Operator Guide

VeloCloud SD-WAN

Version 5.2

Arista.com

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Contents

Chapter 1

About VeloCloud SD-WAN Operator Guide

The Arista VeloCloud SD-WAN™ Operator Guide provides information about VeloCloud Orchestrator, including how to configure and manage Customers and Partners who use the Orchestrator.

Intended Audience

This guide is intended for Operators and Service Providers, who are familiar with the Networking and SD-WAN operations.

Here's a quick walkthrough of the user journey as an Operator super user:

1. Install SD-WAN Orchestrator
2. Configure SD-WAN Orchestrator Disaster Recovery
3. Upload Software Images
4. Configure System Properties
5. Configure Operator Users
6. Configure Operator Profiles
7. Configure Customers
8. Configure Partners
9. Configure User Agreements
10. Manage Edge Licensing
11. Provision Edges
12. Configure Gateways and Gateway Pools
13. Configure Profiles
14. Monitor Customers
15. Monitor and Troubleshoot Gateways
16. Troubleshoot SD-WAN Orchestrator

Chapter 2

Overview of VeloCloud SASE Orchestrator

Arista VeloCloud SASE Orchestrator provides centralized, enterprise-wide installation, configuration, and real time monitoring, in addition to orchestrating the data flow through the cloud network.

The SASE Orchestrator is available as web-based user interface, where you can configure and manage the following:

- Customers
- Partners
- Operator Users
- Gateways and Gateway Pools
- Orchestrator Authentication Modes

Chapter 3

What's New

Table 1: New Features in Version 5.2.0

Feature	Description
Edge Link Down Limit	This feature allows you to set the limit for the Edge link to be down. For additional information, see Edge Management.
Encrypt Device Secrets	This feature activates device secret encryption for all the Edges in the current Enterprise. For additional information, see Edge Management.
Exporting Auto-Rate Limit Events to Orchestrator	To improve the Edge-to-Gateway assignment, when the auto rate-limit capability is activated on Gateways and if the Gateway detects that certain Edges are sending large amount of traffic which might be causing the Gateway to be unstable and drop packets, the auto-rate limit events are generated and reported to the Orchestrator. For additional information, see Operator-Level Orchestrator Alerts and Events.
Exporting Gateway Capacity Events to Orchestrator	Currently, the SD-WAN Gateway assignment is based on Geo-proximity and doesn't take the Gateway capacity health metrics into account. To improve the Edge-to-Gateway assignment the capacity health metrics (Edge Count, Tunnel Count, PKI Activated Tunnel Count, Flow count, NAT Count, Packet Queue Watermark, and Packet Drops) are monitored periodically based on warning and critical thresholds. When any of the metrics count is above the defined warning and critical thresholds, Gateway capacity events are generated and reported to the Orchestrator. For additional information, see Operator-Level Orchestrator Alerts and Events.
High Availability Support for Platform Firmware	Updating the Factory image and Platform firmware on High-availability (HA) SD-WAN Edges is supported for the 5.2.0 release. For additional information, see Manage Operator Profiles.
Partner Settings	This feature allows you to configure the settings of the Partner user. For additional information, see Partner Settings.
Route Summarization	Route Summarization or route aggregation is a method used to minimize the number of routes that a router advertises to its neighbor. For additional information and a use case for Route Summarization, see the *Arista VeloCloud SD-WAN Administration Guide*. For procedure information for configuring Route Summarization when configuring a Gateway Partner Hand Off, see Configure Partner Handoff.
Support for Over Capacity Drops Trend in the **Monitor** > **Gateways** page.	VeloCloud Orchestrator allows you to monitor the total number of packets dropped due to over capacity since the last sync interval.

Chapter 4

Operator-level UI Changes in the New VeloCloud Orchestrator

The VeloCloud Orchestrator has moved and redesigned some features to fit the wider scope of the product and user interface (UI). The new UI has changed from a single product portal (only for SD-WAN) to a common management system that lets customers access multiple services in one place. The new UI navigation has adapted to allow access to multiple services within one shared header. The primary global header now has an Enterprise Applications (Services) drop-down menu that lists the various supported services. You can select and navigate to each service from this menu. Enterprise Global Settings is now located in the Enterprise Applications (Services) drop-down because it has features that are shared across services. These features include User Management, Authentication, Role Customization (now Roles and Service Permissions), Customer Configuration, and more.

This document explains the changes in the Operator UI for some features. It also gives the reasons for these changes.

Software Images

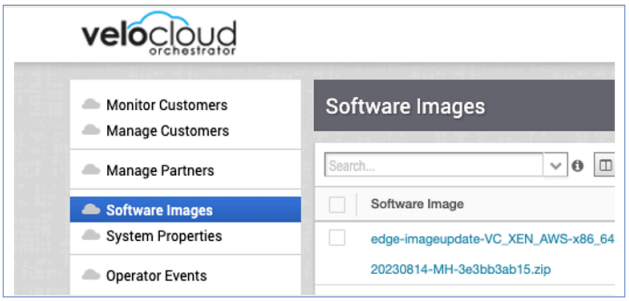
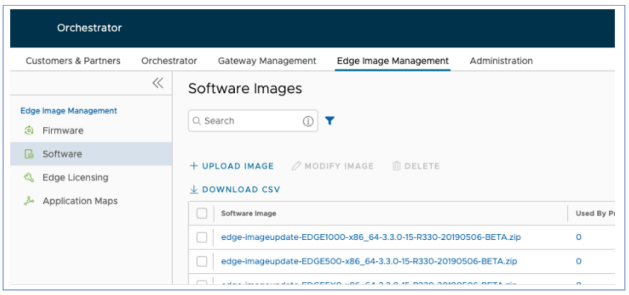
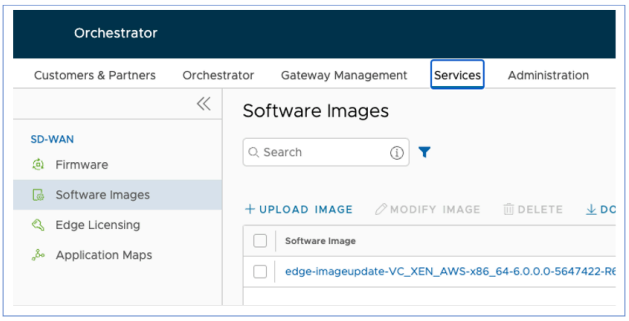
For 5.3.0 and Earlier Versions:

This feature has moved because the Edge-specific features are now under the Operator level, which can handle more than just SD-WAN features. The Operator and other levels are also adjusted to fit the new VeloCloud Orchestrator portal, which can support multiple services.

For 5.4.0 and Later Versions:

This feature is again moved because the Classic Orchestrator UI could not fit multiple services that need configuration at the Operator level. The new **Services** tab can accommodate different service settings, including SD-WAN features such as **Software Images**, **Edge Licensing**, **Firmware**, and **Application Maps**.

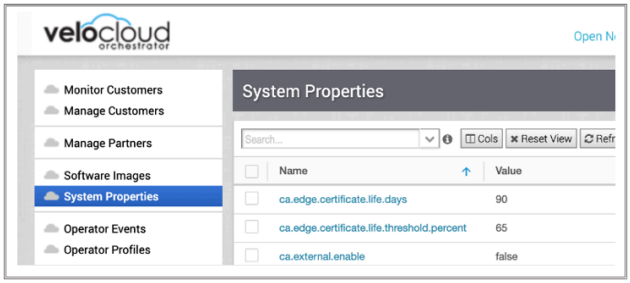
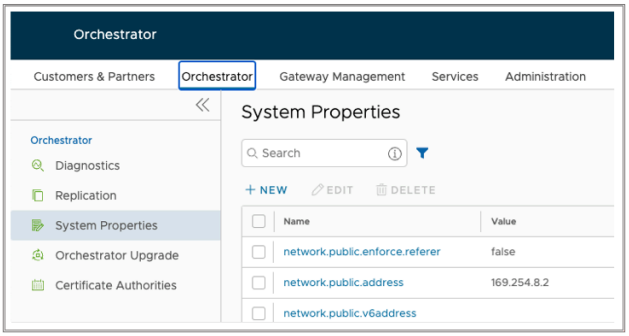
Table 2: Software Images

Classic Orchestrator Location	New Orchestrator Location
Operator > **Software Images** **Figure 4-1: Software Images** 	For 5.3.0 and earlier versions: **Operator** > **Edge Image Management** > **Software** **Figure 4-2: Software Images**  For 5.4.0 and later versions: **Operator** > **Services** > **Software Images** **Figure 4-3: Software Images** 

System Properties

This feature has moved to a new location because the Classic Orchestrator UI did not have clear navigation and organization of pages. The New Orchestrator location has a better hierarchy and categorization of these Operator pages. It groups related features together. **System Properties** is part of Orchestrator configuration, along with **Diagnostics**, **Replication**, **Orchestrator Upgrade**, and **Certificate Authorities**.

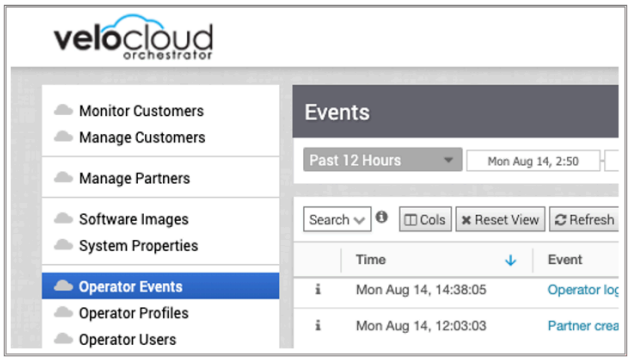
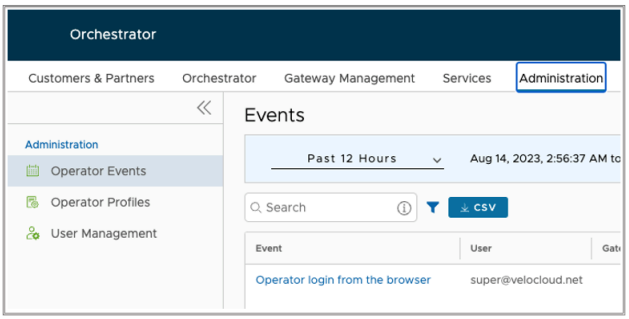
Table 3: System Properties

Classic Orchestrator Location	New Orchestrator Location
Operator > **System Properties**	**Operator** > **Orchestrator** > **System Properties**
Figure 4-4: System Properties	**Figure 4-5: System Properties**
	

Operator Events

This feature has moved to a new location because the Classic Orchestrator UI did not have clear navigation and organization of pages. The New Orchestrator puts all the Operator administration-related features under the **Administration** tab.

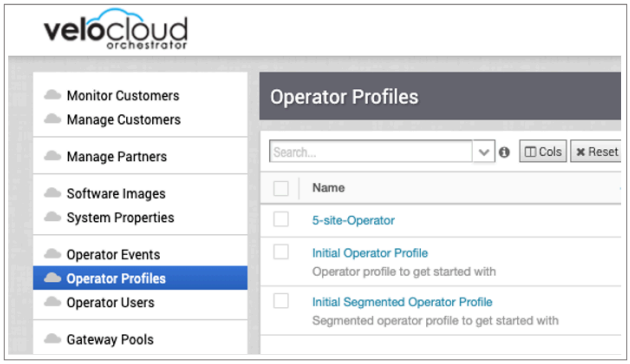
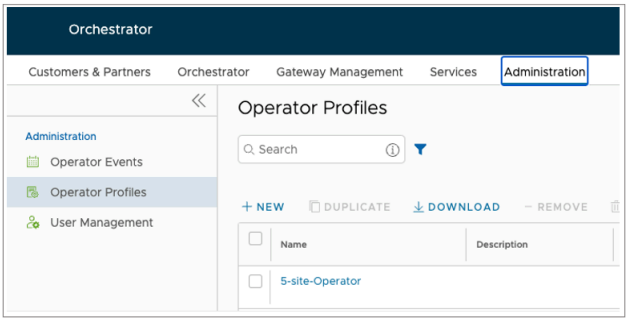
Table 4: Operator Events

Classic Orchestrator Location	New Orchestrator Location
Operator > **Operator Events**	**Operator** > **Administration** > **Operator Events**
Figure 4-6: Operator Events	**Figure 4-7: Events**
	

Operator Profiles

This feature has moved to a new location because the Classic Orchestrator UI did not have clear navigation and organization of pages. The New Orchestrator puts all the Operator administration-related features under the **Administration** tab.

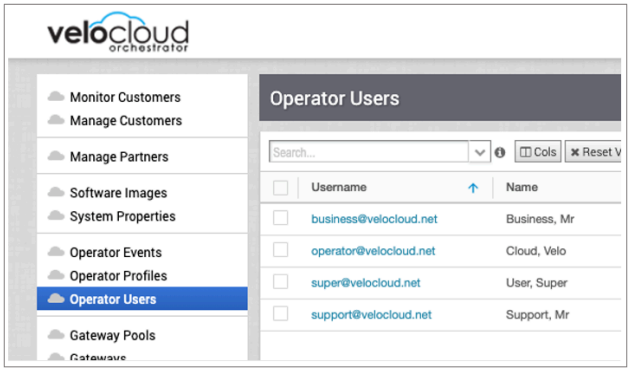
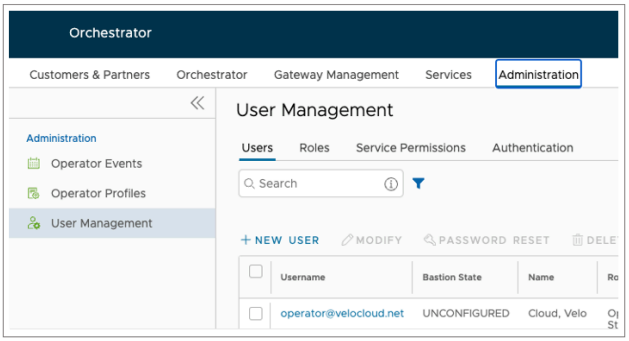
Table 5: Operator Profiles

Classic Orchestrator Location	New Orchestrator Location
Operator > **Operator Profiles**	**Operator** > **Administration** > **Operator Profiles**
Figure 4-8: Operator Profiles	**Figure 4-9: Operator Profiles**
	

Operator Users

This feature has moved to a new location because the Classic Orchestrator UI did not have clear navigation and organization of pages. The New Orchestrator puts all the Operator administration-related features under the **Administration** tab.

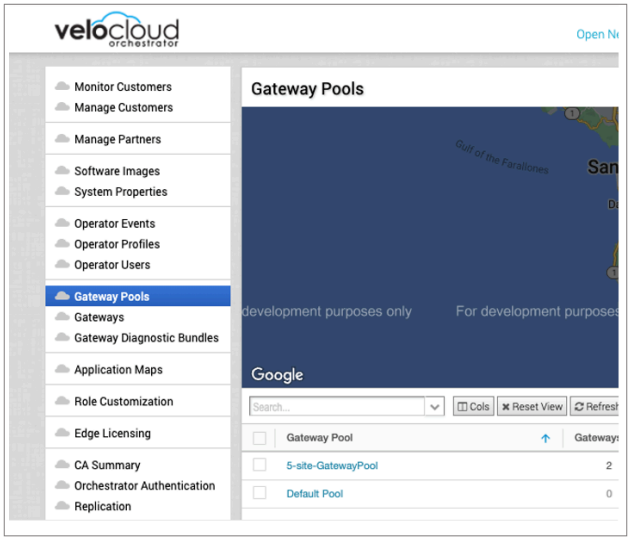
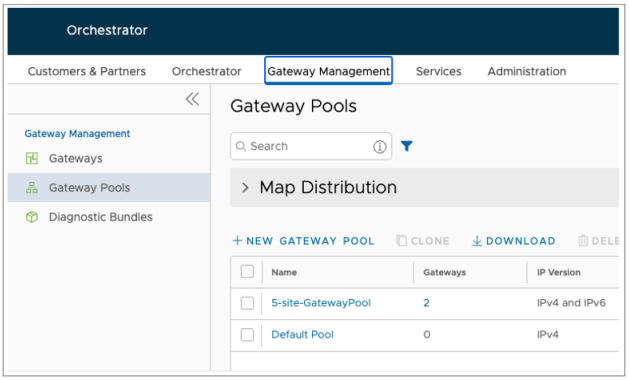
Table 6: Operator Users

Classic Orchestrator Location	New Orchestrator Location
Operator > **Operator Users**	**Operator** > **Administration** > **User Management** > **Users**
Figure 4-10: Operator Users	**Figure 4-11: Users**
	

Gateway Pools

We have moved the **Gateway Pools** feature to the New Orchestrator UI for enhanced user experience. The New Orchestrator UI has a better design that groups all Gateway related features under the **Gateway Management** tab.

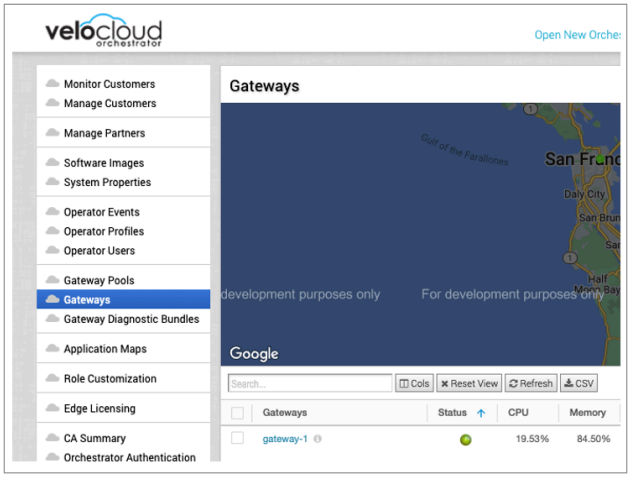
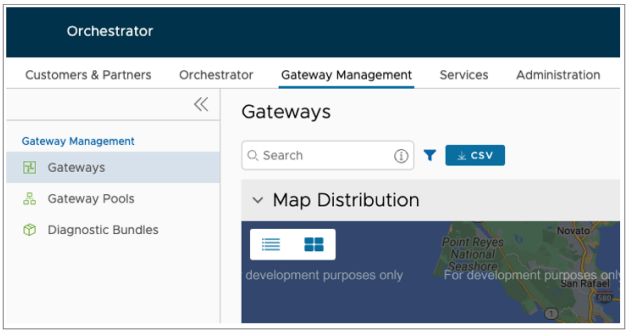
Table 7: Gateway Pools

Classic Orchestrator Location	New Orchestrator Location
Operator > **Gateway Pools**	**Operator** > **Gateway Management** > **Gateway Pools**
Figure 4-12: Gateway Pools	**Figure 4-13: Gateway Pools**
	

Gateways

We have moved the **Gateways** feature to the New Orchestrator UI for enhanced user experience. The New Orchestrator UI has a better design that groups all Gateway related features under the **Gateway Management** tab.

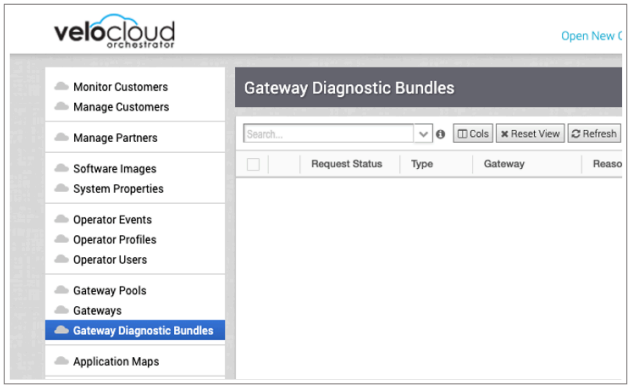
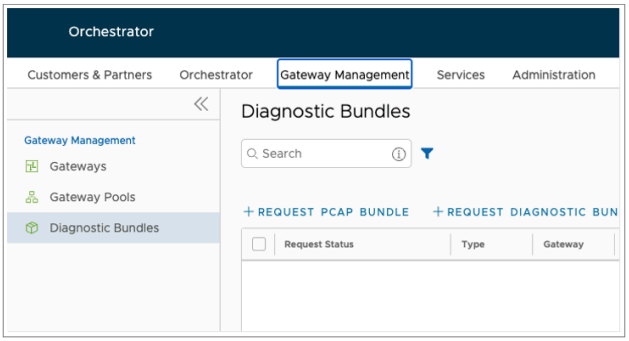
Table 8: Gateways

Classic Orchestrator Location	New Orchestrator Location
Operator > **Gateways**	**Operator** > **Gateway Management** > **Gateways**
Figure 4-14: Gateways	**Figure 4-15: Gateways**
	

Gateway Diagnostic Bundles

We have moved the **Gateway Diagnostic Bundles** feature to the New Orchestrator UI for enhanced user experience. The New Orchestrator UI has a better design that groups all Gateway related features under the **Gateway Management** tab.

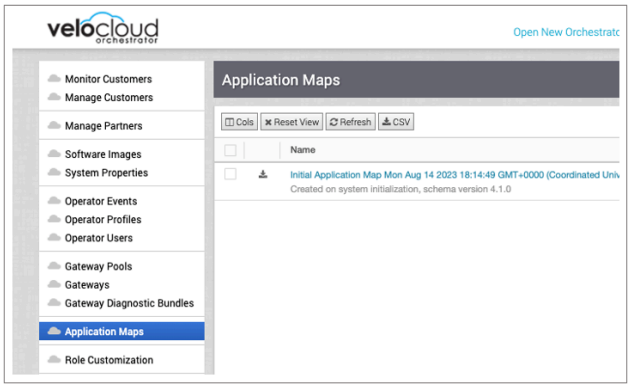
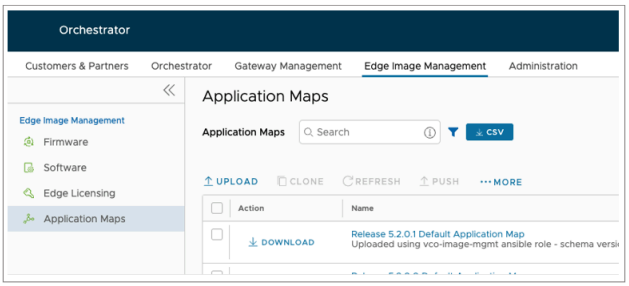
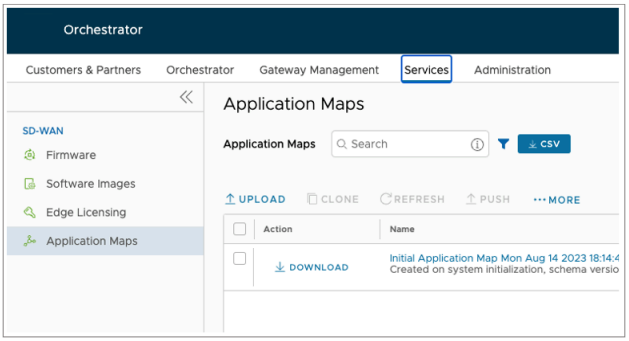
Table 9: Gateway Diagnostic Bundles

Classic Orchestrator Location	New Orchestrator Location
Operator > **Gateway Diagnostic Bundles**	**Operator** > **Gateway Management** > **Diagnostic Bundles**
Figure 4-16: Gateway Diagnostic Bundles	**Figure 4-17: Diagnostic Bundles**
	

Application Maps

We have relocated the **Application Maps** feature to the New Orchestrator UI for better user experience. **Application Maps** is a feature that only applies to the SD-WAN service and the New Orchestrator UI is a portal for many services, so we have moved this feature under the new **Edge Image Management** (or **Services**) tab within the SD-WAN service.

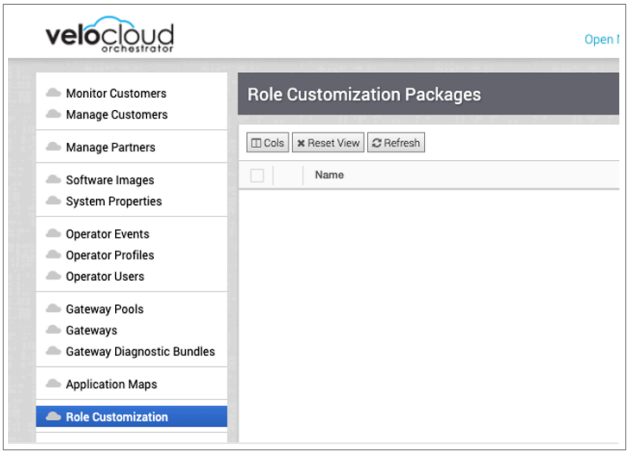
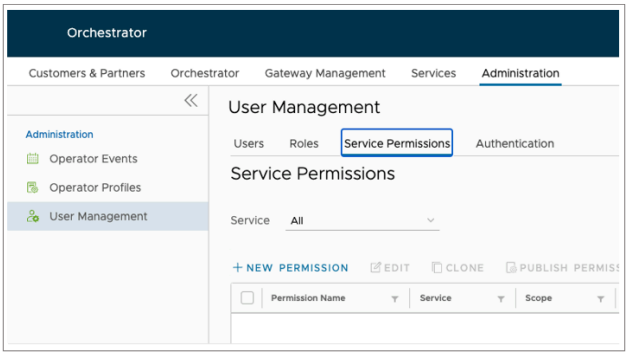
Table 10: Application Maps

Classic Orchestrator Location	New Orchestrator Location
Operator > **Application Maps** **Figure 4-18: Application Maps** 	For 5.3.0 and earlier versions: **Operator** > **Edge Image Management** > **Application Maps** **Figure 4-19: Application Maps** 
	For 5.4.0 and later versions: **Operator** > **Services** > **Application Maps** **Figure 4-20: Application Maps** 

Role Customization (Service Permissions)

We have changed the name of the **Role Customization** feature to **Service Permissions**. This is to make room for the new Role Builder feature that lets you create custom roles by combining different service permissions. **Service Permissions** is a more accurate name for the feature, as it allows you to adjust the access levels for each service.

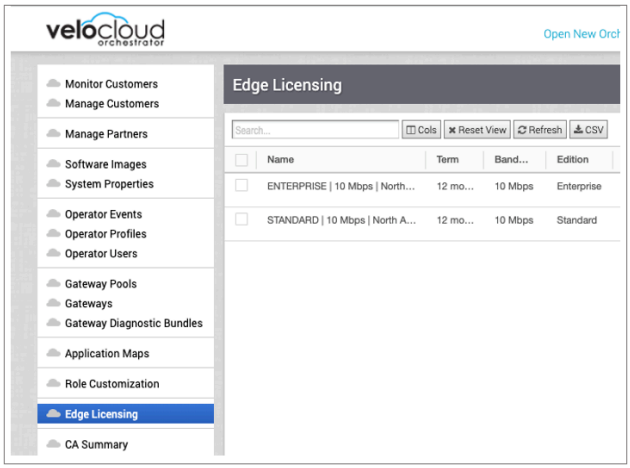
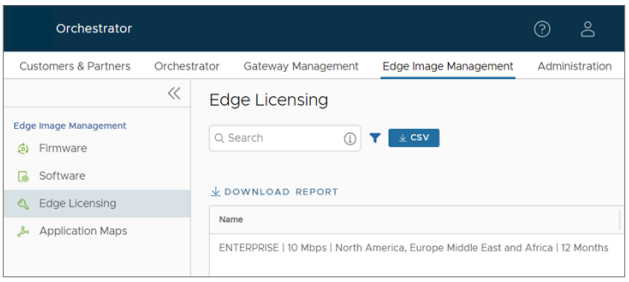
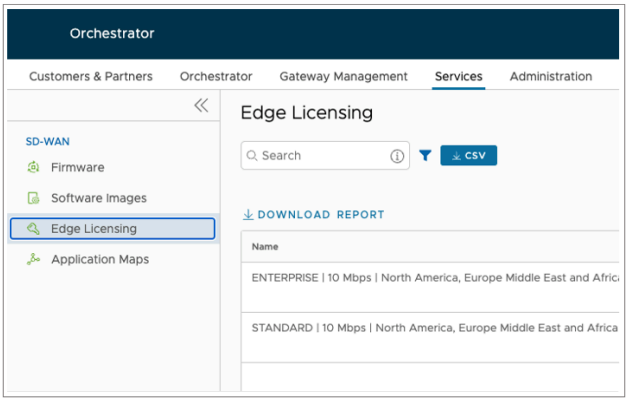
Table 11: Role Customization

Classic Orchestrator Location	New Orchestrator Location
Operator > **Role Customization**	**Operator** > **Administration** > **User Management** > **Service Permissions**
Figure 4-21: Role Customization	**Figure 4-22: Service Permissions**
	

Edge Licensing

We have relocated the **Edge Licensing** feature to the New Orchestrator UI for better user experience. **Edge Licensing** is a feature that only applies to the SD-WAN service and the New Orchestrator UI is a portal for many services, so we have moved this feature under the new **Edge Image Management** (or **Services**) tab within the SD-WAN service.

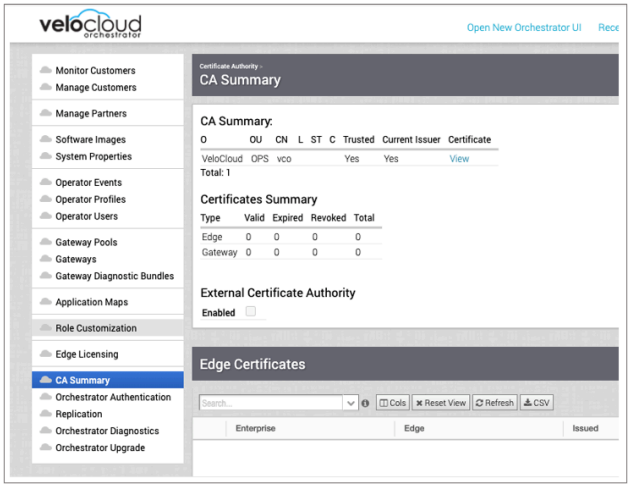
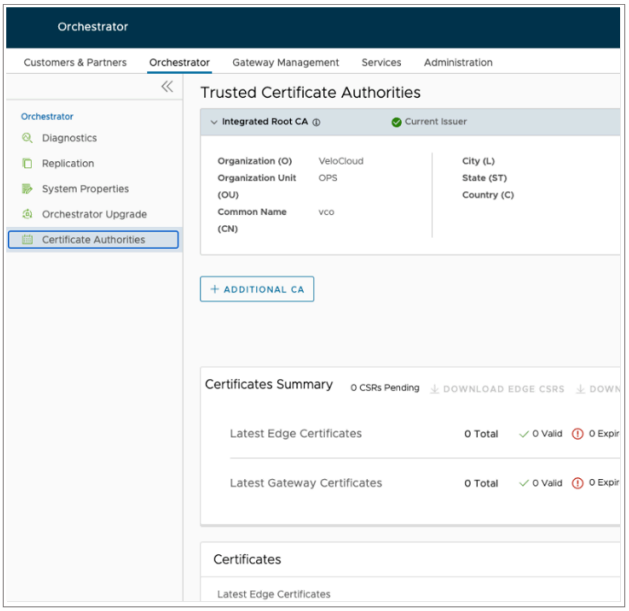
Table 12: Edge Licensing

Classic Orchestrator Location	New Orchestrator Location
Operator > **Edge Licensing** **Figure 4-23: Edge Licensing** 	For 5.3.0 and earlier versions: **Operator** > **Edge Image Management** > **Edge Licensing** **Figure 4-24: Edge Licensing** 
	For 5.4.0 and later versions: **Operator** > **Services** > **Edge Licensing** **Figure 4-25: Edge Licensing** 

CA Summary

CA Summary is renamed to **Certificate Authorities** to clearly represent the content of the page for easier on-boarding.

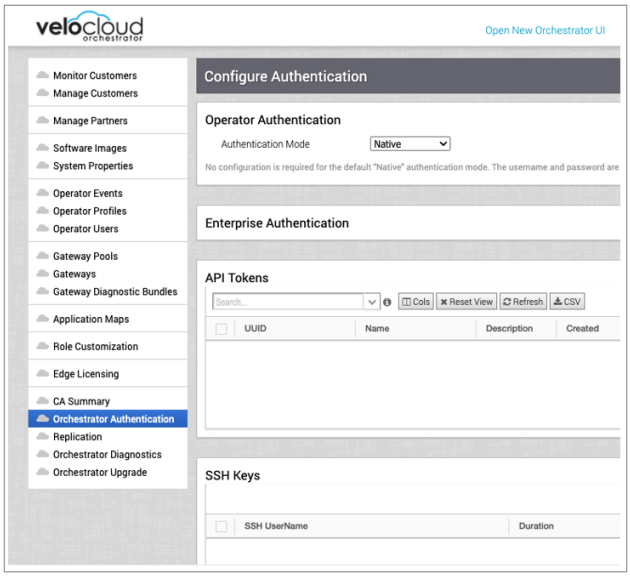
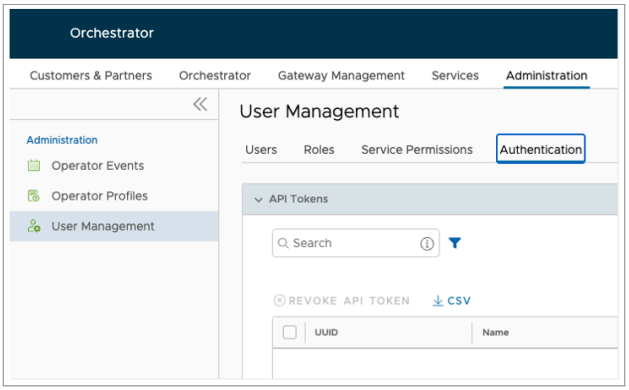
Table 13: CA Summary

Classic Orchestrator Location	New Orchestrator Location
Operator > **CA Summary**	**Operator** > **Orchestrator** > **Certificate Authorities**
Figure 4-26: CA Summary	**Figure 4-27: Certificate Authorities**
	

Orchestrator Authentication

We have reorganized the administrative features for different levels of users. Operators and Partners can find authentication-related features under the **Administration** > **User Management** section. Enterprises can find them under **Global Settings**. This makes it easier to manage user access across the Operator, MSP (Partner), and Enterprise levels.

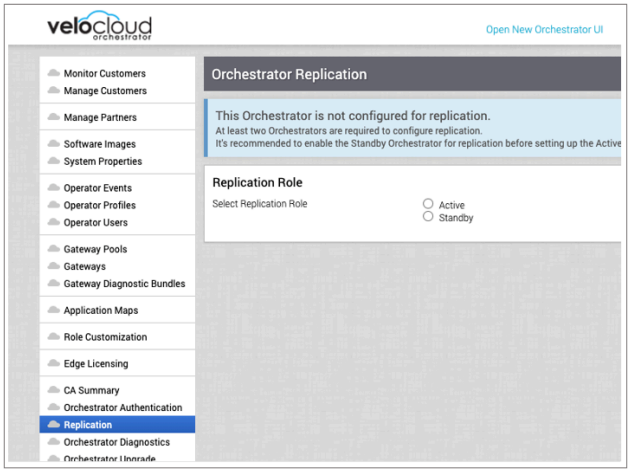
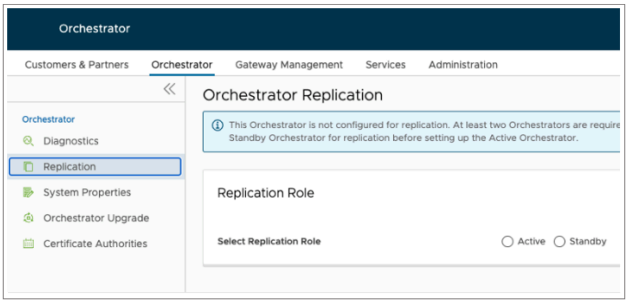
Table 14: Orchestrator Authentication

Classic Orchestrator Location	New Orchestrator Location
Operator > **Orchestrator Authentication**	**Operator** > **Administration** > **User Management** > **Authentication**
Figure 4-28: Orchestrator Authentication	**Figure 4-29: Authentication**
	

Replication

We have moved the **Replication** feature to improve the organization and hierarchy of the Operator pages. **Replication** is part of the Orchestrator configuration, along with other features such as **Orchestrator Diagnostics**, **System Properties**, **Orchestrator Upgrade**, and **Certificate Authorities**.

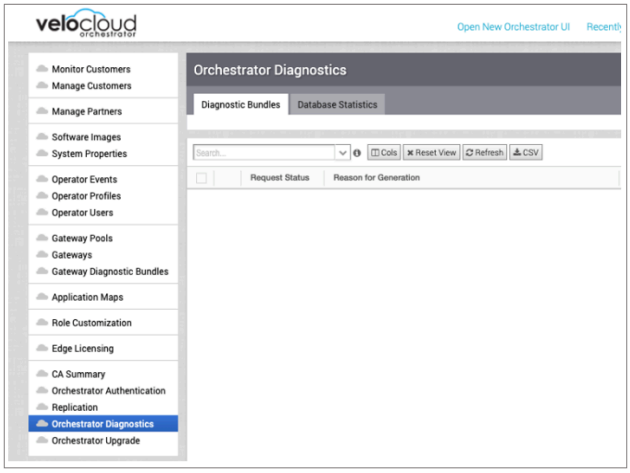
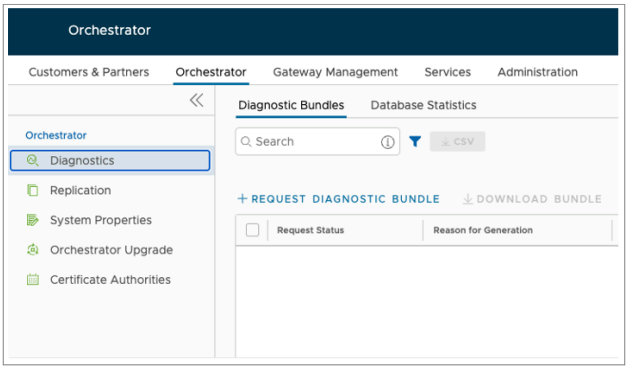
Table 15: Replication

Classic Orchestrator Location	New Orchestrator Location
Operator > **Replication**	**Operator** > **Orchestrator** > **Replication**
Figure 4-30: Replication	**Figure 4-31: Replication**
	

Orchestrator Diagnostics

We have moved the **Orchestrator Diagnostics** feature to improve the organization and hierarchy of the Operator pages. **Orchestrator Diagnostics** is part of the Orchestrator configuration, along with other features such as **Replication**, **System Properties**, **Orchestrator Upgrade**, and **Certificate Authorities**.

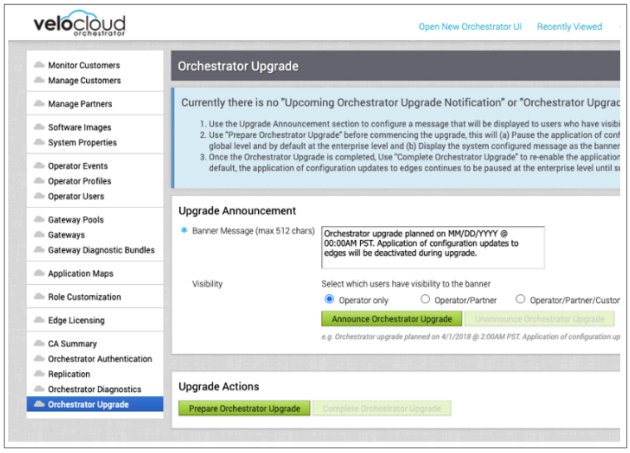
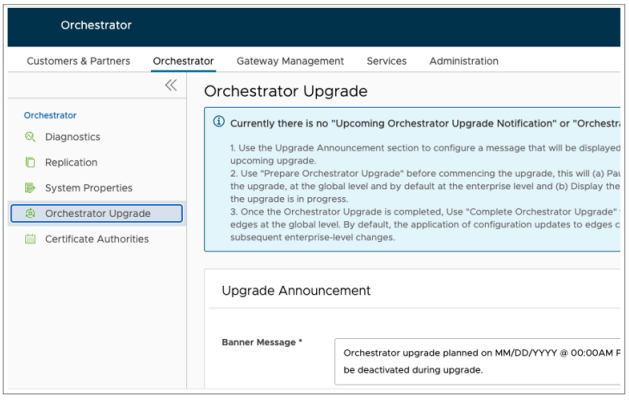
Table 16: Orchestrator Diagnostics

Classic Orchestrator Location	New Orchestrator Location
Operator > **Orchestrator Diagnostics**	**Operator** > **Orchestrator** > **Diagnostics**
Figure 4-32: Orchestrator Diagnostics	**Figure 4-33: Diagnostics**
	

Orchestrator Upgrade

We have moved the **Orchestrator Upgrade** feature to improve the organization and hierarchy of the Operator pages. **Orchestrator Upgrade** is part of the Orchestrator configuration, along with other features such as **Replication**, **System Properties**, **Orchestrator Diagnostics**, and **Certificate Authorities**.

Table 17: Orchestrator Upgrade

Classic Orchestrator Location	New Orchestrator Location
Operator > **Orchestrator Upgrade**	**Operator** > **Orchestrator** > **Orchestrator Upgrade**
Figure 4-34: Orchestrator Upgrade	**Figure 4-35: Orchestrator Upgrade**
	

Chapter 5

Using SSO Login for Operator User

Discusses how to log in to VeloCloud Orchestrator using Single Sign On (SSO) as an Operator user.

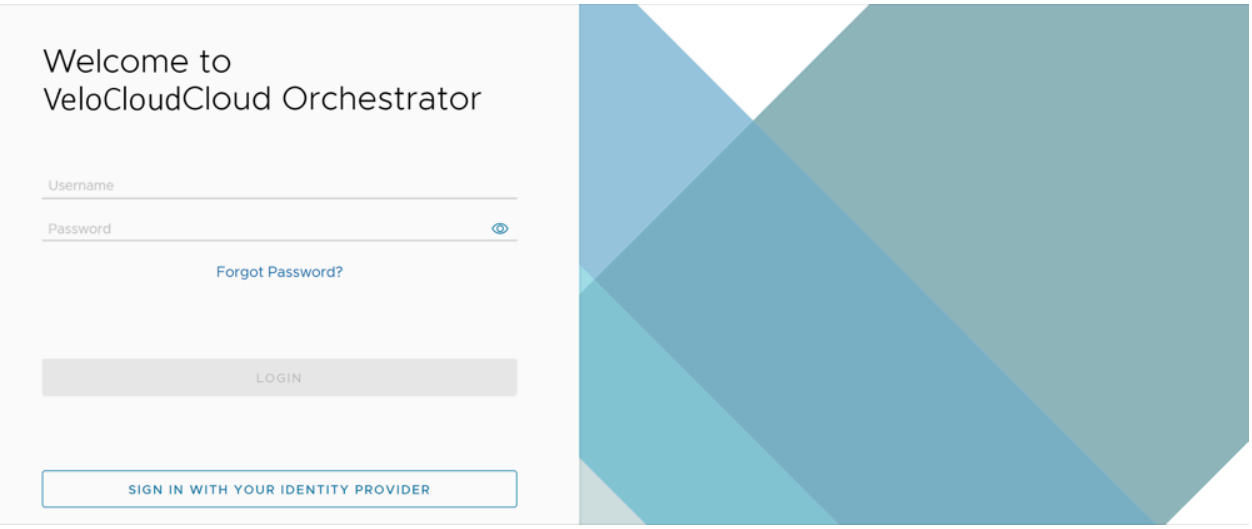
- Ensure you have configured the SSO authentication in VeloCloud Orchestrator. For additional information, see Configure Single Sign On for Operator User.
- Ensure you have set up roles, users, and OIDC application for the SSO in your preferred IDPs. For additional information, see Authentication.

To login into VeloCloud Orchestrator using the SSO as an Operator user:

Note: If other authentication mechanisms fail, there must always be a native Operator Superuser as a system fallback.

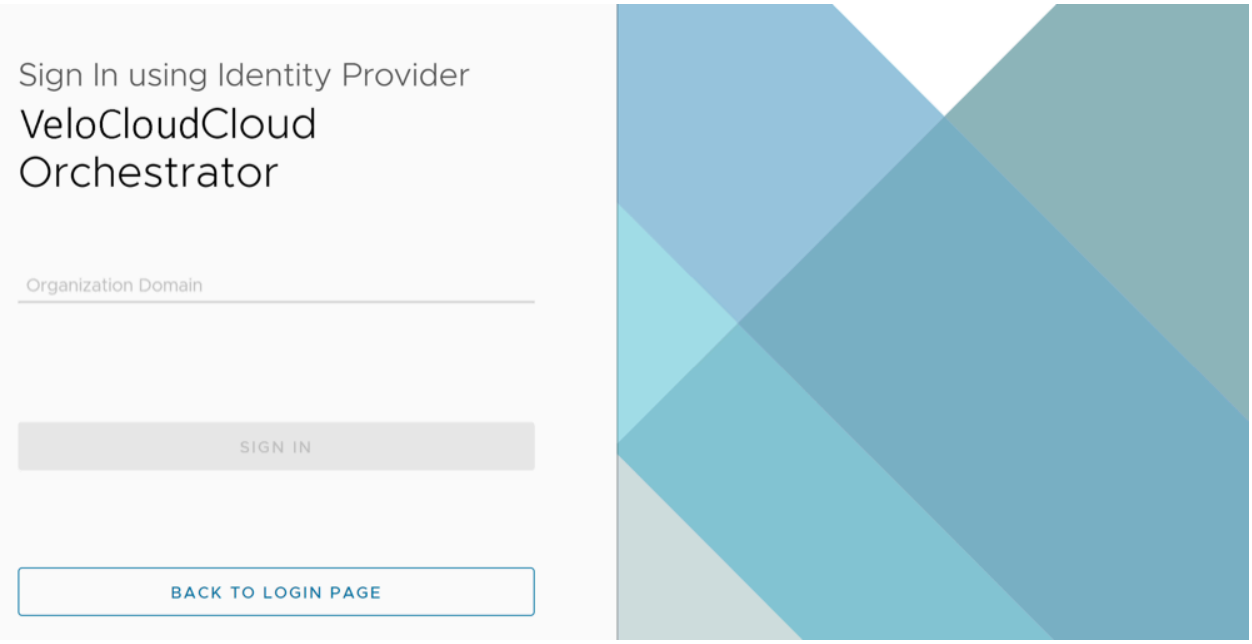
1. In a web browser, launch the Orchestrator application as an Operator user. The **VeloCloud Orchestrator** screen appears.

   Figure 5-1: VeloCloud Orchestrator Login Screen



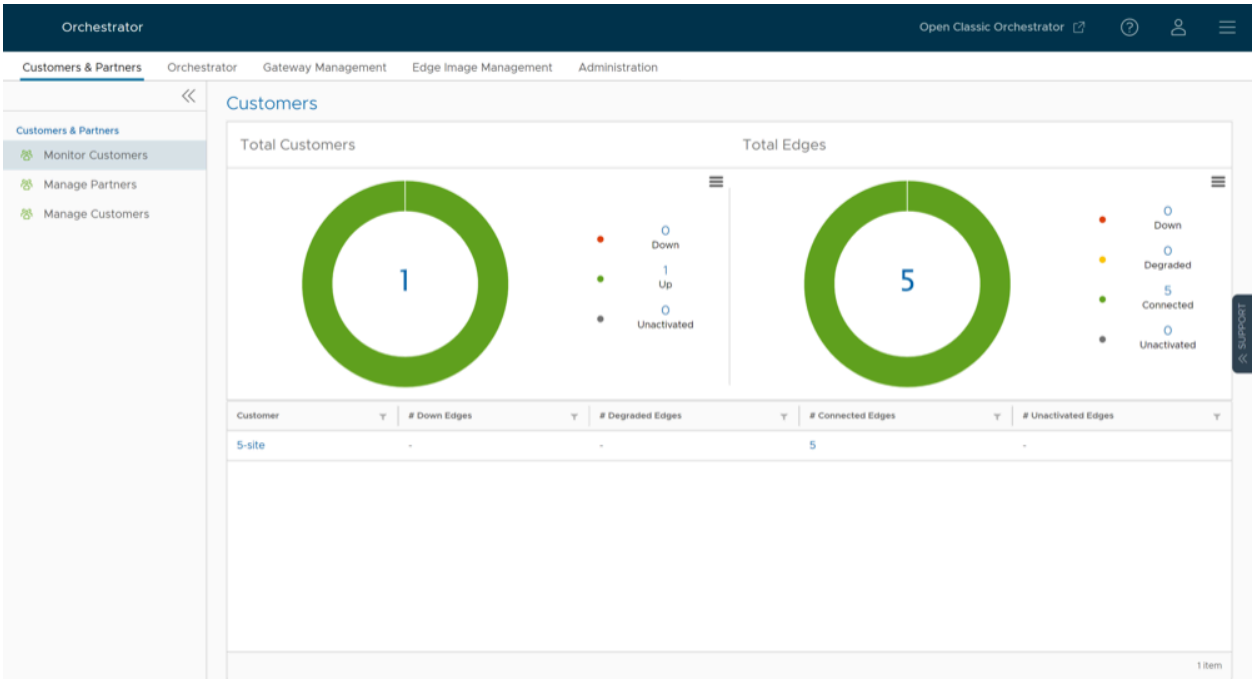
2. Select **Sign In With Your Identity Provider**.

Figure 5-2: VeloCloud Orchestrator Sign In Screen



3. In the **Organization Domain** text box, enter the domain name used for the SSO configuration and select **Sign In**. The IDP configured for the SSO authenticates the user and redirects the user to the configured VeloCloud Orchestrator URL.

Figure 5-3: Customers and Partners Tab



Note:

- Once the users log in to the VeloCloud Orchestrator using the SSO, they are not allowed to login again as native users.

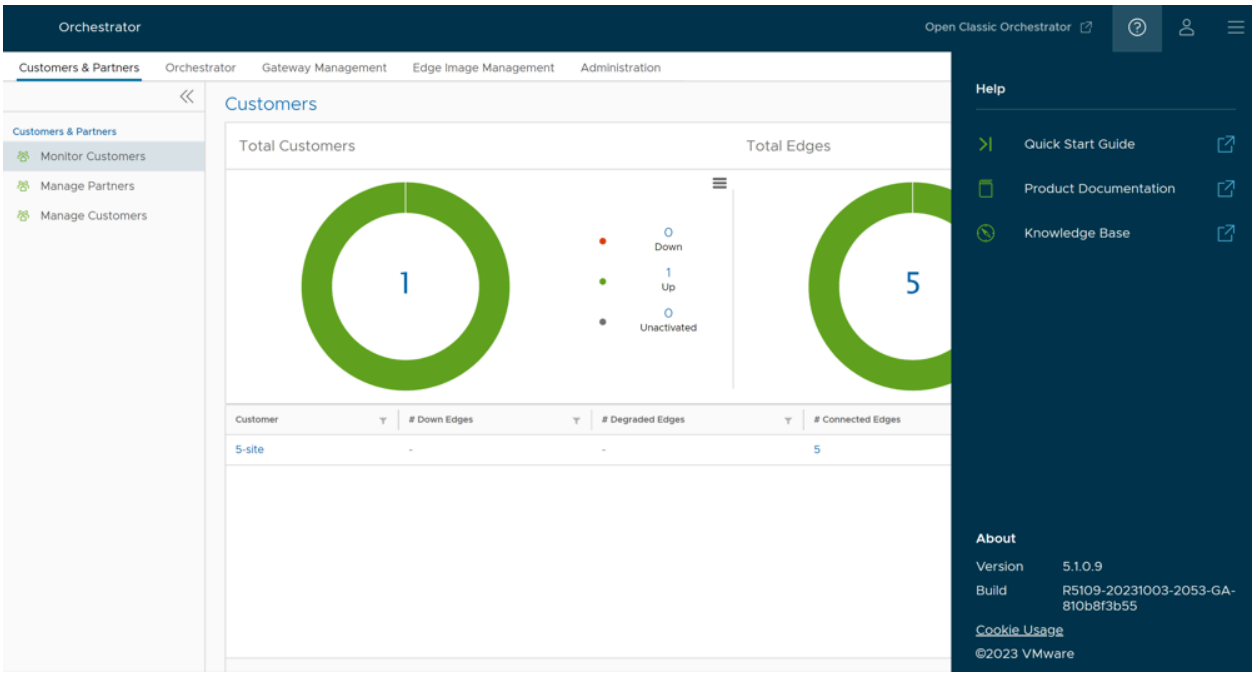
- The user can navigate to the Classic UI by selecting the **Open Classic Orchestrator** option located at the top right of the UI screen.

