Advanced Settings

☐ Preserve route to Intranet from link even if all associated paths are down

☒ Enable Primary Reclaim

Save

Cancel

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.

Delivery Services ⓘ

Virtual PathsInternet ServiceIntranet Services

Static Virtual PathsDynamic Virtual Paths

Static Virtual Paths

Remote Site *QOS ProfileBranch Tracking IPReverse Tracking IP

ECMP GroupRoute Cost

ECMP_Group_1Default

Active Member Paths

Restore Default Member Paths

Path

Actions

WAN Link Properties

NameUDP PortAlternate PortPort Switching Interval (min)Tunnel Header SizeAction

CancelSave

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.

NOTE

Zscaler service supports only session-based ECMP load balancing.

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203

Home Verify Config Service & Bandwidth

Zscaler Site Selection

☐ Automatic Pop selection ☒ **Enable ECMP**

Primary Zscaler Region * Primary ZEN *

APAC Singapore IV

Secondary Zscaler Region * Secondary ZEN *

Americas Denver III-2

Application Settings will be applied to the sites listed below **Select Sites**

No Sites have been Selected

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.

Home Verify Config Service & Bandwidth

Tunnel Type * Regions *

IPSEC Auto X

Site Name	Enable ECMP
Home210	☒

Back Save Cancel

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

[Verify Config](#) [Service & Bandwidth](#)

Service Details

Service Name *

zscaler210

Service Type *

Intranet

Routing Domain

Default_RoutingDomain

Firewall Zone

ECMP Type *

Session

Session

Source Destination IP

☒ Enable ECMP

Tunnel End Points Across Network

+ End Point

Name	Peer IP	IPsec Profile	Actions
ep1	192.168.1.100	zscalerprofile	
ep2	192.168.1.101	zscalerprofile	

Map Sites to Tunnel End Points

+ End Point Mapping

Name	No of Sites	Actions
ep1	1	
ep2	1	

Cancel

Save

Application rules

January 26, 2022

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.

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.
 - **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 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 han-

ded 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.

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.

← Edit Apps & Domains (Global Rules)

Apps & Domains Match Criteria

Apps & Domains* [New Domain App](#) Routing Domain

Source Network: Any Destination Network: Any ☐ Src = Dest

Source Port: Any Destination Port: Any ☐ Src = Dest

Virtual Path Traffic Policy

☒ Enable Virtual Path Traffic Policy

Virtual Path Name: Any (determined by routing) Traffic Policy: Load Balance Paths

QoS Settings

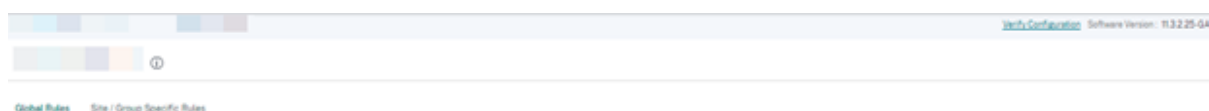
Transfer Type: Interactive Priority: Medium

Note: Bandwidth share available per QoS class per overlay virtual path is determined by [QoS Profiles](#). Intelligent default values are auto-picked, with ability to override the defaults via custom QoS profiles.

⊞ Advanced Settings

Cancel Save

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.

← Edit Custom Application (Global Rules)

Custom Application Match Criteria

Custom Application: [New Custom App](#) Matching Domain: Any IP Address:

Virtual Path Traffic Policy

☒ Enable Virtual Path Traffic Policy

Virtual Path Remote Site: Any (determined by routing) Traffic Policy: Load Balance Paths

QoS Settings

Transfer Size: Interactive Priority: Medium

Note: Bandwidth share available per QoS class per overlay virtual path is determined by [QoS Profiles](#). Intelligent default values are auto-picked, with ability to override the defaults via custom QoS profiles.

☐ Advanced Settings

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.

← Edit Application Group (Global Rules)

Application Group Match Criteria

Application Group: [New App Group](#) Matching Domain: Any IP Address:

Virtual Path Traffic Policy

☒ Enable Virtual Path Traffic Policy

Virtual Path Remote Site: Any (determined by routing) Traffic Policy: Load Balance Paths

QoS Settings

Transfer Size: Interactive Priority: Medium

Note: Bandwidth share available per QoS class per overlay virtual path is determined by [QoS Profiles](#). Intelligent default values are auto-picked, with ability to override the defaults via custom QoS profiles.

☐ Advanced Settings

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**

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](#).

HDX QoE

April 22, 2021

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 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:

- At the network level, navigate to **Configuration > App & DNS Settings > 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)

+ QoE Configuration			
Type	Application	QoE Profile	Actions
Application	ICA Realtime	DefaultQOEProfile	
Application	ICA Interactive	DefaultQOEProfile	
Application	ICA Bulk-Transfer	DefaultQOEProfile	
Application	ICA Background	DefaultQOEProfile	
Application	Independent Compu...	DefaultQOEProfile	

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.

- Navigate to **Configuration > QoS > QoS Profiles**. Select **Standard-HDX-Multistream** as the default QoS Profile and select the **HDX Reporting** check box.

[Verify Config](#)
[QoS Profiles](#)

QoS Profile Name

Name*
 Standard-HDX-Multistream

HDX Settings

Profile Mode
 HDX Multi Stream

☒ DPI for HDX

☒ Multi-stream QoS for HDX

☒ HDX Reporting

Custom Defined HDX IP-Port Pairs to aid

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.

Bandwidth allocation per QoS Class			
Traffic Type	Bandwidth Share		
Realtime	55 %	Realtime Classes: Bandwidth Breakup	
		HDX High	30 %
		High	10 %
		Medium	8 %
		Low	7 %
Interactive	30 %	Interactive Classes: Bandwidth Breakup	
		HDX High	8 %
		HDX Medium	4 %
		HDX Low	2 %
		High	8 %
		Medium	5 %
		Low	3 %
Bulk	15 % (Best Effort, Not Guaranteed)	Bulk Classes: Bandwidth Breakup (Relative Share)	
		High	9 %
		Medium	4 %
		Low	2 %

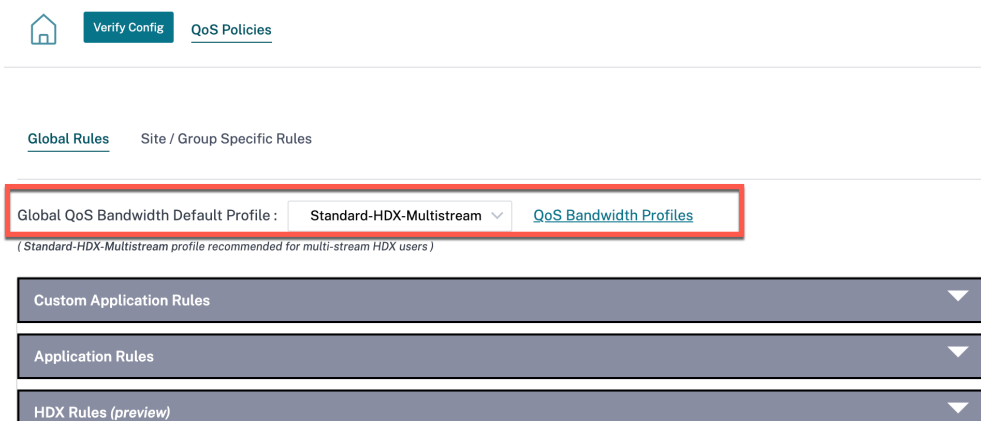
3. Ensure that the new QoS Profile is actively used by checking the Site Count indicator.

 [Verify Config](#) [QoS Profiles](#)

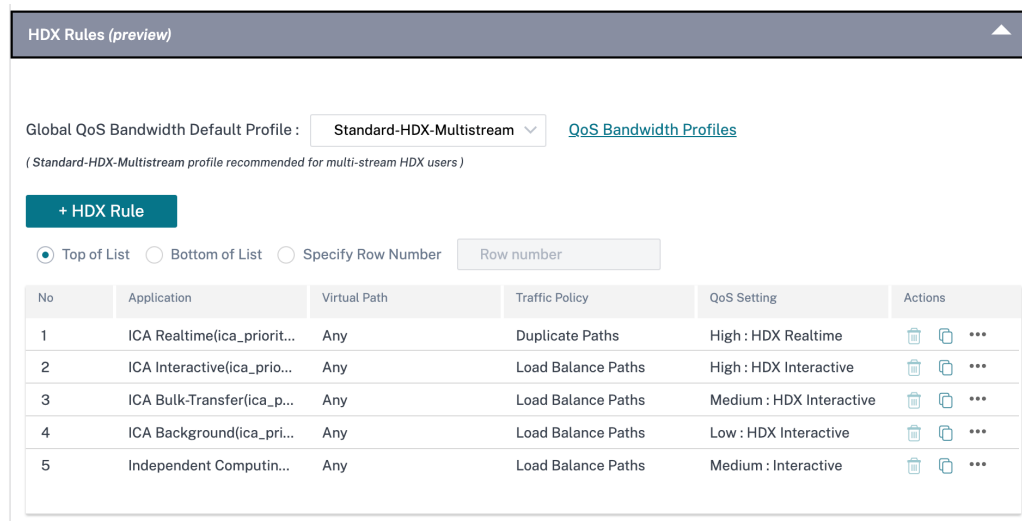
Default Global QoS Profile (Applicable to all Virtual Paths)

Default QoS Profile	Sites Count
Standard-HDX-Multistream Create New Default Profile	11 / 11

4. Navigate to **Configuration > QoS > QoS Policies** 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 detail of any rules, click the line of the rule. To change the setting of any default rule, click the “Clone” icon and make required modification.



These configurations can be modified:

- QoS class: Real-time, Interactive, Bulk
- Traffic policy:
 - Duplicate Paths: The traffic will be duplicated across multiple paths to increase reliability.
 - Persistent Path: The traffic of a flow will remain 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.

Global Rules : Citrix HDX

Citrix HDX Match Criteria

Application *

ICA Realtime(ica_priority_0)

Routing Domain

Any

Source Network

Any

Destination Network

Any

☐ Src = Dest

Source Port

Any

Destination Port

Any

☐ Src = Dest

Virtual Path Traffic Policy

☒ Enable Virtual Path Traffic Policy

Virtual Path Remote Site

Any (determined by routing)

Traffic Policy

Duplicate Paths

QoS Settings

QoS Class

Transfer Type *

HDX Realtime

Priority *

High

Realtime

Interactive

Bulk

HDX Realtime

HDX Interactive

QoS class per overlay virtual path is determined by [QoS Profiles](#).
d, with ability to override the defaults via custom QoS profiles

Advanced Settings

WAN General

☐ Retransmit Lost Packets ☐ Enable Packet Aggregation

LAN To WAN

General:

Drop Depth (bytes) Drop Limit (ms) ☐ Enable Red

Duplicate Packets Disable Depth (bytes) Duplicate Packets Disable Limit (ms)

WAN to LAN

Dscp Tag ☐ Enable Packet Resequencing ☐ Discard Late Resequencing Packets

Hold Time (ms)

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 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)

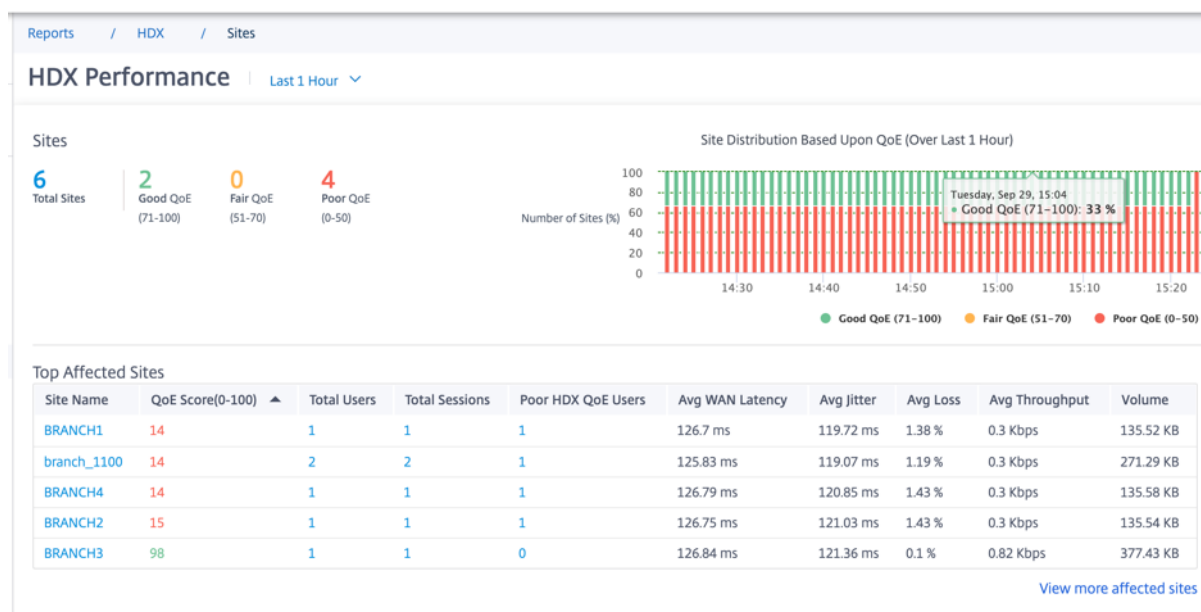
Citrix always recommends using the latest software version to get the latest bug fixes and enhancements. For instance, SD-WAN requires release 11.2.3 or 11.3.1 to have support for new EDT commands introduced in later versions of Citrix Virtual Apps and Desktops LTSR.

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**.



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 period.

of 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 period of time, click **View more affected sites**.

The following are the details of each site:

- **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 for On-premises 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.

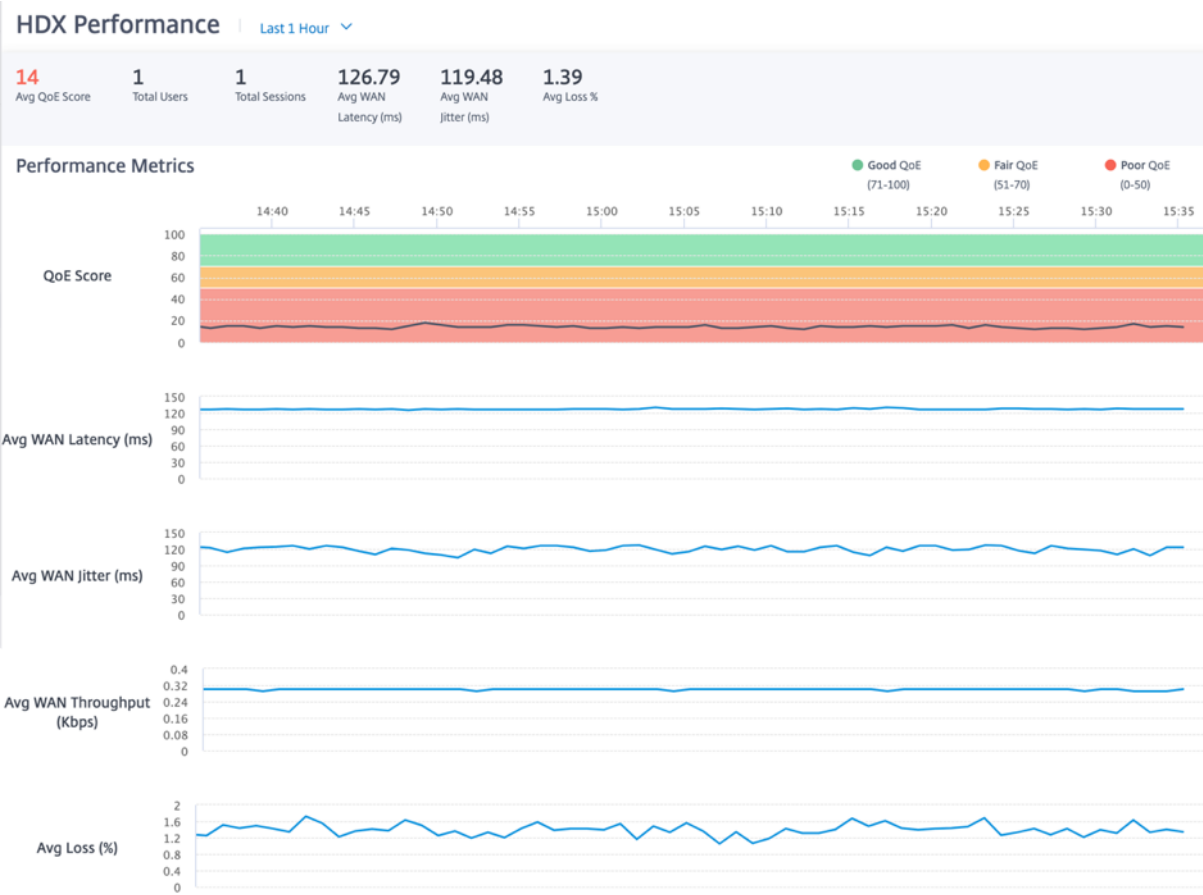
Reports / HDX / Sites / Details

HDX Performance | Last 1 Hour

Search

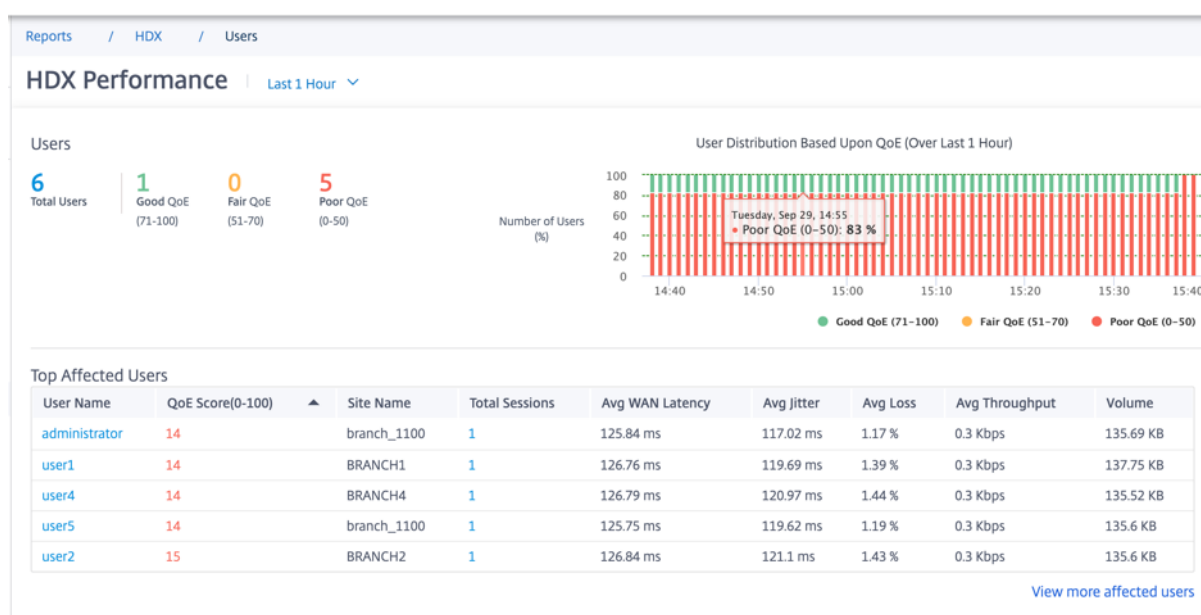
Site Name	QoE Score(0-100)	Total Users	Total Sessions	Poor HDX QoE Users	Avg WAN Latency	Avg Jitter	Avg Loss	Avg Throughput	Volume
BRANCH1	14	1	1	1	126.78 ms	119.42 ms	1.39 %	0.3 Kbps	133.3 KB
branch_1100	14	2	2	1	125.81 ms	118.4 ms	1.18 %	0.3 Kbps	271.29 KB
BRANCH4	14	1	1	1	126.72 ms	120.67 ms	1.44 %	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.



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 example, 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 period of time. 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 de-

scending, 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 period of time, 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 for On-premises GUI might adjust and change the unit based on the number value.

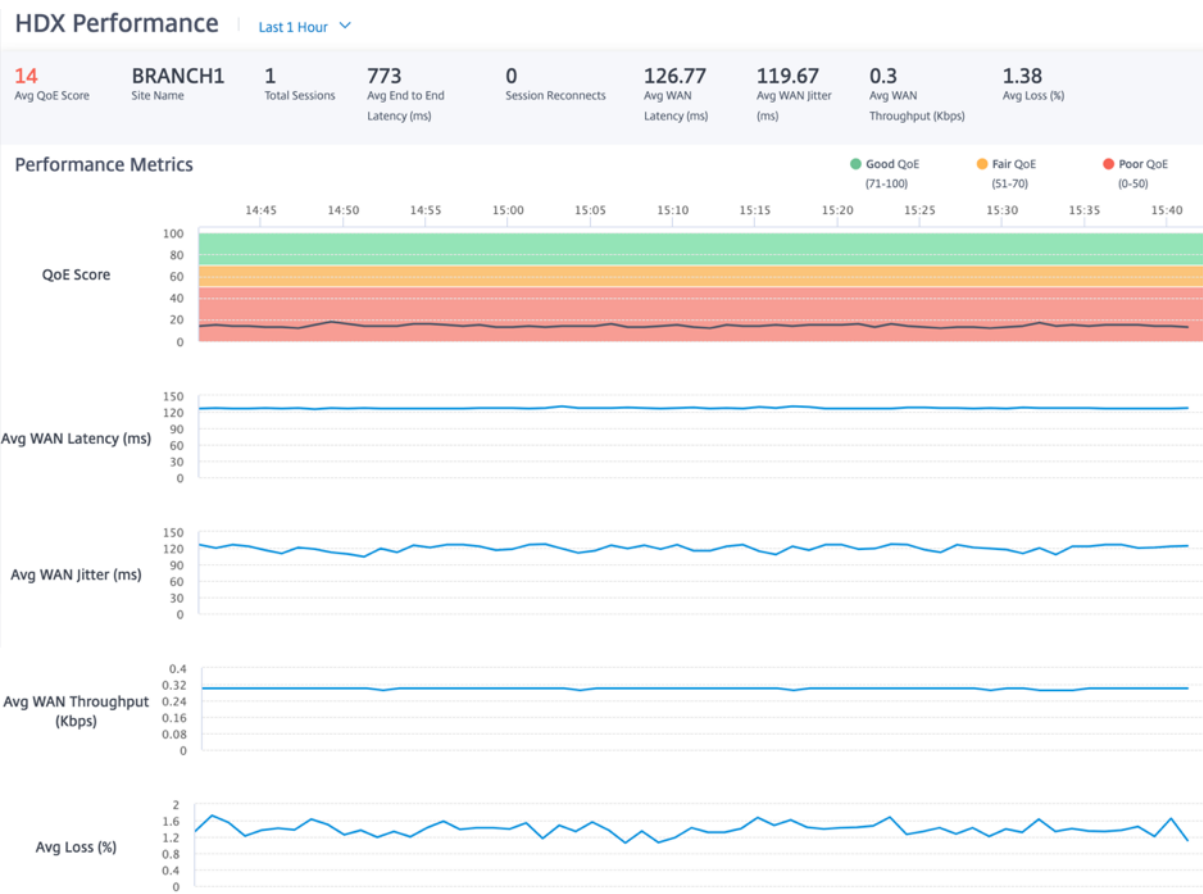
Clicking any column title shows the report sorted on that column. Click **View more affected users** to see the reports of all users. Clicking any single row shows the detailed report for that user.

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.

HDX Performance | Last 1 Hour ▾

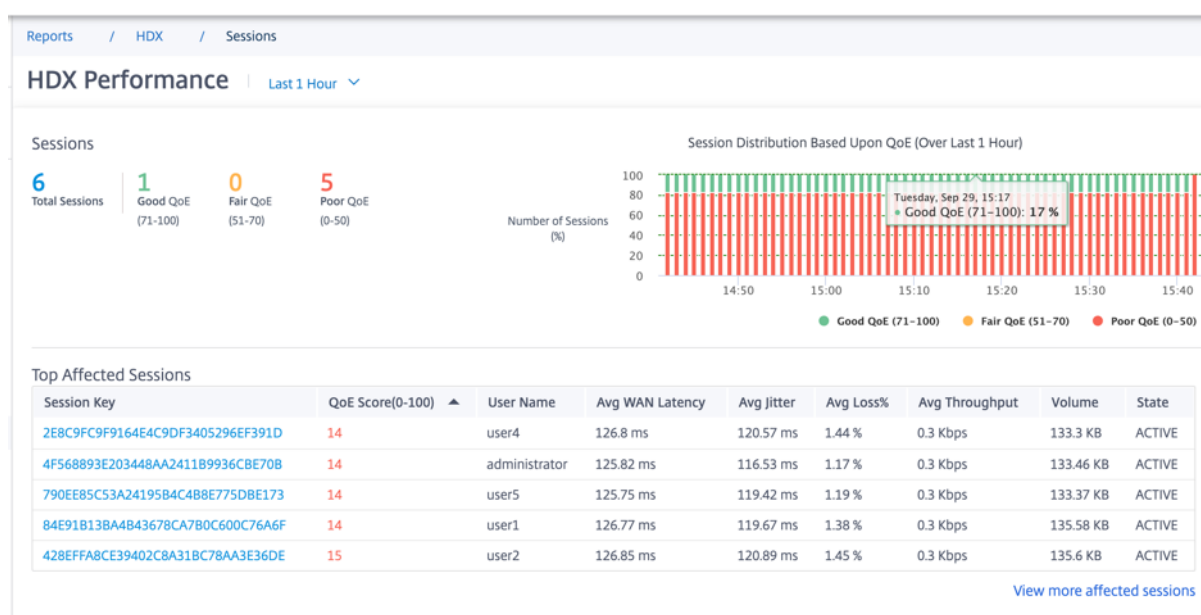
User Name	QoE Score(0-100)	Site Name	Total Sessions	Avg WAN Latency	Avg Jitter	Avg Loss	Avg Throughput	Volume
administrator	14	branch_1100	1	125.84 ms	116.82 ms	1.17 %	0.3 Kbps	135.69 KB
user1	14	BRANCH1	1	126.77 ms	119.67 ms	1.39 %	0.3 Kbps	135.58 KB
user4	14	BRANCH4	1	126.8 ms	120.93 ms	1.44 %	0.3 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.



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 period of time, click **View more affected sessions**.

The following are the Detail of the top each session:

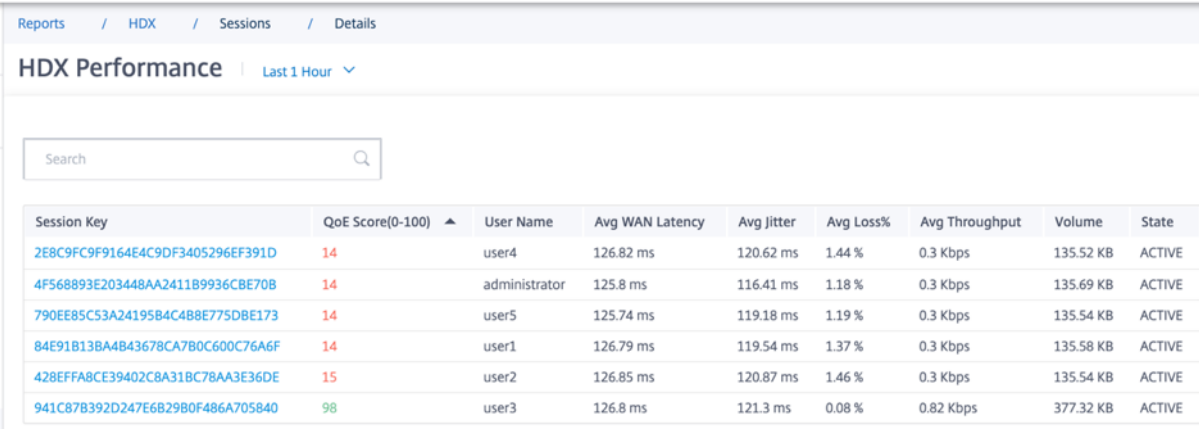
- Session Key:** The unique identity for an HDX session.
- QoE Score (0-100):** The average QoE of this session.
- User Name:** The user name.
- Avg WAN Latency:** The average WAN latency of the session for the selected duration, measured

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 for On-premises GUI might adjust and change the unit based on the number value.

Clicking any column title, shows the report sorted on that column. Clicking on **View more affected sessions** to see 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.



Reports / HDX / Sessions / Details

HDX Performance | Last 1 Hour

Search

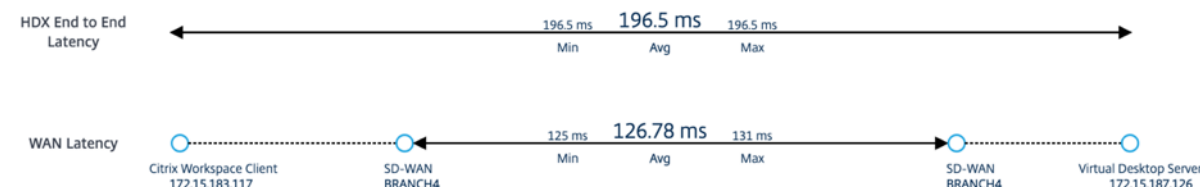
Session Key	QoE Score(0-100)	User Name	Avg WAN Latency	Avg Jitter	Avg Loss%	Avg Throughput	Volume	State
2E8C9FC9F9164E4C9DF3405296EF391D	14	user4	126.82 ms	120.62 ms	1.44 %	0.3 Kbps	135.52 KB	ACTIVE
4F568893E203448AA2411B9936CBE70B	14	administrator	125.8 ms	116.41 ms	1.18 %	0.3 Kbps	135.69 KB	ACTIVE
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
428EFA8CE39402C8A31BC78AA3E36DE	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.

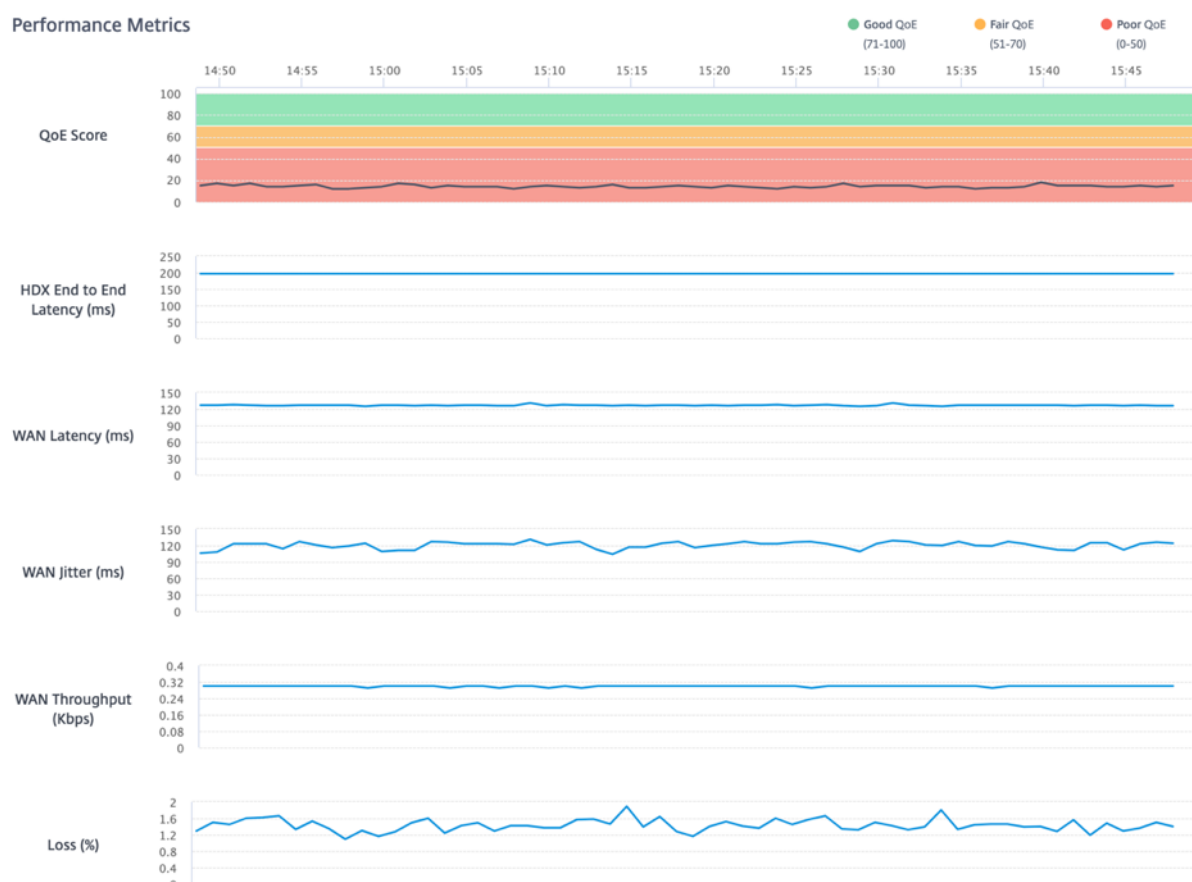
HDX Performance Last 1 Hour

Avg QoE Score	14 /100	User Name	user4	VDA Name	WIN-AV44DDIH8JC
Session Duration	60 (minutes)	Site Name	BRANCH4	VD/VA	Virtual App
Session State	ACTIVE	Session Type	Multi-Stream	WAN Optimized	No
Session Reconnects	0			Network Service	MCNVPX111-BRANCH4

Latency Distribution



Performance Metrics



- **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

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 disconnect and reconnect 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.

IP rules

March 3, 2022

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 ALTHHTTPS always appear at the top of the list on the Rules table. However, site-specific IP rules (once created) appear above HTTP, HTTPS, ALTHHTTPS, 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.

← Edit IP Protocol (Global Rules)

IP Protocol Match Criteria

Source Network ☐ Use IP Group Destination Network ☐ Use IP Group ☐ Src = Dst

Source Port Destination Port ☐ Src = Dst

Protocol DSCP ☐ Rebind Flow On DSCP Change

Routing Domain VLAN ID

Virtual Path Traffic Policy

☒ Enable Virtual Path Traffic Policy

Virtual Path Remote Site Traffic Policy

QoS Settings

Transfer Type Priority

Note: Bandwidth share available per QoS class per overlay virtual path is determined by [QoS Profiles](#). Intelligent default values are auto-picked, with ability to override the defaults via custom QoS profiles.

Internet Traffic Policy

☐ Enable Internet Policy

☐ Advanced Settings

Cancel Save

- IP Protocol Match Criteria
 - **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 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.

Virtual Path Traffic Policy

☒ Enable Virtual Path Traffic Policy

Virtual Path Remote Site

Any (determined by routing)

Traffic Policy

Override Service

Override Service

<N/A>

Internet

Passthrough

Discard

QoS Settings

QoS Class

Transfer Type

- 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.
 - **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.

QoS Policies ⓘ

Global Rules : IP Protocol

IP Protocol Match Criteria

Source Network

☐ Use IP Group

Destination Network

☐ Use IP Group

Any

Any

☐ Src = Dest

Source Port

Destination Port

Any

Any

☐ Src = Dest

Protocol

DSCP

Any

Any

☐ Rebind Flow On DSCP Change

Routing Domain

Vlan Id

Any

Virtual Path Traffic Policy

☒ Enable Virtual Path Traffic Policy

Virtual Path Remote Site

Traffic Policy

Any (determined by routing)

Load Balance Paths

QoS Settings

QoS Class

Transfer Type *

Priority *

Interactive

Medium

Note: Bandwidth share available per QoS class per overlay virtual path is determined by [QoS Profiles](#). Intelligent default values are auto-picked, with ability to override the defaults via custom QoS profiles

Internet Traffic Policy

☐ Enable Internet Policy

☐ Advanced Settings

Cancel

Save

Advanced Settings

Advanced Settings

WAN General

☒ Retransmit Lost Packets
 ☐ Enable Packet Aggregation

TCP Termination

☐ Enable TCP Termination

Header Compression

☐ Enable GRE
 ☐ Enable IP, TCP, UDP

LAN To WAN

General :

Drop Depth (bytes)

Drop Limit (ms)

Large Packet Size (bytes)

☐ Enable Red

Duplicate Packets Droable Depth (bytes)

Duplicate Packets Droable Limit (ms)

Large Packets Drop Depth (bytes)

Large Packets Drop Limit (ms)

Reassign :

Priority

Transfer Type

Large Packet Size (bytes)

Reassign Size (bytes)

Duplicate Packets Droable Depth (bytes)

Duplicate Packets Droable Limit (ms)

Large Packets Drop Depth (bytes)

Large Packets Drop Limit (ms)

Normal Packets Drop Depth (bytes)

Normal Packets Drop Limit (ms)

☐ Enable Red

WAN to LAN

Drop Tag

☐ Enable Packet Resequencing

Hold Time (ms)

☐ Discard Late Resequenece Packets

Done

Cancel

- 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

- **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
 - **DSCP Tag:** DSCP tag applied to the packets that match this rule on WAN to LAN, before

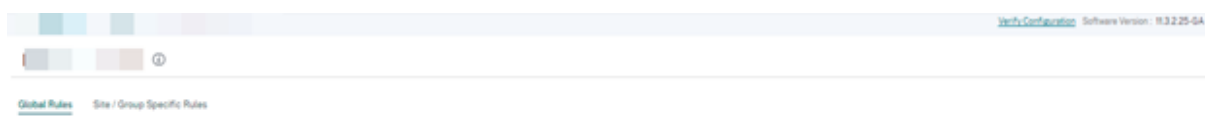
sending them to the LAN.

- **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](#).

QoS policies

January 27, 2022

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.

Global Rules Site / Group Specific Rules

Global QoS Bandwidth Default Profile

Standard-HDX-Multistream

Standard-HDX-Multistream profile recommended for multi-stream HDX users-QoS Rule Profiles

Custom Application Rules Application Rules HDX Rules Application Group Rules IP Rules Default IP-Protocol Rules

Search

No	Protocol	DSCP	Service	Forward Mode	QoS Setting
1	SIP	af	Virtual Path	Duplicate Paths	High- Realtime
2	ICA	Any	Virtual Path	Load Balance Paths	High- Interactive
3	ICAQSP	Any	Virtual Path	Load Balance Paths	High- Interactive
4	ICAUDP	Any	Virtual Path	Load Balance Paths	High- Interactive
5	ICAQSPUDP	Any	Virtual Path	Load Balance Paths	High- Interactive
6	ICMP	Any	Virtual Path	Persistent Path	Medium- Interactive
7	SSH	Any	Virtual Path	Load Balance Paths	Medium- Interactive
8	TELNET	Any	Virtual Path	Load Balance Paths	Medium- Interactive
9	RDP	Any	Virtual Path	Load Balance Paths	Medium- Interactive
10	RPC	Any	Virtual Path	Load Balance Paths	Medium- Interactive

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.

Application steering

Navigate to **Configuration > QoS > Custom Application Rules**. Specify how the traffic needs to be steered.

← Edit Custom Application (Global Rules)

Custom Application Match Criteria

Custom Application

[New Custom App](#)

Routing Domain

IP Address

Virtual Path Traffic Policy

☒ Enable Virtual Path Traffic Policy

Virtual Path Remote Size

Traffic Policy

QoS Settings

Transfer Type

Priority

Note: Bandwidth share available per QoS class per overlay virtual path is determined by [QoS Profiles](#). Intelligent default values are auto-picked, with ability to override the defaults via custom QoS profiles.

☐ Advanced Settings

Cancel

Save

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.

Custom Applications

Custom App Name

Enter Name

☐ Enable Reporting

Reporting Priority

Match Criteria

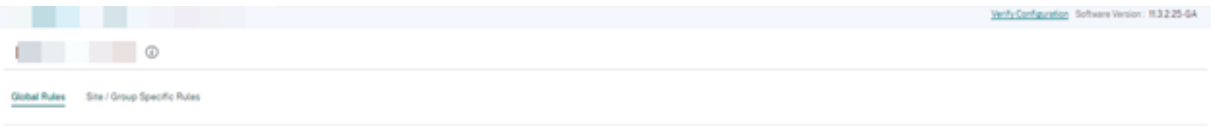
Add Match Criteria

Application	Protocol	Network IP	Port	DSCP	Actions

Cancel

Save

Click **Verify Configuration** on the **Configuration > QoS Policies** page to validate any audit error.

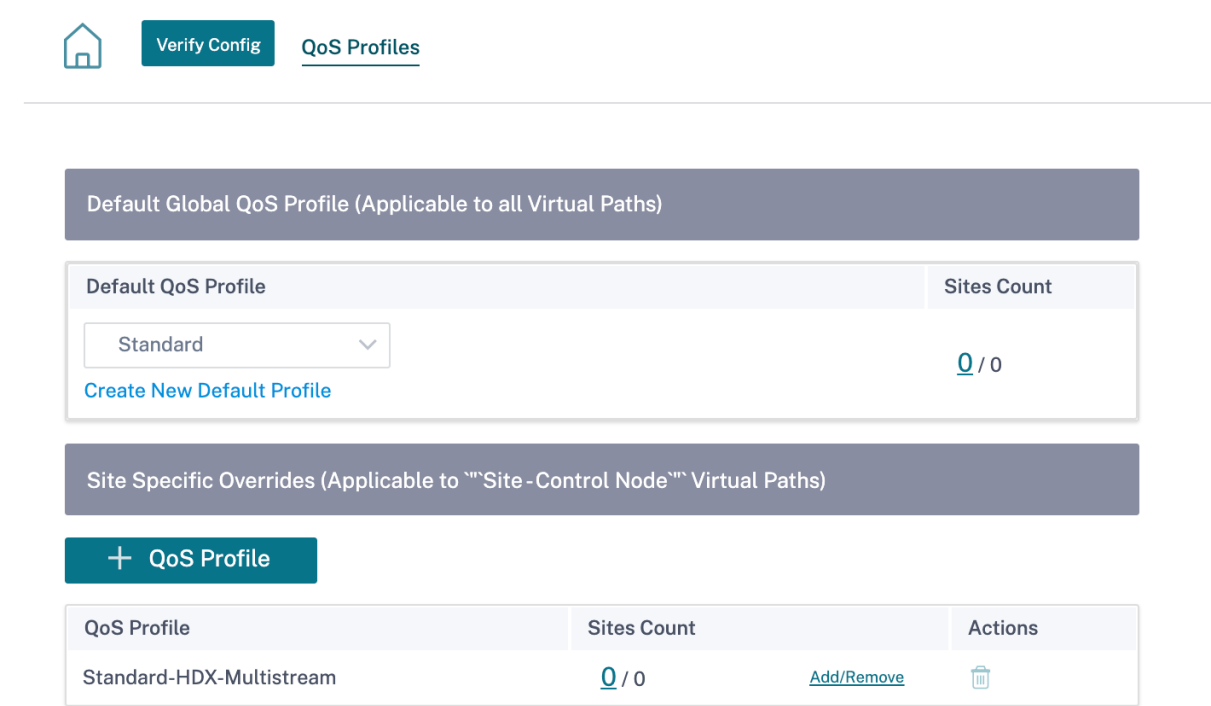


IP Rules

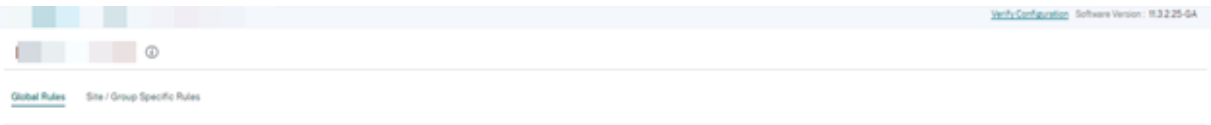
IP Rules help you to create rules for your network and take certain Quality of Service (QoS) decisions based on the rules. For more information on IP rules, see [IP rules](#).

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.



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](#).

Bandwidth allocation per QoS Class			
Traffic Type	Bandwidth Share		
Realtime	%	Realtime Classes: Bandwidth Breakup	
		HDX High	%
		High	%
		Medium	%
		Low	%
Interactive	%	Interactive Classes: Bandwidth Breakup	
		HDX High	%
		HDX Medium	%
		HDX Low	%
		High	%
		Medium	%
Bulk	% (Best Effort, Not Guaranteed)	Bulk Classes: Bandwidth Breakup (Relative Share)	
		High	%
		Medium	%
		Low	%

Site configuration

May 5, 2022

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.

New Site

Site Details

Site Name *
Bengaluru

☒ On-Premises ☐ Cloud Site

Site Address *
Bengaluru, Karnataka, India ☒ Lat/Lng

Latitude *
12.9715987

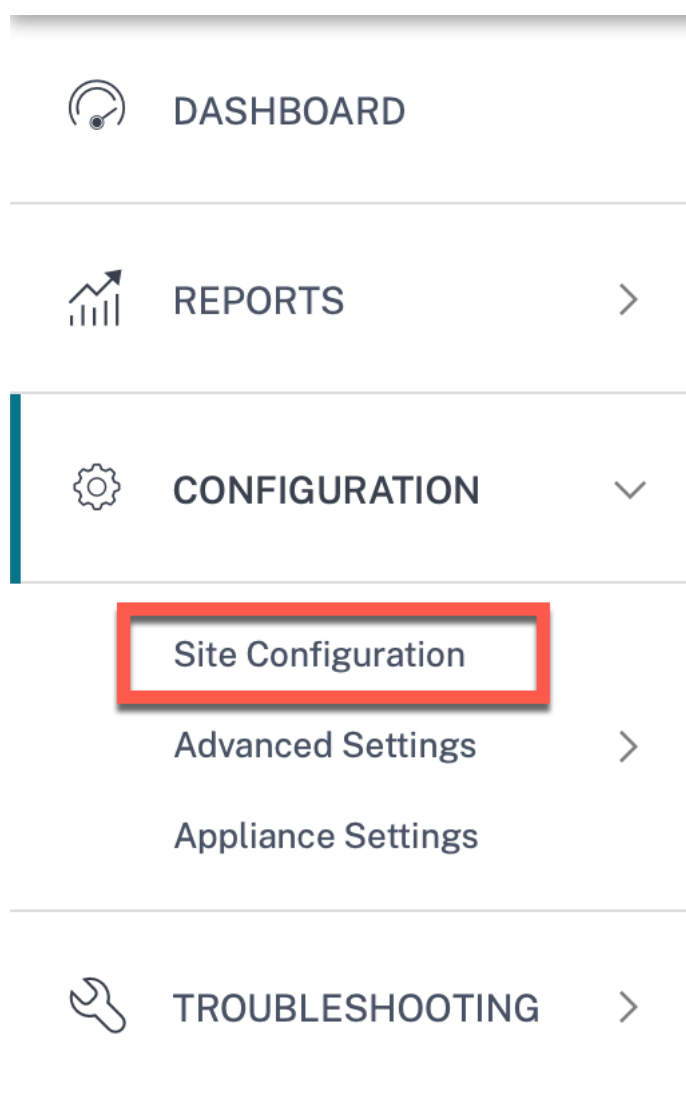
Longitude *
77.5945627

Cancel Next

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**.



Site details

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

Verify Config

01 Site Details

02 Device Details

03 Interfaces

04 WAN Links

05 Routes

06 Summary

Site Information

Site Profile

Site Name *

Site Address *

☐ Lat/Lng

None

SiteA

1239 Henderson Ave, Sunnyvale,

Region *

Device Model *

Sub-Model *

Device Edition *

Default-Region

210

BASE

SE

Site Role *

Bandwidth Tier (Mbps) *

Select Tag

[Create New](#)

MCN

20

Default Routing Domain

Default Routing Domain Settings

Default Routing Domain

Global Default

Default_RoutingDomain

Advanced Settings

☐ Enable Source MAC Learning

☐ Preserve route to Internet from link even if all associated paths are down

☐ Preserve route to Intranet from link even if all associated paths are down

Contact Details

Contact Name

Contact Email

Enter Contact Name for this Site

Enter Contact Email for this Site

Cancel

Save

Prev

Next

SiteA

SDWAN-210 (Primary)

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

01 Site Details 02 Device Details 03 Interfaces 04 WAN Links 05 Routes 06 Summary

Template Information

Template Name *
test

Region * Device Model * Sub-Model * Device Edition *
 Default-Region 210 BASE SE

Site Role * Bandwidth Tier (Mbps) * Select Tag [Create New](#)
 Branch 100

Default Routing Domain

Default Routing Domain Settings Default Routing Domain
 Global Default Default_RoutingDomain

Advanced Settings

☐ Enable Source MAC Learning
☐ Preserve route to Internet from link even if all associated paths are down
☐ Preserve route to Intranet from link even if all associated paths are down

Contact Details

Contact Name Contact Email
 Enter Contact Name for this Template Enter Contact Email for this Template

Notes

Enter Notes for this Site

Cancel Save Prev Next

test
SDWAN-210

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.

- 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 for On-premises 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.

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 for On-premises 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](#).

Configuration / Site Configuration

[Verify Configuration](#) Software Version : 11.3.1.53-GA

01 Site Details

02 Device Details

03 Interfaces

04 WAN Links

05 Routes

06 Summary

Device Information

☒ Enable HA

Primary Device

- Serial Number : 338D8622-6416-C527-C69D-4E631D113803 [Delete](#)

- Short Name : MB-Branch1-Primary

Secondary Device

- Serial Number : Not configured [Add](#)

- Short Name :

Advanced HA Settings

Failover Time (ms)

Shared Base MAC

1000

AA:AA:AA:00:00:00

☐ Primary Reclaim

☐ HA Fail-to-Wire Mode

☐ Disable Shared MAC

Cancel

Save

Prev

Next

LAN-1 1

WAN-1 2Broadband-Verizon

MB_Branch1

SDWAN-VPX

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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244

01 Site Details 02 Device Details 03 Interfaces 04 WAN Links 05 Routes 06 Summary

Device Information

☐ Enable HA

Primary Device

- Serial Number : Not configured [Add](#)

- Short Name :

Cancel Save Prev Next

Click **Add**.

Add Device

Serial Number *

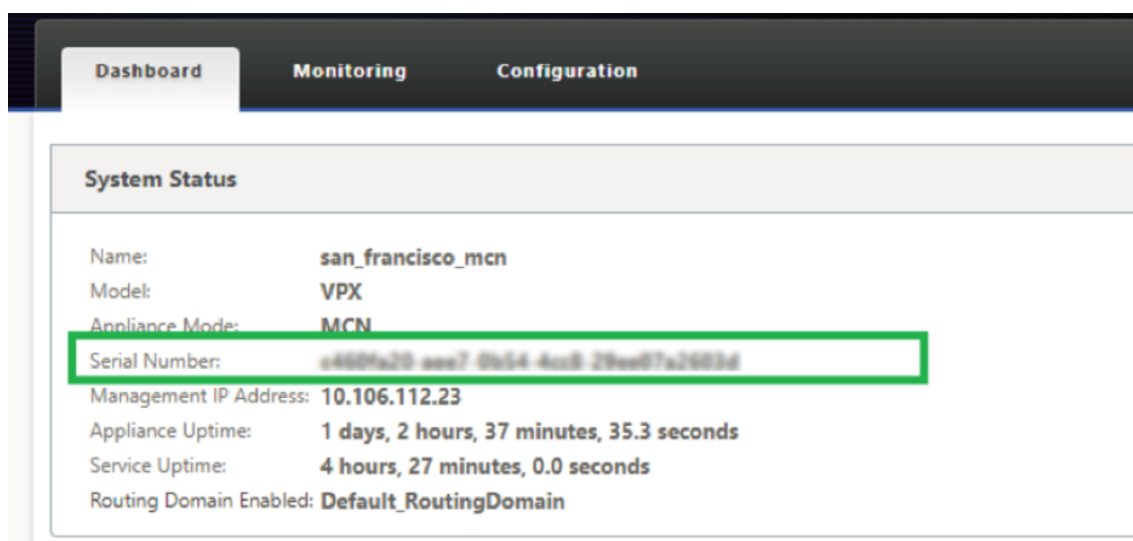
XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX

Short Name

MB-Branch1-Primary

Cancel 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.

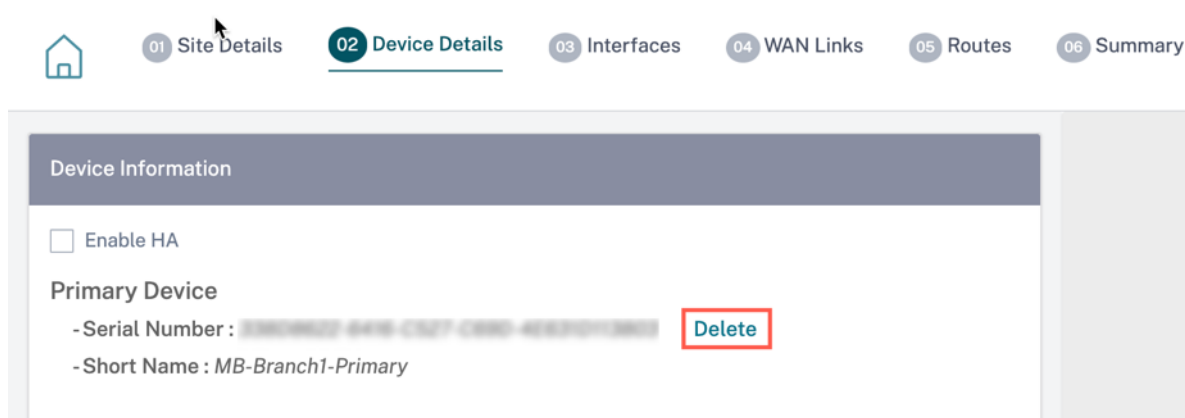


- **Short Name:** The **Short Name** field is used to specify an easily identifiable short name for a site or to tag a site if desired.

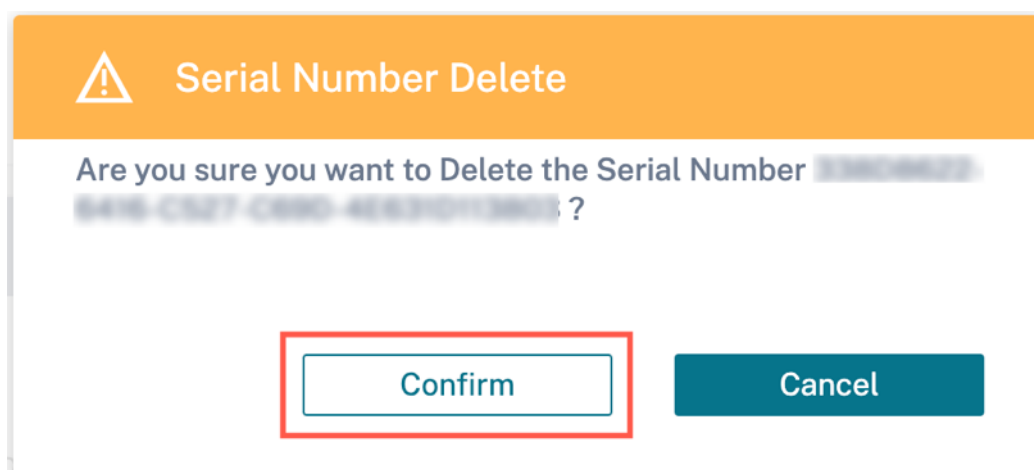
Click the **Delete** option if you want to delete the serial number.

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.



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](#)

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-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](#).

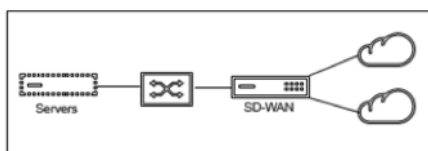
The IP addresses configured for interfaces get listed under the **InBand Management IP** drop-down list. The DNS proxy services configured under **Advanced Settings > DNS** get listed in the **InBand Management DNS** drop-down list.

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.

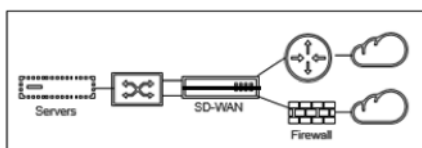
Earlier, the DHCP client was only supported on Fail-to-block port. With the Citrix SD-WAN 11.2.0 release, the DHCP client capability is extended on fail-to-wire port for the branch site with serial High Availability (HA) deployments. This enhancement:

- ★ 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

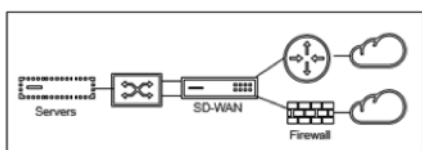
- ★ Inline (Fail-to-Wire) option is available only on hardware appliances and not on virtual appliances (VPX / VPXL).
- ★ DHCP client is now supported on the private intranet link.
- ★ A LAN interface must not be connected into the fail-to-wire pair as packets might be bridged between the interfaces.



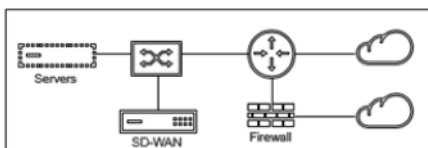
- ★ **Fail-to-Block:** This option disables the physical connection between the bridged pair of interfaces on hardware appliances, preventing traffic from flowing across the bridge in the event of appliance restart or failure.

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.
- **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 act as a PPPoE client. It authenticates with the PPPoE server and obtains dynamic IP address, or uses static IP address to establish PPPoE connections.

- **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).
- **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 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. It authenticates with the PPPoE server and obtains the dynamic IP address, or uses the static IP address to establish PPPoE connections.

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.
- IPv6 and IPX protocols.
- PPP Multi Link.
- Van Jacobson style TCP/IP header compression.
- Connection-ID compression option in Van Jacobson style TCP/IP header compression.
- 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.

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 PPPoE specific 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.”

Virtual Interfaces

VLAN ID *	Virtual Interface Name *	
0	VIF-1-LAN-1	☐ Enable HA Heartbeat
Routing Domain *	Firewall Zones	Client Mode
Default_RoutingDomain	Internet_Zone	PPPoE Static
AC Name	Service Name	Reconnect Hold Off (s)
test-ac-name	test-service-name	0
Username *	Password *	Auth
test-username		Auto

Note : Converting Virtual Interface to PPPoE will clear any Gateway IP Address and Virtual IP. Address (in case of PPPoE Dynamic only) associate with it under access interfaces

☐ DHCP Client
 ☐ SLAAC
 ☐ Directed Broadcast

- **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.
- 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

The **Reports > Real Time > PPPoE** page provides status information of the configured VNIs with the PPPoE static or dynamic client mode. It allows you to manually start or stop the sessions for troubleshooting purposes.

Site Reports: Real Time PPPoE 

Relative Time ▼ Interval: Last 1 Hour ▼

[Retrieve Latest Data](#) [Start](#) [Stop](#)

Q Click here to search or you can enter Key : Value format ⋮

☐	VIRTUAL INTERFACE ▼	IP ADDRESS ▼	GATEWAY IP ▼	SESSION ID ▼	STATE ▼	+
☐	VirtualInterface-2			0	Dialling	
☐	VIF-2-LAN-1			3	Ready	

Showing 1-2 of 2 items Page 1 of 1 10 rows ▼

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.

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.

PPPoE session type	Status Color	Description
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.
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 for On-premises supports configuring wired 802.1X authentication on LAN interfaces.

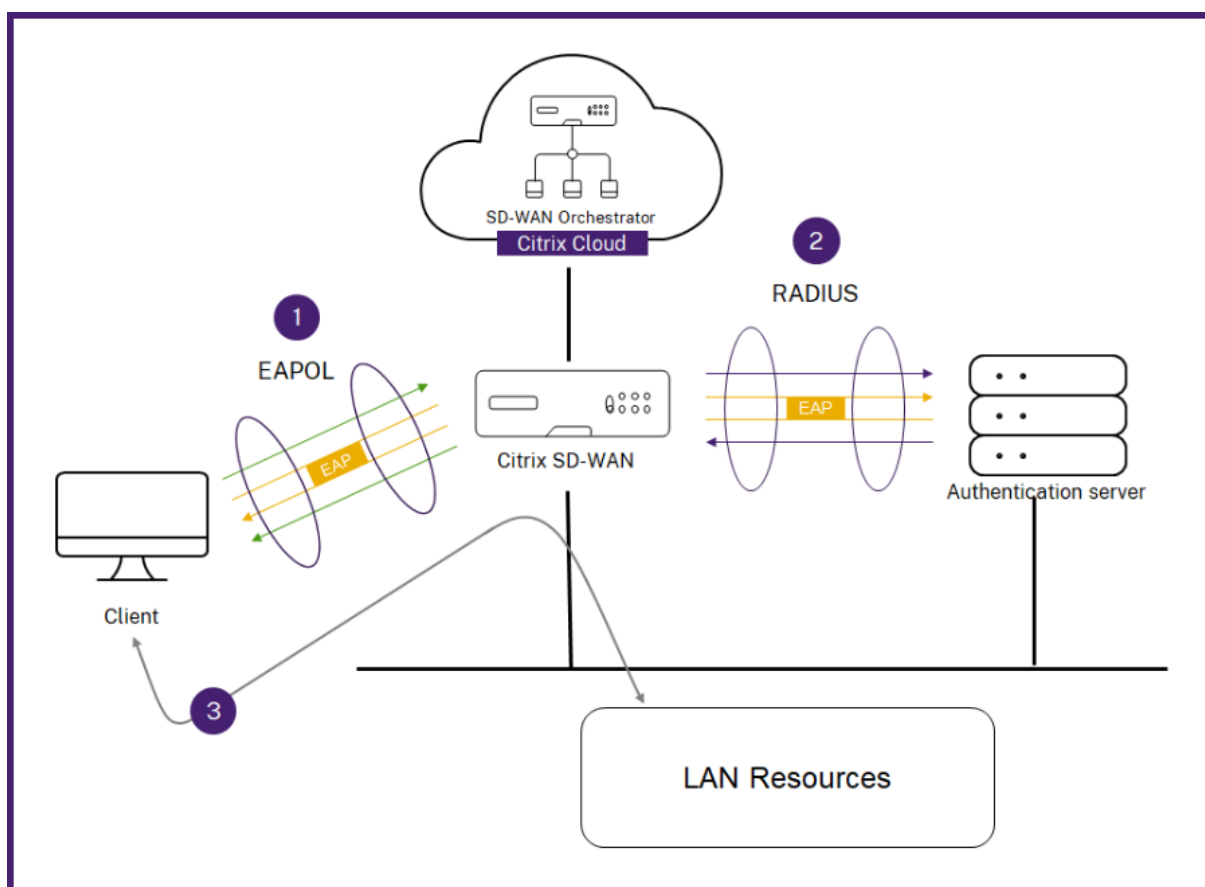
In the Citrix SD-WAN network, the clients send authentication requests to the Citrix SD-WAN appliance to access the LAN resources. The Citrix SD-WAN appliance acts as an authenticator and sends the authentication requests to the authentication server. Citrix SD-WAN Orchestrator for On-premises supports 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.
- 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 min-

utes, 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.

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.

Wired 802.1X Configuration

☒ Enable 802.1x

i When enabled 802.1x Configuration will be applied to supported ports only.

RADIUS Profiles

Primary RADIUS Profile *

PiFreeRADIUS

Create Radius Profile

Secondary RADIUS Profile

Select Radius Profile

Create Radius Profile

Virtual Interfaces

Authenticated VIF *

101

Unauthenticated VIF

100

MAC Address Bypass

MAC Address Bypass Value

Enter a MAC Address to byapss

Add

MAC Address Bypass Value	Actions
--------------------------	---------

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.

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 profile](#) to configure WAN link attributes quickly. If you have already used a site profile, the **WAN link** attributes auto-populate.

WAN link attributes

Verify Config

01 Site Details

02 Device Details

03 Interfaces

04 WAN Links

05 Routes

06 Summary

WAN Link Attributes

Access Type *
Public Internet

ISP Name *
Captive Audience

☐ Custom
Internet Category
Broadband

Link Name *
Broadband-Captive_Audience-

Tracking IP Address

☐ Auto Detect
Public IPv4 Address
E.g. a.b.c.d

Public IPv6 Address
E.g. 2001:0db8:85a3:0000:0000:8a2e:0370:7334

Egress

Speed *
100
Mbps

Permitted Rate
100

☐ Auto Learn ☒ Physical Rate

Ingress

Speed *
100
Mbps

Permitted Rate
100

☐ Auto Learn ☒ Physical Rate

Access Interfaces

Access Interface Name
AIF-1

Virtual Interface *
Select Virtual Interface

Virtual Path Mode *
Primary

IP Address *
E.g. a.b.c.d

☒ V4 ☐ V6 Gateway IP Address *
E.g. a.b.c.d

☒ Bind Access Interface to Gateway MAC ☐ Enable Proxy ARP

Enable Internet Access on
Routing Domain(s)
None

Done

Services

Service Bandwidth Settings :
Global Defaults

Virtual Path Settings for the Link

Relative Bandwidth Provisioning across Virtual Paths :
Global Defaults

Advanced WAN Options

☐ Enable Metering ☐ Adaptive Bandwidth Detection

Congestion Threshold (µs)
20000

Provider ID

Frame Cost (Bytes)
1

Standby Mode
Disabled

MTU (Bytes)
1350

Eligibility

	LAN to WAN	WAN to LAN
Real Time	☒	☒
Interactive	☒	☒
Bulk	☒	☒

Cancel

SiteA

SDWAN-210 (Primary)

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262

- **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.
- **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.
 - **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 more information, 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 address.
- **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.

The screenshot shows the 'Access Interfaces' configuration window. It contains the following fields and controls:

- Access Interface Name:** A text field with the value 'BRANCH_UTM-WL-1-AI-1'.
- Virtual Interface:** A dropdown menu with 'WAN1' selected.
- Virtual Path Mode:** A dropdown menu with 'Primary' selected.
- IP Address:** A section with radio buttons for 'V4' (selected) and 'V6'. Below them is a text input field.
- Gateway IP Address:** A text input field.
- Bind Access Interface to Gateway MAC:** A checked checkbox.
- Enable Proxy ARP:** An unchecked checkbox.
- Enable Internet Access on Routing Domain(s):** A section with a dropdown menu showing 'All'.
- Buttons:** 'Cancel' and 'Done' buttons at the bottom right.

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 minimum 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.

Services

Service Bandwidth Settings :

Link Specific

Service Name *

Allocation % *

Mode *

internet

50

primary

Tunnel Header Size (bytes)

0

☒ Access Interface Failover

LAN to WAN

Tagging

Max Delay (ms)

None

500

Min Kbps *

Max Kbps

100

WAN to LAN

Tagging

Matching

None

None

☒ Grooming

Min Kbps *

Max Kbps

100

Cancel

Done

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 re-

served bandwidth value in Kbps for each virtual path.

Virtual Path Settings for the Link

Relative Bandwidth Provisioning across Virtual Paths : Link Specific ▾

☐ Enable Auto-Bandwidth Provisioning across all Virtual paths associated with the link

Max to Min Virtual Path Bandwidth Ratio for the Link

Minimum Reserved Bandwidth for each Virtual Path (Kbps)

Custom Bandwidth Allocation for Virtual Paths

Dynamic Virtual Paths

Virtual Path	Bandwidth Allocation (Upload)	Bandwidth Allocation (Download)	Action
Virtual Paths Remote Site Branch2 ▾			
MCN_PRIMARY_test - Branch2	1	1	

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.
 - **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.

Upload

Minimum Bandwidth (Kbps)

80

Maximum Bandwidth (Kbps)

Bandwidth Allocation (Relative Measure)

10 **Weight**

Download

Minimum Bandwidth (Kbps)

80

Maximum Bandwidth (Kbps)

Bandwidth Allocation (Relative Measure)

10 **Weight**

Cancel **Done**

3. Click **Done**.

Note

Citrix SD-WAN Orchestrator for On-premises 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

- 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](#).

The screenshot shows the 'Advanced WAN Options' configuration panel. It features a dark blue header with the title and an upward-pointing arrow. Below the header, there are two checkboxes: 'Enable Metering' and 'Adaptive Bandwidth Detection', both of which are currently unchecked. The main configuration area is divided into two rows. The first row contains three input fields: 'Congestion Threshold (µs)' with a value of '20000', 'Provider ID' (empty), and 'Frame Cost (Bytes)' with a value of '1'. The second row contains two input fields: 'Standby Mode' with a dropdown menu set to 'Disabled' and 'MTU (Bytes)' with a value of '1350'.

- **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](#).

Advanced WAN Options
▲

☒ Enable Metering
☐ Adaptive Bandwidth Detection

Congestion Threshold (µs)

Provider ID

Frame Cost (Bytes)

Standby Mode

MTU (Bytes)

Data Cap(MB)

Billing Cycle

Starting From

☐ Disable Link if Data Cap Reached

Approximate Data Already Used (MB)

- **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.

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.

No	Match Type	Name	Delivery Service	Routing Domain	Sites	Cost	Actions
1	Application	EzTravel.com.tw	Internet Breakout	Any	Global	21	
2	Application Group	Default Cloud Dir...	Cloud Direct Service	Any	Global	45	
3	Application Group	Default SIA App ...	Secure Internet Access ...	Any	Global	45	
4	Application Group	O365Optimize_In...	Internet Breakout	Any	SiteA	50	
5	Application Group	O365Optimize_In...	Internet Breakout	Any	Global	50	

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
- Application group: 41–60

Verify Config 01 Site Details 02 Device Details 03 Interfaces 04 WAN Links 05 Routes 06 Summary

Application Routes IP Routes

Cost Ranges: Custom Application (1-20) Application (21-40) Application Group (41-60) IP (1-65535)

Application Match Criteria

Match Type Application Application * Gazeta.pl(gazeta) Routing Domain Any

Traffic Steering

Delivery Service Internet Breakout Cost * 21

Eligibility Based on Path

Add Path

Site Name	From Wan Link	To Wan Link	Actions

Cancel Save

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 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.

Verify Config

01 Site Details

02 Device Details

03 Interfaces

04 WAN Links

05 Routes

06 Summary

Application Routes

IP Routes

Cost Ranges:

Custom Application (1-20)

Application (21-40)

Application Group (41-60)

IP (1-65535)

IP Protocol Match Criteria

Destination Network *

☒ Use IP Group

Routing Domain

Any

Default_RoutingDomain

Traffic Steering

Delivery Service

Cost *

Internet Breakout

5

Eligibility Criteria

☒ Export Route

Eligibility Based on Path

Add Path

Site Name	From Wan Link	To Wan Link	Actions

Cancel

Save

Summary

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

Navigation: [Verify Config](#) | [01 Site Details](#) | [02 Device Details](#) | [03 Interfaces](#) | [04 WAN Links](#) | [05 Routes](#) | [06 Summary](#)

Site & Device Details

Site Name	Device Model	Site Role	Serial Number	Bandwidth Tier
mymcn	VPX	MCN	3065cea3-f6b8...	1000 Mbps

Interfaces

LAN-1-1

- VLAN0-VIF-1-LAN-1-Default_RoutingDomain-192.168.1.1/24

WAN-1-2

- VLAN0-VIF-2-WAN-1-Default_RoutingDomain-172.16.1.2/24

WAN Links

Broadband-OTE-1-1000 Mbps ↑ 1000 Mbps ↓

- AlF-1-VIF-2-WAN-1-172.16.1.2-172.16.1.1-primary

Buttons: [Cancel](#) [Save](#) [Save as Profile](#) [Prev](#) [Done](#)

Network Diagram

Diagram showing the site 'mymcn' (SDWAN-VPX (Primary)) connected to LAN-1 1 and WAN-1 2Broadband-OTE-1.

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](#).

LTE firmware upgrade

December 16, 2020

Citrix SD-WAN Orchestrator for On-premises 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**.

The screenshot shows the 'Site Details' configuration page. The 'Sub-Model' dropdown is highlighted with a red box and set to 'LTE'. Other fields include Site Profile (None), Site Name (Site_210), Site Address (Kolkata, West Bengal, India), Region (Default-Region), Device Model (210), Device Edition (SE), Site Role (Branch), and Bandwidth Tier (Mbps) (200).

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.

Network Configuration: Home

Site Group: All

Software Version: 11.2.2.1005

[+ Add Site](#)
[Batch Add Sites](#)
[Deploy Config/Software](#)
[Back Up/Review Checkpoints](#)
[More Actions ...](#)
[Deployment Tracker](#)

Availability	Cloud Connectivity	Site Name	Site Role	Device Model	Serial No	Bandwidth Tier	Management IP	Actions
●	● Inactive	Branch_Azure_VPXL	Branch	VPXL-SE		200	Unknown	Edit Copy More
●	● Inactive	RajanCube_210	Branch	210-SE		200	Unknown	Edit Copy More
●	● Inactive	Siva_1100_Branch	Branch	1100-SE		300	Unknown	Edit Copy More
●	● Inactive	Siva_2100_Branch	Branch	2100-SE		1000	Unknown	Edit Copy More
●	● Online	Site_210	Branch	210-SE		200	Unknown	Edit Copy More
●	● Online	Branch_VPX_Azure	Branch	VPX-SE	2867ACC5-DDFD-4105...	50	10.105.173.229	Edit Copy More
●	● Online	MCN_Azure	MCN	VPX-SE	0000-0017-0293-3041...	1000	172.20.0.4	Edit Copy More
●	● Online	Azure VPX Branch test	Branch	VPX-SE	0000-0015-9237-3615...	500	172.18.0.4	Edit Copy More
●	● Online	Site_210	Branch	210-SE	✓ GF04KD3EGW	100	10.140.3.67	Edit Copy More

Page Size: 200 Showing 1-9 of 9 items Page 1 of 1

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 field is non-editable. Once you click **Stage**, it downloads all the appropriate LTE firmware for the selected software version.

Software Version : 11.2.2.1005

Stage ☒ Activate ☒ Ignore Incomplete

Staged Appliances 4/4

Activated Appliances 4/4

Total Appliances	Staged	Activated	Failed
4	4	4	0

Online	Site	Status	HA State	Software Version
Yes	MCN_Azure	Activation Complete	Not Configured	11.2.2.1005.888881
Yes	Azure_VPX_Branch_test	Activation Complete	Not Configured	11.2.2.1005.888881
Yes	Branch_VPX_Azure	Activation Complete	Not Configured	11.2.2.1005.888881
Yes	Site_210	Activation Complete	Not Configured	11.2.2.1005.888881

Page Size: 200 Showing 1-4 of 4 items Page 1 of 1

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.

- Once the staging is completed, click **Activate** button to activate the software.
- 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.

Scheduling Information

Site Name	HA State	Scheduling Information	Maintenance Mode	Actions
Azure_VPX_Branch_test	Not Configured	2021-01-04 at 21:20:00 (Maintenance window of 1 hours and repeated every 1...	☐	
Site_110	Not Configured	2021-01-04 at 21:20:00 (Maintenance window of 1 hours and repeated every 1...	☐	
MCN_Azure	Not Configured	2021-01-04 at 21:20:00 (Maintenance window of 1 hours and repeated every 1...	☐	
Branch_VPX_Azure	Not Configured	2021-01-04 at 21:20:00 (Maintenance window of 1 hours and repeated every 1...	☐	

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

- 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**.

Scheduling Info

Site Name

Azure_VPX_Branch_test

Date:

2021-01-04 21:20:00

Maintenance Window (hours):

1

Repeat Window:

1

Unit:

Days

Save

Cancel

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 for On-premises 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).

Address resolution protocol

March 8, 2021

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.

Configuration / Advanced Settings / ARP

ARP ⓘ

Gateway ARP Timer (ms)

1000

Host ARP Timer (ms)

1000

Save

Neighbor discovery protocol

April 7, 2021

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**.

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.

NDP ⓘ

NDP Router Advertisement

Virtual Interface ^{*}

VIF-1-LAN-1

☐ Enable Advertisement

Max Interval (sec)
600

Min Interval (sec)
200

Router Lifetime (sec)
1800

Link MTU

0

☐ Managed Flag

☐ Other Flag

Reachable Time (ms)
0

Retransmit Timer (ms)
0

Hop Limit
0

Prefix List

+ Prefix List

prefix	Valid Lifetime(Sec)	On-Link	Autonomous Flag	Preferred Lifetime (sec)	Actions
	2592000	Disabled	Disabled	604800	

Save

Cancel

Virtual paths

September 2, 2021

A virtual path is a logical link between two WAN links. It comprises of 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).

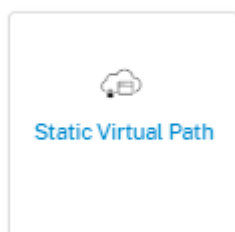
Static virtual paths

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 > Virtual Paths > Static Virtual Paths**.

Static VP Cost: 5



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

Member Path Info

IP DSCP Tagging

Any

Bad Loss Sensitive

Enable

Percent Loss (%)

DEFAULT

Over Time (ms)

1000

Silence Period (ms)

DEFAULT

Path Probation Period (ms)

10000

☒ Instability Sensitive

Cancel

Done

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.

Branch_VPX_Azure-Broadband-ACT-1

UDP Port	UDP Port V6
4980	4980
Alternate Port	Alternate Port V6
Port Switch Interval (min)	Port Switch Interval V6 (min)
1440	1440
Tunnel Header Size in Bytes	
0	☐ Active MTU Detect
☐ Enable UDP Hole Punching	☐ Enable UDP Hole Punching V6

Cancel Done

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 > Virtual Paths > Dynamic Virtual Paths**.

Select **Override Global Defaults** to override the virtual path settings inherited from the global wan link auto-path settings. Select **Enable Dynamic Virtual Paths** to allow dynamic virtual paths between this site and other sites connected through an intermediate node. Set the maximum allowable dynamic virtual paths for the site.

Delivery Services ⓘ

Virtual Paths

Internet Service

Intranet Services

Static Virtual Paths

Dynamic Virtual Paths

Dynamic Path Override Settings

Site Specific Override

☒ Enable Dynamic Virtual Paths

Max limit for Number of dynamic virtual paths

3

Active Member Paths

☐	Link	UDP Port	Alternate Port	Interval (min)	Actions
☒	Broadband-ATMNet-1	4980	0	1440	

Save

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.

Member Path Info

UDP Port

4980

UDP Port V6

1025

Alternate Port

0

Alternate Port V6

0

Interval (min)

1440

Interval V6

0

LAN to WAN

Throughput (Kbps)

Throughput (pps)

WAN to LAN

Throughput (Kbps)

Throughput (pps)

Cancel

Done

Dynamic routing

November 23, 2021

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 free 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.

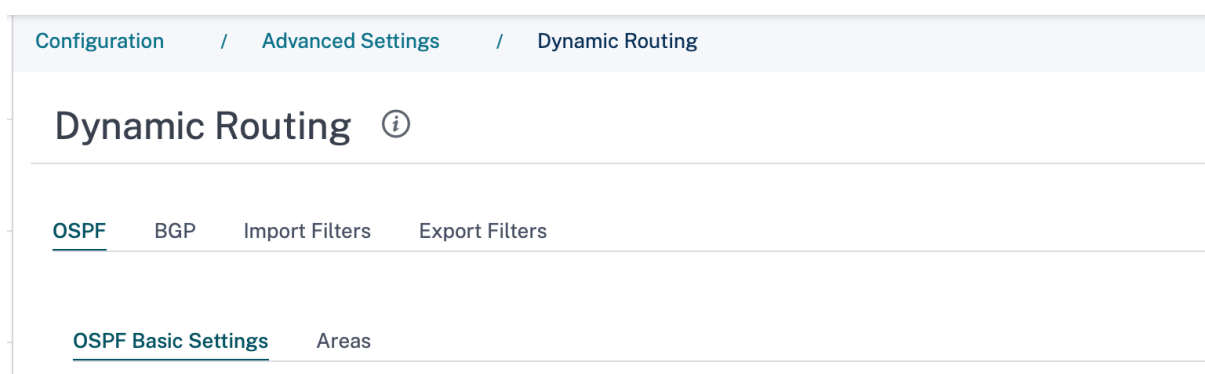
Earlier, the dynamic routing capability was available only for a single router ID. You were able configure a unique router ID either globally for the entire protocol (one for OSPF and BGP) or provide no router ID. From Citrix SD-WAN 11.3.1 release onwards, you can not only configure a router ID for the entire protocol but also configure a router ID for each routing domain. With this 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.

The screenshot shows a configuration window titled "Router ID Settings". It contains two main input fields: "Routing Domain" and "Router ID". The "Routing Domain" field is a dropdown menu currently showing "Default_RoutingDomain". The "Router ID" field is an empty text box. Below these fields are two buttons: "Save Router ID Settings" (in a teal box) and "Cancel" (in a light blue box).

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:** An IPv4 address used for OSPF advertisements. This is optional, if not specified the lowest virtual IP of the virtual interfaces participating in routing is chosen.
- **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.
- **Advertise BGP Routes:** To enable redistribution of BGP routes into the OSPF domain.

Configuration / Advanced Settings / Dynamic Routing

Dynamic Routing ⓘ

OSPF BGP Import Filters Export Filters

OSPF Basic Settings Areas

☐ Enable

Export OSPF Route Type

Type 5 AS External

Export OSPF Route Weight

0

☐ Advertise Citrix SD-WAN Routes

Tag Value

0

☐ Advertise BGP Routes

Tag Value

0

Protocol Preference *

150

Router ID Settings

Routing Domain *

Default_RoutingDomain

Router ID *

Save Router ID Settings

Cancel

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.

Dynamic Routing ⓘ

[OSPF](#)
[BGP](#)
[Import Filters](#)
[Export Filters](#)

Area Information

Area ID *

☐ Stub Area

Virtual Interfaces

Name *

Routing Domain *

Authentication Type

Password

Interface Cost *

Network Type

Hello Interval *

Dead Interval *

BGP

To configure BGP, navigate to **Configuration > Advanced Settings > Dynamic Routing > BGP**.

[Configuration](#) / [Advanced Settings](#) / [Dynamic Routing](#)

Dynamic Routing ⓘ

[OSPF](#)
[BGP](#)
[Import Filters](#)
[Export Filters](#)

[BGP Basic Settings](#)
[Communities](#)
[Policies](#)
[Neighbors](#)

BGP basic settings

Here 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:** (Optional) IPv4 address used for BGP advertisements. If the router ID is not specified the lowest virtual IP of the virtual interfaces participating in routing is chosen.
- **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.

The screenshot shows the 'Dynamic Routing' configuration page in the Citrix SD-WAN Orchestrator. The breadcrumb trail at the top is 'Configuration / Advanced Settings / Dynamic Routing'. The main heading is 'Dynamic Routing' with an information icon. Below this, there are tabs for 'OSPF', 'BGP' (which is selected), 'Import Filters', and 'Export Filters'. Under the 'BGP' tab, there are sub-tabs: 'BGP Basic Settings' (selected), 'Communities', 'Policies', and 'Neighbors'. In the 'BGP Basic Settings' section, there is an 'Enable' checkbox which is unchecked. Below it is the 'Local Autonomous System' field with the value '1'. There are two checkboxes: 'Advertise Citrix SD-WAN Routes' (unchecked) and 'Advertise OSPF Routes' (unchecked). The 'Protocol Preference' field has the value '100'. A dark grey bar separates the 'BGP Basic Settings' from the 'Router ID Settings' section. The 'Router ID Settings' section contains a 'Routing Domain' dropdown menu with the text 'Select a Routing Domain' and a 'Router ID' text input field. At the bottom of this section are two buttons: 'Save Router ID Settings' and 'Cancel'.

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.

Dynamic Routing ⓘ

OSPF **BGP** Import Filters Export Filters

Community Information

Community Name *

Enter Community Name

Community Strings

Manual/Well Known

☒ New Format(AA:NN)

ASN *

Value *

Manual

Cancel

Done

- **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.

Dynamic Routing

OSPF BGP Import Filters Export Filters

Policy Information

BGP Policy Name ^{*}

Route Policy Attributes

BGP Attribute

Med

MED Value ^{*}

☐ Copy Route Cost to MED

Cancel

Done

- **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.

Dynamic Routing ?

OSPF **BGP** Import Filters Export Filters

Neighbor Information

Routing Domain *

Default_RoutingDomain

Virtual Interface *

Neighbor IP *

Neighbor AS *

1

Hold Time *

180

Local Preference *

100

Password

☒ IGP Metric
 ☒ Multi Hop

Neighbor Policies

Order

100

Network Address

*

☐ Use IP Group

Community String list

Manual

BGP Community(AA:NN)

*

*

AS Path

*

BGP Policy *

Direction *

Cancel

Done

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 have to 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.

Import filter rules are rules that have to be met before importing dynamic routes into the SD-WAN route database. By default, no routes are imported.

Click **+ Import Rule**.

Dynamic Routing ⓘ

OSPF BGP Import Filters Export Filters

Import Filter Rule Attributes

Protocol

Routing Domain

Source Router

Destination IP

☐ Use IP Group

Prefix

Next Hop

Route Tag

Any

Default_RoutingDomain

*

*

eq

*

*

*

AS Path Length

Citrix SD-WAN Cost

☒ Export Route to Citrix Appliances

☒ Include

eq

*

6

☐ Eligibility Based on Gateway

☐ Eligibility Based On Path

Service Type

Service Name

Path

Local

Select Name

Select Path

Local

Internet

Intranet

GRE Tunnel

Passthrough

Cancel

Done

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

Field Criteria	Description	Value
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
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 have to be met when advertising SD-WAN routes over dynamic routing protocols. All the routes are advertised to peers by default.

Define the rules that have to be met when advertising SD-WAN routes over dynamic routing protocols. By default, all routes are advertised to peers.

Click **+ Export Rule**.

Dynamic Routing ⓘ

OSPF BGP Import Filters **Export Filters**

Export Filter Rule Attributes

Routing Domain

Network Address/Mask

☐ Use IP Group

Prefix

Cost

Service Type

Service Name

Gateway IP Address

Default_RoutingDomain

*

eq

*

eq

*

Any

Select Name

*

Export OSPF Route Type

Export OSPF Route Weight

Type 5 AS External

Weight

☒ Include

Cancel

Done

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

Field Criteria	Description	Value
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
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

Field Criteria	Description	Value
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.

Network address translation

May 3, 2022

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 for On-premises, from site level, navigate to **Configuration > Advanced Settings > NAT**.

NAT ⓘ

Dynamic Source NAT Static Source NAT Destination NAT

+ Dynamic Source NAT

☒ Top of List
 ☐ Bottom of List
 ☐ Specify Row Number

Row number

No	Type	Name	Inside Zone	Routing Domain	Inside IP	Actions
----	------	------	-------------	----------------	-----------	---------

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 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.

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 for On-premises, 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).
- **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 for On-premises 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.

NAT ⓘ

Dynamic Source NAT

Type	Routing Domain	IP Type	
Internet ▾	Default_RoutingDomain ▾	ipv4 ▾	
Destination Service *	Inside Zone	Inside IP/Prefix	Outside IP
Internet	Default_LAN_Zone ▾	Any	

— Advanced Options

☐ Port Parity

☐ Bind Responder Route

☐ Allow Related

☐ IPSec Passthrough

☐ GRE/PPTP Passthrough

☐ On Recieve

☐ Symmetric

Port Forwarding Rules

Routing Domain	Protocol	Outside Port	Inside IP *	Inside Port
Default_RoutingDomain ▾	Both ▾			

Cancel

Done

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 for On-premises, 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.
- **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.

NAT ⓘ

Static Source NAT

Type

Destination Service *

Inside Zone

Outside Zone

Internet

Internet

Default_LAN_Zone

Default_LAN_Zone

IP Address Type

☐ IPv4
 ☒ IPv6

Routing Domain

Inside IP/Prefix *

Outside IP/Prefix

WAN Link

Default_RoutingDomain

☐ Bind Responder Route
 ☐ Proxy NDP
 ☐ On Recieve
 ☐ Auto Learn via PD

Cancel

Save

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

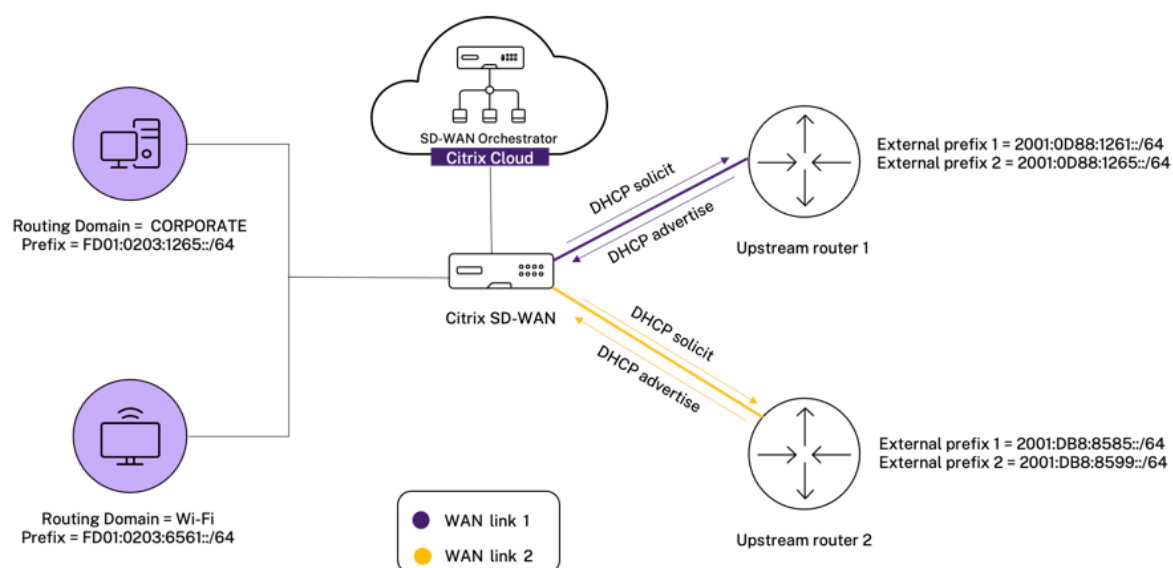
outside network prefix. The number of static NAT policies required depends on the number of inside networks and the number of outside networks (WAN links). If there are **M** number of inside networks and **N** number of WAN links, then the number of static NAT policies required is **M x N**.

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 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 $2 \times 2 = 4$. These 4 static NAT policies specify the address translation for:

- 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.

NAT ⓘ

Static Source NAT

Type	Destination Service *	Inside Zone	Outside Zone
Internet	Internet	Default_LAN_Zone	Default_LAN_Zone
IP Address Type ☐ IPv4 ☒ IPv6			
Routing Domain	Inside IP/Prefix *	Outside IP/Prefix *	WAN Link
Default_RoutingDomain	FD01:0203:6561::/64	2001:0D88:1265::/64	O365t1-WL-1
☐ Bind Responder Route ☐ Proxy NDP ☐ On Recieve ☐ Auto Learn via PD			
Cancel		Save	

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.

NAT ⓘ

Static Source NAT

Type	Destination Service *	Inside Zone	Outside Zone
Internet	Internet	Default_LAN_Zone	Default_LAN_Zone
IP Address Type ☐ IPv4 ☒ IPv6			
Routing Domain	Inside IP/Prefix *	Outside IP/Prefix	WAN Link
Default_RoutingDomain	FD01:0203:6561::/64		O365t1-WL-2
☐ Bind Responder Route ☐ Proxy NDP ☐ On Recieve ☒ Auto Learn via PD			
Cancel		Save	

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.

NAT ⓘ

Destination NAT

Type	Service Name *	IP Type			
Internet ▾	Internet	ipv4 ▾			
Inside IP/ Prefix *	Inside Port	Outside IP *	Outside Port	Routing Domain	
				Default_RoutingDomain ▾	
Cancel		Save			

Dynamic host configuration protocol

November 22, 2021

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 Subnets Relays DHCP Options Set (Global)

+ Server Subnet

Virtual Interface	Domain Name	Primary DNS	Secondary DNS	Enabled	Actions

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.

DHCP ⓘ

Server Subnet

Virtual Interface

IP Subnet

Domain Name

VIF-5-LAN-2

10.146.110.1/23

uk.bgroup.bz

Primary DNS

Secondary DNS

172.27.0.3

172.27.0.4

☒ Enable

IP Address Ranges

+ IP Address Range

Range Start IP	Range End IP	Gateway IP	DHCP Options Set	Actions
10.146.110.21	10.146.110.32	10.146.110.1	CHDigital	

Reserved IP Addresses

Fixed IP Address *

MAC Address *

10.146.110.21

58:e6:ba:2b:30:b1

DHCP Options Set: [DHCP Options Set](#)

CHDigital

Cancel

Done

Enter the **Domain Name**, **Primary DNS**, and **Secondary DNS**. The DHCP Server forwards this infor-

mation 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.

To configure the DHCP server, in the Site configuration page, navigate to **Configuration > Advanced Settings > DHCP > Relays** > click **+ DHCP Relay**.

DHCP ⓘ

Server Subnets Relays DHCP Options Set (Global)

+ DHCP Relay

Virtual Interface

IP Address

Virtual Interface



Server IP



Save

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.

DHCP ⓘ

Server Subnets Relays DHCP Options Set (Global)

Set Name *

IP Address Type ☒ V4 ☐ V6

+ DHCP Options

DHCP Option Name	Option Number	Data Type	DHCP Option Value	Actions

Cancel

Save

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

April 8, 2021

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.

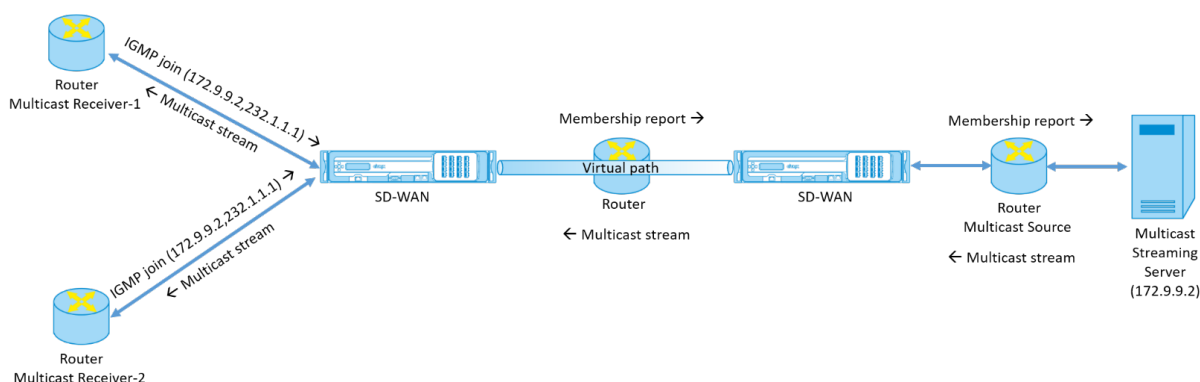
With the source specific multicast (SSM), you can specify the source from which the receivers receive the multicast traffic. It ensures that the receivers are not open listeners to every source that is sending multicast streams but rather listen to a particular multicast source.

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 the branch and the data center. The Citrix SD-WAN overlay path insures and insulates multicast traffic from WAN degradation or link brownouts.

Configure multicast

To configure multicast, perform the following on the SD-WAN appliance 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 proxy to carry the IGMP control channel information for multicast routing. IGMP V3 is required for single source multicast.
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

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 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.

Multicast Groups ⓘ

Multicast Group

Group Name *
Grp2

Group IP *
232.1.1.1

Routing Domain *
Default_RoutingDomain

☒ Enable IGMP Proxy

Service

+ Service

Service Type	Service Instance	Direction	Upstream	Actions
Local	VIF-1-LAN-1	Send	No	
Virtual Path	orch_mcn	Receive	Yes	

Cancel
Save

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.

Multicast Groups ⓘ

Multicast Group

Group Name *
iDC1_Grp

Group IP *
232.1.1.1

Routing Domain *
Default_RoutingDomain

☒ Enable IGMP Proxy

Service

+ Service

Service Type	Service Instance	Direction	Upstream	Actions
Local	VIF-2-WAN-1	Receive	Yes	
Virtual Path	orch_mcn	Send	No	

Cancel
Save

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 list of source senders the SD-WAN appliance will not have any reporting data.

Site Reports:Real Time Flows

Maximum number of flows to display Retrieve latest data Search

☒ Upload ☒ Download Customize Columns

Info	No	Application	Direction	Throughput (Kbps)	Routing Domain	Source IP Addr	Dest IP Addr	Source Port	Dest Port	Proto	Service Type	Packets	PPS	Class	Service Name	Age (mS)	Bytes
①	1	isakmp	Upload	1068.459	Default_RoutingDomain	10.3.2.4	232.1.1.1	44250	5001	UDP(17)	VPath	7212	89.157	N/A	zscalerService_1	3934	0

Showing Showing 1-1 of 1 items Page 1 of 1

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.

Site Reports:Real Time Firewall Connections

Maximum number of Connections to display Retrieve latest data Search Customize Columns

				Source		Destination			Sent	
Application	Family	Routing Domain	IP Addr	Service Type	IP Addr	Service Type	State	Is NAT	Bytes	Kbps
Internet Security ...	Encrypted	Default_RoutingD...	10.56.2.4	IPHost	165.225.218.38	Intranet	ESTABLISHED	NO	6429631	0.025
Internet Security ...	Encrypted	Default_RoutingD...	10.56.2.4	IPHost	165.225.216.38	Intranet	ESTABLISHED	NO	6430975	0.025

1 to 2 of 2 < < Page 1 of 1 > >

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.

Site Report : Real Time Statistics

ARP Routes Virtual Path Services Classes Ethernet Observed Protocols Wan Path Application QoS **Multicast Group**

[Retrieve latest data](#)

Multicast Group Destination Services

Multicast Group	Service Type	Service Name	Packets	Kbps
ATGDC1_Grp	IPHOST		1071	1068.503

Multicast Group Source Services

Multicast Group	Service Type	Service Name	Packets	Kbps
ATGDC1_Grp	VPath	Ombud1	1071	1068.503

Multicast Group Statistics

Multicast Group	Packets Received	Kbps Received	Packets Sent	Kbps Sent
ATGDC1_Grp	1071	1068.503	1071	1068.503

Virtual router redundancy protocol

November 6, 2021

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.

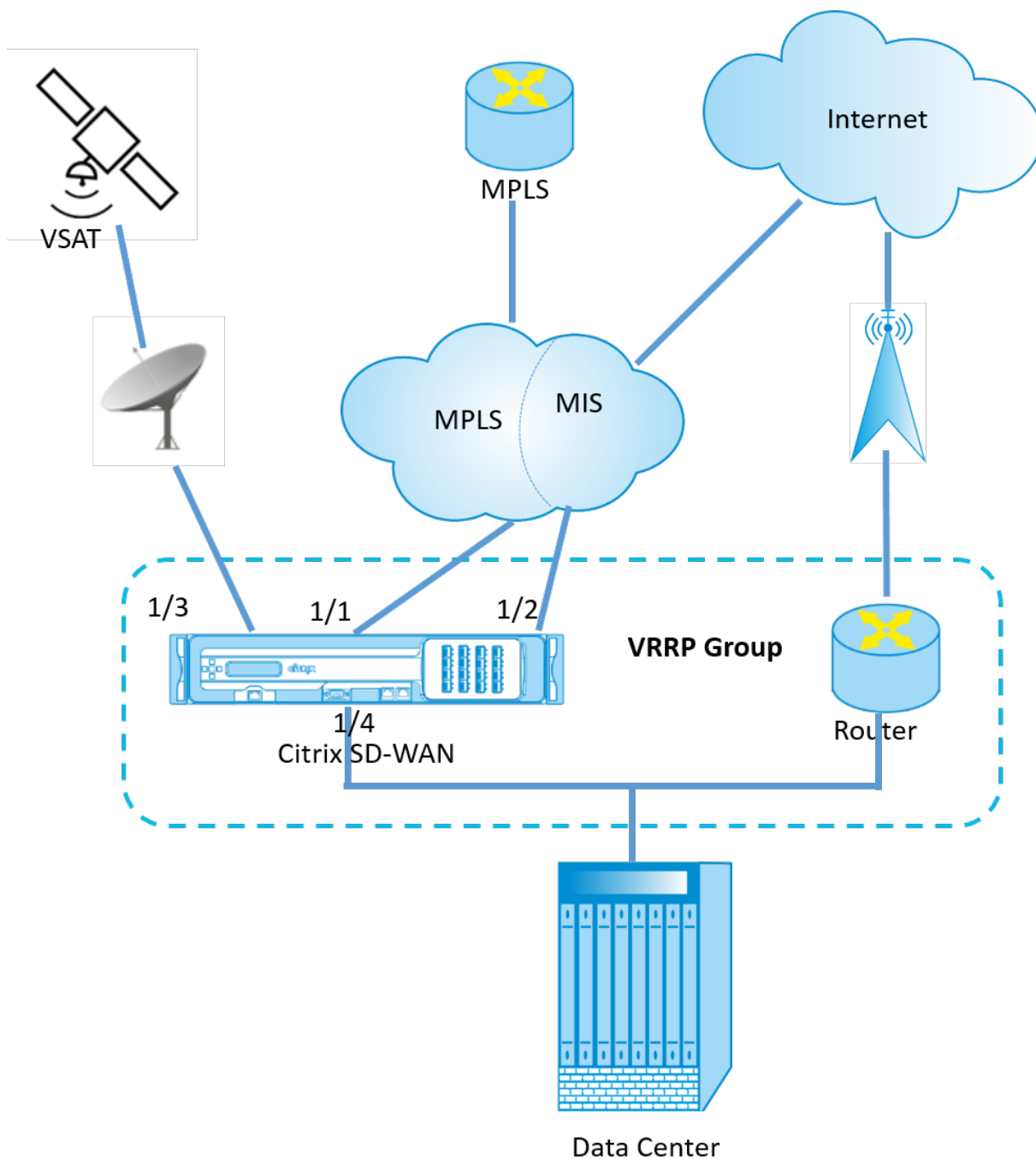
A back-up router automatically takes over if the primary / main router fails. In a VRRP set-up, the main router sends a VRRP packet known as an advertisement to the back-up routers. When the main router stops sending the advertisement, the back-up router sets the interval timer. If no advertisement is 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 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. 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.