- Manage Customers and Partner
- Manage Operators
- Configure User Account details
- Manage Gateway pools and Gateways
- Manage Software and Firmware images

Additionally, in the VeloCloud Orchestrator home page, you can access the following features from the Global Navigation bar:

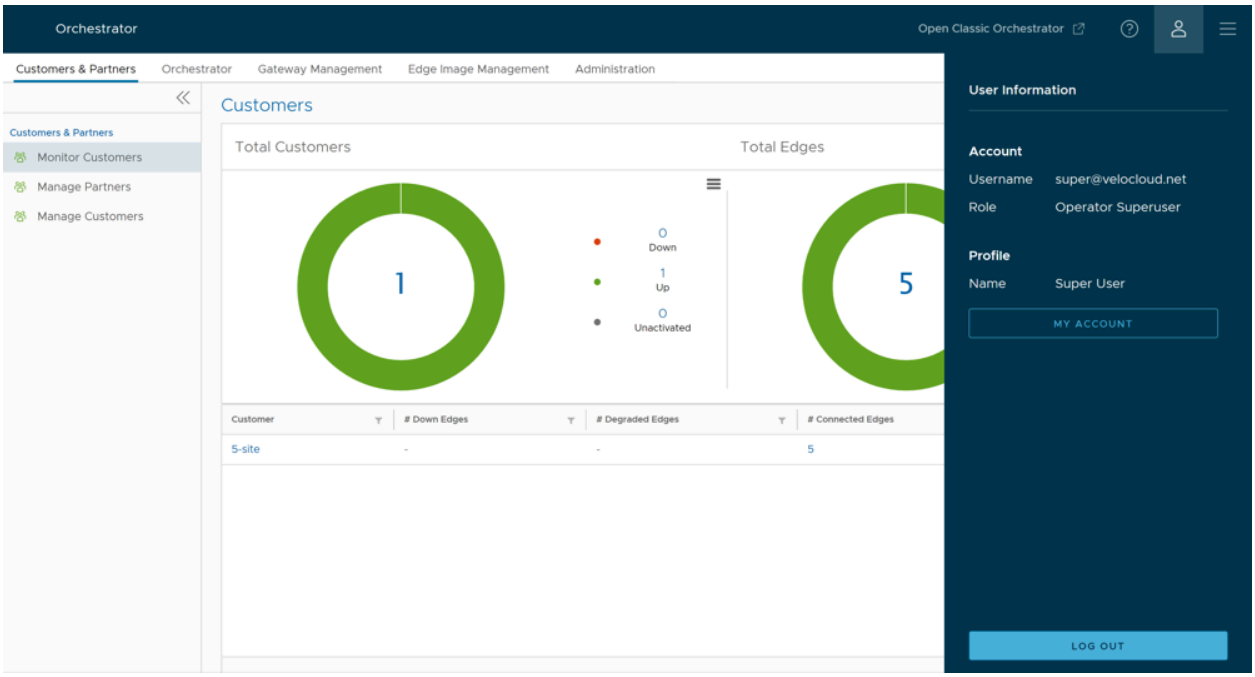
- The user can select the **Question Mark** icon located at the top right of the screen to access the **Help** page. The **Help** page displays links to quick start guide, product documentation, and knowledge base. Users can also view additional information such as version number, build number, cookie usage, and VeloCloud trademark.

  Figure 5-4: Help Page



- The user can select the **User** icon located at the top right of the screen to access the **My Account** page. The **My Account** page allows users to configure basic user information, SSH keys, and API tokens. Users can also view the current user's role and the associated privileges.

  Figure 5-5: User Information Page

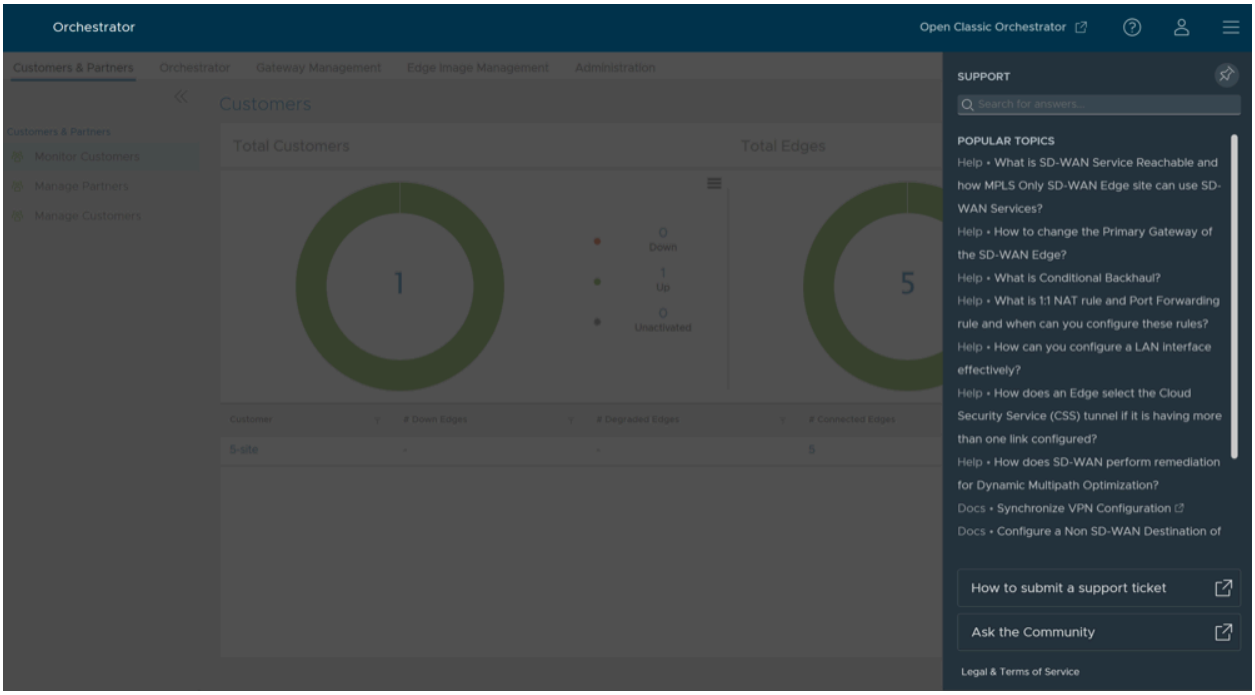


- The In-product Contextual Help Panel with context-sensitive user assistance is supported in the SD-WAN service of the Enterprise Orchestrator UI and as well as for the Operator and Partner levels. User can access the In-product Contextual Help Panel by selecting the **Support** expand and collapse button available on the right side of the screen.

  The panel allows users across all levels to access helpful and important information such as Question-Based Lists (QBLs), Knowledge base links, Ask the Community link, how to file a support ticket, and other

related documentation from within the Orchestrator UI page itself. This makes it easier for the user to learn our product without having to navigate to another site for guidance or contact the Support Team.

Figure 5-6: In-product Contextual Help Panel



Chapter 6

Advisory Notice and Consent Warning Message

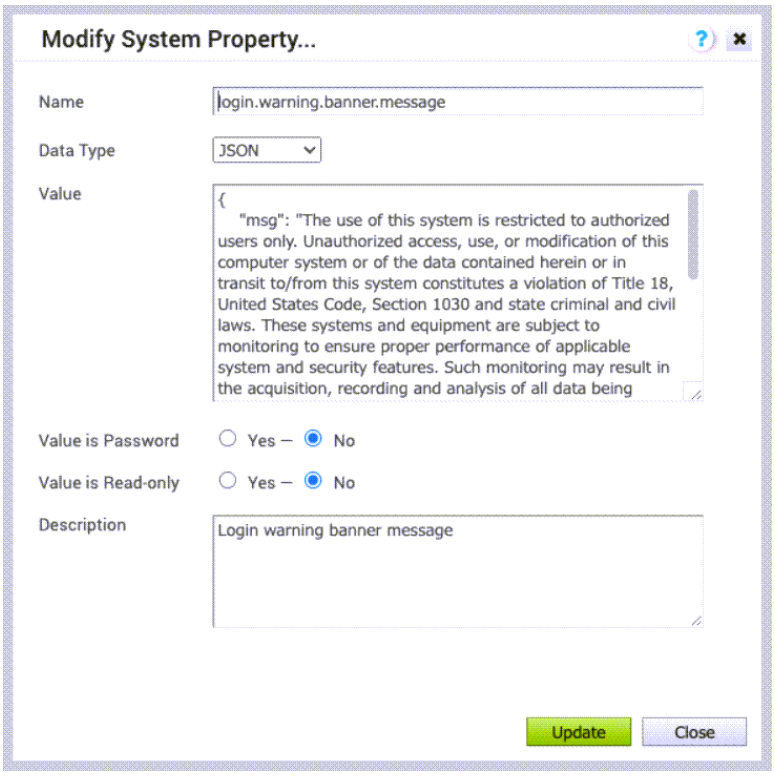
Configure Advisory Notice and Consent Warning Message for SASE Orchestrator

As an Operator user, you can configure and display a Security Administrator-specified advisory notice and consent warning message regarding the use of SASE Orchestrator for Operators, Partners, and Enterprises.

To configure the consent warning message:

1. In the **Operator** portal, go to **System Properties**.
2. Search and locate the `login.warning.banner.message` system property.
3. Select the system property, and then select **Actions** > **Modify** > **System Property**. The **Modify System Property** page appears.

   Figure 6-1: Modify System Property … Page



4. Ensure that the **Data Type** field is set to **JSON**.
5. In the **Value** text area, the default value is as follows:

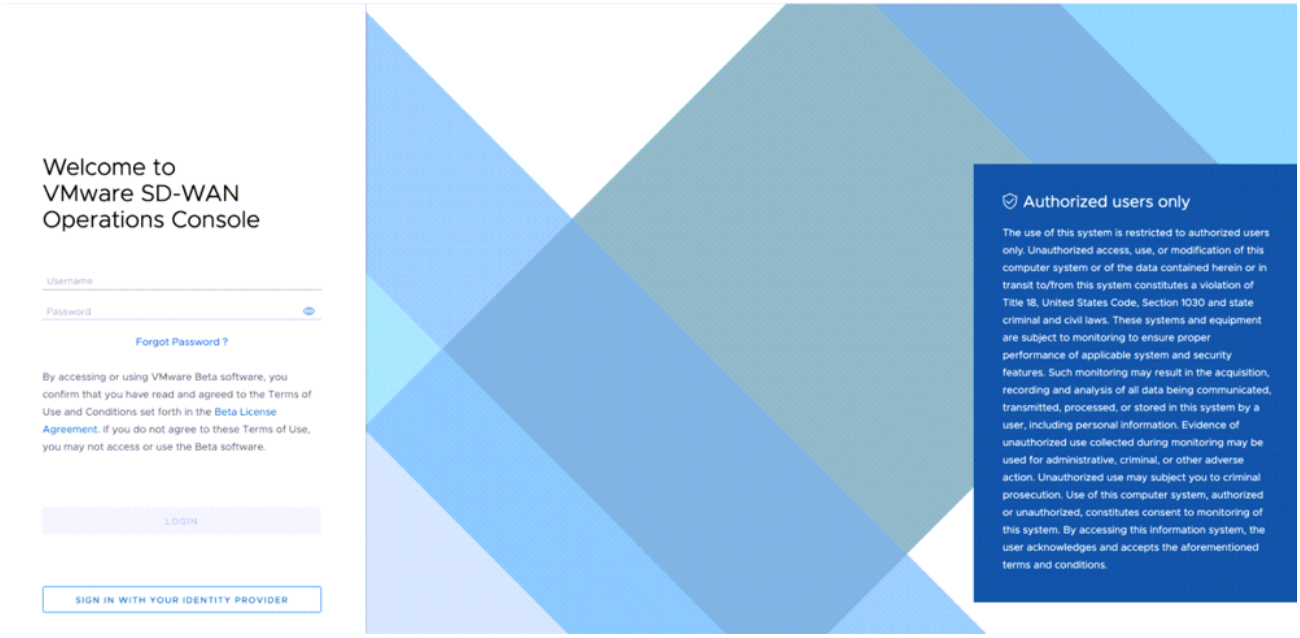
```
{ "msg": "" }
```

In the "msg" variable, type the required warning message between "".

6. Ensure that the **Value is Password** and **Value is Read-only** fields are set to **No**.
7. Select **Update**.

The warning message is displayed in the SASE Orchestrator prior to user login for Operator, Partner, and Enterprise.

Figure 6-2: VeloCloud SD-WAN Operations Console Login Page



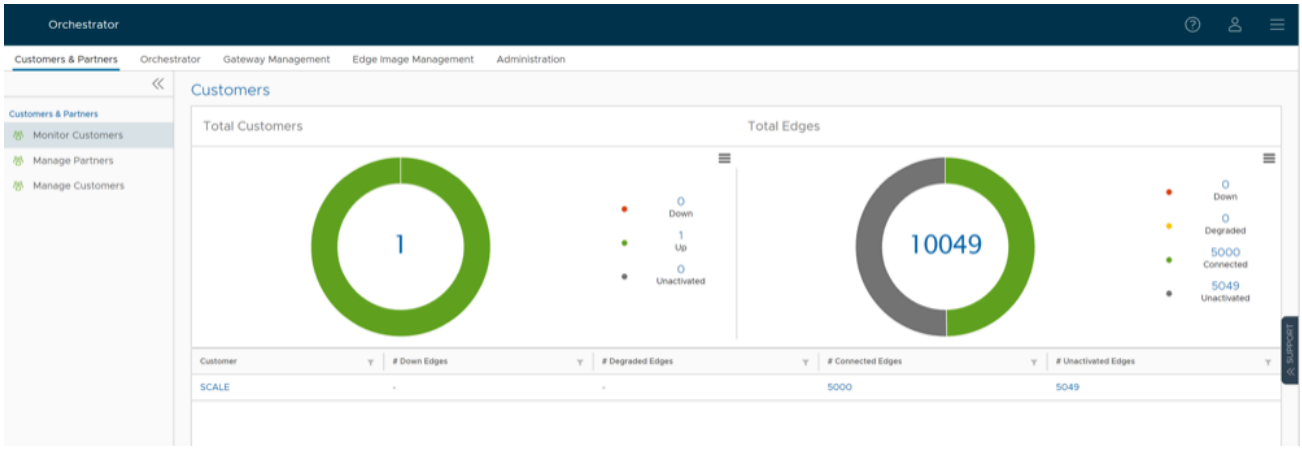
Chapter 7

Monitor Customers

As an Operator user, you can monitor the status of your Customers along with the Edges connected to the Customers.

Log into the Arista VeloCloud Orchestrator as an Operator user. In the **SD-WAN** service of the **Operator** portal, select **Customers & Partners** > **Monitor Customers**.

Figure 7-1: Monitor Customers Tab



The **Customers** page displays the following details:

Total Customers

- Customers managed by the Operator.
- Number of Customers that are UP, DOWN, and UNACTIVATED. Select the number to view the corresponding Customer details at the bottom panel.
- In the bottom panel, select the link to the Customer name to navigate to the Enterprise portal, where you can view and configure other settings corresponding to the selected customer.

Total Edges

- Edges associated with the Customers.
- Number of Edges that are DOWN, DEGRADED, CONNECTED, and UNACTIVATED. Select the number to view the corresponding details of the Edges in the bottom panel.
- In the bottom panel, place the mouse cursor on the Down Arrow displayed next to the number of Edges, to view the details of each Edge. Select the link to the Edge name to navigate to the Enterprise Monitoring portal, where you can view additional details corresponding to the selected Edge.

Note: The Orchestrator UI does not provide the option for auto refresh. You must refresh the window manually to view the current data.

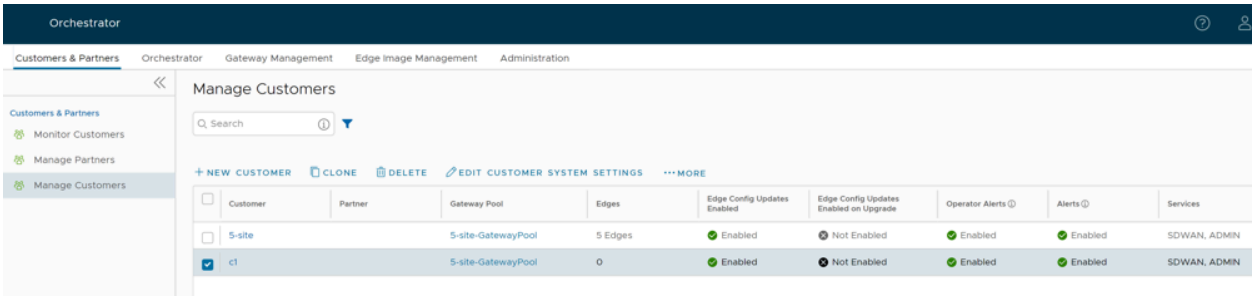
Chapter 8

Manage Customers

The Manage Customers option allows you to create new Customers, configure the Customer capabilities, clone the existing configuration, and to configure other Customer settings.

1. In the **Operator** portal, navigate to **Customers & Partners** > **Manage Customers**.

   Figure 8-1: Manage Customers



2. You can perform the following actions:

   Table 18: Manage Customers Fields Description

Option	Description
Search	Enter a search term to search for the matching text across the table. Use the advanced search option to narrow down the search results.
New Customer	Select this option to add a new Customer. For additional information, see Create New Customer
Clone	Clones the existing configurations of the selected Customer. You can select any of the additional clone attributes. For additional information, see Clone a Customer.
Delete	Deletes the selected Customers. Enter the number of selected Customers in the pop-up window, and then select **Delete**. **Note:** Ensure that you have removed all the Edges associated with the selected Customer, before deleting the Customer.
Edit Customer System Settings	Allows you to edit the system settings for the customer. For additional information, see the *Enterprise Settings* section in the *Arista SD-WAN Administration Guide*.
Stage to Bastion	Select to stage a Customer to the Bastion Orchestrator.

Note: Stage to Bastion and **Unstage from Bastion** options are available only when the Bastion Orchestrator feature is activated using the `session.options.enableBastionOrchestrator` system property.

For additional information, see *Bastion Orchestrator Configuration Guide*.

3. Select **More** to perform the following actions:

Table 19: Manage Customers Additional Options

Option	Description
Unstage from Bastion	Removes a Customer from the Bastion Orchestrator.
Edit Customer Edge Management	Allows to edit the Edge Management feature for the selected Customers.
Transfer to Partner	Assigns the selected Customer to a Partner. You can select an existing Partner from the drop-down list.
Release from Partner	Releases the selected Customer from the Partner.
Send Support Email	Sends customer support messages to the selected Customer.
Assign Operator Profile	Adds an Operator Profile for the selected Customers.  **Note:** This option is available only for an Enterprise with an activated Edge Image Management feature.
Update Edge Image Management	Activates or deactivates the Edge Image Management feature for the selected Customers.
Update Operator Alerts	Activates or deactivates the Operator alerts for the selected Customers.
Update Customer Alerts	Activates or deactivates the Customer alerts for the selected Customers.
Rebalance Gateways	Rebalances the Gateways of Edges associated with the selected Customer.
Export All Customers	Exports the details of all the Customers in the Operator portal to a CSV file. The default separator used is a comma (,).
Export Customers Edge Inventory	Exports the inventory details of all the Edges associated with all the Customers to a CSV file. The default separator used is a comma (,).

4. Following are the other options available in the **Manage Customers** area:

Table 20: Manage Customers Display Options

Option	Description
Columns	Select the check boxes to view the required columns.
Refresh	Select this option to refresh the page.

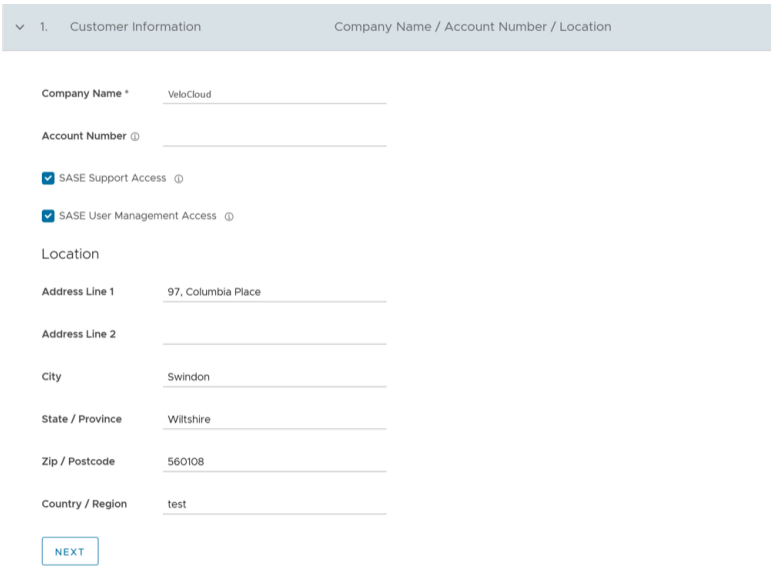
8.1 Create New Customer

In the **Operator** portal, you can create Customers and configure the Customer settings. Only Operator Super Users and Operator Standard Admins can create a new Customer. As an Operator Super User, you can temporarily deactivate creating new Customers, by setting the system property `session.options.disableCreateEnterprise` to **True**. You can use this option when SASE Orchestrator exceeds the usage capacity.

1. In the **Operator** portal, go to **Customers & Partners** > **Manage Customers**, and then select **New Customer**. The **New Customer** page displays the following sections:

a. Customer Information:

Figure 8-2: Customer Information Page



Enter the details in the following fields and select **Next**.

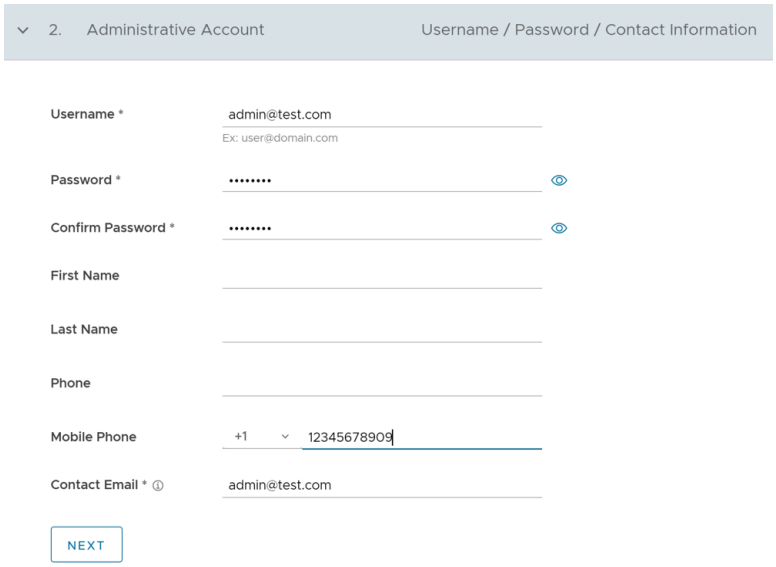
Note: The **Next** button is activated only when you enter all the mandatory details.

Table 21: Customer Information Fields Description

Option	Description
Company Name	Enter your company name.
Account Number	Enter a unique identifier for the Customer.
SASE Support Access	This check box is selected by default, and grants access to the VeloCloud Support to view, configure, and troubleshoot the Edges connected to the Customer. For security reasons, the Support cannot access or view the user identifiable information.
SASE User Management Access	Select the check box to allow the VeloCloud Support to assist in User Management. The User Management includes options to create users, reset password, and configure other settings. In this case, the Support has access to user identifiable information.
Location	Enter relevant address details in the respective fields.

b. Administrative Account:

Figure 8-3: Administrative Account Page



Enter the details in the following fields and select **Next**.

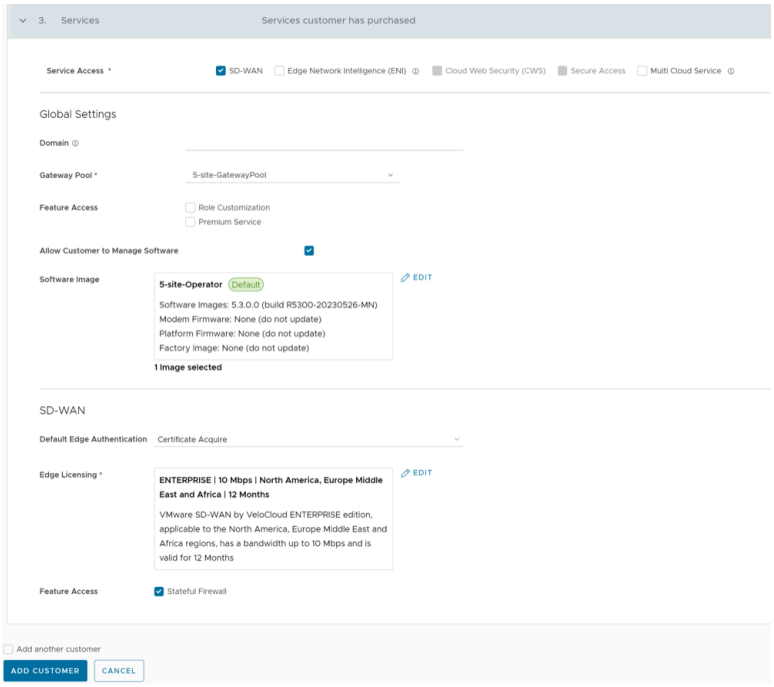
Note: The **Next** button is activated only when you enter all the mandatory details.

Table 22: Administrative Account Fields Description

Option	Description
Username	Enter the username in the `user@domain.com` format.
Password	Enter a password for the Administrator. **Note:** Starting from the 4.5 release, the use of the special character "<" in the password is no longer supported. In cases where users have already used "<" in their passwords in previous releases, they must remove it to save any changes on the page.
Confirm Password	Re-enter the password.
First Name	Enter the first name.
Last Name	Enter the last name.
Phone	Enter a valid phone number.
Mobile Phone	Enter a valid mobile number.
Contact Email	Enter the email address. The alerts on service status are sent to this email address.

c. Services:

Figure 8-4: Services Page



Configure the following global settings:

Table 23: Services Fields Description

Option	Description
Domain	Enter the domain name to be used to activate Single Sign On (SSO) authentication for the Orchestrator.
Gateway Pool	Select an existing Gateway pool from the drop down list. For additional information, see Manage Gateway Pools.
Feature Access	You can select either **Role Customization** or **Premium Service**, or both the check boxes.
Allow Customer to Manage Software	Select the check box if you want to allow an Enterprise Super User to manage the software images available for the Enterprise. Once selected, the **Software Image** field is displayed. Select **Add** and in the **Select Software/Firmware Images** pop-up window, select and assign the software/firmware images from the available list for the Enterprise. Select **Done** to add the selected images to the Software Image list. **Note:** You can remove an assigned image from an Enterprise, only if the image is not currently used by any Edge within the Enterprise. For additional information, see Platform and Modem Firmware and Factory Images and Software Images.
Operator Profile	Select an Operator profile to be associated with the Customer from the available drop-down list. This field is not available if **Allow Customer to Manage Software** is selected. For additional information on Operator profiles, see Manage Operator Profiles.

Service Access: This option is available above the **Global Settings** section. You can choose the services that the Customer can access along with the roles and permissions available for the selected service.

> **Note:** This option is available only when the system property `session.options.enableServiceLicenses` is set as **True**.

SD-WAN- When you select this service, the following options are available:

Table 24: SD-WAN Fields Description

Option	Description
Default Edge Authentication	Choose the default option to authenticate the Edges associated with the Customer, from the drop-down list. • **Certificate Deactivated**: Edge uses a pre-shared key mode of authentication. • **Certificate Acquire**: This option is selected by default and instructs the Edge to acquire a certificate from the certificate authority of the SASE Orchestrator, by generating a key pair and sending a certificate signing request to the Orchestrator. Once acquired, the Edge uses the certificate for authentication to the SASE Orchestrator and for establishment of VCMP tunnels. **Note:** After acquiring the certificate, the option can be updated to **Certificate Required**. • **Certificate Required**: Edge uses the PKI certificate. Operators can change the certificate renewal time window for Edges using the system property `edge.certificate.renewal.window`.
Edge Licensing	Select **Add** and in the **Select Edge Licenses** pop-up window, select and assign the Edge licenses from the available list for the Enterprise. **Note:** The license types can be used on multiple Edges. It is recommended to provide your customers with access to all types of licenses to match their edition and region. For additional information, see Edge Licensing.
Feature Access	Select the **Stateful Firewall** check box to override the Stateful Firewall settings activated on the Enterprise Edge.

2. After entering all the details, select the **Add Customer** button. If you want to add another customer, you can select the **Add another Customer** check box before selecting **Add Customer**. The new Customer name is displayed on the **Customers** page. You can select the Customer name to navigate to the Enterprise portal and add configurations to the Customer.

   For additional information, see Configure Customers.

8.2 Clone a Customer

You can clone the configurations from an existing customer and create a new customer with the cloned settings.

Only Operator Super users and MSP Super users can clone a customer.

By default, the following configurations are cloned from the selected customer:

- Enterprise configuration profiles
- Enterprise network services and objects like:
  - DNS services
  - Private network names
  - Network Segments
- Customer capabilities
- Edge authentication scheme
- Address groups and Port groups

Note: Distributed Cost Calculation is not copied to the cloned Enterprise.

You cannot clone an Enterprise if it consists of the following:

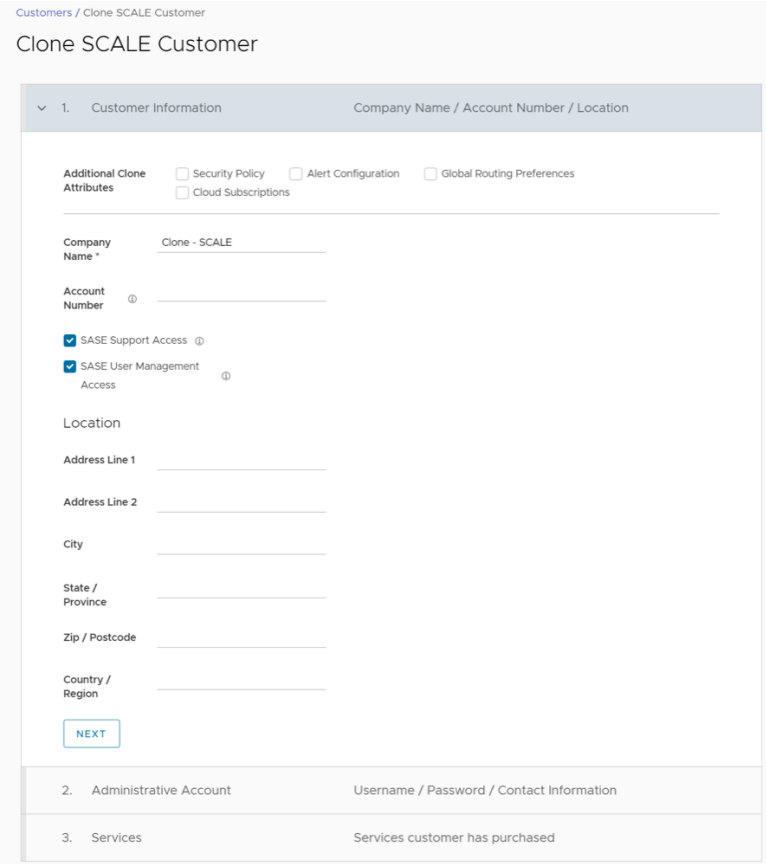
- Profile with Edge references like hubs, clusters, and so on
- Profile containing Partner Gateway References
- Cloud Security Service enabled
- Non SD-WAN Destinations
- VNF or VNF licenses
- Authentication services
- NetFlow objects like collectors or filters

Log into the VeloCloud Orchestrator as an Operator user. Navigate to **Customers & Partners** > **Manage Customers**.

1. On the **Customers** page, select the customer you want to clone, and then select **Clone**.

2. The **Clone Customer** page appears.

Figure 8-5: Clone SCALE Customer



3. Configure the **Customer Information** and **Administrative Account** details, and **Services**. For additional information, see Create New Customer.

4. Select **Add Customer**.

The new customer name is displayed in the **Customers** page. The customer is already configured with the cloned settings. You can select the customer name to navigate to the Enterprise portal and add or modify the configurations. For additional information about customer configurations and settings, see Configure Customers.

8.3 Configure Customers

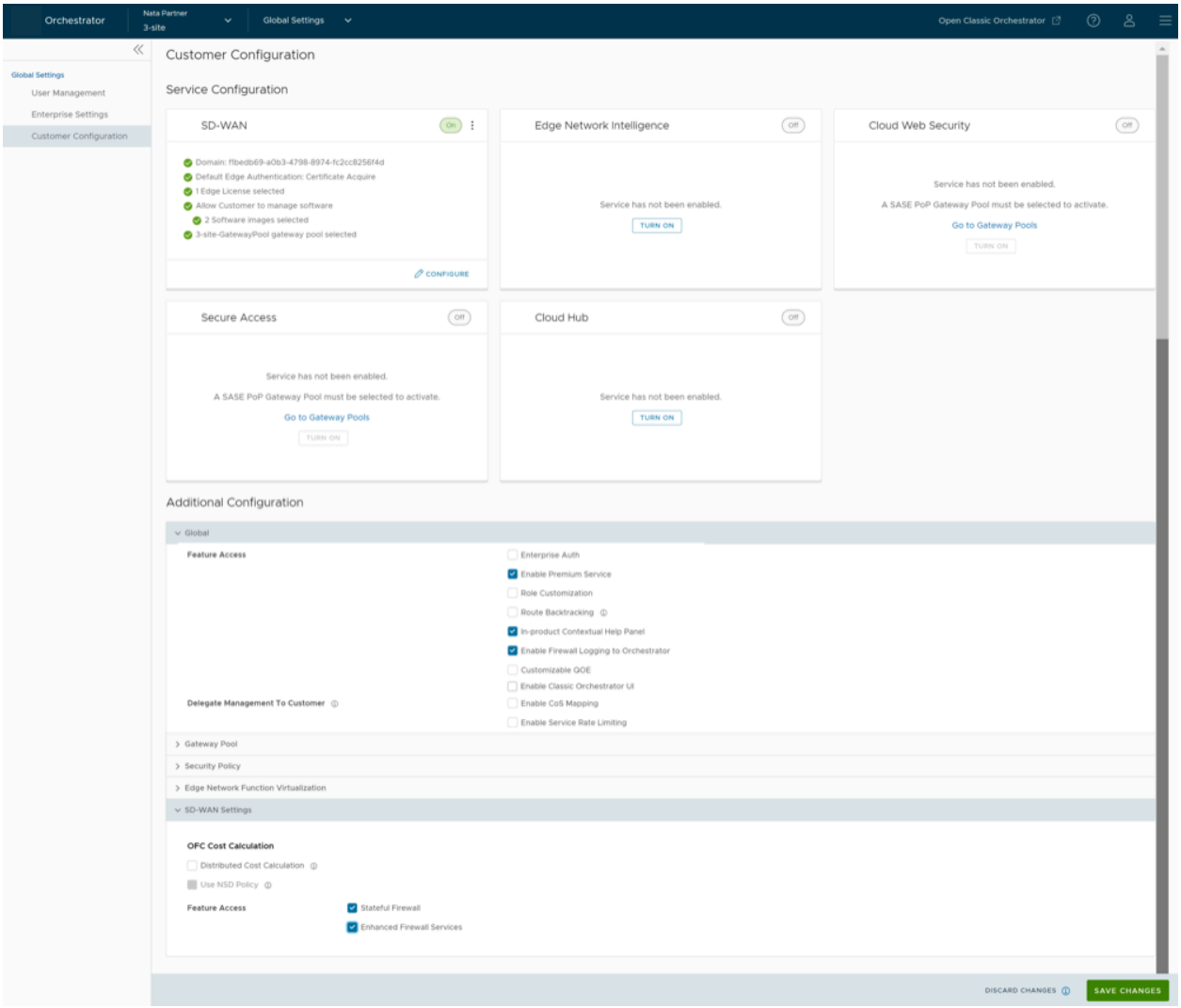
After creating a Customer, configure the feature options and settings that the Customer can access. As an Operator, you can choose the settings the Customer can modify.

When you create a new Customer, you are redirected to the **Customer Configuration** page, where you can configure the Customer settings. You can also navigate to the **Customer Configuration** page directly from the Operator portal, by following the steps below:

1. In the monitoring and configuration options page, select a Customer, and from the top header, select **SD-WAN** > **Global Settings**.

2. From the left menu, select **Customer Configuration**. The following page is displayed:

Figure 8-6: Customer Configuration



The **Service Configuration** section includes the **SD-WAN** services

Select the **Turn On** button to activate the service. Select the vertical ellipsis present at the top right corner of the tile to turn off or configure the service. You can also use the **Configure** option present at the bottom right corner of the tile to configure the respective service. The tile displays the configuration summary.

Note: When you select the **Turn off** option, a pop-up window appears asking for your confirmation. Select the check box and select **Turn Off Service**.

3. Selecting the **Configure** option displays the following pop-up window. Configure the settings, and then select **Update**.

Figure 8-7: SD-WAN Configuration

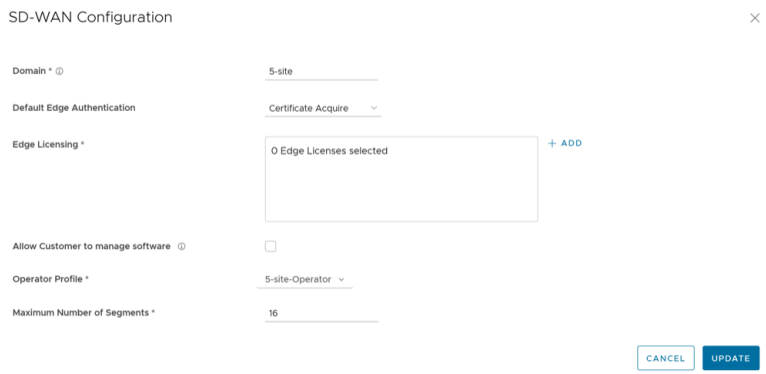


Table 25: SD-WAN Configuration Fields Description

Option	Description
Domain	Enter the domain name to be used to activate Single Sign On (SSO) authentication for the Orchestrator.
Default Edge Authentication	Choose the default option to authenticate the Edges associated to the Customer, from the drop-down menu. • **Certificate Deactivated**: Edge uses a pre-shared key mode of authentication. • **Certificate Acquire**: This option is selected by default and instructs the Edge to acquire a certificate from the certificate authority of the SASE Orchestrator, by generating a key pair and sending a certificate signing request to the Orchestrator. Once acquired, the Edge uses the certificate for authentication to the SASE Orchestrator and for establishment of VCMP tunnels. **Note:** After acquiring the certificate, the option can be updated to **Certificate Required**. • **Certificate Required**: Edge uses the PKI certificate. Operators can change the certificate renewal time window for Edges using the system property edge.certificate.renewal.window.
Edge Licensing	The existing Edge Licenses are displayed. Select **Add** to add or remove the licenses. **Note:** The license types can be used on multiple Edges. It is recommended to provide your Customers with access to all types of licenses to match their edition and region. For additional information, see Edge Licensing.
Allow Customer to Manage Software	Select the check box if you want to allow an Enterprise Super User to manage the software images available for the Enterprise. For additional information, see the topic *Edge Image Management* in the *VeloCloud SD-WAN Administration Guide*
Operator Profile	Select an Operator profile to be associated with the Customer from the available drop-down menu. This field is not available if **Allow Customer to Manage Software** is selected. For additional information on Operator profiles, see Manage Operator Profiles.
Maximum Number of Segments	Enter the maximum number of segments that can be configured. The valid range is 1 to 16.The default value is 16.

4. Following are the additional configuration settings available on the **Customer Configuration** page:

Table 26: Customer Configuration Addition Settings

Option	Description
Global	
User Agreement Display	Select either of the following from the drop-down menu: • Inherit • Override to Hide • Override to Show **Note:** This field is available only when the system property `session.options.enableUserAgreements` is set to **True**.
Feature Access	Provides access to the selected features. Select one or more check boxes from the below list to activate these features for the Customer: • **Enterprise Auth**: By default, only the Operator can activate or deactivate two-factor authentication for an Enterprise. When you select this check box, the Enterprise Admins can configure the two-factor authentication on their own. This option also controls the activation and deactivation of Single Sign On (SSO). • **Enable Premium Service**: This option is selected by default. Premium Service refers to the On-Demand Remediation feature that is a core part of SD-WAN's Dynamic Multipath Optimization (DMPO). DMPO is used for all traffic that traverses a VeloCloud SD-WAN Gateway. When Premium Service is selected, the Gateway uses Forward Error Correction (FEC) for customer traffic impacted by high levels of WAN link jitter or loss, and which cannot be steered to a better quality WAN link. When Premium Service is not selected, traffic still traverses the VeloCloud SD-WAN Gateway and benefit from other components of DMPO like Continuous Monitoring, Dynamic Application Steering, and Secure Traffic Transmission. However, traffic impacted by high levels of WAN link jitter or loss does not benefit from error correction by the Gateway. For additional information, see the topic *Dynamic Multipath Optimization (DMPO)* in the *Arista VeloCloud SD-WAN Administration Guide*. • **Role Customization**: Allows an Enterprise Super user to customize the role privileges for other Enterprise users. • **Route Backtracking**: Allows the device to choose the best route in the order of prefix length. • **In-product Contextual Help Panel**: Provides access to the 'In Product Help' panel integrated within the Orchestrator. This feature is deactivated by default. An Operator must activate this option for the Enterprise Customers. • **Enable Firewall Logging to Orchestrator**: By default, Edges cannot send their Firewall logs to the Orchestrator. Select this check box to allow an Edge to send the Firewall logs to the Orchestrator. • **Customizable QoE**: Allows the Customer to configure the minimum and maximum latency threshold values for Voice, Video, and Transactional application categories of an Edge. • **Enable Classic Orchestrator UI**: Allows the Customer to switch from the Angular Orchestrator UI to the Classic Orchestrator UI. This option is available only when the system property `session.options.enableClassicOrchestrator` is set to **True**.

Option	Description
Delegate Management To Customer	Allows the Customer to modify the settings of the selected property. Following two properties are always visible to the Customers: • **Enable CoS Mapping**: Allows to configure CoS mapping while configuring a business policy. • **Enable Service Rate Limiting**: Allows to rate limit services in a business policy.
Gateway Pool	
Current Gateway Pool	Displays the current Gateway pool associated with the selected Customer. If required, you can choose a different Gateway pool available in the drop-down menu and select **Save Changes**.
Gateways in this Pool	Displays the Gateway details in the current pool.
Partner Hand Off	Activating the **Gateway Pool** option displays the **Configure Hand Off** section. If the Gateways available in the Gateway pool have been assigned with Partner Gateway role, you can handoff the Gateways to Partners. For details, see Configure Partner Handoff.
Security Policy	
Hash	By default, there is no authentication algorithm configured for the VPN header as AES-GCM is an authenticated encryption algorithm. When you select the **Turn off GCM** check box, you can select one of the following as the authentication algorithm for the VPN header, from the drop-down menu: • SHA 1 • SHA 256 • SHA 384 • SHA 512
Encryption	Select either **AES 128** or **AES 256** as the AES algorithm's key size to encrypt data. The default encryption algorithm mode is **AES 128**.
DH Group	Select the Diffie-Hellman (DH) Group algorithm to be used when exchanging a pre-shared key. The DH Group sets the strength of the algorithm in bits. The supported DH Groups are 2, 5, 14, 15, 16, 19, 20, and 21. **Note:** • DH Groups 19, 20, and 21 are available starting from Release 5.2.0. • It is recommended to use DH Group **14**, which is the default value.
PFS	Select the Perfect Forward Secrecy (PFS) level for additional security. The supported PFS Groups are 2, 5, 14, 15, 16, 19, 20, and 21. PFS Groups 19, 20, and 21 are available starting in Release 5.2.0. By default, PFS is deactivated.
Turn off GCM	Select this check box to activate **Hash** and select an authentication algorithm for the VPN header.
IPsec SA Lifetime Time(min)	Time when Internet Security Protocol (IPsec) re-keying is initiated for Edges. The minimum IPsec lifetime is 3 minutes and maximum IPsec lifetime is 480 minutes. The default value is 480 minutes. **Note:** It is not recommended to configure low lifetime value for IPsec (less than 10 minutes), as it can cause traffic interruption in some deployments due to re-keys. The low lifetime values are for debugging purposes only.

Option	Description
IKE SA Lifetime(min)	Time when Internet Key Exchange (IKE) re-keying is initiated for Edges. The minimum IKE lifetime is 10 minutes and maximum IKE lifetime is 1440 minutes. The default value is 1440 minutes. **Note:** It is not recommended to configure low lifetime values IKE (less than 30 minutes), as it can cause traffic interruption in some deployments due to re-keys. The low lifetime values are for debugging purposes only.
Secure Default Route Override	Select the check box so that the destination of traffic matching a secure default route (either Static Route or BGP Route) from a Partner Gateway can be overridden using Business Policy.
Edge Network Function Virtualization: Allows to activate NFV on the Edges and allows Customers to deploy third party VNFs on service ready Edge platforms. Currently, the service ready Edge platform models are 520v and 840. As an Operator User, when you activate the **Edge NFV**, the Customers can configure and deploy VNFs and VNF licenses from their network services.	
Edge NFV	Select this option to activate the ability to deploy VNFs on Edges. After deploying one or additional VNFs on Edges, you cannot deactivate this option.
Security VNFs	Select the relevant check boxes, to deploy the corresponding security VNFs on Edges. For additional information, see the topic *Security VNFs* in the *VeloCloud SD-WAN Administration Guide*.
SD-WAN Settings	
OFC Cost Calculation	Select the required check box: • **Distributed Cost Calculation**: Select this check box to delegate route cost calculation to Edges/Gateways. **Note:** This option is available only for the Edges/Gateways with version 3.4.0 and later. After activating **Distributed Cost Calculation**, it is recommended to refresh the routes by navigating to **Configure** > **Overlay Flow Control** in the **SD-WAN** service of the **Enterprise** portal. For additional information, see Configure Distributed Cost Calculation. • **Use NSD Policy**: Select this check box to use NSD policy for route cost calculation to Edges/Gateways. **Note:** This option is available only for the Edges/Gateways with version 4.2.0 and later.
Multiple-DSCP tags per Flow Path Calculation	This feature is used when the original user traffic is encapsulated in another tunnel (GRE/IPsec) and the DSCP labels are saved in the new IP header. The feature activates path calculation for a single flow (same source/destination) with multiple DSCP tags and offers path differentiations based on the DSCP values in the flow. Select the **Include DSCP value as part of flow lookup** check box to include DSCP values as part of flow look-up and path calculation. For additional information, see Configure Path Calculation with Multiple DSCP Labels per Flow. **Note:** This field is available only when the system property `session.options.enableFlowParametersConfig` is set to **True**.
Feature Access	
Stateful Firewall	Select the **Stateful Firewall** check box to override the Stateful Firewall settings activated on the Enterprise Edge.

Option	Description
Enhanced Firewall Services	Select the **Enhanced Firewall Services** check box to activate the Enhanced Firewall Services using the Firewall functionality in VeloCloud SASE Orchestrator. **Note:** For Enhanced Firewall Services (EFS) to work, ensure the Edge version is upgraded to 5.2.0.0. **Note:** Unselecting this option will only deactivate the EFS feature in the UI. To deactivate the EFS feature for an existing customer, you must first deactivate the EFS feature in the SD-WAN service of the Enterprise portal by navigating to **Configure** > **Profiles/Edges** > **Firewall** > **Enhanced Firewall Services** and then by unselecting this check box in Global Settings. For additional information about configuring Enhanced Firewall Services Policy rule, see the topic *Configure Enhanced Firewall Services* in the *Arista VeloCloud SD-WAN Administration Guide*.

5. Select **Save Changes**.

Note: When you modify the **Security Policy** settings, the changes may cause interruptions to the current services. In addition, these settings may reduce overall throughput and increase the time required for VCMP tunnel setup, which may impact branch to branch dynamic tunnel setup times and recovery from Edge failure in a cluster.

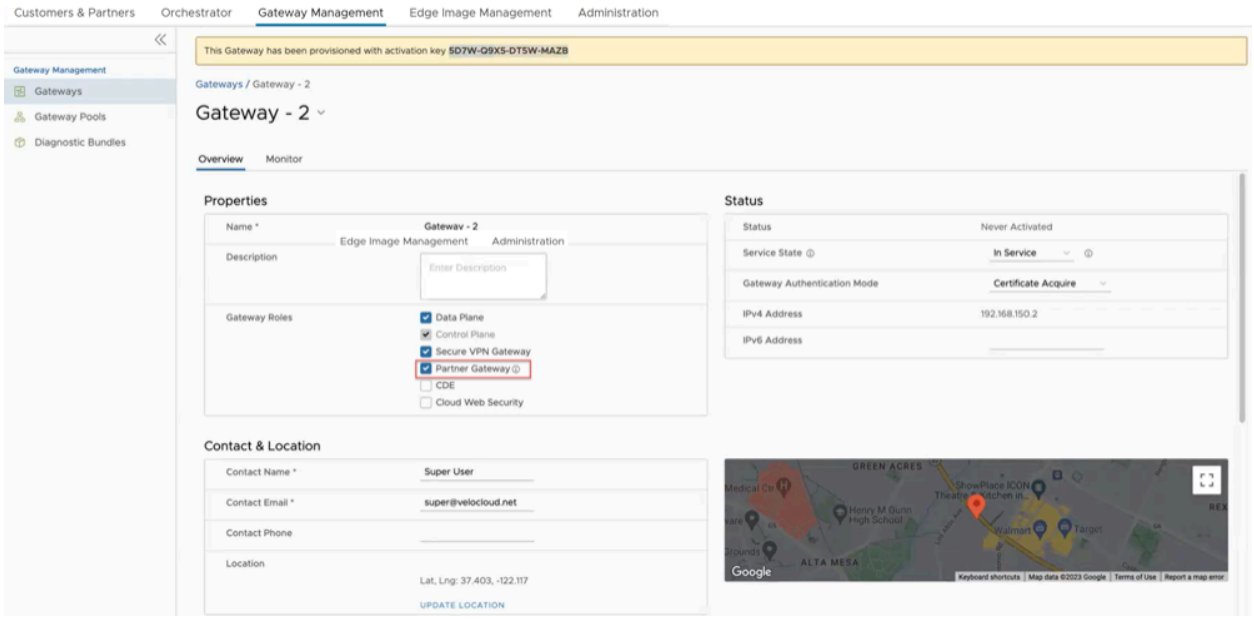
8.3.1 Configure Partner Handoff

You can configure a Gateway to hand off to Partners. The Gateway acts as a Partner Gateway that enables you to configure the Hand off Interface, Static Routes, BGP, and other settings.

Ensure that the Gateway to be handed off is assigned with Partner Gateway Role. In the Orchestrator portal (Operator or Partner), select **Gateways** and select the link to an existing Gateway. In the **Properties**

section of the selected Gateway's Overview page, you can enable the **Partner Gateway** role as shown in the following screenshot.

Figure 8-8: Gateways Overview



Procedure:

To configure the handoff settings, perform the following steps:

1. Log in to the SASE Orchestrator as an Operator user.
2. Navigate to **Customers & Partners** > **Manage Customers**.
3. In the **Manage Customers** window, select the link of the desired customer.
4. Go to **Global Settings** > **Customer Configuration**.
5. In the **Customer Configuration** window, scroll down to **Additional Configuration** and expand the **Gateway Pool** area.
6. Turn on the **Partner Hand Off** toggle button.