To configure VRRP, in the Site configuration page, navigate to **Configuration > Advanced Settings > VRRP** > click + **Add VRRP**.

VRRP ⓘ

VRRP Settings

VRRP Group ID *	Version	Priority *	Advertisement Interval *
1	V3	100	1000
Authentication Type	Authentication Text	☒ Reclaim	☒ Use V2 Checksum

Virtual Router IPs

Virtual Interface *	Virtual IP Address *	VRRP Router IP *
VIF-1-One-Arm-1	1.1.1.1	1.2.3.4

Cancel
Done

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.
- **Virtual Interface:** The virtual interface to be used for VRRP. Choose one of the configured virtual interfaces.

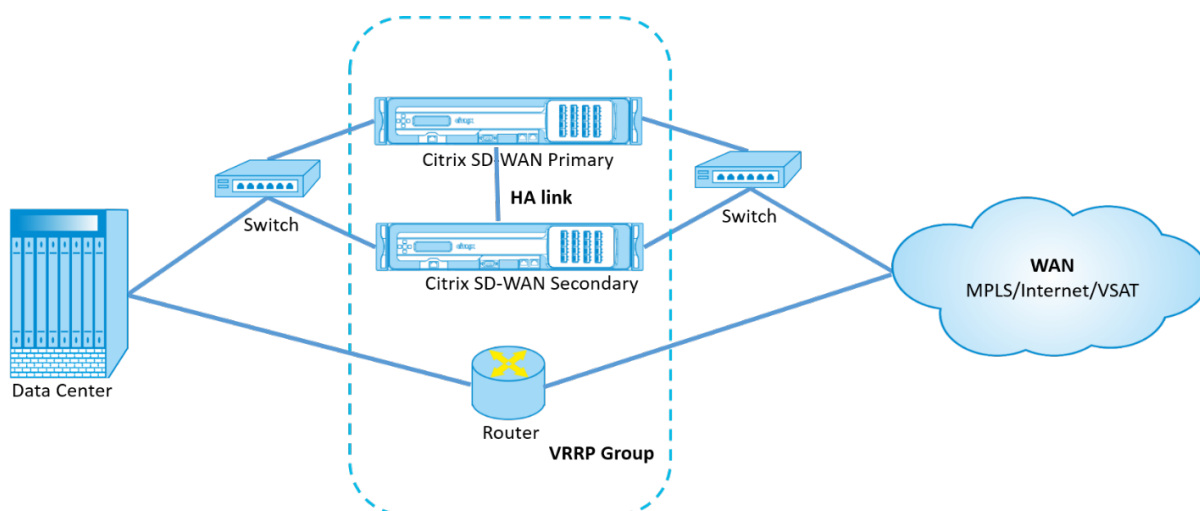
- **Virtual IP Address:** The virtual IP address assigned to the virtual interface. Choose one of the configured virtual IP addresses for the virtual interface.
- **VRRP Router IP:** The virtual router IP address for the VRRP group. By default, the Virtual IP address of the SD-WAN appliance is assigned as the virtual router IP address.

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.

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

April 7, 2021

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**.

DNS ⓘ

Site Specific DNS Services DNS Proxies DNS Transparent Forwarders

+ DNS Service

No	DNS Service Name	Primary DNS	Secondary DNS	Actions

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 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

DNS Service for the Site

DNS Service Name *	Type
Eg: dns_service1	Static 
Service Type	Service Instance
	
Primary DNS *	Secondary DNS
Eg: a.b.c.d	Eg: a.b.c.d
Cancel Save	

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 requests based on application domain names.

DNS ⓘ

DNS Proxy

DNS Proxy Name *

DNS-proxy-1

Interfaces to intercept DNS requests

☐	Virtual Interface
☒	VIF-1-LAN-1
☒	VIF-2-WAN-1
☐	VIF-3-WAN-2
☐	VIF-4-LAN-2

IPv4 Default DNS Service

IPv6 Default DNS Service

App Specific DNS Forwarding Rule

Application * IPv4 DNS Service * IPv6 DNS Service

Cancel

Done

- 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:
 - **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 spec-

ified 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.

DNS ⓘ

DNS Transparent Forwarder

Application *

▼

IPv4 DNS Service * IPv6 DNS Service

▼

▼

Cancel

Save

- **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.

Prefix delegation groups

April 7, 2021

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.

Prefix Delegation Groups ⓘ

Prefix Delegation Group

WAN Virtual Interface *

Select WAN Virtual Interface ▼

Prefix Delegation List

LAN Virtual Interface * Prefix Length

Select LAN Virtual Interface ▼ 64

Interface IP Host Portion Prefix ID

Save Prefix Delegation List Cancel

October 4, 2021

Link aggregation groups

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.

Citrix SD-WAN Orchestrator for On-premises supports simple Link Aggregation Group (ACTIVE-BACKUP). The 802.3ad LACP protocol based negotiations are not supported in the current release. At any time only one port is active and the other ports are in backup mode. The active and backup supports rely on the Data Plane Development Kit (DPDK) package for LAG functionality.

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

Note

- The LAG functionality is not supported on VPX/VPXL platforms.
- 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.

Platform	Maximum number of LAGs supported	LACP supported ports
110	1	1/1
		1/2
		1/3
210	2	1/1 or 1/2
		1/3
		1/4
410	1	1/5
		1/1 or 1/2
		1/3 or 1/4
1100	3	1/5 or 1/6
		1/1 or 1/2

Platform	Maximum number of LAGs supported	LACP supported ports
2100	3	1/3 or 1/4
		1/5
		1/6
		1/7
		1/8
		1/1 or 1/2
		1/3 or 1/4
		1/5
		1/6
		1/7
4100	4	1/8
		1/1 or 1/2
		1/3 or 1/4
		10/1
		10/2
		10/3
		10/4
		10/5
		10/6
		10/1 or 10/2
5100	3	10/3 or 10/4
		10/5
		10/6
		10/7
		10/8
		1/1 or 1/2
		1/3 or 1/4
		10/1 or 10/2
6100	4	

Platform	Maximum number of LAGs supported	LACP supported ports
		10/3 or 10/4
		10/5
		10/6
		10/7
		10/8

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.

LAG ⓘ

Name	Ethernet Interfaces	Mode	Transmission Policy
LAG0	1/1 1/2 1/3	LACP	IP+L4
LAG1	1/1 1/2 1/3		

Save

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.

Verify Config

01 Site Details

02 Device Details

03 Interfaces

04 WAN Links

05 Routes

06 Summary

Interface Attributes

Deployment Mode *

Interface Type *

Security *

Interface Name

Edge (Gateway)

WAN

Untrusted

WAN-1

Physical Interface

Select Interface *

LAG0

1/1

1/4-MGMT

LTE-1

[Link Aggregation Group](#)

Virtual Interfaces

+ Sub-Interface

VLAN ID	Routing Domain	Firewall Zone	IP Address	VIF Name	Actions
0	Default_RoutingDo...	<Default>	172.16.42.10/24	VIF-2-WAN-1	

Cancel

Done

In the **Interfaces** section, click **Link Aggregation Group** to quickly change the LAG configuration if necessary.

Link Aggregation Groups

Name	Ethernet Interfaces	Mode	Transmission Policy
LAG0	1/11/21/3		
LAG1	1/11/21/3	Active-Backup	None

Cancel

Done

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](#).

Appliance settings

May 3, 2022

Citrix SD-WAN Orchestrator for On-premises 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.



Device Information

Select Device

Primary

Primary

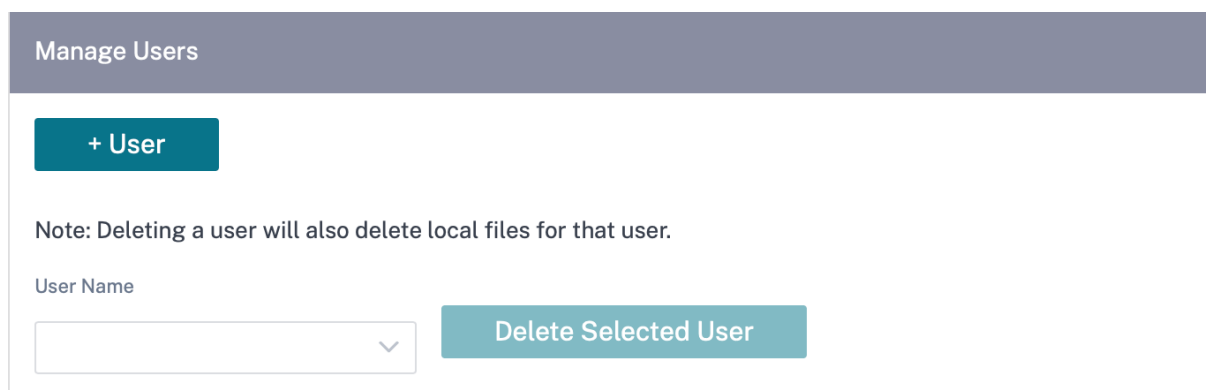
Secondary

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**.



Manage Users

+ User

Note: Deleting a user will also delete local files for that user.

User Name

▼

Delete Selected User

Provide the following details:

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

Manage Users

User Name *

admin

New Password *

.....

Confirm Password *

.....

User Level *

admin

Cancel

Save

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.

User Accounts**RADIUS****TACACS+**

Change Local User Password

User Name *

admin

Current Password

.....

New Password *

.....

Confirm Password *

.....

Save

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 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.

Administrator Interface NetFlow Host Settings Network Adapters AppFlow Host Settings SNMP Fallback Configuration

User Accounts **RADIUS** TACACS+

Radius Settings

☒ Enable RADIUS

Server 1:	IP Address* 10.102.72.41	Authentication Port* 1812
Server 2:	IP Address 10.102.72.56	Authentication Port 1812
Server 3:	IP Address	Authentication Port

Server Key: *****

Confirm Server Key: *****

Timeout: 10

Save

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 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.

User Accounts RADIUS **TACACS+**

Tacacs Settings

☒ Enable TACACS

Server 1:

IP Address*

10.102.75.41

Authentication Port*

49

Server 2:

IP Address

10.102.75.46

Authentication Port

49

Server 3:

IP Address

Authentication Port

Authentication Type: ☒ PAP ☐ ASCIIServer Key:

Confirm Server Key:

Timeout:

10

Save

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](#).

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.

NetFlow Host Settings

☒ Enable NetFlow

NetFlow Host 1:

IP Address*

10.102.72.41

Port*

2055

NetFlow Host 2:

IP Address

Port

NetFlow Host 3:

IP Address

Port

Save

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**.

The screenshot displays the 'Network Adapters' configuration page. At the top, a navigation bar includes tabs for 'Admin Interface', 'NetFlow', 'Network Adapters' (selected), 'AppFlow', 'SNMP', 'Fallback', 'DataTime', 'Syslog', 'Overlay Soft-Reset Actions', 'Certificate Authentication', 'Mobile Broadband Status', and 'Mobile Broadband Settings'. The main content area is divided into sections: 'Management Network Preference' with radio buttons for 'Out-Of-Band' (selected) and 'In-Band'; 'IP Address' with sub-sections for IPv4 and IPv6, each containing checkboxes for 'Enable IPv4/IPv6', 'Enable DHCP', and 'Enable SLAAC', and corresponding input fields for IP Address, Subnet Mask, Gateway IP Address, and Prefix; and 'DNS Settings' with input fields for 'Primary DNS' and 'Secondary DNS'. A 'Save' button is located at the bottom left.

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**

SNMP

UDP Port:

161

System Description:

Citrix Virtual WAN Appliance

System Contact:

support@citrix.com

System Location:

Citrix

SNMP v1/v2

☐ Enable v1/v2 Agent

Community String:

public

☐ Enable v1/v2 Traps

Destination IP Address(es):

Port:

162

SNMP v3

☐ Enable v3 Agent

User Name:

Password:

Verify Password:

Authentication:

MD5

Encryption:

None

☐ Enable v3 Traps

Destination IP Address(es):

Port:

162

User Name:

Password:

Verify Password:

Authentication:

MD5

Encryption:

None

Save

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335

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.

Warning

Restarting dynamic routing might result in network outage.

Restart Dynamic Routing

Restarting routing process may result in network outage. It is provided only for trouble shooting and can result in undesired behavior if performed when service is enabled.

Restart

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.

Virtual Paths and Paths

Enable ▾

Virtual Path: London-Germany ▾

Notes:

Disabling all paths in either direction will cause the entire virtual path to be disabled.

Disabling a path or virtual path is not persistent across Citrix Virtual WAN Service restart operations. All paths will be re-enabled after a restart.

Submit

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.

All Paths on WAN Link

Enable ▾

WAN Link: London-Internet-AOL-1 ▾

Notes:

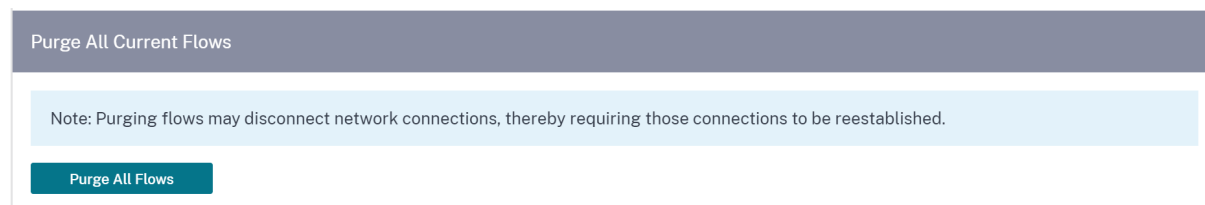
Disabling all paths in either direction will cause the entire virtual path to be disabled.

Disabling paths for a WAN Link is not persistent across Citrix Virtual WAN Service restart operations. All paths will be re-enabled after a restart.

Submit

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.

Date/Time Settings

NTP Settings

☐ Use NTP Server

NTP Server 1

time.nist.gov

NTP Server 2

NTP Server 2

NTP Server 3

NTP Server 3

NTP Server 4

NTP Server 4

Date/Time Settings

Date

01/03/2021

Time

6:51 AM

Save

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.

Date/Time Settings

NTP Settings

☒ Use NTP Server

NTP Server 1

time.nist.gov

NTP Server 2

NTP Server 2

NTP Server 3

NTP Server 3

NTP Server 4

NTP Server 4

Date/Time Settings

Date

01/03/2021

Time

6:23 AM

Save

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.

Timezone Settings

After changing the timezone setting, a reboot will be necessary for the timezone changes to take full effect.

Until then, some logs will continue to use the actual timezone setting in effect at the time of the last reboot, even though events timestamps may reflect the new setting.

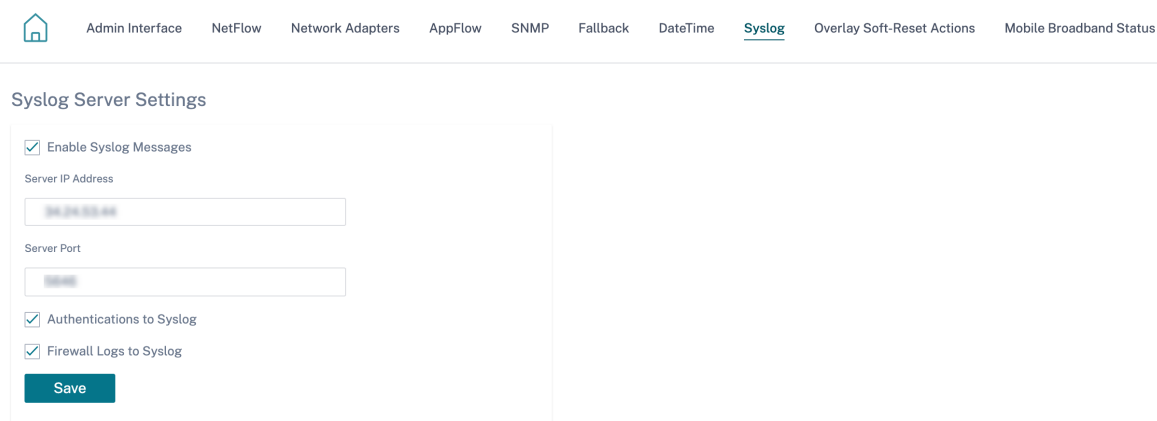
Timezone

UTC

Save

Syslog server settings

You can configure Syslog server settings of SD-WAN appliances using Citrix SD-WAN Orchestrator for On-premises. 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](#).



The following Syslog server settings are configurable through Citrix SD-WAN Orchestrator for On-premises:

- **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 for On-premises 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 for On-premises.

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**.

Network Security ⓘ

Network Security Settings

Encryption

AES-128

☒ Enable Encryption Key Rotation

☐ Enable Extended Packet Encryption Header

☐ Enable Extended Packet Authentication Trailer

Extended Packet Authentication Trailer Type

☐ Enable FIPS Mode

☒ Enable Appliance Authentication

Save

Network Secure Key

Regenerate

During deployment, if the appliance authentication is enabled but a PKI certificate is not installed in the appliance, then the staging shows failed status.

Current Deployment | Deployment History | Change Management Settings | Site Details

Software Version:

Cancel Stage

✖

Activate

☐ Ignore Incomplete

Settings ...

0/2

Staged Appliances

0/2

Activated Appliances

Total Appliances	Ready For Activation	Activated	Failed	Offline
2	0	0	1	0

Search

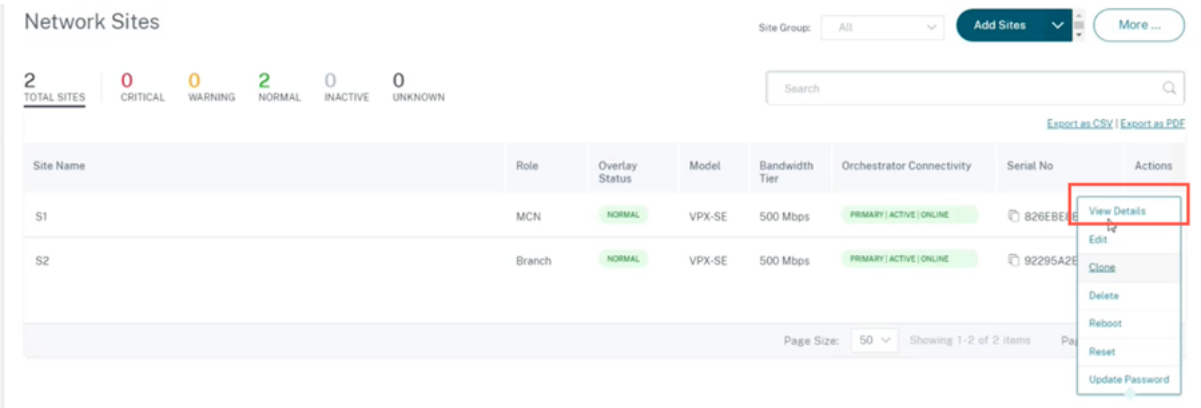
[Export as CSV](#) | [Export as PDF](#)

Online	Site	Status	HA State	Software Version	Actions
Yes	S1	Staging in Progress	Not Configured		
Yes	S2	Staging Failed(ER613-PKI Cert Not Installed)	Not Configured		

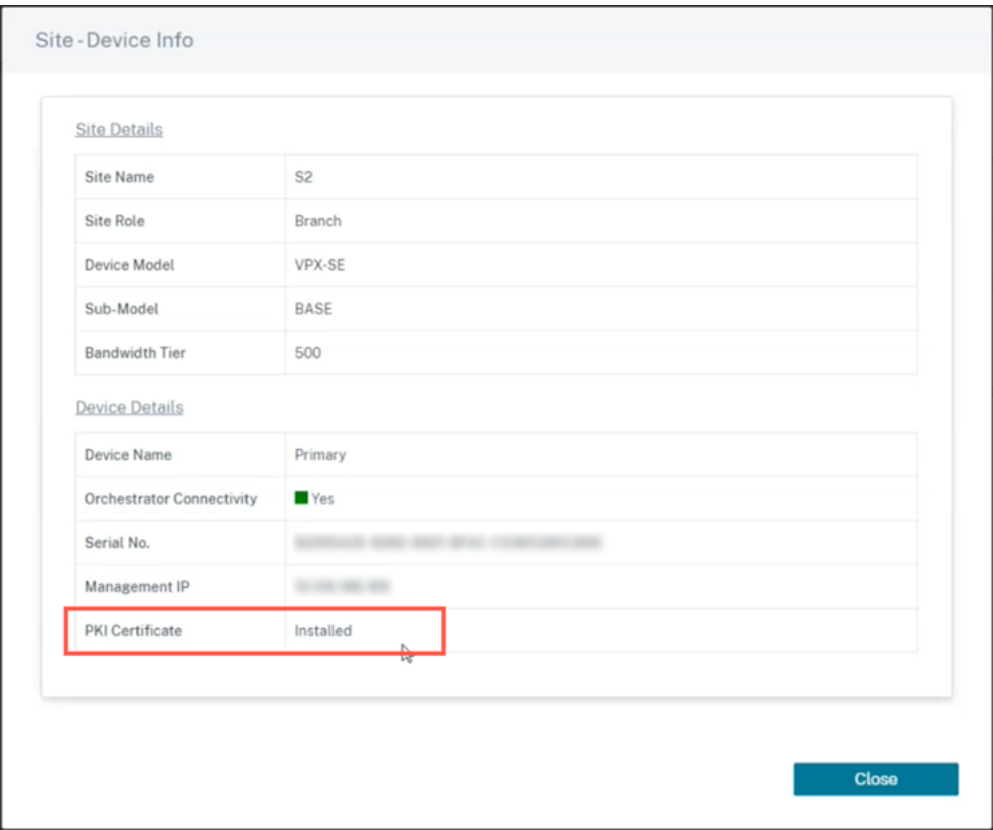
Page Size: 50 | Showing 1-2 of 2 items | Page 1 of 1

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.

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 (PKCS12)

Click here or drag and drop a Certificate Authority Bundle to upload.
Allowed file types are .p12

Upload

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**.

Upload Certificate Authority Bundle (PKCS12)

Click here or drag and drop a Certificate Authority Bundle to upload.
Allowed file types are .p12

Upload

Create certification signing request

The appliance can generate an unsigned certificated 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**.

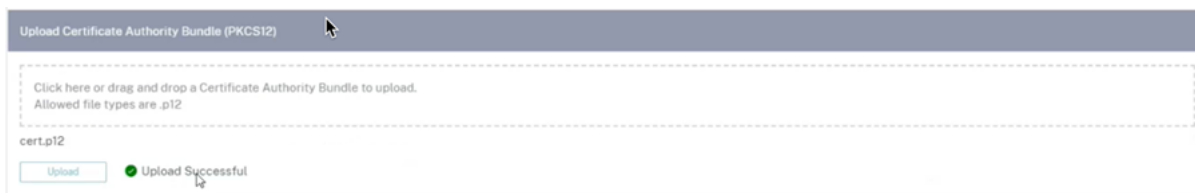
Create Certificate Signing Request (CSR)

Common Name: S2	Business name / Organization: *
Department Name / Organizational Unit: *	Town / City: *
Province, Region, County or State: *	Country: *
Email address: *	

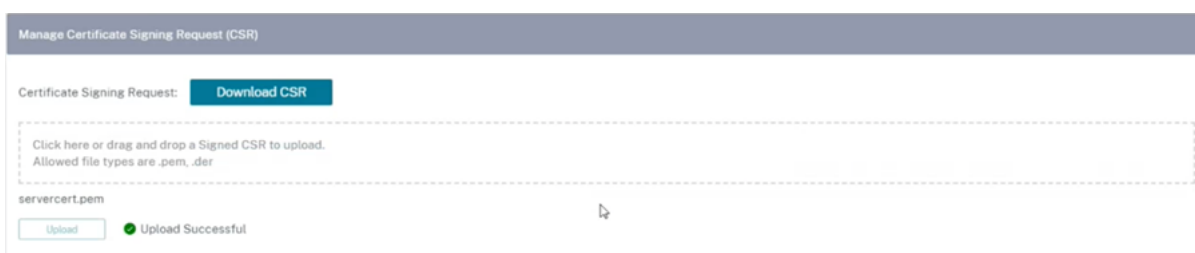
Create CSR

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 virtual 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 number. Make an actively revoked certificate available in your network for a short duration.

Mobile broadband settings

Citrix SD-WAN Orchestrator for On-premises 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 for On-premises.

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**.

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.

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.

Admin Interface

NetFlow

Network Adapters

AppFlow

SNMP

Fallback

DateTime

Syslog

Overlay Soft-Reset Actions

Certificate Authentication

Mobile Broadband Status

Mobile Broadband Settings

Mobile Broadband Operations

Modem Type

Internal Modem

SIM PIN Status (SIM One)

PIN State

N/A

PIN Retries Remaining

-

PUK Retries Remaining

-

Enable

Verify

Modify

Unblock

APN Settings

APN

Authentication

None

Username

Password

Apply

Network Settings

Network Mode

4G

Apply

Roaming

Roaming Status

Disabled

Apply

Manage Firmware

Click here to select the file or drag and drop the selected file.

Available Firmwares

02.33.03.00_TELSTRA

Apply

Delete

Enable/Disable Modem

Disable

Reboot Modem

Reboot

SIM Card (SIM One)

Refresh SIM

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.

Mobile Broadband Status

Modem Type	Status Of
Internal Modem	Device
Status	
Active SIM	SIM Two
Data Service Capability	non-simultaneous-cs-ps
ESN	0
Expected Data Format	802-3
Hardware Revision	10000
IMEI	015724000010437
MEID	86769804038963
MSISDN	
Manufacturer	QUALCOMM INCORPORATED
Max RX Channel Rate (bps)	100000000
Max TX Channel Rate (bps)	50000000
Model	QUECTEL Mobile Broadband Module
Modem Mode	QMI
Networks	gsm umts lte
Operating Mode	online
Operating Mode HW Restricted	0
PRL Only Preference	0
PRL Version	0
Revision	EG25GGBR07A07M2G
SIM Capability	supported
Software Version	EG25GGBR07A07M2G
Type	110-WIFI-LTE

In-band management

February 1, 2022

Citrix SD-WAN Orchestrator for On-premises 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-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 additional 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 for On-premises 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 for On-premises toggles between management and in-band ports, configure **InBand Management DNS** or **InBand Management DNS V6** to ensure uninterrupted Citrix SD-WAN Orchestrator for On-premises connectivity.

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 for On-premises, 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.

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**.

The screenshot displays the 'Day 0' Default / 'Day N' Fallback Config page. At the top, a blue banner states: 'The fallback configuration provides basic network functionality when a critical failure occurs and the system can no longer function.' Below this, a toggle switch for 'Enable Fallback Configuration' is highlighted with a red box. The 'LAN Settings' section includes the following fields:

- VLAN ID: 0
- IP Address: 192.168.101.1/24
- Enable DHCP Server: ☐
- DHCP Start: 192.168.101.50
- DHCP End: 192.168.101.250
- Dynamic DNS Servers: ☒
- DNS Server: [empty field]
- Alt DNS Server: [empty field]
- Internet Access: ☐

A 'Reset' button is located in the top right corner of the configuration area.

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.

'Day O' Default / 'Day N' Fallback Config

The fallback configuration provides basic network functionality when a critical failure occurs and the system can no longer function.

☒ Enable Fallback Configuration Reset

LAN Settings

VLAN ID 0	IP Address 192.168.101.1/24
☒ Enable DHCP Server	
DHCP Start 192.168.101.50	DHCP End 192.168.101.250
☐ Dynamic DNS Servers	
DNS Server 	Alt DNS Server
☒ Internet Access	

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:

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)

Port Settings

Port	Mode
1	☐ WAN ☒ LAN ☐ Disabled
2	☒ WAN ☐ LAN ☐ Disabled
3	☐ WAN ☐ LAN ☒ Disabled
4	☐ WAN ☐ LAN ☒ Disabled
5	☐ WAN ☐ LAN ☒ Disabled
6	☐ WAN ☐ LAN ☒ Disabled
7	☐ WAN ☐ LAN ☒ Disabled
8	☐ WAN ☐ LAN ☒ Disabled
MGT	☐ WAN ☐ LAN ☒ Disabled

Unassigned Port Bypass Mode

Fail to Block

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**, **VLAN ID** text fields are grayed out. Clear the **Enable DHCP** check box, if you want to configure static IP.

WAN Settings

Port	DHCP Mode	IP Address	Gateway IP Address	Vlan ID	WAN Tracking IP
2	☒ Enable DHCP			0	9.9.9.9

Save

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 for On-premises 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 for On-premises immediately.

Once the connection is established, a service agent running on the appliance sends the heartbeat information to the Citrix SD-WAN Orchestrator for On-premises every 10 seconds. If the Citrix SD-WAN Orchestrator for On-premises does not receive the heartbeat for 5 minutes, the In-band port failover is activated. Citrix SD-WAN Orchestrator for On-premises 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 for On-premises is maintained even if the virtual path is down.



Internet Service

Service Name Cost

Internet 5

Advance Settings

☒ Preserve route to Internet from link even if all associated paths are down

Cancel Save

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](#).

Verify Config

01 Site Details

02 Device Details

03 Interfaces

04 WAN Links

05 Routes

06 Summary

Interface Attributes

Deployment Mode *

Interface Type *

Security *

Interface Name

Edge (Gateway) ▾

LAN ▾

Trusted ▾

LAN-1

Physical Interface

Select Interface *

LAG1

1/1

LTE-E1

MGMT

[Link Aggregation Group](#)

Virtual Interfaces

VLAN ID *

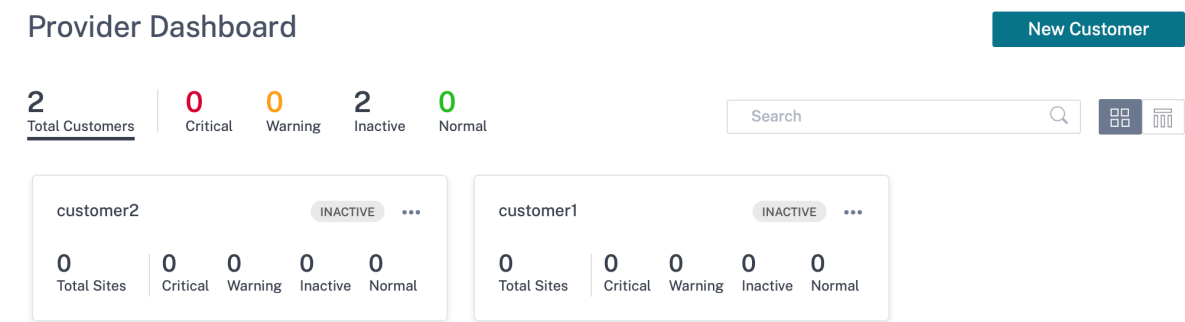
Virtual Interface Name *

To reconfigure the management port to perform management functionality, remove the configuration. Create a configuration without using the management port and activate it.

Provider dashboard

October 21, 2020

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.

Customer/Network dashboard

March 30, 2022

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.

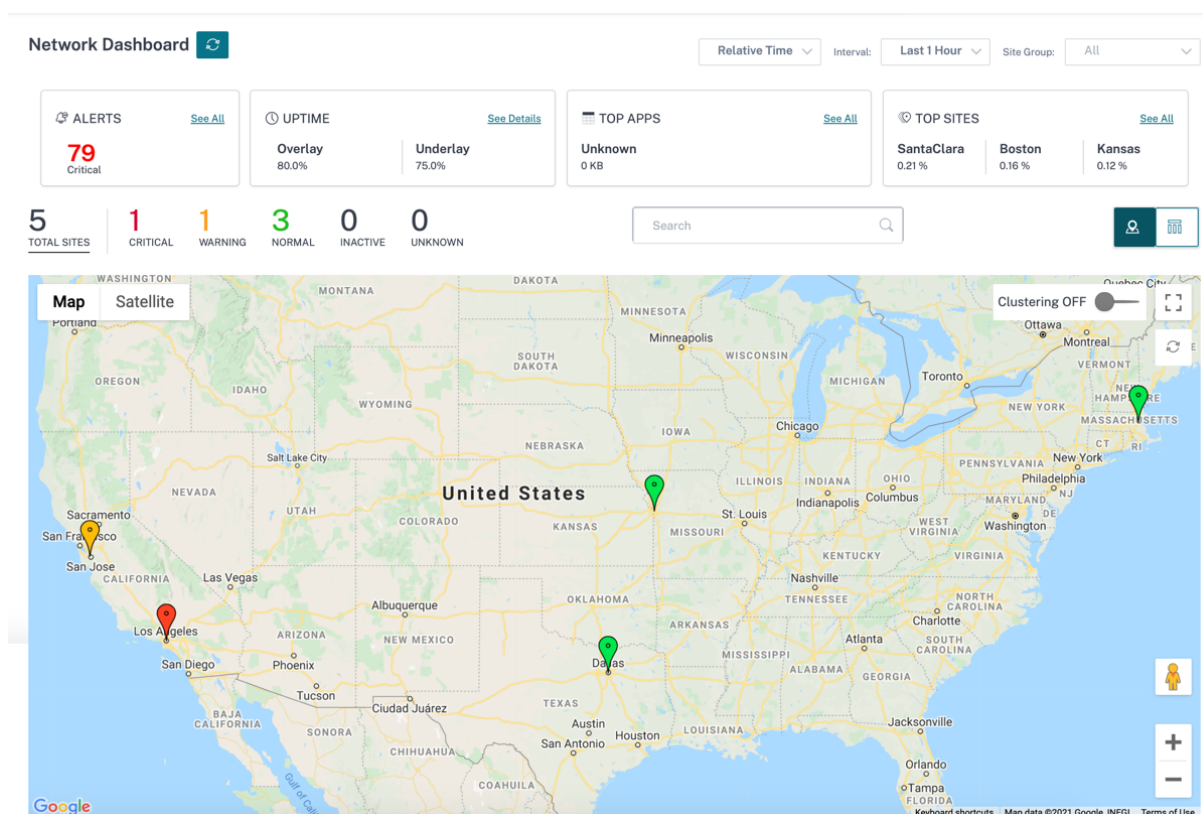
The dashboard summarizes the following aspects of a network, with a provision to drill down for more details.

- **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.



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.

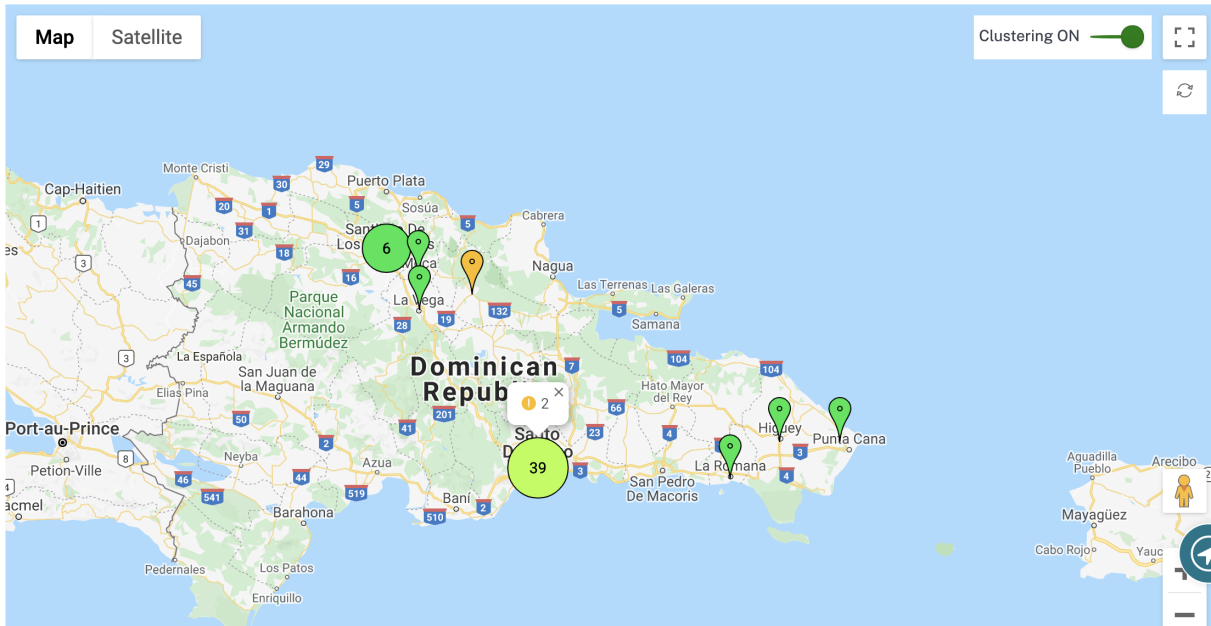
On hovering over any site, some of the key site-specific details such as the site role, device model, bandwidth tier is displayed. The virtual paths associated with a site show up with suitable color codes that reflect their health. The **List View** provides the same details for each site, summarized 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.

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:

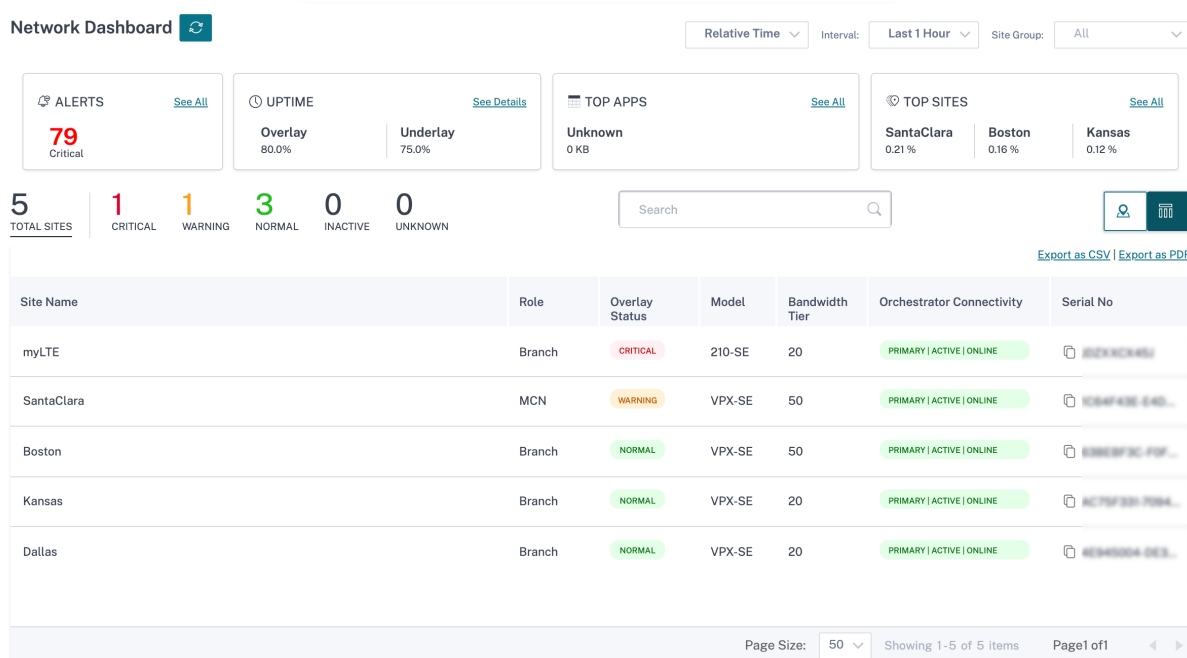
Color Legends	Description
	All sites in the cluster are green. That means each site has all the virtual paths, and the associated member paths UP
	All sites in the cluster are orange. That means each site has at least one member path DOWN, but all virtual paths UP
	All sites in the cluster are red. That 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

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.

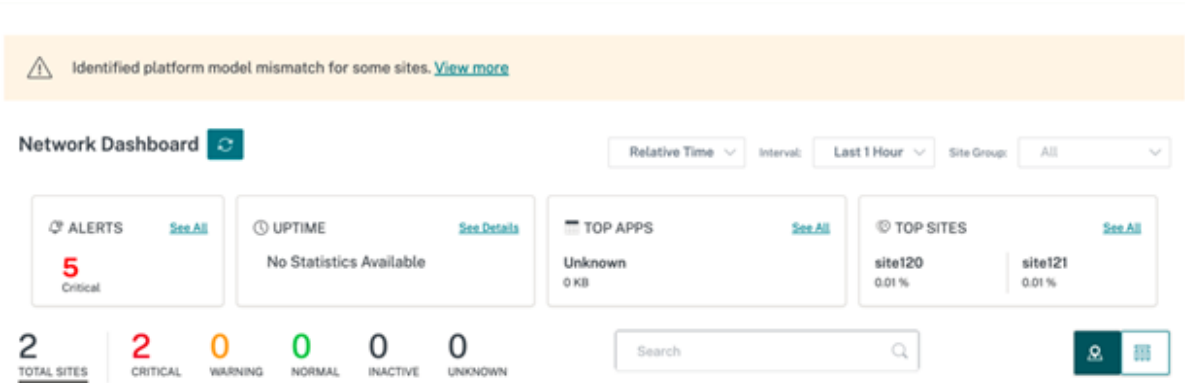


Record device mismatch

Citrix SD-WAN Orchestrator for On-premises 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 for On-premises, 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.

Platform Mismatch Details

Site Name	Device Platform	User Reported Platform	Device Submodel	User Reported Submodel
site120	CBVPX	CB110		

Close

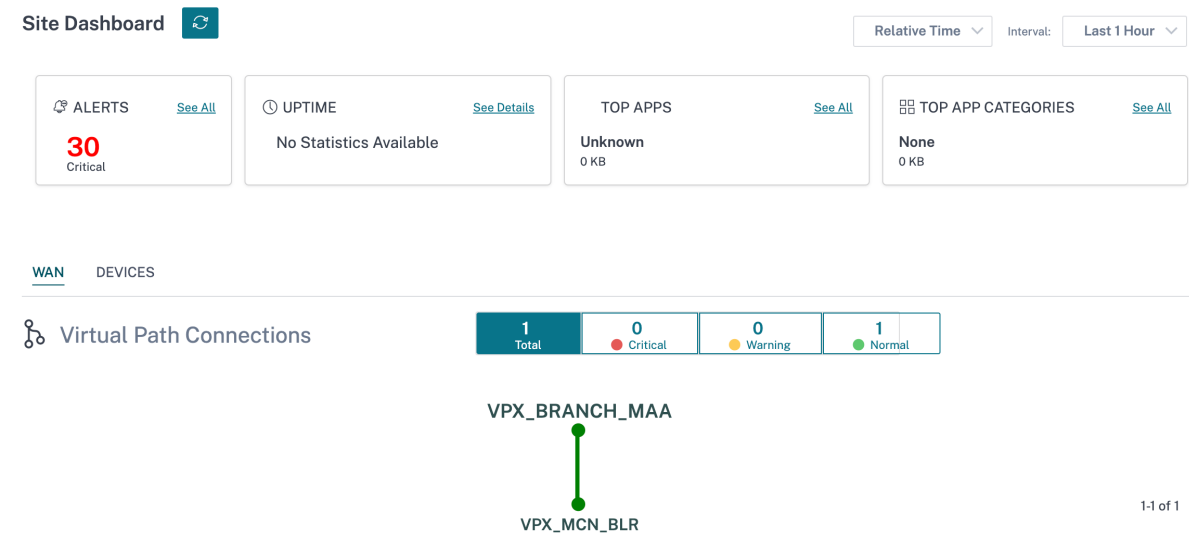
Site dashboard

September 15, 2021

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



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.

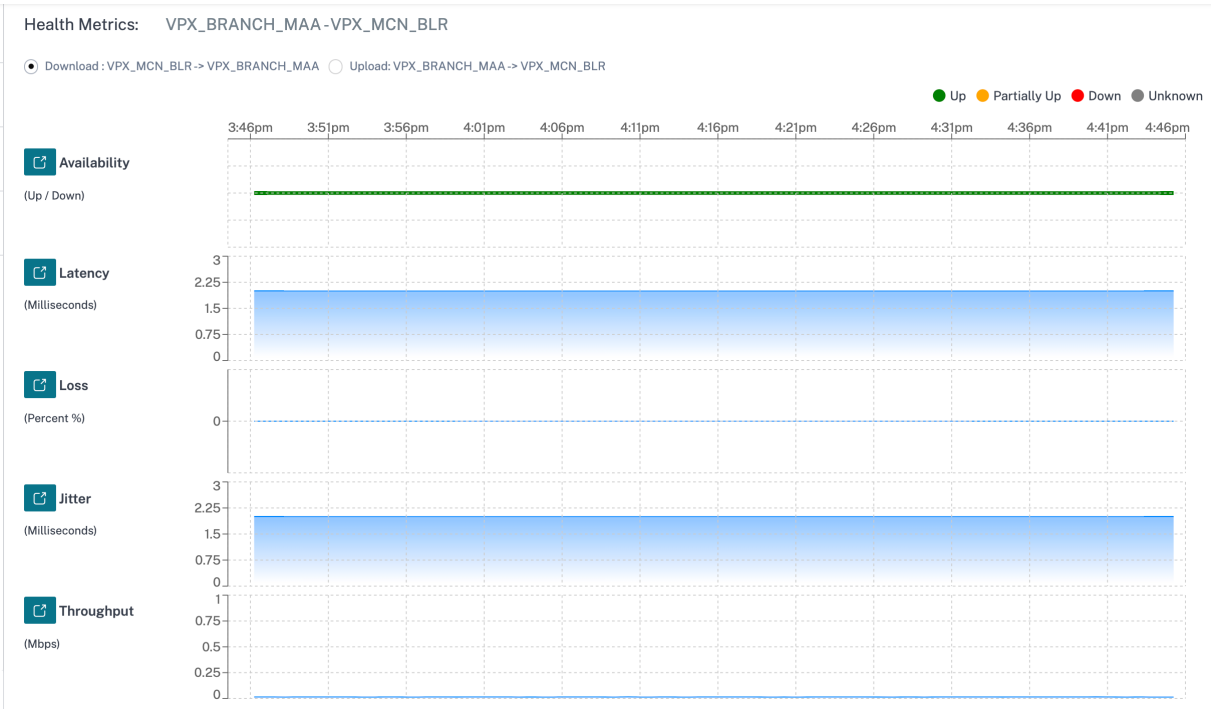
You can select any virtual path connection, to review the corresponding health metrics and trends.

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.



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.

WAN

DEVICES

Device Info

Orchestrator Connectivity	Uptime	Short Name	Device Model	Device Edition	Serial No.	Bandwidth	Management IP	Actions
Yes	1 month 22 days 54 minutes	Primary	210	SE	J0ZKXCK46J	20 Mbps	10.217.110.33	 

Interfaces (Primary)

STATUS	Interface Port	Bytes Sent	Bytes Received	Errors
 Down	1/1	117056	0	0
 Down	1/2	117056	0	0
 Up	LTE-1	2595352	7122	0

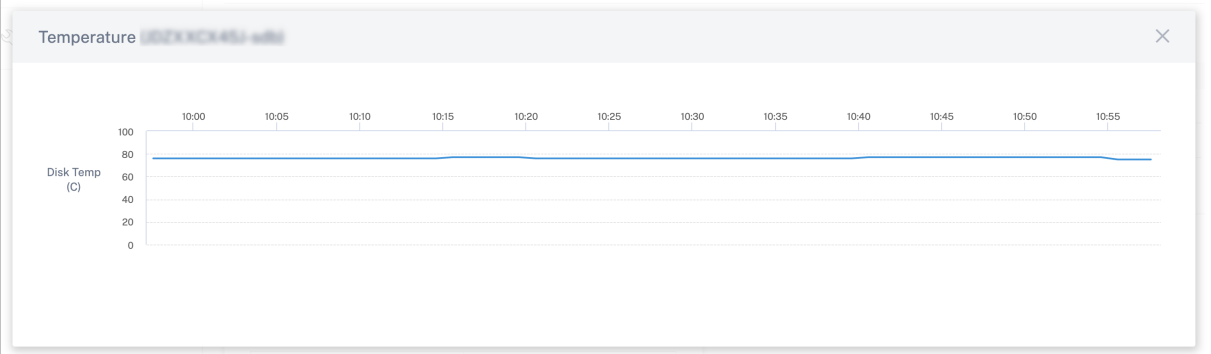
Temperature

Device Name : Primary

Serial No : J0ZKXCK46J

Name	Temperature (C)
System	58
cpu0	58
sda	30 
sdb	76 

You can also click the graph icon in the **Temperature (C)** column and view the information in graphical form.



February 1, 2022

Provider Troubleshooting

The Provider audit logs page displays provider-level logs and device logs, enabling quick troubleshooting.

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:** Select 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.
 - **Payload:** Body of the request sent through API.
 - **Response:** Error response when the API request fails. This field is displayed only when the API request fails.
 - **URL:** HTTP URL of the revoked API.
 - **Source IP:** The IP address of the endpoint from which the feature was configured. This field is displayed on the Audit logs page and the Audit Info page.

Audit Info

Method	POST
Status	Failure (404)
Payload	--
Response	{ "type": "https://errors-api.cloud.com/common/notFound", "detail": "Multi-MCN not found", "parameters": [{ "name": "id", "value": "22afd958-617c-4295-8d56-98cdc7331613"}, { "name": "entityType", "value": "Msp" }] }
URL	/policy/v1/msp/22afd958-617c-4295-8d56-98cdc7331613/domainName
Source IP	

Close

- **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](#).

Provider Troubleshooting: Audit Logs

☒ Log Payloads

Search



User



Feature



Start Date

End Date

[Export as CSV](#)

Feature	Message	User	Created At	Source IP	Action
● Base Msp	Create Customers		September 30, 2021 3:51...		i
● Base Msp	Create Customers		May 26, 2021 11:30 PM		i

Showing 1-2 of 2 items

Page

1

of 1



February 3, 2022

Network Troubleshooting

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 **SD-WAN Troubleshooting > Audit Logs** to view the **SD-WAN Troubleshooting Audit Logs** page.

The SD-WAN Troubleshooting 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:** Select 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. You see the following error response when the API request fails.
 - **Payload:** Body of the request sent through API.
 - **Response:** Error response when the API request fails. This field is displayed only when the API request fails.
 - **URL:** HTTP URL of the revoked API.

Audit Info

Method	PUT
Status	Success (200)
Payload	{ "regions": [{ "name": "", "isDefault": true, "siteNames": ["s1"], "allowExternalVipMatch": false, "forceInternalVipMatch": false }, { "id": null, "name": "US-WEST", "admins": [], "subnets": [], "isDefault": false, "siteNames": ["Branch_MCN", "Branch_SC"], "description": "", "allowExternalVipMatch": false, "forceInternalVipMatch": false }] }
URL	/policy/v1/customer/e53af250-79fe-4d60-8b48-f564f9206533/config/regions

Close

- **Source IP:** The IP address of the endpoint from which the feature was configured. This field is displayed on the Audit logs page and the Audit Info page.

- **What Changed:** This section displays the logs of all the changes made to the features through the UI. Enable the Log Payloads toggle button to view the changes in the Audit Info section.

Source IP	
What Changed	<pre>{ 1 gre: [2 { 3 greService: { 4 mtu: 1500, 5 checksum: false, 6 serviceName: "GRELan", 7 serviceType: "lan", 8 firewallZone: "", 9 routingDomain: "Default_RoutingDomain", 10 keepalivePeriod: 10, 11 keepaliveRetries: 3 12 }, 13 gresiteBindings: [14] 15 }, 16 + {...} 17] }</pre>

- **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](#).

SD-WAN Troubleshooting Audit Logs ⓘ

Log Payloads Search					
User	Feature	Site	Start Date	End Date	
Export as CSV					
Feature	Message	User	Created At	Source IP	Action
Site	Perform Cm Activate	admin	January 28, 2022 12:09 PM		ⓘ
Site	Perform Cm Stage	admin	January 28, 2022 12:08 PM		ⓘ
Troubleshooting	Create Diagnostic Bundle	admin	January 25, 2022 5:03 PM		ⓘ
Troubleshooting	Create Diagnostic Bundle	admin	January 25, 2022 4:09 PM		ⓘ
Appliance	Create Device E842a311-8e93-4e47-83ba-6ac998943eb5 Appliance S...	admin	January 25, 2022 3:01 PM		ⓘ
Appliance	Create Device 76ebd472-3ec8-4943-9fca-670f8a1d78de Appliance Set...	admin	January 25, 2022 3:00 PM		ⓘ
Appliance	Create Device 69287e1d-44c0-4154-a523-2ae34196acd3 Appliance Se...	admin	January 25, 2022 3:00 PM		ⓘ
Appliance	Create Device 370e63cf-3faf-430e-9ddd-1e768a729168 Appliance Sett...	admin	January 25, 2022 2:59 PM		ⓘ
Appliance	Create Device 772a2f37-fdf5-4c3e-909a-8d92ced65f90 Appliance Set...	admin	January 25, 2022 2:58 PM		ⓘ
User Settings	Create Scope Userrole	sdwan-onprem-sp	January 25, 2022 11:35 AM		ⓘ
User Settings	Create Scope Userrole	sdwan-onprem-sp	January 25, 2022 11:34 AM		ⓘ
User Settings	Delete Scope Userrole 6a11915d-0bea-4c88-945d-5a6cd7017aff	sdwan-onprem-sp	January 25, 2022 11:34 AM		ⓘ
User Settings	Create Scope Userrole	sdwan-onprem-sp	January 25, 2022 11:32 AM		ⓘ
User Settings	Delete Scope Userrole 13b70c5b-453e-4405-b80e-2286bf58c996	sdwan-onprem-sp	January 25, 2022 11:31 AM		ⓘ

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.

Network Troubleshooting : Device Logs

Select Site
San Francisco

Download (0 Bytes / 1 GB) Search Device Logs

☐	Name	Last Modified	Size
☐	init.log	September 20, 2019 11:10 AM	2.76 MB
☐	SDWAN_filetransfer.log	September 20, 2019 11:10 AM	1.66 MB
☐	SDWAN_ip_learned.log	September 20, 2019 11:10 AM	1.21 MB
☐	SDWAN_snmp_poll.log	September 20, 2019 11:10 AM	1.66 MB
☐	SDWAN_config_update.old.log	September 20, 2019 11:10 AM	1.91 MB
☐	SDWAN_snmp_poll.old.log	September 20, 2019 11:10 AM	1.91 MB
☐	SDWAN_dynamic_virtual_path.old.log	September 20, 2019 11:10 AM	7.63 MB
☐	SDWAN_management.log	September 20, 2019 11:10 AM	1.51 MB
☐	SDWAN_filetransfer.old.log	September 20, 2019 11:10 AM	1.91 MB
☐	SDWAN_common.old.log	September 20, 2019 11:10 AM	3.81 MB
☐	SDWAN_dynamic_virtual_path.log	September 20, 2019 11:10 AM	1.66 MB
☐	SDWAN_igmp_proxy.old.log	September 20, 2019 11:10 AM	1.91 MB
☐	SDWAN_security.old.log	September 20, 2019 11:10 AM	1.91 MB
☐	dynamic_routing.log	September 20, 2019 11:10 AM	123.47 KB

Site troubleshooting

September 30, 2021

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.

Download (0 Bytes / 1 GB) Search Device Logs

☐	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**.

Select Device

Active

Create New

Search

Name	Last Updated At	File Size	Status	Action
bangalore_mcn-8dc156e...	August 12, 2020 2:11 PM	16.04 MB	Available For Download	Download Delete
new_test-8dc156e9-af52...	August 11, 2020 10:36 AM	16.34 MB	Available For Download	Download Delete

** STS is Available for Only 5 Days*

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 currently running on the appliance. You can download an already available STS from the Citrix SD-WAN Orchestrator for On-premises even if the device is offline.

Create Diagnostic Information Dump

Create a diagnostic dump.

If the filename is left blank, one will be auto-generated.

Filename

Cancel

Create

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.

Provider reports

April 23, 2021

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 for On-premises 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.

Customer Name	High	Medium	Low
Citrix Demo Center	0	0	0
ABC Systems	0	0	0
Winstorm Motors	0	0	0
Creative Enterprises	0	0	0
Gremona Textiles	0	0	0
AMS_Demo	0	0	0
Demo1	0	0	0
Test	0	0	0
Test-Customer-1123	0	0	0
Rehab_Test	0	0	0
Support_Training	59	10	11
Abycare Hospitals	0	76	480

You can also view the severity, site at which the alert originated, alert message, time, and other information under **Details**.

Provider Report : Alerts

Summary [Details](#)

Delete Alerts						54 TOTAL 4 HIGH 8 MEDIUM 42 LOW			
Search									
☐	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.

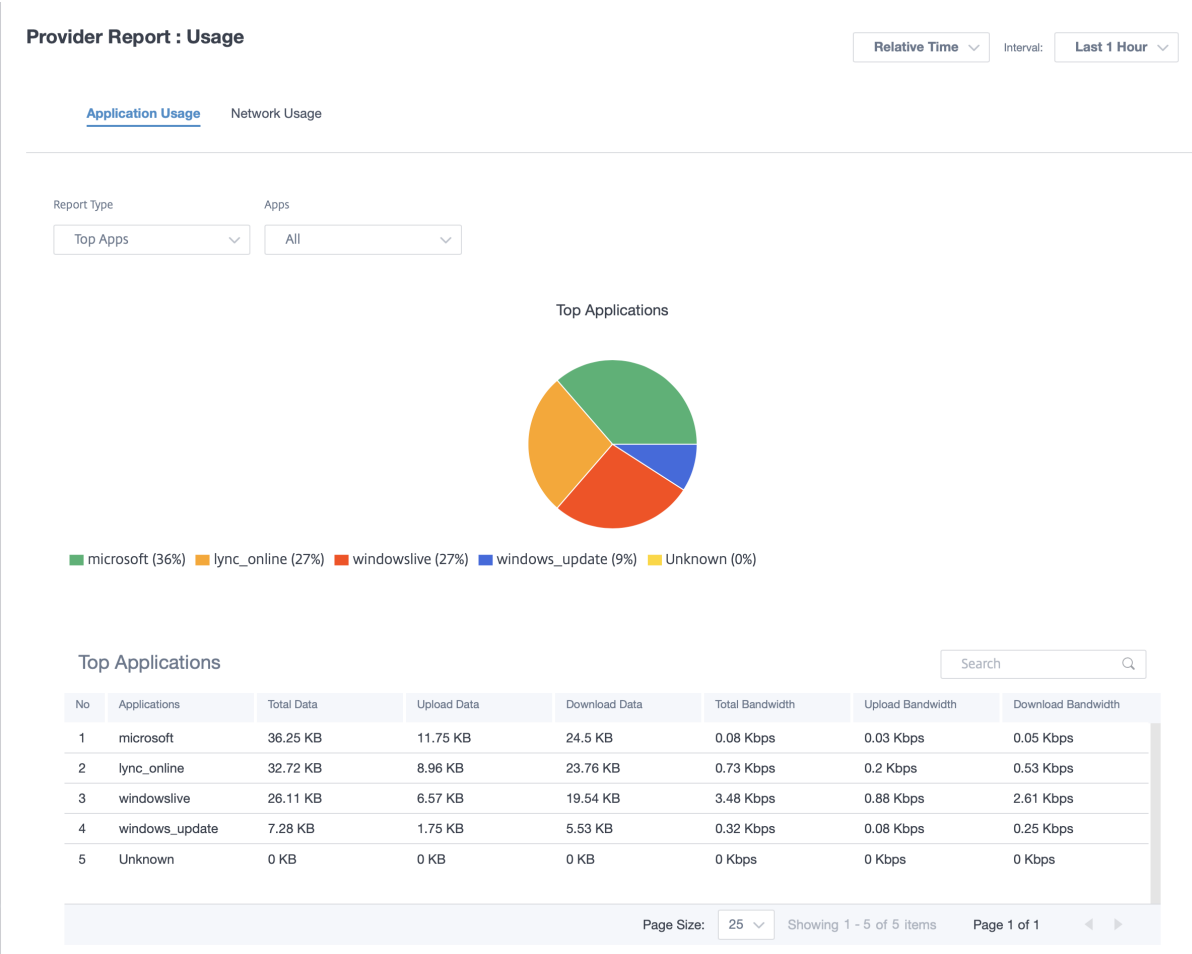
You can also select and delete alerts.

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.



Provider Report : Usage

Relative Time

Interval:

Last 1 Hour

Application Usage

Network Usage

Report Type

App Categories

Top App Categories

All

Top Application Categories



Web (91%) Application Service (9%) None (0%)

Top Application Categories

Search

No	Application Category	Total Data	Upload Data	Download Data	Total Bandwidth	Upload Bandwidth	Download Bandwidth
1	None	0 KB	0 KB	0 KB	0 Kbps	0 Kbps	0 Kbps
2	Application Service	8.62 KB	2.54 KB	6.07 KB	1.15 Kbps	0.34 Kbps	0.81 Kbps
3	Web	102.37 KB	29.04 KB	73.33 KB	0.2 Kbps	0.06 Kbps	0.14 Kbps

Page Size:

25

Showing 1 - 3 of 3 items

Page 1 of 1

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**.

Provider Report : Usage

Relative Time

Interval:

Last 1 Hour

Application Usage

Network Usage

Report Type

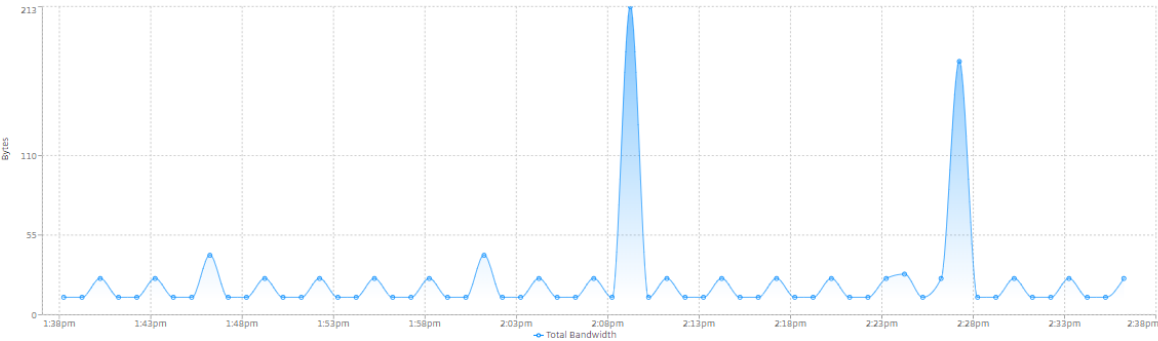
App Categories

Metric

Top App Categories

Instant Messaging

Total Bandwidth

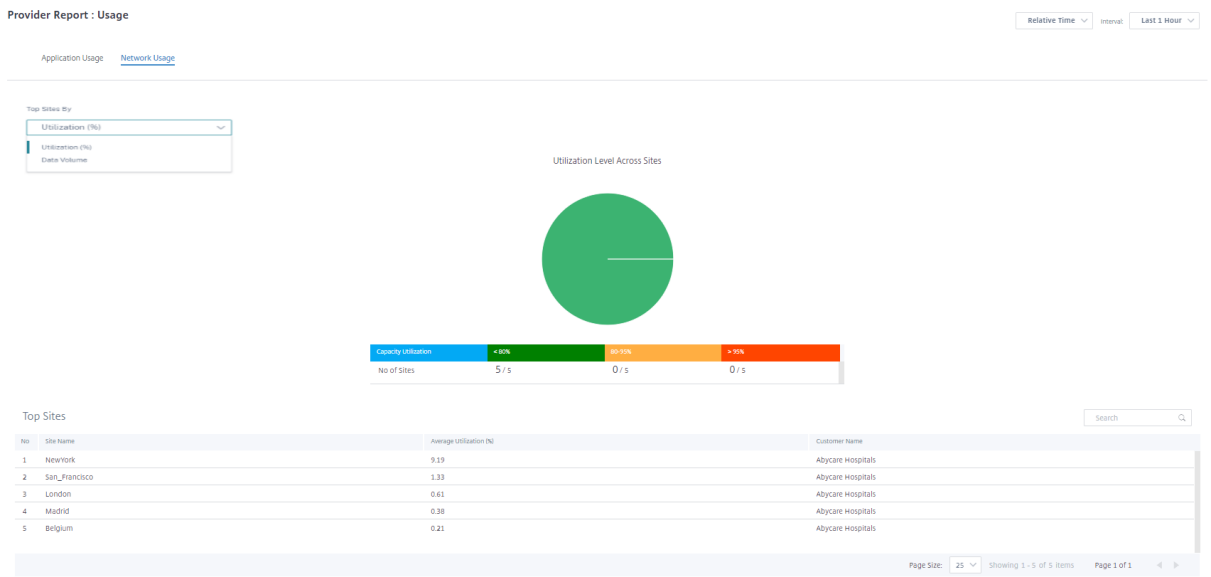


- **Report Type:** Select **Top App** or **App Categories** from the list.
- **Apps/App Categories:** Select top application or categories from the list.

- **Metric:** Select the bandwidth metric (such as Total Data, Incoming Data, Total Bandwidth) from the list.

Network usage

The 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

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.

Provider Report : Inventory

Summary [Details](#)

Select Customer :

Abycare Hospitals

Search

DEPLOYED

UNDEPLOYED

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-ae7-0b54-4cc...	11.2.0.88.861012	10.106.112.23

Page Size:

25

Showing 1 - 6 of 6 items

Page 1 of 1

February 3, 2022

Customer/Network reports

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.

Alerts

The customer can review a detailed report of all the events and alerts generated across all the sites in this network.

It includes the severity, site at which the alert originated, alert message, time, and other details.

Network Reports : Alerts					
					Site Group: All
Delete Alerts					509 TOTAL 41 HIGH 67 MEDIUM 401 LOW
Search					
☐	Severity	Site	Source	Message	Time
☐	Low	San Francisco	APPLIANCE	The state of Virtual Path San_Francisco-Madrid has changed from BAD to GOOD	Jan 30th 2020, 12:35 am
☐	Low	San Francisco	APPLIANCE	Virtual Path San_Francisco-Madrid Path Madrid-DSL-ono-1->San_Francisco-Broadband-...	Jan 30th 2020, 12:35 am
☐	Low	San Francisco	APPLIANCE	Virtual Path San_Francisco-Madrid Path San_Francisco-Broadband-AMIS-2->Madrid-DS...	Jan 30th 2020, 12:35 am
☐	Low	San Francisco	APPLIANCE	Virtual Path San_Francisco-Madrid Path San_Francisco-Broadband-AMIS-2->Madrid-DS...	Jan 30th 2020, 12:35 am
☐	Low	San Francisco	APPLIANCE	Virtual Path San_Francisco-Madrid Path Madrid-DSL-ono-1->San_Francisco-Broadband-...	Jan 30th 2020, 12:35 am
☐	High	San Francisco	APPLIANCE	The Virtual Path San_Francisco-Madrid is no longer DEAD	Jan 30th 2020, 12:35 am
☐	Low	NewYork	APPLIANCE	WAN Link NewYork-Internet-AOL-1 is now up.	Jan 30th 2020, 12:16 am
☐	Low	San Francisco	APPLIANCE	Ethernet link on device 4 changed from ETH_LINK_DOWN to ETH_LINK_UP.	Jan 30th 2020, 12:15 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.

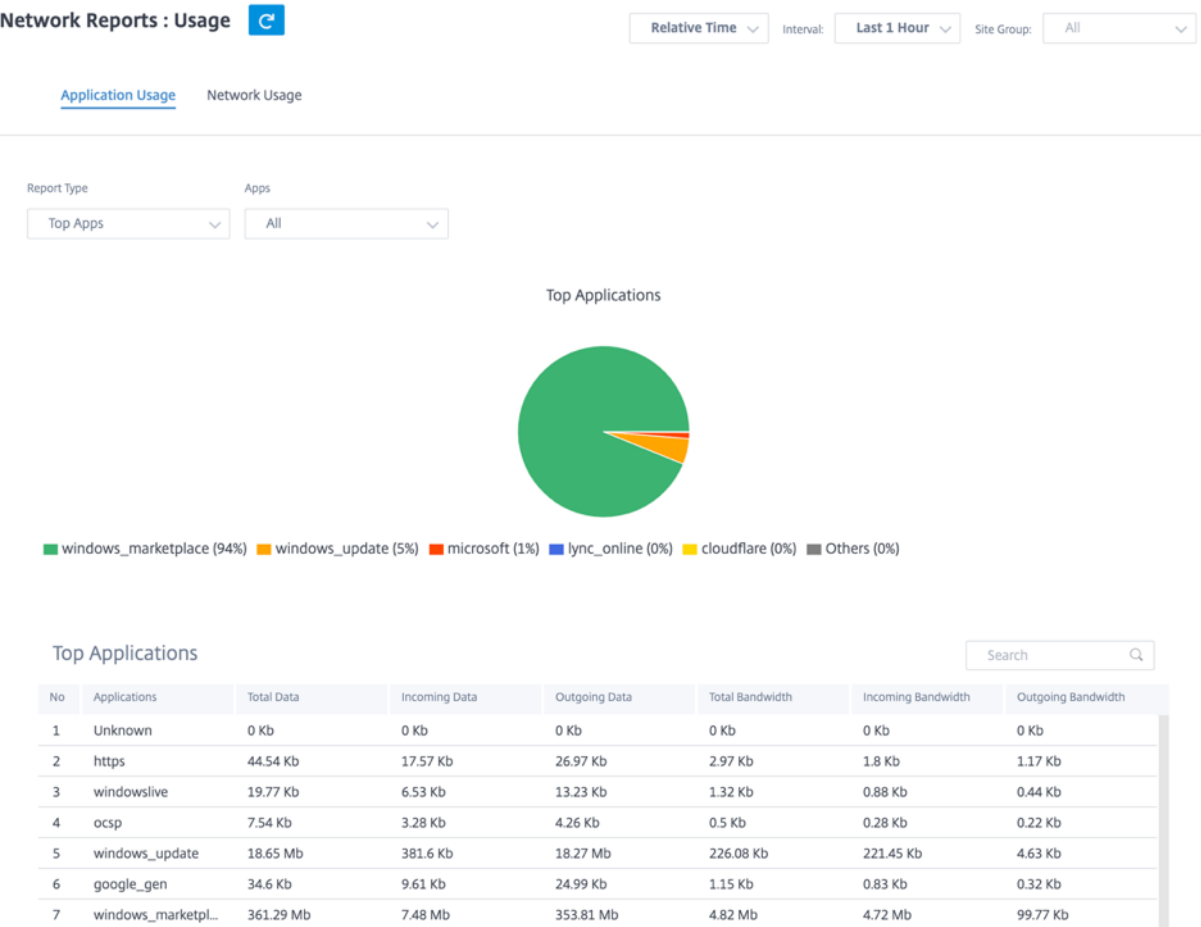
You can also select and clear alerts.

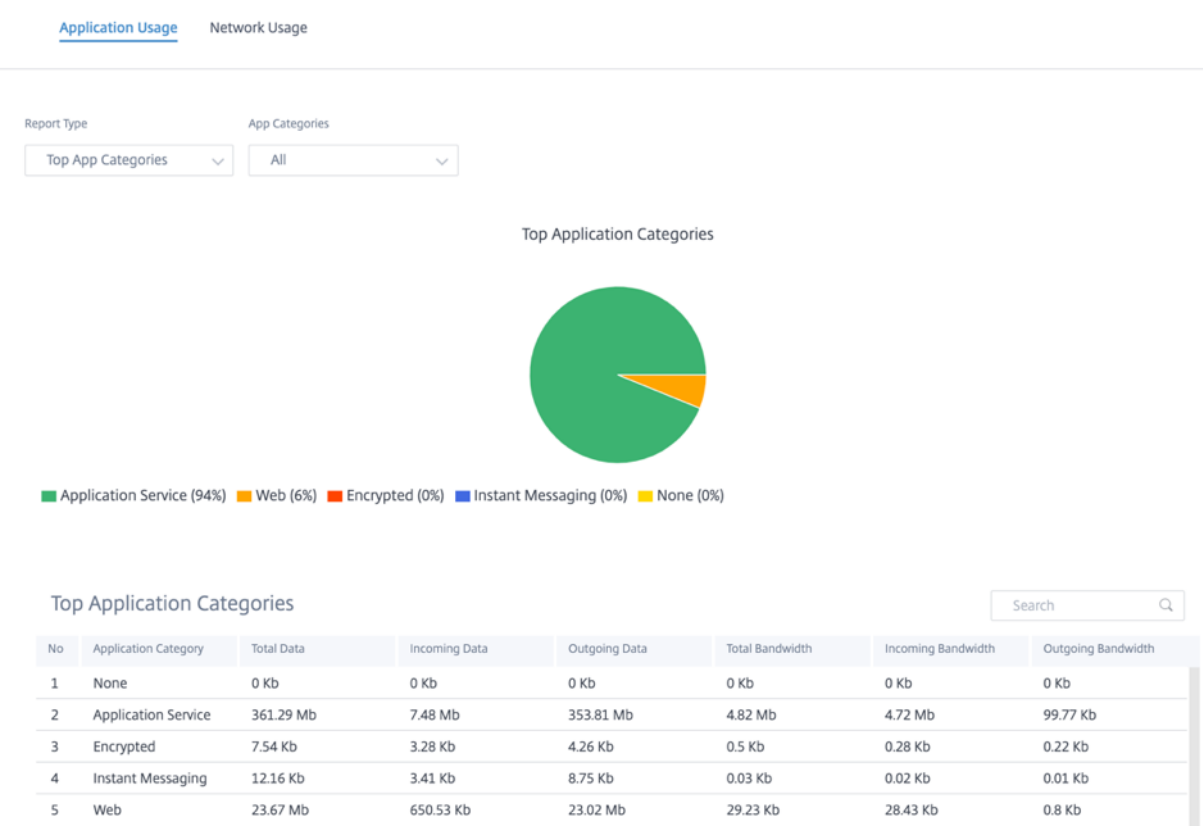
Usage

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

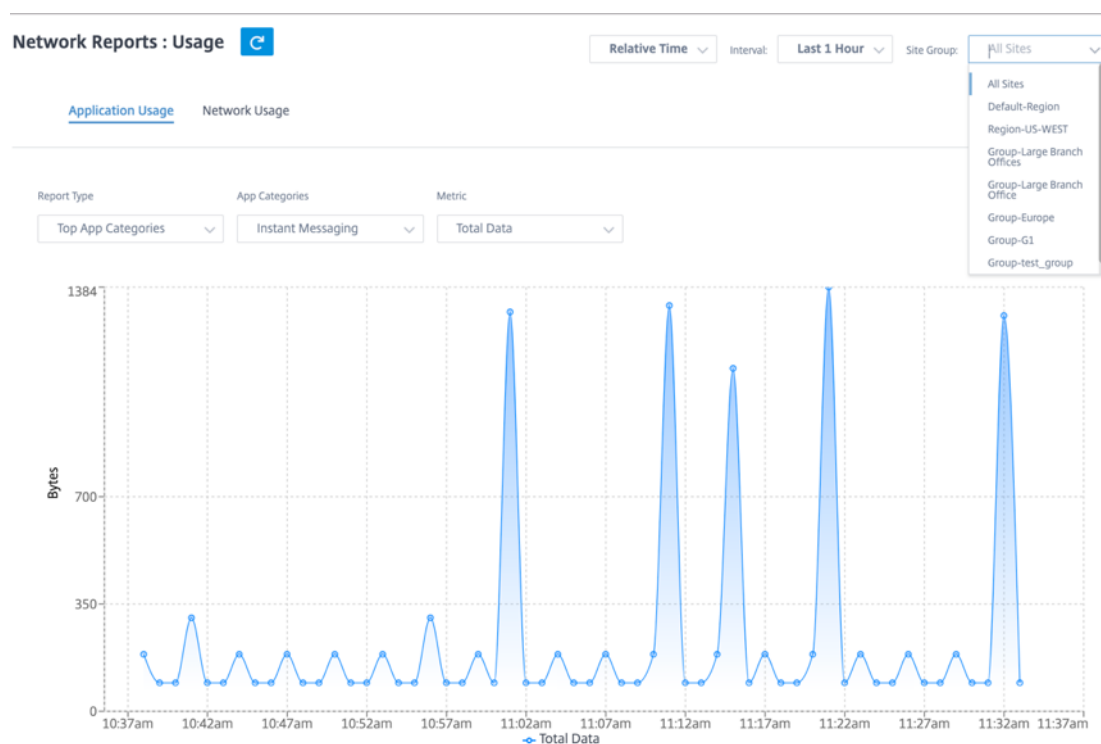
The **Top Applications** and **Top Application Categories** chart shows the top applications and top application families that are widely used across all the sites. This allows you to analyze the data consumption pattern and reassign the bandwidth limit for each class of data within the network.





Application bandwidth

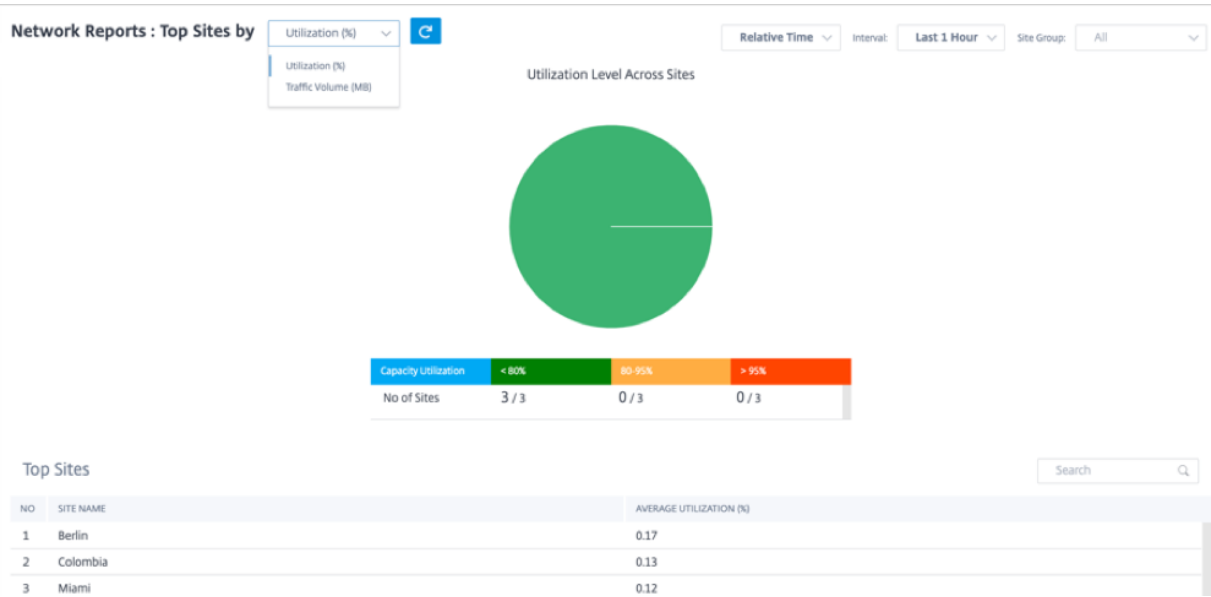
You can view the bandwidth usage statistics for the selected site group or for all sites. The bandwidth statistics are collected for the selected time interval. You can filter the statistics report based on the **Report Type, Apps or Apps Categories, and Metrics.**



- **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.

Network usage

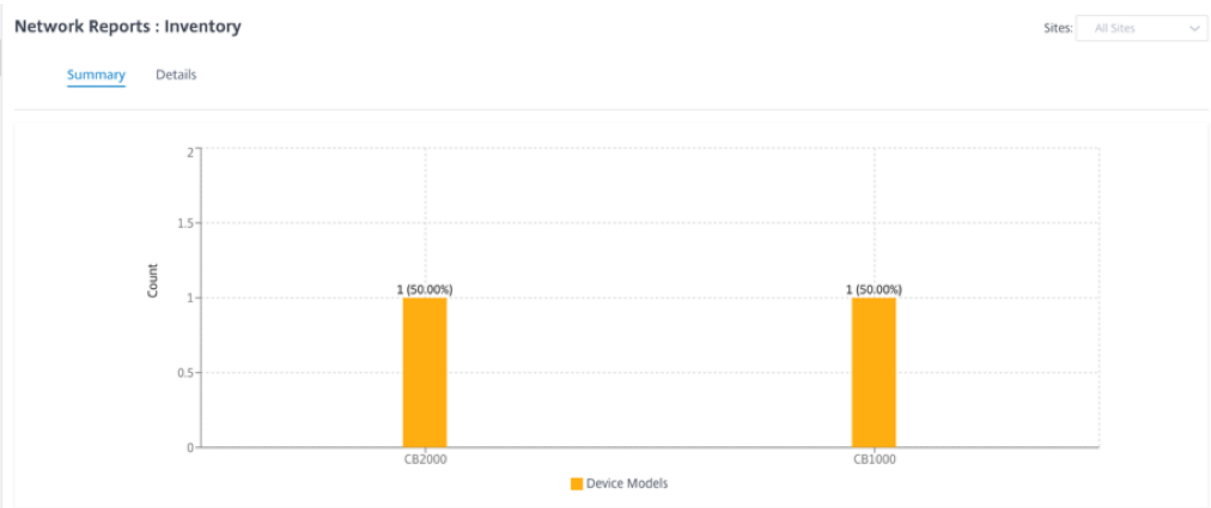
The **Top Sites** chart depicts the top sites in the customer network that have the highest bandwidth usage. You can view the Sites by Utilization (%) or Traffic Volume (MB).



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.



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.

Network Reports : Inventory

Sites: All Sites

SummaryDetails

Search

DEPLOYEDUNDEPLOYED

SITE NAME	DEVICE ROLE	DEVICE MODEL	SERIAL NUMBER	CURRENT SOFTWARE	MANAGEMENT IP
SFO	MCN	2000	7A9D12F8VZ	10.1.1.37.715522	10.200.33.72
Chennai	Branch	1000	JNHF2CKG1X	10.1.1.37.715522	10.200.32.42

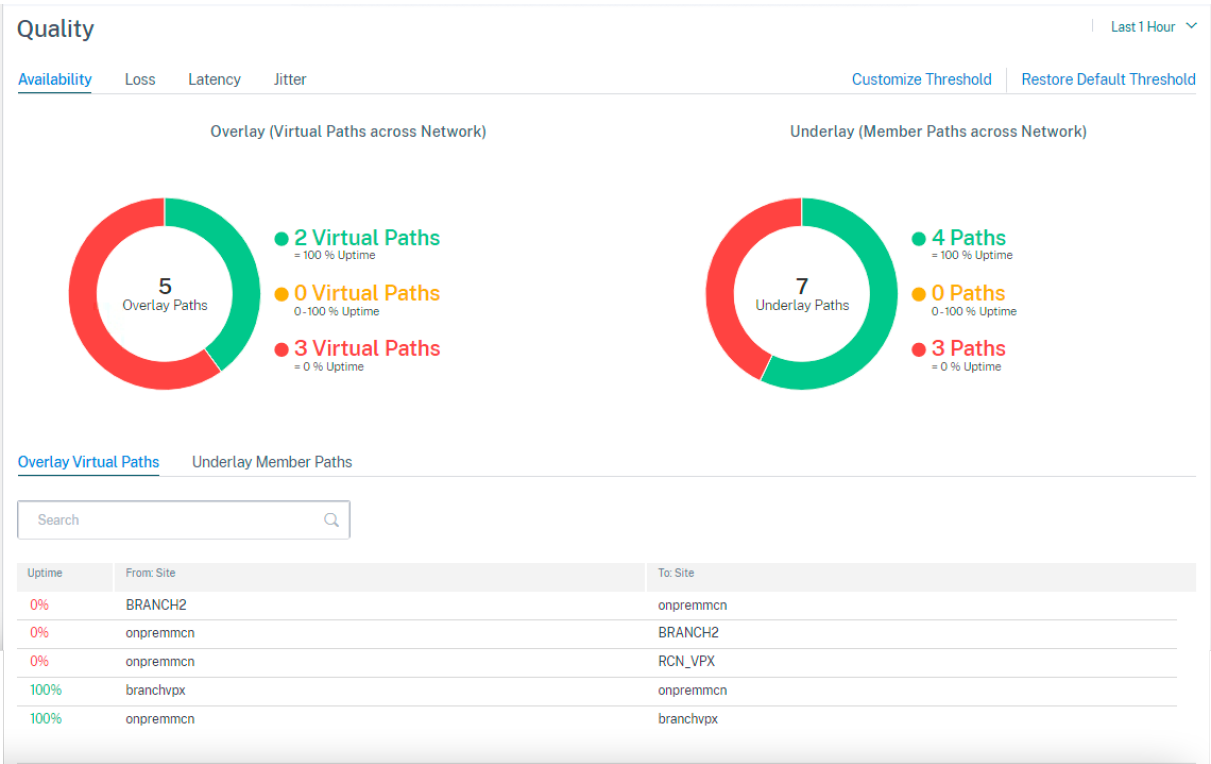
Page Size: 25Showing 1 - 2 of 2 itemsPage 1 of 1

HDX dashboard and reports

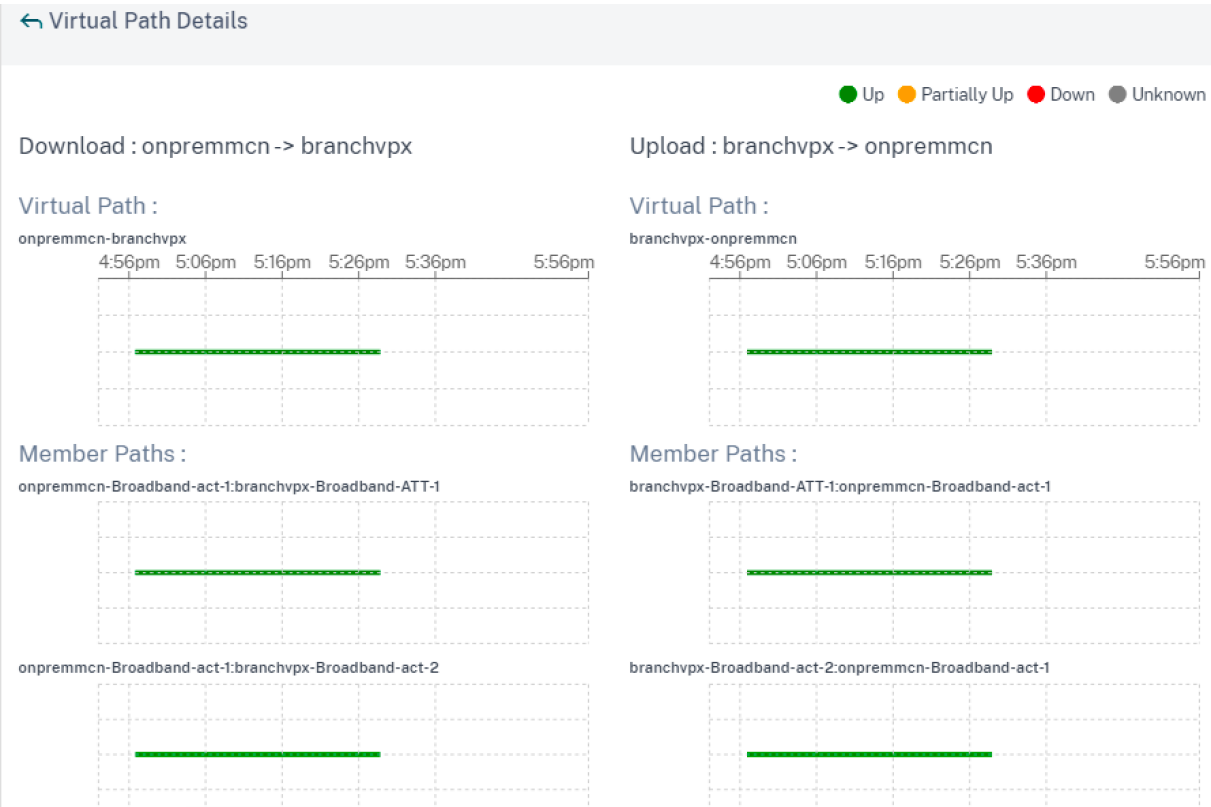
For details on HDX dashboard and reports, see [HDX dashboard and reports](#).

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.



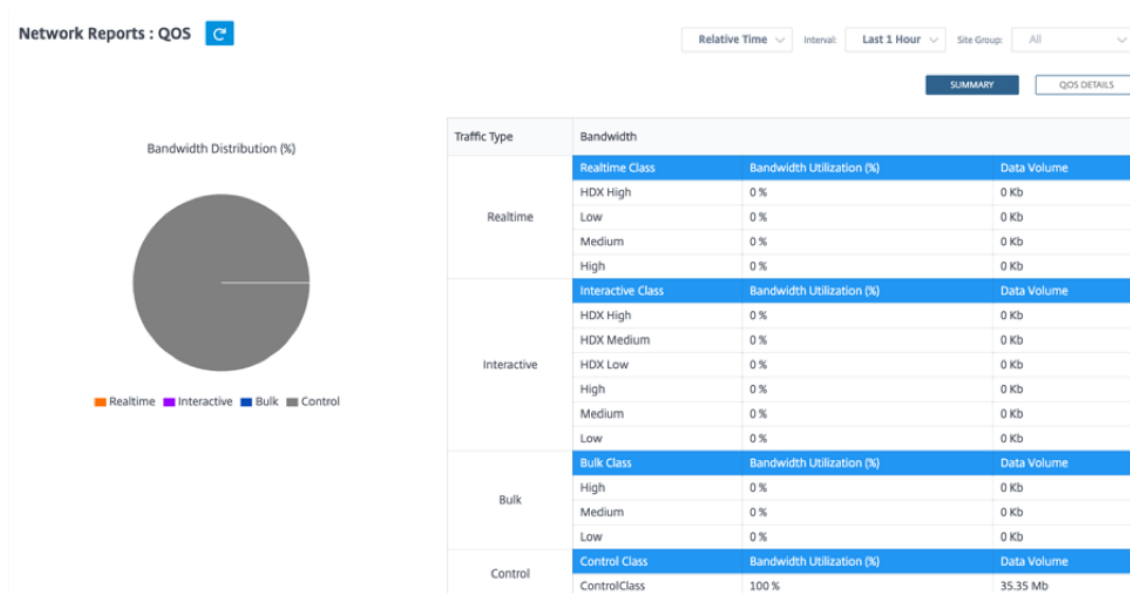
Loss : Custom Thresholds

Green ●	<=	5	% Loss
Citrus ●		5 - 10	% Loss
Yellow ●	>=	10	% Loss

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.



- **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.

Network Reports : QOS

Relative Time Interval: Last 1 Hour Site Group: All

SUMMARY QOS DETAILS

Site: All Traffic Type: All Select Priority: All

SITE	VIRTUAL PATH	TRAFFIC TYPE	PRIORITY	BANDWIDTH	DATA VOLUME	DROP (%)	DROP VOLUME
Berlin	Berlin-Miami	Control	ControlClass	13.44 Kbps	5.95 Mb	0 %	0 Kb
Berlin	Berlin-Colombia	Control	ControlClass	23.03 Kbps	10.19 Mb	0 %	0 Kb
Miami	Miami-Berlin	Control	ControlClass	17.35 Kbps	7.68 Mb	0 %	0 Kb
Colombia	Colombia-Berlin	Control	ControlClass	26.98 Kbps	11.94 Mb	0 %	0 Kb

Page Size: 25 Showing 1 - 4 of 4 items Page 1 of 1

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

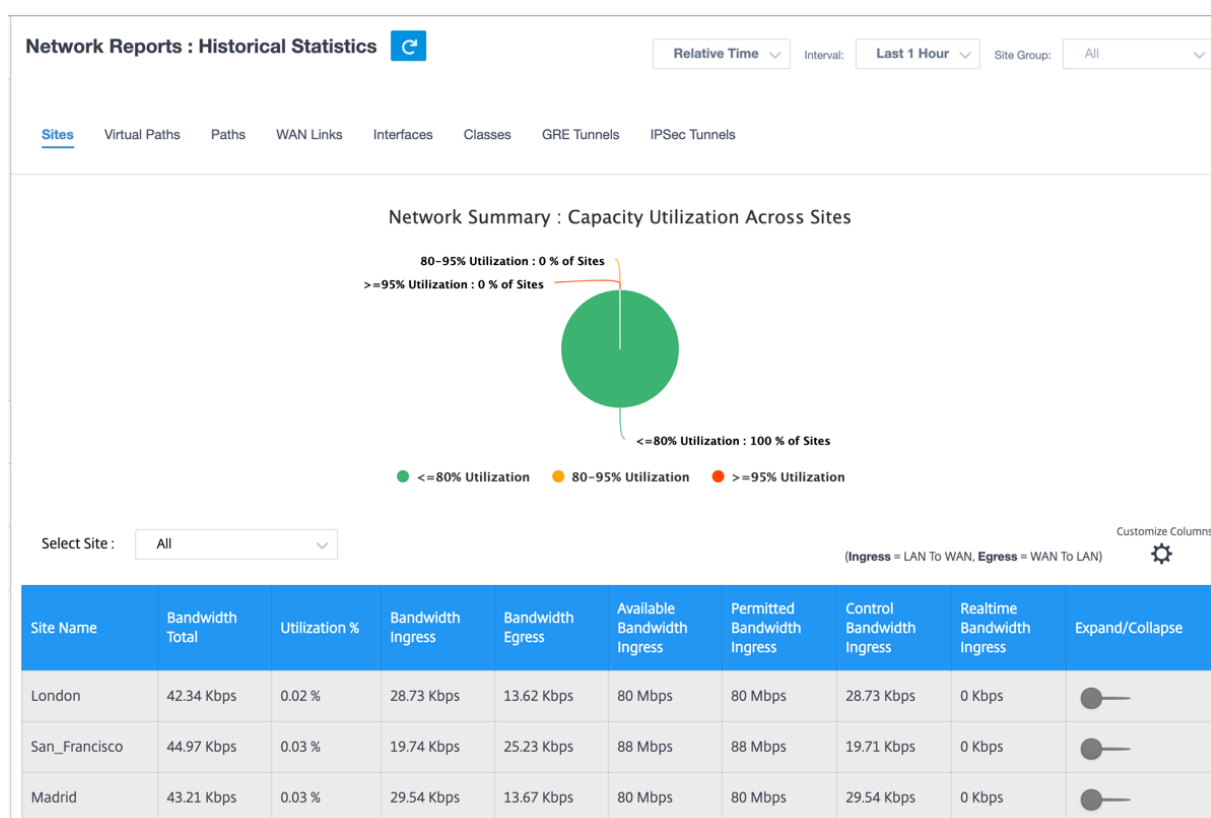
The statistics are collected as graphs. These graphs are plotted as timeline versus usage, allowing you to understand the usage trends of various network object properties. You can view graphs for network-wide application statistics.

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.

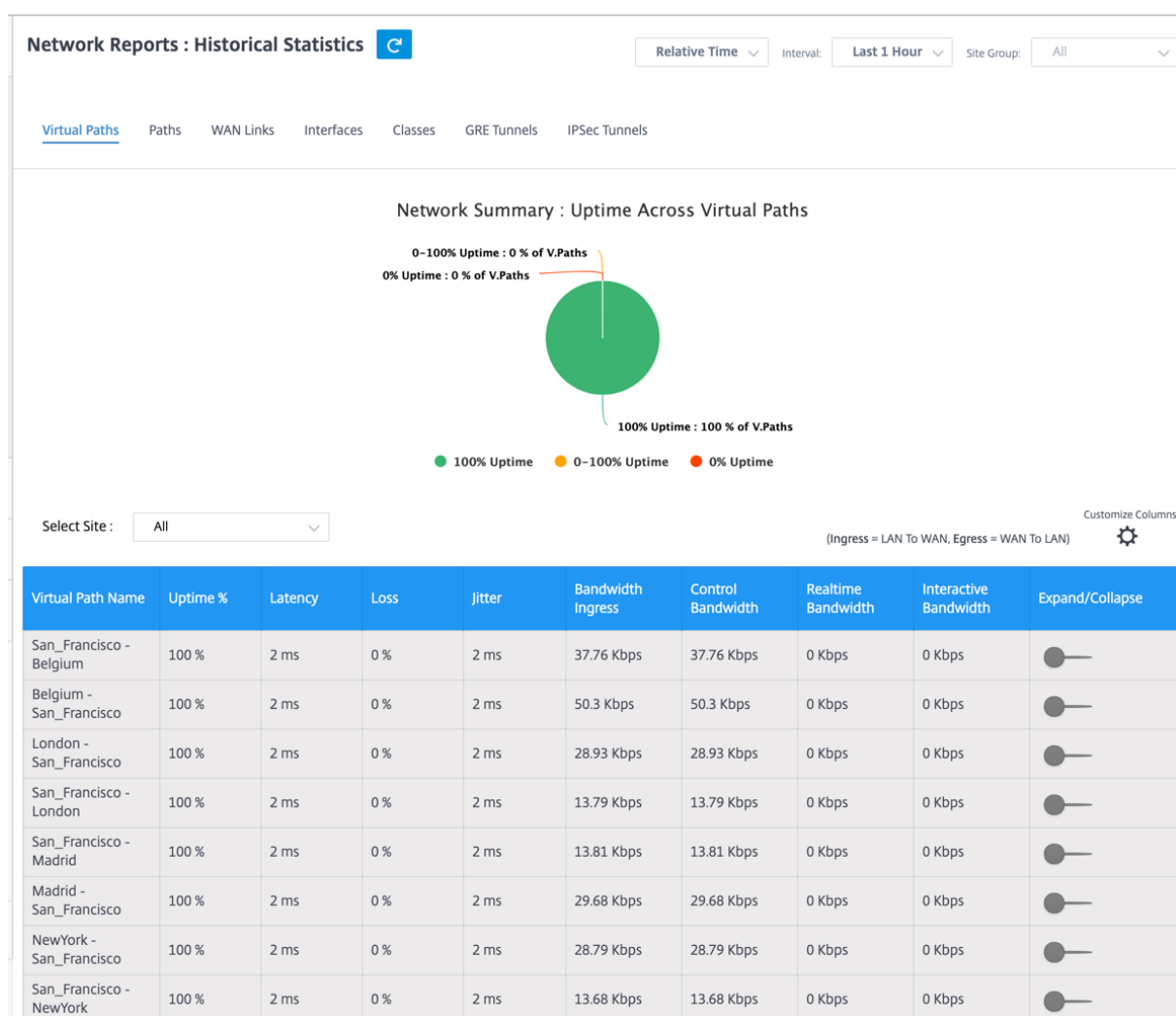


You can view the following metrics:

- **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 Ingress:** The max and the min download speed through the WAN port.
- **Bandwidth Egress:** The max and the min upload speed through the WAN port.
- **Available Bandwidth Ingress:** Total bandwidth allocated to all the WAN links of a site.
- **Permitted Bandwidth Ingress:** Bandwidth available for transmitting information.
- **Control Bandwidth Ingress:** Bandwidth used to transfer control packets that contain routing, scheduling, and link statistics information.
- **Realtime Bandwidth Ingress:** Bandwidth consumed by applications that belong to the real-time class type in the NetScaler 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.

Virtual paths

To view the **Virtual Paths** statistics, navigate to **Reports > Statistics > Virtual Paths** tab.