7. In the **Configure Hand Off** area, configure the following fields in the table below:

Figure 8-9: Configure Hand Off

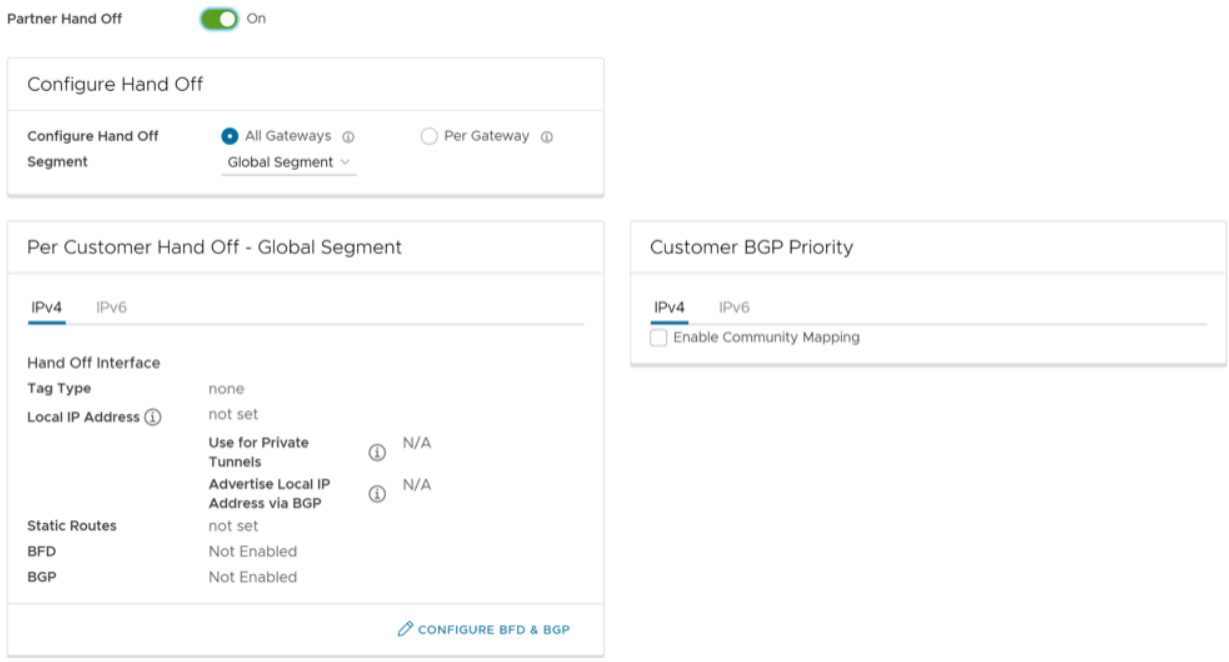
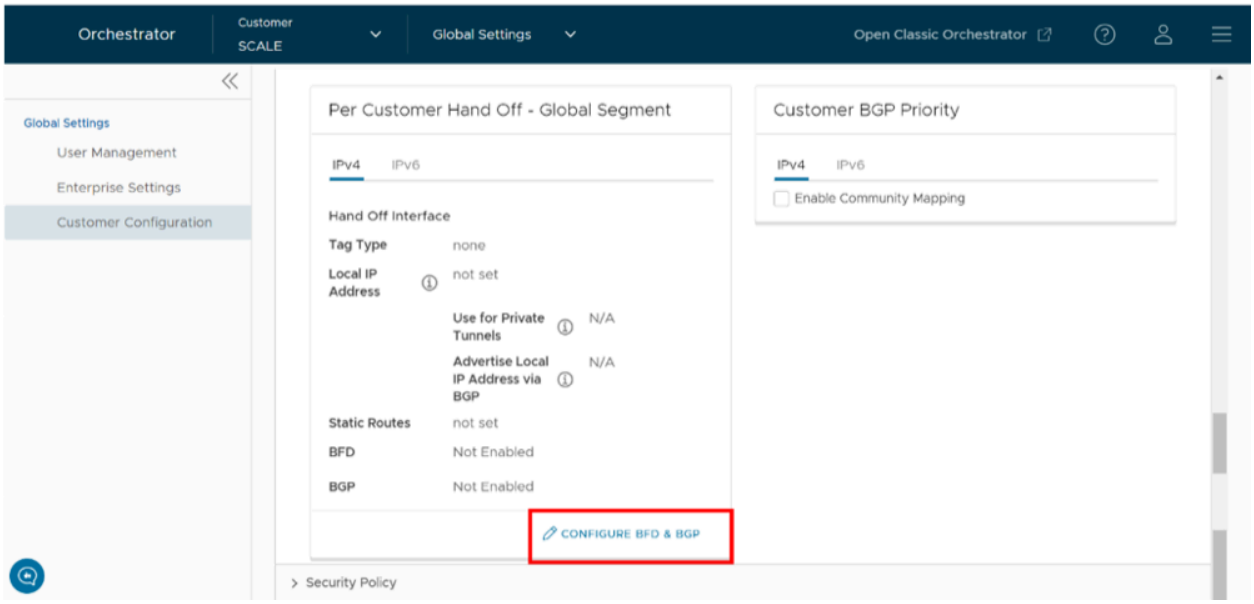


Table 27: Configure Hand Off Option Descriptions

Option	Description
Configure Hand Off	By default, the hand off configuration is applied to all the Gateways. If you want to configure a specific Gateway, choose **Per Gateway**, and then select the Gateway from the drop-down list.
Segment	By default, **Global Segment** is selected, which means that the hand off configuration is applied to all the segments. If you want to configure a specific segment, select the segment from the drop-down menu.
Hand Off Interface	This section displays the values that are configured on the **Configure BGP and BFD** page.
Customer BGP Priority	Select the check box and configure the Community Mapping details.

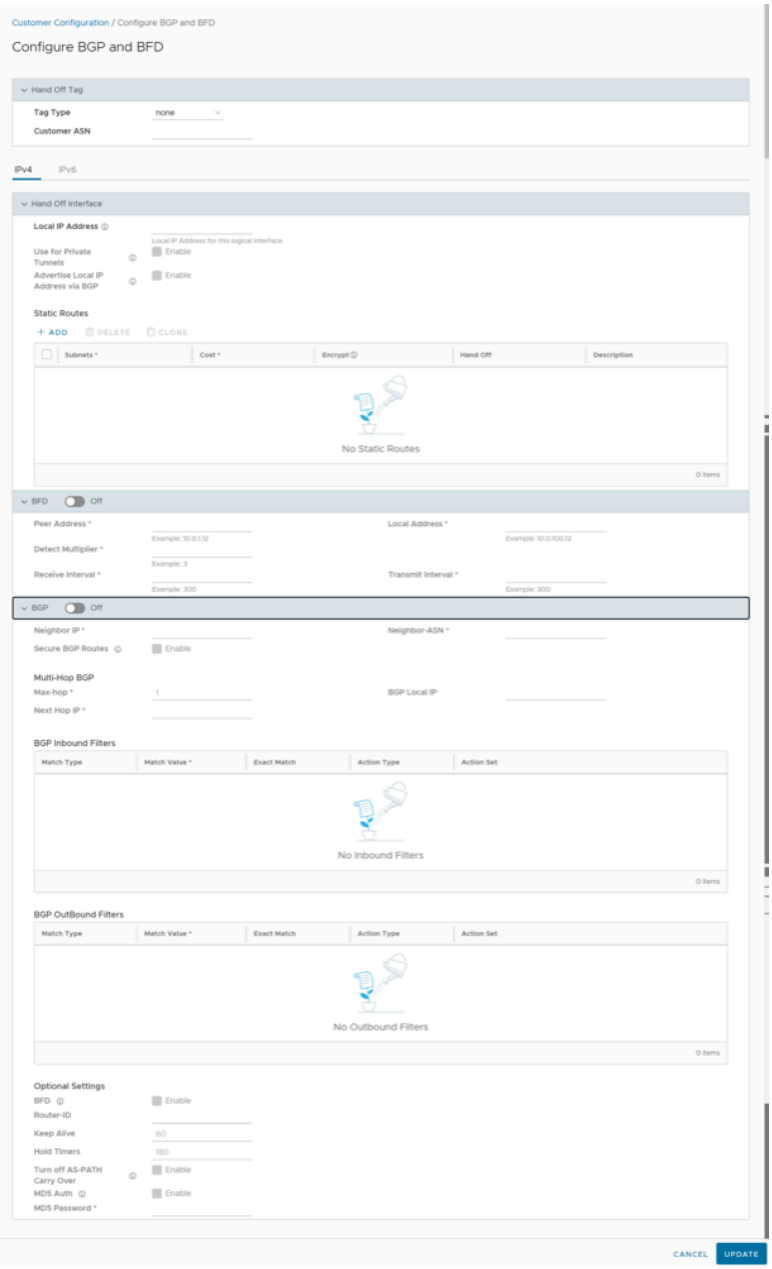
8. At the bottom of the **Per Customer Hand Off – Global Segment** area, select the **Configure BFD & BGP** link, as shown in the image below.

Figure 8-10: Customer Configuration



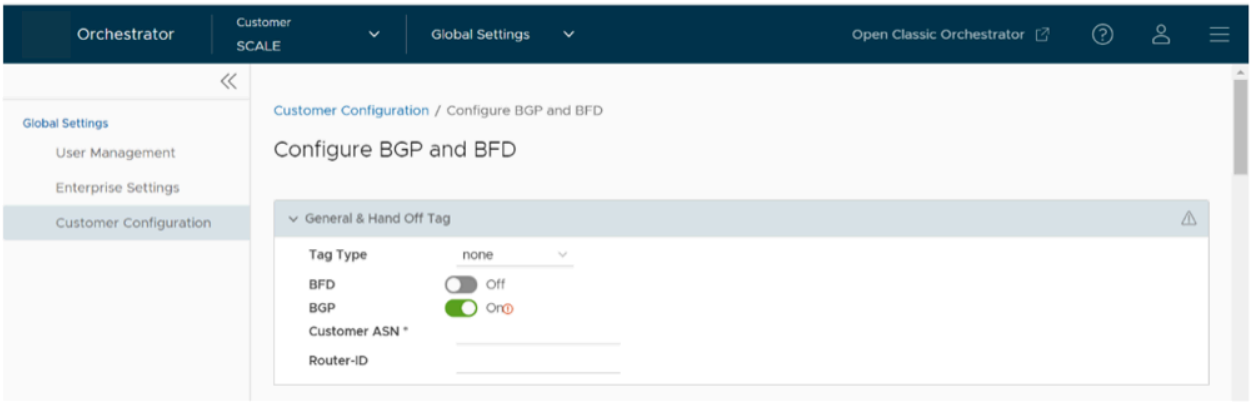
The **Configure BGP and BFD** screen displays, as shown in the image below.

Figure 8-11: Configure BGP and BFD



9. Open the **General & Hand Off Tag** section and turn the **BGP** option to the **On** position. See figure below.

Figure 8-12: Customer Configuration



10. Scroll down to the **BGP** section and select the arrow to display the **BGP** section.
11. Configure the fields in the table below.

Table 28: BGP Option Descriptions

Option	Description
Hand Off Tag	
Tag Type	Choose the tag type, which is the encapsulation, in which the Gateway hands off customer traffic to the Router. The following are the types of tags available: • **None**: Untagged. Choose this during single tenant hand off or a hand off towards shared services VRF. • **802.1Q**: Single VLAN tag • **802.1ad / QinQ(0x8100) / QinQ(0x9100)**: Dual VLAN tag
Customer ASN	Enter the Customer Autonomous System Number.
Hand Off Interface: You can configure the following settings for IPv4 and IPv6.	
Local IP Address	Enter the Local IP address for the logical Hand Off interface.
Use for Private Tunnels	Select the check box so that private WAN links connect to the private IP address of the Partner Gateway. If private WAN connectivity is activated on a Gateway, the Orchestrator audits to ensure that the local IP address is unique for each Gateway within an Enterprise.
Advertise Local IP Address via BGP	Select the check box to automatically advertise the private WAN IP of the Partner Gateway through BGP. The connectivity is provided using the existing Local IP address.
Static Routes: You can add, delete, or clone a static route.	
Subnets	Enter the IP address of the Static Route Subnet that the Gateway should advertise to the Edge.
Cost	Enter the cost to apply weightage on the routes. The range is from 0 to 255.
Encrypt	Select the check box to encrypt the traffic between Edge and Gateway.
Hand off	Select the hand off type as either **VLAN** or **NAT**.
Description	Enter a descriptive text for the static route. This field is optional.
BFD: Turn the toggle button to On to activate this section.	
Peer Address	Enter the IP address of the remote peer to initiate a BFD session.
Detect Multiplier	Enter the detection time multiplier. The remote transmission interval is multiplied by this value to determine the detection timer for connection loss. The range is from 3 to 50.
Receive Interval	Enter the minimum time interval, in milliseconds, at which the system can receive the control packets from the BFD peer. The range is from 300 to 60000 milliseconds.
Local Address	Enter a locally configured IP address for the peer listener. This address is used to send the packets.
Transmit Interval	Enter the minimum time interval, in milliseconds, at which the system can send the control packets from the BFD peer. The range is from 300 to 60000 milliseconds.
BGP: Turn the toggle button to On to activate this section.	
Neighbor IP	Enter the IP address of the configured BGP neighbor network.
Secure BGP Routes	Select the check box to allow encryption for data-forwarding over BGP routes.
Max-hop	Enter the number of maximum hops to allow multi-hop for the BGP peers. The range for Max-hop is from 1 to 255, and the default value is 1.  **Note:** This field is available only for eBGP neighbors, when the local ASN and the neighboring ASN are different.

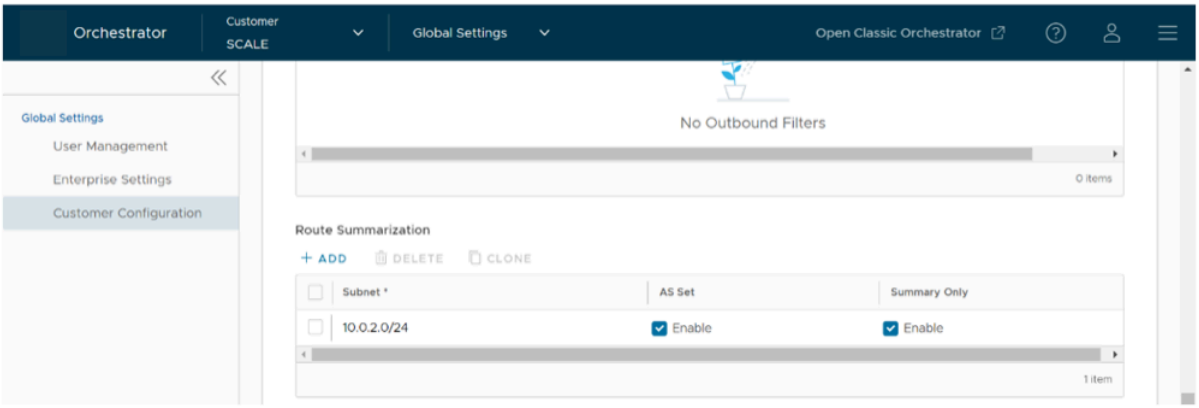
Option	Description
Next Hop IP	Enter the next-hop IP address to be used by BGP to reach the multi-hop BGP peer. **Note:** This option is available only for multi-hop eBGP with Max-hop count greater than 1.
Neighbor-ASN	Enter the Autonomous System Number of the Neighbor network.
BGP Local IP	Local IP address is the equivalent of a loopback IP address. Enter an IP address that the BGP neighborships can use as the source IP address for the outgoing BGP packets. If you do not enter any value, the IP address of the Hand Off Interface is used as the source IP address.
BGP Inbound Filters	Displays the BGP inbound filters.
BGP Outbound Filters	Displays the BGP outbound filters.
BGP Optional Settings	
BFD	Select the check box to subscribe to the BFD session.
Router-ID	Enter the Router ID to identify the BGP Router.
Keep Alive	Enter the BGP Keep Alive time in seconds. The default timer is 60 seconds.
Hold Timers	Enter the BGP Hold time in seconds. The default timer is 180 seconds.
Turn off AS-PATH Carry Over	Select the check box to turn off AS-PATH carry over, which influences the outbound AS-PATH to make the L3-routers prefer a path towards a PE. If you select this option, ensure to tune your network to avoid routing loops. It is recommended not to select this check box.
MD5 Auth	Select the check box to activate BGP MD5 authentication. This option is used in a legacy network or federal network, and is used as a security guard for BGP peering.
MD5 Password	Enter a password for MD5 authentication. **Note:** Starting from the 4.5 release, the use of the special character "<" in the password is no longer supported. In cases where users have already used "<" in their passwords in previous releases, they must remove it to save any changes on the page.

Route Summarization is new for the 5.2 release. For an overview, use case, and black hole routing details for Route Summarization, see the section titled, *Route Summarization* in the *Arista VeloCloud SD-WAN Administration Guide*. For Route Summarization configuration details, follow the steps below:

a. If applicable, configure for **Route Summarization**.

b. Scroll down to the **Route Summarization** area in the **BGP** section.

Figure 8-13: Route Summarization



c. Configure the Route Summarization fields, as described in the table below:

Table 29: Route Summarization fields Description

Option	Description
+Add	Select **+Add** to add a new row in the **Route Summarization** area. **Note:** To add additional rows to configure Route Summarization, select **+Add**. To Clone or Delete a route summarization, use the appropriate buttons, located next to **+Add**.
Subnet column	Under the **Subnet** column, enter the IP subnet.
AS Set column	Generate AS set path information from the summarized routes (while advertising the summarized route to the peer). Under the **AS Set** column, select the **Yes** check box if applicable.
Summary Only column	Under the **Summary Only** column, select the **Yes** check box to allow only the summarized route to be sent.

d. Select **Update** to save the settings.

8.3.2 Configure Distributed Cost Calculation

By default, the Orchestrator is actively involved in learning the dynamic routes. VeloCloud SD-WAN Edges and Gateways rely on the Orchestrator to calculate initial route preferences and return them to the Edge and Gateway. The Distributed Cost Calculation feature enables you to distribute the route cost calculation to the Edges and Gateways. Only an Operator user can configure Customer settings, including Distributed Cost Calculation.

Ensure the following before you activate the Distributed Cost Calculation feature.

- All the Edges and Gateways must use software version 3.4.0 or later.
- The software image associated with the Operator Profile must use version 3.4.0 or later.

Note:

Anybody experiencing an issue with Orchestrator based route calculation needs **Distributed Cost Calculation** enabled.

This default method of involving the Orchestrator in both dynamic route calculation and the distribution of those routes to Edges and Gateways has the following drawbacks:

- If the Orchestrator is under a high load, the route convergence time is significantly high (for example, as much as 40 seconds for 2000+ routes), as the Orchestrator takes that time to calculate the preference for all the synchronized routes and returns those preferences to the Edges and Gateways.
- Using the Orchestrator for route calculation means that new dynamic routes learned while the Orchestrator was unreachable are not advertised until the Orchestrator becomes reachable again.

When a customer enterprise uses Distributed Cost Calculation, the Orchestrator is no longer actively involved in the route preference calculation and instead routes are properly inserted in order by the Edge and Gateway instantly upon learning them and then convey these preferences to the Orchestrator.

When you choose to enable Distributed Cost Calculation for the Edges and Gateways, the feature provides the following benefits:

- Minimizes the impact on route learning when an Orchestrator is unreachable.
- Route convergence time is reduced from minutes to seconds in large networks with thousands of dynamic routes.
- Network delays are significantly reduced.
- Provides instantaneous Data Plane convergence.
- Supports enhanced re-ordering and pinning of routes on the Overlay Flow Control.
- Provides an option to refresh routes in the **Overlay Flow Control** page. Whenever there is a change in the Overlay Flow Control policy, the Refresh Routes option applies the changes to the existing routes immediately, without the need to restart the Edge or Gateway.

Enabling Distributed Cost Calculation has the following impacts on the Customer Enterprise network:

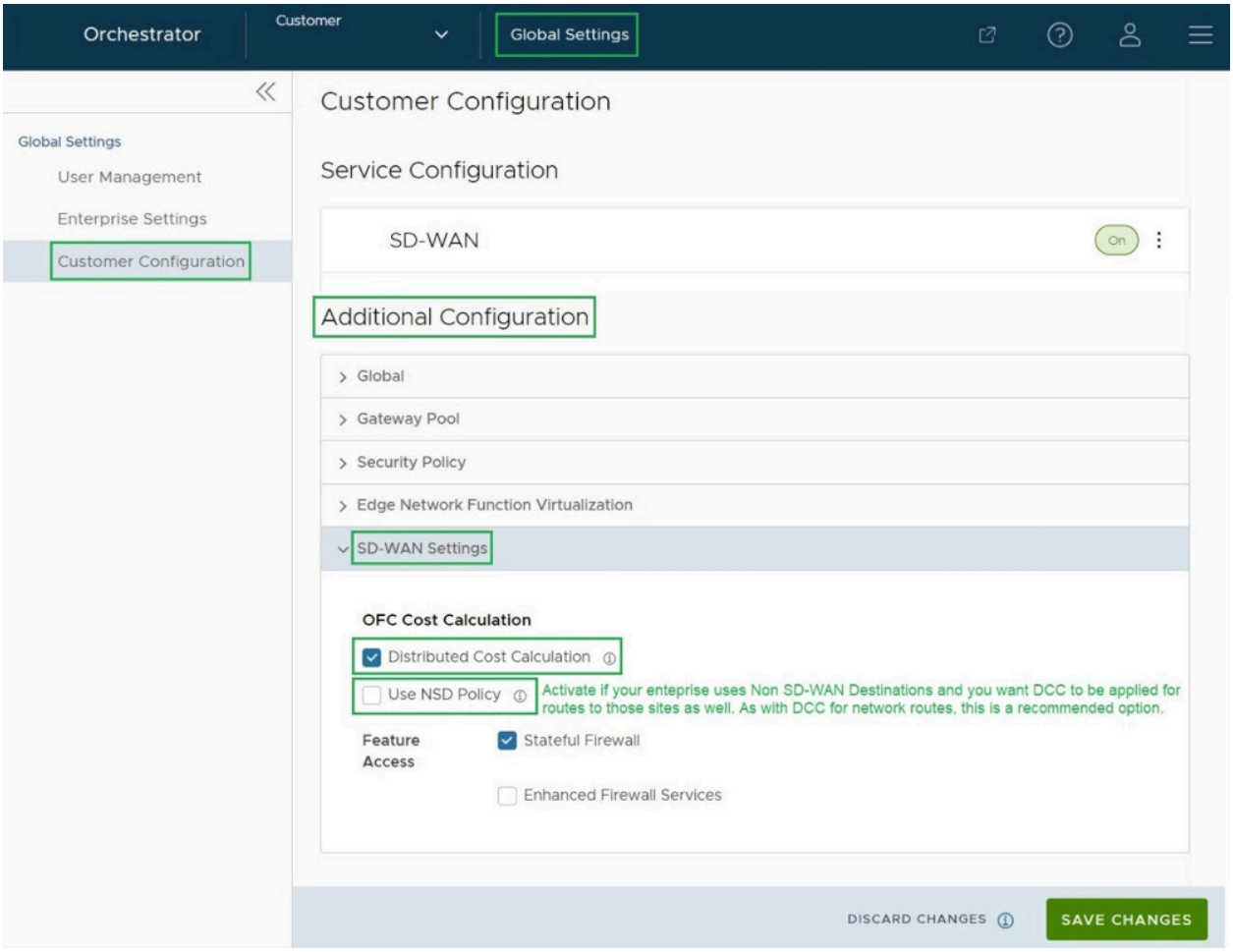
- All the local dynamic routes are refreshed, and the preference and advertise action of these routes are updated. This updated information is advertised to the Gateway, Orchestrator, and eventually across the Enterprise. The customer's network needs to completely rebuild the route table, which for most customer deployments will take less than 5 seconds. A large scale customer deployment (like 100,000+ routes) may take up to 2 minutes. During the time the route table is being rebuilt, customer traffic for all sites is impacted.
- Any existing flow using these routes can potentially be affected due to the change in the routing entries.

Note: It is recommended to enable Distributed Cost Calculation in a maintenance window to minimize the impact on the Customer Enterprise.

To configure Distributed Cost Calculation for a customer:

1. In the Operator portal, navigate to **Manage Customers**.
2. Select a customer and either select **Edit Customer System Settings** or select the link to the customer.

3. In the Enterprise portal, go to **Global Settings** > **Customer Configuration**.
4. **Figure 8-14: Customer Configuration**



5. In the **Customer Configuration** page, navigate to the **Additional Configuration** > **SD-WAN Settings** > **OFC Cost Calculation** section and configure the following:
   - Select the **Distributed Cost Calculation** checkbox to delegate the cost calculation of routes to Edges and Gateways.
   - Select the **Use NSD Policy** checkbox to use the Non SD-WAN Destination policy for route cost calculation of Edges and Gateways. This option is available only for Edges and Gateways that are running Software version 4.3.0 or later.
6. Select **Save Changes**.

Note: After enabling **Distributed Cost Calculation**, it is recommended to refresh the routes in the **Overlay Flow Control** page in the **SD-WAN** service of the **Enterprise** portal.

Note: When an Enterprise has **Distributed Cost Calculation** activated and a user tries to deactivate the software update in the **Operator Profile** page, then the user must ensure that, in future, no Edges in the Enterprise are downgraded to software image versions lower than 3.4.0. If one or more Edges in the Enterprise is using software image version below 3.4.0, the Enterprise traffic may take a sub-optimal path. The sub-optimal path will be corrected only when the Edge is upgraded to 3.4.0 or later versions.

The following are some of the scenarios in which the software versions can change and the user must make sure the Edges are using the software image version 3.4.0 or later:

- Factory Reset- When an Edge is reset to factory settings, it restores the software version of the Edge to factory image version which can be below 3.4.0.
- Edge Activation- When an Edge is activated, it may come up with software versions below 3.4.0.

Once **Distributed Cost Calculation** is activated, all the dynamic routes are assigned with new preferences and advertise action based on the Distributed Cost Calculation and the new information is propagated across the Enterprise Network.

The Orchestrator is no longer actively involved in the route preference calculation and instead the routes are properly inserted in order by the Edge and Gateway instantly upon learning them and then these preferences are conveyed to the Orchestrator.

The Overlay Flow Control policy is sent to Edges and Gateways in Control Plane Configuration updates. Edges and Gateways send the routes with computed cost and advertise action to the Orchestrator. Edges and Gateways handle the order of the routes based on the cost and route attributes.

To view a summary of all the routes in your network, select **Configure** > **Overlay Flow Control** in the **SD-WAN** service of the **Enterprise** portal. You can view the routes and advertise action in the **Overlay Flow Control** page. For additional information, see the topic *Overlay Flow Control* in the *VeloCloud SD-WAN Administration Guide*.

8.3.3 Configure Path Calculation with Multiple DSCP Labels per Flow

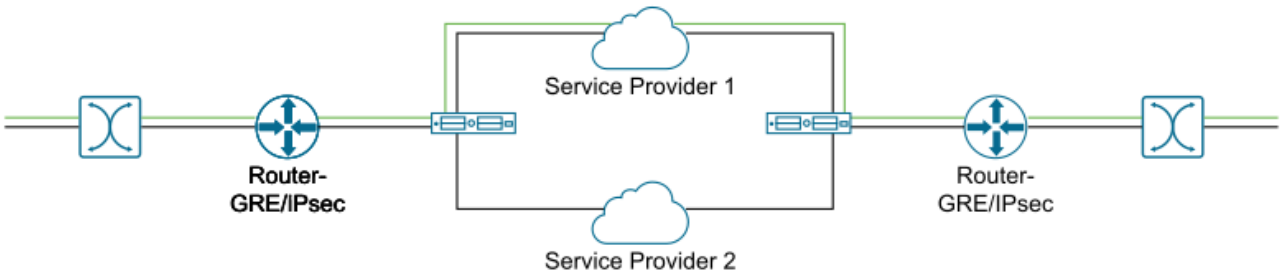
An Edge classifies a traffic flow based on the first packets in the flow. You can create business policies with application based on Differentiated Service Code Point (DSCP) and with different DSCP markings to determine the flow treatment.

By default, an Edge classifies a flow based on the first few packets received in the flow. Business Policy and QoS marking determine the flow treatment. Once the flow is classified, an entry with five tuple information of the flow is created in the flow cache table. Subsequent packets in the flow will use the five-tuple lookup against the flow cache table.

For network topologies with Layer 3 network devices doing encapsulation and/or encryption before the traffic arrives at the Edge, this creates a challenge for the Edge to forward traffic based on the Business Policy. The

traffic from the end users is multiplexed into single flow with the same source and destination IP addresses, and protocols by the Layer 3 encapsulation/encryption device, as illustrated in the following image.

Figure 8-15: Path Calculation



The impact of multiplexing end user flows into a single tunnel creates polarization of flow forwarding using the five tuples of flow cache table, which results in WAN links not being utilized.

The Path Calculation with Multiple DSCP Labels per Flow allows the DSCP value to be included, in addition to the five tuples, as part of the flow cache table lookup. Use the path calculation with multiple DSCP tags when the original user traffic is encapsulated in another tunnel like GRE or IPsec, and DSCP labels are preserved in the new IP header. This option enables path calculation for a single flow with multiple DSCP labels, which consists of same source and destination IP addresses, and offers path differentiations based on the DSCP labels in the flow.

When you enable the **Multiple-DSCP tags per Flow Path Calculation**, the Edges can differentiate the traffic flows based on the DSCP marked labels.

To enable Multiple-DSCP tags per Flow Path Calculation:

1. In the **Operator** portal, select **Orchestrator** > **System Properties**.
2. Select **New**.
3. In the **New System Property** window, create a system property with the following parameters:
   - **Name**: *session.options.enableFlowParametersConfig*
   - **Data Type**: *Boolean*
   - **Value**: *True*
4. Select **Save Changes**.
5. In the **Operator** portal, navigate to **Global Settings** > **Customer Configuration** > .
6. On the **Customer Configuration** page, go to the additional configuration settings section, and then under **SD-WAN settings**, select the **Include DSCP value as part of flow lookup** check box for **Multiple-DSCP tags per Flow Path Calculation**.

   Note: This option is available only when the system property **session.options.enableFlowParametersConfig** is set to **True**.

7. Select **Save Changes**.

8. In the Edges, different flows are created based on different DSCP labels.

> **Note:** When you select **Include DSCP value as part of flow lookup**, the inter-operability with previous versions is undefined.

While configuring the business policy for an Edge, you can choose to match a DSCP label for an application. For additional information, see the topic *Configure Business Policy Rule* in the *VeloCloud SD-WAN Administration Guide*.

When traffic arrives at the Edge, if the traffic flow matches with the selected application and DSCP tag, then the corresponding action is performed.

You can create additional business policies with different DSCP labels to match with different traffic flows and apply different treatments for those flows. For additional information on business policies, see the *Arista VeloCloud SD-WAN Administration Guide.*

Limitations:

- The path calculation with multiple DSCP labels per Flow is not applicable for the SD-WAN Gateways. You can enable this option only for Edge-to-Edge tunnels, where Edge-to-Edge can be any of the following:
  - Edge-to-Edge through Hub
  - Spoke-to-Hub
  - Dynamic Branch-to-Branch

  You can use this option for On-Premise deployment where Gateway is used only for control plane functionality and not for data plane traffic.
- The path calculation with multiple DSCP labels per Flow is intended only for GRE or IPsec traffic. The direct Internet traffic does not carry multiple DSCP labels within a single flow.
- After you enable the path calculation option, when the traffic flow consists of packets with same five-tuple information but different DSCP markings, LAN side NAT might not work as expected.

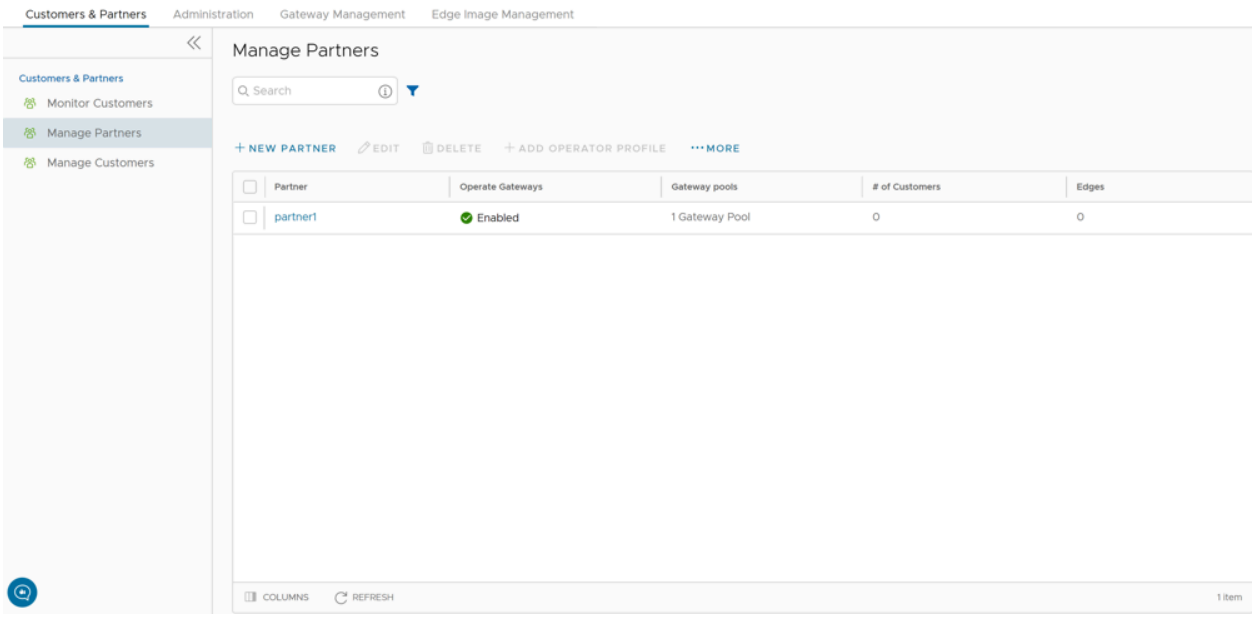
Chapter 9

Manage Partners

The Manage Partners option allows you to create new Partners, who can independently manage a group of Customers.

1. Log into the VeloCloud Orchestrator as an Operator user. In the SD-WAN service of the Operator portal, select **Manage Partners**.

   Figure 9-1: Manage Partners



2. You can perform the following actions:

Table 30: Manage Partners Option Descriptions

Option	Description
Search	Enter a search term to search for the matching text across the table. Use the advanced search option to narrow down the search results.
New Partner	Select this option to add a new Partner. For additional information, see Create New Partner.
Edit	This option takes you to the **Partner Overview** page in the Partner portal, where you can edit the **Partner Capabilities**, **Available Software Images**, and **Gateway Pool** of the selected Partner. For additional information, see Configure Partner.
Delete	Deletes the selected Partners. Enter the number of selected Partners in the pop-up window, and then select **Delete**.  **Note:** Ensure that you have removed all the Customers associated to the selected Partner, before deleting the Partner.
Add Operator Profile	Assigns an Operator profile to the selected Partners, which specifies the network settings managed by SASE Orchestrator. In the **Add Profiles to Selected Partners** pop-up window, select a profile and select the arrow to add it. Select **Save**. For additional information, see Manage Operator Profiles.
More	Select this option, and then select **Download** to download the list of Partners' profiles in a CSV format.

3. Following are the other options available in the **Manage Partners** area:

Table 31: Manage Partners Option Descriptions

Option	Description
Columns	Select the check boxes to view the required columns.
Refresh	Select this option to refresh the page.

9.1 Create New Partner

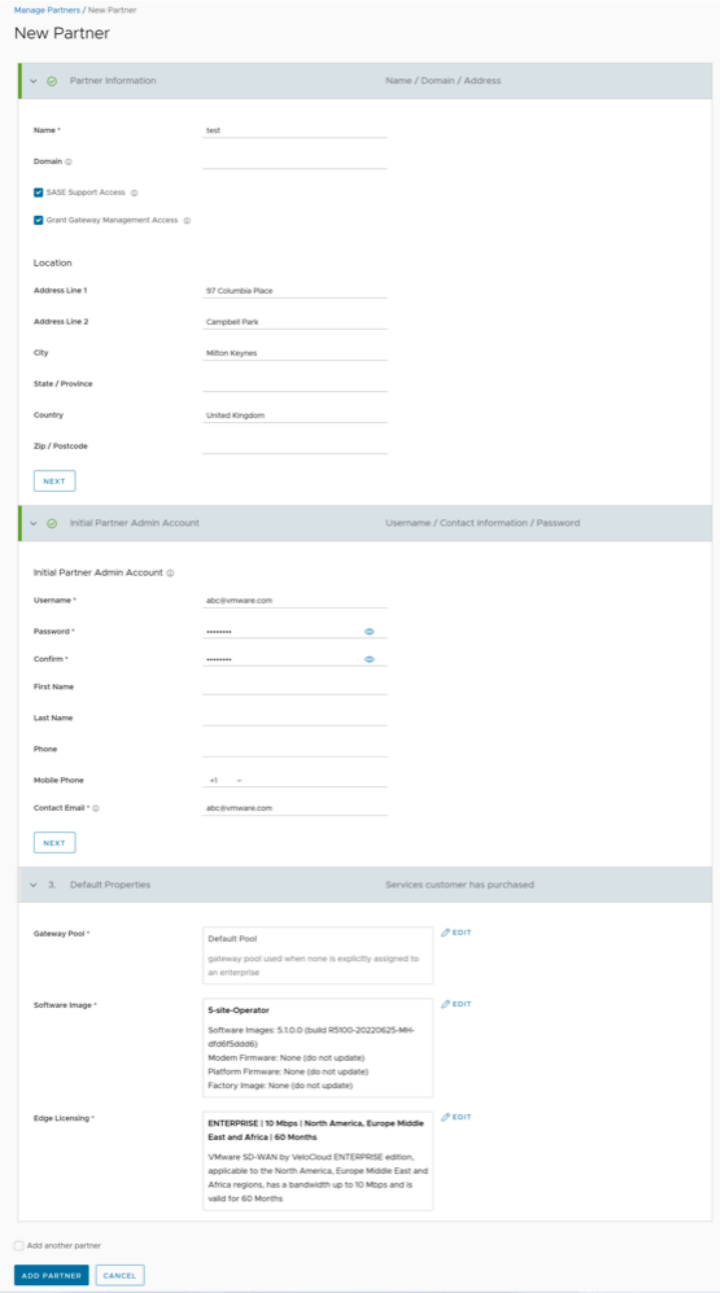
In the **Operator** portal, you can create Partners and configure the settings, so that the Partners can manage a group of Customers on their own.

Only Operator Superusers, Standard Operators, and Business Specialist Operators can create a new Partner.

 **Note:** As an Operator Super User, you can temporarily deactivate creating new partners by setting the system property `session.options.disableCreateEnterpriseProxy` to **True**. You can use this option when SASE Orchestrator exceeds the usage capacity.

1. Log into the Arista SASE Orchestrator as an Operator user. In the Operator portal, go to **Customers & Partners** > **Manage Partners**, and then select **New Partner**.

   Figure 9-2: Create New Partner



2. On the **New Partner** page, enter the following details:

> **Note:** Select **Next** to go to the next section on the page. The **Next** button is activated only when you enter all the mandatory details in each section.

Table 32: New Partner

Option	Description
Partner Information	
Name	Enter the Partner name.
Domain	Enter the domain name of the Partner.
SASE Support Access	This option is selected by default and grants access to the Arista Support to view, configure, and troubleshoot the settings of the Partner.
Grant Gateway Management Access	Select the checkbox to allow the Partner to create and manage the Gateways.
Location	Enter relevant address details in the respective fields.
Initial Partner Admin Account	
Username	Enter the username in the **user@domain.com** format.
Password	Enter a password for the Partner.  **Note:** Starting from the 4.5 release, the use of the special character "<" in the password is no longer supported. In cases where users have already used "<" in their passwords in previous releases, they must remove it to save any changes on the page.
Confirm	Re-enter the password.
First Name, Last Name, Phone, Mobile Phone	Enter relevant details in the respective fields.
Contact Email	Enter the email address. The alerts on service status are sent to this email address.
Default Properties	
Gateway Pool	Select **Add** to select the SD-WAN Gateway Pool from the available list. After adding the SD-WAN Gateway Pools, you can select **Edit** to add or remove the pools. For additional information on SD-WAN Gateway Pools, see Manage Gateway Pools
Software Image	Select **Add** to select the Software Image from the available list. After adding the Software Image, you can select **Edit** to add or remove the images. For additional information on Software Images, see Software Images.
Edge Licensing	Select **Add** to select the SD-WAN Edge licenses from the available list. After adding the licenses, you can select **Edit** to add or remove the licenses. This option is available only when the value of System Property `session.options.enableEdgeLicensing` is set to **True**.  **Note:** The license types can be used on multiple Arista SD-WAN Edges. It is recommended to provide the Partners with access to all types of licenses to match their edition and Edge Licensing region. For additional information, see

3. Select the **Add Another Partner** checkbox, to create another new Partner, or directly select the **Add Partner** button. The new Partner name is displayed on the **Manage Partners** page. You can select the Partner name to navigate to the Partner portal and add additional configurations to the Partner. For additional information, see Configure Partner

9.2 Configure Partner

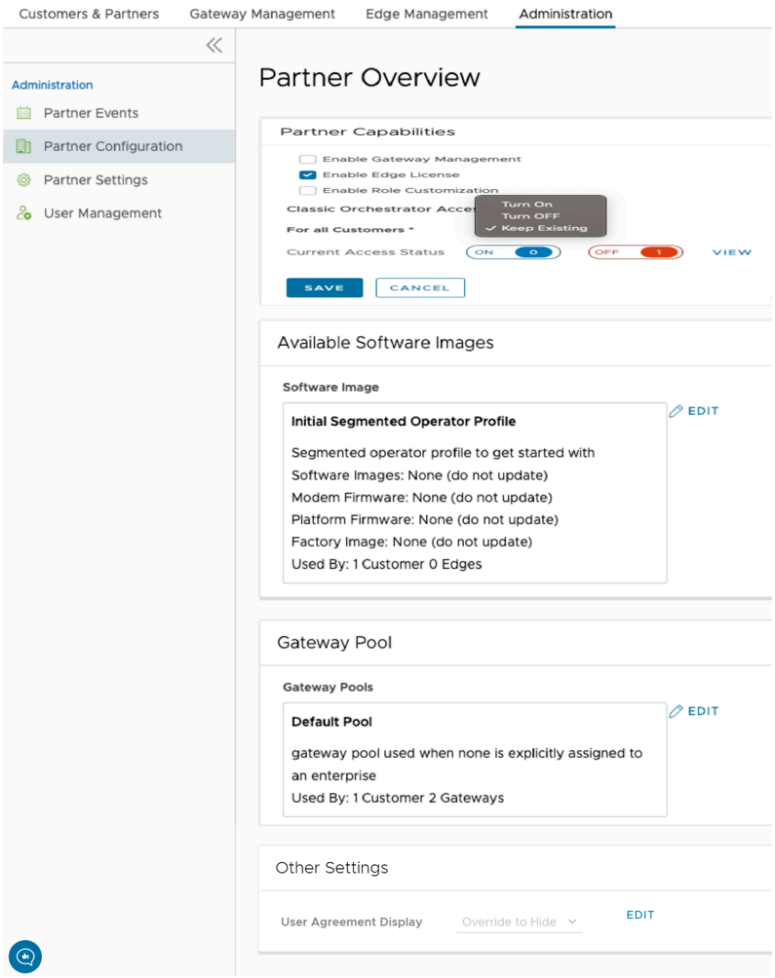
As an Operator Superuser and Operator Admin, when you create a new Partner, you are automatically redirected to the Partner Overview page, where you can configure Partner capabilities, Software images, Gateway pools, and other settings that the Partner can access.

Perform the below steps to configure Partner information for an existing Partner:

1. In the **Operator** portal of the Arista SASE Orchestrator, select **Manage Partners**, and then select the Partner name to navigate to the **Partner** portal and add additional configurations to the Partner.

   The **Partner Overview** page for the selected Partner appears.

   Figure 9-3: Partner Configuration



2. You can configure the following capabilities and settings for the selected Partner:

Table 33: Partner Configuration

Option	Description
Partner Capabilities	Selecting **Edit** allows you to select the following capabilities for the current Partner: • **Enable Gateway Management** – Allows the Partner users to create, configure, and manage their own Gateways. • **Enable Edge License** – Allows the Partner users to manage their Edge Licenses. • **Enable Role Customization** – Allows a Partner Super user to customize the service permissions of other Partner users and Enterprise users of the Partner.
Classic Orchestrator Access	Displays the Classic Orchestrator accessibility settings for the Partner Customers. **For All Customers**: An Operator can choose any one of the following options from the drop-down menu: • **Turn On**: Allows Partner Customers to access the Classic Orchestrator. • **Turn Off**: Does not allow Partner Customers to access the Classic Orchestrator. • **Keep Existing**: This option indicates no change to the settings. • **Current Access Status**: Displays the access information (On/Off) for the existing Partner Customers. Select **View** to view the list of names and statuses of the Partner Customers.  **Note:** You must refresh the page to see the **Classic Orchestrator UI** button at the top right of the screen.
Available Software Images	Displays all the software images assigned to the Partner. Select **Edit** to add or remove the software images in the list.  **Note:** You cannot remove the software images that are assigned to a Customer.
Gateway Pool	Displays the Gateway pools associated with the selected Partner. Select **Edit** to add or remove the Gateway pools in the list.  **Note:** You cannot remove the Gateway Pools that are assigned to a Customer.
Other Settings	Displays the settings of the User Agreement only if you have activated the User Agreement feature. By default, the User Agreement feature is not activated. To enable the User Agreement feature, navigate to the System Properties in the Operator portal, and set the value of the `session.options.enableUserAgreements` system property as True. You can choose to override the default display settings of the User Agreement, by selecting the **Edit** button and selecting relevant option from the **User Agreement Display** drop-down menu. By default, the Customer inherits the display mode set in the system properties.

3. Select **Save Changes**.

Chapter 10

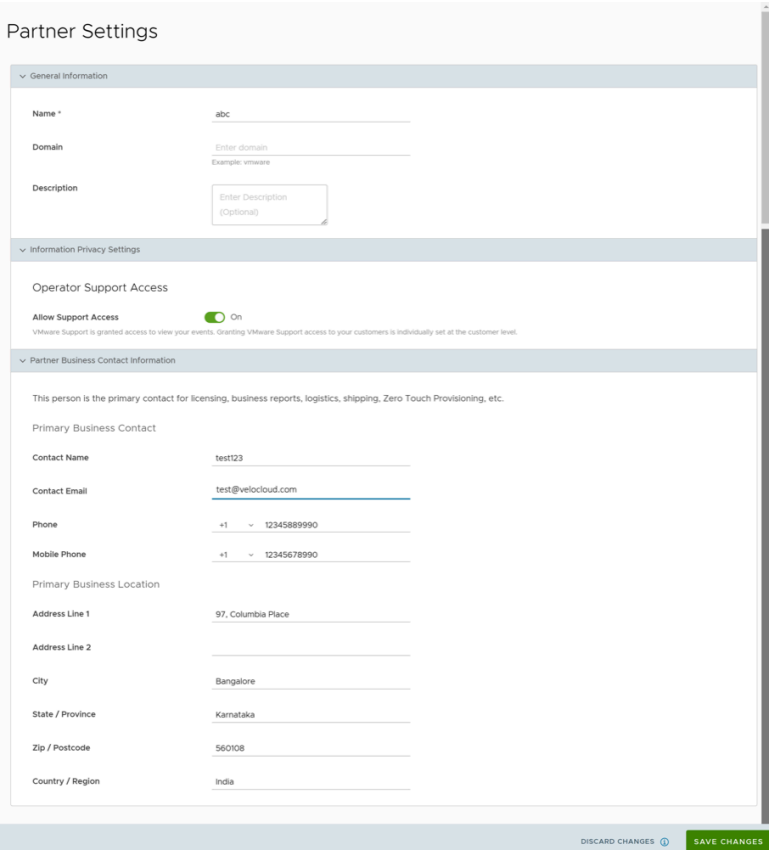
Partner Settings

As an Operator, you can configure Partner specific information such as name, primary location, and primary contact.

1. In the **Operator** portal, select **Manage Partners**, and then select the link to a Partner name for which you wish to edit the settings.
2. From the top menu, select **Administration**, and then from the left menu, select **Partner Settings**.

   The following screen appears:

   Figure 10-1: Partner Settings



3. You can edit the following settings on this screen:

Table 34: Partner Setting Options

Option	Description
Name	You can edit the Partner name.
Domain	You can edit the Partner domain name.
Description	Enter a description. This field is optional.
Operator Support Access	This option is activated by default, indicating that Arista Support can view Partner level events.  **Note:** When deactivated, the Operator can no longer edit the settings of the selected Partner. Only the Partner can activate this setting from the Partner portal.
Partner business contact information	Enter information of the primary person in charge of licensing, business reports, logistics, shipping, Edge auto-activation, etc.

4. Select **Save Changes**.

Chapter 11

Manage Operators

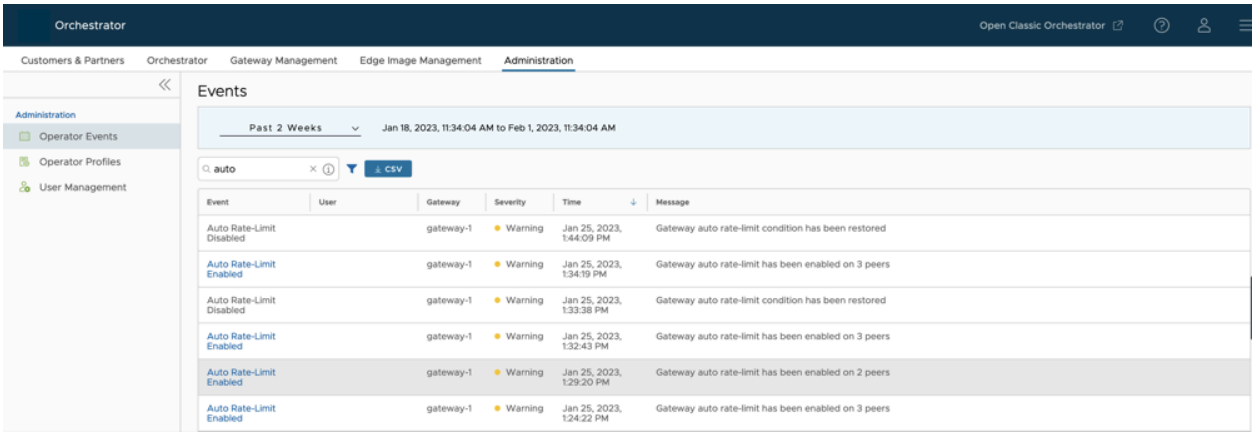
In the **Operator** portal, you can configure and manage Operator Profiles and Operator Users. You can also view the events triggered by Operators.

11.1 Monitor Operator Events

Displays a list of events generated within the SASE Orchestrator at the Operator level. These events help to determine the status of Arista System.

1. To view the Operator events using the Orchestrator UI, select **Administration** > **Operator Events**.

   Figure 11-1: Operator Events

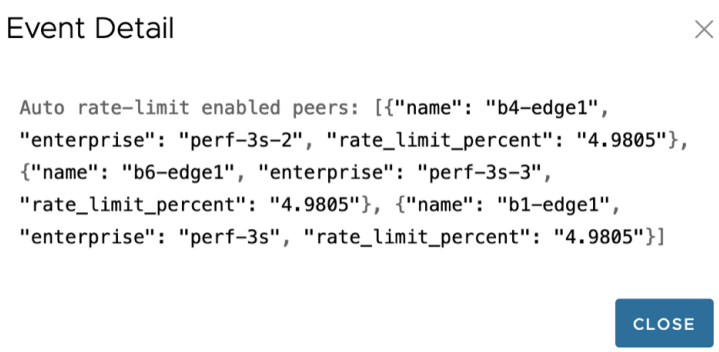


   The **Events** page displays the recent Operator events. You can select the link to an event to view additional details about the selected event.

2. When the auto rate-limit capability is activated on a Gateway, the Gateway will drop packets if it detects that certain Edges are sending large amount of traffic which might be causing the Gateway to be unstable.

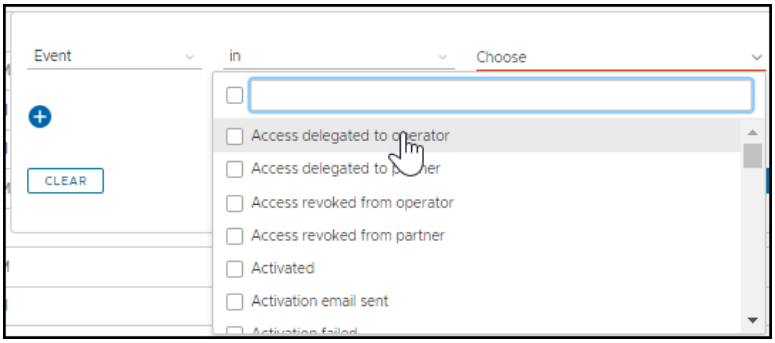
The event message includes the information about the list of Edges to which the Gateway is applying the auto rate limit and the rate limit percentage.

Figure 11-2: Event Details



3. In the **Search** field, enter a term to search for specific details. Select the **Filter** icon to filter the view by a specific criteria. In the Filter, choose **Event**, and then select the drop-down arrow next to the field to view the list of Operator Events available and to filter by specific Events.

Figure 11-3: List of Available Operator Events



Select the **CSV** option to download a report of the events in CSV format.

Note: For detailed information about alerts and events generated within the VeloCloud Orchestrator at the Operator level, see Operator-Level Orchestrator Alerts and Events

11.2 Manage Operator Profiles

An Operator Profile is used to specify the network settings managed by VeloCloud Orchestrator. After you create a Customer or Partner, you can assign an Operator profile to them.