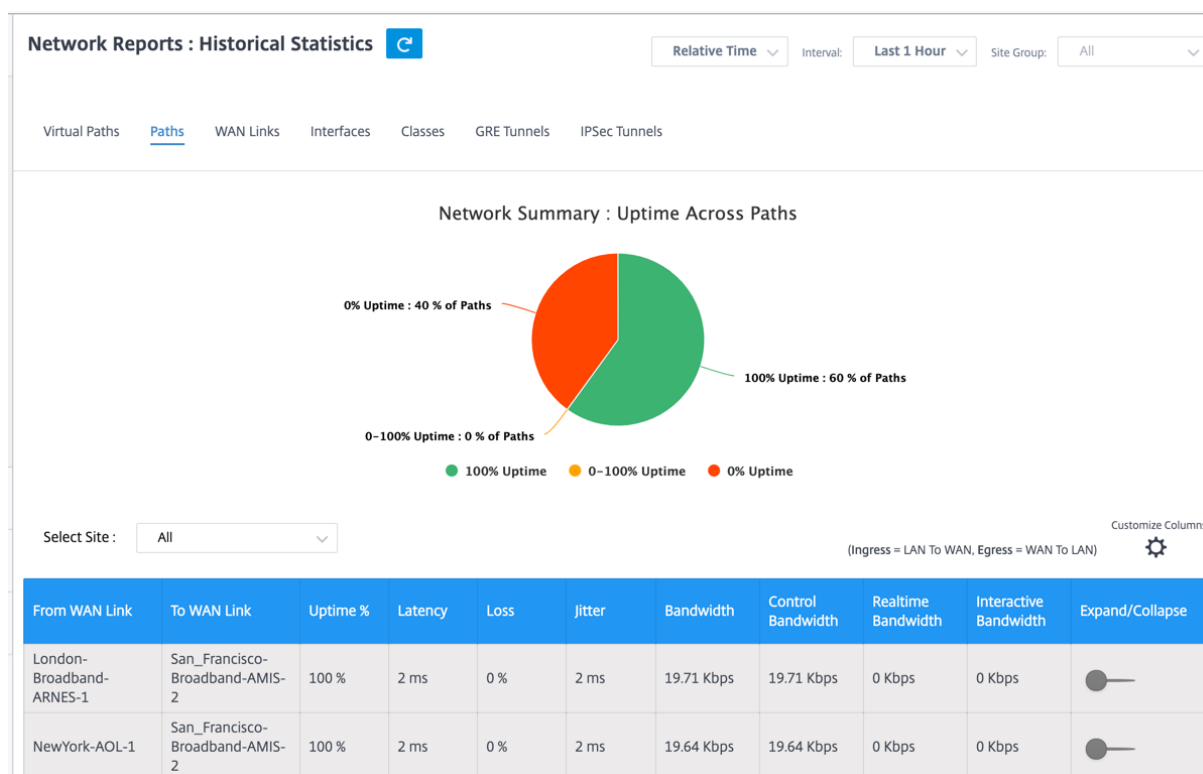
You can view the following metrics:

- **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 Ingress:** Ingress (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).
- **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.



You can view the following metrics:

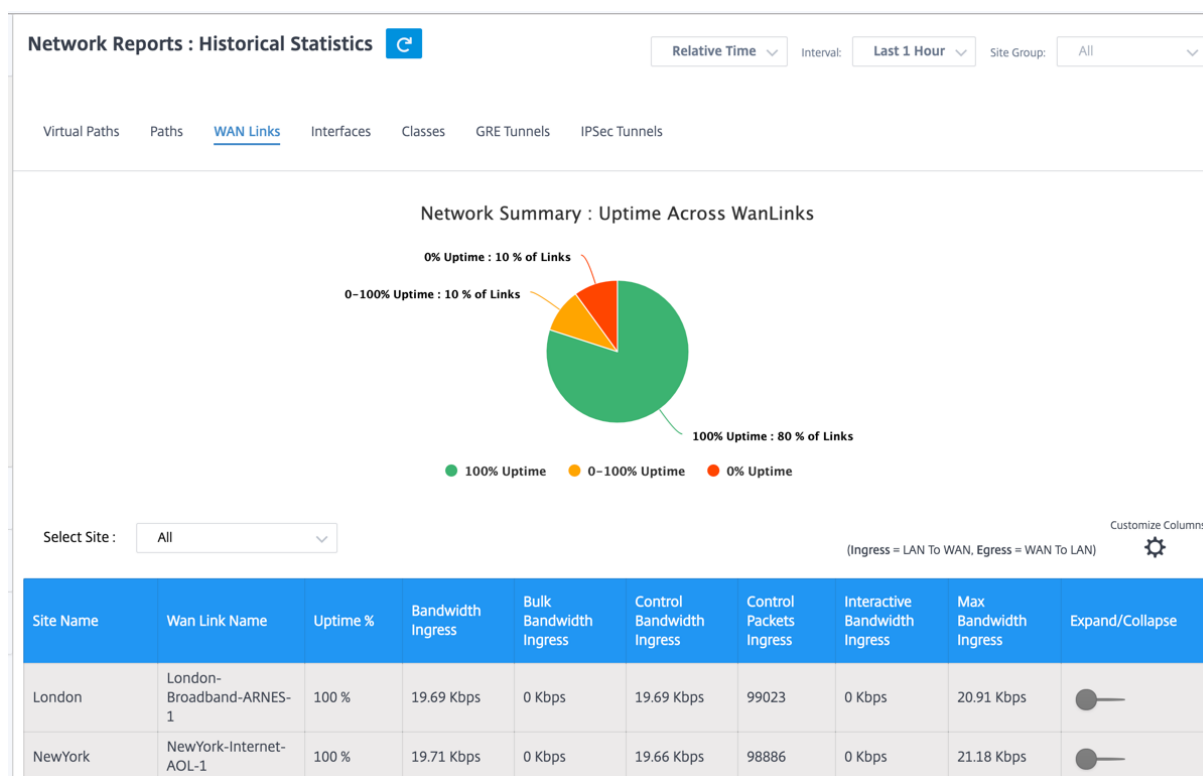
- **From WAN Link:** The source WAN link.
- **To WAN Link:** The destination WAN link.
- **Latency:** The latency in milliseconds for real time traffic.
- **Loss:** Percentage of packets lost.
- **Jitter:** Variation in the delay of received packets, in milliseconds.
- **Bandwidth:** Total bandwidth 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 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.



You can view the following metrics:

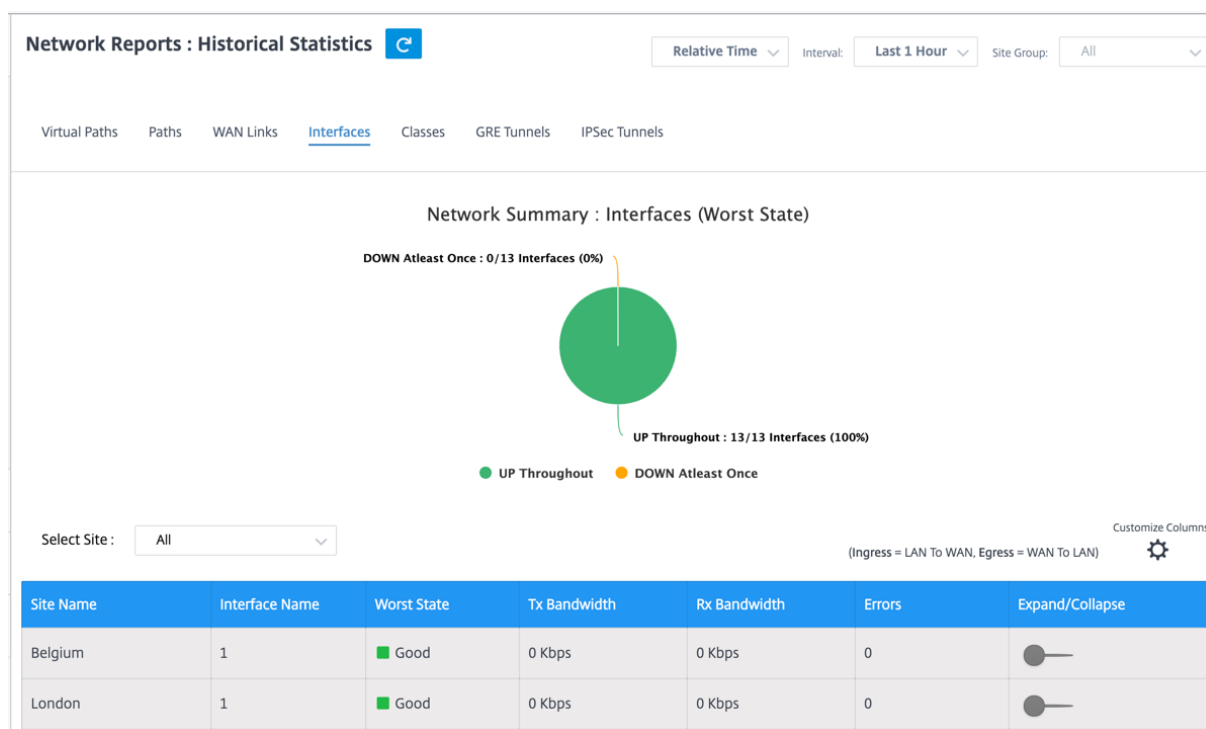
- **WAN Link Name:** The path name.
- **Bandwidth Ingress:** Ingress (LAN to WAN) Bandwidth usage for the selected time period.
- **Bulk Bandwidth Ingress:** Ingress (LAN to WAN) Virtual Path Bandwidth used by Bulk traffic for the selected time period.
- **Control Bandwidth Ingress:** Ingress (LAN to WAN) Virtual Path Bandwidth used by Control traffic for the selected time period.

- **Control Packet Ingress:** Ingress (LAN to WAN) Virtual Path Control packets for the selected time period.
- **Interactive Bandwidth Ingress:** Ingress (LAN to WAN) Virtual Path Bandwidth used by Interactive traffic for the selected time period.
- **Max Bandwidth Ingress:** Max Ingress (LAN to WAN) Bandwidth used in a minute for the selected time period.
- **Min Bandwidth Ingress:** Min Ingress (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.



You can view the following metrics:

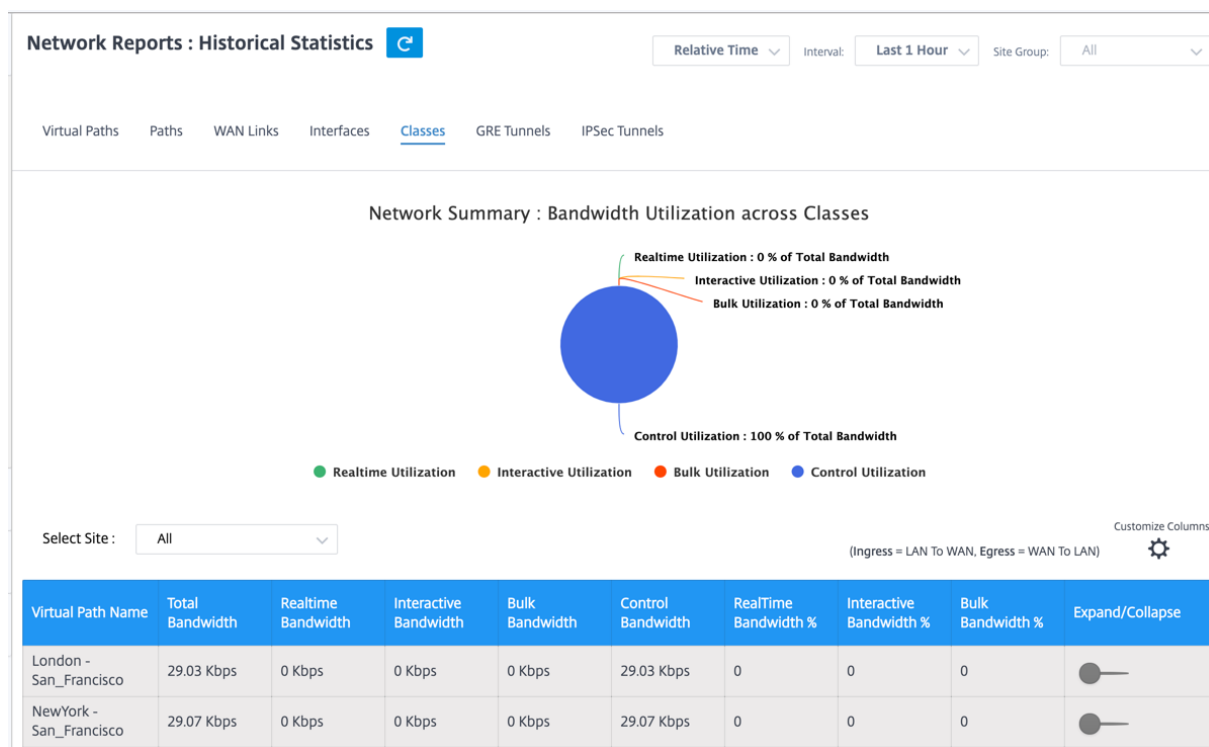
- **Interface Name:** The name of the Ethernet interface.
- **Tx Bandwidth:** Bandwidth transmitted.
- **Rx Bandwidth:** Bandwidth received.
- **Errors:** Number of errors observed during the selected time period.

- **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.



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.

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:

- **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

You can also get the following real time statistics information under **Troubleshooting > Statistics**:

- ARP
- Routes
- Ethernet
- Observed Protocols
- Application
- Rules

Network Reports : Real Time Statistics 

Site Group: All 

ARP Routes Virtual Path Services Classes Ethernet Observed Protocols Wan Path Application QOS Other Stats 

Belgium  Retrieve latest data Search 

Gateway ARP Timer: 1000
End User ARP Timer: 1000

Num	Interface	Routing Domain	VLAN	IP Address	MAC Address	State	Type
1	2		0	172.10.30.1	26:63:82:97:57:37	READY_ACTIVE	PERSISTENT
0	3		0	172.10.40.1	06:12:90:dd:91:5f	READY_ACTIVE	PERSISTENT

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.

Network Reports : Real Time Flows 

Site Group: All 

San Francisco  Retrieve latest data Search 

☒ Upload ☒ Download  Customize Columns

Info	No	Application	Source IP Addr	Dest IP Addr	Source Port	Dest Port	Proto IP	Packets	PPS	Class	Service Name	Age (ms)	Bytes
①	1	N/A	172.10.10.6	192.229.232.240	49976	80	TCP (6)	3	0.004	N/A	-	792120	156
①	2	N/A	172.10.10.6	192.229.232.240	49837	80	TCP (6)	3	0.001	N/A	-	4114023	156
①	3	N/A	172.10.10.6	192.229.232.240	49835	80	TCP (6)	3	0.001	N/A	-	4140148	156
①	4	N/A	172.10.10.6	192.229.232.240	49833	80	TCP (6)	3	0.001	N/A	-	4179835	156
①	5	N/A	172.10.10.6	192.229.232.240	49970	80	TCP (6)	3	0.002	N/A	-	1745589	156
①	6	N/A	172.10.10.6	192.229.232.240	49831	80	TCP (6)	3	0.001	N/A	-	4220070	156
①	7	N/A	172.10.10.6	192.229.232.240	49825	80	TCP (6)	3	0.001	N/A	-	4258507	156
①	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 connections

At the network level, select the site from the drop-down list before you can fetch the statistics. The **Firewall connections** provide the state of the connection 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.

Network Reports : Real Time Firewall Connections

Site Group: All

San Francisco

Retrieve latest data

Search

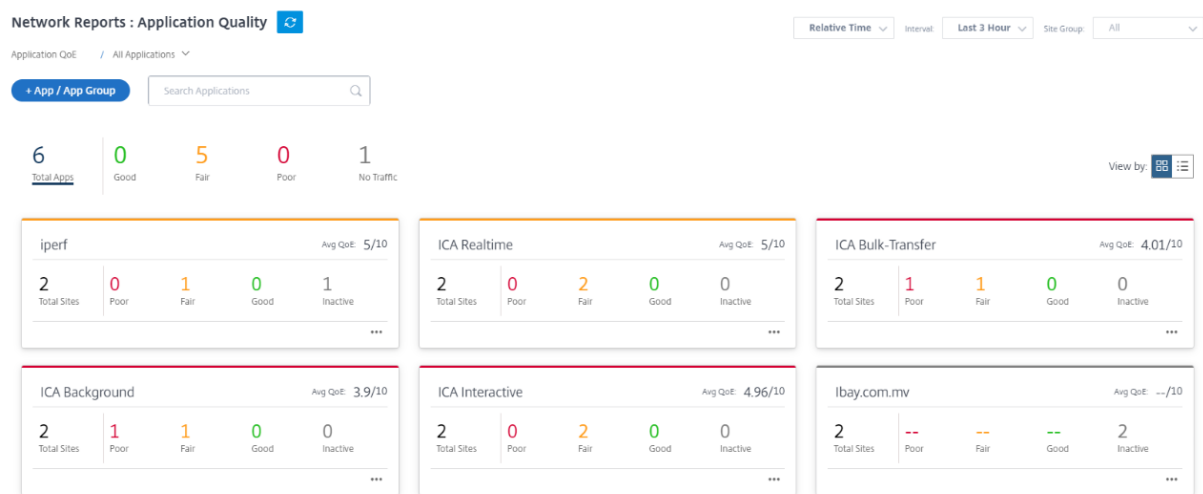
Connections Displayed: 5
Connections In Use: 5/128000

Application	Family	Routing Domain	IP Protocol	IP Addr	Port	Service Type	Service Name	Zone	IP #
Domain Name Se...	Network Service	Default_Routing...	UDP	172.10.10.6	49794	Local	VIF-Bridge-1-VL...	Default_LAN_Zone	10.1
Domain Name Se...	Network Service	Default_Routing...	UDP	172.10.10.6	56626	Local	VIF-Bridge-1-VL...	Default_LAN_Zone	10.1
Microsoft(micros...	Web	Default_Routing...	TCP	172.10.10.6	49775	Local	VIF-Bridge-1-VL...	Default_LAN_Zone	52.
Domain Name Se...	Network Service	Default_Routing...	UDP	172.10.10.6	61426	Local	VIF-Bridge-1-VL...	Default_LAN_Zone	10.1
Google Talk (incl...	Instant Messaging	Default_Routing...	TCP	172.10.10.6	49743	Local	VIF-Bridge-1-VL...	Default_LAN_Zone	74.1

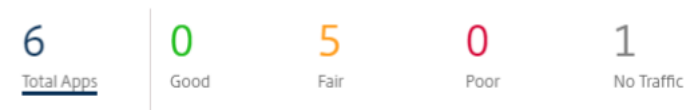
Application Quality

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.

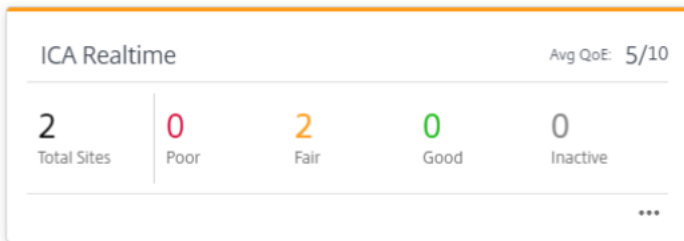
Quality	Range	Color Coding
Good	8–10	Green
Fair	4–8	Orange
Poor	0–4	Red



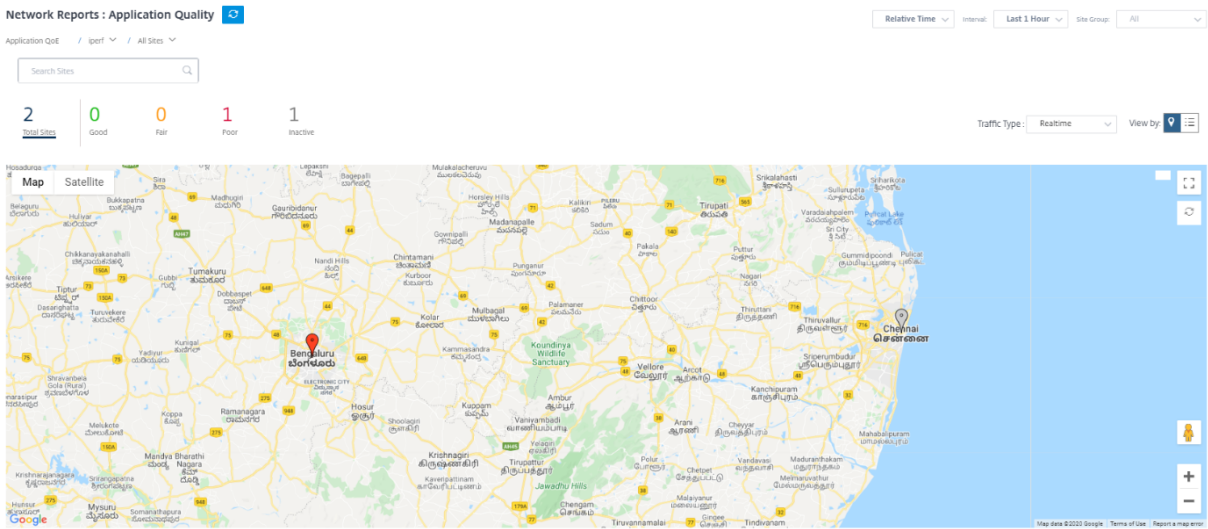
The top of the dashboard displays the overall number of applications and the number of applications that have good, fair, or poor Application QoE in the network. It also displays the number of applications that do not have any traffic.



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.

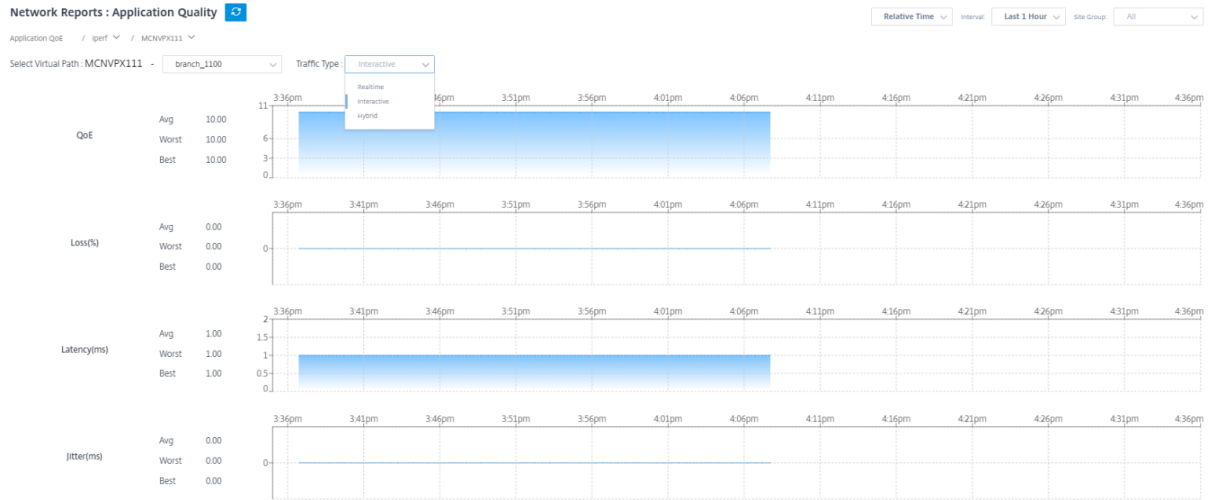


Click an individual application card to view the details on the number of sites that have good, fair, or poor application QoE for the selected application. A map view of all the sites that is running the selected application is displayed. Click a site in the map to further drill down and view the Application QoE statistics of the various virtual paths at the site.



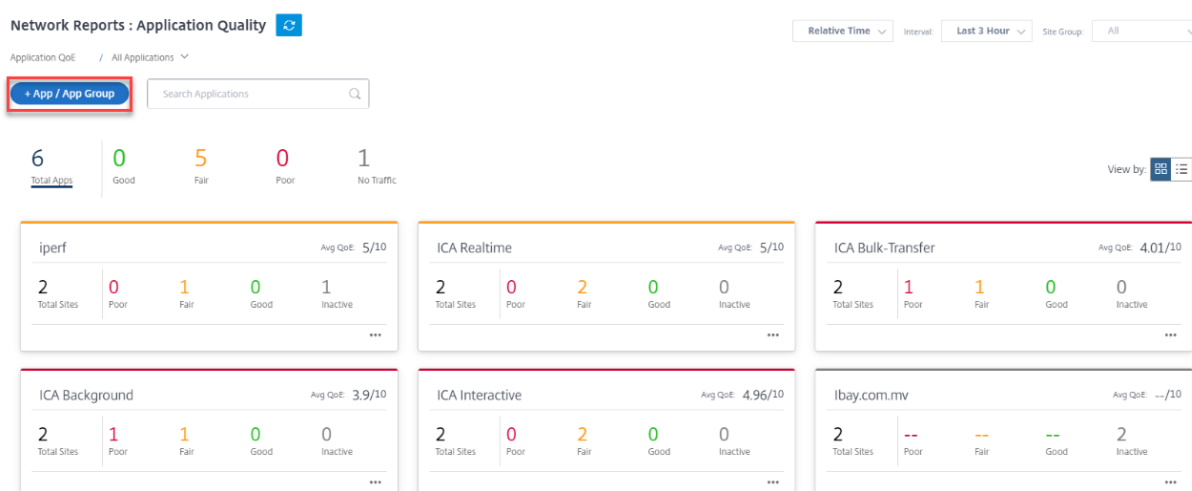
You can view the following metrics for Real-time, Interactive, and Hybrid traffic for the selected time-frame:

- **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.



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.

Add App/App Group

Type * Application Application

Application * Ibay.com.mv(ibay) Ibay.com.mv(ibay)

QoE Profile * new_qoe_profile + New QoE Profile

Cancel Ok

Click **+ New QoE Profile** to create a new 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 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%.

Add App/App Group

Type * Application Application * Ibay.com.mv(ibay) QoE Profile * DefaultQOEProfile [+ New QoE Profile](#)

Profile Configuration

Profile Name * Test-Profile Traffic Type * Hybrid

Realtime Configuration

One Way Latency (ms) * 190 Jitter (ms) * 30 Packet Loss (%) * 3

Interactive Configuration

Expected Burst Rate (%) * 60 Packet Loss per Flow (%) * 2

Cancel Done

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](#).

August 23, 2021

Site reports

The **Site Reports** provide visibility into site-level alerts, usage trends, quality, device information, and firewall statistics.

Alerts

The site administrator can review a detailed report of all the events and alerts generated at a site. It includes the severity, site at which the alert originated, alert message, time, and other details.

Site Report : Alerts				
 Delete Alerts		Search		216 TOTAL 10 HIGH 17 MEDIUM 189 LOW
☐	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 statistics report based on the **Report Type**, **Apps or Apps Categories**, and **Metrics**.

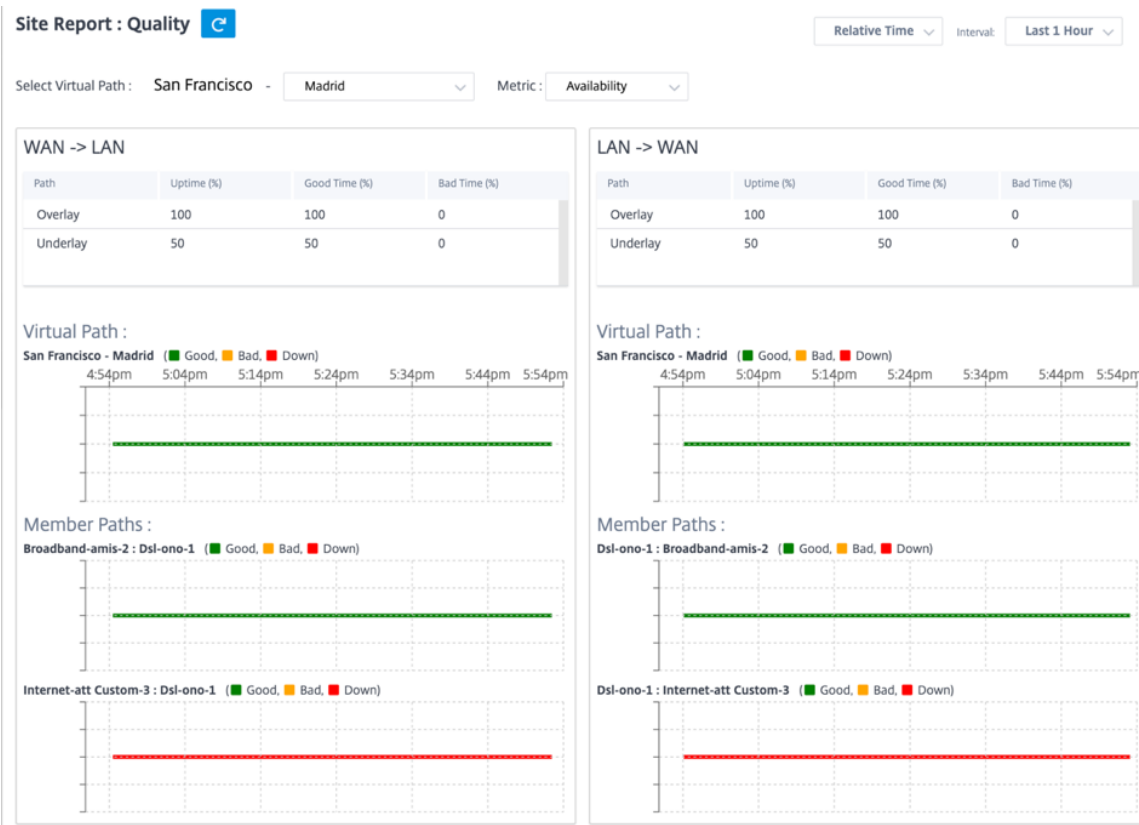


- **Report Type:** Select **Top App or App Categories** from the list.
- **Apps/App Categories:** Select top application or categories (such as network service) from the list.
- **Metric:** Select the bandwidth metric (such as Total Data, Incoming Data, Total Bandwidth) from the list.

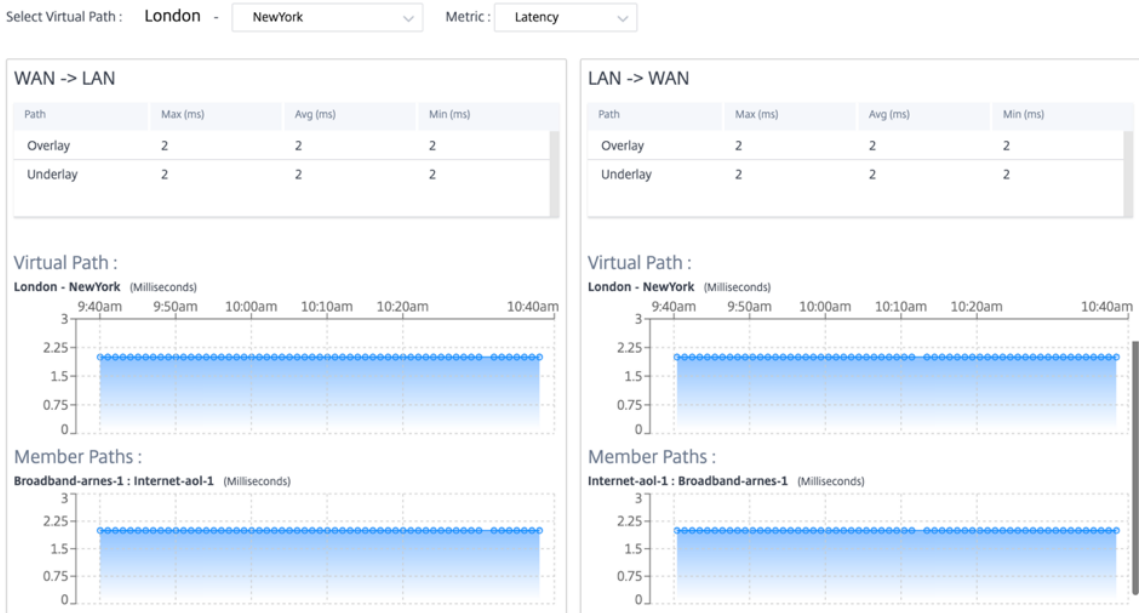
Quality

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.

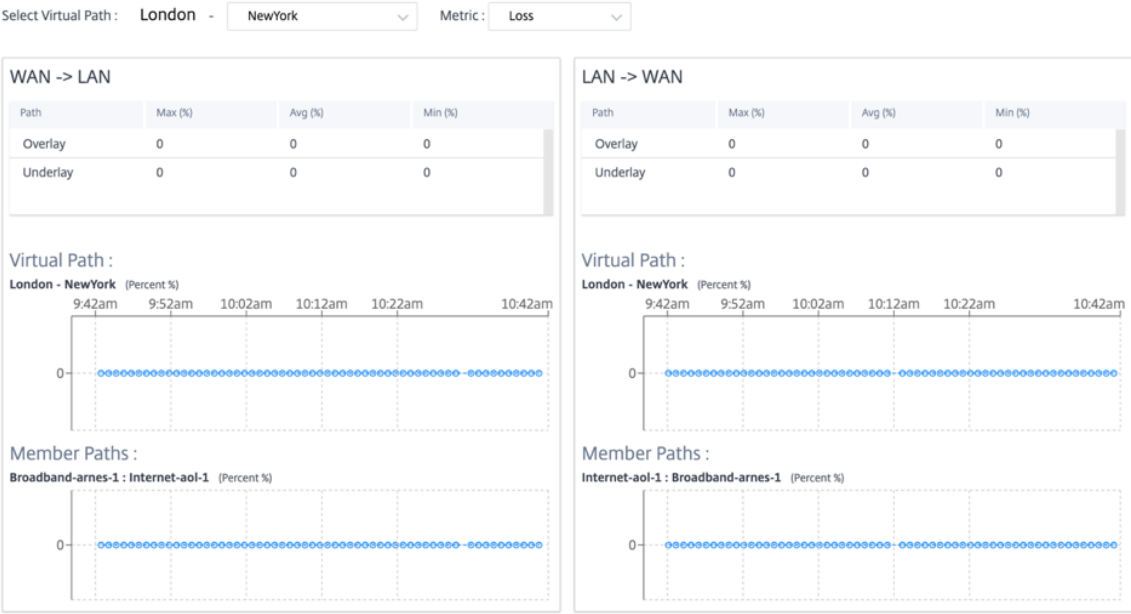
- **Availability**



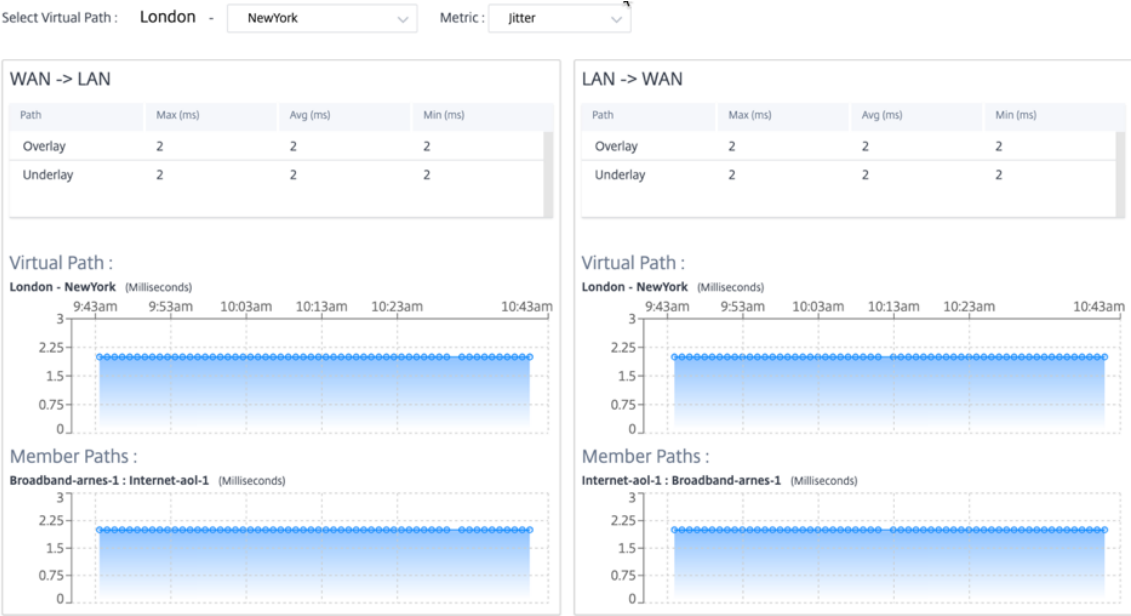
• Latency



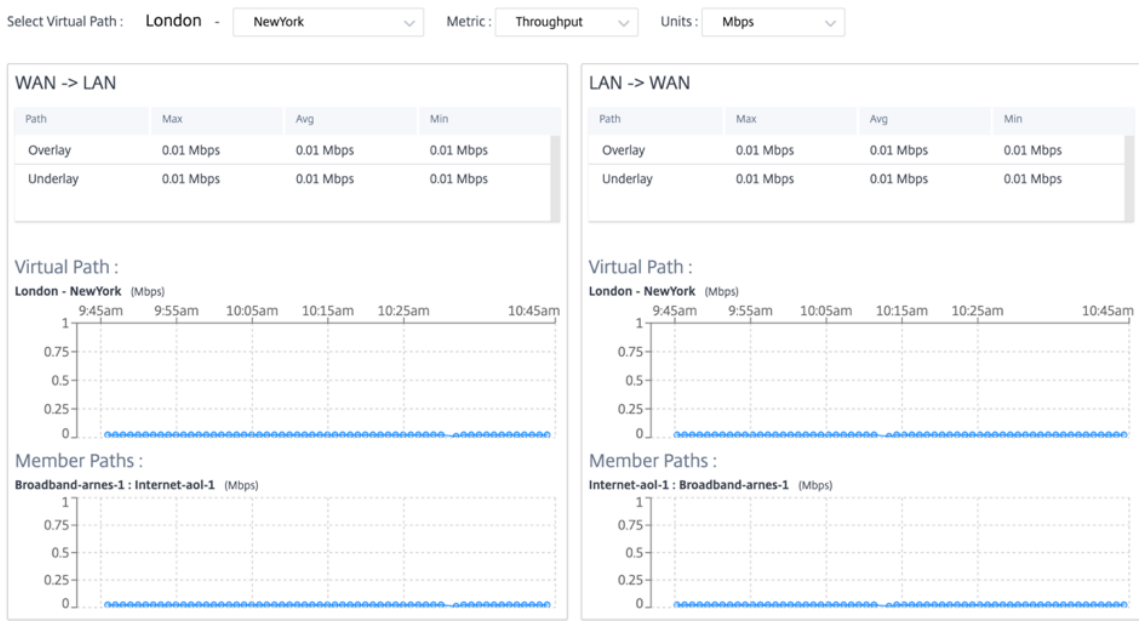
• Loss



• Jitter



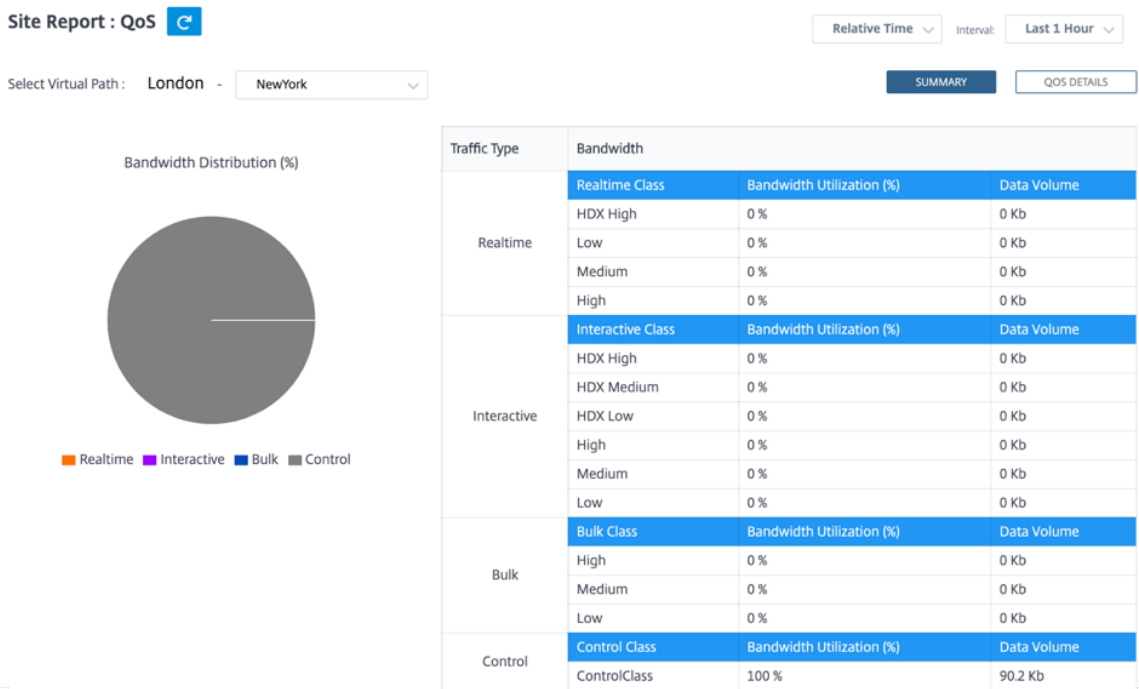
• Throughput



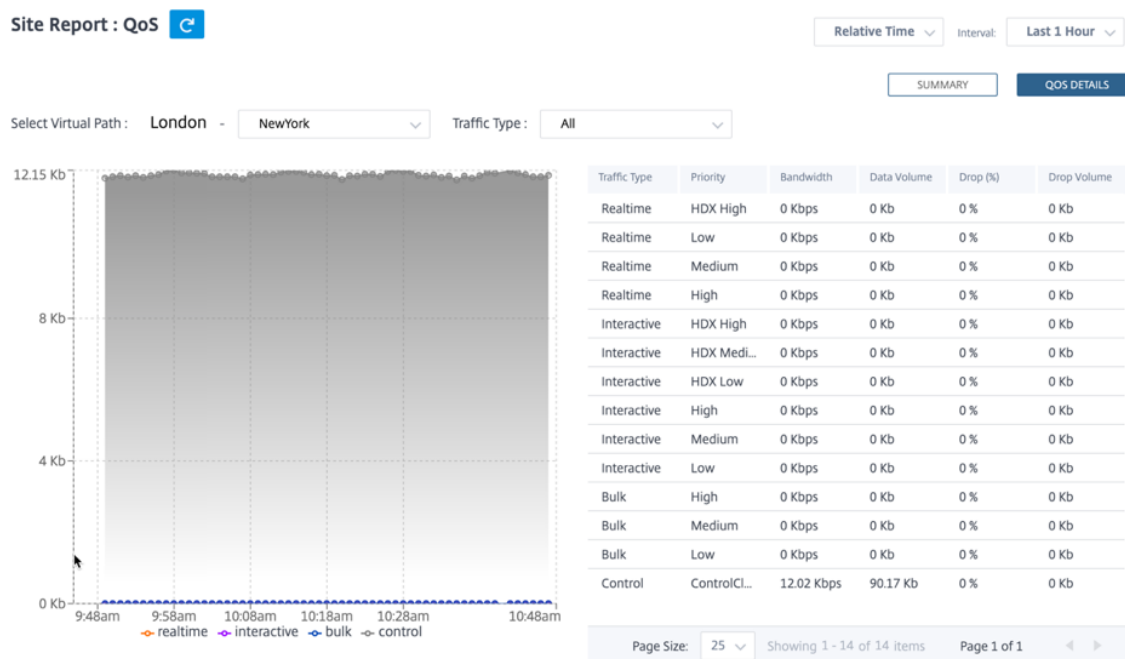
Quality of Service

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.



- **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.



Historical statistics

For each site, you can view the statistics as graphs for the following network parameters:

- Virtual Paths

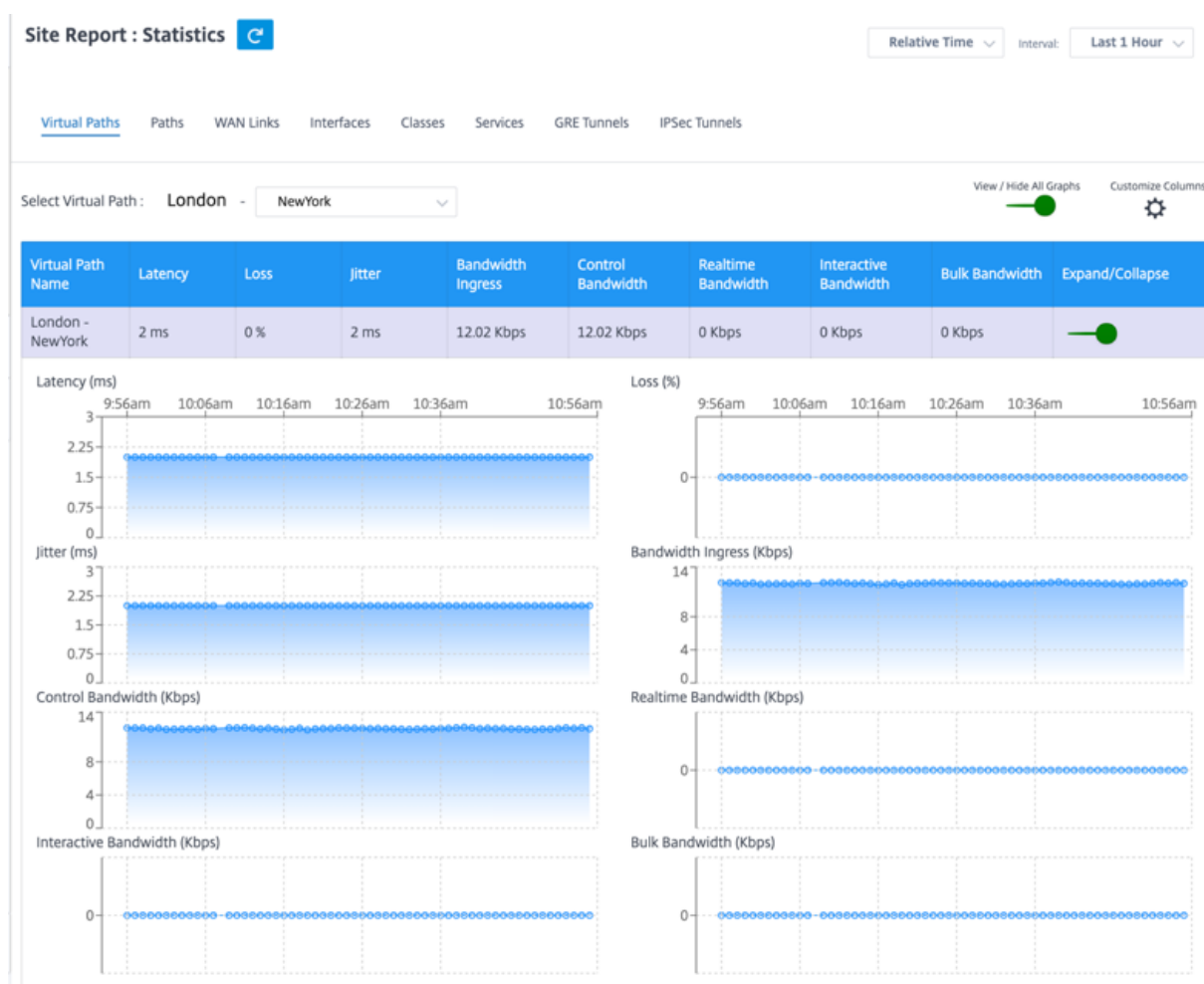
- Paths
- WAN Links
- Interfaces
- Classes
- Services
- GRE Tunnels
- IPsec Tunnels

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 > Statistics > Virtual Paths** tab.



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 Ingress: Ingress (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.
- **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.

Paths

To view the **Paths** statistics, navigate to **Reports > Statistics > Paths** tab.

Site Report : Statistics

Relative Time

Interval:

Last 1 Hour

Virtual Paths

Paths

WAN Links

Interfaces

Classes

Services

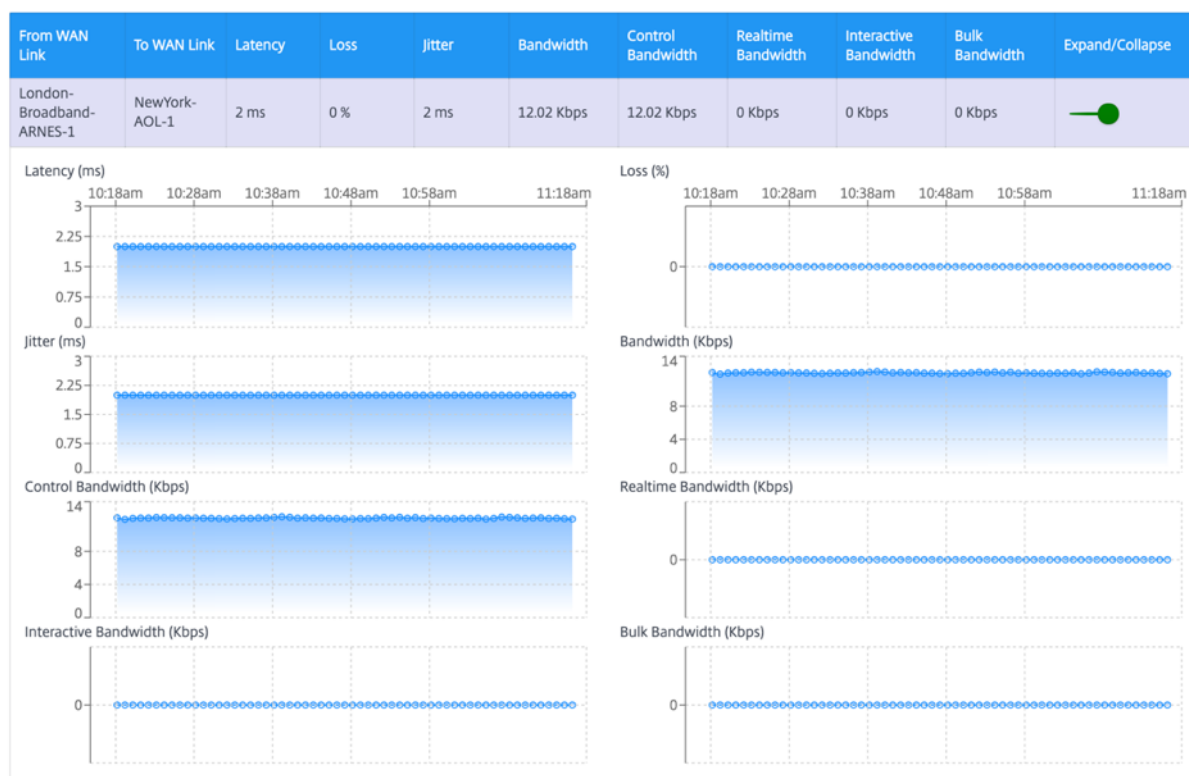
GRE Tunnels

IPSec Tunnels

Select Virtual Path : London - NewYork

View / Hide All Graphs

Customize Columns



You can view the following metrics:

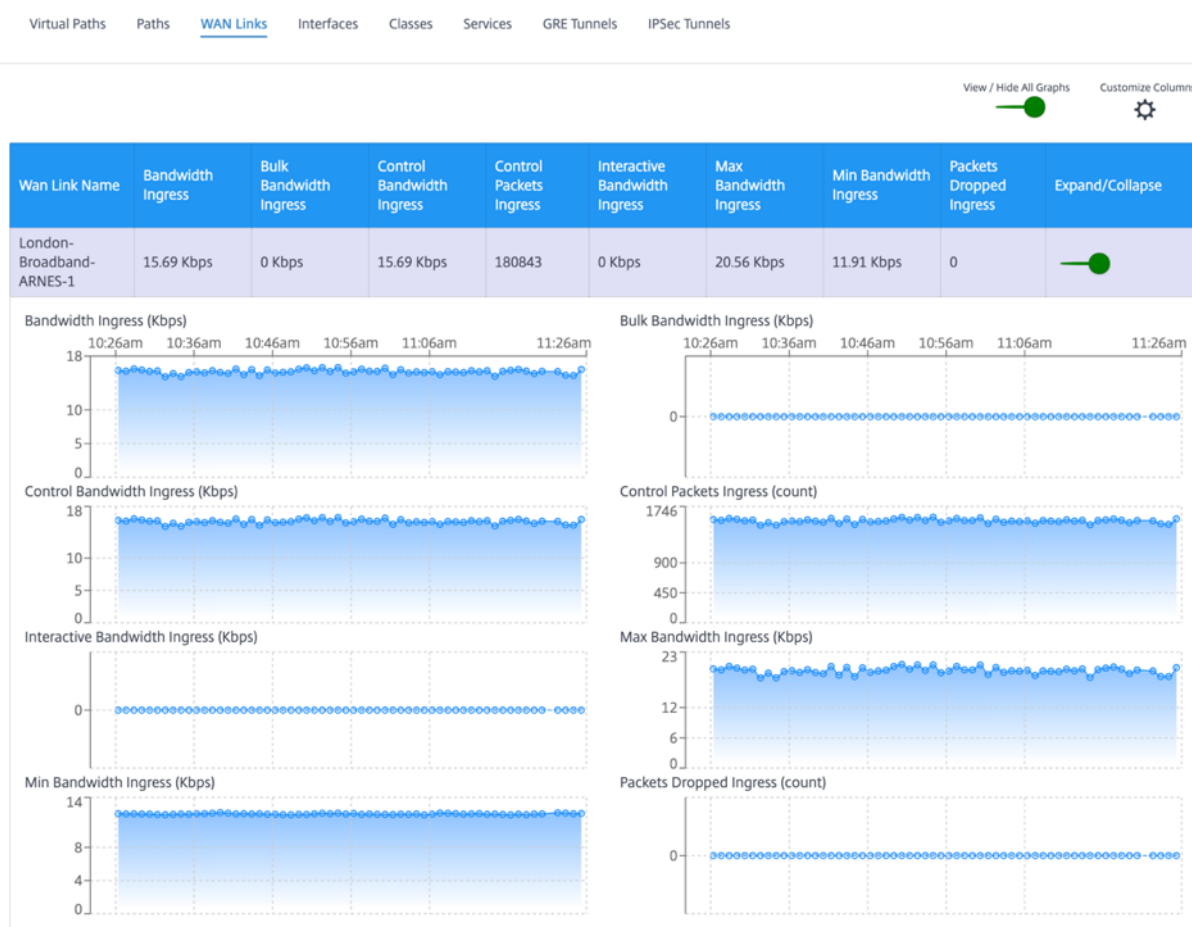
- **From WAN Link:** The source WAN link.
- **To WAN Link:** The destination WAN link.
- **Latency:** The latency in milliseconds for real time traffic.
- **Loss:** Percentage of packets lost.
- **Jitter:** Variation in the delay of received packets, in milliseconds.
- **Bandwidth:** Total bandwidth 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.



You can view the following metrics:

- **WAN Link Name:** The path name.
- **Bandwidth Ingress: Ingress (LAN > WAN) Bandwidth** usage for the selected time period.
- **Bulk Bandwidth Ingress: Ingress (LAN > WAN) virtual path bandwidth** used by Bulk traffic for the selected time period.
- **Control Bandwidth Ingress: Ingress (LAN > WAN) virtual path bandwidth** used by Control traffic for the selected time period.

- **Control Packet Ingress: Ingress (LAN > WAN) Virtual Path Control packets** for the selected time period.
- **Interactive Bandwidth Ingress: Ingress (LAN > WAN) virtual path bandwidth** used by Interactive traffic for the selected time period.
- **Max Bandwidth Ingress: Maximum ingress (LAN > WAN) bandwidth** used in a minute for the selected time period.
- **Min Bandwidth Ingress: Minimum ingress (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 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.

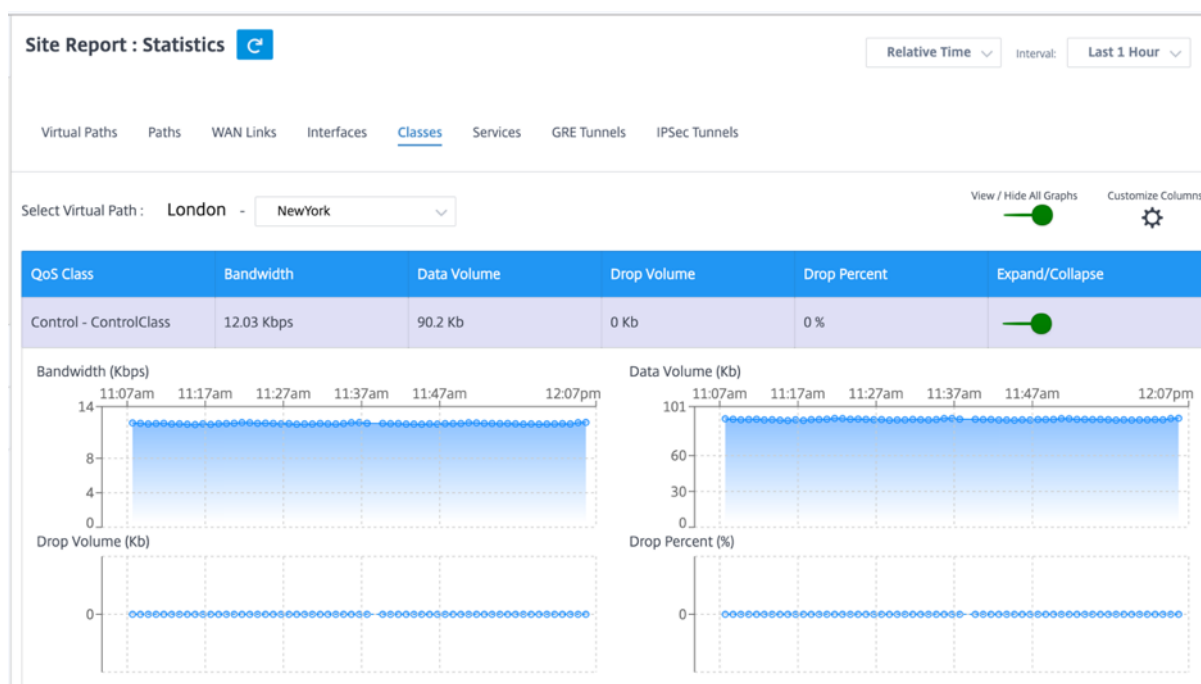
You can view the following metrics:

- **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.



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

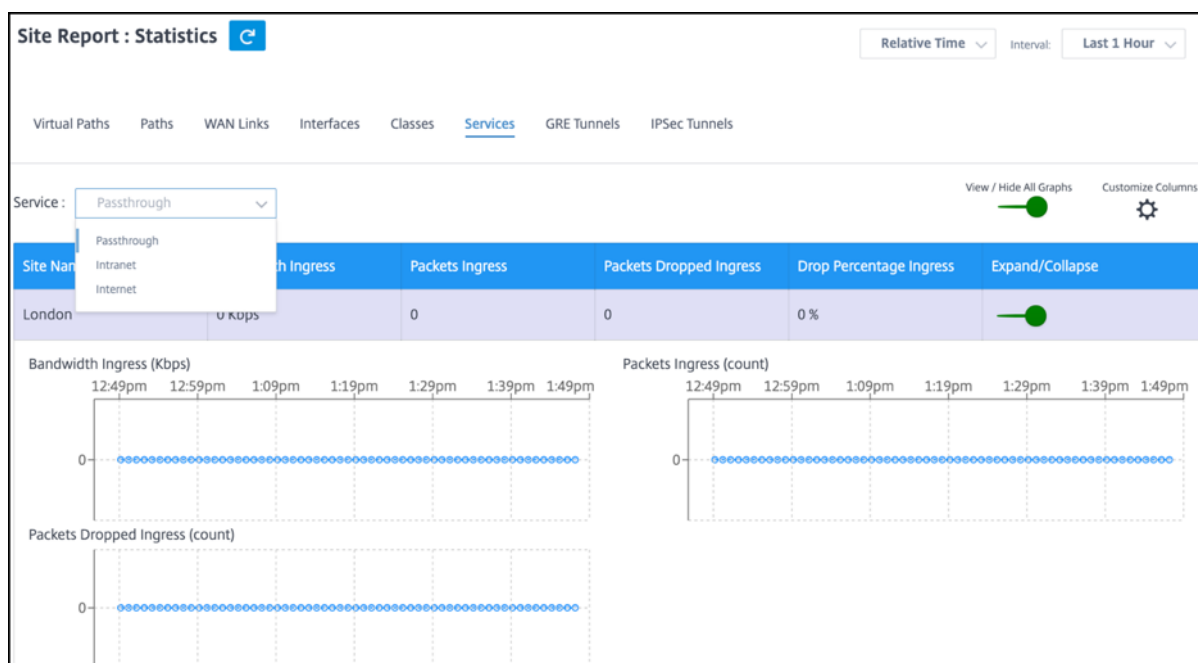
To view the **Services** statistics, navigate to **Reports > Statistics > Services** tab.

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 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 Ingress: Ingress (LAN > WAN) Bandwidth** usage for the selected time period.
- **Packet Ingress: (LAN > WAN) Packets** sent for the selected time interval.
- **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:

- **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

You can also get the following real time statistics information under **Troubleshooting > Statistics**:

- Address Resolution Protocol (ARP)
- Routes

- Virtual Path Services
- Classes
- Ethernet
- Observed Protocols
- WAN Path
- Application QoS
- Other Statistics (Rules, Rule Applications, Applications, Site, Multicast Group, IPsec Tunnel, GRE Tunnel, WAN Link Usage, Intranet, Access Interfaces, WAN Links, and MPLS Queues)

Site Report : Real Time Statistics

ARP Routes Virtual Path Services Classes Ethernet Observed Protocols Wan Path Application QoS Rules ▾

Retrieve latest data

No Rows To Show

Rules
Rule Applications
Applications
Site
Multicast Group
IPsec Tunnel

Search

Page 0 of 0

Address Resolution Protocol

To view ARP statistics, navigate to **Reports > Real Time > ARP** tab.

Click **Retrieve latest data** to get the current data.

Site Report : Real Time Statistics

ARP Routes Virtual Path Services Classes Ethernet Observed Protocols Wan Path Application QoS Other Stats ▾

Retrieve latest data

Gateway ARP Timer: 1000
End User ARP Timer: 1000

Num	Interface	Routing Domain	VLAN	IP Address	MAC Address	State	Type
3	3		0	172.10.20.1	86:db:1f:df:62:63	READY_ACTIVE	PERSISTENT
2	2		0	172.10.10.1	c6:23:ae:26:33:56	READY_ACTIVE	PERSISTENT
1	1		0	172.10.10.6	f6:9d:fc:db:18:76	READY_ACTIVE	END_USER
0	0		0	176.10.10.1	00:00:00:00:00:00	REPLY_PENDING	PERSISTENT

1 to 4 of 4 Page 1 of 1

Routes

To view Route statistics, navigate to **Reports > Real Time > Routes** tab.

Site Report : Real Time Statistics

ARP

Routes

Virtual Path Services

Classes

Ethernet

Observed Protocols

Wan Path

Application QOS

Other Stats

Retrieve latest data

Search

routes_Default_RoutingDomain

Num	Network Address	Gateway IP Address	Service	Firewall Zone	Reachable	Site IP Address	Site	Type
0	172.10.10.0/24	*	Local	Default_LAN_Zone	YES	*	San_Francisco	Static
1	172.10.20.0/24	*	Local	Default_LAN_Zone	YES	*	San_Francisco	Static
2	176.10.10.0/24	*	Local	Default_LAN_Zone	YES	*	San_Francisco	Static
3	172.10.30.0/24	*	San_Francisco-Belgi...	Default_LAN_Zone	YES	*	Belgium	Dynamic
4	172.10.40.0/24	*	San_Francisco-Belgi...	Default_LAN_Zone	YES	*	Belgium	Dynamic
5	192.168.40.0/24	*	San_Francisco-New...	Default_LAN_Zone	YES	*	NewYork	Dynamic
6	192.168.80.0/24	*	San_Francisco-Lond...	Default_LAN_Zone	YES	*	London	Dynamic
7	192.168.90.0/24	*	San_Francisco-Madrid	Default_LAN_Zone	YES	*	Madrid	Dynamic
8	0.0.0.0/0	*	Internet	Internet_Zone	YES	*	San_Francisco	Static
9	0.0.0.0/0	*	San_Francisco-Belgi...	Internet_Zone	YES	*	Belgium	Dynamic
10	0.0.0.0/0	*	San_Francisco-Lond...	Internet_Zone	YES	*	London	Dynamic
11	0.0.0.0/0	*	Passthrough	Any	YES	*	*	Static
12	0.0.0.0/0	*	Discard	Any	YES	*	*	Static

Virtual Path Services

To view virtual path service statistics, navigate to **Reports > Real Time > Virtual Path Services** tab.

Site Report : Real Time Statistics

ARP

Routes

Virtual Path Services

Classes

Ethernet

Observed Protocols

Wan Path

Application QOS

Other Stats

Retrieve latest data

Search

From Site	To Site	State	MTU	Latency BOWT (mS)	Worst Jitter (mS)	Best Jitter (mS)	Receive Rate (
San_Francisco	Belgium	GOOD	1492	2	2	2	26.70
Belgium	San_Francisco	GOOD	N/A	2	2	2	29.02
San_Francisco	London	GOOD	1492	2	2	2	8.73
London	San_Francisco	GOOD	N/A	2	2	2	12.76
San_Francisco	Madrid	GOOD	1492	2	2	2	8.72
Madrid	San_Francisco	GOOD	N/A	2	2	2	13.29
San_Francisco	NewYork	GOOD	1492	2	2	2	8.74
NewYork	San_Francisco	GOOD	N/A	2	2	2	12.75

Classes

To view Class statistics, navigate to **Reports > Real Time > Classes** tab.

Site Report : Real Time Statistics

ARP Routes Virtual Path Services **Classes** Ethernet Observed Protocols Wan Path Application QOS Other Stats ▾

Retrieve latest data

Search 

Virtual Path Service : San_Francisco-Madrid

Class	Name	Type	Wait (mS)	Pending kB	Pending Pkts	Sent kB	Sent Pkts	Dropped kB	Dropped Pkt
0	HDX_priority_tag_0	realtime	0	0	0	0	0	0	0
1	HDX_priority_tag_1	interact	0	0	0	0	0	0	0
2	HDX_priority_tag_2	interact	0	0	0	0	0	0	0
3	HDX_priority_tag_3	interact	0	0	0	0	0	0	0
4	class_4	bulk	0	0	0	0	0	0	0
5	class_5	bulk	0	0	0	0	0	0	0
6	class_6	bulk	0	0	0	0	0	0	0
7	class_7	bulk	0	0	0	0	0	0	0
8	RealTime_Low	realtime	0	0	0	0	0	0	0

Ethernet

To view Ethernet statistics, navigate to **Reports > Real Time > Ethernet** tab.

Site Report : Real Time Statistics

ARP Routes Virtual Path Services Classes **Ethernet** Observed Protocols Wan Path Application QOS Other Stats ▾

Retrieve latest data

Search 

Port	Link State	Frames Sent	Bytes Sent	Frames Received	Bytes Received	Errors
1	UP	257217	369288045	146919	10111132	0
2	UP	903360	75647738	1110000	457690503	0
3	UP	811072	71615021	821492	73408789	0
4	UP	5712	365568	48	3688	0

Observed Protocols

To view observed protocol statistics, navigate to **Reports > Real Time > Observed Protocols** tab.

Site Report : Real Time Statistics

ARP Routes Virtual Path Services Classes Ethernet **Observed Protocols** Wan Path Application QoS Other Stats ▾

Retrieve latest data

Search 🔍

Rule Group	Rule	Protocol	Port	Service Type	Service Instance	LAN to WAN		
						Packets	Bytes	Kb/s
http/www/www-http	585	TCP	80	INTERNET	-	119265	5346866	5.6
https	585	TCP	443	INTERNET	-	17761	1396640	1.4
UNCOMMON	585	TCP	-	INTERNET	-	3	156	0.0
domain	585	UDP	53	INTERNET	-	263	19173	0.0
ntp	585	UDP	123	INTERNET	-	1	76	0.0
https	585	UDP	443	INTERNET	-	48	55856	0.0

WAN Path

To view WAN path statistics, navigate to **Reports > Real Time > WAN Path** tab.

Site Report : Real Time Statistics

ARP Routes Virtual Path Services Classes Ethernet Observed Protocols **Wan Path** Application QoS Other Stats ▾

Retrieve latest data

Search 🔍

Num	From Link	To Link	Congestion	Path State	Reason	Duration (S)	Virtual Path Service State	Source
1	San_Francisco-Broa...	Belgium-Internet-Ve...	NO	GOOD	N/A	8494	GOOD	4980
2	San_Francisco-Inter...	Belgium-Internet-Ve...	UNKNOWN	DEAD	GATEWAY	11724	GOOD	4980
3	San_Francisco-MPL...	Belgium-MPLS-ATT-...	NO	GOOD	N/A	8494	GOOD	4980
4	San_Francisco-MPL...	Belgium-MPLS-ATT-...	NO	GOOD	N/A	8494	GOOD	4980
5	Belgium-Internet-Ve...	San_Francisco-Broa...	NO	GOOD	N/A	8494	GOOD	4980
6	Belgium-Internet-Ve...	San_Francisco-Inter...	UNKNOWN	DEAD	SILENCE	11724	GOOD	4980
7	Belgium-MPLS-ATT-...	San_Francisco-MPL...	NO	GOOD	N/A	8494	GOOD	4980
8	Belgium-MPLS-ATT-...	San_Francisco-MPL...	NO	GOOD	N/A	8494	GOOD	4980
9	San_Francisco-Broa...	London-Broadband-...	NO	GOOD	N/A	7702	GOOD	4980
10	San_Francisco-Inter...	London-Broadband-...	UNKNOWN	DEAD	GATEWAY	11724	GOOD	4980
11	London-Broadband-...	San_Francisco-Broa...	NO	GOOD	N/A	7703	GOOD	4980
12	London-Broadband-...	San_Francisco-Inter...	UNKNOWN	DEAD	SILENCE	11724	GOOD	4980

Application QoS

To view application QoS statistics, navigate to **Reports > Real Time > Application QoS** tab.

Site Report : Real Time Statistics

ARP Routes Virtual Path Services Classes Ethernet Observed Protocols Wan Path **Application QOS** Other Stats ▾

Retrieve latest data

Search 

Num	Site	Service	Routing Domain	IP Address		Port		Application Object	Application	Ap
				Src	Dst	Src	Dst			
0	San_Francisco	San_Francisco-Belgi...	*	*	*	*	*	ica_priority_0	*	0
1	San_Francisco	San_Francisco-Belgi...	*	*	*	*	*	ica_priority_1	*	0
2	San_Francisco	San_Francisco-Belgi...	*	*	*	*	*	ica_priority_2	*	0
3	San_Francisco	San_Francisco-Belgi...	*	*	*	*	*	ica_priority_3	*	0
4	San_Francisco	San_Francisco-Belgi...	*	*	*	*	*	ica	*	0

You can select other statistics as needed from the drop-down list and view the statistics.

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 SD-WAN Orchestrator.

You can view the direction, no of packets, delta packets, and mismatched DSCP packets for Intranet and Virtual path services.

Site Reports:Real Time Statistics

ARP Routes Virtual Path Services Classes Ethernet Observed Protocols Wan Path Application QOS **MPLS Queues** ▾

Retrieve latest data

Search 

Intranet Data Rates

Name	Direction	Intranet Packets	Intranet Kbps	Delta Intranet Packets	Delta Intranet kB	Mismatched DSCP Packets	Mismatched DSCP kB
branchv6queue	Recv	0	0.00	0	0.00	0	0.00
branchv6queue	Send	0	0.00	0	0.00	0	0.00

1 to 2 of 2 < < Page 1 of 1 > >

Virtual Path Service Data Rates

Name	Direction	Virtual Path Service Packets	Virtual Path Service Kbps	Delta Virtual Path Service Packets	Delta Virtual Path Service kB	Mismatched DSCP Packets	Mismatched DSCP kB	IP, TCP, UDP, Compress
branchv6queue	Recv	8670933	14.44	8670933	742073.60	0	0.00	0
branchv6queue	Send	8671465	14.39	8671465	739441.35	N/A	N/A	0

1 to 2 of 2 < < Page 1 of 1 > >

Private MPLS Queues

Private MPLS	MPLS Queue	Access Interface	IP Address	Proxy Address	Proxy ARP State	MAC	Last ARP Reply Age(ms)
BRANCH_1-WL-2	branchv6queue	BRANCH_1-WL-2-AI-1	b:3	N/A	N/A	N/A	
MCN_DC-WL-2	ipv6queue	N/A	0.0.0.0	N/A	N/A	N/A	

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](#).

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.

Site Report : Real Time Flows

Retrieve latest data

Search

☒ Upload ☒ Download

Customize Columns

Info	No	Application	Source IP Addr	Dest IP Addr	Source Port	Dest Port	Proto IP	Packets	PPS	Class	Service Name	Age (mS)	Bytes
①	1	N/A	172.10.10.6	192.229.232.240	49976	80	TCP (6)	3	0.000	N/A	-	3702175	156
①	2	N/A	172.10.10.6	192.229.232.240	49837	80	TCP (6)	3	0.000	N/A	-	7024077	156
①	3	N/A	172.10.10.6	192.229.232.240	49835	80	TCP (6)	3	0.000	N/A	-	7050202	156
①	4	N/A	172.10.10.6	192.229.232.240	49833	80	TCP (6)	3	0.000	N/A	-	7089890	156
①	5	N/A	172.10.10.6	192.229.232.240	49970	80	TCP (6)	3	0.000	N/A	-	4655644	156
①	6	N/A	172.10.10.6	192.229.232.240	49831	80	TCP (6)	3	0.000	N/A	-	7130125	156
①	7	N/A	172.10.10.6	192.229.232.240	49825	80	TCP (6)	3	0.000	N/A	-	7168561	156
①	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

Firewall connections

The **Firewall connections** provide the state of the connection 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.

Site Report : Real Time Firewall Connections

Retrieve latest data

Search

Connections Displayed: 2

Connections In Use: 2/128000

Source									
Application	Family	Routing Domain	IP Protocol	IP Addr	Port	Service Type	Service Name	Zone	IP A
Microsoft(micros...	Web	Default_Routing...	TCP	172.10.10.6	49775	Local	VIF-Bridge-1-VL...	Default_LAN_Zone	52.
Google Talk (incl...	Instant Messaging	Default_Routing...	TCP	172.10.10.6	49743	Local	VIF-Bridge-1-VL...	Default_LAN_Zone	74.

Routing Protocols

The Routing Protocols report provides the details of the parameters associated with the routing protocols. Choose a protocol from the **View** drop-down list and a routing domain from the **Routing Domain** drop-down list. Click **Retrieve Latest Data** to view the current data.

You can view the parameter details associated with the following:

- BGP State
- OSPF State
- OSPF Topology
- OSPF Interface
- OSPF LSADB
- OSPF Neighbors
- Route Table

Site Reports: Real Time Routing Protocols 

Relative Time ▼ Interval: Last 1 Hour ▼

Dynamic Routing Protocol

View:

Routing Domain:

BGP State ▼

Default_RoutingDomain ▼

Retrieve Latest Data

BGP State

name	proto	table	state	since	info
bgp1_rdomain_0	BGP	T0	start	2021-03-19 15:23:28	Connect
Preference: 100					
Input filter: neighbour_0_in					
Output filter: neighbour_0_out					
Routes: 0 imported, 0 exported, 0 preferred					
Route change stats: received rejected filtered ignored accepted					
Import updates: 0 0 0 0 0					
Import withdraws: 0 0 --- 0 0					
Export updates: 0 0 0 --- 0					
Export withdraws: 0 --- --- --- 0					
BGP state: Connect					
Neighbor address: 172.58.1.28					
Neighbor AS: 10					
NetScaler SD-WAN Interface: vni-0					

IGMP

When the multicast receivers initiate a join group request, you can see the receiver details under **Reports > Real Time > IGMP > IGMP 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 packets received and the filter type RECV is used to include IGMP receive packets.

Site Reports: Real Time IGMP

Relative Time Interval: Last 1 Hour

IGMP PROXY Groups IGMP Stats

RefreshPurge IGMP GroupPurge IGMP Stats

Type: RECV Click here to search or you can enter Key : Value format

☐	TYPE	DESCRIPTION	VALUE	
>	☐ RECV	Receive IGMP packets	613	
>	☐ RECV	Receive V2 Leave	307	
>	☐ RECV	Receive V3 General Query Upstream	306	

To view the details of IGMP proxy groups, navigate to **Reports > Real Time > IGMP > IGMP Proxy Groups**. Click **Refresh** to get the current data.

Site Reports: Real Time IGMP

Relative Time Interval: Last 1 Hour

IGMP PROXY Groups IGMP Stats

RefreshPurge IGMP GroupPurge IGMP Stats

Click here to search or you can enter Key : Value format

☐	TYPE	NAME	GROUP	FILTER	VERSION	PACKETS SENT	BYTES SENT
>	☐ HOST	VIF-1-LAN-1	232.1.1.1	EXCLUDE		1234416	1849155168

Select **Purge IGMP Stats** to purge IGMP statistical data from the IGMP stats table.

Select **Purge IGMP Group** to purge IGMP group data from the IGMP groups table.

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.

Site Reports: Real Time VRRP

Relative Time Interval: Last 1 Hour

Retrieve Latest DataEnableDisable

Click here to search or you can enter Key : Value format

☐	VRRP ID	VERSION	INTERFACE(S)	STATE	PRIORITY	VIRTUAL ROUTER IP	ADVERTISEMENT IN...	
☐	10	2	VIF-3-LAN-1	Master	100	172.16.16.200	1000	

Showing 1-1 of 1 itemsPage 1 of 110 rows

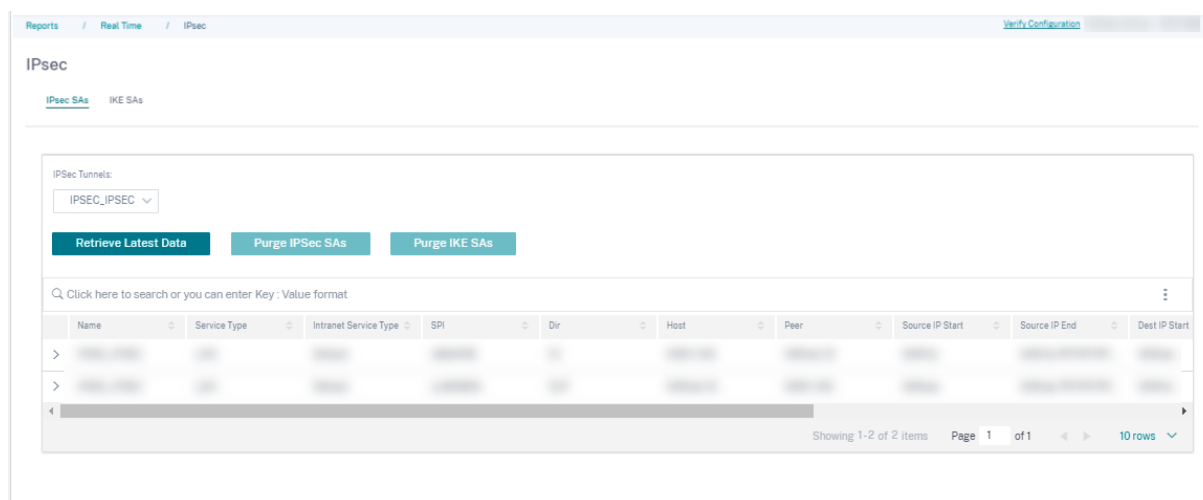
IPsec

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.

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.



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
- Network
- CPU Usage
- Disk Usage
- Memory Usage

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** column right top corner of the table and select/deselect the options that you want to display or hide in the table.

Customize Columns to be Displayed

☒ Select All
☒ Bytes Received
☒ Packets Received
☒ Error Count Received
☒ Bytes Sent
☒ Packets Sent
☒ Error Count Sent

Cancel
Done

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.

Dashboard

Site Report : Appliance Reports

Relative Time
Interval: Last 1 Hour

Reports

Alerts
Usage
Quality
QoS
Historical Statistics
Real Time
Cloud Direct (preview)
OS65 Metrics
Appliance Reports

Configuration

Interfaces
Network
CPU Usage
Disk Usage
Memory Usage

Customize Columns

Interface Name	Bytes Sent	Bytes Received	Packets Sent	Packets Received	Error Count Sent	Error Count Received	Actions
Interface 1	37 Kbps	41 Kbps	3193	3427	0	0	
Interface 3	0 Kbps	0 Kbps	0	0	0	0	
Management Interface	8 Kbps	10 Kbps	273	321	0	0	
Interface 2	1 Kbps	1 Kbps	79	79	0	0	

- **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** – Average number of packets sent for the selected duration.
- **Packets Received** – Average 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.

Network

The **Network** page shows the number of TCP connections for each configured site.

Site Report : Appliance Reports

Relative Time
Interval: Last 1 Hour

Interfaces
Network
CPU Usage
Disk Usage
Memory Usage

Customize Columns

Site Name	Active	Passive	Failed	Resets	Established	Actions
DC_MCN	1331309	535959	8968	67806	18	

- **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	System	Users	Nice	Idle	Io Wait	Irq	Soft Irq	Steal	Actions
DC_MCN	9.34 %	21.47 %	21.47 %	62.5 %	2.11 %	0 %	0.05 %	1.86 %	

- **Site Name** – Displays the site name.
- **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 Report : Appliance Reports 

Relative Time Interval Last 1 Day

Interfaces Network CPU Usage Disk Usage Memory Usage

Customize Columns 

Site Name	Disk Name	Read IOPS	Write IOPS	Latency	Read Throughput	Write Throughput	Disk Utilization	Actions
DC_MCN	loop0	0 IOPS/sec	0 IOPS/sec	0 ms	0 Kbps	0 Kbps	0 %	
DC_MCN	xvda	0 IOPS/sec	15 IOPS/sec	0 ms	0 Kbps	0 Kbps	21 %	

- **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.

Memory usage

The **Memory Usage** page shows the report of the amount of memory used.

Site Report : Appliance Reports 

Relative Time Interval Last 1 Day

Interfaces Network CPU Usage Disk Usage Memory Usage

Customize Columns 

Site Name	Apps	Swap Cache	Slab Cache	Shmem	Cache	Buffers	Unused	Swap	Actions
DC_MCN	3.11 Gb	0 Kb	306.7 Mb	1.63 Mb	6.91 Gb	297 Mb	1.39 Gb	0 Kb	

- **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.

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**.

Site Reports: WAN Link Metering 

Relative Time Interval: Last 1 Hour

WAN Link Name	Total Usage	Data Usage	Control Usage	Usage (%)	Billing Cycle	Starting From	Days Elapsed
_New_H2-Broadband-ACT-1	0.97 MBs	0.04 MBs	0.92 MBs	NA	Monthly	04/01/2021	6 days of 30 days
New_H2-LTE-AOL_Broadband-3	0 MBs	0 MBs	0 MBs	NA	Monthly	04/01/2021	6 days of 30 days
_New_H2-LTE-Idea-2	0.21 MBs	0 MBs	0.21 MBs	NA	Monthly	04/01/2021	6 days of 30 days
New_H2-Broadband-ACT-1	89.5 MBs	71.67 MBs	17.83 MBs	NA	Monthly	04/01/2021	6 days of 30 days

Diagnostics

October 18, 2021

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.

Diagnostics ⓘ

☐ Ping ☐ Traceroute ☐ Packet Capture ☐ Bandwidth Test ☐ iPerf

- **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**.

Diagnostics ⓘ

☒ Ping ☐ Traceroute ☐ Packet Capture ☐ Bandwidth Test ☒ iPerf [View Results](#)

Source Site

Source Site *

SantaClara

PING

IP Address

Interface

Gateway IP (Optional)

Routing Domain

Ping Count

Packet Size (bytes)

Default_RoutingDomain

5

70

Test Results

*****Result of ping*****

PING 80.80.80 with 70 bytes of data (5 attempts)

*****Result of iperf*****

Client connecting to 10.1.2.3, UDP port 5001

Binding to local address 10.1.2.2

Sending 1470 byte datagrams, IPG target: 11215.21 us (kalman adjust)

UDP buffer size: 208 KByte (default)

[3] local 10.1.2.2 port 45212 connected with 10.1.2.3 port 5001

ID	Interval	Transfer	Bandwidth
[3]	0.0- 1.0 sec	131 Kbytes	1.07 Mbits/sec
[3]	1.0- 2.0 sec	128 Kbytes	1.05 Mbits/sec
[3]	2.0- 3.0 sec	128 Kbytes	1.05 Mbits/sec
[3]	3.0- 4.0 sec	128 Kbytes	1.05 Mbits/sec
[3]	4.0- 5.0 sec	128 Kbytes	1.05 Mbits/sec
[3]	5.0- 6.0 sec	128 Kbytes	1.05 Mbits/sec
[3]	6.0- 7.0 sec	129 Kbytes	1.06 Mbits/sec
[3]	7.0- 8.0 sec	128 Kbytes	1.05 Mbits/sec
[3]	8.0- 9.0 sec	128 Kbytes	1.05 Mbits/sec
[3]	9.0-10.0 sec	128 Kbytes	1.05 Mbits/sec
[3]	10.0-11.0 sec	128 Kbytes	1.05 Mbits/sec
[3]	11.0-12.0 sec	128 Kbytes	1.05 Mbits/sec
[3]	12.0-13.0 sec	129 Kbytes	1.06 Mbits/sec

- **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**.

Diagnostics ⓘ

☐ Ping ☒ Traceroute ☐ Packet Capture ☐ Bandwidth Test ☐ iPerf

Source Site

Source Site *

SantaClara

Traceroute

Destination Site

Path

Cancel

Processing

Kansas

SantaClara-Internet-ATT-2->Kansas-Internet-ATT-2

Test Results

*****Result of traceroute*****

Trace Route Initiated on Virtual Path SantaClara-Kansas, Path SantaClara-Internet-ATT-2->Kansas-Internet-ATT-2.

Please wait while the trace is completed.

Trace Route Results:

Virtual Path: SantaClara-Kansas

Path: SantaClara-Internet-ATT-2->Kansas-Internet-ATT-2

Trace Route to 10.1.2.3, destination was reached after 1 hops, 1 hops attempted.

hops	rtt 1	rtt 2	rtt 3	mean rtt
1	10.1.2.3	2.438ms	2.344ms	2.291ms

Hops to destination: 1

- **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.

Diagnostics ⓘ **Test Results** X

 Executing diagnostic command on appliance, this may take some time, please wait... [Clear](#) [Copy](#) [Download](#)

☐ Ping ☐ Traceroute ☒ Packet Capture ☐ Bandwidth Test ☐ iPerf

Source Site

Source Site *

SantaClara

Packet Capture

Interface: 1 Filter: [Help](#) Duration (seconds): 5 Max no of packets to view: 1000

[Cancel](#) [Processing](#)

Packet capture test results are downloaded.

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**.

Diagnostics ⓘ **Test Results**

☐ Ping ☐ Traceroute ☐ Packet Capture ☒ Bandwidth Test ☐ iPerf

Source Site

Source Site *

SantaClara

Bandwidth Test

Destination Site

Kansas

Path

SantaClara-Internet-ATT-2->Kansas-Internet-ATT-2

[Cancel](#) [Run](#)

*****Result of bandwidth*****
 Minimum Bandwidth:451829 kbps
 Maximum Bandwidth:668430 kbps
 Average Bandwidth:539664 kbps

- **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**.

iPerf

Transport Protocol

UDP

Time Interval (sec) *

15

Port *

5001

Server

Select Site

Bandwidth Measurement Mode

All Overlay member paths

Path to test

Choose Path

Server iPerf Options

Client iPerf Options

Cancel

Run

*****Result of iperf*****

Server listening on UDP port 5001
Binding to local address 10.1.2.3
Receiving 1470 byte datagrams
UDP buffer size: 208 KByte (default)

[ID]	Interval	Transfer	Bandwidth	Jitter	Lost/Total	Datagrams
[3]	0.0- 1.0 sec	129 KBytes	1.06 Mbits/sec	0.254 ms	0/	90 (0%)
[3]	1.0- 2.0 sec	128 KBytes	1.05 Mbits/sec	0.440 ms	0/	89 (0%)
[3]	2.0- 3.0 sec	128 KBytes	1.05 Mbits/sec	0.354 ms	0/	89 (0%)
[3]	3.0- 4.0 sec	129 KBytes	1.06 Mbits/sec	0.204 ms	0/	90 (0%)
[3]	4.0- 5.0 sec	128 KBytes	1.05 Mbits/sec	0.160 ms	0/	89 (0%)
[3]	5.0- 6.0 sec	128 KBytes	1.05 Mbits/sec	0.401 ms	0/	89 (0%)
[3]	6.0- 7.0 sec	128 KBytes	1.05 Mbits/sec	0.366 ms	0/	89 (0%)
[3]	7.0- 8.0 sec	128 KBytes	1.05 Mbits/sec	0.360 ms	0/	89 (0%)
[3]	8.0- 9.0 sec	128 KBytes	1.05 Mbits/sec	0.357 ms	0/	89 (0%)
[3]	9.0-10.0 sec	128 KBytes	1.05 Mbits/sec	0.308 ms	0/	89 (0%)
[3]	10.0-11.0 sec	129 KBytes	1.06 Mbits/sec	0.252 ms	0/	90 (0%)
[3]	11.0-12.0 sec	128 KBytes	1.05 Mbits/sec	0.363 ms	0/	89 (0%)
[3]	12.0-13.0 sec	128 KBytes	1.05 Mbits/sec	0.328 ms	0/	89 (0%)
[3]	13.0-14.0 sec	128 KBytes	1.05 Mbits/sec	0.508 ms	0/	89 (0%)
[3]	14.0-15.0 sec	128 KBytes	1.05 Mbits/sec	0.304 ms	0/	89 (0%)
[3]	0.0-15.0 sec	1.88 MBytes	1.05 Mbits/sec	0.304 ms	0/	1338 (0%)
[SUM]	0.0-15.0 sec	2.00 MBytes	1.12 Mbits/sec	0.304 ms	0/	1428 (0%)

Announcements

May 17, 2021

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.

Provider Administration: Announcements

Customer Announcements

+ New

Created By	Subject	Content	Expires	Actions
admin	Maintenance activity on 16...	Maintenance activity is sch...	Never	 

Page Size: 50

Showing 1 - 1 of 1 items

Page1 of1

Provide a subject line and enter content in HTML or plain text format. You can also set the announcement expiration.

New Announcement

Subject *

Maintenance activity -20 May 2021

Content *

Maintenance activity is scheduled for 20 May 2021 between 6 PM to 8 PM. The services will be unavailable during this window.

Expiration *

☒ Never

☐ On

Cancel Save

The saved announcements are displayed to all the customers.

 Maintenance activity is scheduled for 20 May 2021 between 6 PM to 8 PM. The services will be unavailable during this window. [Click here to read the entire message](#)

Network Dashboard

Relative Time Interval: Last 1 Hour Site Group: All

ALERTS [See All](#)
17
Critical

UPTIME [See Details](#)
Overlay 100.0%
Underlay 100.0%

TOP APPS [See All](#)
Unknown
0 KB

TOP SITES [See All](#)
onpre... 0.04 %
BRAN... 0.03 %
branc... 0.02 %

[+ New Site](#) [Map](#) [List](#) [Select Continent](#) [Select Country](#) [Search](#)

3 Total Sites **3** Normal

Availability	Orchestrator Connectivity	Site Name	Site Role	Device Model	Serial No	Bandwidth Tier
●	● Online	onpremmcn	MCN	VPX-SE	AF19B86B-15B0-57F2-51F8-8ECF1...	20
●	● Online	BRANCH2	Branch	VPX-SE	2A302151-72A2-87C8-B794-2D53...	20
●	● Online	branchvpx (HA)	Branch	VPX-SE	83E78799-4F85-AD41-7977-74F15...	20

Page Size: 50 Showing 1 - 3 of 3 items Page 1 of 1

User administration

July 8, 2021

Citrix SD-WAN Orchestrator for On-premises supports role-based access control (RBAC). RBAC regulates access to SD-WAN Orchestrator 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 Citrix SD-WAN Orchestrator for On-premises. You can assign a user with a role from the list of predefined roles.

By default, a user account is created on Citrix SD-WAN Orchestrator for On-premises with user name **admin** and password set as **password**. The user is asked to change the default password during initial login.

You can add users who can be authenticated locally and remotely. Users who are authenticated remotely are authenticated through RADIUS or TACACS+ authentication servers.

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
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 (Preview)	An administrator who can only view and edit the network related information
Provider-Security-Admin (Preview)	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

Customer roles

The following table lists the predefined customer roles:

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 (Preview)	A customer administrator who can only view and edit network related information
Customer-Security-Admin (Preview)	A customer administrator who can only view and edit security related information

A user with **Customer-Master-Admin** role can perform the following:

- Add users and assign customer roles
- Edit or delete assigned roles

Support roles

For troubleshooting purposes, 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. After the validity period expires, the support user loses access to Customer information. However, the support user details continue to appear under the **Administration > User Administration**. Based on the need, the Customer administrator can either delete or extend the validity of the support role.

Role	Description
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

Authentication types

Citrix SD-WAN Orchestrator for On-premises supports the following types of authentication:

- **Single-factor authentication:** Single-factor authentication presents one authentication method to gain access to Citrix SD-WAN Orchestrator for On-premises for users.
- **Two-factor authentication (TFA):** Two-factor authentication presents two authentication methods to gain access to Citrix SD-WAN Orchestrator for On-premises for users. It introduces an extra layer of security in the login sequence.

The following authentication methods are supported for single-factor and two-factor authentication:

- **Local:** When selected, the user must use the password configured on Citrix SD-WAN Orchestrator for On-premises to gain access.
- **RADIUS:** When selected, the user must use the RADIUS server password to gain access.
- **TACACS+:** When selected, the users must use the TACACS+ server password to gain access.

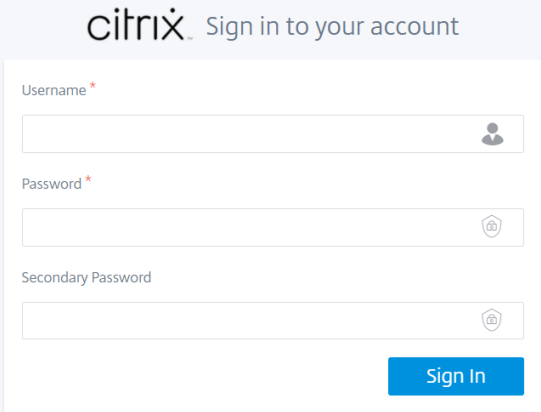
The following table lists the primary and secondary authentication methods supported for users who are authenticated locally:

	Primary Authentication Type	Secondary Authentication Type
Single-factor authentication	Local	-
Two-factor authentication	Local	RADIUS or TACACS+

The following table lists the primary and secondary authentication methods supported for users who are authenticated remotely:

	Primary Authentication Type	Secondary Authentication Type
Single-factor authentication	Local, RADIUS, or TACACS+	-
Two-factor authentication	Local, RADIUS, or TACACS+	RADIUS or TACACS+

If **Two-factor authentication** is enabled and the RADIUS/TACACS+ servers are configured as a secondary authentication type, then the **Secondary password** field is visible at the login page.



The image shows a login interface for Citrix. At the top, the Citrix logo is followed by the text "Sign in to your account". Below this is a white rectangular form containing three input fields: "Username" with a red asterisk, "Password" with a red asterisk, and "Secondary Password". Each field has a small icon to its right (a person for Username, a shield for Password, and a shield for Secondary Password). A blue "Sign In" button is located at the bottom right of the form. At the bottom of the page, below the form, is the text "Copyright(©) Citrix Systems, Inc. All rights reserved."

Add a user

Navigate to **Administration > User Administration** > click **+ New** > Enter the following details > click **Add**.

- Enter the user name.
- **Single factor authentication:** Enables only the primary authentication for logging in the users.
- **Two factor authentication:** Enables both primary and secondary authentication for logging in the users. For more information, see [Remote Authentication Servers](#).
- **Primary Authentication Type:** Select Local or the IP address of the remote authentication server.
- **Secondary Authentication Type:** Select the IP address of the remote authentication server.

NOTE

The **Secondary Authentication Type** field is grayed out if Single factor authentication is chosen.

- **Role:** Select a role from the list of the available roles.
- **Deny access to Customers:** (Available only at the provider level). While adding users, providers can deny access to specific customers.

- **Expiration Date (MM/DD/YYYY):** The date up to which the support user has access to customer information. The default validity period is for two weeks from the date the role is assigned.
- Enter your password. The length of the password must be between 8–128 characters.

Add User

Username *

user1

☒ Single factor authentication ☐ Two factor authentication

Primary Authentication Type

Local

Role

Customer-Master-Admin

Expiration Date (MM/DD/YYYY)

N/A

Password *

Confirm Password *

Add

Cancel

Using the **Actions** column, you can change the user role, update the password, and edit the authentication type. You can also delete the user if necessary.

Network Administration: User Administration

Users

+ New

User	Role	Expiration	Primary Auth Server	Secondary Auth Server	Actions
admin	Customer-Master-Ad...	N/A	Local	None	
tac_sdwan1	Customer-Master-Ad...	N/A	10.10.10.98 (TACACS...	None	
rad_sdwan1	Customer-Master-Ad...	N/A	Local	10.10.10.99 (RADIUS)	
test	Customer-Master-Re...	N/A	Local	None	

Page Size: 200 Showing 1 - 4 of 4 items Page1 of1

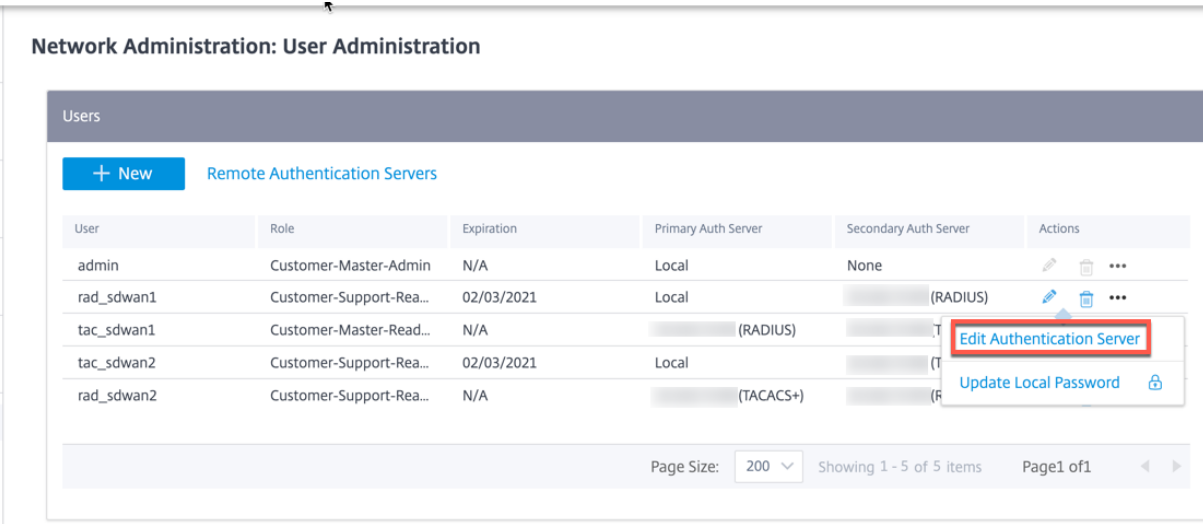
Limitation

Citrix SD-WAN Orchestrator for On-premises does not support duplication of user names for a different customer under the same provider. When this action is performed, you see the error message **Error while account creation**.

Change authentication type

You can change the authentication type of a user from single-factor authentication to two-factor authentication and conversely.

To change the authentication type of a user, in the **Actions** column, click ... and then **Edit Authentication Server**.



Network Administration: User Administration

Users

[+ New](#) [Remote Authentication Servers](#)

User	Role	Expiration	Primary Auth Server	Secondary Auth Server	Actions
admin	Customer-Master-Admin	N/A	Local	None	
rad_sdwan1	Customer-Support-Rea...	02/03/2021	Local	(RADIUS)	
tac_sdwan1	Customer-Master-Read...	N/A	(RADIUS)		
tac_sdwan2	Customer-Support-Rea...	02/03/2021	Local	(TACACS+)	
rad_sdwan2	Customer-Support-Rea...	N/A	(TACACS+)		

Page Size: 200 Showing 1 - 5 of 5 items Page 1 of 1

If you have currently selected **Single factor authentication**, you can switch to two-factor authentication. Click **Two factor authentication** and select the remote server from **Secondary Authentication Type** drop-down list. Click **Apply**.

If you have currently selected two factor authentication, you can choose to change only the secondary authentication type or switch to single factor authentication.

To switch to single factor authentication, click **Single factor authentication**. The **Secondary Authentication Type** drop-down list gets disabled and only the **Primary Authentication type** drop-down list is enabled.

Primary Authentication Type can only be set at the time of user creation and it cannot be edited later.

Change password

You can change the password of local users. To change the password of a user, in the **Actions** column, click ... and **Update Local Password**.

NOTE

You can modify the password only for local users. For users authenticated remotely, you must update the password on the external server.

Change user role

To change the user role, click the **Edit** icon in the **Actions** column. Select a **Role** and click **Apply**.

NOTE

You cannot edit the role of the default admin user.

Edit User

Username *

tac_sdwan1

Role

Customer-Master-Admin

Expiration Date (MM/DD/YYYY)

N/A

Apply Cancel

Domain name

July 9, 2021

The domain name is a vanity URL used in the address bar to access Citrix SD-WAN Orchestrator for On-premises. Using domain name makes it easier to remember and also allows you to use your company brand name.