Operators can upload, modify, or delete the following firmware and factory images in the Orchestrator UI:

- Firmware Platform images for 6x0, 7x0, and 3x00 (3400/3800/3810) Edge device models
- Firmware Modem images for 510-LTE (Edge 510LTE-AE, Edge 510LTE-AP) and 610-LTE (Edge 610LTE-AM, Edge 61LTE-RW)

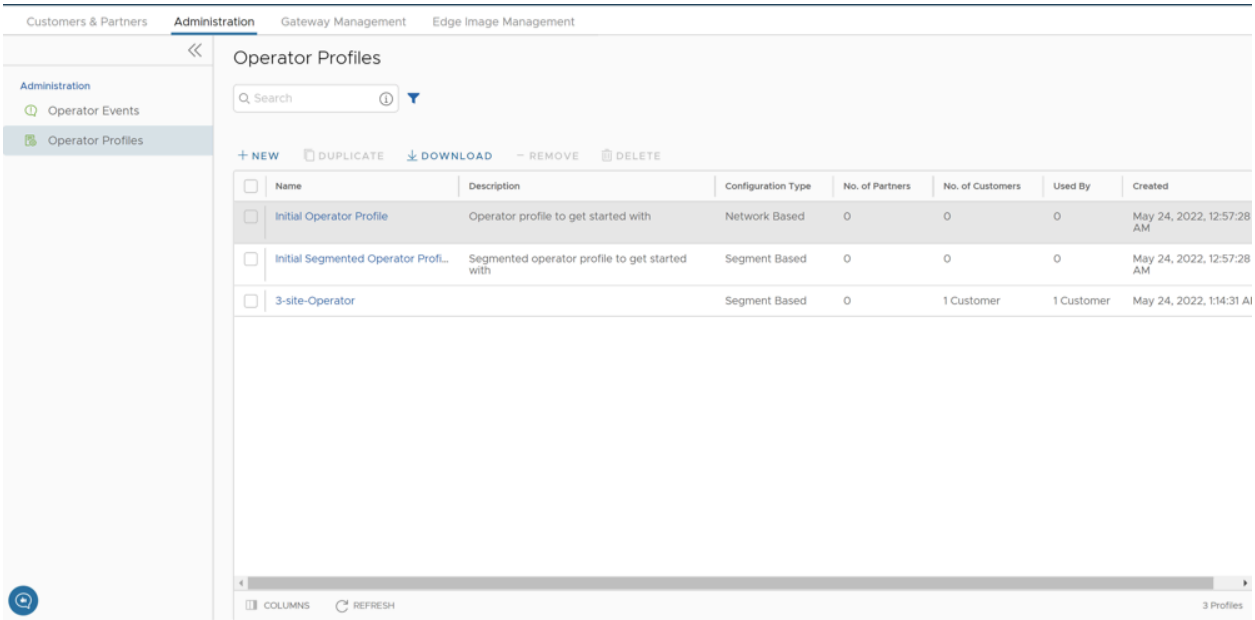
- Factory images for all physical Arista SD-WAN Edge devices

With the 5.2 release, updating the Factory image and Platform firmware on High-availability (HA) Edges is supported. Steps and requirements are described in the appropriate sections in the procedure below.

See Platform and Modem Firmware and Factory Images for additional information.

1. In the Operator portal, from the top menu, select **Administration** > **Operator Profiles**. The **Operator Profiles** page displays the available profiles.

   Figure 11-4: Operator Profile



> **Note:** The Operator profiles that contain a deprecated image are flagged to notify the user that the software version of the profile contains a deprecated software image.

2. As an Operator user, you can perform the following actions on this page:

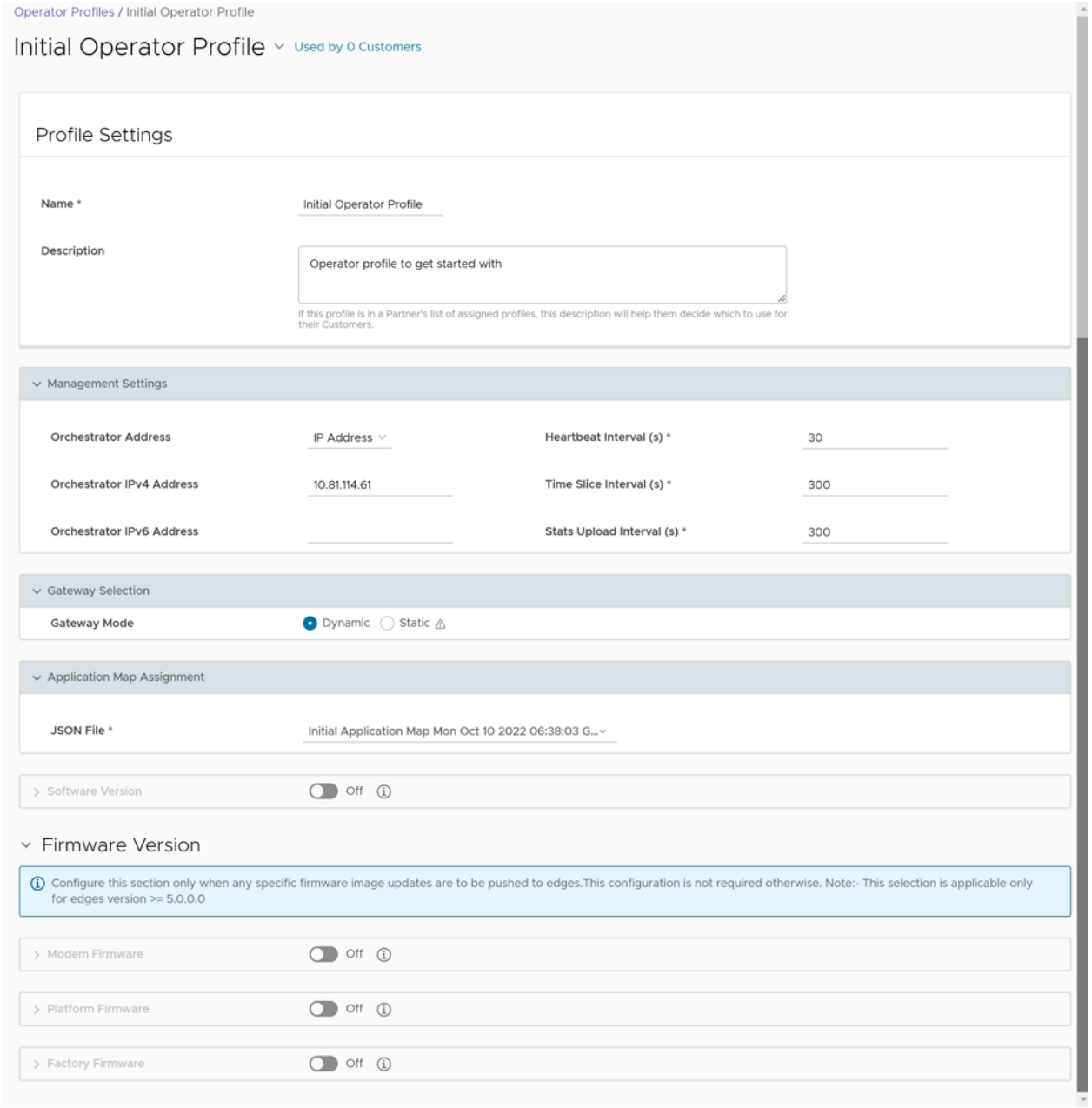
Table 35: List of Operator Actions

Option	Description
Search	Enter a search term to search for a matching text across the page. You can use the Advanced Search option to narrow down the search results.
New	Select this option to create a new Operator Profile. Enter the desired name and description in the dialog and select **Create**.
Duplicate	Select this option to create a copy of the selected Operator Profile. You can update the name and description.
Download	Select this option to download the csv file containing a list of all or the selected Operator Profiles.
Remove	Select this option to remove the selected Operator Profile(s) from all the associated Partners and Customers. You can complete this action only after you enter the correct number of profiles selected.
Delete	Select this option to delete the selected profile(s). You can complete this action only after you enter the correct number of profiles selected.  **Note:** You cannot delete a profile that has already been assigned to a Customer or Partner.
Columns	You can select the desired columns to be displayed in the table.
Refresh	Select this option to refresh the page.

 **Note:** You cannot delete a profile that has already been assigned to a Customer or Partner.

3. To update an existing Operator Profile, select the link to that Operator Profile name. The selected Operator Profile page appears, as shown in the image below.

Figure 11-5: Initial Operator Profile



4. You can configure the existing settings of the selected Profile. See table below.

Table 36: Profile Settings

Option	Description
Profile Settings	
Name	Edit the existing name of the Operator Profile.
Description	Edit the existing description of the Operator Profile.
Management Settings	
Orchestrator Address	Choose to use either FQDN or IP address as the Orchestrator Address. If you select FQDN, enter the FQDN address.
Orchestrator IPv4 Address	Enter the IPv4 address to be used as Orchestrator Address.
Orchestrator IPv6 Address	Enter the IPv6 address to be used as Orchestrator Address.
Heartbeat Interval (s)	Displays the time interval between the heartbeat messages sent from the VeloCloud Orchestrator to SD-WAN Edges. The default value is 30 seconds and minimum interval must be 10 seconds. If an SD-WAN Edge does not receive two heartbeats continuously, then the SD-WAN Edge is marked as Down.  **Note:** When you modify the heartbeat interval, make sure to update the SD-WAN Edge Offline Alert Notification Delay time accordingly, to avoid sending unnecessary alerts.
Time Slice Interval (s)	Displays the time interval over which the monitoring data is collected for a flow. The default value is 300 seconds.
Stats Upload Interval (s)	Displays the time interval for uploading the monitoring data. All the data for each Timeslice is collected during the Stats Upload Interval and then uploaded. The default value is 300 seconds.
Gateway Selection	
Gateway Mode	By default, the SD-WAN Gateway selection is **Dynamic** and the Arista SD-WAN Gateways are chosen dynamically from the SD-WAN Gateway Pool. Ensure that the SD-WAN Gateway Pool consists of at least two Arista SD-WAN Gateways, for the SD-WAN Gateway selection to be efficient. Select the check box to make the SD-WAN Gateway selection as Static. For the Static SD-WAN Gateway selection, you must specify the Primary SD-WAN Gateway. You can also enter an optional Secondary SD-WAN Gateway.  **Note:** Use the Static SD-WAN Gateway Selection only for testing or debugging purposes. You must not use this option for SD-WAN Edge-to- SD-WAN Edge VPN or Partner handoff configurations.
Application Map Assignment	
JSON File	By default, the initial Application Map is assigned to the Operator Profile. You can choose a different Application Map from the drop-down list. For additional information, see Application Maps.
Software Version: You can choose to push the latest Software Image to the SD-WAN Edges. By default, no updates are applied to the devices. Activate the toggle button to display the following fields.	
Version	Choose the Software Image from the drop-down list. For additional information on the Software Images, see Software Images.
Update Duration	Select the **Update Duration** check box, and then enter the duration time in minutes. When you activate this option, the VeloCloud Orchestrator updates all the devices associated with the Enterprise customer within the specified time duration.
Firmware Version	
 **Note:** This section is available only for Edge versions 5.0.0 and above. This section is activated only when we deactivate the **Software Version** section.	

The 5.1.0 release introduces the functionality for Operators to manage image upgrades for both Platform firmware, Modem firmware, and Factory Default images. (See table below for specific device requirements.

See the table below for device requirements and a description of both software types.

Table 37: Device Requirements

Software Type	Device Requirements	Components of the Edge that will be Updated
Modem Firmware	For the 5.1.0 release and later: 510-LTE (EDGE 510LTE-AE, EDGE510LTE-AP) and 610-LTE (EDGE610LTE-AM, EDGE61LTE-RW)	Carrier firmware and configuration files
Platform Firmware	For the 5.0.0 release, only Edge 6x0 devices are supported. For the 5.1.0 release, EDGE3400/ EDGE3800/ EDGE3810 models are also supported. Starting from the 5.2.4 release, Edge 7x0 devices are supported.	• BIOS (Basic Input/Output System) • CPLD (Complex Programmable Logic Device) • PIC (Programmable Intelligent Compute)
Factory Default (MR): Edge 500, Edge 5x0, Edge 6x0, Edge 7x0	For the 5.0.0 and later releases: all Edge devices.	Default factory image will be updated.

Note:

- It is important that you update the software version first. Then, after completion, update the firmware (Platform or Modem), and then update the factory default. Do not update the software version, the firmware, and the factory default at the same time. Also, only update one component at a time.

  CAUTION: For the "Factory Image Update" feature, only use images that have been officially distributed as supported Factory Image versions. Do not use any other software update images with this feature. At any given time, Arista has an official "current" Factory Image version that is distributed from activate-sdwan.arista.com. Any other version (older or newer, supported or unsupported) that is installed as a "factory image" will be automatically updated to this version the next time the Edge is in an unactivated state and connected to the Internet.

- For releases prior to 5.0.0, the Operator Profile update will be a success, but the Firmware images will not be applied on the Orchestrator. No events will be generated, as the Orchestrator does not have a supported software version.
- For the 5.0.0 release and later, the Operator Profile update will be a success, and the Orchestrator will update the Firmware and Factory image components.

See the table below for a compatibility matrix of supported images for the supported Edge devices.

Table 38: Compatibility Matrix of Supported Edge Device

Device Family	Software Image (Device Family)	Platform Firmware (Device Family)	Modem Firmware (Device Family)	Factory Default (Device Family)
EDGE 6x0	EDGE 6X0	EDGE 6X0	610-LTE	EDGE 6X0
EDGE 3x00	EDGE 8X0	Edge 3X00	NA	EDGE 8X0
	EDGE 1000			EDGE 1000
	EDGE 3X00			EDGE 3X00
510LTE	Edge 510LTE-AE	NA	Edge 510LTE-AE	Edge 5X0
	Edge 510LTE-AP		Edge 510LTE-AP	
610-LTE	Edge 610LTE-AM	Edge 6X0	Edge 610LTE-AM	Edge 6X0
	Edge 61LTE-RW		Edge 61LTE-RW	
EDGE 7x0 (EDGE 710-W, EDGE 710-5G, EDGE 720, EDGE 740)	EDGE 7x0	EDGE 7x0	EDGE 7x0	EDGE 7x0

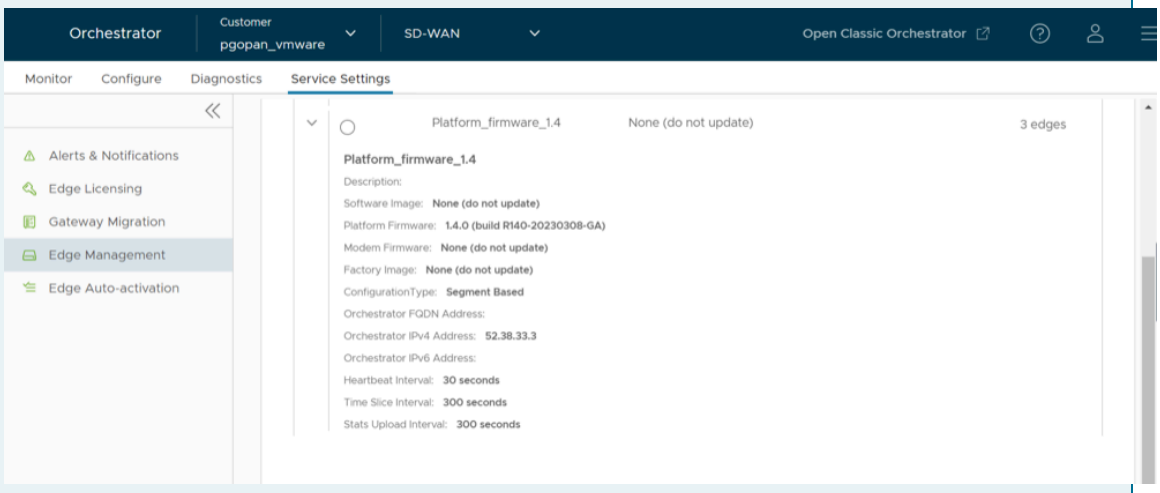
The Operator can create multiple different profiles and select profiles with various combinations to manage different types of Firmware updates to be applied to Edges. See the notes below for additional information.

Note:

- Before an Operator can update and manage the Platform Firmware for 6X0 Edge devices and Factory Default images for all devices, the Edge and Orchestrator software version must first be updated to 5.0.0 or later.

- In the 5.0.0 release, the Operator Profile name will display as an image bundle (software and firmware) that lists the details of the Firmware images tagged in the Operator profile. (To view this setting, go to **Edge ManagementService Settings**). See image below.

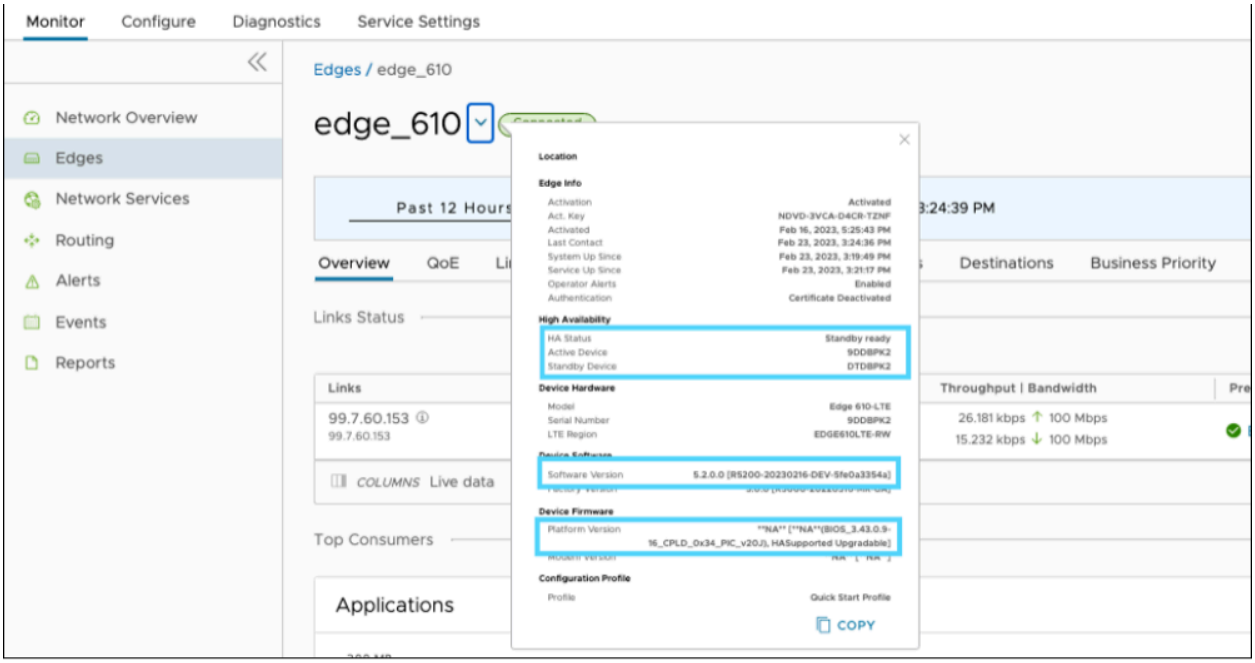
  Figure 11-6: Service Settings



- All Factory and Firmware upgrades are limited to post activation.
- The 5.0.0 software image can be used to update the Factory default image on the Edge if the 5.0.0 or greater release image is uploaded from the “Software tab.” The software will be updated. If the image is uploaded from “Firmware tab,” the Factory Default image will be updated. Platform Firmware images can be uploaded only from the “Firmware tab."
- The Platform Firmware upgrade takes at least 10 minutes to complete and includes multiple Edge reboots where the Edge will display as offline.
- For the 5.2 release, updating the Factory image and Platform firmware on HA (High-availability) Edges is supported. For updating Modem firmware on HA Edges, follow the steps below.
  - 1- The Edges must be unconfigured from HA.
  - 2- Apply the Modem firmware.

- 3- Reconfigure to HA mode.

Figure 11-7: Edge



5. In the Software Version section, select the **Version** drop-down menu. Select the software image and select **Save Changes**. To update a Platform Firmware, a 5.0.0 or above software version for an Edge 6X0 or Edge 3X00 must be applied. To update Modem Firmware, a 5.0.0 or above software version for an Edge 510-LTE (Edge 510LTE-AE, Edge 510LTE-AP) or 610-LTE (Edge 610LTE-AM, Edge 61LTE-RW) must be applied.

   Note:

   - It is important that you update the software version first. Then, after completion, update the Factory image or Platform or Modem Firmware. Do not update the software version and the firmware at the same time.
   - The **Version** drop-down menu displays the software images that are deprecated with a flag, but you will not be able to select the deprecated images.

   For the selected profile, the usage information such as number of customers using the profile and software version used by the profile, appears at the left-hand bottom of the page.

   If a Software Version 5.0.0 and above for an Edge 6X0 is selected from the Software Version drop-down menu, the Firmware section will be available for upgrade. If a software version lower than 5.0.0 is selected, or when a software image bundle for a Virtual Edge is selected, the Firmware section is grayed out.
6. Select **Save Changes**.
7. In the Software Version section, uncheck the Software Version check box and select **Save Changes**.
8. In the Firmware section, check the Platform Firmware and/or Factory Image check boxes in the appropriate sections and choose an image from the drop-down menu. See important note below.

> **Note:** The Firmware image section can be configured for the software version 5.0.0 and greater and for 6X0 Edge devices.

9. Select **Reapply** to force re-update of the selected software image for the Edges associated with the selected Operator Profile.
10. Select **Save Changes**.

Related Links

- To assign a profile for a new customer, see Create New Customer
- To change the profile for an existing customer, see Configure Customers
- To assign a profile for a partner, see Manage Partners

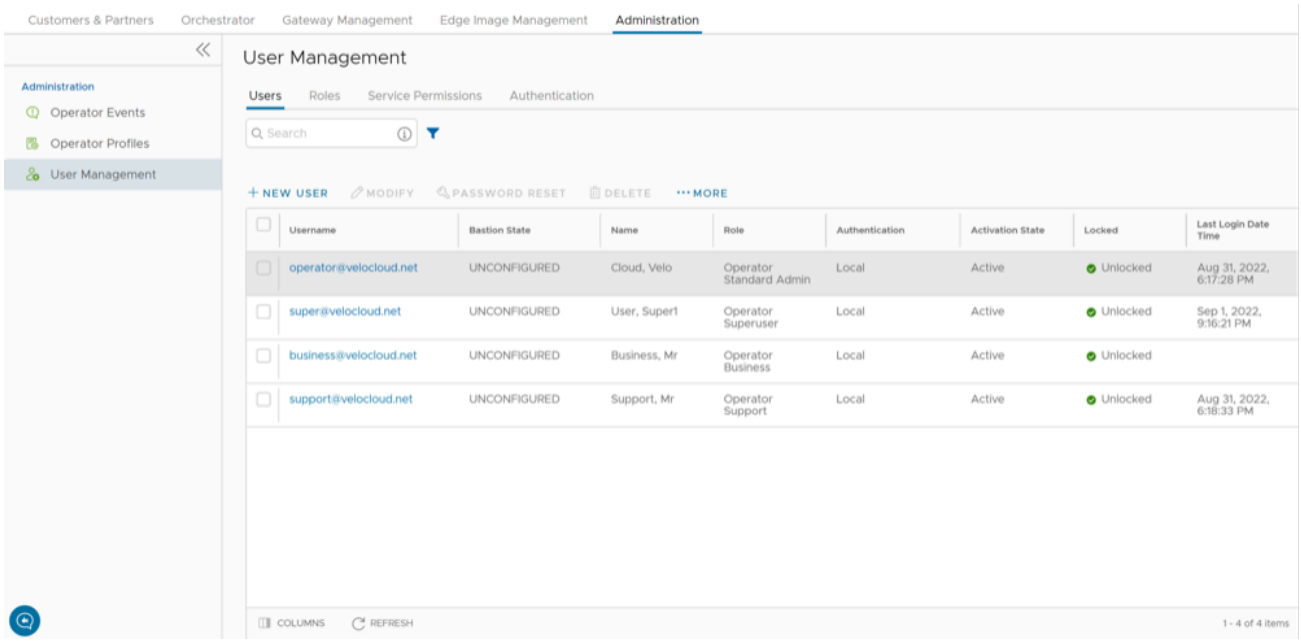
Chapter 12

User Management - Operator

The User Management feature allows you to manage users, their roles, service permissions (formerly known as Role Customization), and authentication.

As an Operator, you can access this feature from the **Operator** portal, by navigating to **Administration** > **User Management**. The following screen is displayed:

Figure 12-1: User Management



The **User Management** window displays four tabs: **Users**, **Roles**, **Service Permissions**, and **Authentication**.

For more information on each of these tabs, see:

- Users
- Roles
- Service Permissions
- Authentication

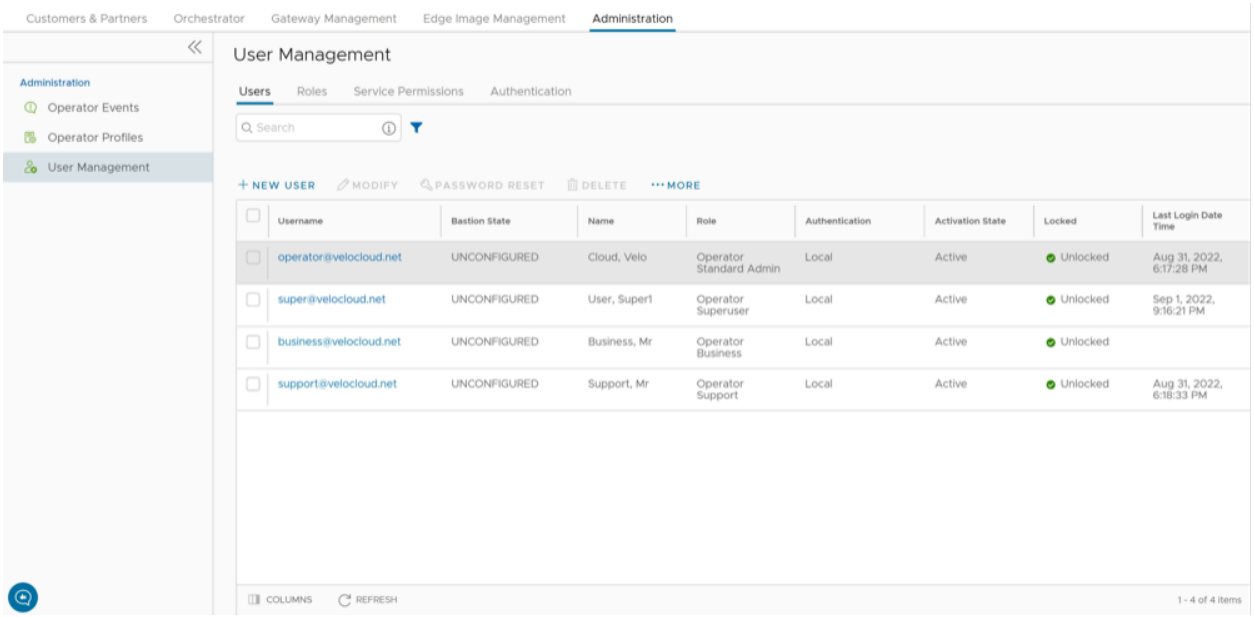
12.1 Users

As an Operator, you can view the list of existing users and their corresponding details. You can add, modify, or delete a user. However, you cannot modify or delete an Operator Super User. An Operator Super User can create new Operator users with different role privileges and configure API tokens for each Operator user.

Perform the following steps to access the **Users** tab:

1. In the **Operator** portal, select **Administration** from the top menu.
2. From the left menu, select **User Management**. The **Users** tab is displayed by default.

Figure 12-2: Users Tab



3. On the **Users** screen, you can perform the following activities:

Table 39: User Action Items

Option	Description
New User	Creates a new Operator user. For additional information, see Add New User.
Modify	Allows you to modify the properties of the selected Operator user. You can also select the link to the username to modify the properties. You can change the **Activation State** of the selected Operator user. Only an Operator Super User can manage API tokens. For additional information, see API Tokens.
Password Reset	Sends an email to the selected user with a link to reset the password. You can also choose to freeze the account until the password is reset.
Delete	Deletes the selected user. You cannot delete the default users.
More	Select this option, and then select **Download** to download the details of all the users into a file in CSV format.

4. The following are the other options available on the **Users** tab:

Table 40: Filter Options

Option	Description
Search	Enter a search term to search for the matching text across the table. Use the advanced search option to narrow down the search results.
Columns	Select the columns to be displayed or hidden on the page.
Refresh	Select to refresh the page to display the most current data.

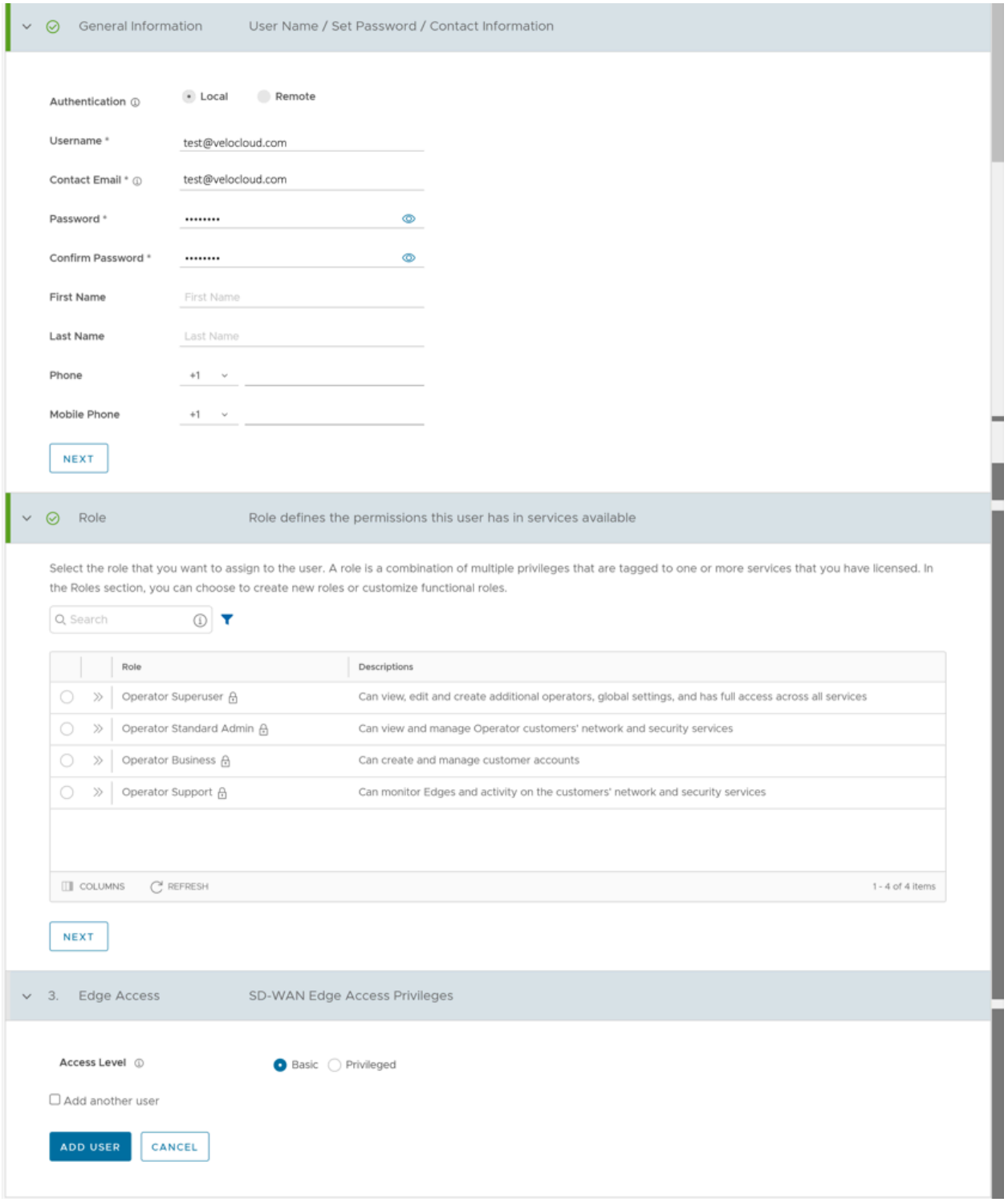
12.1.1 Add New User

In the **Operator** portal, you can add new users and configure the user settings. Only Operator Super Users and Operator Standard Admins can add a new user. To add a new user, perform the following steps:

1. In the **Operator** portal, select **Administration** from the top menu.
2. From the left menu, select **User Management**. The **Users** tab is displayed by default.

3. Select **New User**. The following screen appears:

Figure 12-3: New User Information and Roles



4. Enter the following details for the new user:

Table 41: User Information

Option	Description
General Information	Enter the required personal details of the user.
Role	Select a role that you want to assign to the user. For information on roles, see Roles
Edge Access	Ensure that you have Operator Super User role to modify the **Access Level** for the user. Choose one of the following options: • **Basic**: Allows you to perform certain basic debug operations such as ping, tcpdump, PCAP, remote diagnostics, and so on. • **Privileged**: Grants you the root-level access to perform all basic debug operations along with Edge actions such as restart, deactivate, reboot, hard reset, and shutdown. In addition, you can access Linux shell. The default value is **Basic**. **Note:** Only Operator Super Users can modify the default value to **Privileged**.

Note: The **Next** button is activated only when you enter all the mandatory details in each section.

5. Select the **Add another user** check box if you wish to create another user, and then select **Add User**. The new user appears in the **User Management** > **Users** page. Select the link to the user to view or modify the details.

12.1.2 API Tokens

You can access the Orchestrator APIs using tokens instead of session-based authentication. As an Operator Super User, you can manage the API tokens. You can create multiple API tokens for a user.

Note: For Enterprise Read Only users and MSP Business Specialist users, token-based authentication is not activated.

By default, the API Tokens are activated. If you want to deactivate them, go to **System Properties** in the Operator portal, and set the value of the system property `session.options.enableApiTokenAuth` as **False**.

Note: Operator Super User should manually delete inactive Identity Provider (IdP) users from the Orchestrator to prevent unauthorized access via API Token.

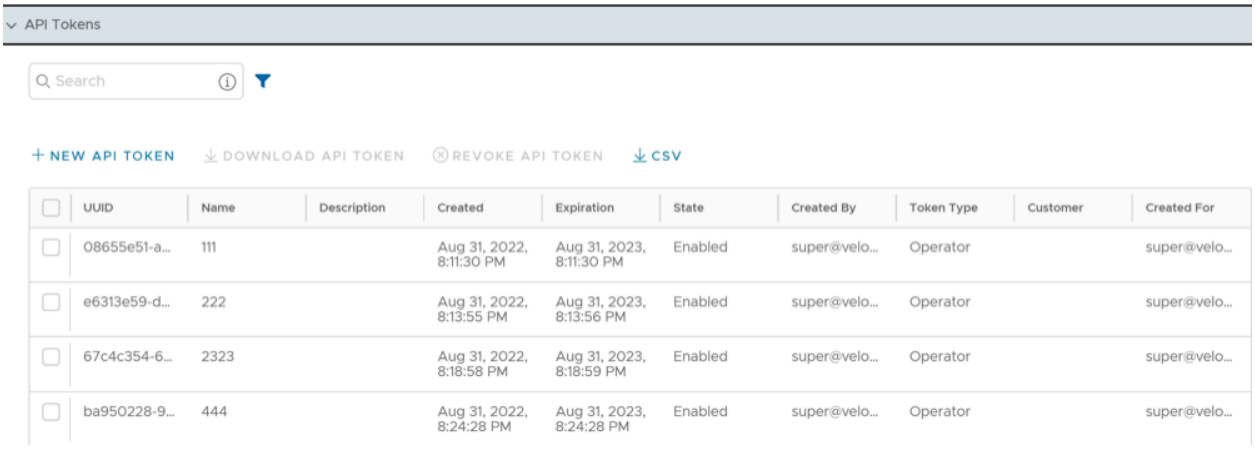
The users can create, revoke, and download the tokens based on their roles.

To manage the API tokens:

1. In the **Operator** portal, navigate to **Administration** > **User Management** > **Users**.

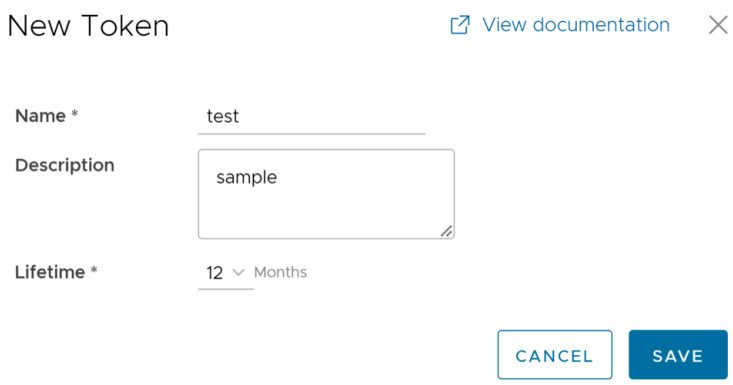
2. Select a user and select **Modify** or select the link to the username. Go to the **API Tokens** section.

Figure 12-4: API Token



3. Select **New API Token**.

Figure 12-5: New API Token



4. In the **New Token** window, enter a **Name** and **Description** for the token, and then choose the **Lifetime** from the drop-down menu.
5. Select **Save**. The new token is displayed in the **API Tokens** table. Initially, the status of the token is displayed as **Pending**. Once you download it, the status changes to **Enabled**.
6. To download the token, select the token, and then select **Download API Token**.
7. To deactivate a token, select the token, and then select **Revoke API Token**. The status of the token is displayed as **Revoked**.
8. Select **CSV** to download the complete list of API tokens in a .csv file format.
9. When the Lifetime of the token is over, the status changes to **Expired**.

> **Note:** Only the user who is associated with a token can download it and after downloading, the ID of the token alone is displayed. You can download a token only once. After downloading the token, the user can send it as part of the Authorization Header of the request to access the Orchestrator API.

The following example shows a sample snippet of the code to access an API.

```
curl -k -H "Authorization: Token <Token>" -X POST https://vco/portal/ -d '{ "id": 1, "jsonrpc":
 "2.0", "method": "enterprise/getEnterpriseUsers", "params": { "enterpriseId": 1 }}'
```

Similarly, you can configure additional properties and create API tokens for Partner Admins, Enterprise Customers, and Partner Customers. For additional information, see:

- 'Users' topic in the *Arista VeloCloud SD-WAN Administration Guide*.
- 'Users' topic in the *Arista VeloCloud SD-WAN Partner Guide*.

The following are the other options available in the **API Tokens** section:

Table 42: API Token

Option	Description
Search	Enter a search term to search for the matching text across the table. Use the advanced search option to narrow down the search results.
Columns	Select the columns to be displayed or hidden on the page.
Refresh	Select to refresh the page to display the most current data.

12.2 Roles

The Orchestrator consists of two types of roles.

Note: Starting from the 5.1.0 release, **Functional Roles** are renamed as **Privileges**, and **Composite Roles** are renamed as **Roles**.

The roles are categorized as follows:

- **Privileges** – Privileges are a set of roles relevant to a functionality. A privilege can be tagged to one or more of the following services: SD-WAN and Global Settings. Users require privileges to carry out business processes. For example, a Customer support role in SD-WAN is a privilege required by an SD-WAN user to carry out various support activities. Every service defines such privileges based on its supported business functionality.
- **Roles** – The privileges from various categories can be grouped to form a role. By default, the following roles are available for an Operator user:

Table 43: Roles for an Operator User

Role	SD-WAN Service	Cloud Web Security Service	Secure Access Service	Global Settings Service
Operator Standard Admin	SD-WAN Operator Admin	Cloud Web Security Operator Admin	Secure Access Operator Admin	Global Settings Operator Admin
Operator Superuser	Full Access	Full Access	Full Access	Full Access
Operator Business	SD-WAN Operator Business	-	-	Global Settings Operator Business
Operator Support	SD-WAN Operator Support	Cloud Web Security Operator Read Only	Secure Access Operator Read Only	Global Settings Operator Support

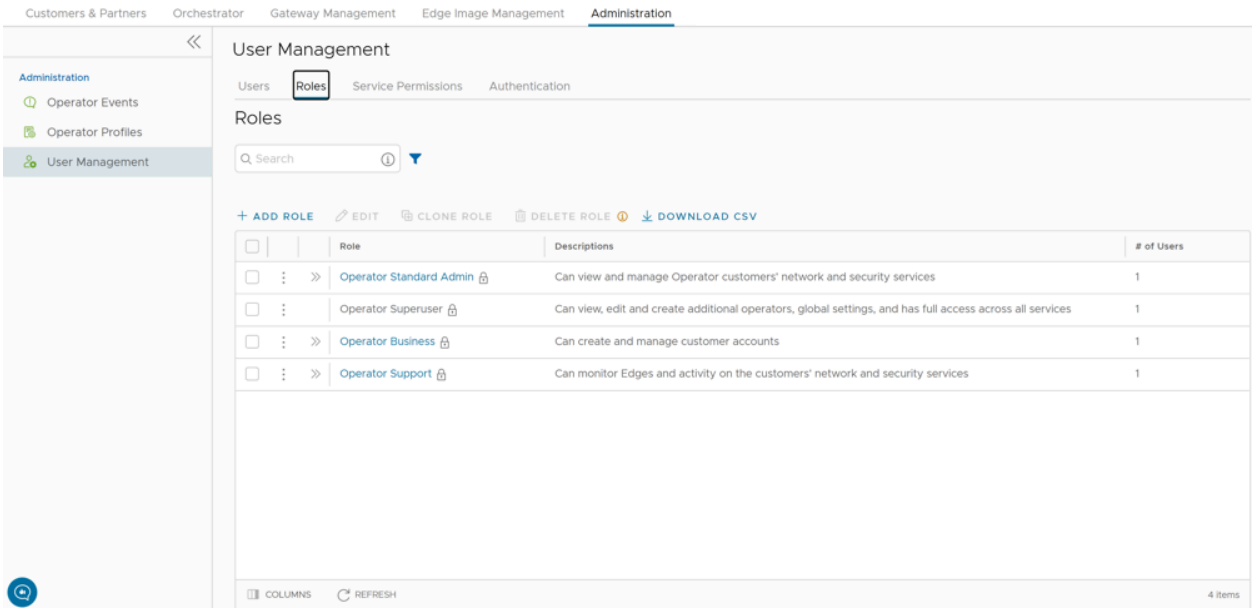
If required, you can customize the privileges of these roles. For additional information, see Service Permissions

As an Operator, you can view the list of existing standard roles and their corresponding descriptions. You can add, edit, clone, or delete a new role. However, you cannot edit or delete a default role.

Perform the below steps to access the **Roles** tab:

1. In the **Operator** portal, select **Administration** from the top menu.
2. From the left menu, select **User Management**, and then select the **Roles** tab. The following screen appears:

Figure 12-6: Roles



3. On the **Roles** screen, you can perform the following activities:

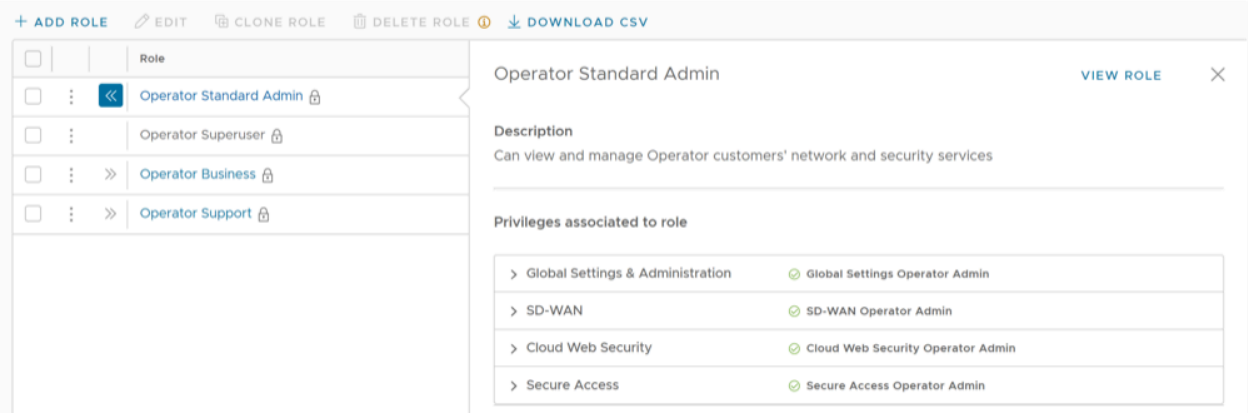
Table 44: User Action Items

Option	Description
Add Role	Creates a new custom role. For additional information, see Add Role.
Edit	Allows you to edit only the custom roles. You cannot edit the default roles. Also, you cannot edit or view the settings of a Superuser.
Clone Role	Creates a new custom role, by cloning the existing settings from the selected role. You cannot clone the settings of a Superuser.
Delete Role	Deletes the selected role. You cannot delete the default roles. You can delete only custom composite roles. Ensure that you have removed all the users associated with the selected role, before deleting the role.
Download CSV	Downloads the details of the user roles into a file in CSV format.

Note: You can also access the **Edit**, **Clone Role**, and **Delete Role** options from the vertical ellipsis of the selected Role.

4. Select the **Open** icon "**>>** displayed before the Role link, to view additional details about the selected Role, as shown below:

Figure 12-7: Manage Roles



5. Select the **View Role** link to view the privileges associated to the selected role for the following services:
   - Global Settings & Administration
   - SD-WAN
6. The following are the other options available on the **Roles** tab:

Table 45: Filter Options

Option	Description
Search	Enter a search term to search for the matching text across the table. Use the advanced search option to narrow down the search results.
Columns	Select the columns to be displayed or hidden on the page.
Refresh	Select to refresh the page to display the most current data.

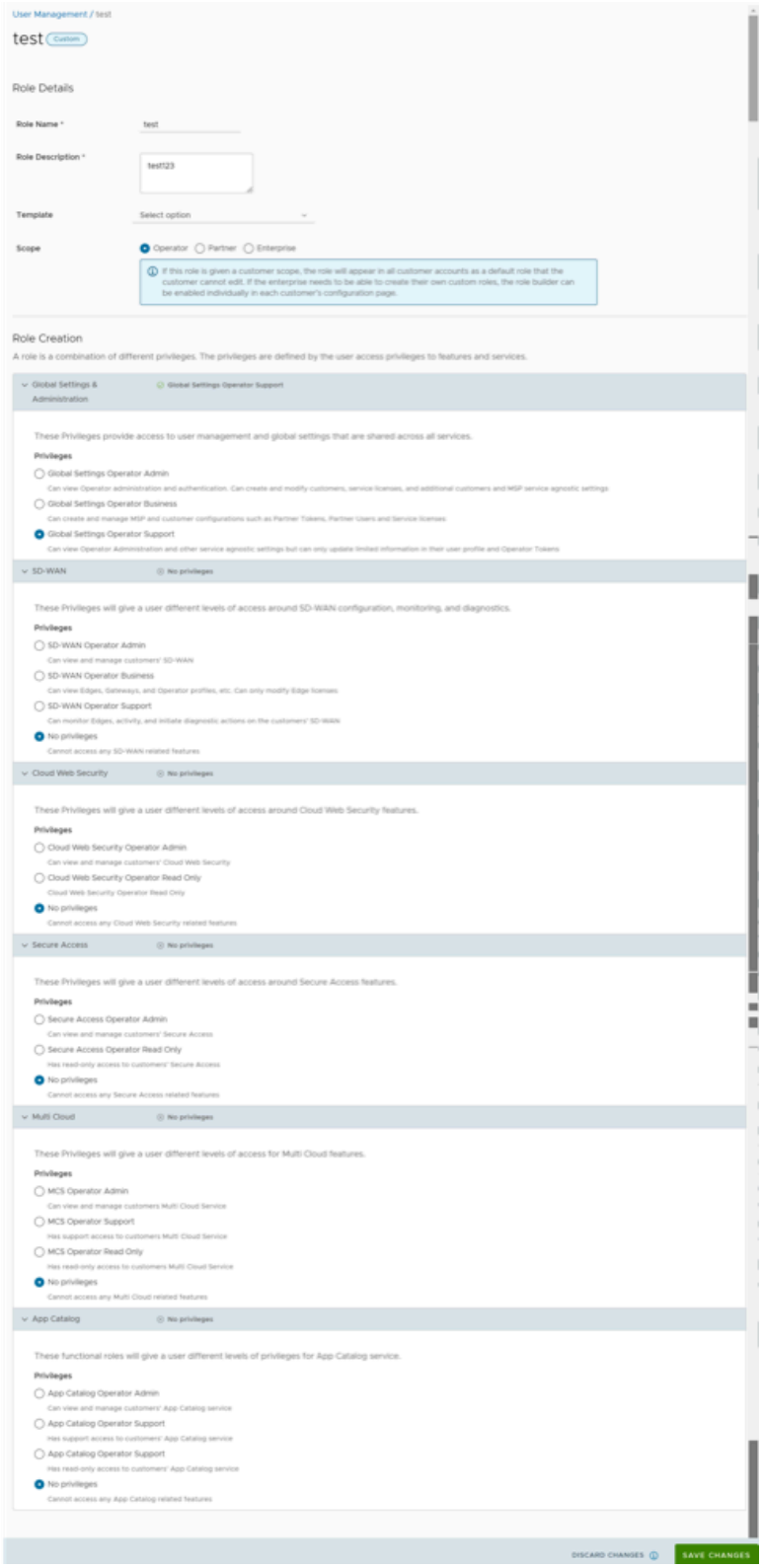
12.2.1 Add Role

Perform the below steps to add a new role for an Operator:

1. In the **Operator** portal, select **Administration** from the top menu.
2. From the left menu, select **User Management**, and then select the **Roles** tab.

3. Select **Add Role**. The following screen appears:

Figure 12-8: Add Role



4. Enter the following details for the new custom role:

Table 46: New Custom Role Option Description

Option	Description
Role Details	
Role Name	Enter a name for the new role.
Role Description	Enter a description for the role.
Template	Optionally, select an existing role as template from the drop-down list. The privileges of the selected template are assigned to the new role.
Scope	Select **Operator**, **Partner**, or **Customer** as the scope for the new role. The new role appears in all the accounts for the selected user, as a default role. If an Operator creates a role for a Partner, it appears in the Partner's roles' list and can be edited only by an Operator and a Partner user who has the required permissions.
Role Creation: The options in this section vary depending on the selected **Scope**.	
Global Settings & Administration	These privileges provide access to user management and global settings that are shared across all services. Choosing one of the privileges is mandatory. By default, **Global Settings Operator Support** is selected for the **Operator** scope.
SD-WAN	These privileges provide the Operator, Partner, or Enterprise Administrator with different levels of read and/or write access around SD-WAN configuration, monitoring, and diagnostics. You can optionally choose an SD-WAN privilege. The default value is **No Privileges**.
Cloud Web Security	These privileges provide the Operator, Partner, or Enterprise Administrator with different levels of read and/or write access around Cloud Web Security features. You can optionally choose a Cloud Web Security privilege. The default value is **No Privileges**.
Secure Access	These privileges provide the Operator, Partner, or Enterprise Administrator with different levels of read and/or write access around Secure Access features. You can optionally choose a Secure Access function privilege. The default value is **No Privileges**.
Multi Cloud	These privileges provide the Operator, Partner, or Enterprise Administrator with different levels of read and/or write access around Multi Cloud features. You can optionally choose a Multi Cloud function privilege. The default value is **No Privileges**.
App Catalog	These privileges provide the Operator, Partner, or Enterprise Administrator with different levels of read and/or write access around App Catalog features. You can optionally choose an App Catalog function privilege. The default value is **No Privileges**.

5. Select **Save Changes**. The new custom role appears in the **User Management** > **Roles** page of the user, depending on the selected **Scope**. Select the link to the custom role to view the settings.

12.3 Service Permissions

Service Permissions allow an Administrator to granularly define actions (Read, Create, Update, and Delete) assigned to each Privilege (such as Cloud Security Service and Customer Segment configuration) within a Privilege Bundle.

Note:

- Starting from the 5.1.0 release, **Role Customization** is renamed as **Service Permissions**.
- To activate this feature, an Operator must navigate to **Global Settings** > **Customer Configuration** > **Additional Configuration** > **Feature Access**, and then check the **Role Customization** check box.

You can customize only the permissions and not the roles. When you customize a permission, the changes would impact the roles associated with it. For additional information, see Roles.