To use a domain name ensure that you have a local DNS server configured with a DNS record linking the domain name to Citrix SD-WAN Orchestrator for On-premises management IP address. Ensure that the domain name is configured during early configuration. On setting up a domain name, Citrix SD-WAN Orchestrator for On-premises reboots and certificates are regenerated automatically. The same domain name must be configured on the individual appliances. For more details, see [On-prem SD-WAN Orchestrator configuration on SD-WAN appliance](#).

It is not mandatory to configure a domain name. If you do not have a domain name and you still want to use DNS Server for IP address resolution, configure DNS records that point to Citrix SD-WAN Orchestrator for On-premises IP for the following three FQDNs:

- sdwanzt.citrixnetworkapi.net
- download.citrixnetworkapi.net
- sdwan-home.citrixnetworkapi.net

For example, if a Citrix SD-WAN Orchestrator for On-premises domain is configured as **citrix.com**, then you must create the DNS record in the DNS Server for the below FQDN and Citrix SD-WAN Orchestrator for On-premises IP address:

- download.citrix.com

- sdwanzt.citrix.com
- sdwan-home.citrix.com

In advanced configuration:

For Example: If a Citrix SD-WAN Orchestrator for On-premises domain is configured as **citrix.com**, **Download Management Service Domain** is configured as **download.citrix.com**, and the **Statistics Management Service Domain** is configured as **statistics.citrix.com**, then you must create the DNS record in the DNS Server for the below FQDN and corresponding IP Address:

- download.citrix.com
- sdwanzt.citrix.com
- statistics.citrix.com

Configuring or changing a domain name for an existing configuration affects Citrix SD-WAN Orchestrator for On-premises and appliance connectivity. You must manually perform the [certificate authentication](#) process or use the [Site zero-touch deployment settings](#) option.

Note

In a provider managed setup, only provider administrators have access to edit domain name related information.

To configure a domain name, at the network level, navigate to **Administration > Domain Name** and provide a Citrix SD-WAN Orchestrator for On-premises domain name.

Custom Domains

☐ Advanced Configuration

On-prem SD-WAN Orchestrator Domain *

Apply

HTTPS certificate

May 17, 2021

HTTPS certificate is required for establishing secure management HTTPS connection to Citrix SD-WAN Orchestrator for On-premises. You can use the default HTTPS certificate available on the Citrix SD-WAN Orchestrator for On-premises GUI or upload a custom HTTPS certificate generated from any other framework such as OpenSSL or from a trusted authority. Custom HTTPS certificate allows you to have control over the security and the other subject parameters related to the certificate.

To view the default certificate, navigate to **Administration > HTTPS Certificate**.

Note

In a provider managed setup, only provider administrators have access to regenerate and upload HTTPS certificate.

Network Administration: HTTPS Certificate

Regenerate

Installed Certificate

Issuer	
Country	US
State/Province	California
Locality	San Jose
Organization	Citrix Systems, Inc.
Organizational Unit	Engineering
Common Name	Citrix
Email	support@citrix.com

Issued To	
Country	US
State/Province	California
Locality	San Jose
Organization	Citrix Systems, Inc.
Organizational Unit	Engineering
Common Name	Citrix
Email	support@citrix.com

Certificate Details

Certificate Fingerprint	386C3530375A8B7F464C1B6377553536693774A4AC3738694834E2
Start Date	March 18 08:09:35 2021 GMT
End Date	March 18 08:09:35 2022 GMT
Serial Number	386C3530375A8B7F464C1B63775536693774A4AC3738694834E2

Upload Certificate

Upload Certificate

Click to select or drag n drop file here.
Allowed file types are .crt

Upload Key

Click to select or drag n drop file here.
Allowed file types are .key

Upload

The **Installed Certificate** section provides a summary of the certificate that is installed on the appliance. The appliance uses this certificate to identify itself in the network.

The **Issued to** section provides details about who the certificate was issues to. The **Common Name** in

the certificate matches with the name of the appliance, since the certificate is bound to the appliance name. The **Issuer** section provides the details of the certificate signing authority, who signed the certificate. The Certificate details include the fingerprint of the certificate, serial number, and the validity period for the certificate.

To regenerate the certificate, navigate to **Administration > HTTPS Certificate** and click **Regenerate**.

Note

Regenerating the certificate disconnects any existing connected HTTPS sessions and restarts the HTTPS server. After the certificate is successfully regenerated, the GUI gets refreshed automatically.

You can generate HTTPS certificates from any other framework such as OpenSSL or from a trusted authority and upload it on the Citrix SD-WAN Orchestrator for On-premises. Certificate format supported is .crt and key format supported is .key.

To upload a custom HTTPS certificate, click **Upload** or drag the certificate and key files in the **Upload Certificate** and **Upload Key** boxes respectively. After successful upload, the GUI gets refreshed automatically.

Disk space management

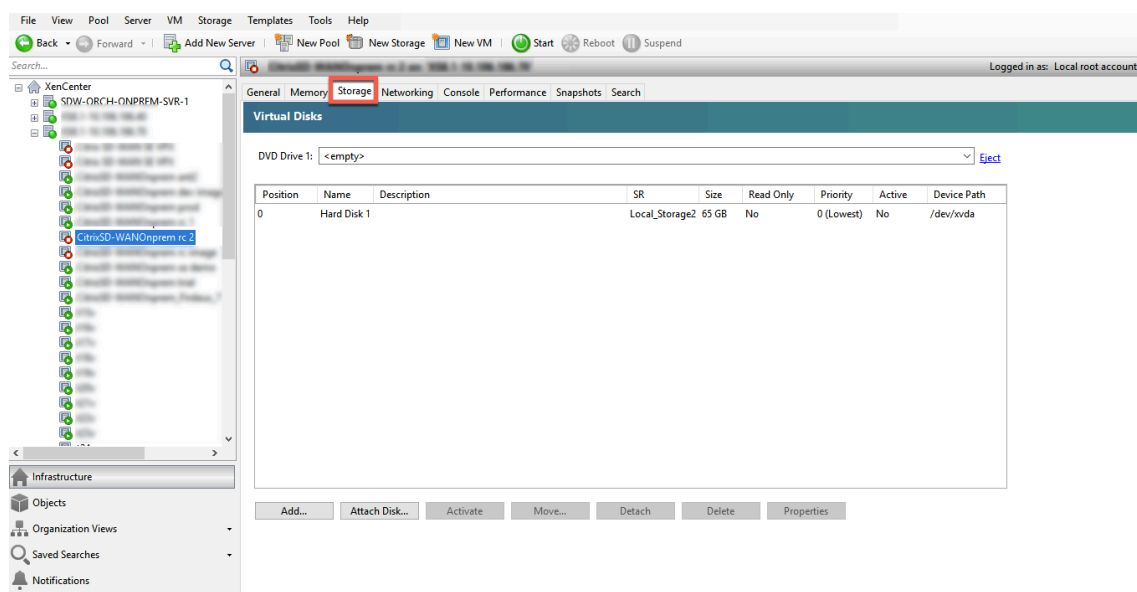
July 9, 2021

You can increase the disk space allocated for Citrix SD-WAN Orchestrator for On-premises.

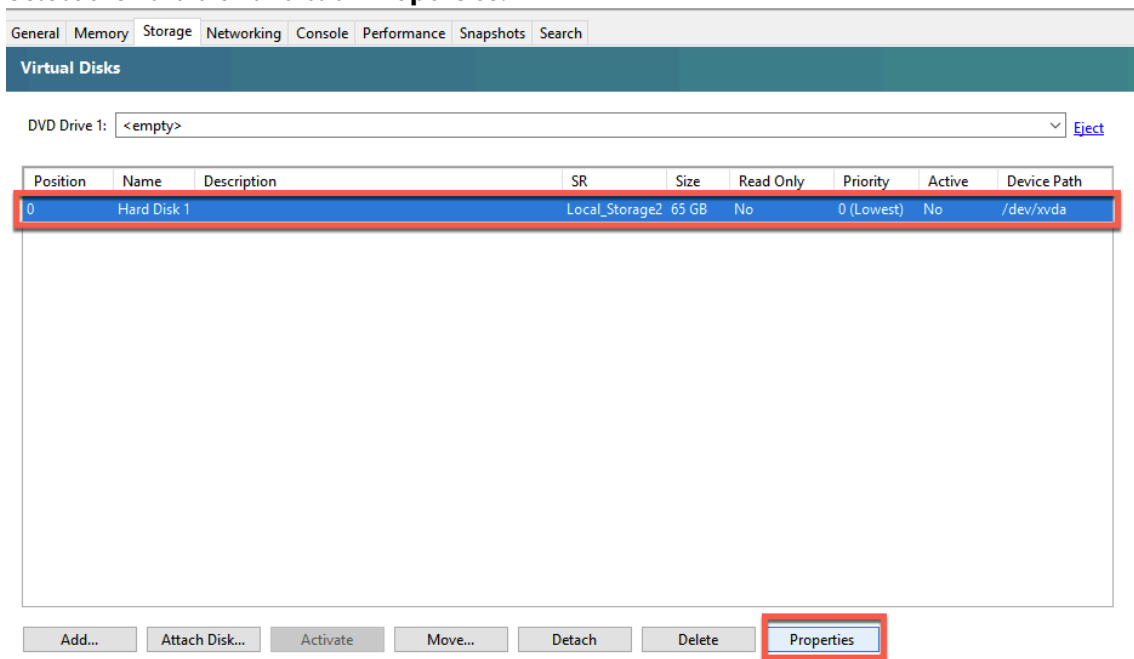
Increase disk space on Citrix Hypervisor

To increase the disk space on Citrix Hypervisor.

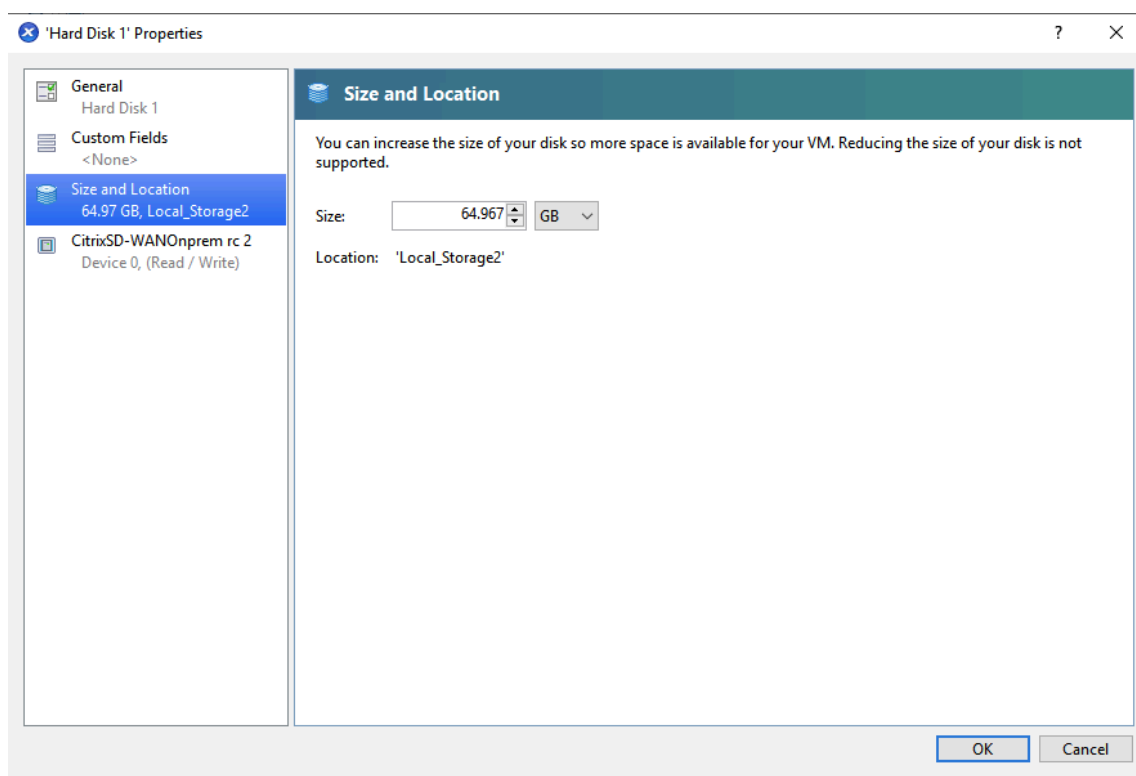
1. Shut down the virtual machine (VM) from the hypervisor.
2. Select the virtual machine and click the **Storage** tab.



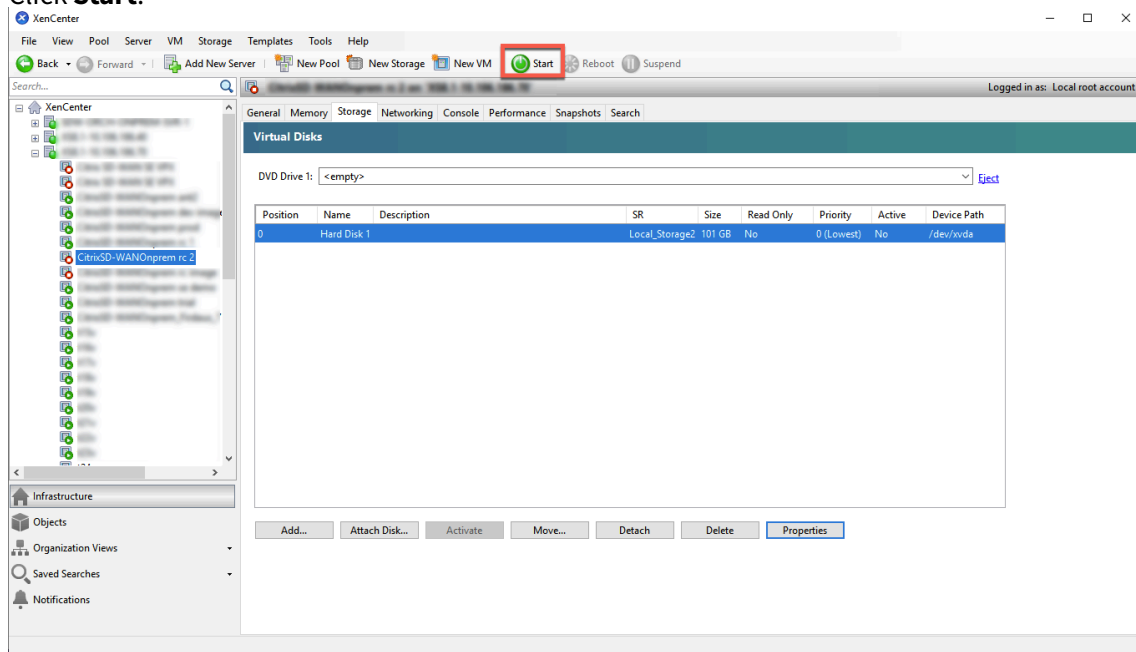
3. Select the hard disk and click **Properties**.



4. Click the **Size and Location** option and update the **Size** of your disk space. Click **OK**.



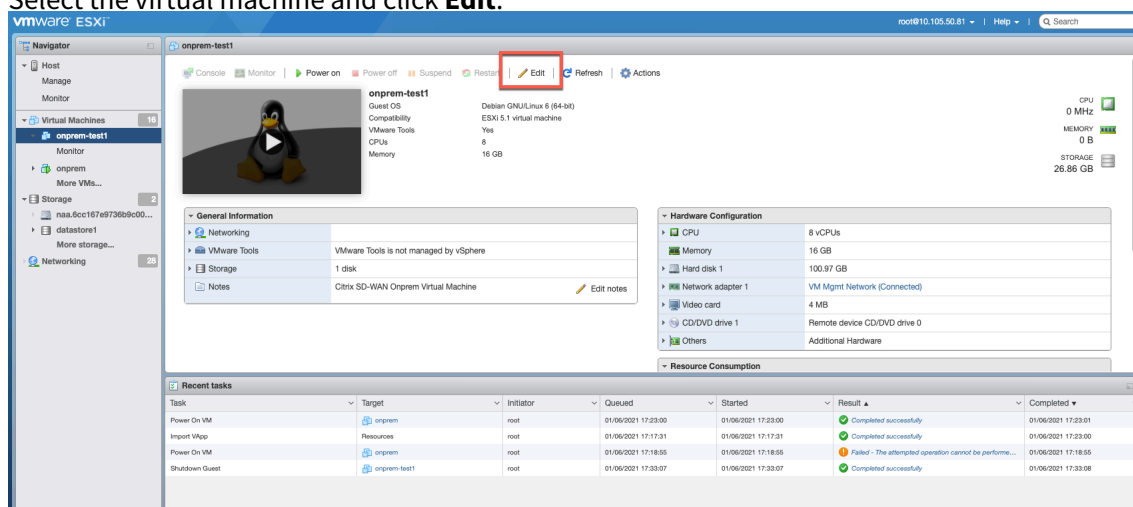
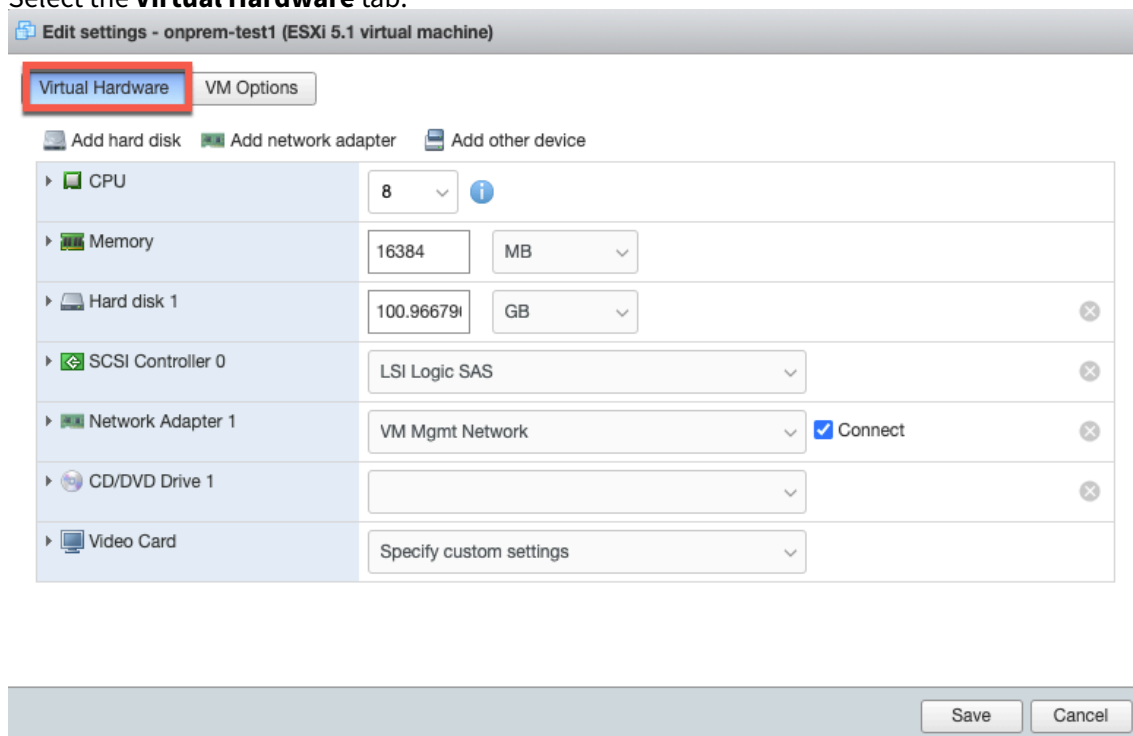
5. Click **Start**.

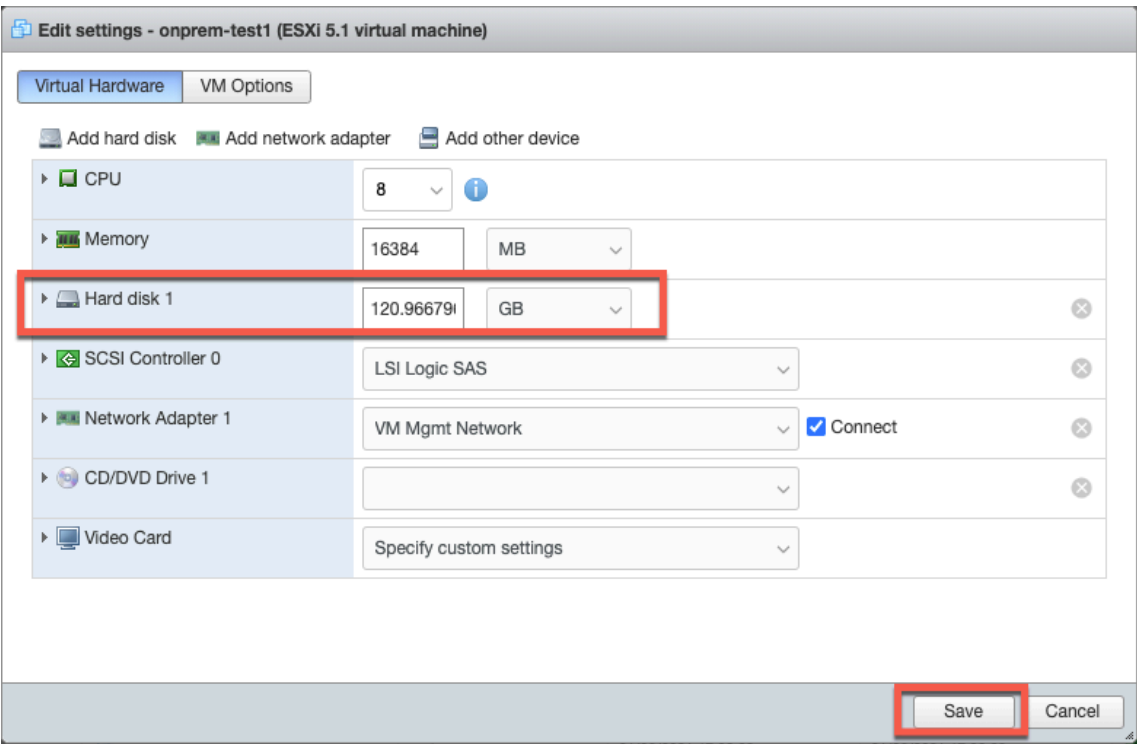


Increase disk space on ESXi Server

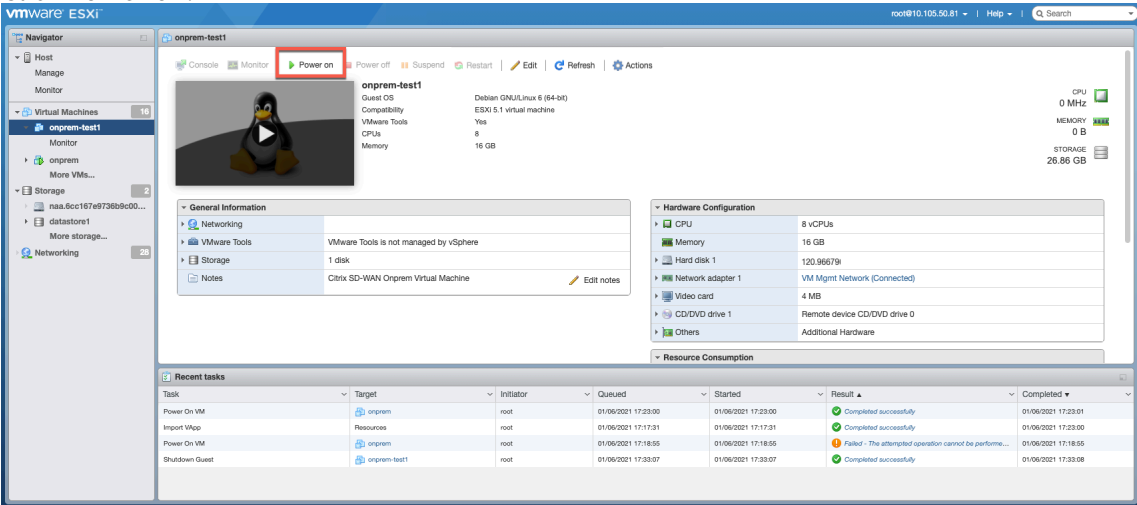
To increase the disk space on the ESXi server.

1. Shut down the virtual machine (VM) from the hypervisor.

2. Select the virtual machine and click **Edit**.3. Select the **Virtual Hardware** tab.4. Increase the hard disk space in the **Hard disk** field and click **Save**.



5. Click **Power on**.



March 8, 2021

Replace an affected Citrix SD-WAN appliance

To replace an affected appliance in Citrix SD-WAN Orchestrator for On-premises:

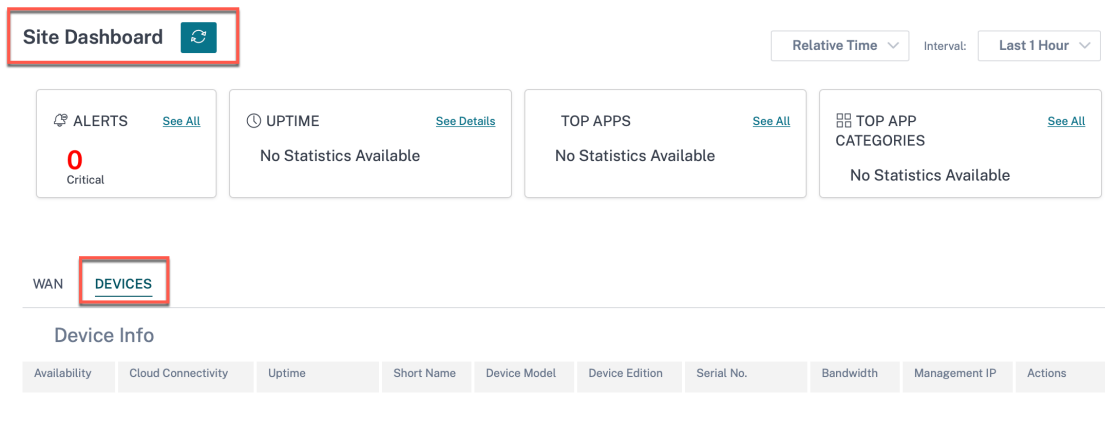
1. Log in to Citrix SD-WAN Orchestrator for On-premises and select the affected site. At the site level, navigate to **Configuration > Site Configuration > Device Information** and remove the serial number from the **Primary Device Serial Number** field. Click **Save**.

Note

If the appliance is still reachable through Citrix SD-WAN Orchestrator for On-premises, then the appliance is in “Factory Reset” state.

The screenshot shows the 'Device Information' configuration page in Citrix SD-WAN Orchestrator. The 'Enable HA' checkbox is checked. The 'Primary Device Serial Number' field is highlighted with a red box and contains the placeholder text 'Enter Device Serial (Required for Deployment)'. The 'Short Name' field is set to 'Primary'. The 'Secondary HA Device Serial Number' field is set to 'H3TM4CXEJV'. The 'HA Device Short Name (Optional)' field is set to 'Secondary'. The 'Advanced HA Settings' section is collapsed. At the bottom of the page are four buttons: 'Cancel', 'Save', 'Prev', and 'Next'.

2. Navigate to **Dashboard > Devices** and ensure that the affected appliance is removed from the list.



3. Make a note of the affected appliance's power and cabling setup and then remove the appliance from the rack.
4. Mount the new appliance on the rack and redo the power and cabling as it was for the affected appliance.
5. In the Citrix SD-WAN Orchestrator for On-premises UI, at the site level, navigate to **Configuration > Site Configuration > Device Details**. Add the serial number of the new appliance in the **Primary Device Serial Number** field. Click **Save**.

Device Information

☒ Enable HA

Primary Device Serial Number

HE530CXRDG

Short Name

Primary

Secondary HA Device Serial Number

H3TM4CXEJV

HA Device Short Name (Optional)

Secondary

Advanced HA Settings

Cancel

Save

Prev

Next

6. Configure Zero-touch deployment. For more information, see [Zero-touch deployment](#).

7. Allow a few minutes for the appliance to update cloud connectivity on the site dashboard.

Network Dashboard

Relative Time

Interval: Last 1 Hour

Site Group: All

ALERTS

See All

0 Critical

UPTIME

See Details

No Statistics Available

TOP APPS

See All

No Statistics Available

TOP SITES

See All

No Statistics Available

+ New Site

Map

List

Select Continent

Select Country

Search

2 Total Sites

2 Critical

Availability	Cloud Connectivity	Site Name	Site Role	Device Model	Serial Number	Bandwidth Tier	Management IP
●	● Online	MCN_VPX	MCN	VPX-SE	6E886BCA-18CF-6C...	1000	10.102.77.106
●	● Online	Client_vpx	Branch	VPX-SE	HE530CXRDG	1000	10.102.77.107

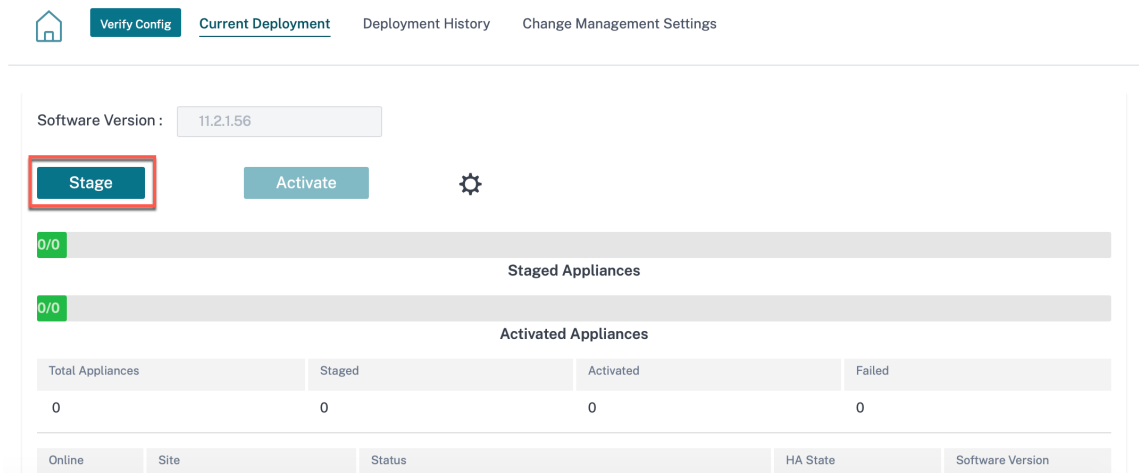
Page Size: 200

Showing 1 - 2 of 2 items

Page 1 of 1

8. At the network level, navigate to **Configuration > Network Config Home** and click **Deploy Config/Software**.

9. Click **Stage**.



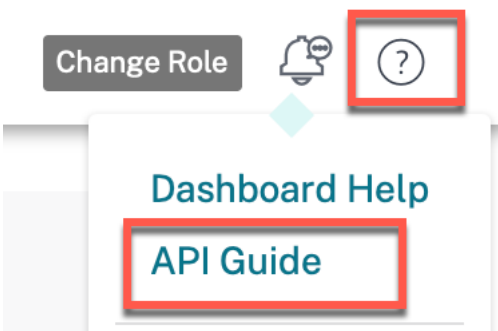
10. Click **Activate** after staging is completed.
11. Navigate to the site dashboard and verify the successful activation of the appliance.

API guide for Citrix SD-WAN Orchestrator for On-premises

April 5, 2022

To access the Citrix SD-WAN Orchestrator for On-premises API Guide on the Swagger UI:

1. Log in to the Citrix SD-WAN Orchestrator for On-premises and click **?** at the top-right corner of the UI and then click **API Guide**.



The Swagger spec details are displayed.

Swagger Spec Details

Citrix Cloud ID: `9a8f8a49a`
Customer ID: `77577523-044F-43B3-87E3-63A73339B6c`
Swagger Spec URL: <https://10.106.186.76/swagger-ui/>
On-Premises Swagger Spec: [Download](#)

Cancel Done

2. Click the Swagger spec URL to access the API guide.

Citrix SD-WAN Orchestrator for On-premises APIs through curl

Prerequisites

- Cloud login
- Local login

Perform the following steps to use Citrix On-premises orchestrator APIs through curl:

1. **Cloud login:** In the case of a fresh XVA, you must log in to the cloud first.

```
1 curl -k -X POST -H "Content-Type: application/json" https://<
   onprem-orchestrator-ip>/policy/v1/onprem/cloudLogon - data '{
2   "clientId": "<clientId>", "clientSecret": "<clientSecret> ", "ccId": "
   <ccid>", "pop": " <popName>" }
3   '
```

The `clientId`, `clientSecret`, and `ccId` can be obtained from the IAM page.

Note

Ensure that the customer account is already created in cloud before attempting the cloud logon.

2. **Local login:** Then do local login to get the auth token.

```
1 curl -k -X POST -H "Content-Type: application/json" https://<onprem-orchestrator-ip>/onpm/v1/logon --data '{
2   "username": "admin", "password": "<passwordField>" }
3   '
```

This returns **token** and **customerId** in response. The **customerId** remains fixed and it is needed in other API calls. Save the **customerId** for later use. The token remains valid for one hour. Later, you must perform a fresh login.

Example: Use the **auth** token and **customerId** to fire other Citrix On-premises APIs.

```
1 curl -k -X GET -H "authorization:CWSAuth bearer= <token> " -H "
   Content-Type: application/json" https://<onprem-orchestrator-ip>/onpm/v1/scope/<customerId>/globalSettings/ntpSettings
```

Orchestrator administration

October 18, 2021

This section provides you the information on administrative activities that can be performed on the Citrix SD-WAN Orchestrator for On-premises platform.

Software

You can download Citrix SD-WAN appliance software version required for all the appliances in your network and stored in Citrix SD-WAN Orchestrator for On-premises. Use the stored software to upgrade your Citrix SD-WAN Orchestrator for On-premises software to the latest version.

Note

Provider managed setup is introduced from Citrix SD-WAN Orchestrator for On-premises 10.3 release. Downgrading to software releases lower than Citrix SD-WAN Orchestrator for On-premises 10.3 release is not supported.

Publish software

In a provider managed setup, Citrix SD-WAN Orchestrator for On-premises allows provider administrators to download Citrix SD-WAN appliance software version required for all the appliances in your network. Provider administrators can publish the downloaded software version. The published software

is downloaded and stored in Citrix SD-WAN Orchestrator for On-premises. Customer administrators can deploy the published software to all the appliances managed by Citrix SD-WAN Orchestrator for On-premises.

In a customer managed setup, customer administrators can download Citrix SD-WAN appliance software version required for all the appliances in the network. They can publish the software in Citrix SD-WAN Orchestrator for On-premises and deploy the software to all appliances.

To publish software, navigate to **Infrastructure > Orchestrator Administration > Software Images > Appliance**.

Provider Infrastructure: Software Images

Orchestrator

Appliance

Publish New Software

Software Version
11.3.1.53

Publish

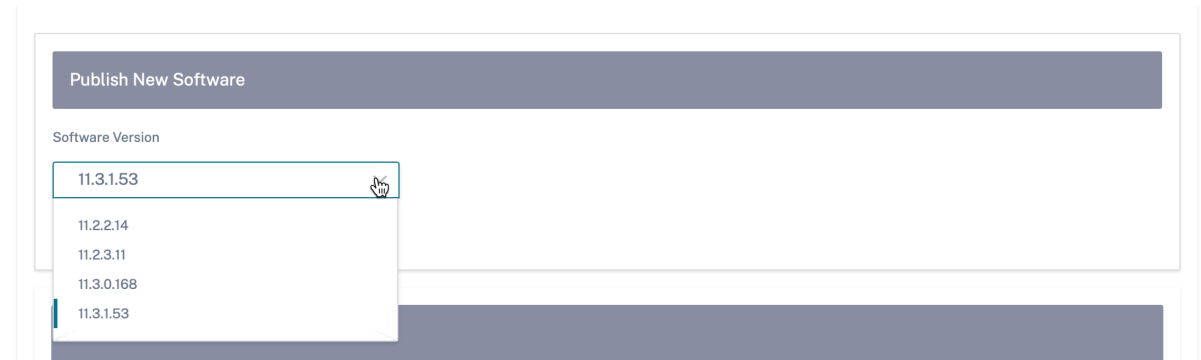
Published Software Details

Refresh

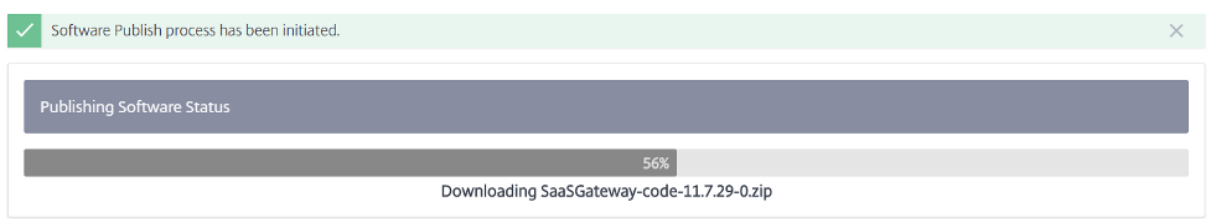
Software Version	Status	Details	Actions
------------------	--------	---------	---------

Page Size: 50 Showing 0 - 0 of 0 items Page 1 of 1

You can choose a software version to be published from a pre-built list of software versions that are supported by the current Citrix SD-WAN Orchestrator for On-premises. For newer software versions that are not available in the list, upgrade to the latest Citrix SD-WAN Orchestrator for On-premises release which supports the new software version. For information on upgrading Citrix SD-WAN Orchestrator for On-premises, see [Software upgrade](#).



Citrix SD-WAN Orchestrator for On-premises downloads Citrix SD-WAN software of the selected version for all the platforms. A progress bar indicates the progress of the publishing process.



The published software versions are displayed under **Published Software Details**. At any given point Citrix SD-WAN Orchestrator for On-premises can store up to three published software versions. If you are intending to publish another software version, delete one of the three versions available before beginning the publishing process.

Published Software Details			
<button>Refresh</button>			
Software Version	Status	Details	Actions
11.2.2.2	FINISHED	Successfully downloaded and published the...	
11.3.0.98	FINISHED	Successfully downloaded and published the...	
11.2.1.56	FINISHED	Successfully downloaded and published the...	

After the publishing is successful you can deploy, stage, and activate the software to all the appliances on the network from the **Network Configuration** page. For more information, see [Network Configuration](#). For a successful deployment, ensure that all the appliances are connected to Citrix SD-WAN Orchestrator for On-premises. For more details, see [Connectivity with Citrix SD-WAN appliances](#).

Software upgrade

In a provider managed setup, only provider administrators can upgrade the Citrix SD-WAN Orchestrator for On-premises software to the latest version.

In a customer managed setup, customer administrators can upgrade Citrix SD-WAN Orchestrator for On-premises software to the latest version.

NOTE

Download the appropriate Citrix SD-WAN Orchestrator for On-premises software package to your local computer. You can download this package from [Downloads](#) page.

Perform the following steps to upload and install a new version of the Citrix SD-WAN Orchestrator for On-premises software:

1. In the Citrix SD-WAN Orchestrator for On-premises UI, navigate to **Infrastructure > Orchestrator Administration > Software Images > Orchestrator**.
2. Click inside the box and select the ctx-onprem-1 (latest date).tar.gz binary file that you have downloaded and saved on your local system.

The screenshot shows the 'Orchestrator' tab selected in the top navigation bar. Below the navigation bar, there is a section for software management. It displays the 'Current Software Version' as 'R10_3_0_187.888886'. Below this is a dashed box containing the text 'Click here to select the file or drag and drop the selected file. Allowed file type is .gz'. An 'Upload' button is located below the dashed box. Below the 'Upload' button, it shows 'Uploaded File Name : none'. At the bottom of this section, there is a warning message: 'While upload is in progress, please do not navigate away from this page. Doing so will cancel the software upload.' Below the warning message are two buttons: 'Install' and 'Delete'.

3. Click **Upload** to upload the selected software package to the current Citrix SD-WAN Orchestrator for On-premises virtual machine.
4. After the upload completes, click **Install**.
5. When prompted to confirm, click **Install**.

Management settings**Note**

In a provider managed setup, only provider administrators have access to edit configuration under **Infrastructure > Orchestrator Administration > Management Settings**.

Management IP and DNS

After Citrix SD-WAN Orchestrator for On-premises Virtual Machine (VM) is deployed and a management IP is configured either manually or through DHCP, you can change the **Management IP and DNS** settings through Citrix SD-WAN Orchestrator for On-premises GUI. Citrix SD-WAN Orchestrator

for On-premises stack takes about 3 minutes to restart. Once the management IP address is changed the SSH connections get re-established.

To configure/change the management IP and DNS settings, at the network level, navigate to **Infrastructure > Orchestrator Administration > Management Settings > Management IP & DNS**.

Provide the following details:

- **IP Address:** The IP address for Citrix SD-WAN Orchestrator for On-premises VM.
- **Gateway IP Address:** The Gateway IP address that Citrix SD-WAN Orchestrator for On-premises use to communicate with external networks.
- **Subnet Mask:** The subnet mask to define the network in which Citrix SD-WAN Orchestrator for On-premises is available.
- **Primary DNS:** The IP address of the primary DNS server to which all DNS requests from Citrix SD-WAN Orchestrator for On-premises are forwarded to.
- **Secondary DNS:** The IP address of the secondary DNS server to resolve DNS requests if the primary DNS server is not available.

Management IP & DNS

NTP

Remote Auth Servers

Management Interface IP

IP Address *

10.102.78.86

Subnet Mask *

255.255.255.0

Gateway IP Address *

10.102.78.1

Save**DNS Settings**

Primary DNS *

10.140.50.5

Secondary DNS

Secondary DNS

Save**NTP settings**

You can either set the date and time manually, or use a Network Time Protocol (NTP) server to synchronize the clock time of Citrix SD-WAN Orchestrator for On-premises with Coordinated Universal

Time (UTC).

To configure NTP server, at the network level, navigate to **Infrastructure > Orchestrator Administration > Management Settings > NTP** and enable **Use NTP server**.

Provide the NTP server IP address or domain name. You can provide up to four NTP servers, but ensure that at least one is configured. If one NTP server is down, Citrix SD-WAN Orchestrator for On-premises automatically synchronizes with the other NTP server. If you specify a domain name for an NTP server, ensure that the external DNS server is configured to point the domain name to the IP address.

NTP settings

☒ Use NTP server

NTP server 1

NTP server 2

NTP server 3

NTP server 4

To configure date and time manually, disable the **Use NTP server** option and manually select the date and time.

Date/Time settings

Date

Time

[Save](#)

Select the time zone based on your country/city.

NOTE

Reboot the Orchestrator VM after changing the time zone. Some logs continue to use the previous time zone, until the reboot is done. For instructions, see [Reboot Orchestrator VM](#).

Timezone settings

After changing the timezone setting, a reboot will be necessary for the timezone changes to take full effect.

Until then, some logs will continue to use the actual timezone setting in effect at the time of the last reboot, even though events timestamps may reflect the new setting.

Timezone

Etc/UTC



Save

Remote Authentication Servers

In a provider managed setup, only provider administrators can configure RADIUS or TACACS+ servers for the users who are authenticated remotely. Customer administrators can use the remote authentication servers configured by the provider administrators. In a customer managed setup, customer administrators can configure RADIUS or TACACS+ servers.

NOTE

Ensure that the required user accounts are created on the RADIUS or TACACS+ authentication server.

Management IP & DNS
NTP
[Remote Auth Servers](#)

Remote Authentication Servers

+ New

Name	IP Address	Port	Type	Actions
server1			RADIUS	
server2			RADIUS	

Page Size: 50
Showing 1 - 2 of 2 items
Page 1 of 1

Test Remote Server Connection

Username *

Password *

Remote Authentication Server *

Verify

To configure remote authentication, navigate to **Infrastructure > Orchestrator Administration > Management Settings > Remote Auth Servers**. Click **+ New**. Enter the following details:

- **Enable:** Enables remote authentication server configuration.
- **Server Name:** The name of the remote authentication server.
- **Server Type:** The type of remote authentication server - RADIUS or TACACS+.
- **IP Address:** The host IP address for the remote authentication server.
- **Port:** The port number for the remote authentication server. The default port for the RADIUS server is 1812 and the TACACS+ server is 49.
- **Server Key** and **Confirm Server Key:** A secret key to use when connecting to the remote authentication server.
- **Authentication Type:** (available only for TACACS+ server) Select the encryption method to use to send the user name and password to the TACACS+ server.
 - **PAP:** Uses Password Authentication Protocol (PAP) to strengthen user authentication by assigning a strong shared secret to the TACACS+ server.
 - **ASCII:** Uses the ASCII character set to strengthen user authentication by assigning a strong shared secret to the TACACS+ server.
- **Timeout:** The time interval (in seconds) to wait for an authentication response from the remote authentication server.

Add Authentication Server

☒ Enable

Server Name *

server3

Server Type

RADIUS

IP Address *

10.2.3.4

Port *

1812

Server Key

....

Confirm Server Key

....

Timeout

10

Add

Cancel

You can also test the remote server connection. Under **Test Remote Server Connection**, provide your **Username** and **Password**. Select the remote authentication server and click **Verify**.

Database management

You can create backup of the current database running on Citrix SD-WAN Orchestrator for On-premises and later use the backed-up file to restore the same database state.

Note

- In a provider managed setup, only provider administrators have access to create database backup and restore the same.
- You cannot restore the database backup taken in a provider managed setup on a customer managed setup. Similarly, you cannot restore the database backup taken in a customer managed setup on a provider managed setup.

To create database backup, navigate to **Infrastructure > Orchestrator Administration > Database Management**. Click **Backup**.

Click download under the **Actions** column to download the backed-up database.

Click **Upload** to browse and upload the downloaded file. You can also drag the downloaded file and drop it on the screen.

To restore, click **Restore** under the **Actions** column.

NOTE

- You can save only one database backup at a time. To replace an existing backup with the latest, delete the existing backup and click **Backup**.
- Restore of the database must be done to the same release of Citrix SD-WAN Orchestrator for On-premises from where the data backup was taken.
- The database backup only takes the backup of configuration and statistics. It does not back up the platform related data.

Only one backup can exist on the system at a time.

Backup

Created At	Status	Actions
Tue, 04 May 2021 12:09:00 GMT	Available	

Page Size: 50 Showing 1 - 1 of 1 items Page 1 of 1

While upload is in progress, please do not navigate away from this page. Doing so will cancel the upload.

Click here to select the file or drag and drop the selected file.
Allowed file type is .gz

Upload

Storage Management

Citrix SD-WAN Orchestrator for On-premises supports migrating customer configurations, statistics, local database, and published Citrix SD-WAN release version from an existing disk to a new disk.

In a provider managed setup, only provider administrators can perform disk migration. Customer administrators in the provider managed setup do not have privileges to perform disk migration. In a customer managed setup, customer administrators can perform disk migration.

You can perform disk migration either to increase the disk space or for disaster recovery.

- **Add a new disk:** You can add a new disk having storage size at least twice as that of the current data consumed by the Citrix SD-WAN Orchestrator for On-premises. Through Citrix SD-WAN Orchestrator for On-premises UI, you can activate the new disk and migrate the existing customer configurations, statistics, local database, and published Citrix SD-WAN release version. Once the newly added disk is activated, Citrix SD-WAN Orchestrator for On-premises gets rebooted.
- **Disaster recovery:** In the event of a disaster, you can attach the disk containing the data to a new instance of Citrix SD-WAN Orchestrator for On-premises virtual machine which is on the same version of Citrix SD-WAN Orchestrator for On-premises. Activate the disk without choosing **Migrate Data** option in the Citrix SD-WAN Orchestrator for On-premises UI. Once the disk is

activated, Citrix SD-WAN Orchestrator for On-premises gets rebooted.

NOTE

- When disk migration is in progress, do not power off or manually reboot Citrix SD-WAN Orchestrator for On-premises. Powering off or manual reboot can cause data loss.
- When a disk is migrated from a disk partition that was added earlier to a newly created disk partition, after migration, the data in the old disk is not removed. To remove the data in the old disk, attach it to another operating system and delete the data securely.

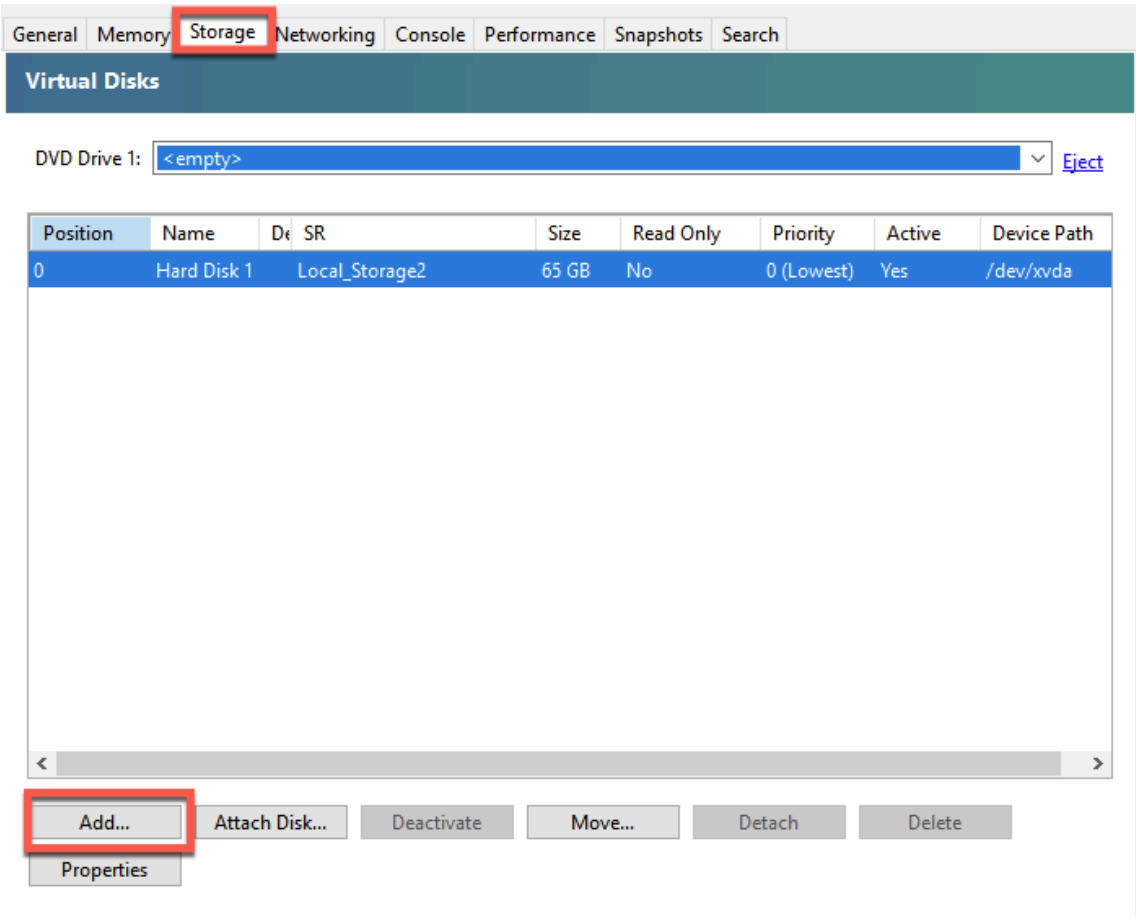
Limitations

The following are the limitations with the disk migration process:

- The users in the old release are not migrated to the new release. Post migration, delete the users and create them again.
- STS created on the old Citrix SD-WAN Orchestrator for On-premises virtual machine is not migrated. However, post migration, the UI lists the STS generated on the old Citrix SD-WAN Orchestrator for On-premises virtual machine. Delete the STS manually.
- Database backup created in the old Citrix SD-WAN Orchestrator for On-premises is not migrated. Post migration if it is getting listed, delete it manually.
- By default, it is assumed that the new Citrix SD-WAN Orchestrator for On-premises to which the disk is migrated to, has connectivity to all two factor authentication servers. If the admin account is using two factor authentication servers and if the connections to the two factor authentication servers are not available, then even the admin cannot log in. In such scenarios, contact Citrix support.
- After migrating to the new disk, you cannot increase the disk space allocated for Citrix SD-WAN Orchestrator for On-premises.
- In the disaster recovery scenario, you must reconfigure the custom domain after activating the disk.
- In the disaster recovery scenario, after activating the disk, you must either perform non-cloud zero-touch deployment or cloud brokered zero-touch deployment to establish connectivity between Citrix SD-WAN appliances on the sites with Citrix SD-WAN Orchestrator for On-premises.

Add a new disk on Citrix Hypervisor

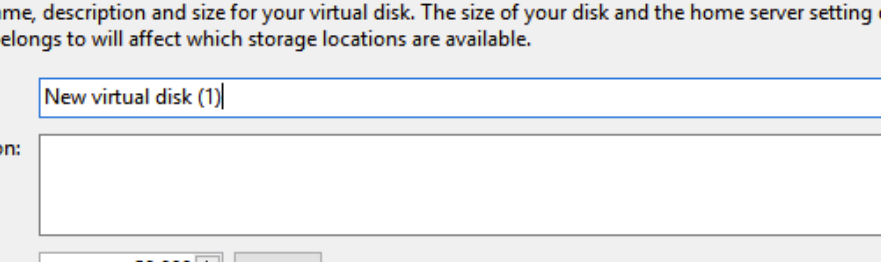
1. Select the virtual machine (VM) from the hypervisor. Select the **Storage** tab and click **Add**.



2. Provide details such as name, description, size, and location of the new disk. Click **Add**. The newly added disk gets listed under the **Storage** tab.

NOTE

The disk size must be at least twice as that of the current data consumed by the Citrix SD-WAN Orchestrator for On-premises.



Add Virtual Disk

Enter a name, description and size for your virtual disk. The size of your disk and the home server setting of any VM the disk belongs to will affect which storage locations are available.

Name: New virtual disk (1)

Description:

Size: 50.000 GB

Location:

- Local storage on 1.23 TB free of 1.78 TB
- Local_Storage2 171.47 GB free of 1.82 TB

Add **Cancel**

GeneralMemoryStorageNetworkingConsolePerformanceSnapshotsSearch

Virtual Disks

DVD Drive 1: <empty> [Eject](#)

Position	Name	Description	SR	Size	Read Only	Priority	Active	Device Path
0	Hard Disk 1		Local_Storage2	65 GB	No	0 (Lowest)	Yes	/dev/xvda
1	New virtu...		Local_Storage2	50 GB	No	0 (Lowest)	Yes	/dev/xvdb

Add...Attach Disk...DeactivateMove...DetachDelete

Properties

- Log in to the Citrix SD-WAN Orchestrator for On-premises UI and navigate to **INFRASTRUCTURE > Orchestrator Administration > Storage Management**. The newly attached disk automatically gets listed under **Storage Management**.
- Choose the **Active** radio button and select the **Migrate Data** check box. Click **Apply**.

Network Infrastructure: Storage Management

 Reboot of the system will happen as part of Storage migration process.

Storage Management

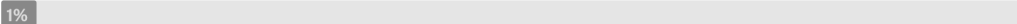
Host	File System	Type	Size(MB)	Available(MB)	Active	Migrate Data
Local*	/dev/xvda2	ext3	64891	47196	☐	☐
Local	/dev/xvdb	ext3	51200	unknown	☒	☒

Apply

- The disk migration process is triggered. Customer configurations, statistics, local database, and Citrix SD-WAN release version on the existing disk get migrated to the new disk. After the migration is completed, Citrix SD-WAN Orchestrator for On-premises gets rebooted.

Storage Management

Storage Migration Status

1% 

Disk migration triggered.

Storage Management

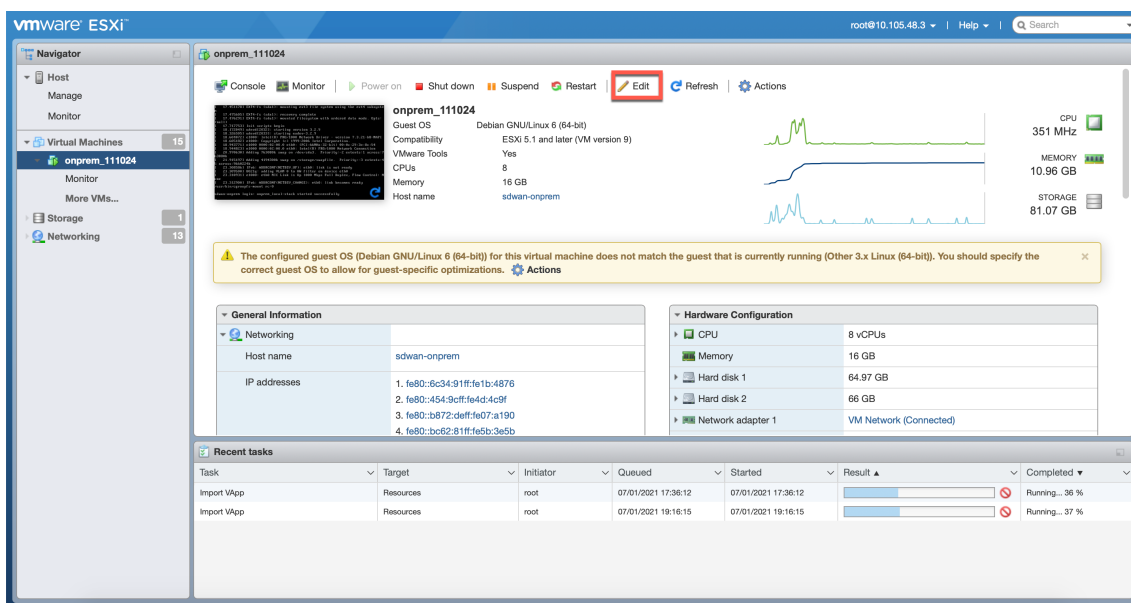
Storage Migration Status

Storage migration done and reboot is in progress. It takes approximately 5 to 6 minutes to complete the reboot process. Your system may be unavailable in that time period.

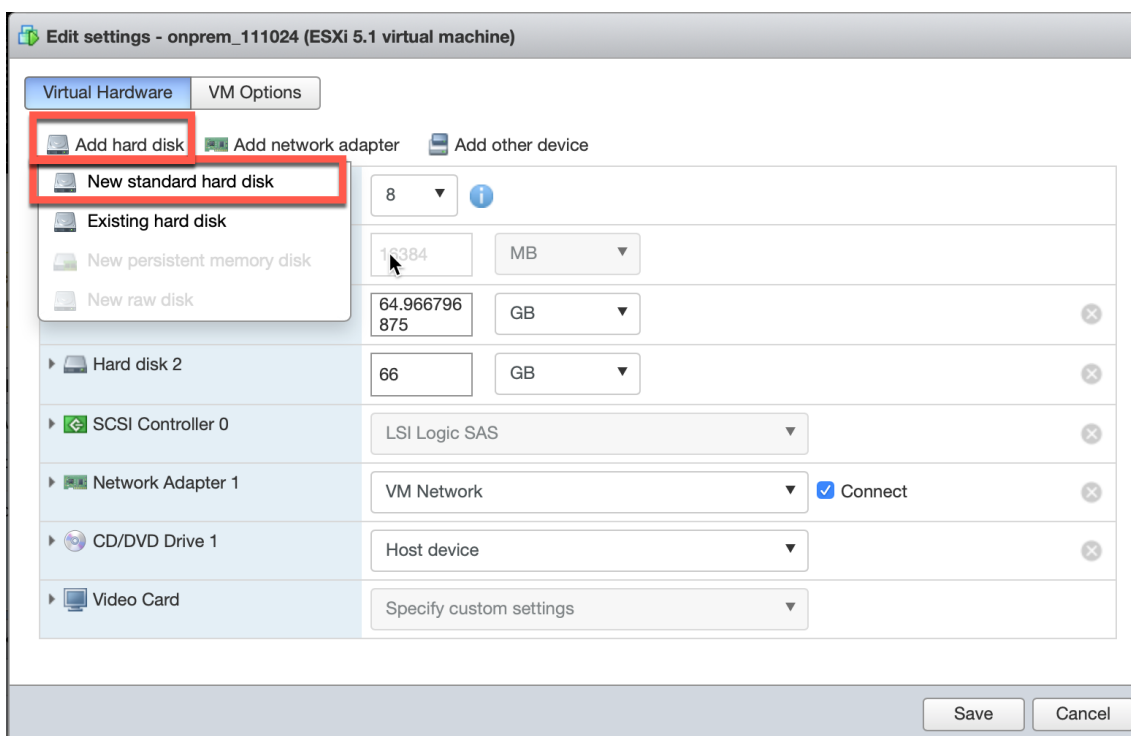
336 secs

Add a new disk on ESXi Server

1. Log in to your ESXi server and select the virtual machine. Click **Edit**.



2. Click **Add hard disk > New standard hard disk**.



3. Enter the disk storage space and other settings based on your preference. Click **Save**.

NOTE

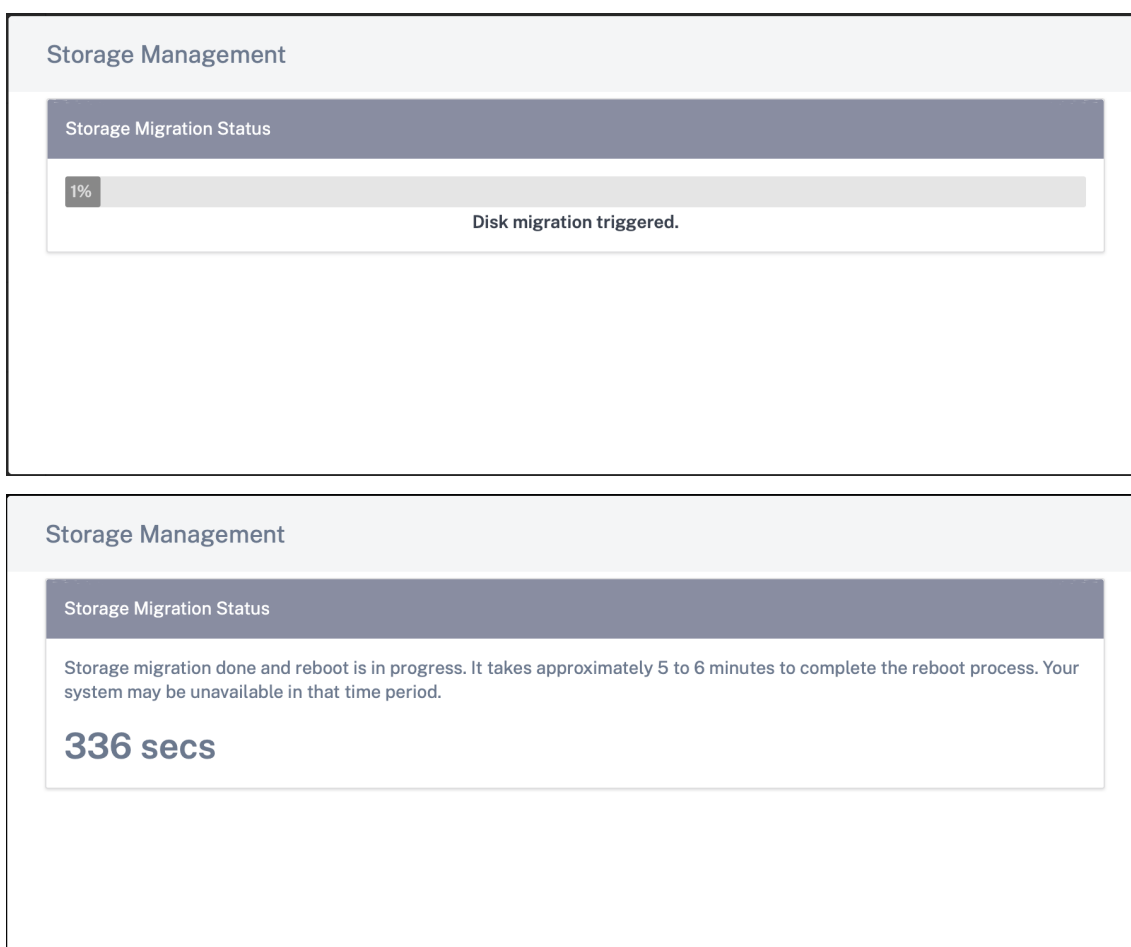
The disk size must be at least twice as that of the current data consumed by the Citrix SD-WAN Orchestrator for On-premises.

- Log in to the Citrix SD-WAN Orchestrator for On-premises and navigate to **INFRASTRUCTURE > Orchestrator Administration > Storage Management**. The newly attached disk gets listed here.
- Choose the **Active** radio button and select the **Migrate Data** check box. Click **Apply**.

Network Infrastructure: Storage Management

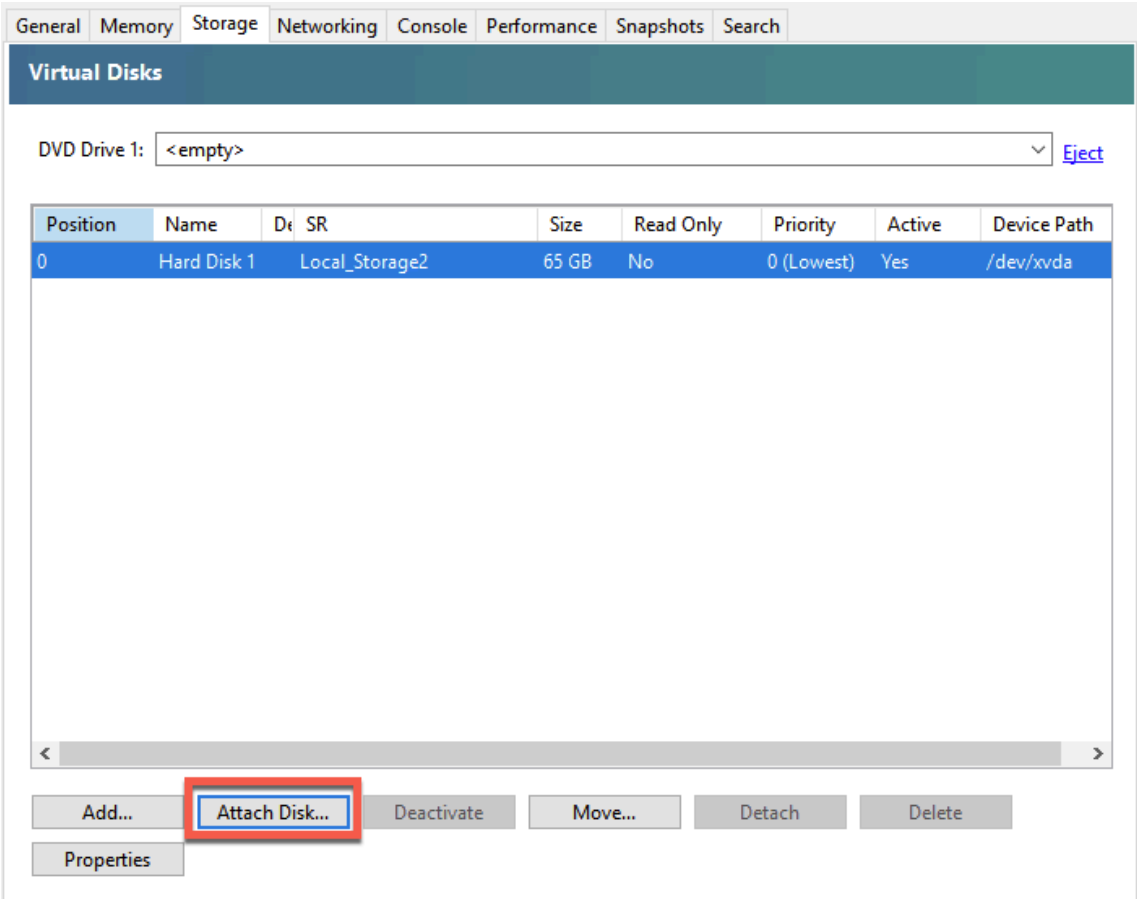
Host	File System	Type	Size(MB)	Available(MB)	Active	Migrate Data
Local*	/dev/xvda2	ext3	64891	47196	☐	☐
Local	/dev/xvdb	ext3	51200	unknown	☒	☒

- The disk migration process is triggered. Customer configurations, local database, Citrix SD-WAN release version, and database statistics on the existing disk get migrated to the new disk. After the migration is completed, Citrix SD-WAN Orchestrator for On-premises gets rebooted.



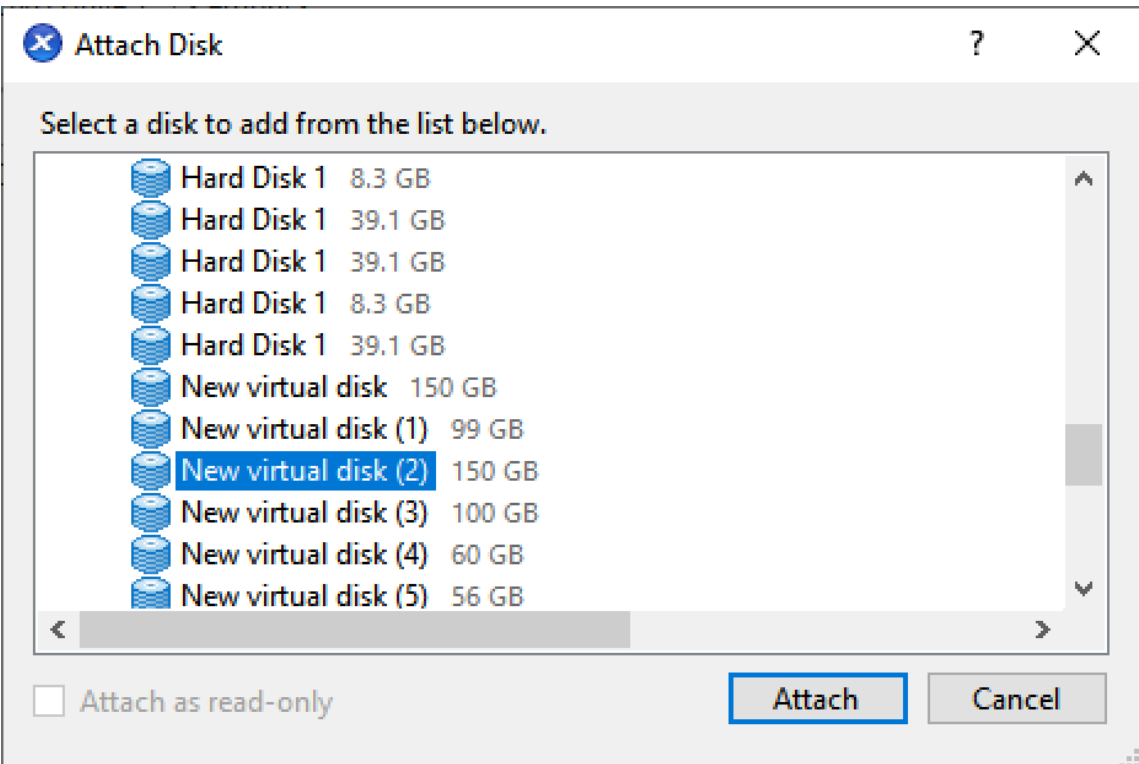
Disaster recovery on Citrix Hypervisor

1. Select the virtual machine (VM) from the hypervisor. Select the **Storage** tab and click **Attach Disk**.



2. Select the disk attached to the Citrix SD-WAN Orchestrator for On-premises which hit disaster and click **Attach**.

If the disk is not listed, ensure that the disk attached to Citrix SD-WAN Orchestrator for On-premises which hit disaster is detached and Citrix SD-WAN Orchestrator for On-premises is in shutdown state.



- Log in to the Citrix SD-WAN Orchestrator for On-premises UI and navigate to **INFRASTRUCTURE > Orchestrator Administration > Storage Management**. The newly attached disk gets listed here.
- Choose only the **Active** radio button (clear the **Migrate Data** check box if selected) and click **Apply**.

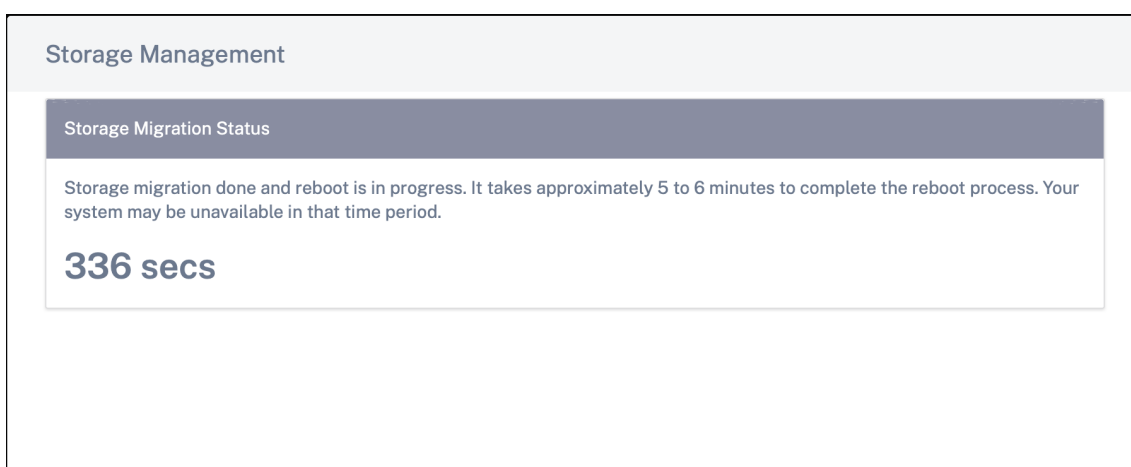
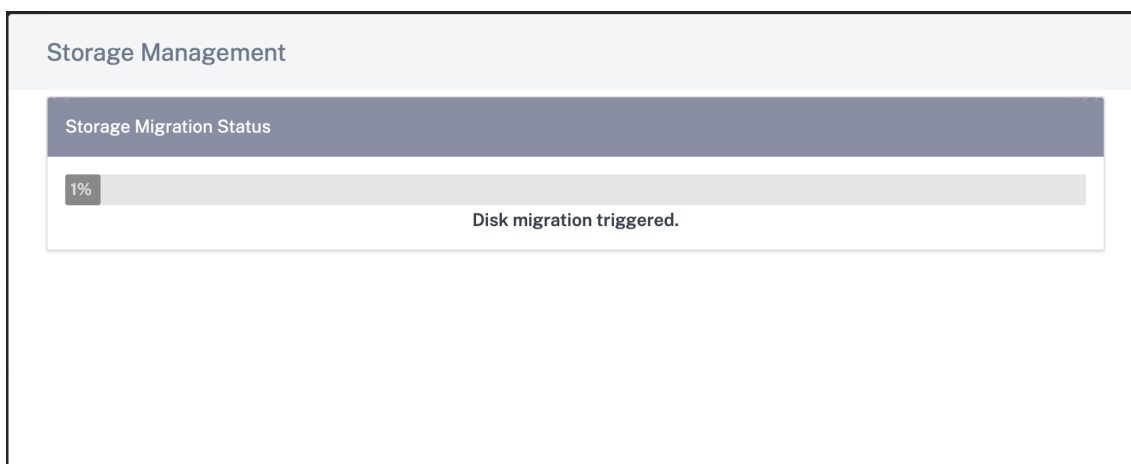
Note

Do not select the **Migrate Data** check box. Citrix SD-WAN Orchestrator for On-premises triggers the migration at the back-end and reboots itself once the migration is completed.

Storage Management						
Host	File System	Type	Size(MB)	Available(MB)	Active	Migrate Data
Local*	/dev/xvda2	ext3	64891	26730	☐	☐
Local	/dev/xvdb	ext3	153600	unknown	☒	☐

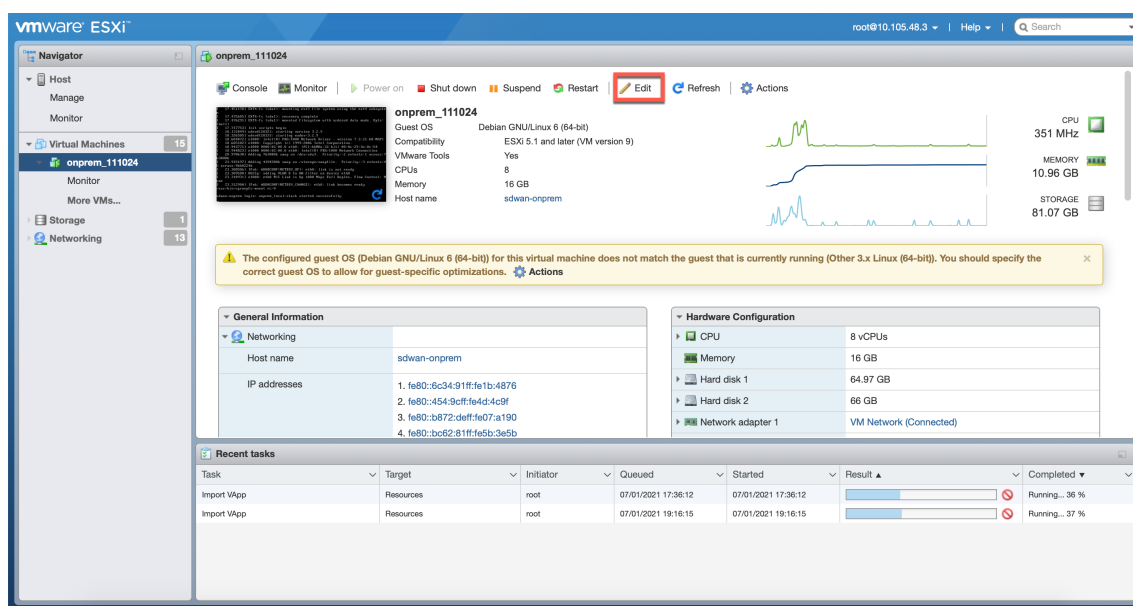
Apply

- After the migration is completed, Citrix SD-WAN Orchestrator for On-premises gets rebooted.

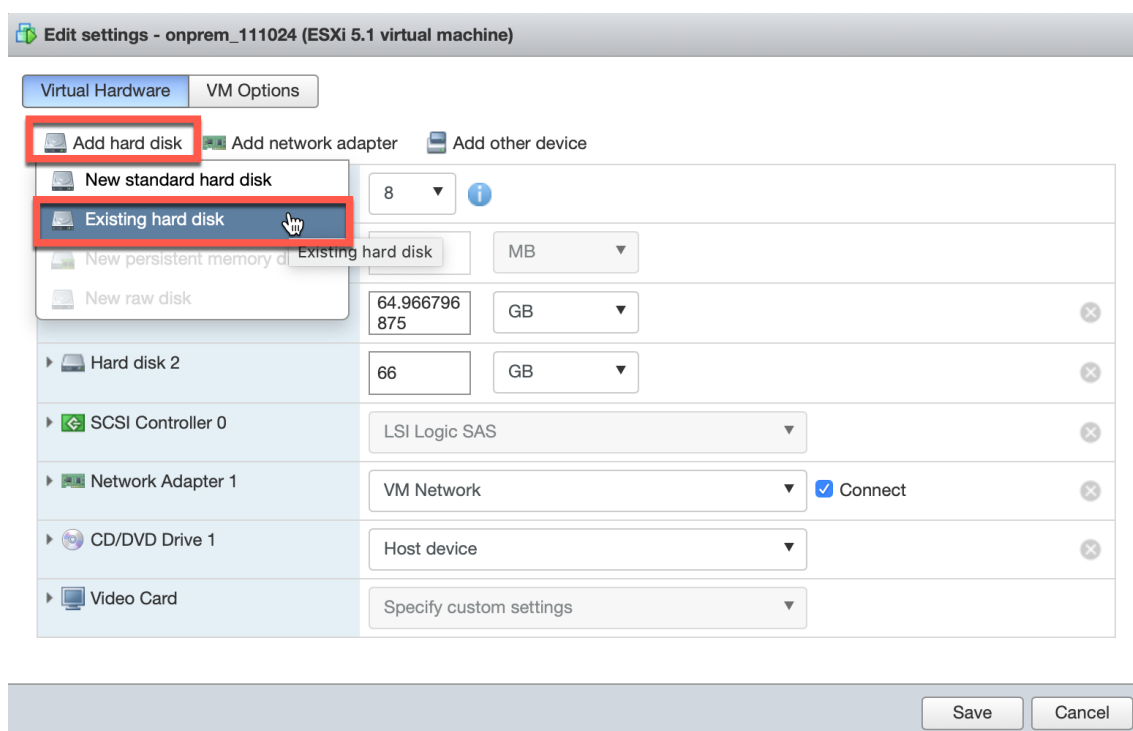


Disaster recovery on ESXi server

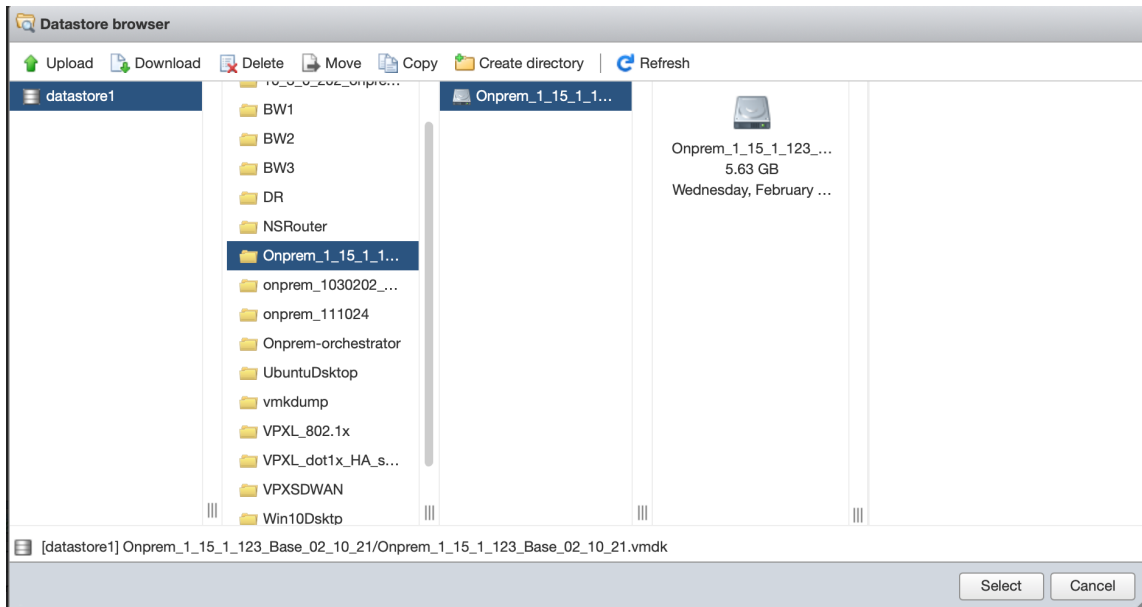
1. Log in to the ESXi server and select the virtual machine. Click **Edit**.



2. Click **Add hard disk > Existing hard disk**.



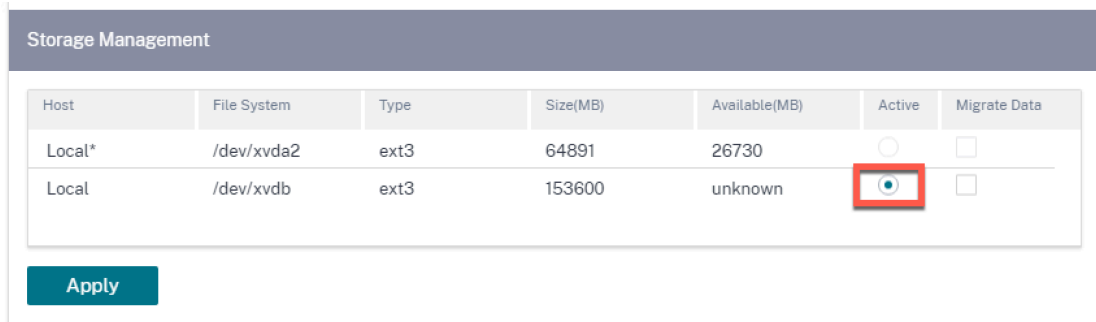
3. Browse for the disk attached to the Citrix SD-WAN Orchestrator for On-premises which hit disaster and click **Select**.



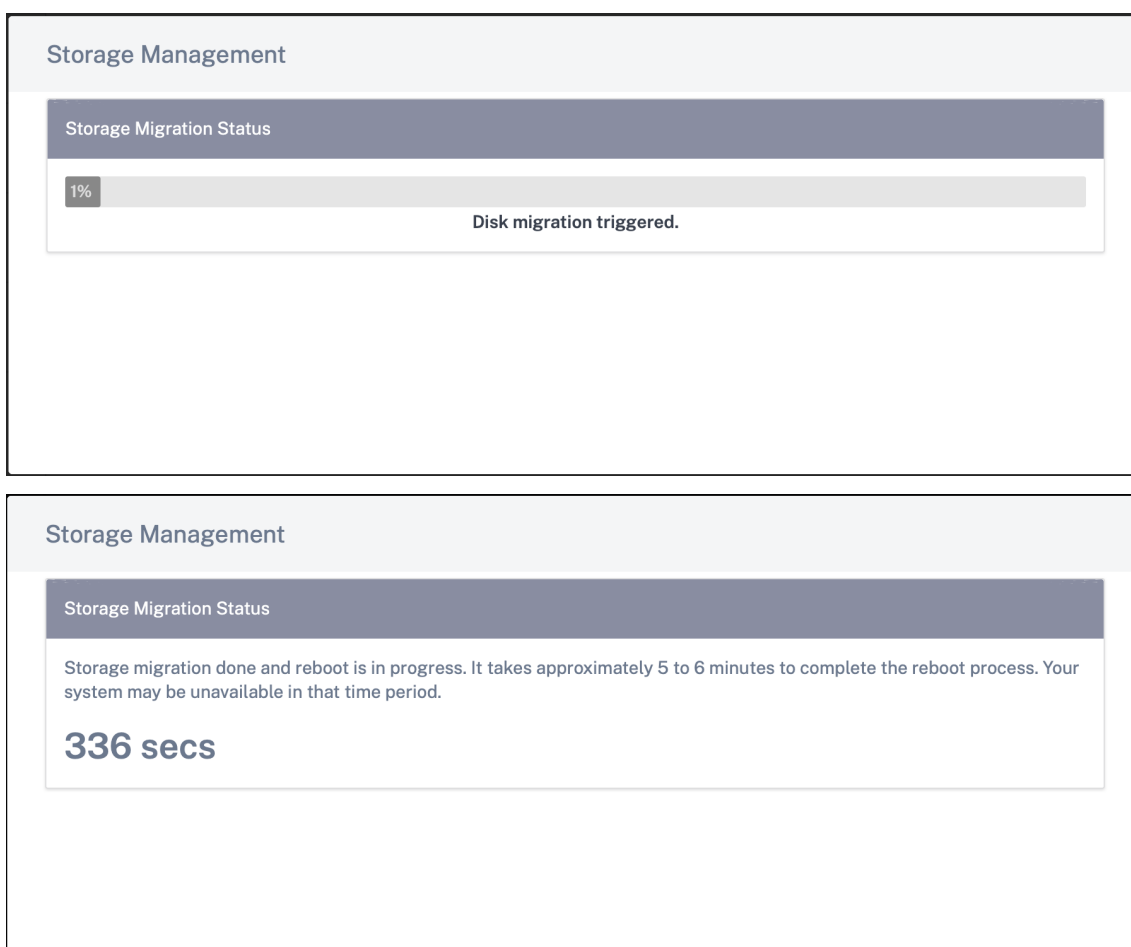
- Log in to the Citrix SD-WAN Orchestrator for On-premises UI and navigate to **INFRASTRUCTURE > Orchestrator Administration > Storage Management**. The newly attached disk gets listed here.
- Choose only the **Active** radio button (clear the **Migrate Data** check box if selected) and click **Apply**.

Note

Do not select the **Migrate Data** check box. Citrix SD-WAN Orchestrator for On-premises triggers the migration at the back-end and reboots itself once the migration is completed.



- After the migration is completed, Citrix SD-WAN Orchestrator for On-premises gets rebooted.



HTTP Proxy

Citrix SD-WAN Orchestrator for On-premises requires an Internet connection for licensing, Cloud login, Cloud brokered ZTD, Cloud direct, and publish software. If Citrix SD-WAN Orchestrator for On-premises is connected to the Internet through an HTTP proxy server, you can configure the HTTP proxy server settings on your Citrix SD-WAN Orchestrator for On-premises virtual machine.

The HTTP proxy setting centralizes the management of all the outgoing requests made to Citrix Cloud. Administrators can route the outgoing requests from Citrix SD-WAN Orchestrator for On-premises to Citrix Cloud through an HTTP proxy server.

Before you begin

To use HTTP proxy for Cloud login for the first time, you must configure HTTP proxy settings through the CLI console of Citrix SD-WAN Orchestrator for On-premises.

On the Cloud login page of a new Citrix SD-WAN Orchestrator for On-premises virtual machine, if you want HTTP proxy to be used for all the outbound connections from Citrix SD-WAN Orchestrator for

On-premises to Citrix SD-WAN Orchestrator service, you must configure the HTTP proxy details using the CLI. Once the Cloud login is complete and you access the configuration page, you can configure the HTTP proxy server details on the UI.

Configuring HTTP proxy settings on the CLI

Configure HTTP proxy settings by running the `set_http_proxy` command. You can configure HTTP proxy using either of the options provided below:

- When authentication is enabled at the Proxy server:

```
set <ip address> <port> <user name> <password>
```

- When authentication is not enabled at the Proxy server:

```
set <ip address> <port>
```

Show HTTP Proxy Settings

- `show`: This command displays the proxy settings on the CLI. The output does not display the password.

Clear HTTP Proxy Settings

- `clear`: This command deletes the HTTP proxy settings.

Return to main_menu

- `main_menu`: This command redirects you to the CLI console of Citrix SD-WAN Orchestrator for On-premises.

```
SDWORCH>set_http_proxy

Which would you like to do?
    "set <ip address> <port> [<user name>] [<password>]" - Set HTTP Proxy settings
    "clear" - Clear HTTP Proxy settings
    "show" - Show HTTP Proxy settings
    "main_menu" - Return to the Main Menu

set_http_proxy>set 11.11.11.11 5555

Are you sure you want to set HTTP proxy settings? <y/n>?
y
Successfully updated proxy settings.

Which would you like to do?
    "set <ip address> <port> [<user name>] [<password>]" - Set HTTP Proxy settings
    "clear" - Clear HTTP Proxy settings
    "show" - Show HTTP Proxy settings
    "main_menu" - Return to the Main Menu

set_http_proxy>_
```

Configuring HTTP proxy server settings on the UI

1. Login to the Citrix SD-WAN Orchestrator for On-premises UI and navigate to **Infrastructure > Orchestrator Administration > HTTP Proxy**.
2. In the **Network Infrastructure: HTTP Proxy** section, enter values for the following fields:
 - **IP Address:** The IP address of the proxy server.
 - **Port:** The network port number on which the proxy server accepts connections.
 - **User Name:** User name of the proxy server.
 - **Password:** The password for the proxy server.

Note

You can leave the user name and Password fields blank if there is no authentication configured on the proxy server.

Network Infrastructure: HTTP Proxy

HTTP Proxy

IP Address *

11.11.11.11

Port *

5555

Username

Password

Apply

Remove

3. Click Apply. A confirmation dialog box appears.

4. Click Yes, Update.



Save HTTP Proxy Settings

Are you sure you want to update the HTTP Proxy Settings?

Yes, Update

No, Cancel

Notes

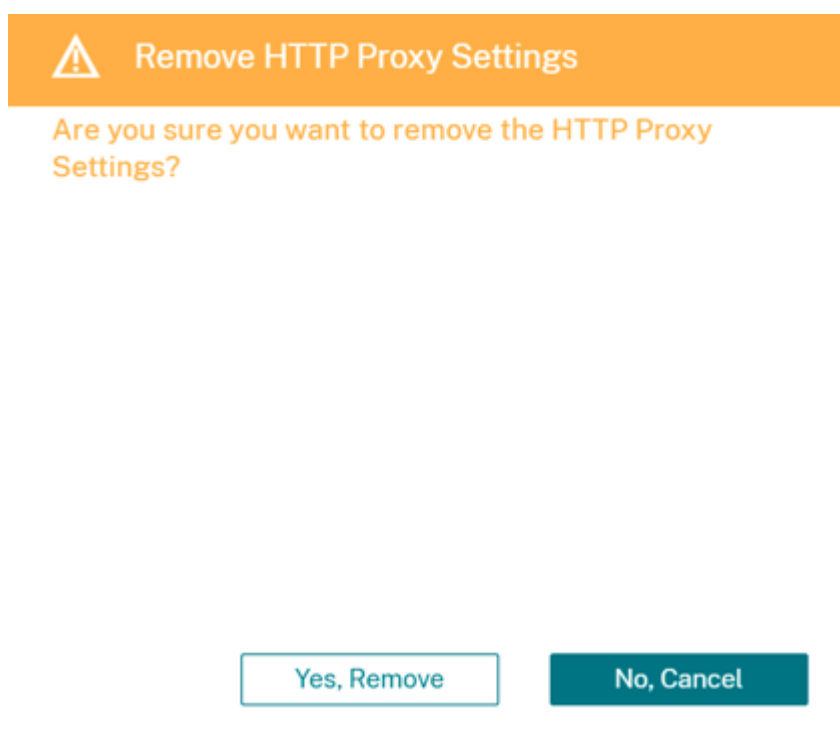
- To use the HTTP proxy server for outbound traffic from Citrix SD-WAN Orchestrator for On-premises to Citrix Cloud, the proxy server must be configured as a transparent SSL HTTP proxy or SSL bypass HTTP proxy server. The server must not spoof the Citrix

SD-WAN Orchestrator service's SSL certificate.

- You can remove the proxy server settings altogether, if Citrix SD-WAN Orchestrator for On-premises is connected to the internet directly. You can also remove the proxy server settings and configure another proxy server, if necessary.

Remove proxy server settings on the UI

1. In the Citrix SD-WAN Orchestrator for On-premises UI, navigate to **Infrastructure > Orchestrator Administration > HTTP Proxy**.
2. In the **Network Infrastructure: HTTP Proxy** section, click **Remove**. A confirmation dialog box appears.
3. Click **Yes, Remove**.



Purge Settings

You can clear historical statistics/ data for a selected time interval. The statistics / data older than the set days are cleared. Once the data is cleared, it becomes no longer available. By default, Citrix SD-WAN Orchestrator for On-premises clears historical statistics / data older than 30 days.

At the network level, navigate to **Infrastructure > Orchestrator Administration > Purge Settings**, select the time interval, and click **Apply**. For example, if you want to purge historical statistics / data older than 180 days, select 180 from the **Purge Statistics Interval (days)** drop-down list and click

Apply. The purging process happens sometime around 12:48 AM daily at the time zone set on your SD-WAN appliance.

Network Infrastructure: Purge Settings



Orchestrator diagnostics

May 17, 2021

This section provides information on the diagnostic activities that can be performed on Citrix SD-WAN Orchestrator for On-premises infrastructure.

Note

In a provider managed setup, provider administrators have access to all the GUI pages **Infrastructure > Orchestrator Diagnostics**. Customer administrators have access to view only **Platform events and logs** and **Platform health** GUI pages.

Platform events and logs

Any change in platform level attributes, such as CPU, memory, or storage in the system is logged as an event and displayed on the Citrix SD-WAN Orchestrator for On-premises.

For example, if CPU usage exceeds the set limit, a platform event is logged and an alarm is triggered. The alarm comes up in the Notifications bar. The notification gets cleared if the CPU usage gets decreased. The **Platform Events & Logs** page maintains the history of all platform related alarms that were triggered. If the CPU usage decreases, the alarm status becomes INACTIVE. If it is still above the limits, the alarm status remains ACTIVE.

To view the platform events, navigate to **Infrastructure > Orchestrator Diagnostics > Platform Events & Logs**.

The following details are displayed for logged platform events:

- **Description:** The description of the platform event.

- **Alarm Status:** The status of the alarm. If the platform attribute exceeds the set limit, then the status is ACTIVE. If the platform level attribute subsides to a value within the set limit, then alarm status is INACTIVE.
- **Resource:** The platform level attribute – CPU, Memory, or Storage.
- **Current Value:** The latest value of the logged platform attribute.
- **Created At:** The time when the platform event occurred.

Description	Alarm Status	Resource	Current Value	Created At
UPPER THRESHOLD EXCEEDED	ACTIVE	Memory	70.1	Sun 22 November, 2020 at ...
UPPER WARNING THRESHOLD EX...	ACTIVE	CPU	51.4	Sun 22 November, 2020 at ...

Page Size: 200 Showing 1 - 2 of 2 items Page 1 of 1

Platform health

You can view the health of the Citrix SD-WAN Orchestrator for On-premises platform. The health information includes real-time values (in percentage) for CPU usage, Memory usage, and free storage available.

To view the platform health, navigate to **Infrastructure > Orchestrator Diagnostics > Platform Health**.

CPU Usage	1%
Memory Usage	74%
Free Storage	35%

Diagnostic info

A diagnostic package consists of System Log files, system information, and other necessary details that assist the Support team in diagnosing and resolving issues with your system.

To create a diagnostic package, navigate to **Infrastructure > Orchestrator Diagnostics > Diagnostic info**. Click **Create**. After the package is created, you can download it to your computer and then share it with the Support team.

NOTE

Citrix SD-WAN Orchestrator for On-premises can store a maximum of five diagnostic packages at a time.

These packages contain important real-time system information you can forward to Citrix Support Representatives.
Total five Diagnostic Packages can exist on the system at a time.

Diagnostic Packages*

Create

Restart Citrix SD-WAN Orchestrator for On-premises app

You can restart only the Citrix SD-WAN Orchestrator for On-premises app without rebooting the Operating System (OS). During restart, Citrix SD-WAN Orchestrator for On-premises app goes offline and the all services become unavailable. It takes approximately 6 minutes for the restart to complete. After the restart, Citrix SD-WAN Orchestrator for On-premises login page is displayed.

To restart Citrix SD-WAN Orchestrator for On-premises app, navigate to **Infrastructure > Orchestrator Diagnostics > Restart Orchestrator App**. Click **Restart** and **Yes, Restart** to confirm.

On-Prem Orchestrator status: UP 

Restart

Reboot Citrix SD-WAN Orchestrator for On-premises VM

The Reboot process restarts the Operating System (OS) of Citrix SD-WAN Orchestrator for On-premises. During the reboot, Citrix SD-WAN Orchestrator for On-premises goes offline and all services become unavailable. It takes approximately 6 to 8 minutes for the reboot to complete. After the reboot, Citrix SD-WAN Orchestrator for On-premises login page is displayed.

You can reboot Citrix SD-WAN Orchestrator for On-premises as part of a troubleshooting activity or during a maintenance activity.

To reboot, navigate to **Infrastructure > Orchestrator Diagnostics > Reboot Orchestrator VM**. Click **Reboot** and **Yes, Reboot** to confirm.

Network Infrastructure: Reboot Orchestrator VM

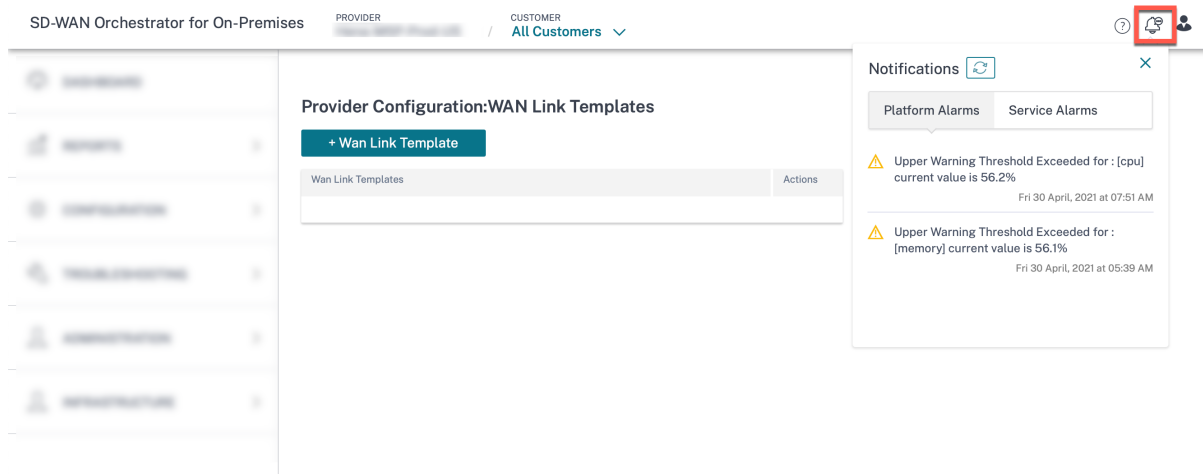
Reboot

Alarms

July 9, 2021

You can view the platform specific and service specific alarms associated with Citrix SD-WAN Orchestrator for On-premises. Platform specific alarms show platform related alerts such as storage issue, RAM, CPU. Service alarms show the status of the microservices running in Citrix SD-WAN Orchestrator for On-premises.

To view the alarms, click the bell icon on the top right corner of the Citrix SD-WAN Orchestrator for On-premises UI and select **Platform Alarms** or **Service Alarms** as needed.



**Locations**

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