The Service Permissions are applied to the privileges as follows:

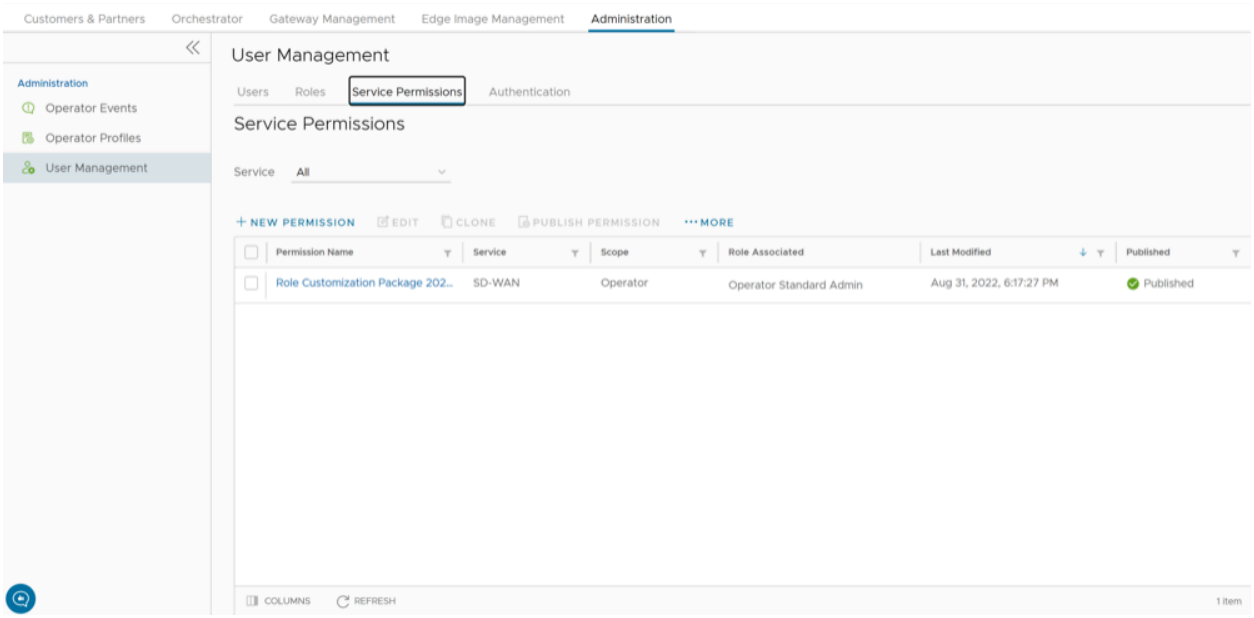
- The customizations done at the Enterprise level override the Partner or Operator level customizations.
- The customizations done at the Partner level override the Operator level customizations.
- Only when there are no customizations done at the Partner level or Enterprise level, the customizations made by the Operator are applied globally across all users in the Orchestrator.

Note: For information on user privileges, see List of User Privileges.

To access the **Service Permissions** tab:

1. In the **Operator** portal, select **Administration** from the top menu.
2. From the left menu, select **User Management**, and then select the **Service Permissions** tab. The following screen appears:

   Figure 12-9: User Management



3. On the **Service Permissions** screen, you can perform the following activities:

Table 47: Service Permission Options

Option	Description
Service	Select the service from the drop-down menu. The available services are: • **All** • **Global Settings** • **SD-WAN** Custom service permissions, if any, associated with the selected service are displayed. By default, all of the custom service permissions are displayed.
New Permission	Allows you to create a new permission. For additional information, see New Permission.
Edit	Allows you to edit the settings of the selected permission. You can also select the link to the **Permission Name** to edit the settings.
Clone	Allows you to create a copy of the selected permission.
Publish Permission	Applies the customization available in the selected package to the existing permission. This option modifies the privileges only at the current level. If there are customizations available at the Operator level or a lower level for the same role, then the lower level takes precedence.
More	Allows you to select from the following additional options: • **Delete**: Deletes the selected permission. You cannot delete a permission if it is already in use. **Note:** A permission can only be deleted if it is in a draft mode. The **Delete** option is deactivated for a published permission. If you want to delete a published permission, you must reset the permission to system default, which changes it to draft mode and activates the **Delete** option for the permission. • **Download JSON**: Downloads the list of permissions into a file in JSON format. • **Upload Permission**: Allows you to upload a JSON file of a customized permission. • **Reset to System Default**: Allows you to reset the current published permissions to default settings. Only the permissions applied to the privileges in the current level (Operator, Partner, or Enterprise) of the VeloCloud Orchestrator are reset to the default settings. If Operators or Customers have customized their privileges in the Partner or Enterprise level in the Orchestrator, those settings remain the same.

4. The following are the other options available in the **Service Permissions** tab:

Table 48: Filter Options

Option	Description
Columns	Select the columns to be displayed or hidden on the page. **Note:** The **Role Associated** column displays the Roles using the same Privilege Bundle.
Refresh	Select to refresh the page to display the most current data.

Note: Service Permissions are version dependent, and a service permission created on an Orchestrator using an earlier software release will not be compatible with an Orchestrator using a later release. For example, a service permission created on an Orchestrator that is running Release 3.4.x does not work properly if the Orchestrator is upgraded to a 4.x Release. Also, a

service permission created on an Orchestrator running Release 3.4.x does not work properly when the Orchestrator is upgraded to 4.x.x Release. In such cases, the user must review and recreate the service permission for the newer release to ensure proper enforcement of all roles.

12.3.1 New Permission

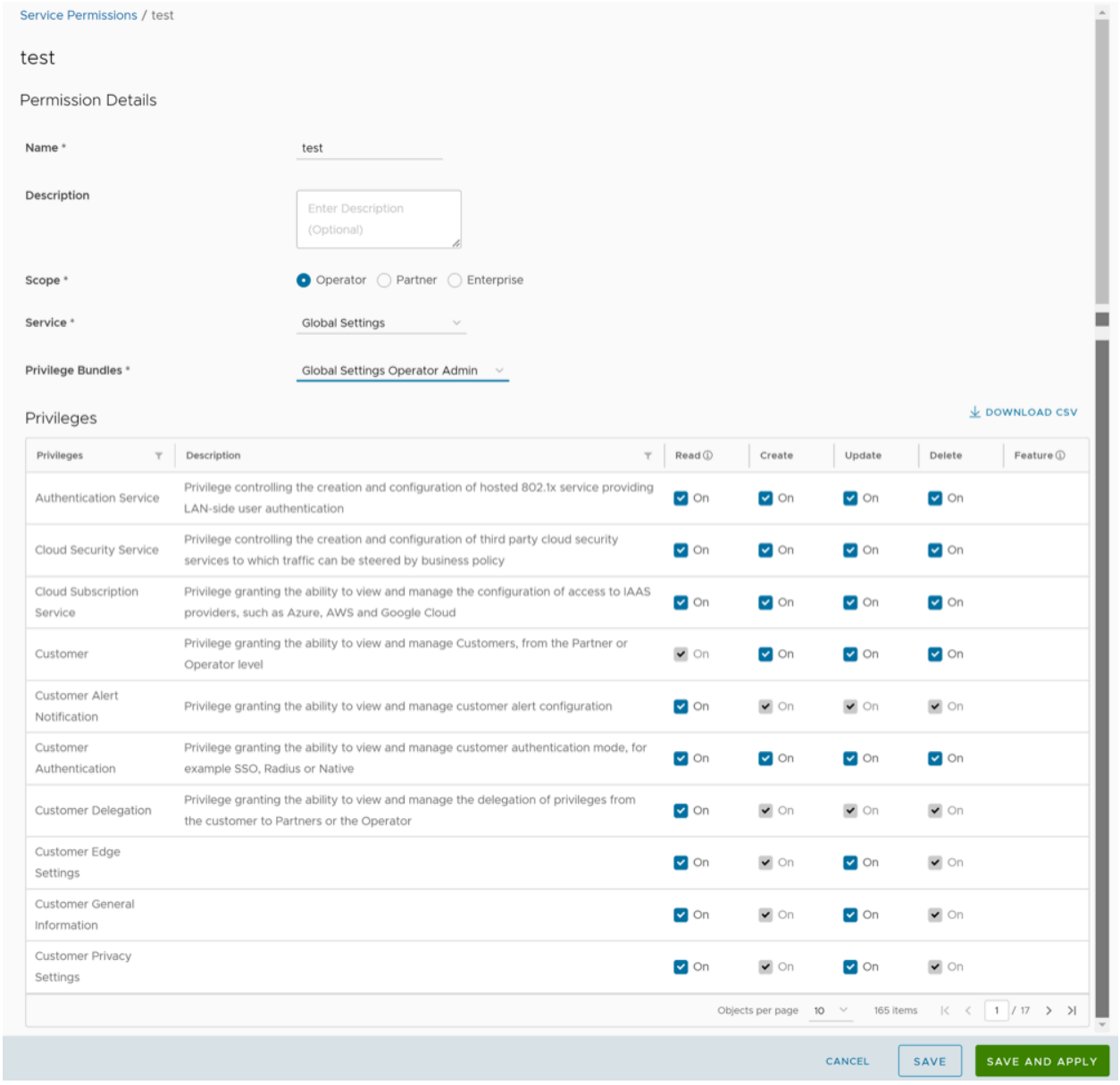
You can customize the privileges and apply them to the existing permission in the VeloCloud Orchestrator.

Perform the below steps to add a new permission:

1. In the **Operator** portal, select **Administration** from the top menu.
2. From the left menu, select **User Management**, and then select the **Service Permissions** tab.

3. Select **New Permission**. The following screen appears:

Figure 12-10: Permission Details



4. Enter the following details to create a new permission:

Table 49: Privilege and Permission Options

Option	Description
Name	Enter an appropriate name for the permission.
Description	Enter a description. This field is optional.
Scope	Select **Operator**, **Partner**, or **Enterprise** as the scope. An Operator can apply the permissions for Operators, Partners, and Customers.
Service	Select a service from the drop-down menu. The available services are: • **Global Settings** • **SD-WAN** • **Edge Compute**
Privilege Bundle	Select a privilege bundle from the drop-down menu. The privileges are populated depending on the selected **Service**.
Privileges	Displays the list of privileges based on the selected Privilege Bundle. You can edit only those privileges that are eligible for customization.

Note: Operator Superuser role cannot be customized.

5. Select **Download CSV** to download the list of all privileges, their description, and associated actions, into a file in CSV format.
6. Select **Save** to save the new permission. Select **Save and Apply** to save and publish the permission.

Note: The **Save** and **Save and Apply** buttons are activated only after you modify the permissions.

The new permission is displayed on the **Service Permissions** page.

12.3.2 List of User Privileges

This section lists all the privileges available in the **Operator** portal.

The columns in the table indicate the following:

- **Allow Privilege** – Do the privileges have allow access?
- **Deny Privilege** – Do the privileges have deny access?
- **Customizable** – Is the privilege available for customization in the **Service Permissions** tab?

Table 50: Privileges and Access

Feature	Name of the Privilege	Description	Allow Privilege	Deny Privilege	Customizable
Manage Customers	Create Customer	Grants ability to view and manage Enterprise Customers as an Operator or a Partner	Yes	No	No
	Read Customer				
	Update Customer			Yes	Yes
	Delete Customer			No	No
	Manage Customer				
Manage Partners	Create Partner	Grants ability to view and manage Partners	Yes	No	No
	Read Partner				
	Update Partner				
	Delete Partner				
	Manage Partner				
Software Images	Create Software Package	Grants access to upload and assign Edge Software Images and Application Maps	Yes	Yes	Yes
	Read Software Package				
	Update Software Package				
	Delete Software Package				
	Manage Software Package				
System Properties	Create System Property	Grants access to view and manage System Properties	Yes	Yes	No
	Read System Property				Yes
	Update System Property				No
	Delete System Property				No
	Manage System Property				Yes
	Edit Restricted System Properties	Controls the ability of user to edit restricted system properties	Yes	No	No
Operator Events	Create Operator Event	Grants ability to view Operator events	Yes	Yes	Yes
	Read Operator Event				
	Update Operator Event				
	Delete Operator Event				
	Manage Operator Event				
Operator Profiles	Create Operator Profile	Grants ability to view and manage Operator profiles	Yes	Yes	Yes
	Read Operator Profile				

Feature	Name of the Privilege	Description	Allow Privilege	Deny Privilege	Customizable
	Update Operator Profile				
	Delete Operator Profile				
	Manage Operator Profile				
	View Tab Operator Profile	Controls ability of the user to view and configure within the Operator profile menu	No	Yes	Yes
Operator Users	Create Operator User	Grants ability to view and manage Operator administrative users	Yes	Yes	No
	Read Operator User				Yes
	Update Operator User				No
	Delete Operator User				No
	Manage Operator User				Yes
Operator Users > API Tokens	Create Operator Token	Grants ability to view and manage the operator Authentication Tokens	Yes	No	No
	Read Operator Token				
	Update Operator Token				
	Delete Operator Token				
	Manage Operator Token				
Gateway Pools Gateways Gateway Diagnostic bundles	Create Gateway	Grants ability to view and manage Gateway pools and Gateways as an Operator or a Partner	Yes	Yes	Yes
	Read Gateway				
	Update Gateway				
	Delete Gateway				
	Manage Gateway				
	View Tab Gateway List	Controls the ability of user to view the list of Gateways	No	Yes	Yes
Gateways > New Gateway	Create Operator PKI	Grants ability to view and manage Operator level PKI configuration including Gateway certificates and certificate authority	Yes	Yes	No
Gateway > Gateway Authentication Mode	Read Operator PKI				Yes
	Update Operator PKI				No
	Manage Operator PKI				Yes
Gateway Diagnostic bundles > Download Diagnostic Bundles	Download Gateway Diagnostics	Grants ability to download Gateway Diagnostics	No	Yes	Yes
Application Maps	Create Software Package	Grants access to upload and assign Edge software images and Application Maps	Yes	Yes	Yes
	Read Software Package				

Feature	Name of the Privilege	Description	Allow Privilege	Deny Privilege	Customizable
	Update Software Package				
	Delete Software Package				
	Manage Software Package				
Service Permissions	Create Service Permissions Package	Grants access to manage Service Permissions packages	Yes	No	No
	Read Service Permissions Package				
	Update Service Permissions Package				
	Delete Service Permissions Package				
	Manage Service Permissions Package				
Edge Licensing	Create License	Grants ability to view and manage Edge licensing	Yes	No	No
	Read License			Yes	Yes
	Update License				
	Delete License			No	No
	Manage License				
CA Summary > Gateway Certificates > Revoke Certificate	Read Operator PKI	Grants ability to view and manage operator level PKI configuration including Gateway certificates and certificate authority	Yes	Yes	Yes
	Delete Operator PKI				No
	Manage Operator PKI				Yes
	Read Customer PKI	Grants ability to view and manage Enterprise PKI settings	Yes	No	No
	Delete Customer PKI				
	Manage Customer PKI				
Orchestrator Authentication > Operator Authentication	Create Operator Authentication	Grants ability to view and manage Operator authentication mode, like SSO, RADIUS, or Native	Yes	Yes	Yes
	Read Operator Authentication				
	Update Operator Authentication				
	Delete Operator Authentication				
	Manage Operator Authentication				

Feature	Name of the Privilege	Description	Allow Privilege	Deny Privilege	Customizable
Orchestrator Authentication > Enterprise Authentication	Create Customer Authentication	Grants ability to view and manage Customer authentication mode, like RADIUS or Native	Yes	Yes	Yes
	Read Customer Authentication				
	Update Customer Authentication				
	Delete Customer Authentication				
	Manage Customer Authentication				
Replication	Create Replication	Grants access to view and configure Orchestrator disaster recovery	Yes	Yes	No
	Read Replication				Yes
	Update Replication				No
	Delete Replication				
	Manage Replication				Yes
Orchestrator Diagnostics > Diagnostic Bundles	Create Orchestrator Diagnostics	Grants access to request and view Orchestrator diagnostic bundles	Yes	Yes	Yes
Orchestrator Diagnostics > Database Statistics	Read Orchestrator Diagnostics				
	Update Orchestrator Diagnostics				
	Delete Orchestrator Diagnostics				
	Manage Orchestrator Diagnostics				
Orchestrator Upgrade for Standalone	Create Software Package	Grants access to upload and assign Edge software images and Application Maps	Yes	Yes	Yes
	Read Software Package				
	Update Software Package				
	Delete Software Package				
	Manage Software Package				
Orchestrator Upgrade for DR Setup	Create Replication	Grants access to view and configure Orchestrator disaster recovery	Yes	Yes	No
	Read Replication				Yes
	Update Replication				No
	Delete Replication				
	Manage Replication				Yes

Feature	Name of the Privilege	Description	Allow Privilege	Deny Privilege	Customizable
User Agreements	Create User Agreement Read User Agreement Update User Agreement Delete User Agreement Manage User Agreement	Grants access to configure the customer user agreement	Yes	No	No
Orchestrator Owners Manage Orchestrators Edge Inventory	Create Edge Inventory Read Edge Inventory Update Edge Inventory Delete Edge Inventory Manage Edge Inventory	Grants ability to view and manage Edge inventory as needed for Redirect configuration	Yes	No	No

When the corresponding user privilege is denied, the Orchestrator window displays the `404 resource not found` error

Table 51: Customizable Feature Privileges

Navigation Path in the Enterprise Portal	Name of the Tab	Name of the Privilege	Description
Configure > **Edges** > **Select Edge**	Overview	Assign Edge Profile	Grants ability to assign a Profile to Edges
Configure > **Edges** > **Select Edge**	Firewall	Configure Edge Firewall Logging	Grants ability to configure Edge level firewall logging
Configure > **Profiles** > **Select Profile**	Firewall	Configure Profile Firewall Logging	Grants ability to configure Profile level firewall logging
DiagnosticsRemote Actions	**Select Edge** > **Deactivate**	Deactivate Edge	Grants ability to reset the device configuration to its factory default state
Global Settings > **Enterprise Settings** > **Information Privacy Settings** > **SD-WAN PCI**	Enforce PCI Compliance	Deny PCI Operations	Denies access to sensitive Customer data including PCAPs, etc. on the Edges and Gateways, for all users including Arista Support
Diagnostics > **Diagnostic Bundles**	**Select Edge** > **Download Bundle**	Download Edge Diagnostics	Grants ability to download Edge Diagnostics
Gateway Management > **Diagnostic Bundles**	**Select Gateway** > **Download Bundle**	Download Gateway Diagnostics	Grants ability to download Gateway Diagnostics
Configure > **Profiles**	Duplicate	Duplicate Customer Profile	Grants ability to edit duplicate customer level Profiles
Configure > **Segments / Configure** > **Profiles / Configure** > **Edges**	Segments drop-down menu	Edit Tab Segments	Grants ability to edit within the Segments tab
Configure > **Edges** > **Select Edge**	Device	Enable HA Cluster	Grants ability to configure HA Clustering
Configure > **Edges** > **Select Edge**	Device	Enable HA Active/Standby Pair	Grants ability to configure active/standby HA
Configure > **Edges** > **Select Edge**	Device	Enable HA VRRP Pair	Grants ability to configure VRRP HA
Diagnostics > **Remote Diagnostics**	Clear ARP Cache	Remote Clear ARP Cache	Grants ability to clear the ARP cache for a given interface
Diagnostics > **Remote Diagnostics** > **Gateway**	Cloud Traffic Routing (drop-down menu)	Remote Cloud Traffic Routing	Grants ability to route cloud traffic remotely
Diagnostics > **Remote Diagnostics**	DNS/DHCP Service Restart	Remote DNS/DHCP Restart	Grants ability to restart the DNS/DHCP service
Diagnostics > **Remote Diagnostics**	Flush Flows	Remote Flush Flows	Grants ability to flush the Flow table, causing user traffic to be re-classified
Diagnostics > **Remote Diagnostics**	Flush NAT	Remote Flush NAT	Grants ability to flush the NAT table
Diagnostics > **Remote Diagnostics** > **LTE SIM Switchover**	LTE Switch SIM Slot **Note:** This is for 610-LTE and 710 5G devices only.	Remote LTE Switch SIM Slot	Grants ability to activate the SIM Switchover feature. After the test is successful, you can check the status from Monitor > Edges > Overview tab
Diagnostics > **Remote Diagnostics**	List Paths	Remote List Paths	Grants ability to view the list of active paths between local WAN links and each peer
Diagnostics > **Remote Diagnostics**	List current IKE Child SAs	Remote List current IKE Child SAs	Grants ability to use filters to view the exact Child SAs you want to see

Navigation Path in the Enterprise Portal	Name of the Tab	Name of the Privilege	Description
Diagnostics > **Remote Diagnostics**	List current IKE SAs	Remote List Current IKE SAs	Grants ability to use filters to view the exact SAs you want to see
Diagnostics > **Remote Diagnostics**	MIBs for Edge	Remote MIBS for Edge	Grants ability to dump Edge MIBs
Diagnostics > **Remote Diagnostics**	NAT Table Dump	Remote NAT Table Dump	Grants ability to view the contents of the NAT table
Diagnostics > **Remote Diagnostics**	**Select Edge** > **Rebalance Hub Cluster**	Remote Rebalance Hub Cluster	Grants ability to either redistribute Spokes in Hub Cluster or redistribute Spokes excluding this Hub
Diagnostics > **Remote Diagnostics**	**Select Edge (with SFP module)** > **Reset SFP Firmware Configuration**	Remote Reset SFP Firmware Configuration	Grants ability to reset the SFP Firmware Configuration
Diagnostics > **Remote Actions**	Reset USB Modem	Remote Reset USB Modem	Grants ability to execute the Edge USB modem reset remote action
Diagnostics > **Remote Diagnostics**	Scan for Wi-Fi Access Points	Remote Scan for Wi-Fi Access Points	Grants ability to scan the Wi-Fi functionality for the VeloCloud SD-WAN Edge
Diagnostics > **Remote Diagnostics**	System Information	Remote System Information	Grants ability to view system information such as system load, recent WAN stability statistics, monitoring services
Diagnostics > **Remote Diagnostics**	VPN Test	Remote VPN Test	Grants ability to execute the Edge VPN test remote action
Diagnostics > **Remote Diagnostics**	WAN Link Bandwidth Test	Remote WAN link Bandwidth Test	Grants ability to re-test the bandwidth of a WAN link
Diagnostics > **Remote Actions**	**Select Edge** > **Shutdown**	Shutdown Edge	Grants ability to execute the Edge shutdown remote action
Service Settings > **Alerts & Notifications**	**Notifications** > **Email/SMS**	Update Customer SMS Alert	Grants ability to configure SMS alerts at the customer level
Monitor > **Edges** > **Select Edge**	Top Sources	View Edge Sources	Grants ability to view Monitor Edge Sources tab
Monitor > **Firewall**	Firewall Logging	View Firewall Logs	Grants ability to view collected firewall logs
Monitor > **Edges** > **Select Edge**	Top Sources	View Flow Stats	Grants ability to view collected flow statistics
Monitor > **Firewall Logs**	Firewall Logs	View Profile Firewall Logging	Grants ability to view the details of firewall logs originating from VeloCloud SD-WAN Edges
Configure > **Profiles**	Firewall	View Stateful Firewall	Grants ability to view collected flow statistics
Configure > **Profiles**	**Firewall tab** > **Configure Firewall** > **1** > **Syslog Forwarding**	View Syslog Forwarding	Grants ability to view logs that are forwarded to a configured syslog collector
Operator portal > **Gateway Management**	Gateways	View Tab Gateway List	Grants ability to view the Gateway list tab
Operator portal > **Administration**	Operator Profiles	View Tab Operator Profile	Grants ability to view and configure settings within the Operator Profile menu tab
Monitor > **Edges** > **Select Edge**	Top Sources	View User Identifiable Flow Stats	Grants ability to view potentially user identifiable flow source attributes

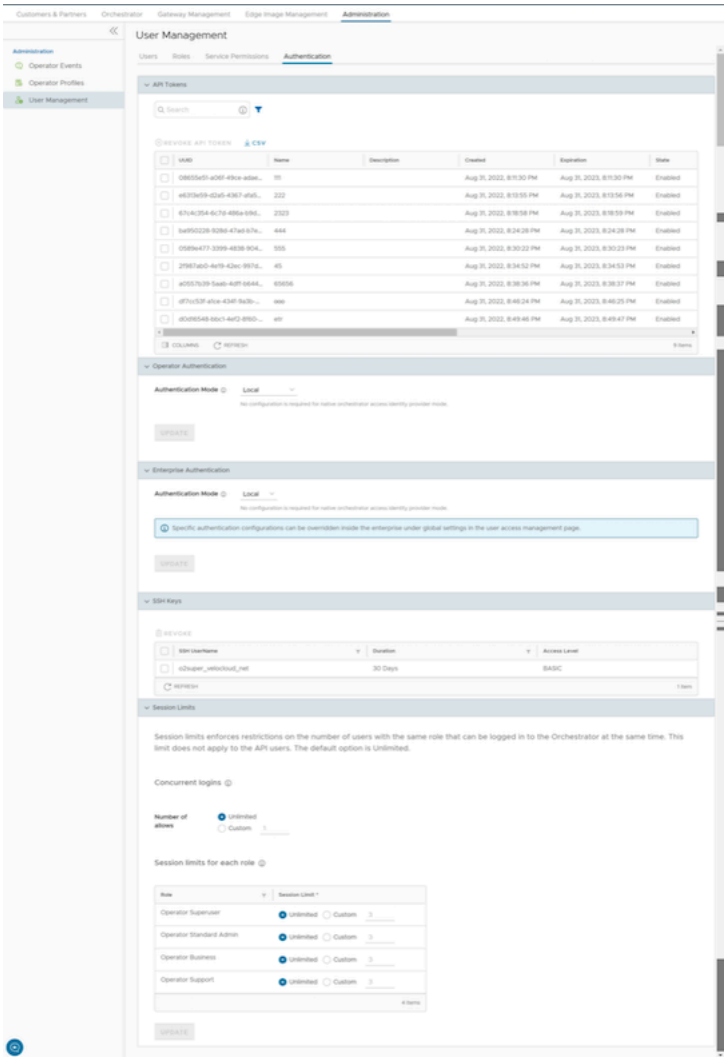
12.4 Authentication

The Authentication feature allows you to set the authentication modes for both, Operators and Enterprise users. You can also view the existing API tokens.

Perform the following steps to access the **Authentication** tab:

1. In the **Operator** portal, select **Administration** from the top menu.
2. From the left menu, select **User Management**, and then select the **Authentication** tab. The following screen appears:

Figure 12-11: Authentication



API Tokens

You can access the Orchestrator APIs using token-based authentication, irrespective of the authentication mode. Operator Administrators with right permissions can view the API tokens issued to Orchestrator

users, including tokens issued to the Partner and Customer users. If required, an Operator Administrator can revoke the API tokens.

By default, the API Tokens are activated. If you want to deactivate them, go to **Orchestrator** > **System Properties**, and set the value of the system property `session.options.enableApiTokenAuth` as **False**.

Note: Operator Super User should manually delete inactive Identity Provider (IdP) users from the Orchestrator to prevent unauthorized access via API Token.

The following are the options available in this section:

Table 52: API Tokens Option Descriptions

Option	Description
Search	Enter a search term to search for the matching text across the table. Use the advanced search option to narrow down the search results.
Revoke API Token	Select the token and select this option to revoke it. Only an Operator Super User or the user associated with an API token can revoke the token.
CSV	Select this option to download the complete list of API tokens in a .csv file format.
Columns	Select the columns to be displayed or hidden on the page.
Refresh	Select to refresh the page to display the most current data.

As an Operator Super User, you can manage the API tokens for Enterprise users. For information on creating and downloading API tokens, see.API Tokens

Operator Authentication / Enterprise Authentication

Select one of the following Authentication modes:

- **Local**: This is the default option and does not require any additional configuration.
- **Single Sign-On**: Operator users with Superuser permission can set up and configure Single Sign On (SSO) in VeloCloud Orchestrator. Single Sign-On (SSO) is a session and user authentication service that allows users to log in to multiple applications and websites with one set of credentials. Integrating an SSO service with VeloCloud Orchestrator enables VeloCloud Orchestrator to authenticate users from OpenID Connect (OIDC)-based Identity Providers (IdPs).

  Prerequisites:

  - Ensure that you have the Operator Superuser permission.
  - Before setting up the SSO authentication in VeloCloud Orchestrator, make sure that you have set up Users, Service Permissions, and OpenID connect (OIDC) application for VeloCloud Orchestrator in your preferred identity provider's website.

  Note:

  - **Single Sign-On** mode is available only for **Operator Authentication** in the **Operator** portal.
  - Token-based authentication is deactivated for SSO users.

- SSO integration at the Operator management level of a Arista hosted Orchestrator is reserved for the Arista SD-WAN TechOPS Operators. Partners with Operator level access of a hosted Orchestrator do not have the option to integrate to an SSO service.

To enable Single Sign On (SSO) for VeloCloud Orchestrator, you must enter the Orchestrator application details into the Identity Provider (IdP). Select each of the following links for step-by-step instructions to configure the following supported IdPs:

- Configure Azure Active Directory for Single Sign On
- Configure Okta for Single Sign On
- Configure OneLogin for Single Sign On
- Configure PingIdentity for Single Sign On

You can configure the following options when you select the **Authentication Mode** as **Single Sign-on**.

Figure 12-12: Single Sign-on

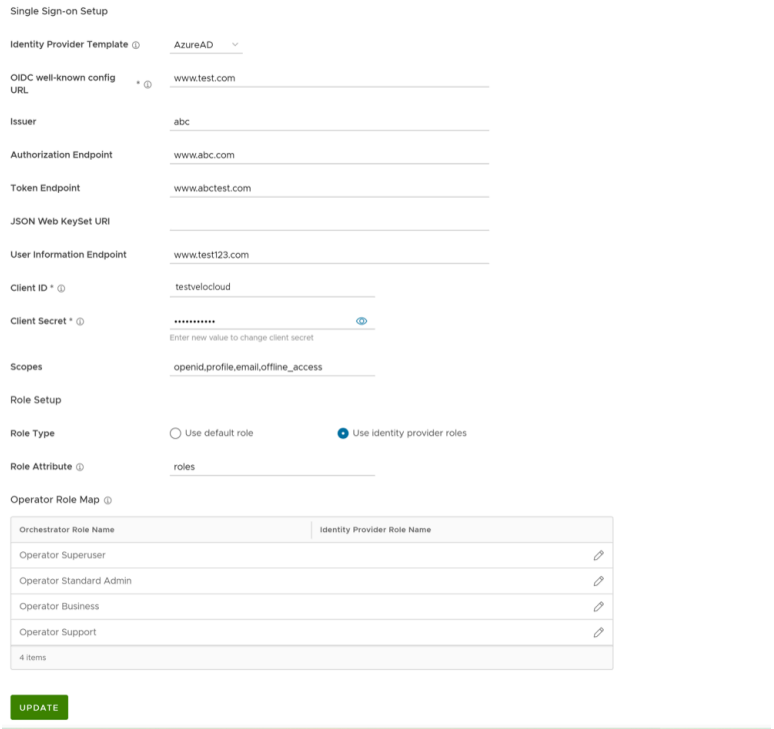


Table 53: Single Sign-on Option Descriptions

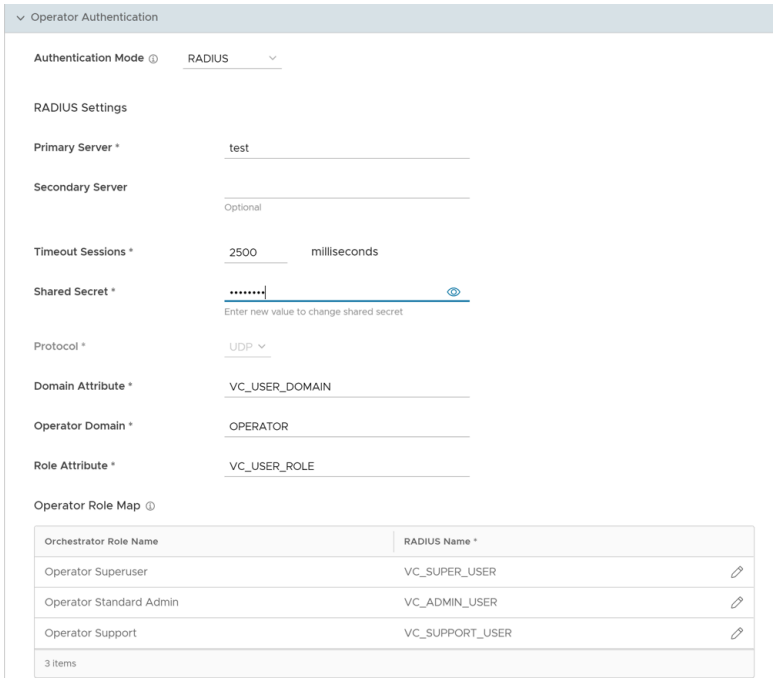
Option	Description
Identity Provider Template	From the drop-down menu, select your preferred Identity Provider (IdP) that you have configured for Single Sign On. This pre-populates fields specific to your IdP. **Note:** You can also manually configure your own IdPs by selecting **Others** from the drop-down menu.
OIDC well-known config URL	Enter the OpenID Connect (OIDC) configuration URL for your IdP. For example, the URL format for Okta will be: `https://{oauth-provider-url}/.well-known/openid-configuration`.
Issuer	This field is auto-populated based on your selected IdP.
Authorization Endpoint	This field is auto-populated based on your selected IdP.
Token Endpoint	This field is auto-populated based on your selected IdP.
JSON Web KeySet URI	This field is auto-populated based on your selected IdP.
User Information Endpoint	This field is auto-populated based on your selected IdP.
Client ID	Enter the client identifier provided by your IdP.
Client Secret	Enter the client secret code provided by your IdP, that is used by the client to exchange an authorization code for a token.
Scopes	This field is auto-populated based on your selected IdP.
Role Type	Select one of the following two options: • Use default role • Use identity provider roles
Role Attribute	Enter the name of the attribute set in the IdP to return roles.
Operator Role Map	Map the IdP-provided roles to each of the Operator user roles.

Select **Update** to save the entered values. The SSO authentication setup is complete in the VeloCloud Orchestrator.

- **RADIUS**: Remote Authentication Dial-In User Service (RADIUS) is a client-server protocol that enables remote access servers to communicate with a central server. RADIUS authentication provides a centralized management for users. You can configure the Orchestrator Authentication in RADIUS

mode, so that the Operator and Enterprise Customers log into the portals using the RADIUS servers. Enter appropriate details in the following fields:

Figure 12-13: Operator Authentication Field



- You can edit the **Protocol** value only in the **System Properties**. Navigate to **Orchestrator** > **System Properties**, and edit the protocol in the **Value** field of the system property `vco.operator.authentication.radius`.
- The **Operator Domain** field is available only for Operators.
- In the **Operator Role Map / Enterprise Role Map** section, map the RADIUS server attributes to each of the Operator or Enterprise user roles. This role mapping is used to determine the role the users would be assigned when they login to the Orchestrator using the RADIUS server for the first time.
- Select **Update** to save the entered values.

SSH Keys

You can create only one SSH Key per user. Select the **User Information** icon located at the top right of the screen, and then select **My Account** > **SSH Keys** to create an SSH Key.

As an Operator, you can also revoke an SSH Key.

Select the **Refresh** option to refresh the section to display the most current data.

For additional information, see Configure User Account Details.

Session Limits

> **Note:** To view this section, an Operator user must navigate to **Orchestrator > System Properties**, and set the value of the system property `session.options.enableSessionTracking` to **True**.

The following are the options available in this section:

Table 54: System Properties Option Descriptions

Option	Description
Concurrent logins	Allows you to set a limit on concurrent logins per user. By default, **Unlimited** is selected, indicating that unlimited concurrent logins are allowed for the user.
Session limits for each role	Allows you to set a limit on the number of concurrent sessions based on user role. By default, **Unlimited** is selected, indicating that unlimited sessions are allowed for the role. **Note:** The roles that are already created by the Operator in the **Roles** tab, are displayed in this section.

Select **Update** to save the selected values.

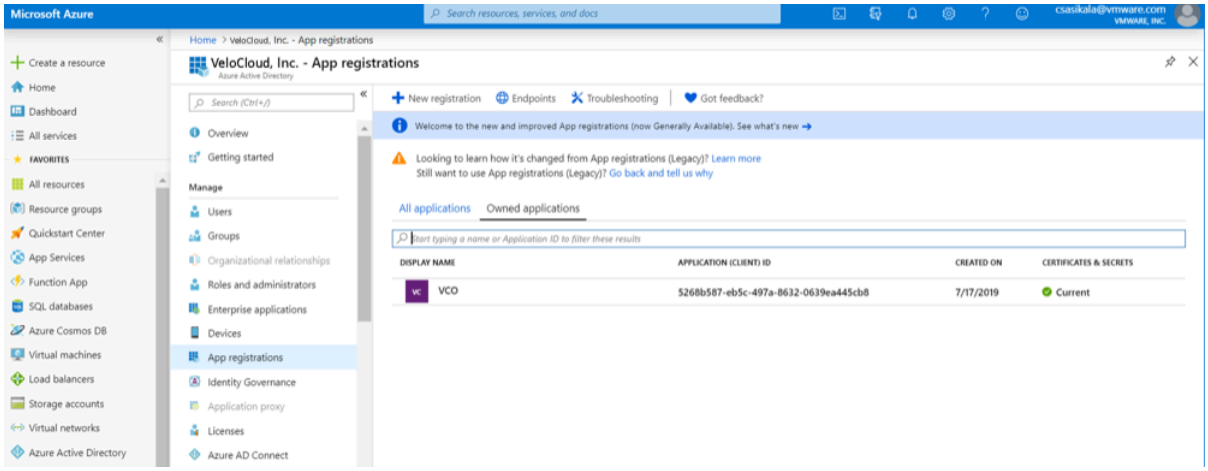
12.4.1 Configure Azure Active Directory for Single Sign On

To set up an OpenID Connect (OIDC)-based application in Microsoft Azure Active Directory (Azure AD) for Single Sign On (SSO), perform the following steps.

Ensure you have an Azure AD account to sign in.

1. Log in to your https://portal.azure.com account as an Admin user. The **Microsoft Azure** home screen appears.
2. To create a new application perform the below steps:
   a. Search and select the **Azure Active Directory** service.

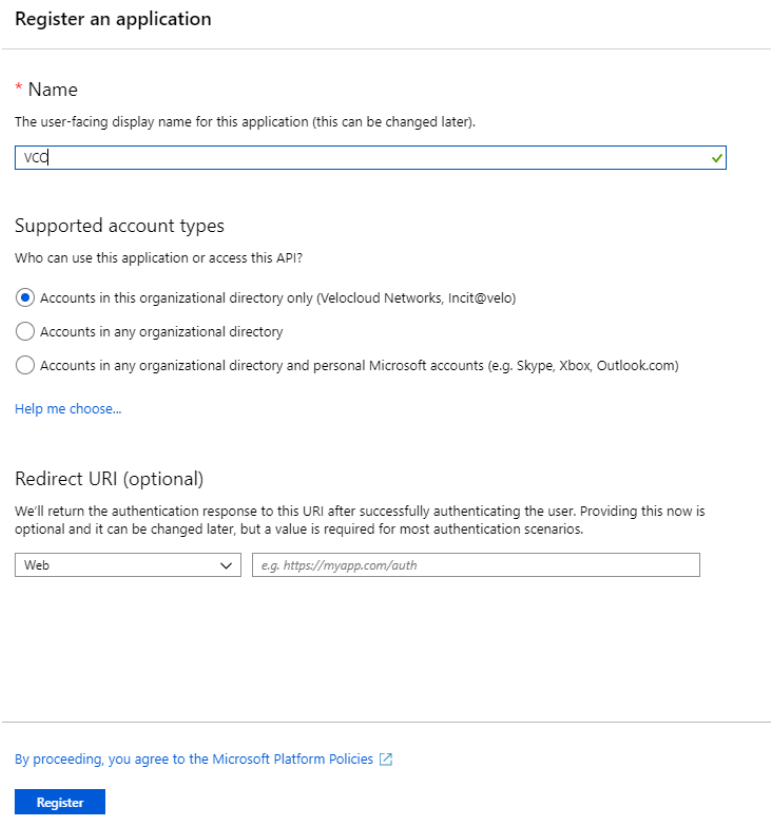
Figure 12-14: Azure Active Directory



b. Go to **App registration** > > **New registration**.

The **Register an application** screen appears.

Figure 12-15: Register an Application Screen



c. In the **Name** field, enter the name for your VeloCloud Orchestrator application.

d. In the **Redirect URL** field, enter the redirect URL that your VeloCloud Orchestrator application uses as the callback endpoint.

In the VeloCloud Orchestrator application, at the bottom of the **Configure Authentication** screen, you can find the redirect URL link. Ideally, the VeloCloud Orchestrator redirect URL will be in this format: `https://<Orchestrator URL>/login/ssologin/openidCallback`.

e. Select **Register**.

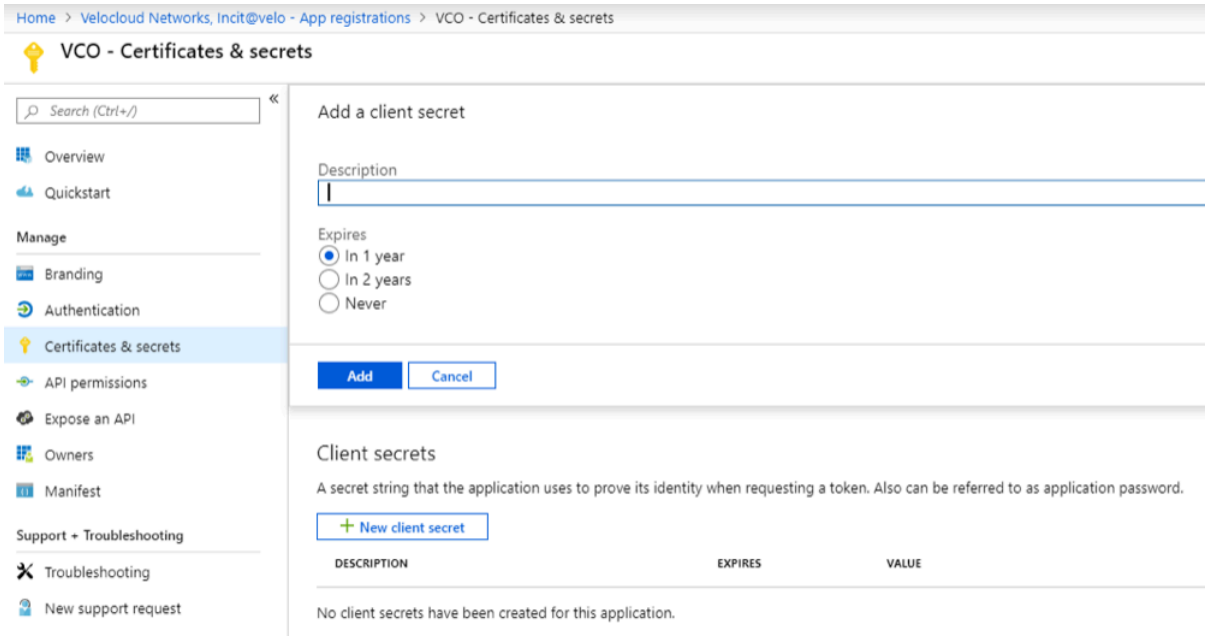
Your VeloCloud Orchestrator application will be registered and displayed in the **All applications** and **Owned applications** tabs. Make sure to note down the Client ID/Application ID to be used during the SSO configuration in VeloCloud Orchestrator.

f. Select **Endpoints** and copy the well-known OIDC configuration URL to be used during the SSO configuration in VeloCloud Orchestrator.

g. To create a client secret for your VeloCloud Orchestrator application, on the **Owned applications** tab, select on your VeloCloud Orchestrator application.

h. Go to **Certificates & secrets** > **New client secret**. The **Add a client secret** screen appears.

Figure 12-16: Certificates & secrets



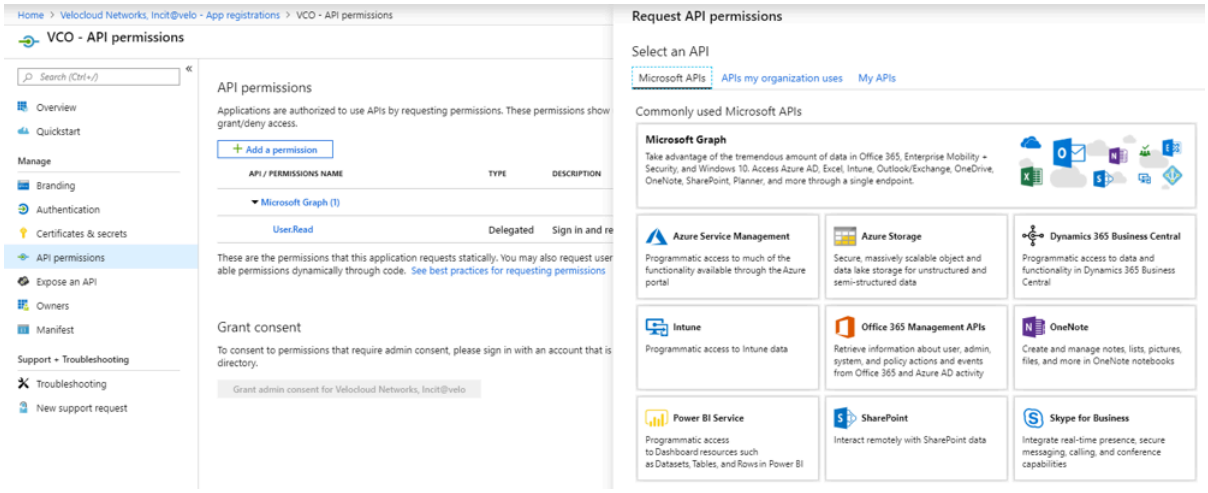
i. Provide details such as description and expiry value for the secret and select **Add**.

The client secret is created for the application. Note down the new client secret value to be used during the SSO configuration in VeloCloud Orchestrator.

j. To configure permissions for your VeloCloud Orchestrator application, select your VeloCloud Orchestrator application and go to **API permissions** > **Add a permission**.

The **Request API permissions** screen appears.

Figure 12-17: API Permission



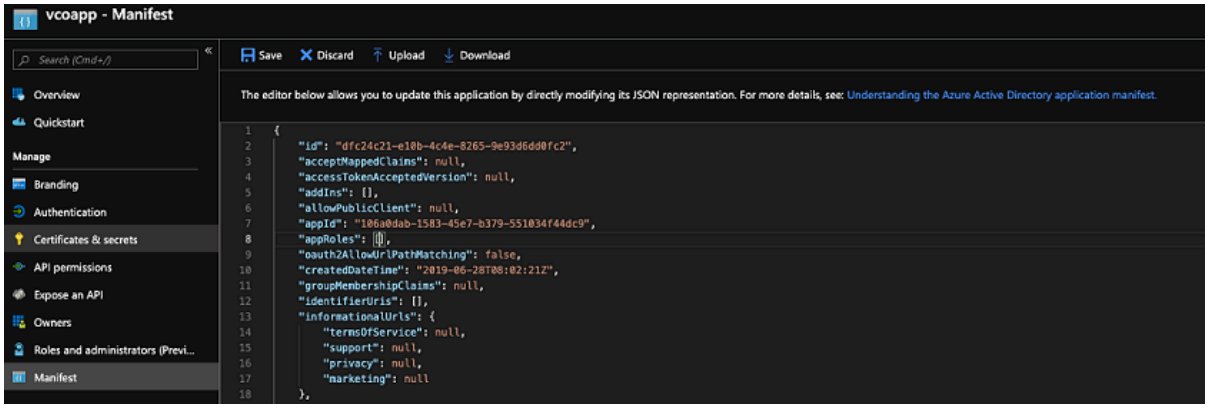
k. Select **Microsoft Graph** and select **Application permissions** as the type of permission for your application.

l. Under **Select permissions**, from the **Directory** drop-down menu, select `Directory.Read.Al` and from the **User** drop-down menu, select `User.Read.All`.

m. Select **Add permissions**.

n. To add and save roles in the manifest, select your VeloCloud Orchestrator application and from the application **Overview** screen, select **Manifest**. A web-based manifest editor opens, allowing you to edit the manifest within the portal. Optionally, you can select **Download** to edit the manifest locally, and then use **Upload** to reapply it to your application.

Figure 12-18: Application



o. In the manifest, search for the appRoles array and add one or more role objects as shown in the following example and select **Save**.

> **Note:** The value property from appRoles must be added to the **Identity Provider Role Name** column of the **Role Map** table, located in the **Authentication** tab, in order to map the roles correctly.

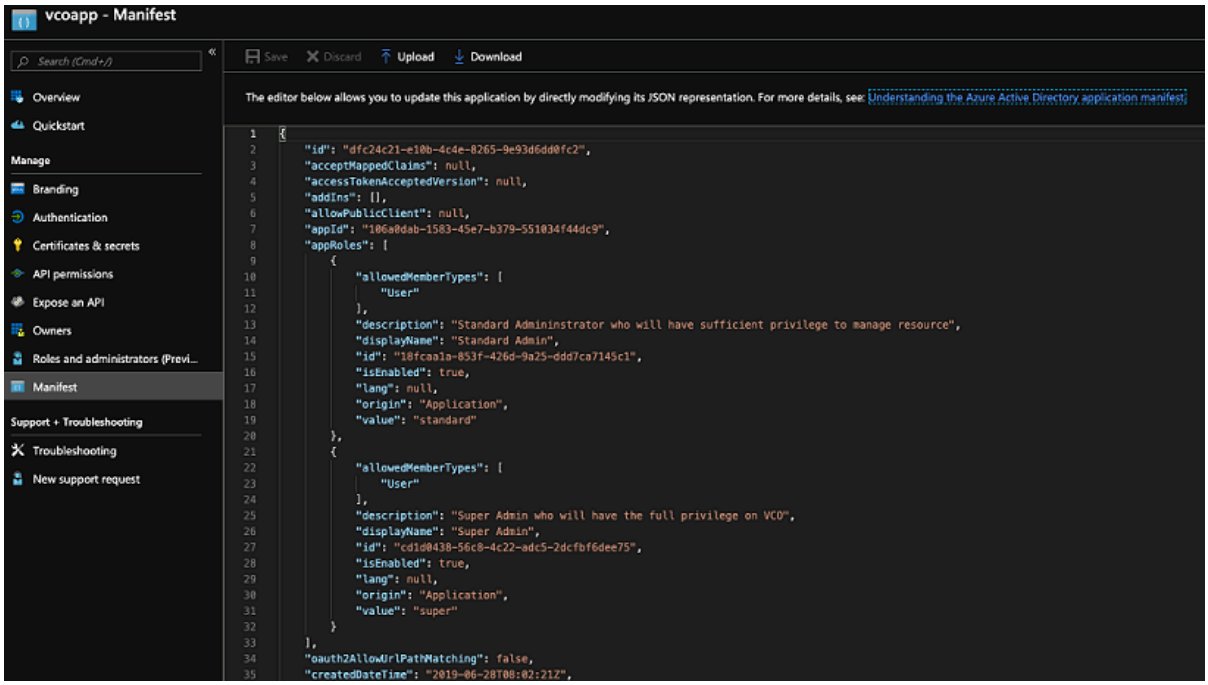
Sample role objects

```
{ "allowedMemberTypes": [ "User" ], "description": "Standard Administrator who will
 have sufficient privilege to manage resource", "displayName": "Standard Admin", "id":
 "18fcaa1a-853f-426d-9a25-ddd7ca7145c1", "isEnabled": true, "lang": null, "origin":
 "Application", "value": "standard" }, { "allowedMemberTypes": [ "User" ], "description"
: "Super Admin who will have the full privilege on VeloCloud Orchestrator", "displayName"
: "Super Admin", "id": "cd1d0438-56c8-4c22-adc5-2dcfbf6dee75", "isEnabled": true, "lang":
 null, "origin": "Application", "value": "superuser" }
```

> **Note:** Make sure to set id to a newly generated Global Unique Identifier (GUID) value. You can generate GUIDs online using web-based tools (for example, https://www.guidgen.com/), or by running the following commands:
>
> - Linux/OSX- genuine

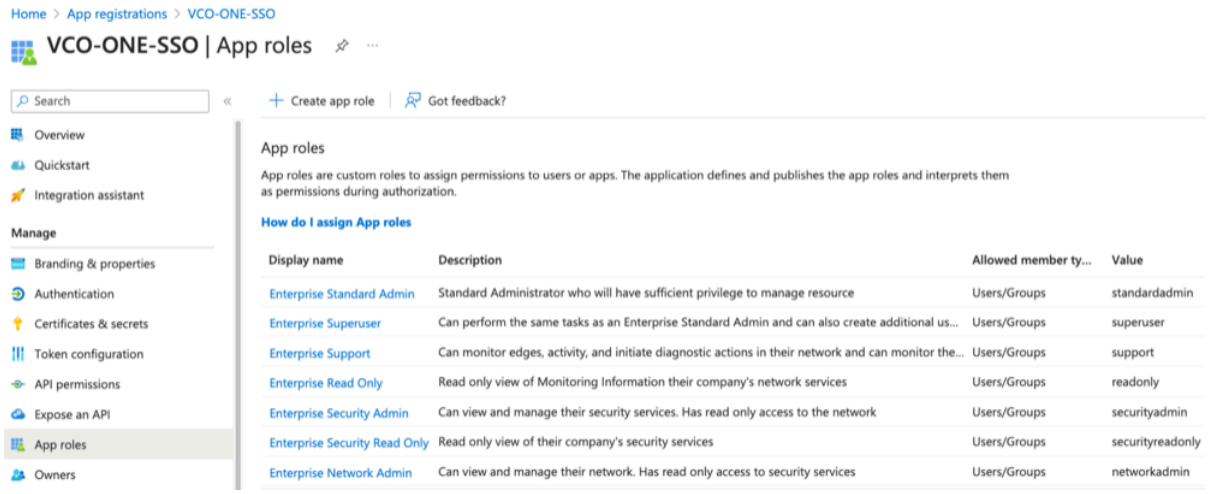
- Windows - powershell [guid]::NewGuid()

Figure 12-19: Global Unique Identifier (GUID)



Roles are manually set up in the VeloCloud Orchestrator, and must match the ones configured in the **Microsoft Azure** portal.

Figure 12-20: App Roles



3. To assign groups and users to your VeloCloud Orchestrator application:
   a. Go to **Azure Active Directory** > **Enterprise applications**.
   b. Search and select your VeloCloud Orchestrator application.
   c. Select **Users and groups** and assign users and groups to the application.
   d. Select **Submit**.

You have completed setting up an OIDC-based application in Azure AD for SSO.

Configure Single Sign On in VeloCloud Orchestrator.

12.4.2 Configure Okta for Single Sign On

To support OpenID Connect (OIDC)-based Single Sign On (SSO) from Okta, you must first set up an application in Okta. To set up an OIDC-based application in Okta for SSO, perform the steps on this procedure.

Ensure you have an Okta account to sign in.

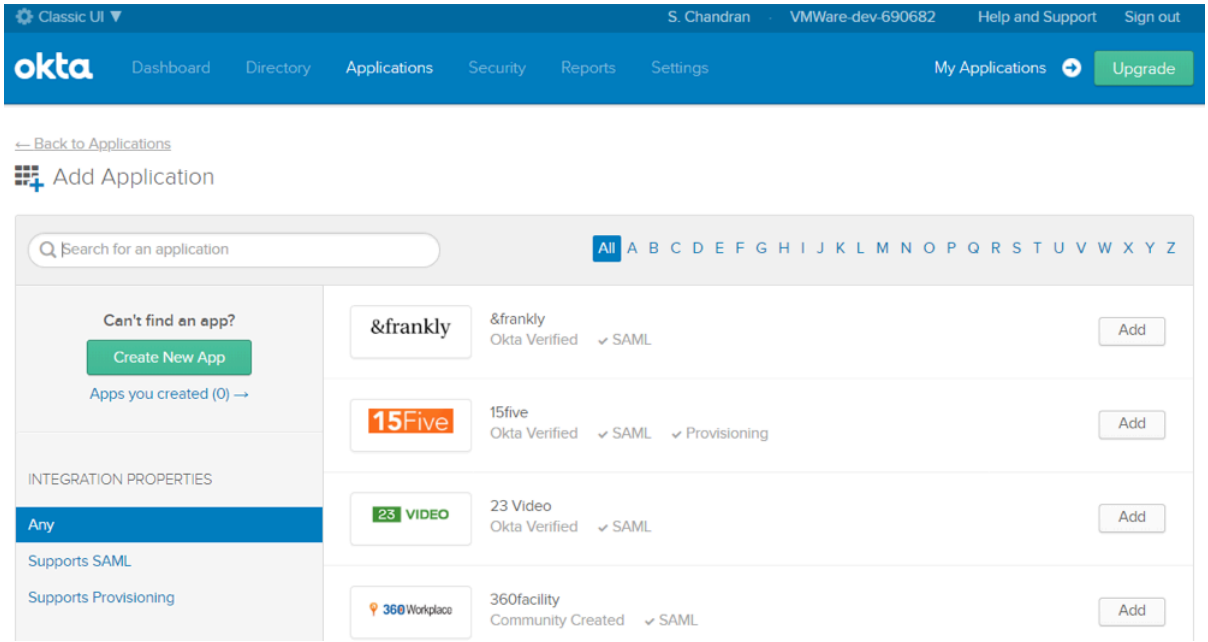
1. Log in to your Okta account as an Admin user. The **Okta** home screen appears.

   Note: If you are in the Developer Console view, then you must switch to the Classic UI view by selecting **Classic UI** from the **Developer Console** drop-down list.

2. To create a new application:

   a. In the upper navigation bar, select **Applications** > **Add Application**. The **Add Application** screen appears.

   Figure 12-21: Add Application



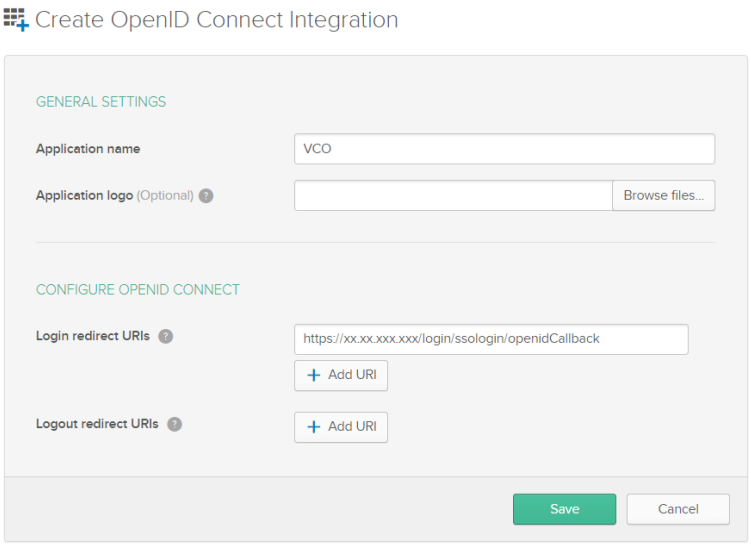
   b. Select **Create New App**. The **Create a New Application Integration** dialog box appears.

   c. From the **Platform** drop-drop menu, select **Web**.

   d. Select **OpenID Connect** as the Sign on method and select **Create**

The **Create OpenID Connect Integration** screen appears.

Figure 12-22: OpenID Connect Integration



e. Under the **General Settings** area, in the **Application name** text box, enter the name for your application.

f. Under the **CONFIGURE OPENID CONNECT** area, in the **Login redirect URIs** text box, enter the redirect URL that your VeloCloud Orchestrator application uses as the callback endpoint.

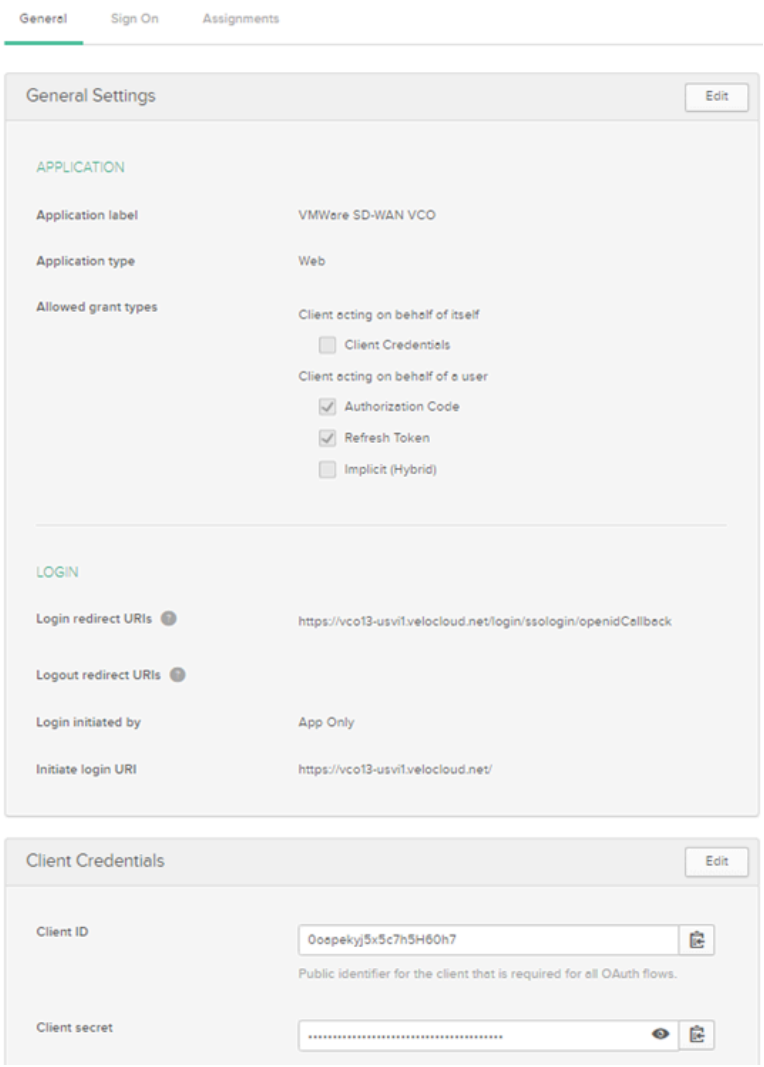
In the VeloCloud Orchestrator application, at the bottom of the **Configure Authentication** screen, you can find the redirect URL link. Ideally, the VeloCloud Orchestrator redirect URL will be in this format: `https://<Orchestrator URL>/login/ssologin/openidCallback`.

g. Select **Save**. The newly created application page appears.

h. On the **General** tab, select **Edit** and select **Refresh Token** for Allowed grant types, and select **Save**.

Note down the Client Credentials (Client ID and Client Secret) to be used during the SSO configuration in VeloCloud Orchestrator.

Figure 12-23: General Settings



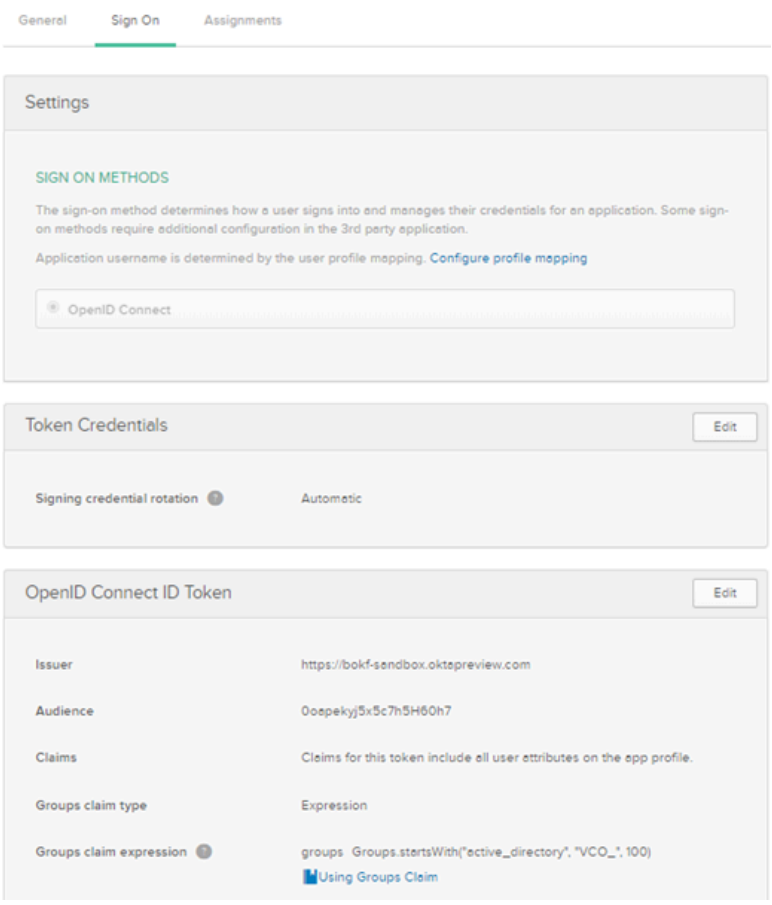
i. Select the **Sign On** tab and under the **OpenID Connect ID Token** area, select **Edit**.

j. From the **Groups claim type** drop-down menu, select **Expression**. By default, Groups claim type is set to **Filter**.

k. In the **Groups claim expression** textbox, enter the claim name that will be used in the token, and an Okta input expression statement that evaluates the token.

l. Select **Save**. The application is setup in IDP. You can assign user groups and users to your VeloCloud Orchestrator application.

Figure 12-24: SIGN ON METHODS



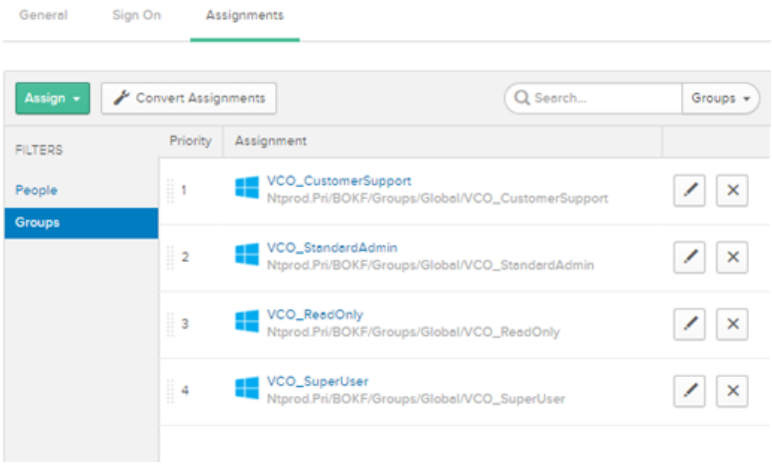
3. To assign groups and users to your VeloCloud Orchestrator application:

   a. Go to **Application** > **Applications** and select your VeloCloud Orchestrator application link.

   b. On the **Assignments** tab, from the **Assign** drop-down menu, select **Assign to Groups** or **Assign to People**. The **Assign <Application Name> to Groups** or **Assign <Application Name> to People** dialog box appears.

c. Select **Assign** next to available user groups or users you want to assign the VeloCloud Orchestrator application and select **Done**. The users or user groups assigned to the VeloCloud Orchestrator application will be displayed.

Figure 12-25: Assign Groups



You have completed setting up an OIDC-based application in Okta for SSO.

Configure Single Sign On in VeloCloud Orchestrator.

12.4.3 Configure OneLogin for Single Sign On

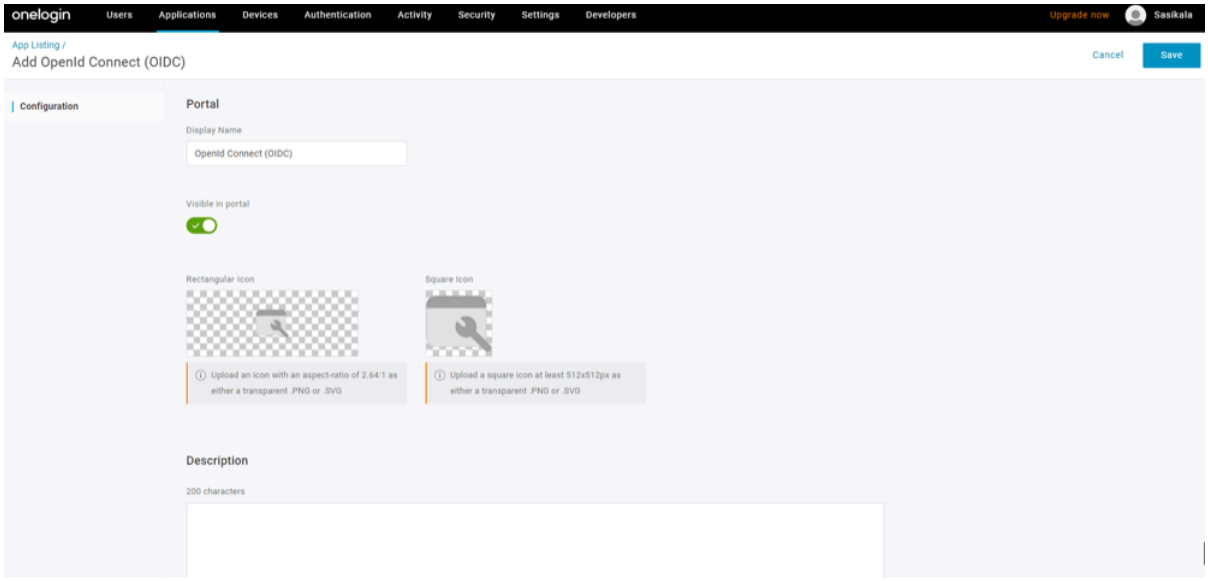
To set up an OpenID Connect (OIDC)-based application in OneLogin for Single Sign On (SSO), perform the steps below:

Ensure you have an OneLogin account to sign in.

1. Log in to your https://app.onelogin.com/login account as an Admin user. The **OneLogin** home screen appears.
2. To create a new application:
   a. In the upper navigation bar, select **Apps** > **Add Apps**.

b. In the **Find Applications** text box, search for “OpenId Connect” or “oidc” and then select the **OpenId Connect (OIDC)** app. The **Add OpenId Connect (OIDC)** screen appears.

Figure 12-26: Add OpenId Connect (OIDC)

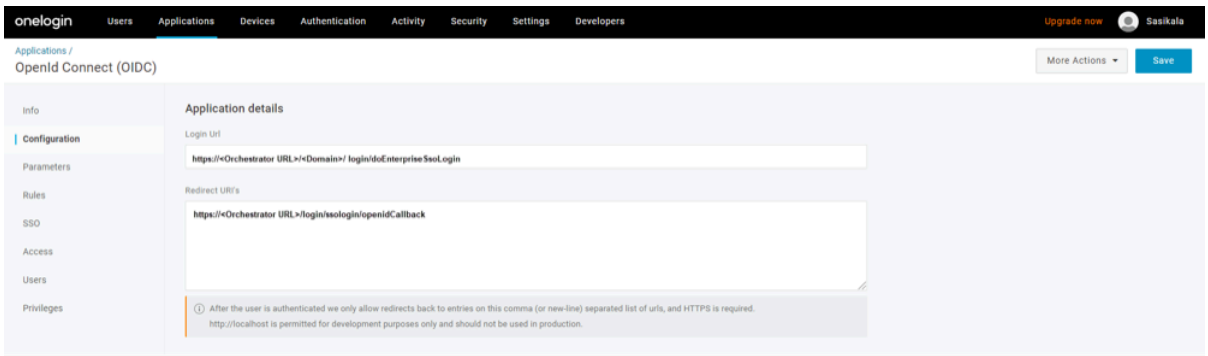


c. In the **Display Name** text box, enter the name for your application and select **Save**.

d. On the **Configuration** tab, enter the Login URL (auto-login URL for SSO) and the Redirect URI that VeloCloud Orchestrator uses as the callback endpoint, and select **Save**.

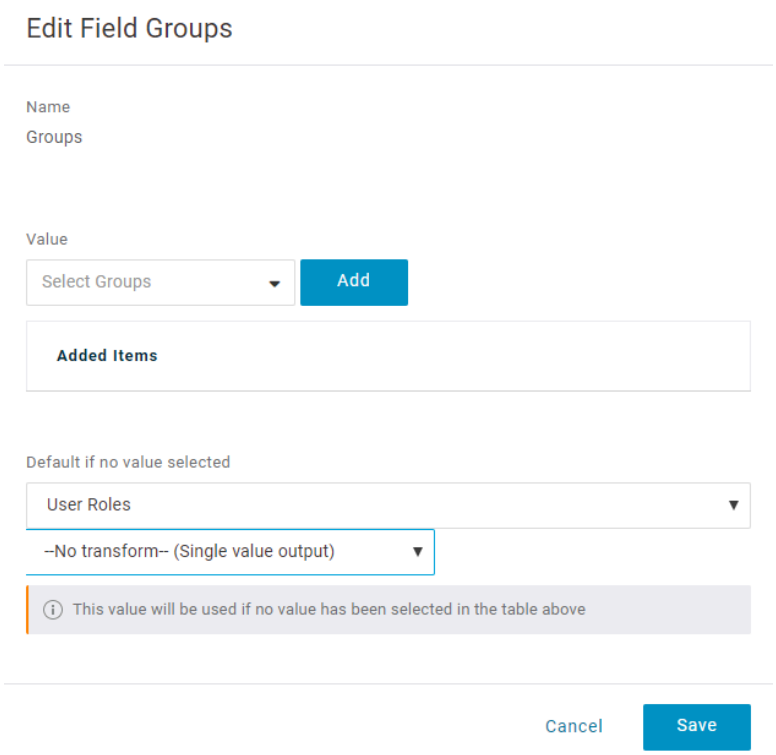
- **Login URL**- The login URL will be in this format: `https://<Orchestrator URL>/<Domain>/login/doEnterpriseSsoLogin`. Where, <Domain> is the domain name of your Enterprise that you must have already set up to enable SSO authentication for the VeloCloud Orchestrator. You can get the Domain name from the **Enterprise portal** > **Administration** > **System Settings** > **General Information** page.
- **Redirect URI's**- The VeloCloud Orchestrator redirect URL will be in this format: `https://<Orchestrator URL>/login/ssologin/openidCallback`. In the VeloCloud Orchestrator application, at the bottom of the **Authentication** screen, you can find the redirect URL link.

Figure 12-27: Openid Connect



e. On the **Parameters** tab, under **OpenId Connect (OIDC)**, double select **Groups**. The **Edit Field Groups** popup appears.

Figure 12-28: Field Groups



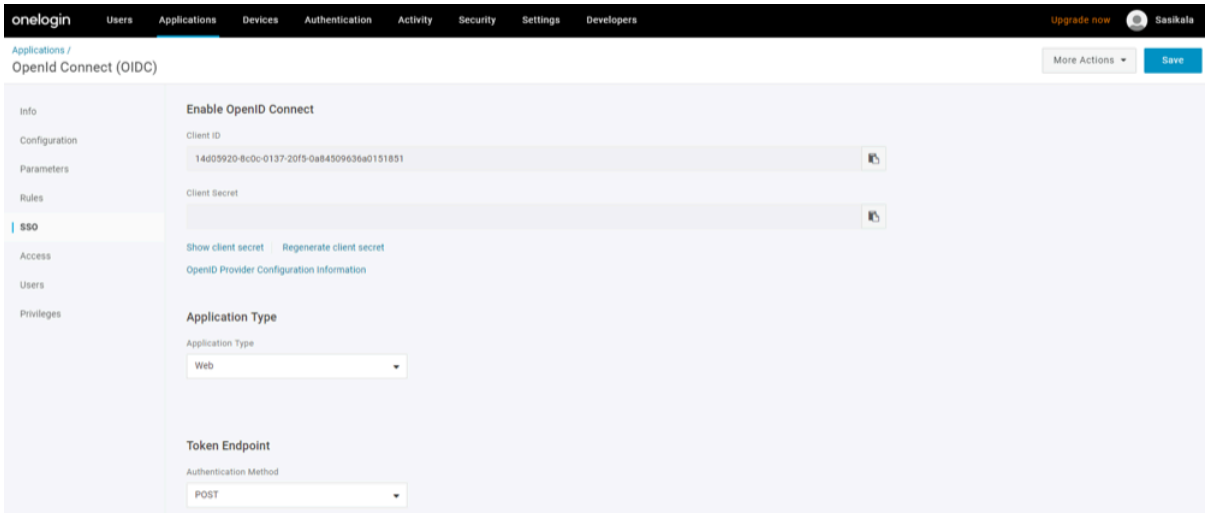
f. Configure User Roles with value “--No transform--(Single value output)” to be sent in groups attribute and select **Save**.

g. On the **SSO** tab, from the **Application Type** drop-down menu, select **Web**.

h. From the **Authentication Method** drop-down menu, select **POST** as the Token Endpoint and select **Save**.

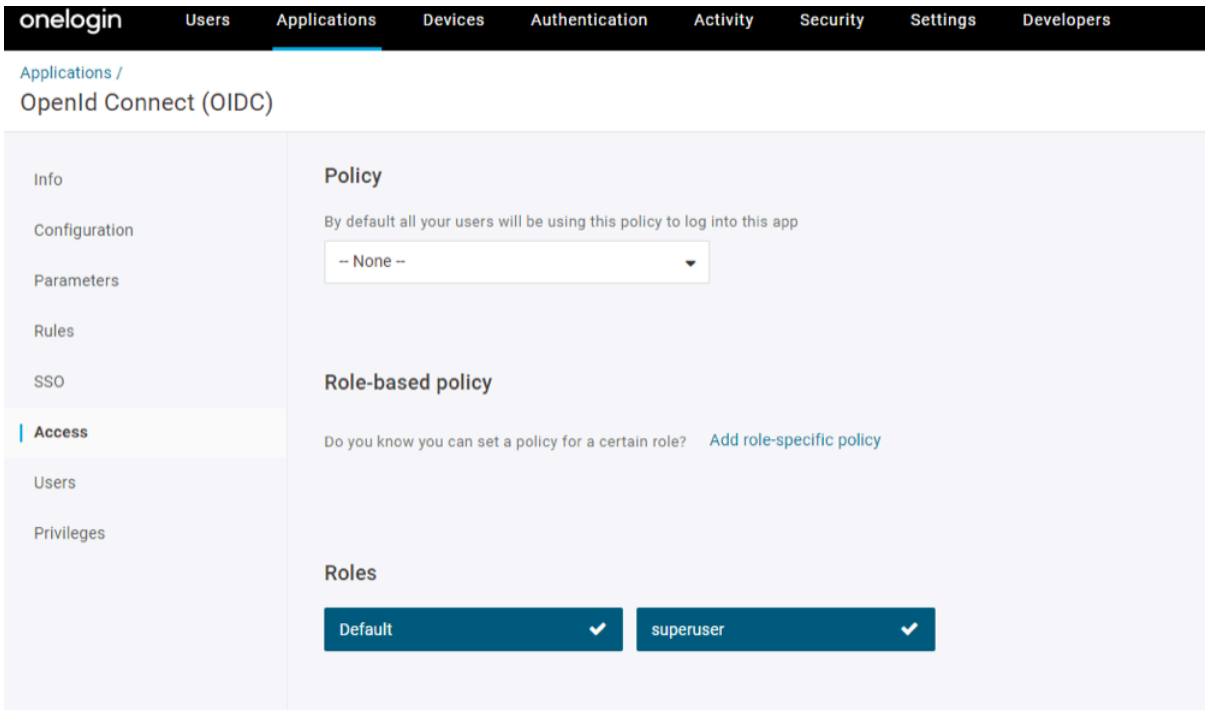
Also, note down the Client Credentials (Client ID and Client Secret) to be used during the SSO configuration in VeloCloud Orchestrator.

Figure 12-29: SSO



i. On the **Access** tab, choose the roles that will be allowed to login and select **Save**.

Figure 12-30: Access



3. To add roles and users to your VeloCloud Orchestrator application:
   a. Select **Users** > **Users** and select a user.
   b. On the **Application** tab, from the **Roles** drop-down menu, on the left, select a role to be mapped to the user.

c. Select **Save Users**.

You have completed setting up an OIDC-based application in OneLogin for SSO.

Configure Single Sign On in VeloCloud Orchestrator.

12.4.4 Configure PingIdentity for Single Sign On

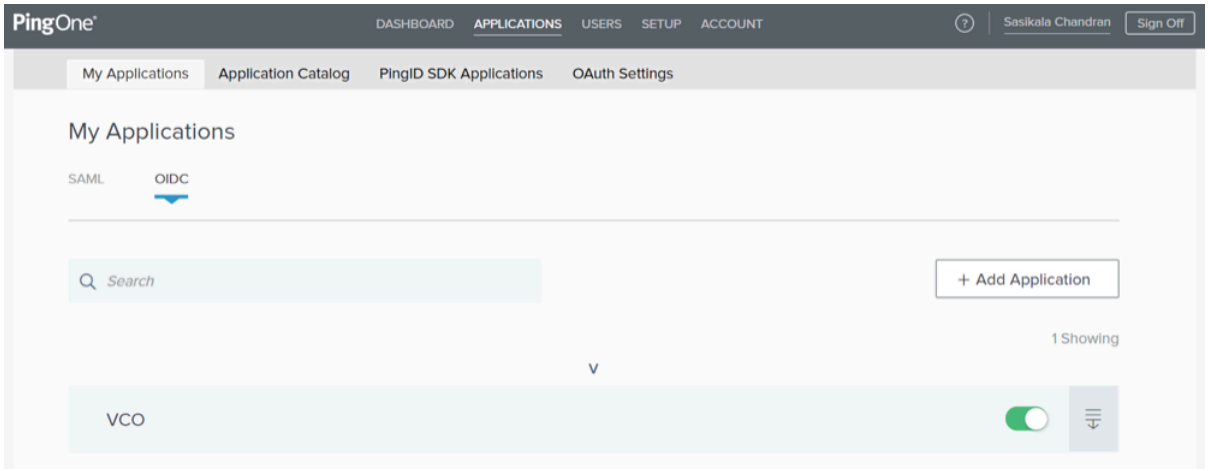
To set up an OpenID Connect (OIDC)-based application in PingIdentity for Single Sign On (SSO), perform the steps on this procedure.

Ensure you have a PingOne account to sign in.

Note: Currently, VeloCloud Orchestrator supports PingOne as the Identity Partner (IDP); however, any PingIdentity product supporting OIDC can be easily configured.

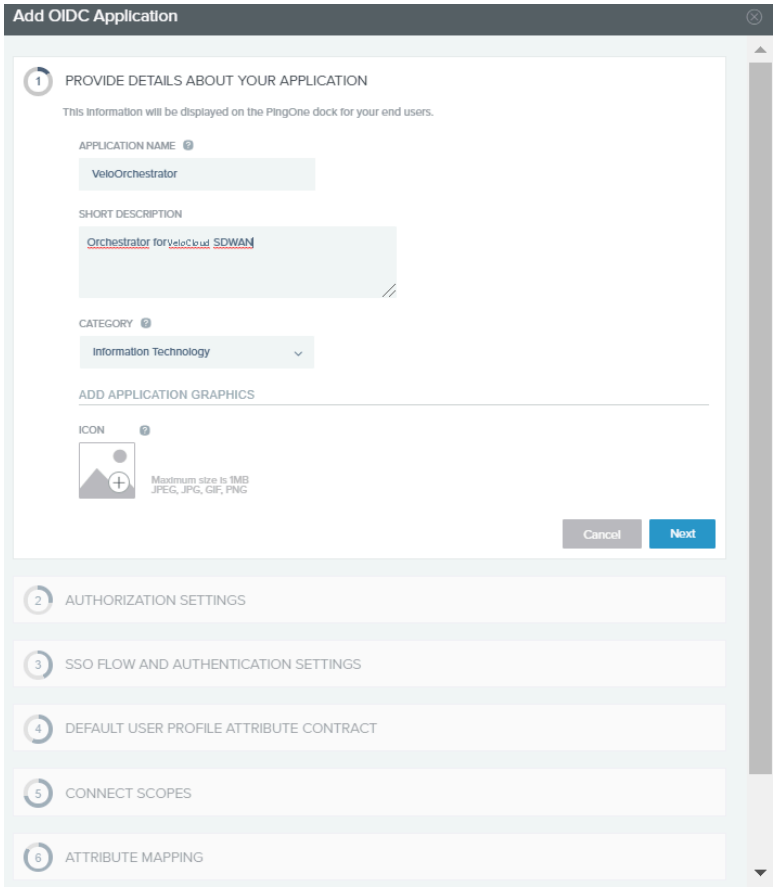
1. Log in to your PingOne account as an Admin user. The **PingOne** home screen appears.
2. To create a new application:
   a. In the upper navigation bar, select **Applications**.

Figure 12-31: Applications



b. On the **My Applications** tab, select **OIDC** and then select **Add Application**. The **Add OIDC Application** pop-up window appears.

Figure 12-32: Add OIDC Application Window



c. Provide basic details such as name, short description, and category for the application and select **Next**.

d. Under **AUTHORIZATION SETTINGS**, select **Authorization Code** as the allowed grant types and select **Next**.

e. Also, note down the Discovery URL and Client Credentials (Client ID and Client Secret) to be used during the SSO configuration in VeloCloud Orchestrator. Under **SSO FLOW AND AUTHENTICATION SETTINGS**, provide valid values for Start SSO URL and Redirect URL and select **Next**. In the VeloCloud Orchestrator application, at the bottom of the **Configure Authentication** screen, you can find the redirect URL link. Ideally, the VeloCloud Orchestrator redirect URL will be in this format: `https://<Orchestrator URL>/login/ssologin/openidCallback`. The Start SSO URL will be in this format: `https://<Orchestrator URL>/<domain name>/login/doEnterpriseSsoLogin`.

f. Under **DEFAULT USER PROFILE ATTRIBUTE CONTRACT**, select **Add Attribute** to add additional user profile attributes.

g. In the **Attribute Name** text box, enter *group_membership* and then select the **Required** checkbox, and select **Next**.

> **Note:** The *group_membership* attribute is required to retrieve roles from PingOne.

h. Under **CONNECT SCOPES**, select the scopes that can be requested for your VeloCloud Orchestrator application during authentication and select **Next**.

i. Under **Attribute Mapping**, map your identity repository attributes to the claims available to your VeloCloud Orchestrator application.

> **Note:** The minimum required mappings for the integration to work are email, given_name, family_name, phone_number, sub, and group_membership (mapped to memberOf).

j. Under **Group Access**, select all user groups that should have access to your VeloCloud Orchestrator application and select **Done**. The application will be added to your account and will be available in the **My Application** screen.

You have completed setting up an OIDC-based application in PingOne for SSO.

Configure Single Sign On in VeloCloud Orchestrator.

Chapter 13

Manage User Agreements

VeloCloud Orchestrator allows an Operator Super User and Operator Standard Administrator to create and manage End User License Agreements. Only an Operator Super User can create an End User License Agreement.

1. In the **Operator** portal, select **Administration** tab and from the left pane select **User Agreements** button.
2. By default, the User Agreement option is deactivated. To activate this option, navigate to the **System Properties** in the **Operator** portal, and set the value of the System Property `session.options.enableUserAgreements` as **True**. In addition, you can configure the display mode of the User Agreement by defining the Value of the System Property `vco.enterprise.userAgreement.display.mode` as follows:
   - **NONE** — The User Agreement is not displayed to any of the Enterprise Users. This is the default value.
   - **ALL** — The User Agreement is displayed to all the Enterprise Users.
   - **WITH_MSPS** — The User Agreement is displayed to all the Enterprise Users with MSPS.
   - **WITHOUT_MSPS** —The User Agreement is displayed to all the Enterprise Users without MSPS.

     The above display settings are applied to all the Customers managed by the Operator. As an Operator, you can override these settings for each Enterprise Customer, as described in Configure Customers.

     Only an Enterprise Super User or Partner Super User can accept a license agreement, based on the System Property settings.

   Once the properties mentioned above are set, the User Agreement page appears in Administration tab.
3. To create and manage User Agreement, select **Administration** > **User Agreements** tab in the Operator portal and perform the following actions:

Table 55: Operator Portal Fields

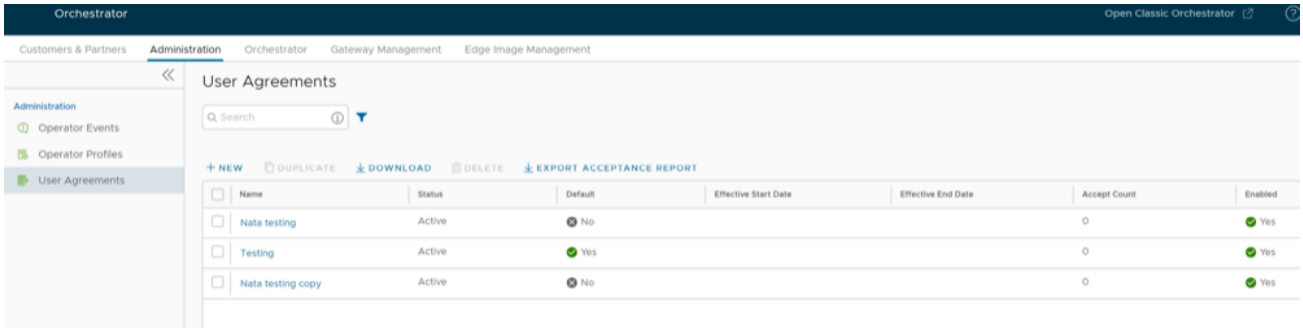
Option	Description
New	Creates a new End User License Agreement.
Duplicate	Duplicates and creates a copy of the selected User Agreement.
Download	Downloads a copy of the User Agreement details.
Delete	Deletes the selected User Agreements.
Export Acceptance Report	Exports a report of all the customers who have accepted the User Agreements, to a CSV file.

Note: To update, select the existing agreement in the table and update as required.

Create a User Agreement

Only Operator Super Users and Operator Standard Administrator can create a new user agreement. You can create multiple active user agreements and configure the default one from the list of active user agreements. You can also choose and configure an active user agreement that you want to show for a particular customer.

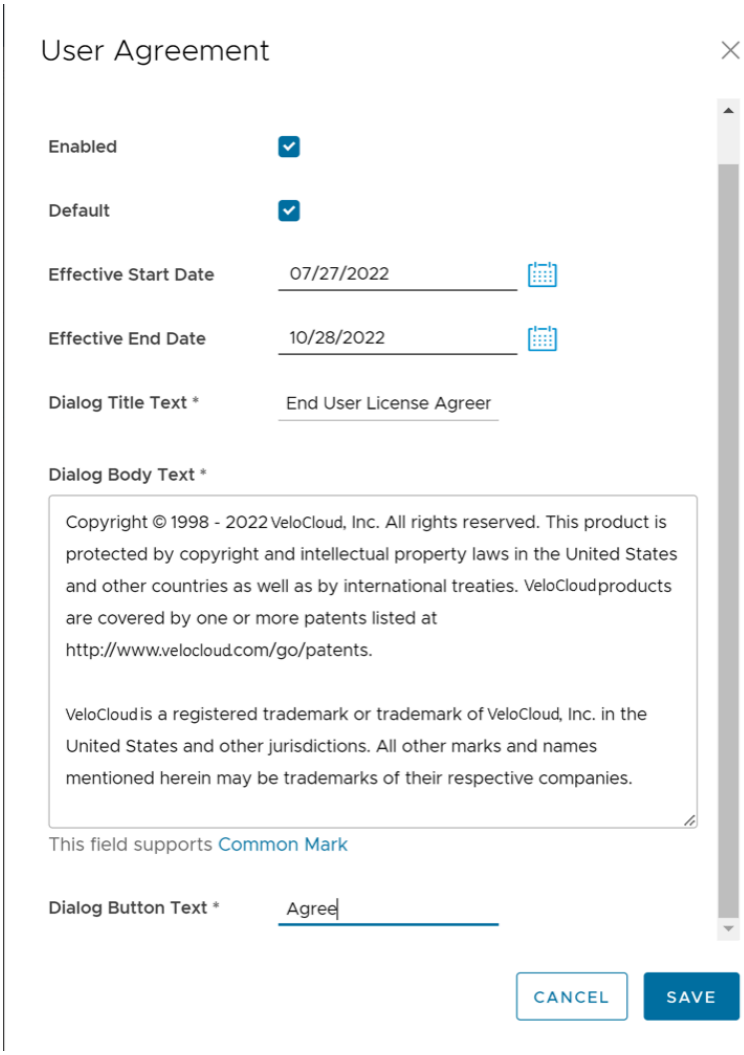
Figure 13-1: User Agreement



- On the **Administration** tab, select **User Agreements** and select **New**.

  The **User Agreement** dialog box appears.

- Enter the following information in the **User Agreement** dialog box:
- **Figure 13-2: User Agreement Dialog Text**



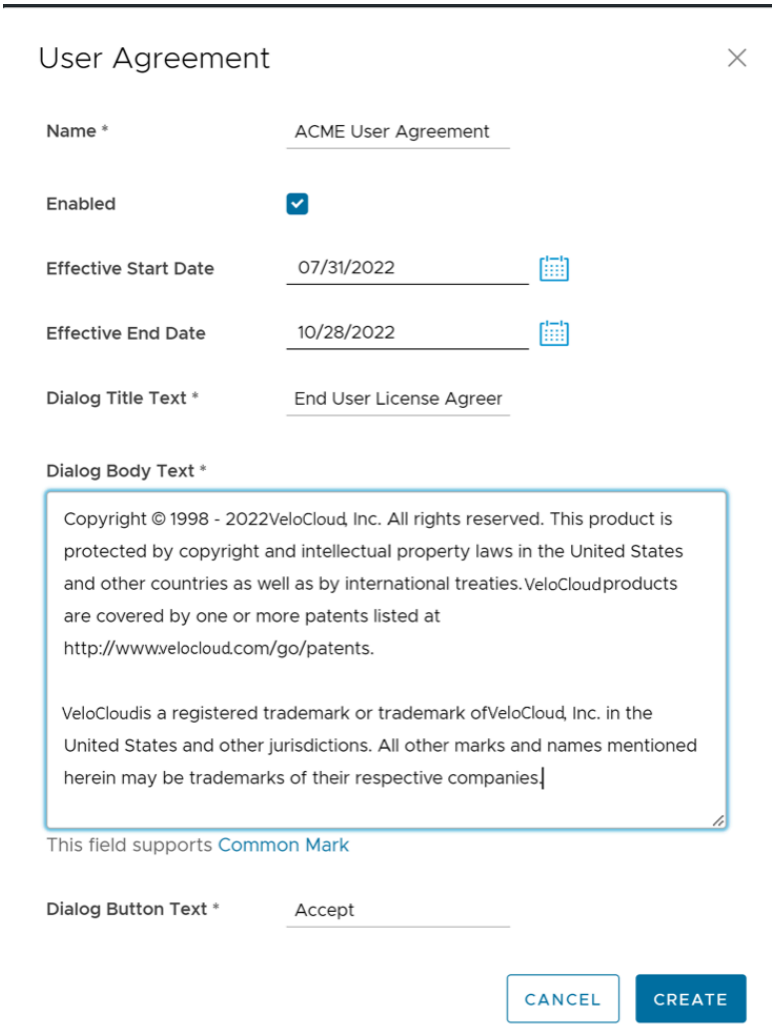
- **Table 56: User Agreement Fields**

Option	Description
Name	Enter the name for the user agreement.
Enabled	By default, this check box is selected. If unselected, the user agreement is Inactive.
Effective Start Date	Enter the date from which the user agreement is effective.
Effective End Date	Enter the date until which the user agreement is effective.
Dialog Title Text	Enter a title for the user agreement.
Dialog Body Text	Enter the descriptive user agreement text that would be visible to the Customer.
Dialog Button Text	Enter the text to be displayed on the button that customer would select to accept the agreement.

- Select **Create**.

The agreements get displayed on the User Agreements page.

Figure 13-3: Agreement Tex



- Select an inactive agreement and select **Delete**, to delete it.

> **Note:** Active agreements cannot be deleted.

When an Enterprise Super User or Partner Super User logs into the VeloCloud Orchestrator for the first time, a 'User Agreement' message pops up prompting the user to accept the agreement. The user must accept the agreement to get access to the VeloCloud Orchestrator. If the user does not accept the agreement, it gets automatically logged out.

Chapter 14

Manage Gateway Pools and Gateways

Arista network consists of multiple service Gateways deployed at top tier network and cloud data centers. The VeloCloud Gateway provides the advantage of cloud-delivered services and optimized paths to all applications, branches, and data centers. Service providers can also deploy their own Partner Gateways in their private cloud infrastructure.

14.1 Manage Gateway Pools

A Gateway Pool is a group of Gateways.

Gateways can be organized into pools that are then assigned to a network. An unpopulated default Gateway pool is available after you install VeloCloud Orchestrator. If required, you can create additional Gateway pools.

As an Operator Superuser and Operator Admin user, you can create, clone, manage, download, and delete Gateway pools created by both Operator and Partner users.

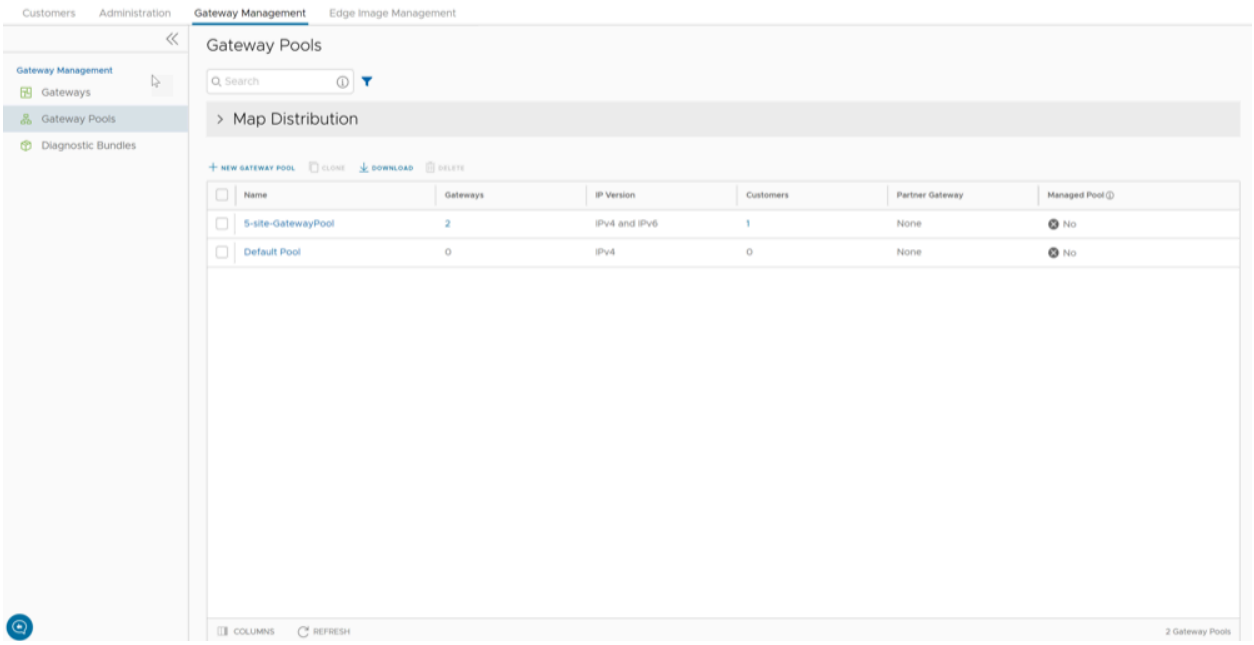
Note: Operator Business Specialist user and Operator IT support user can only view the configured Gateway pools and download the CSV file.

To manage Gateway pools, perform the following steps:

1. Log into the Orchestrator as an Operator Superuser or Admin user.
2. In the Orchestrator UI, select the **Gateway Management** tab and go to **Gateway Pools** in the left navigation pane.

The **Gateway Pools** page appears.

Figure 14-1: Gateway Pools



3. To search a specific Gateway pool, enter a relevant search text in the **Search** box. For advanced search, select the **filter** icon next to the **Search** box to filter the results by specific criteria.
4. The **Map Distribution** section is used for displaying the Gateways on a map. You can click the **+** and **-** buttons to zoom in and zoom out the map, respectively. In the **Gateway Pools** table, if you have selected any Gateway pools then only the Gateways in the selected pools are displayed on the map. Otherwise, all Gateways are displayed on the map.

   The **Gateway Pools** table displays the existing Gateway pools with the following details.

Table 57: Gateway Pools- Options and Descriptions

Option	Description
Name	Specifies the name of the Gateway pool. When clicking on a Gateway pool link in the **Name** column, the user gets redirected to the **Gateway Pools Overview** page.
Gateways	Specifies the number of Gateways available in the Gateway pool. When clicking on a Gateway link in the **Gateways** column, the user gets redirected to the **Gateway Overview** page.
IP Version	Specifies whether the Gateway pool is enabled with IPv4 address or both the IPv4 and IPv6 addresses. **Note:** When assigning Gateways to the Gateway pool, ensure that the IP address type of the Gateway matches the IP address type of pool.
Customers	Specifies the number of Enterprise Customers associated with the Gateway pool. When clicking on a Customer link in the **Customers** column, a dialog opens with listed customers. If a user clicks on a customer then the user gets redirected to the **Configure** > **Customer** page.
Partner Gateway	Specifies the status of the Partner Gateway. The following are the available options: • **None**- Use this option when Enterprises assigned to this Gateway pool do not require Gateway Partner handoffs. • **Allow**- Use this option when the Gateway pool must support both Partner Gateways and Cloud Gateways. • **Only (Partner Gateways)**- Use this option when Edges in the Enterprise should not be assigned Cloud Gateways from the Gateway pool, but can use only the Gateway-1 and Gateway-2 that are set for the individual Edge.
Managed Pool	Specifies if a Partner can manage the Gateway pool.

5. On the **Gateway Pools** page, you can perform the following activities:
   - **New Gateway Pool**: Creates a new Gateway pool. See Create New Gateway Pool.
   - **Clone**: Creates a new Gateway pool, by cloning the existing configurations from the selected Gateway pool. See Clone a Gateway Pool.
   - **Download**: Downloads the CSV file for all Gateway pools or the selected Gateway pool.
   - **Delete**: Deletes the selected Gateway pool. You cannot delete a Gateway pool that is already being used by a Partner oran Enterprise Customer.
   - You can also configure the existing Gateway pools by selecting the name link of the Gateway pool. See Configure Gateway Pools.

14.1.1 Create New Gateway Pool

In addition to the default Gateway pool, you can create new Gateway pools and associate them with Enterprise Customers.

1. In the Orchestrator UI, select the **Gateway Management** tab and go to **Gateway Pools** in the left navigation pane.

   The **Gateway Pools** page appears.
2. Select **New Gateway Pool**.
3. In the **New Gateway Pool** dialog, configure the following details and select **Create**.

Figure 14-2: New Gateway Pool

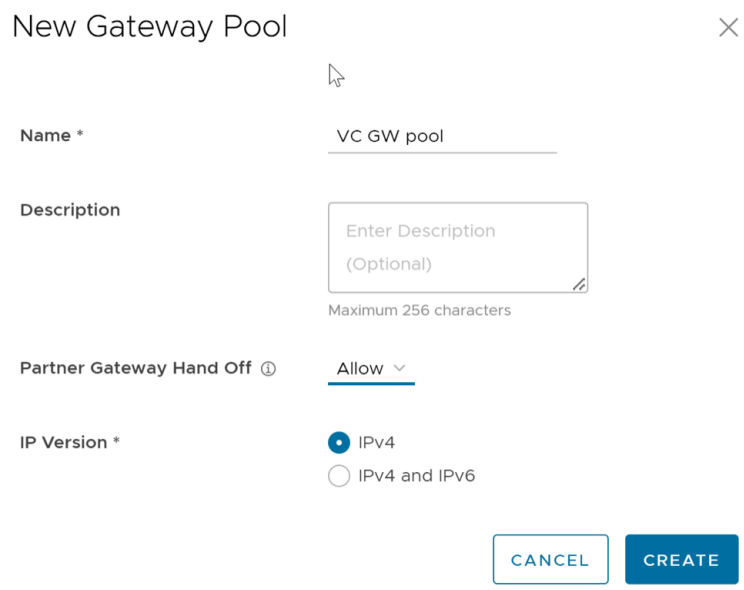


Table 58: New Gateway Pool- Options and Descriptions

Option	Description
Name	Enter a name for the new Gateway pool.
Description	Enter a description for the Gateway pool.
Partner Gateway Hand Off	This option determines the method to hand off the Gateways to Partners. Choose one of the following options from the drop-down list: • **None** – Select this option when Partner Gateway hand off is not required. • **Allow** – Select this option when you want the Gateway pool to support a mix of both the Partner Gateways and Cloud Gateways. • **Only Partner Gateways** – Select this option when Edges in the Enterprise should not be assigned with Cloud Gateways from the pool, and will only be assigned with the Gateways that are set for an individual Edge.
IP Version	Choose one of the following address types with which the Gateway pool should be enabled: • **IPv4** – Allows to add IPv4 only Gateways. • **IPv4 and IPv6** – Allows to add Gateways with IPv4 and IPv6 addresses. **Note:** If you want to use Edges with IPv6 support, then choose **IPv4 and IPv6**.

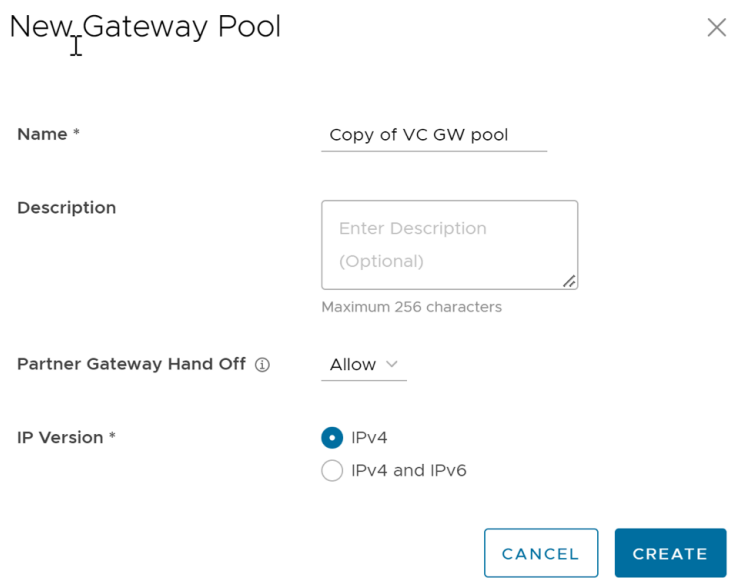
Configure the Gateway pool by adding Gateways to the pool. See Configure Gateway Pools.

14.1.2 Clone a Gateway Pool

You can clone the configurations from an existing Gateway pool and create a new Gateway pool with the cloned settings.

1. In the Orchestrator UI, select the **Gateway Management** tab and go to **Gateway Pools** in the left navigation pane.
   The **Gateway Pools** page appears.
2. In the **Gateway Pools** table, select the Gateway pool that you want to clone and select **Clone**.
   The **New Gateway Pool** dialog with the cloned settings appears.

   Figure 14-3: New Gateway Pool



   The Gateway pool clones the existing configuration from the selected Gateway pool. If required, you can modify the details. For additional information on the options, see Create New Gateway Pool.
3. After updating the Gateway pool details, select **Create**.

Configure the Gateway pool by adding Gateways to the pool. See Configure Gateway Pools.

14.1.3 Configure Gateway Pools

After creating a Gateway pool, you can add Gateways to the pool and associate the pool to an Enterprise Customer.

Whenever you create a new Gateway pool or clone a pool, you are redirected to the **Gateway Pool Overview** page to configure the properties of the pool.

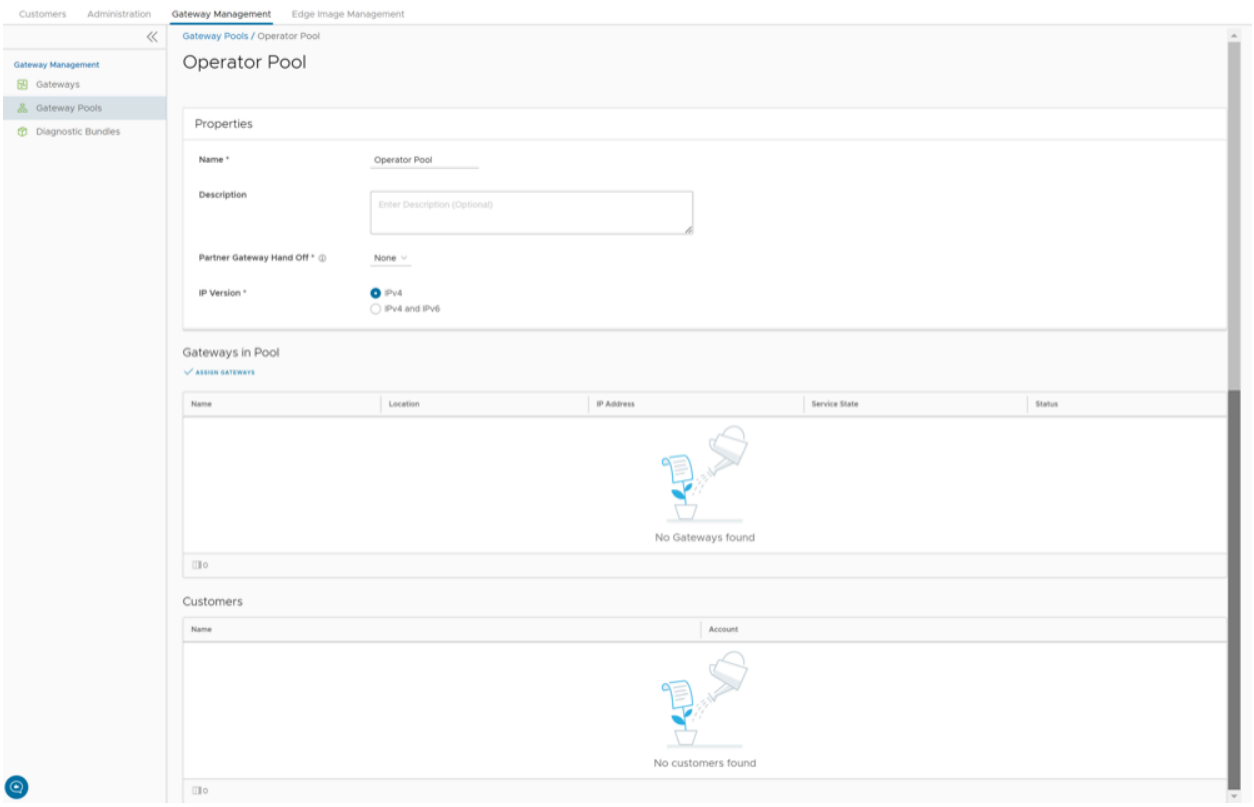
To configure an existing Gateway pool:

1. In the Orchestrator UI, select the **Gateway Management** tab and go to **Gateway Pools** in the left navigation pane.

The **Gateway Pools** page appears.

2. Select the name link to a Gateway pool that you want to configure.
3. Configure the following details for the Gateway pool:

Figure 14-4: Gateway Pools

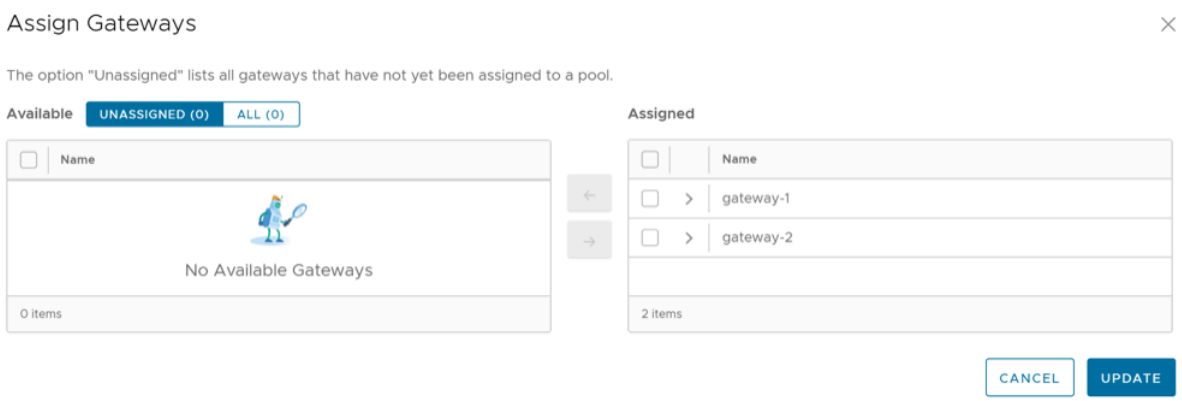


a. In the **Properties** section, the existing Name, Description, Partner Gateway Hand Off details, and the Association Type are displayed. If required, you can modify these details.

b. In the **Gateways in Pool** section, select **Manage** to add Gateways to the pool. The **Assign Gateways to Gateway pool** dialog appears.

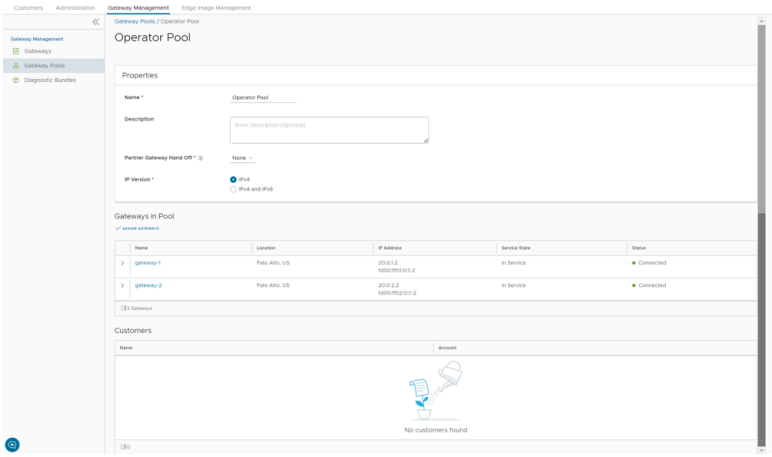
c. In the **Assign Gateways to Gateway pool** dialog, move the required Gateways from the **Available** pane to **Assigned** pane using the Arrows and select **Update**.

Figure 14-5: Assign Gateways



4. The Gateways assigned to the selected Gateway pool are displayed as follows.

Figure 14-6: Operator Pool



5. Select **Save Changes**.
   The configured Gateway pools are displayed in the **Gateway Pools** page.

You can associate the Gateway pool to a Partner or an Enterprise Customer. The Edges available in the Enterprise are connected to the Gateways available in the pool.

Refer to the following links to associate the Gateway pool:

- For a new customer, see Create New Customer.
- For an existing customer, see Configure Customers.
- For a new Partner, see Create New Partner.
- For an existing Partner, see Configure Partner.

14.2 Manage Gateways

14.2.1 Upgrade Orchestrator for Dual Stack Support

To upgrade Orchestrator to release 5.0.0 to support dual stack, perform the following:

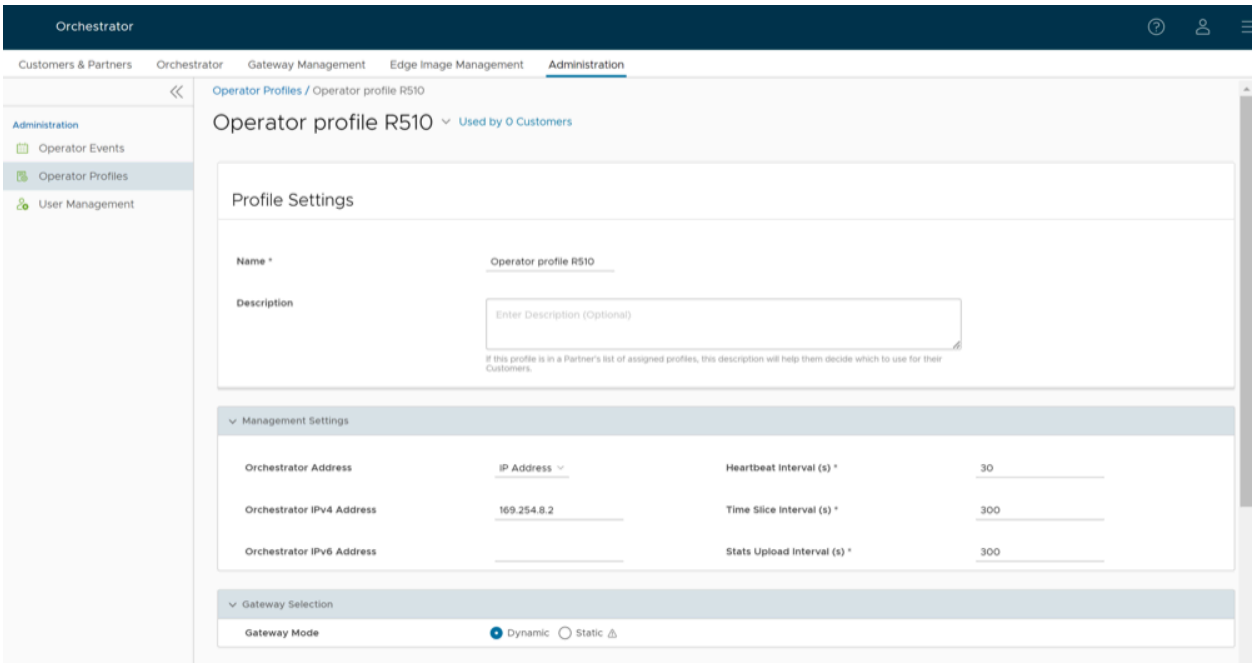
1. Upgrade Orchestrator to release 5.0.0.
2. Add IPv6 address in Orchestrator Shell. The following example shows a sample configuration:

```
vcadmin@vco:~$ cat /etc/netplan/50-cloud-init.yaml
network:
    version: 2
    renderer: networkd
    ethernets:
        eth0:
            addresses:
                - 169.254.8.2/29
                - 'fd00:aaaa:0:1::2/64'
```

```
routes:
    - to: 0.0.0.0/0
       via: 169.254.8.1
       metric: 1
    - to: '0::0/0'
      via: 'fd00:aaaa:0:1::1'
      metric: 1
```

3. In the **Operator** portal, navigate to **Administration** > **Operator Profiles**, and select a Profile.
4. In the **Operator Profiles** page of the selected Profile, navigate to the **Management Settings** section and enter the IPv6 address configured in Orchestrator Shell.

   Figure 14-7: Operator Profile



5. Select **Save Changes**.

14.2.2 Configure IPv6 Address on Gateways

You can provision a Gateway with both IPv4 and IPv6 addresses.

Prerequisites

Ensure that the VeloCloud Orchestrator is running version 5.0.0 as described in Upgrade Orchestrator for Dual Stack Support.

Deploy VeloCloud SD-WAN Gateway on AWS

Consider the following guidelines while deploying SD-WAN Gateways on AWS.

- While migrating Gateways on cloud, it is recommended to destroy and create new instance of Gateways with the IPv6 option enabled.
- When a VeloCloud SD-WAN Gateway is freshly deployed with a AWS c5.4xlarge instance type from the AWS portal with IPv6 option selected, it is required to only use the static mode of IPv4/IPv6 address assignment on interfaces for the Gateway because VeloCloud SD-WAN does not support DHCP on the Gateway side.

Setup IPv6 Address on Gateways for a new Deployment

1. Create a Gateway pool with IP version type as **IPv4 and IPv6**.
2. Deploy a new Gateway with version 5.0.0. You can configure IPv4 and IPv6 addresses on public interface using netplan, if IPv6 is not available in metadata.

   The following example shows a sample configuration:

```
vcadmin@vcg2:~$ cat /etc/netplan/50-cloud-init.yaml network: ethernets: eth0: addresses:
 [169.254.10.2/29, 'fd00:ff01:0:1::2/64'] routes: - {metric: 1, to: 0.0.0.0/0, via:
 169.254.10.1} - {metric: 1, to: '0::0/0', via: 'fd00:ff01:0:1::1'} eth1: addresses:
 [101.101.101.11/24] routes: - {metric: 2, to: 0.0.0.0/0, via: 101.101.101.10} eth2: addresses:
 [192.168.0.111/24] renderer: networkd version: 2 vcadmin@vcg2:~$
```

3. After updating the netplan, run sudo netplan apply to apply the configuration.

```
vcadmin@vcg2:~$ sudo netplan apply vcadmin@vcg2:~$
```

4. Activate the Gateway using IPv4 address of the Orchestrator. If the Orchestrator is provisioned with dual stack, you can activate the Gateway using either IPv4 or IPv6 address of the Orchestrator.
5. After activating, the Orchestrator will push both the IPv4 and IPv6 information to Edges.
6. Upgrade the Software version of Edge to version 5.0.0. Once the Edges are upgraded, the Orchestrator enables options to setup IPv6 related device settings.

Setup IPv6 Address on Gateways Upgraded from Previous Release

1. Upgrade the Gateways to release 5.0.0.
2. In Gateway shell, update the netplan configurations with IPv6 address. The following example shows a sample configuration:

```
vcadmin@vcg2:~$ cat /etc/netplan/50-cloud-init.yaml network: ethernets: eth0: addresses:
 [169.254.10.2/29, 'fd00:ff01:0:1::2/64'] routes: - {metric: 1, to: 0.0.0.0/0, via:
 169.254.10.1} - {metric: 1, to: '0::0/0', via: 'fd00:ff01:0:1::1'} eth1: addresses:
 [101.101.101.11/24] routes: - {metric: 2, to: 0.0.0.0/0, via: 101.101.101.10} eth2: addresses:
 [192.168.0.111/24] renderer: networkd version: 2 vcadmin@vcg2:~$ vcadmin@vcg2:~$ sudo netplan
 apply vcadmin@vcg2:~$
```

3. In the **Orchestrator** portal, navigate to the **Gateways** page and select the upgraded IPv4 Gateway.
4. On the **Overview** page of the selected Gateway, under the **Status** section enter the IPv6 address configured in the Gateway Shell.

   For additional information, see Configure Gateways.
5. The Orchestrator will push the IPv6 configurations to the Edges.
6. Upgrade the Software version of Edge to version 5.0.0. Once the Edges are upgraded, the Orchestrator enables options to setup IPv6 related device settings.
7. You must rebalance Gateways at the Edge level or for the entire Enterprise Customer, for the Edges to get the IPv6 information of Gateway from Orchestrator.

For additional information, refer to the following topics:

- Manage Gateway Pools

- Manage Gateways
- Manage Operator Profiles

14.2.3 Partner Gateways

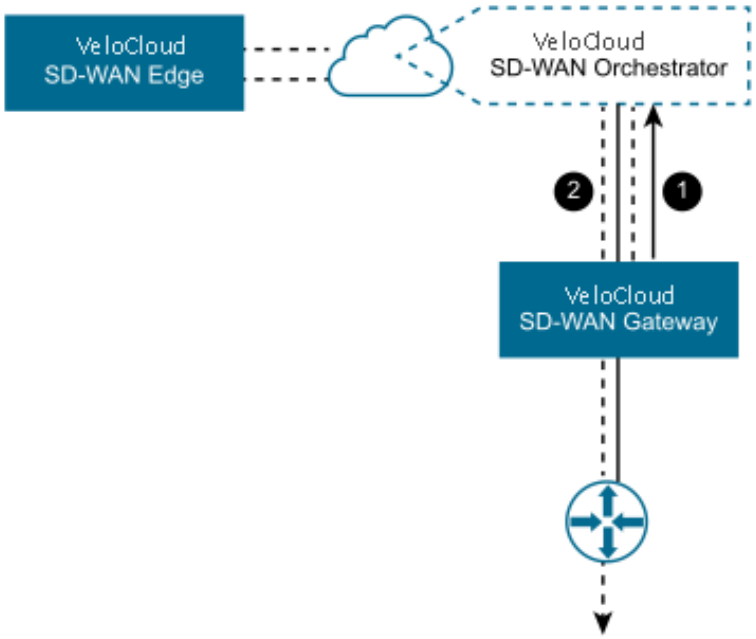
Partner SD-WAN Gateway can be configured with multiple subnets, each of which can be configured with a hand-off of NAT or VLAN. Each subnet can also be configured with a relative cost and whether the traffic should be encrypted or not.

The examples below illustrate two use cases for Partner SD-WAN Gateways configuration.

Partner Gateway Configuration Use Case 1

In the following illustration, a SD-WAN Gateway is connected over VLAN/VRF mode to a VRF that has no access to the public Internet. However, the Partner SD-WAN Gateway must be able to contact the VeloCloud Orchestrator in the public cloud, and there must be a path to reach the cloud. The SD-WAN Gateway can selectively NAT certain traffic (such as the IP address of the VeloCloud Orchestrator, or the subnets used to reach public DNS servers) even though it is operating in VLAN/VRF mode.

Figure 14-8: Partner Gateway Configuration Use Case 1



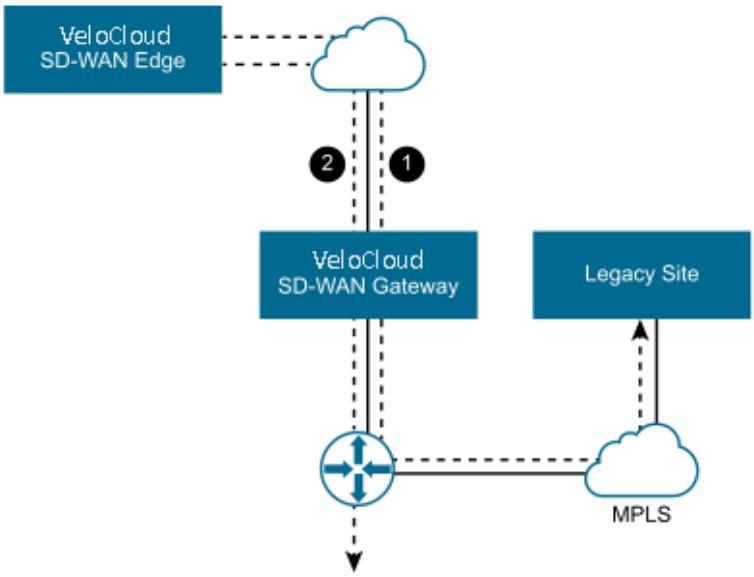
- #1- VeloCloud Orchestrator traffic is routed using IP addresses to NAT.
- #2- Corporate Traffic is routed through subnets to VLAN/VRF.

Partner Gateway Configuration Use Case 2

It is common for a Partner SD-WAN Gateway to tie into a corporate network, providing connectivity to legacy sites. This need can occur even when not all corporate sites have been converted to Arista network. For this use case, it is necessary to specify traffic by subnet on the Partner SD-WAN Gateway. Each subnet can also be configured to encrypt network traffic.

The following illustration shows an example where only the traffic to legacy sites is encrypted. If the SD-WAN Gateway is already configured with a `0.0.0.0/0` subnet to allow all traffic (which is a common configuration), all that would be required is to add the private subnet for your legacy sites and mark it as encrypted.

Figure 14-9: Partner Gateway Configuration Use Case 2



- #1- Subnet (e.g., `10.0.0.0/8`) defined for Legacy Sites and marked for encryption. Traffic is transmitted between SD-WAN Edge and SD-WAN Gateway over the IPsec tunnel.
- #2- Remaining traffic is sent unencrypted to the SD-WAN Edge, and then to its final destination.

Note:

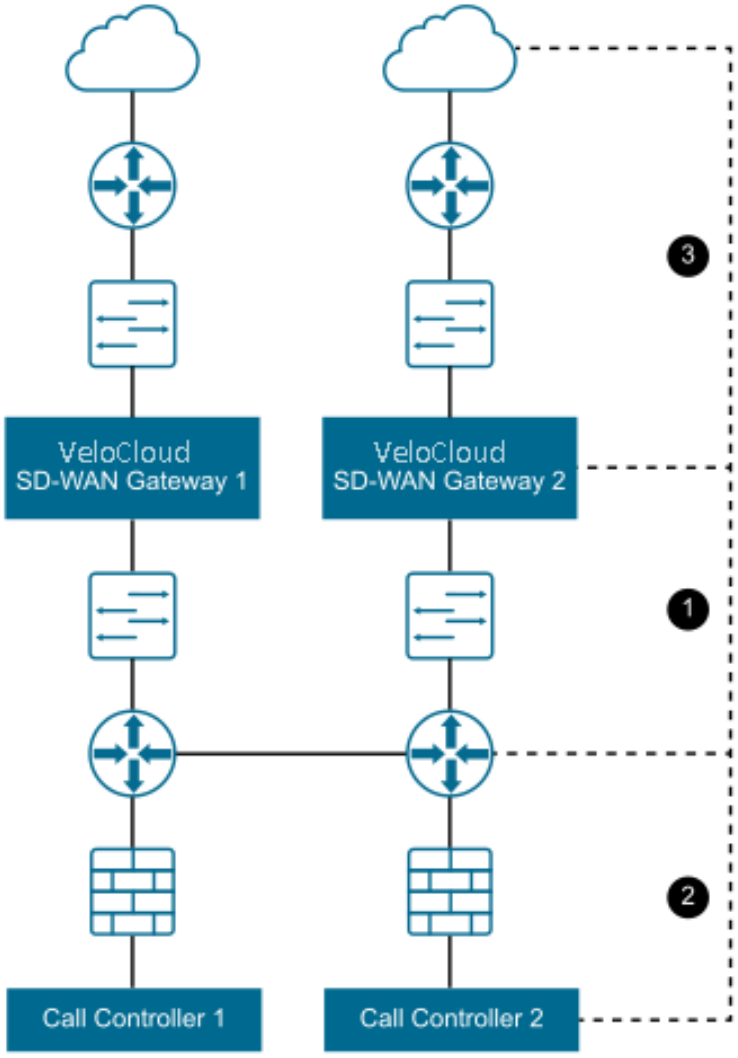
- For an IPsec tunnel via Partner SD-WAN Gateway, the VCMP tunnel failure causes the existing flows to timeout. The expected behavior for existing flows is to remain on the current path. Any new flow will begin to go (direct) causing the tunnel to remain down.
- Use application map flags *mustUseGateway* and *dropIfPartnerGatewayDown* to force or drop traffic through the SD-WAN Gateway until the path is restored. If these flags are not active, a flow flush is required once tunnel path is restored.

14.2.3.1 Partner Gateway Resiliency

The Partner SD-WAN Gateway provides resiliency by detecting failures and failing over to an alternate Partner SD-WAN Gateway. This includes the ability of a Partner SD-WAN Gateway to detect failure conditions and for the surrounding infrastructure to detect failures of the SD-WAN Gateway itself.

Consider the following SD-WAN Gateway topology:

Figure 14-10: SD-WAN Gateway topology



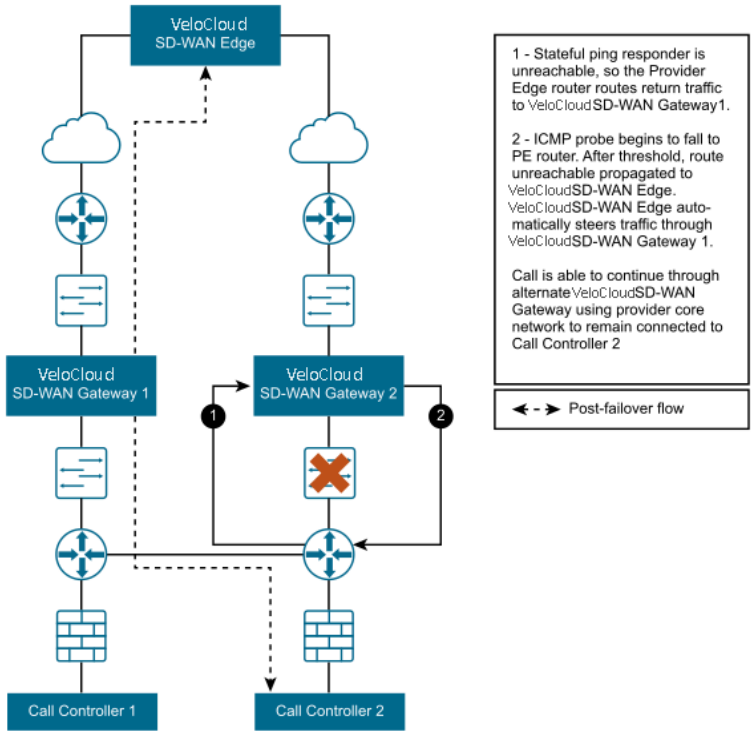
This figure shows three distinct failure zones:

Table 59: Failure Zones

Failure Zone	Component	Description
1	Provider Edge	The Provider Edge is one instance in which failure can be detected either from the Provider Edge router pinging the SD-WAN Gateway, or from the SD-WAN Gateway to the Provider Edge router.
2	Call Controller	The SD-WAN Gateway should be able to ping the Provider Edge router or Call Controller to verify connectivity.
3	WAN	The SD-WAN Gateway should have a stateful ping responder that responds only if the WAN zone is available.

The following figure shows a typical failure scenario that occurs between the SD-WAN Gateway and Provider Edge router and describes the activity that occurs.

Figure 14-11: Failure Scenario between SD-WAN Gateway and Edge



The Partner SD-WAN Gateway also supports configurable route costs to allow for more flexible failure scenarios. Finally, there is an additional hand-off type required where neither NAT nor VLAN tags are applied to the packets and they are simply passed through to the Provider Edge router.

14.2.3.2 ICMP Failover Probes

This section discusses ICMP failover probes.

In order to address a failure in zones #1 or #2 of the VeloCloud SD-WAN Gateway topology diagram, the SD-WAN Gateway supports the optional ability to send failover probes. These probes will ping a single destination IP address at the specified frequency. If the threshold for successive missed ping replies is exceeded, the SD-WAN Gateway will mark the SD-WAN Gateway's routes as unreachable. While the routes are marked as unreachable due to this probe failure state, probes continue to be sent. If the same threshold is exceeded for successive successful pings replies, the SD-WAN Gateway will mark the routes as reachable again.

Example Scenario

For example, consider the case in which a user has configured a frequency of two seconds and a threshold of three.

1. VeloCloud SD-WAN Edges connect to the primary SD-WAN Gateway. The primary SD-WAN Gateway marks routes as reachable.

2. The Primary SD-WAN Gateway fails to receive a reply for three successive probes (~6 seconds).
3. The Primary SD-WAN Gateway marks routes as unreachable and communicates this to all connected SD-WAN Edges.
4. SD-WAN Edges begin routing SD-WAN Gateway traffic via the alternate SD-WAN Gateway.
5. Connectivity is restored and the primary SD-WAN Gateway receives three successive replies from probes.
6. The Primary SD-WAN Gateway marks routes as reachable and communicates this to all connected SD-WAN Edges.
7. SD-WAN Edges route traffic back through the primary SD-WAN Gateway.

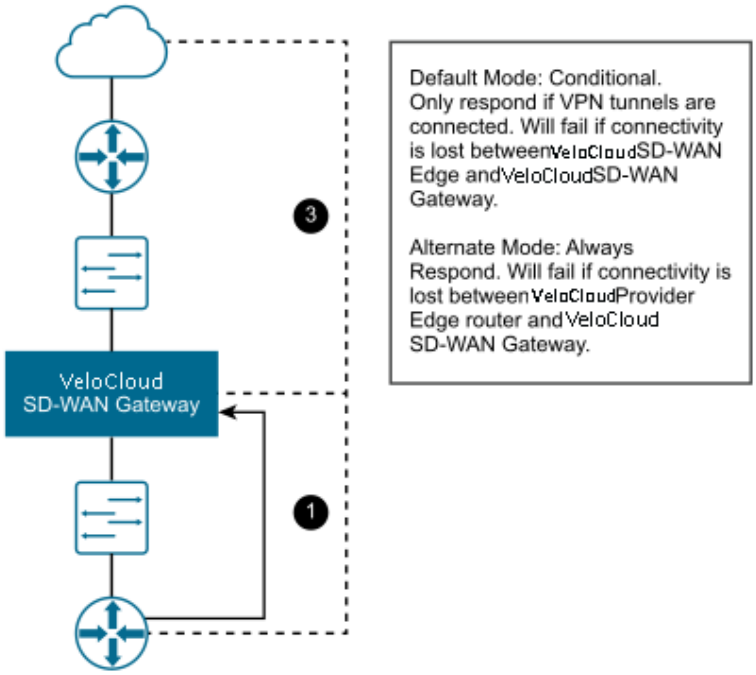
This could be used in failure scenario #1 to ping an IP address on the Provider Edge router itself. This could be used in failure scenario #2 to ping the actual Call Controller.

Stateful Ping Responder

To address a failure in zone #2 or #3 of the Partner SD-WAN Gateway topology diagram, the SD-WAN Gateway supports an optional stateful ping responder. This allows the configuration of a virtual IP address (which must be different from the interface IP address) within the SD-WAN Gateway that will, based on configuration, either respond to pings always (SD-WAN Gateway service is running) or conditionally based on WAN connectivity (the SD-WAN Gateway has VPN tunnels connected).

This can be used in failure scenario #1 by having the Provider Edge router ping the ping responder, as the SD-WAN Gateway becoming unreachable would cause the IP SLA on the Provider Edge router to fail. This could also be used in failure scenario #3 by having the SD-WAN Gateway only respond if VPN tunnels are connected- this is similar to the behavior with BGP (no clients connected means no client routes).

Figure 14-12: Stateful Ping Responder Scenario



The Partner SD-WAN Gateway will respond back to the Provider Edge (PE) router ICMP request based on the IP SLA configured in the PE router. The Stateful Ping Responder PE router should be configured as shown below with proper VLAN tag information.

```
!IP-SLA configuration to send ICMP request to gateway virtual IP ip sla 1 icmp-echo 192.168.10.10
 source-ip 192.168.10.1 vrf CUSTOMER1 threshold 1000 timeout 1000 frequency 2 ip sla schedule
 1 life forever start-time now !tracking the IP SLA for its reachability track 1 ip sla 1
 reachability !all the routes will reachable only when SLA probe succeeds ip route vrf CUSTOMER1
 0.0.0.0 0.0.0.0 192.168.11.101 track 1 ip route vrf CUSTOMER2 0.0.0.0 0.0.0.0 192.168.12.101
 track 1 ip route vrf CUSTOMER1 10.0.0.0 255.0.0.0 192.168.10.10 track 1 ip route vrf CUSTOMER2
 10.0.0.0 255.0.0.0 192.168.10.10 track 1 ip route vrf CUSTOMER1 192.168.100.0 255.255.255.0
 192.168.10.10 track 1
```

Caveats When Using NAT Hand-off Mode

When using NAT hand-off mode, consider the following caveats:

- For VLAN hand-off mode, the Partner SD-WAN Gateway can listen on any IP if it is reachable to the PE router (including its interface IP). For NAT hand-off mode, the Partner SD-WAN Gateway will not respond if the ICMP request comes to its own interface (WAN) IP address.
- Reverse flow is not supported in the NAT hand-off mode.

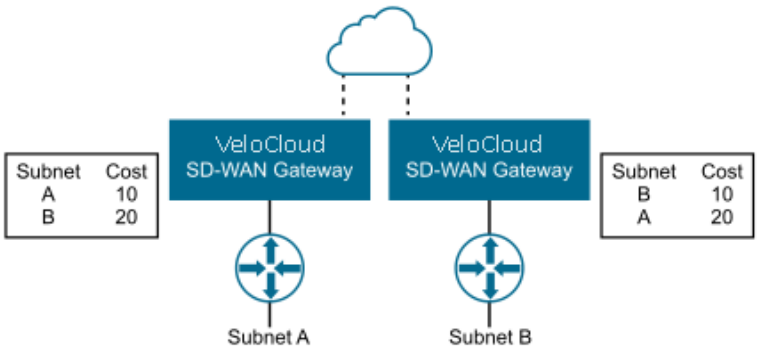
14.2.3.3 Active/Backup Subnets

This section discusses how to configure active and backup subnets for a Partner SD-WAN Gateway.

Subnets on a Partner SD-WAN Gateway

Subnets configured on a Partner SD-WAN Gateway are input as subnets and optional descriptions. A Cost field is included to allow for weighting between routes. Lower-cost routes are preferred over higher-cost routes. The following figure shows cost settings per subnet.

Figure 14-13: Cost Settings per Subnet.



14.3 Manage Gateways

VeloCloud Gateways are a distributed network of gateways, deployed around the world or on-premises at service providers, provide scalability, redundancy and on-demand flexibility. The Gateways optimize data paths to all applications, branches, and data centers along with the ability to deliver network services to and from the cloud.

By default, the Gateways named as ***gateway-1*** and ***gateway-2*** are available when you install Orchestrator. If required, you can create additional Gateways.

As an Operator Super user and Operator Admin user, you can create, manage, and delete Gateways created by both Operator and Partner users.

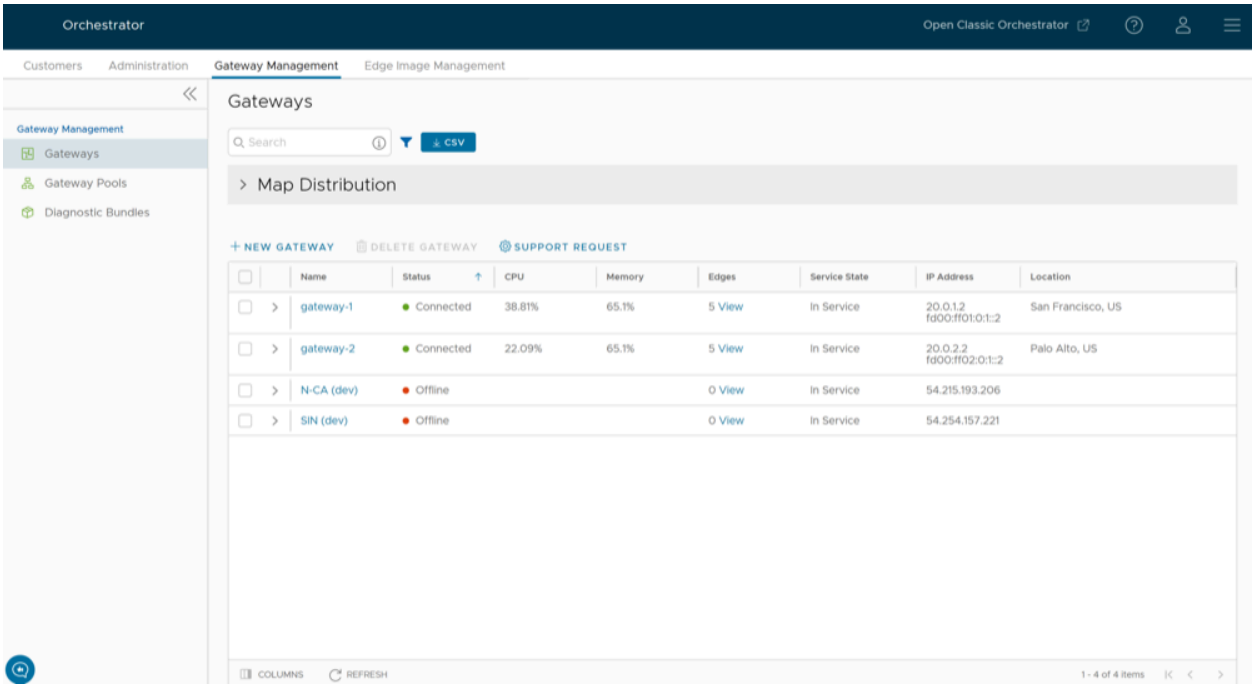
> **Note:** The Operator IT support user and Operator Business Specialist user can only view the configured Gateways.

To manage Gateways, perform the following steps:

1. Log into the **Orchestrator** as an Operator Super user or Admin user.
2. In the Orchestrator UI, select the **Gateway Management** tab and go to **Gateways** in the left navigation pane.

   The **Gateways** page appears.

Figure 14-14: Manage Gateways



To search a specific Gateway, enter a relevant search text in the **Search** box. For advanced search, select the filter icon next to the **Search** box to filter the results by specific criteria.

The **Map Distribution** section is used for displaying the Gateways on a map. You can select the **+** and **-** buttons to zoom in and zoom out the map, respectively.

The **Gateways** table displays the existing Gateways with the following details.

Table 60: Gateways Field Descriptions

Field	Description
Name	Name of the Gateway
Status	Reflects the success or failure of periodic heartbeats sent by mgd to the Orchestrator and does not indicate the status of the data and control plane. The following are the possible statuses: • **Connected** – Gateway is heart beating successfully to the Orchestrator. • **Degraded** – Orchestrator has not heard from the Gateway for at least one minute. • **Offline** – Orchestrator has not heard from the Gateway for at least two minutes.
CPU	Average CPU utilization of all the cores in the system at the time of the last heartbeat.
Memory	Percentage usage of the physical memory by all processes in the system as reported by `psutil.phymem_usage` at the time of the last heartbeat. This is similar to estimating the percentage of memory usage using the **`free`** command.
Edges	Number of Edges connected to the Gateway at the time of the last heartbeat. **Note:** Select **View** next to the number of Edges, to view all the Edges assigned to the Gateway as well as their online/offline status on the Orchestrator. This option does not display the Edges that are actually connected to the Gateway.
Service State	The user-configured service state of the Gateway and whether it is eligible to be assigned to new Edges.
IP Address	The public IP address that public WAN links of an Edge use to connect to the Gateway. This IP address is used to uniquely identify the Gateway. If the Gateway is enabled to accommodate both IPv4 and IPv6 addresses, this column displays both the IP addresses.
Location	Location of the Gateway from GeoIP (by default) or as manually entered by the user. This is used for geographic assignment of the Gateway to Edges and should be verified.

3. On the **Gateways** page, you can perform the following activities:
   - **New Gateway** – Creates a new Gateway. See Create New Gateway.
   - **Delete Gateway** – Deletes the selected Gateway. You cannot delete a Gateway that is already being used by a Partner or an Enterprise Customer.
   - **Stage to Bastion**- Stages a Gateway to the Bastion Orchestrator.
   - **Unstage from Bastion**- Removes a Gateway from the Production Orchestrator.

     Note: Stage to Bastion and **Unstage from Bastion** options are available only when the Bastion Orchestrator feature is enabled using the `session.options.enableBastionOrchestrator` system property.

     For additional information, see *Bastion Orchestrator Configuration Guide*.

   - **Support Request** – Redirects to a Knowledge Base article that has instructions on how to file a support request.

14.3.1 Create New Gateway

In addition to the default Gateways, you can create Gateways and associate them with Enterprise Customers.

To create a Gateway, perform the following steps.

1. In the **Orchestrator** UI, select the **Gateway Management** tab and go to **Gateways** in the left navigation pane. The **Gateways** page appears.
2. Select **New Gateway**. The **New Gateway** dialog appears.
3. In the **New Gateway** dialog, configure the following details:

Figure 14-15: Create New Gateway

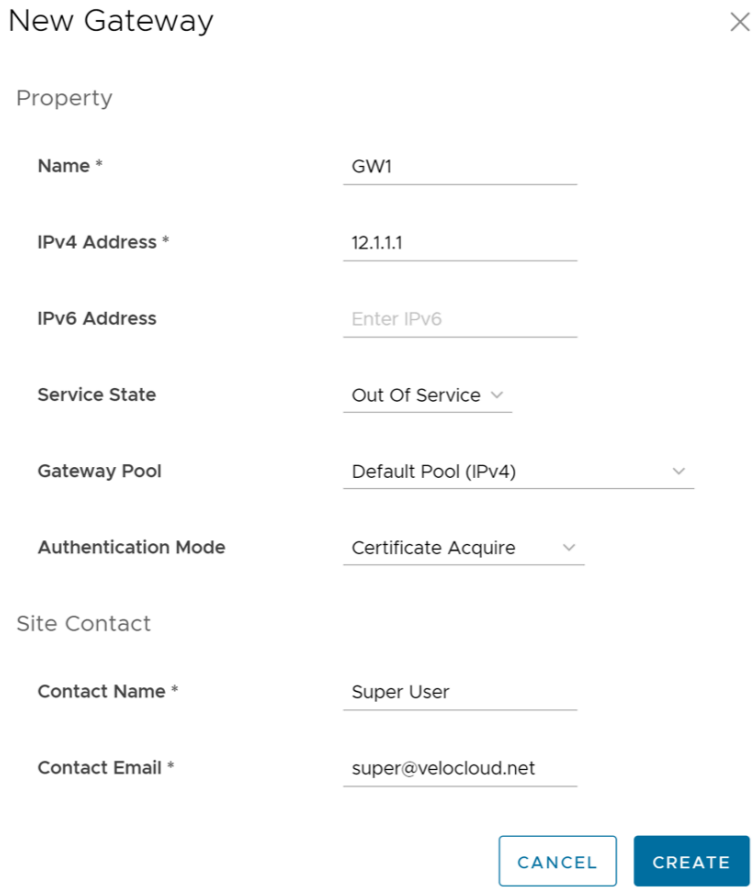


Table 61: New Gateway Field Descriptions

Field	Description
Name	Enter a name for the new Gateway.
IPv4 Address	Enter the IPv4 address of the Gateway.
IPv6 Address	Enter the IPv6 address of the Gateway.
Service State	Select the service state of the Gateway from the drop-down list. The following options are available: • **In Service**- The Gateway is connected and available. • **Out of Service**- The Gateway is not connected. • **Quiesced**- The Gateway service is quiesced or paused. Select this state for backup or maintenance purposes.
Gateway Pool	Select the Gateway Pool from the drop-down list, to which the Gateway would be assigned.
Authentication Mode	Select the authentication mode of the Gateway from the following available options: • **Certificate Not Required**- Gateway uses a pre-shared key mode of authentication. • **Certificate Acquire**- This option is selected by default and instructs the Gateway to acquire a certificate from the certificate authority of the VeloCloud Orchestrator, by generating a key pair and sending a certificate signing request to the Orchestrator. Once acquired, the Gateway uses the certificate for authentication to the VeloCloud Orchestrator and for establishment of VCMP tunnels. **Note:** After acquiring the certificate, the option can be updated to **Certificate Required**. **Note:** With the Bastion Orchestrator feature enabled, the Gateways that are to be staged to Public Orchestrator should have the Authentication mode set to either Certificate Acquire or Certificate Required. • **Certificate Required**- Gateway uses the PKI certificate. Operators can change the certificate renewal time window for Gateways using the system properties.
Contact Name	Enter the name of the Site Contact.
Contact Email	Enter the Email ID of the Site Contact.

Note:

- Once you have created a Gateway, you cannot modify the IP addresses.
- Release 4.3.x and 4.4.x support Greenfield deployment of Gateways for IPv6. If you have upgraded a Gateway from a previous version earlier than 4.3.0, you cannot configure the upgraded Gateway with the IPv6 address.
- Release 4.5.0 supports both the Greenfield and Brownfield deployment of Gateways for IPv6. If you have upgraded a Gateway from a previous version earlier than 4.5.0, you can dynamically configure IPv6 address for the Gateway.
- IPv4/IPv6 dual-stack mode is not supported for Bastion Orchestrator configuration.

Once you create a new Gateway, you are redirected to the **Configure Gateways** page, where you can configure additional settings for the newly created Gateway.

To configure additional settings for the Gateway, see Configure Gateways.

14.3.2 Configure Gateways

When you create a new Gateway, you are automatically redirected to the Configure Gateways page, where you can configure the properties and other additional settings for the Gateway.

To configure an existing Gateway:

1. In the **Operator** portal of the Orchestrator, select the **Gateway Management** tab and go to **Gateways** in the left navigation pane. The **Gateways** page displays the list of available Gateways.
2. Select the link to a Gateway that needs to be configured for additional settings. The details of the selected Gateway are displayed in the **Configure** > **Gateways** page.
3. In the **Overview** tab, you can configure the following details:

Figure 14-16: Configure Gateways Overview Screen

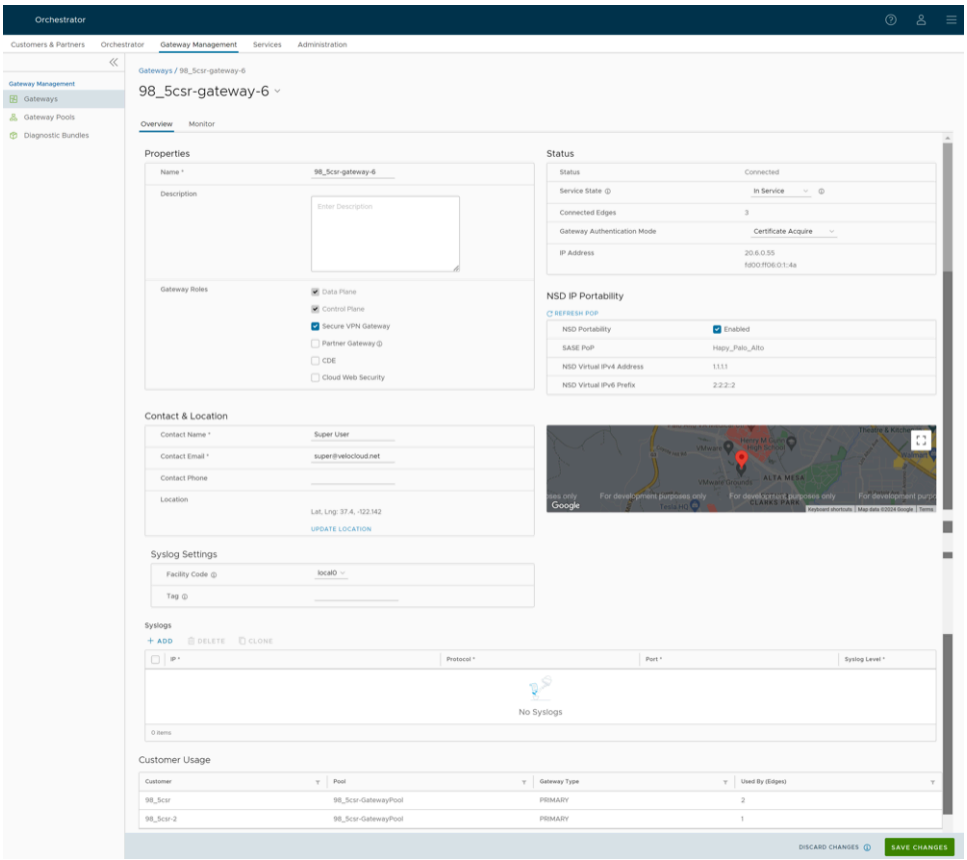


Table 62: Configure Gateways Field Descriptions

Option	Description
Properties	Displays the existing Name and Description of the selected Gateway. If required, you can modify the information. You can also configure the Gateway Roles, as required: • **Data Plane**- Enables the Gateway to operate in the Data plane and is selected by default. • **Control Plane**- Enables the Gateway to operate in the Control plane and is selected by default. • **Secure VPN Gateway**- Select the option to use the Gateway to establish an IPsec tunnel to a Non SD-WAN Destination. • **Partner Gateway**- Select the check box to allow the Gateway to be assigned as a Partner Gateway for Edges. If you select this option, configure the additional settings in the **Partner Gateway (Advanced Handoff) Details** section. • **CDE**- Enables the Gateway to operate in Cardholder Data Environment (CDE) mode. Select this option to assign the Gateway for customers who require to transmit PCI traffic. • **Cloud-to-Cloud Interconnect**- Select the option to enable cloud-to-cloud-interconnect (CCI) tunnels on the VeloCloud Gateways.  **Note:** This Gateway Role option is shown if the `session.options.enableZscalerCci` system property is set to True.

Option	Description

Status	You can configure the following details:
	• **Status**- Displays the status of the Gateway which reflects the success or failure of periodic heartbeats sent to the Orchestrator. The following are the available statuses:
	  • **Connected**- Gateway is heart beating successfully to the Orchestrator.
	  • **Degraded**- Orchestrator has not heard from the Gateway for at least one minute.
	  • **Offline**- Orchestrator has not heard from the Gateway for at least two minutes.
	• **Service State**- Select the Service State of the Gateway from the following available options:
	  • **In Service**- The Gateway is connected, and it is available for Primary or secondary tunnel assignments. When the Service state of the Gateway is switched from the 'Out Of Service' to 'In Service' state, the Primary or Secondary assignments, Super Gateways, Edge-to-Edge routes are recalculated for each Enterprise using the Gateway.
	  • **Pending Service**- The Gateway is connected, and it is pending for tunnel assignments.
	  • **Out of Service**- The Gateway is not connected or not available for any assignments. All the existing assignments are removed.
	  • **Quiesced**- The Gateway service is quiesced or paused. No new tunnels or NSD sites can be added to the Gateway. However, the existing assignments would still remain in the Gateway. Select this state for backup or maintenance purposes.
	  Note: The **Quiesced** and **Out of Service** states are only applicable for Cloud Gateway deployment.
	  When the Service state is **Quiesced**, Orchestrator provides a self-service migration functionality that allows you to migrate from your existing Gateway to a new Gateway without your Operator's support.
	  For additional information, see Quiesce Gateways.
	  Note: Self-service migration is not supported on Partner Gateways.

Connected Edges	Displays the number of Edges connected to the Gateway. This option is displayed only when the Gateway is activated.

Option	Description

Gateway Authentication Mode	Select the authentication mode of the Gateway from the drop-down menu:
	• **Certificate Deactivated**- Gateway uses a pre-shared key mode of authentication. If you change the mode from **Certificate Deactivated** to:
	  • **Certificate Acquire**: Tunnels based on PSK mode are not impacted. Only tunnels with Gateways are impacted. These tunnels are reconnected based on certificate. All tunnels configured with PSK mode continue to stay active and no disruption is seen in the traffic.
	  • **Certificate Required**: The Orchestrator does not directly allow this change. You must first change the mode to **Certificate Acquire**, and then change it to **Certificate Required**. This helps avoiding heartbeat loss to the Orchestrator, when Edge is assigned a certificate.
	• **Certificate Acquire**- This option is selected by default and instructs the Gateway to acquire a certificate from the certificate authority of the Orchestrator, by generating a key pair and sending a certificate signing request to the Orchestrator. Once acquired, the Gateway uses the certificate for authentication to the Orchestrator and for establishment of VCMP tunnels. If you change the mode from **Certificate Acquire** to:
	  • **Certificate Deactivated**: PSK based tunnels are not impacted. Tunnels with Gateways and all certificate-based tunnels are disconnected and reconnected based on PSK.
	  • **Certificate Required**: All peers configured with PSK mode are disconnected and cannot connect to the Hub. All current RSA tunnels stay active.
	When the Hub is in **Certificate Acquire** mode, the tunnels based on the certificate are reestablished with new certificate. PSK based tunnels are not impacted.
	Note: After acquiring the certificate, the option can be updated to **Certificate Required**.
	• **Certificate Required**- Gateway uses the PKI certificate. Operators can change the certificate renewal time window for Gateways using the system property `gateway.certificate.renewal.window`. If you change the mode from Certificate Required to:
	  • **Certificate Deactivated**: All peers with RSA tunnel are disconnected and cannot reconnect. All peers configured with PSK mode continue to stay active and no disruption is seen in the traffic.
	  • **Certificate Acquire**: All peers configured in PSK mode reconnect with Hub/ Gateway. All current RSA tunnels stay active.
	Note:
	  • When Gateway certificate is revoked, the Gateway does not receive certificate revocation list (CRL) as it loses TLS connection immediately. Anyway, the Gateway is still operable.
	  • The current QuickSec design checks CRL time validity. The CRL time validity must match with current time of Edges for the CRL to have impact on new established connection. To implement this, ensure to update Orchestrator time properly to match with date and time of Edges.

Option	Description
IP Address	Displays the public IP address that public WAN links of an Edge use to connect to the Gateway. This IP address is used to uniquely identify the Gateway. If you have configured the Gateway with both IPv4 and IPv6 addresses, this field displays both the IP addresses. If you have created IPv4 only Gateway or if there is an existing IPv4 Gateway upgraded from previous versions, you can enter the IPv6 address to support the dual stack. After you save the changes, the IPv6 address is not sent to the Edges immediately. You can trigger the rebalance operation to push the IPv6 address to the customer and the associated Edges manually or the IPv6 address is sent to the Edges during the next Control Plane update. **Note:** Adding IPv6 address is a one-time activity and once you save the changes, you cannot modify the IP addresses. **CAUTION:** An incorrectly configured IPv6 address, when pushed to Edges, might lead to failure of the IPv6 tunneling to the IPv6 Gateway. In such cases, you need to deactivate the Gateway and create a new one to activate both the IPv4 and IPv6 addresses.
Contact & Location	Displays the existing contact details. If required, you can modify the information.
Syslog Settings	Beginning with the 4.5 release, Gateways can export NAT information via a remote syslog server or via telegraf to the desired destination.
Customer Usage	Displays the usage details of different types of Gateways assigned to the customers.
Pool Membership	Displays the details of the Gateway pools to which the current Gateway is assigned.
Partner Gateway (Advanced Handoff) Details	This section is available only if you select the **Partner Gateway** check box. You can configure advanced handoff settings for the Partner Gateway. For additional information, see the *Partner Gateway (Advanced Handoff) Details* section below.

Partner Gateway (Advanced Handoff) Details

You can configure the following advanced handoff settings for the Partner Gateway:

CAUTION: It is recommended not to push IPv6 configurations to Partner Gateways that are running with Software version earlier than 5.0.

Table 63: Partner Gateway Handoff Field Descriptions

Option	Description
Static Routes | Subnets – Specify the subnets or routes that the Gateway should advertise to the Edge. This is global per Gateway and applies to ALL customers. With BGP, this section is used only if there is a shared subnet that all customers need to access and if NAT handoff is required. Remove the unused subnets from the Static Route list if you do not have any subnets that you need to advertise to the Edge and have the handoff of type NAT. You can select the **IPv4** or **IPv6** tab to configure the corresponding address type for the Subnets.	
Subnets	Enter the IPv4 or IPv6 address of the Static Route Subnet that the Gateway should advertise to the Edge.
Cost	Enter the cost to apply weightage on the routes. The range is from 0 to 255.
Encrypt	Select the check box to encrypt the traffic between Edge and Gateway.
Hand off	Select the handoff type as VLAN or NAT.
Description	Optionally, enter a descriptive text for the static route.
ICMP Probes and Ping Responders Settings **ICMP Failover Probe** – The Gateway uses ICMP probe to check for the reachability of a particular IP address and notifies the Edge to failover to the secondary Gateway if the IP address is not reachable. This option supports only IPv4 addresses.	
VLAN Tagging	Select the VLAN tag from the drop-down list to apply to the ICMP probe packets. The following are the available options: • **None** – Untagged • **802.1q** – Single VLAN tag • **802.1ad** / **QinQ(0x8100)** / **QinQ(0x9100)** – Dual VLAN tag
Destination IP address	Enter the IP address to be pinged.
Frequency	Enter the time interval, in seconds, to send the ping request. The range is from 1 to 60 seconds.
Threshold	Enter the number of times the ping replies can be missed to mark the routes as unreachable. The range is from 1 to 10.
ICMP Responder- Allows the Gateway to respond to the ICMP probe from the next hop router when the tunnels are up. This option supports only IPv4 addresses.	
IP address	Enter the virtual IP address that will respond to the ping requests.
Mode	Select one of the following modes from the drop-down list: • **Conditional** – Gateway responds to the ICMP request only when the service is up and when at least one tunnel is up. • **Always** – Gateway always responds to the ICMP request from the peer.

Note: The ICMP probe parameters are optional and recommended only if you want to use ICMP to check the health of the Gateway. With BGP support on the Partner Gateway, using ICMP probe for failover and route convergence is no longer required. For additional information on configuring BGP support and handoff settings for a Partner Gateway, see Configure Partner Handoff.

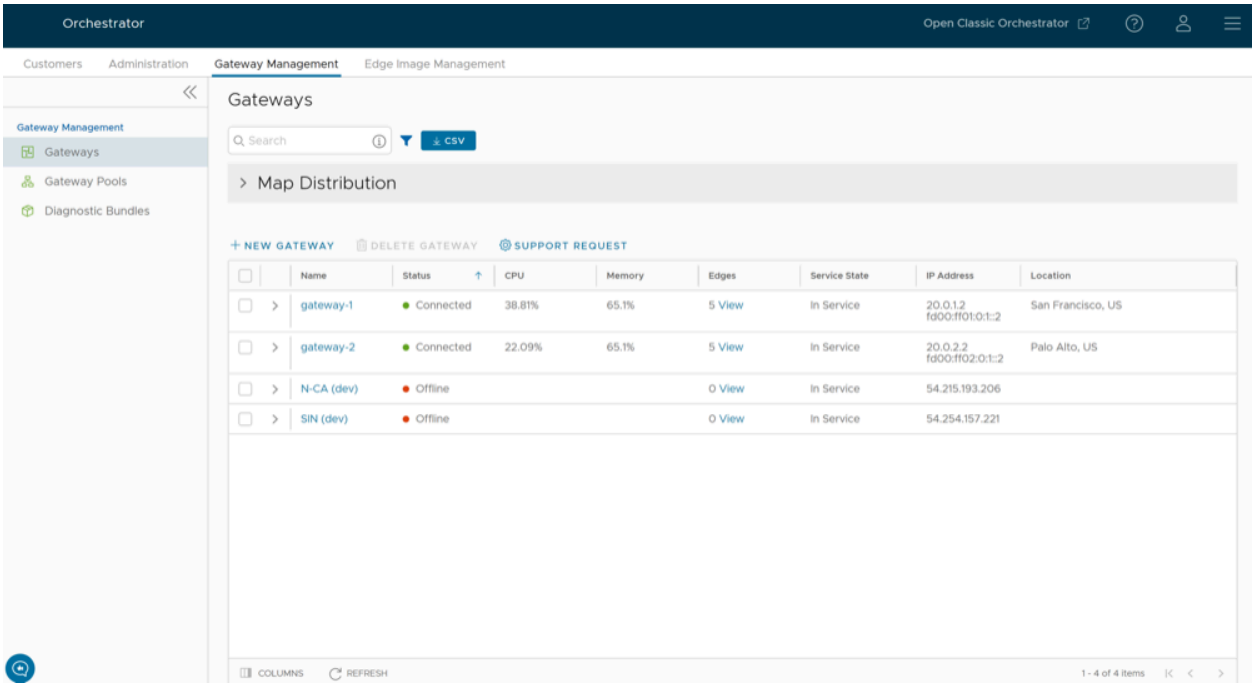
14.3.3 Monitor Gateways

You can monitor the status and network usage data of Gateways available in the **Operator** portal.

To monitor the Gateways:

1. In the **Operator** portal, select **Gateway Management** > **Gateways**.
2. The **Gateways** page displays the list of available Gateways.

Figure 14-17: Gateways Screen



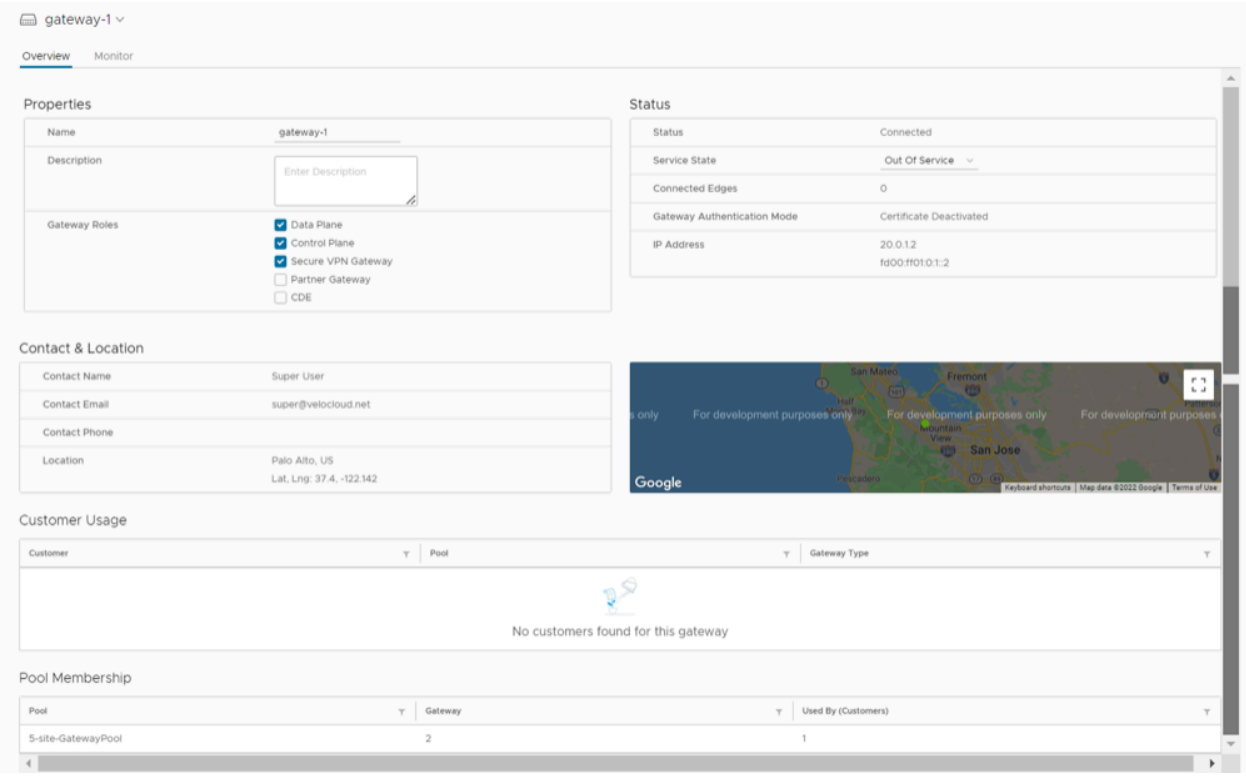
3. Select **Map Distribution** to expand and view the locations of the Gateways in the Map. By default, this view is collapsed.
4. You can also select the arrows prior to each Gateways name to view additional details.

   The page displays the following details:

   - **Name** – Name of the Gateways.
   - **Status** – Current status of the Gateways. The status may be one of the following: Connected, Degraded, Never Activated, Not in Use, Offline, Out of Service, or Quiesced.
   - **CPU** – Percentage of CPU utilization by the Gateways.
   - **Memory** – Percentage of memory utilization by the Gateways.
   - **Edges** – Number of Edges connected to the Gateways.
   - **Service State** – Service state of the Gateways. The state may be one of the following: Historical, In Service, Out of Service, Pending Service, or Quiesced.
   - **IP Address** – The IP Address of the Gateways.
   - **Location** – Location of the Gateways.
5. In the **Search** field, enter a term to search for specific details. Select the **Filter** icon to filter the view by a specific criterion.
6. Select the **CSV** option to download a report of the Gateways in the CSV format.

7. Select the link to a Gateway to view the details of the selected Gateway.

Figure 14-18: View Gateway Overview

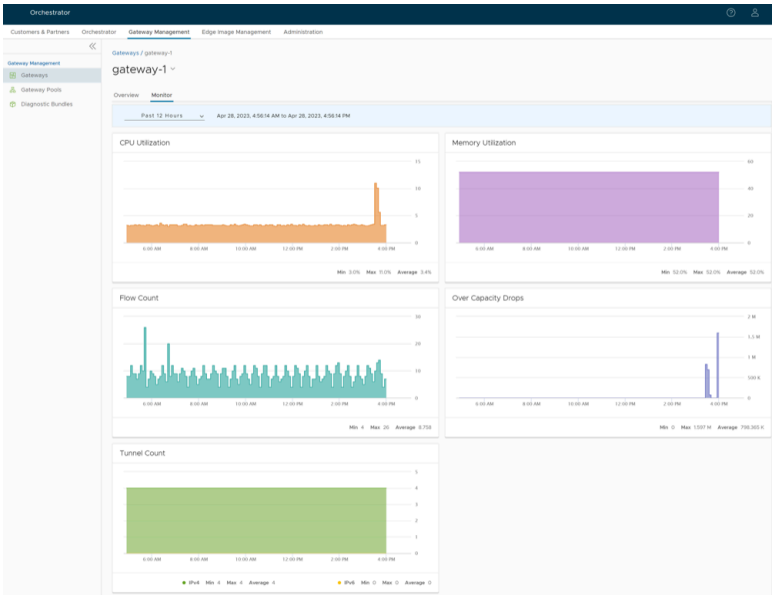


The **Overview** tab displays the properties, status, location, customer usage, and Gateway Pool of the selected Gateway.

Note: In the **Overview** tab, you can modify the **Name** and **Description** of the selected Gateway, and choose a different **Service State**. To configure the other options, navigate to the **Gateways** page in the Operator portal.

8. Select the **Monitor** tab to view the usage details of the selected SD-WAN Gateways.

Figure 14-19: Monitor Network Usage of Gateways



At the top of the page, you can choose a specific time period to view the details of the Gateway for the selected duration.

The page displays graphical representation of usage details of the following parameters for the period of selected time duration, along with the minimum, maximum, and average values.

- **CPU Percentage** – Percentage of usage of CPU.
- **Memory Usage** – Percentage of usage of memory.
- **Flow Counts** – Count of traffic flow.
- **Over Capacity Drops** – Total number of packets dropped due to over capacity since the last sync interval. Occasional drops are expected, usually caused by a large burst of traffic. However, a consistent increase in drops usually indicates a Gateway capacity issue.
- **Tunnel Count** – Count of tunnel sessions for both the IPv4 and IPv6 addresses.

Hover the mouse on the graphs to view additional details.

14.4 SD-WAN Gateway Migration

VeloCloud Orchestrator provides a self-service migration functionality that allows you to migrate from your existing Gateway to a new Gateway without your Operator's support.

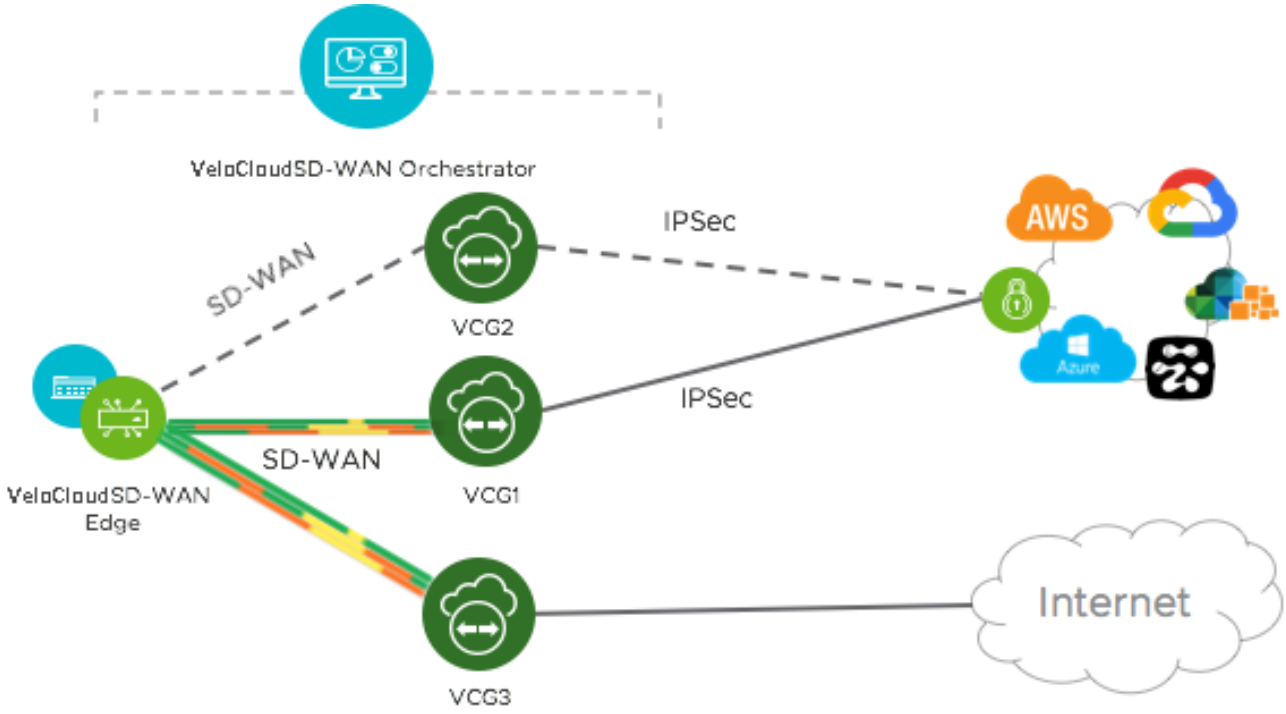
Gateway migration may be required in the following scenarios:

- Achieve operational efficiency.
- Decommission old Gateways.

Gateways are configured with specific roles. For example, a Gateway with data plane role is used to forward data plane traffic from source to destination. Similarly, a Gateway with Control Plane role is called a Super Gateway and is assigned to an Enterprise. Edges within the Enterprise are connected to the Super Gateway. Also, there is a Gateway with Secure VPN role that is used to establish an IPsec tunnel to a Non SD-WAN destination (NSD). The migration steps may vary based on the role configured for the Gateway. For additional information about the Gateway roles, see the *Configure Gateways* section in the *Arista VeloCloud SD-WAN Operator Guide*.

The following figure illustrates the migration process of the Secure VPN Gateway:

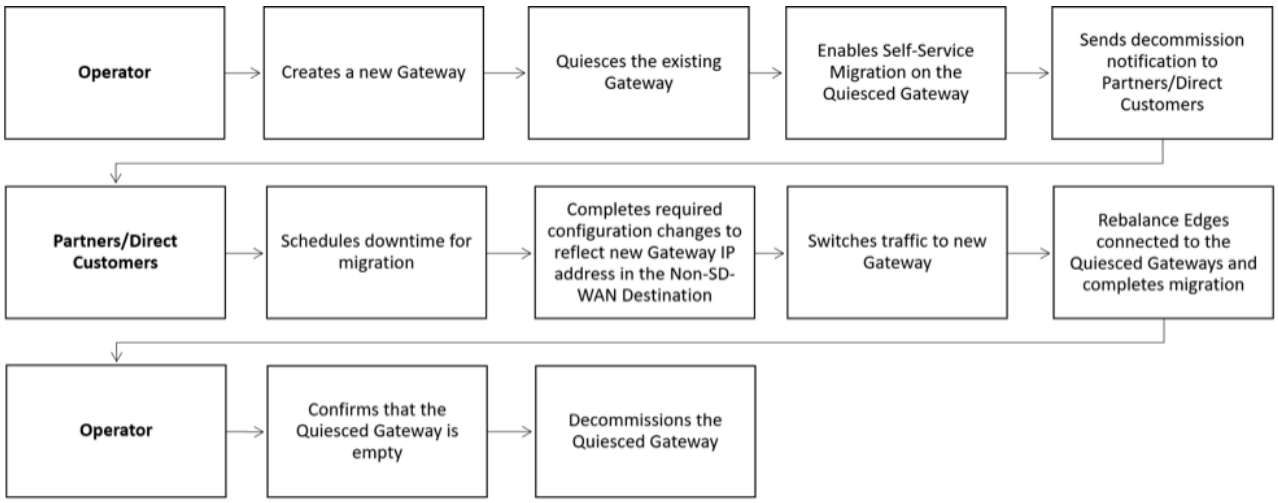
Figure 14-20: Secure VPN Gateway Migration Process



In this example, an SD-WAN Edge is connected to an NSD through a Secure VPN Gateway, ***VCG1***. The ***VCG1*** Gateway is planned to be decommissioned. Before decommissioning, a new Gateway, ***VCG2*** is created. It is assigned with the same role and attached to the same Gateway pool as ***VCG1*** so that ***VCG2*** can be considered as a replacement to ***VCG1***. The service state of ***VCG1*** is changed to Quiesced. No new tunnels or NSDs can be added to ***VCG1***. However, the existing assignments remain in ***VCG1***. Configuration changes with respect to the IP address of ***VCG2*** are made in the NSD, an IPsec tunnel is established between ***VCG2*** and NSD, and the traffic is switched from ***VCG1*** to ***VCG2***. After confirming that ***VCG1*** is empty, it is decommissioned.

Following is the high-level workflow of Secure VPN Gateway migration based on the User roles:

Figure 14-21: Secure VPN Gateway Migration Workflow



14.4.1 Limitations of VeloCloud Gateway Migration

Keep in mind the following limitations when you migrate your Gateways:

- Self-service migration is not supported on Partner Gateways.
- There will be a minimum service disruption based on the time taken to switch Non SD-WAN Destinations (NSDs) from the quiesced Gateway to the new Gateway and to rebalance the Edges connected to the quiesced Gateway.
- If the NSD is configured with redundant Gateways and one of the Gateways is quiesced, the redundant Gateway cannot be the replacement Gateway for the quiesced Gateway.
- During self-service migration of a quiesced Gateway, the replacement Gateway must have the same Gateway Authentication mode as the quiesced Gateway.
- For a customer deploying a NSD via Gateway where BGP is configured on the NSD, if the customer migrates the NSD to a different Gateway using the Self-Service Gateway Migration feature on the Orchestrator, the BGP configurations are not migrated and all BGP sessions are dropped post-migration.

  In this scenario, the existing Gateway assigned to the NSD is in a quiesced state and requires migration to another Gateway. The customer then navigates to **Service Settings** > **Gateway Migration** on the Orchestrator and initiates the **Gateway Migration** process to move their NSD to another Gateway. Post-migration, the BGP Local ASN & Router ID information is not populated on the new Gateway and results in NSD BGP sessions not coming up with all routes being lost and traffic using those routes is disrupted until the user manually recreates all BGP settings.

  This is a Day 1 issue and while the **Gateway Migration** feature accounts for many critical NSD settings, the NSD's BGP settings that are not accounted for, and their loss post-migration is an expected behavior.

Workaround: The migration of a Gateway should be done in a maintenance window only. Prior to the migration, the user should document all BGP settings and be prepared to manually reconfigure these settings post-migration to minimize impact to customer users.

14.4.2 Quiesce Gateways

When you choose to decommission a Gateway, you must change the Gateway to Quiesced state so that no new tunnels or NSDs can be configured on the Gateway. Ensure that you have Operator Super User role to quiesce Gateways.

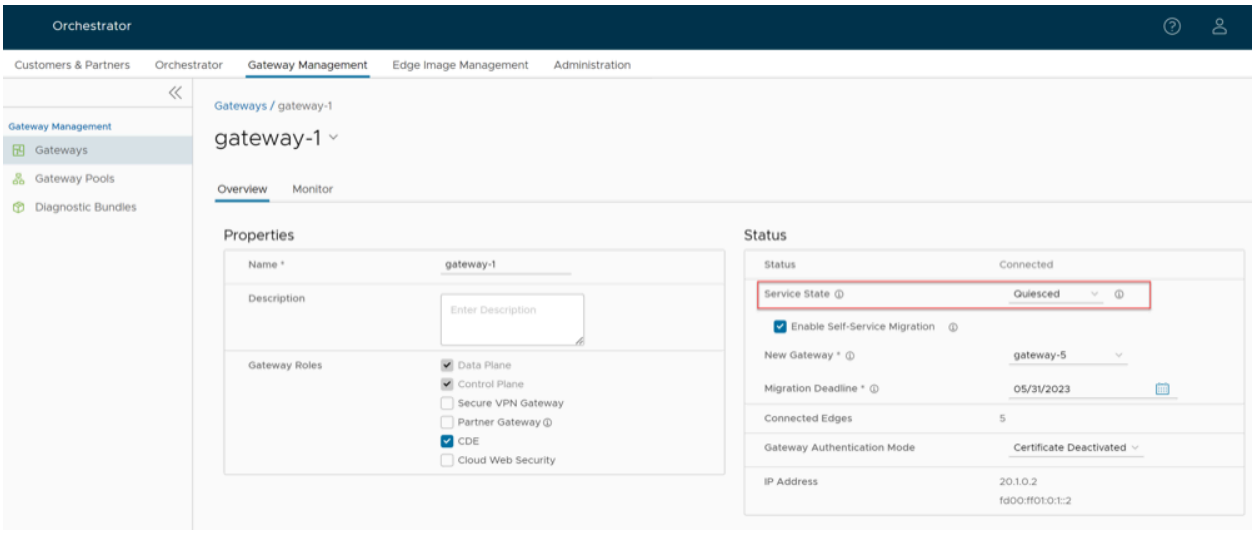
Before you quiesce the existing Gateway, ensure that you create a new Gateway as a replacement. Assign the new Gateway with the same role and attach it to the same Gateway pool as the existing Gateway. For instructions, see the *Configure Gateways* section in the *Arista VeloCloud SD-WAN Operator Guide*. Also, review the Limitations of VeloCloud Gateway Migration before you proceed with quiescing the Gateway.

Note: Arista recommends you to use the self-service migration feature for NSD Gateway migration.

To quiesce the Gateway and enable self-service migration:

1. In the **Operator** portal, go to **Gateway Management**. The **Gateways** page lists the available Gateways.
2. Select the link of the Gateway that you want to quiesce. The details of the Gateway appears in the **Overview** tab.

Figure 14-22: Quiesce Gateways



3. In the **Status** section, from the **Service State** drop-down menu, select **Quiesced**.
4. Select the **Enable Self-Service Migration** check box.
5. From the **New Gateway** drop-down list, select the Gateway that you have created as a replacement to the Gateway that you are quiescing.
6. In the **Migration Deadline** date picker, select a date by when you want the Partners or direct customers to complete the migration. Ensure that the date is within 60 days from the current date.
7. Select **Save Changes**.

In the **Gateways** page, you can see that the **Service State** of the Gateway has changed to **Quiesced**.

Send decommission notification to Partners and direct customers who are impacted. The notification email provides the migration deadline and detailed instructions on how to migrate the Edges and NSDs from the quiesced Gateway to the new Gateway.

A notification icon is displayed for customers and Partners who have one or more Gateways that are in Quiesced service state. Also, a notification icon is displayed for Edges that are connected to a quiesced Gateway.

Note: Decommission notification email is sent only to direct customers and not to Partners' customers.

14.4.3 Decommission Quiesced Gateways

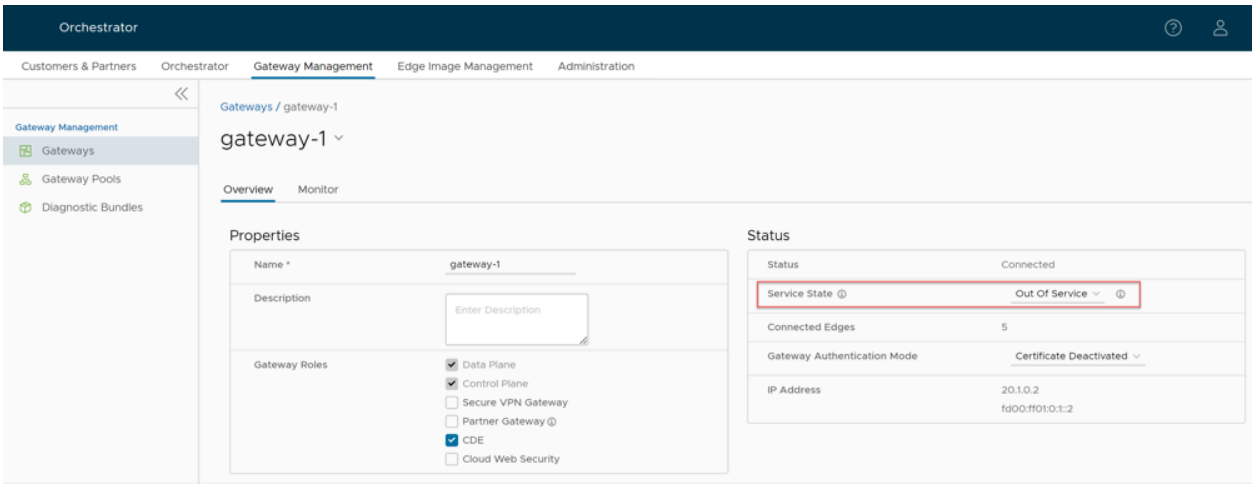
Before you decommission the quiesced Gateways, ensure that there are no Edges or NSDs connected to the Gateway.

In case there are Partners or direct customers who have not yet migrated from the quiesced Gateways, follow-up with them to ensure that they migrate from the quiesced Gateway. Verify that the quiesced Gateway is empty and then decommission it.

To decommission a quiesced Gateway:

1. In the **Operator** portal, go to **Gateway Management**. The **Gateways** page lists the available Gateways.
2. Select the link of the Gateway that you want to decommission. The details of the Gateway appears in the **Overview** tab.

Figure 14-23: Decommission Quiesced Gateways



3. From the **Service State** drop-down list, select **Out Of Service**.
4. Select **Save Changes**.

   Ensure that you remove the Gateway from the Gateway pool and delete the Gateway from Orchestrator.

14.5 Diagnostic Bundles for Gateways

Run diagnostics for Gateways to collect diagnostic bundles and packet capture files for troubleshooting purpose.

- Request Diagnostic Bundles for Gateways
- Request Packet Capture Bundle for Gateways

14.5.1 Request Diagnostic Bundles for Gateways

Diagnostic bundles allow users to collect all the configuration files and log files from a specific VeloCloud Gateway into a consolidated zipped file. The data available in the diagnostic bundles can be used for troubleshooting the Gateways.

As an Operator Super user and Operator Admin user, you can create, manage, download, and delete diagnostic bundles for Gateways created by both Operator and Partner users.

Note: Operator Business Specialist user and Operator IT support users can only view the generated Diagnostic bundles and download the CSV file.

To generate a new Diagnostic bundle:

1. In the **Operator** portal, select the **Gateway Management** tab and select **Diagnostic Bundles** in the left navigation pane.

   The **Diagnostic Bundles** page appears with the existing diagnostic bundles.
2. To generate a new Diagnostic bundle, select **Request Diagnostic Bundle**.
3. In the **Request Diagnostic Bundle** dialog, configure the following details and select **Submit**.

Figure 14-24: Request Diagnostic Bundle

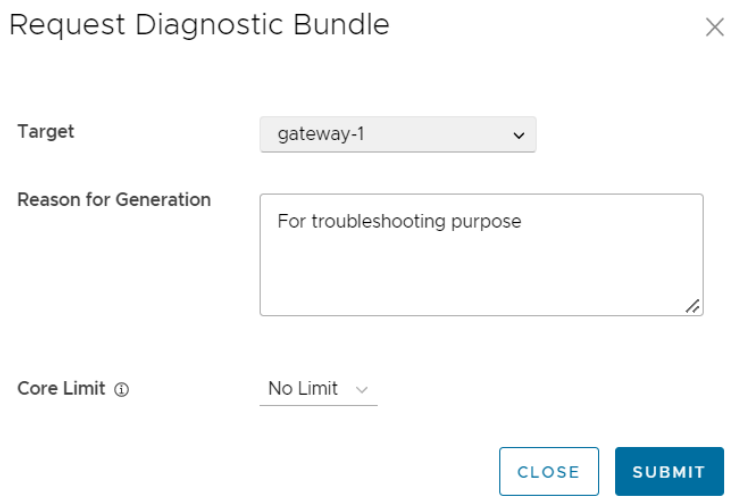


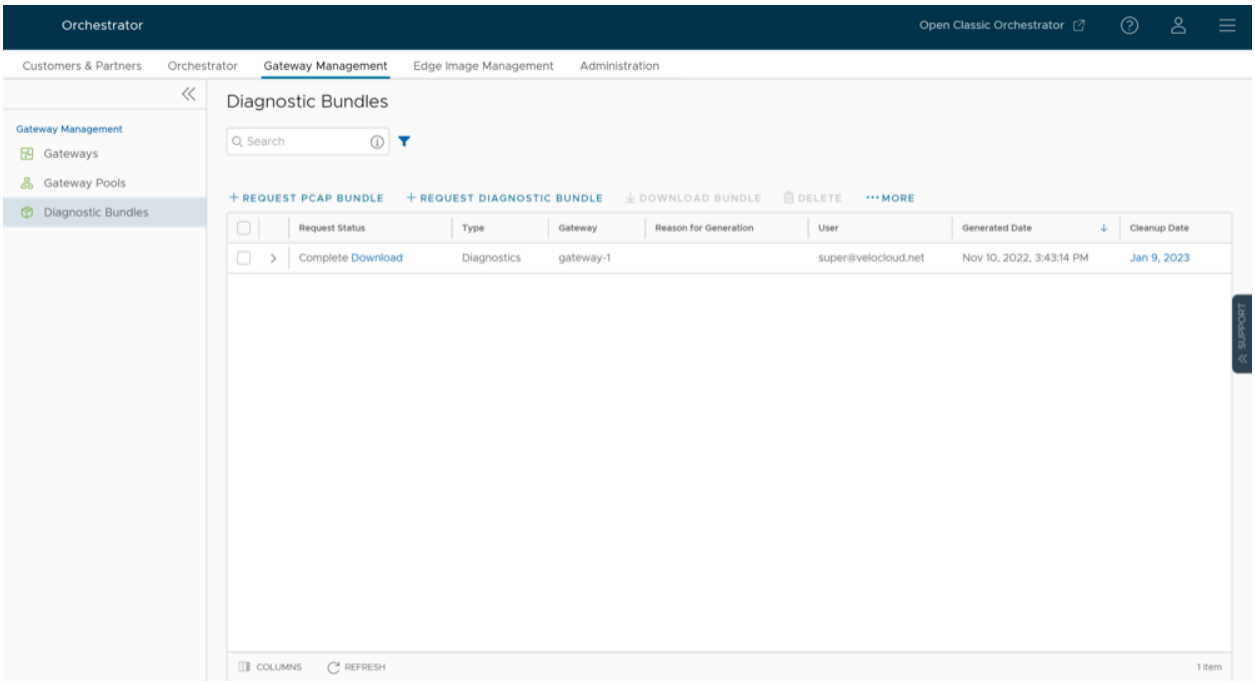
Table 64: Diagnostic Bundle Field Descriptions

Field	Description
Target	Select the target Gateway from the drop-down list. The data is collected from the selected Gateway.
Reason for Generation	Optionally, you can enter your reason for generating the bundle.
Core Limit	Select a Core Limit value from the drop-down, which is used to reduce the size of the uploaded bundle when the Internet connectivity is experiencing issues.

The **Diagnostic Bundles** page displays the details of the bundle being generated, along with the status.

To search a specific diagnostic bundle, enter a relevant search text in the **Search** box. For advanced search, select the **filter** icon next to the **Search** box to filter the results by specific criteria.

Figure 14-25: Manage Diagnostic Bundles

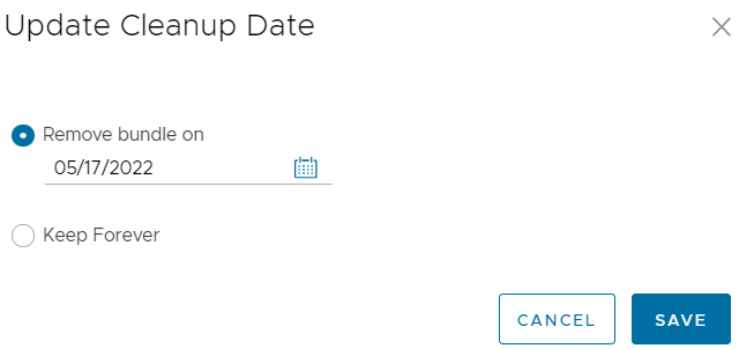


4. You can download the generated Diagnostic bundles to troubleshoot an Edge.
5. To download a generated bundle, select the link next to **Complete** in the **Request Status** column or select the bundle and select **Download Bundle**. The bundle is downloaded as a ZIP file.

   You can send the downloaded bundle to an Arista Support representative for debugging the data.

6. The completed bundles get deleted automatically on the date displayed in the **Cleanup Date** column. You can select the link to the **Cleanup Date** or choose the bundle and select **More** > **Update Cleanup Date** to modify the Date.

   Figure 14-26: Update Cleanup Date



   a. In the **Update Cleanup Date** dialog, choose the date on which the selected Bundle would be deleted.

   b. If you want to retain the Bundle, select the **Keep Forever** check box, so that the Bundle does not get deleted automatically.

   c. To delete a bundle manually, select the bundle and select **Delete**.

14.5.2 Request Packet Capture Bundle for Gateways

The Packet Capture bundle collects the packets data of a network. These files are used in analyzing the network characteristics. You can use the data for debugging the network traffic and determining network status.

As an Operator Super user and Operator Admin user, you can create, manage, download, and delete Packet Capture (PCAP) bundles for Gateways created by both Operator and Partner users.

> **Note:** Operator Business Specialist user and Operator IT support users can only view the generated PCAP bundles and download the CSV file.

To generate a PCAP bundle:

1. In the **Operator** portal, select the **Gateway Management** tab and select **Diagnostic Bundles** in the left navigation pane.

   The **Diagnostic Bundles** page appears with the existing diagnostic bundles.
2. To generate a new PCAP bundle, select **Request PCAP Bundle**.

3. In the **Request PCAP Bundle** dialog, configure the following details and select **Generate**.

Figure 14-27: Request PCAP Bundle

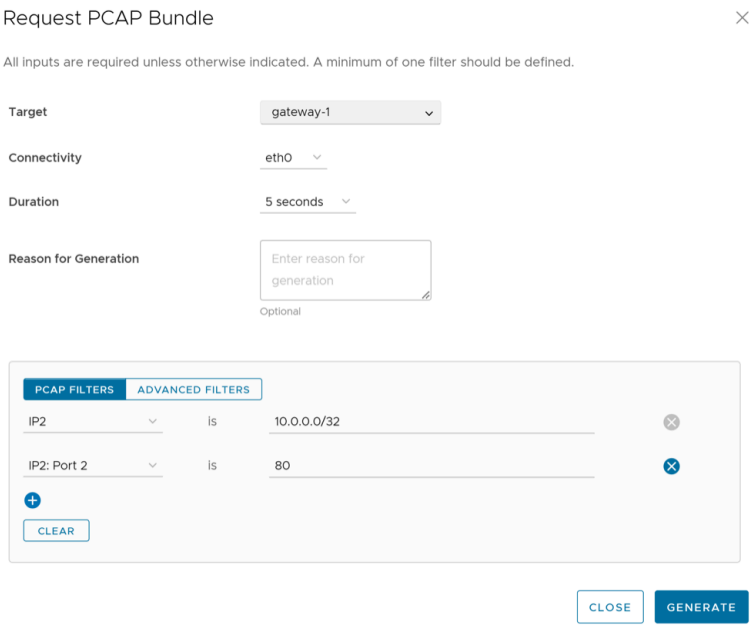


Table 65: Request PCAP Bundle Field Descriptions

Field	Description
Target	Choose the target Gateway from the drop-down list. The packets are collected from the selected Gateway.
Connectivity	Choose an Interface or an Edge ID from the drop-down list. The packets are collected on the selected Interface or Edge associated to the Gateway.
Duration	Choose the time in seconds. The packets are collected for the selected duration. The default value is 5 seconds.
Reason for Generation	Optionally, you can enter your reason for generating the bundle.
PCAP Filters	You can define PCAP filters by which you want to control the PCAP data to be generated by choosing the following options: • **IP1**- Enter an IPv4 address, or IPv6 address, or Subnet mask. • **IP2**- Enter an IPv4 address, or IPv6 address, or Subnet mask. • **IP1:Port1**- Enter a Port ID associated with IP1. • **IP2:Port2**- Enter a Port ID associated with IP2. • **Protocol**- Select a protocol from the list. **Note:** If you choose to use the PCAP filtering capability then you must define at least one filter.
Advanced Filters	You can define free form filters by which you want to control the PCAP data to be generated.

The **Diagnostic Bundles** page displays the details of the PCAP bundle being generated, along with the status.

4. To download a generated bundle, select the link next to **Complete** in the **Request Status** column or select the bundle and select **Download Bundle**. The bundle is downloaded as a ZIP file.
5. The completed bundles get deleted automatically on the date displayed in the **Cleanup Date** column. You can select the link to the **Cleanup Date** or choose the bundle and select **More** > **Update Cleanup Date** to modify the Date.
6. To delete a bundle manually, select the bundle and select **Delete**.

Chapter 15

Platform and Modem Firmware and Factory Images

Operators can upload, modify, or delete Platform and Modem Firmware images for specific Edge devices and Factory images for all physical VeloCloud SD-WAN Edge devices from the Orchestrator.

1. In the **Operator** portal, select the **Edge Image Management** tab.
2. To upload a Firmware image, select **Firmware** on the left panel under **Edge Image Management**. To upload a Software image, select **Software** on the left panel under **Edge Image Management**.

   Note: Operators can upload, modify, or delete the following firmware and factory images:

   - Firmware Platform images for 6x0, 7x0, and 3x00 (3400/3800/3810) Edge device models
   - Firmware Modem images for 510-LTE (Edge 510LTE-AE, Edge 510LTE-AP) and 610-LTE (Edge 610LTE-AM, Edge 61LTE-RW)
   - Factory images for all physical VeloCloud SD-WAN Edge devices

   For additional information about uploading/managing Firmware images, see Manage Operator Profiles.

3. In the appropriate screen (Firmware or Software depending upon which option you have chosen), select the **+Upload Image** link and choose an image file (ZIP format, file size less than 200MB) to upload from your local storage.

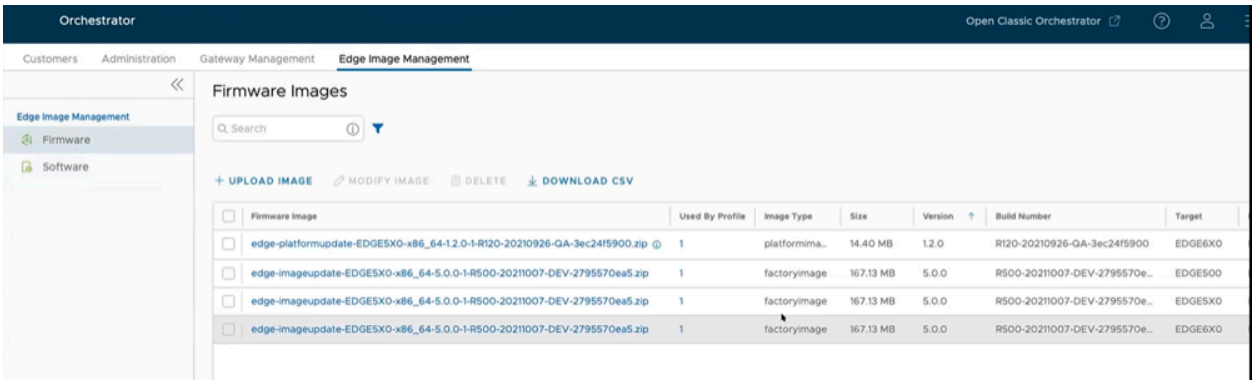
   Note: It is important that you update the software version first. Then, after completion, update the firmware (Platform or Modem) and the factory default. Do not update the software version, the firmware, and the factory default at the same time.

4. After the file is successfully attached, select the **Done** button in the **File Upload** dialog.

   The Orchestrator UI validates the package and uploads it to the portal. You can upload multiple Firmware and Software images to the portal. The uploaded packages are displayed on the appropriate page (**Firmware Images or Software Images**) based on your chosen image type.

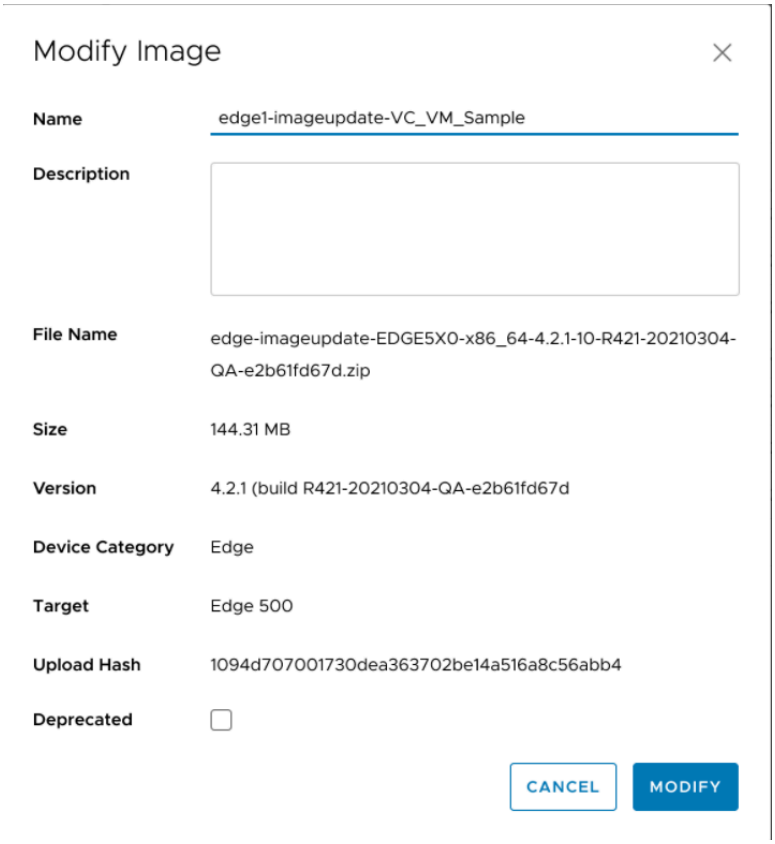
Note: When **Firmware** is selected, note the **Image Type** column which indicates if the image is (Platform Firmware or Factory Default).

Figure 15-1: Manage Firmware Images



5. To modify a Firmware or Software image, select an image from the appropriate page (Firmware or Software), and then select **Modify Image**. The **Modify Image** pop-up window appears.

Figure 15-2: Modify Image



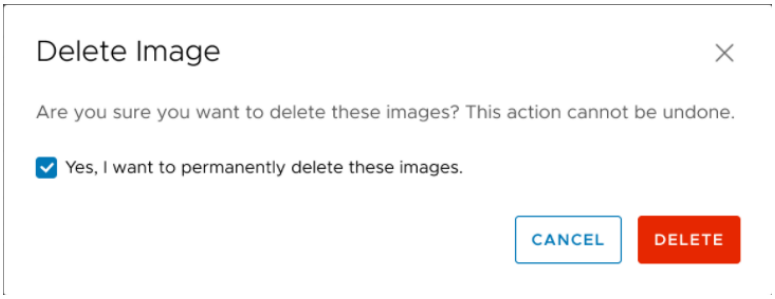
6. You can update the Name and Description of the Firmware or Software image package, if needed.
7. If necessary, select the **Deprecated** check box to deprecate the Firmware or Software image and select the **Modify** button. The deprecated Firmware or Software image is flagged and appears in the respective page (Firmware Images or Software Images).

Note: Once the image is deprecated, the image will not appear in the list of available firmware or software images, or versions to be assigned to Operator Profiles, or Customers or Edges.

Note: The existing Operator Profiles that contain a deprecated image are also flagged to notify the user that the Firmware or Software version of the profile contains a deprecated software image.

8. To delete a package from the portal, select the image and select **Delete** (depending upon which option you have chosen).

Figure 15-3: Delete Image



To manage VeloCloud SD-WAN Edges within an Enterprise with a specific Software/Firmware Image, see the topic Manage Operator Profiles.

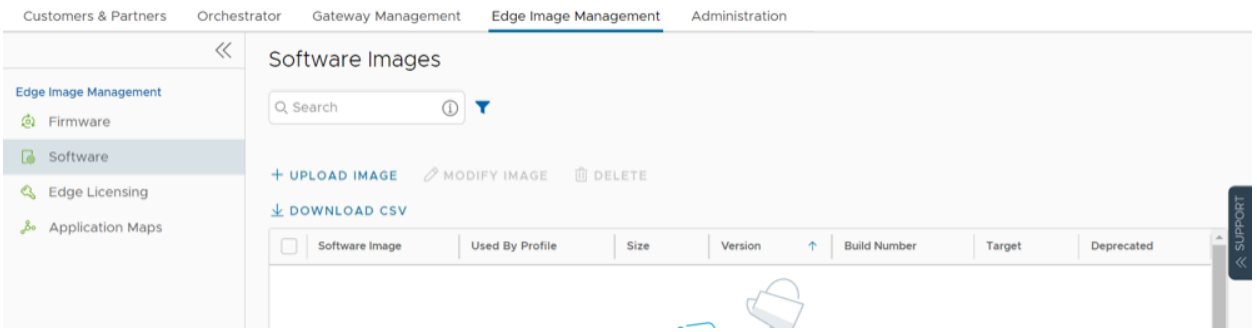
Software Images

The **Orchestrator** portal allows Operator Super Users and Operator Standard Admins to manage the Software Images for the associated Edges.

As an Operator Super User, you can upload a new software image, modify the existing software images, and delete a software image associated with the Edges.

1. To upload a new software image, in the **Operator** portal, select **Services** at the top of the screen, and then select **Software** on the left side of the panel.

   Figure 16-1: Manage Software Images



2. Select **Upload Image** and choose an Image file (ZIP format) to upload from your local storage. The Orchestrator validates the package and uploads it to the portal. You can upload multiple Software Images to the portal.
3. The uploaded packages are displayed in the **Software Images** page.
4. To modify an uploaded software image, select the link to the image name or select the image and select **Modify Image**. The **Modify Image** pop-up window appears.
5. You can update the Name and Description of the software image package, if needed.
6. Select the **Deprecated** check box to deprecate the software image and select **OK**. The deprecated software image is flagged and appears in the **Software Images** page.

   Note: Once the image is deprecated, the image will not appear in the list of available software images or versions to be assigned to Operator Profiles, or Customers or Edges.

   Note: The existing Operator Profiles that contain a deprecated image is also flagged to notify the user that the software version of the profile contains a deprecated software image.

7. To delete a package from the portal, select the image and select **Delete**.

To upgrade the Edges within an Enterprise with a specific Software Image, see Manage Operator Profiles.

Chapter 17

Edge Licensing

Only Operators can enable the Edge Licensing and assign the licenses to a Partner user. If the Edge Licensing is not enabled for you, contact your Operator.

The Edge Licensing feature is activated by default.

To deactivate Edge Licensing, in the **Operator** portal, go to **Orchestrator** > **System Properties**, and set the value of the system property `session.options.enableEdgeLicensing` to **False**.

The Edge Licenses are available with the following components:

Table 66: Edge Licenses- Components and Supported Attributes

Component	Supported Attributes
Bandwidth	10M, 30M, 50M, 100M, 200M, 350M, 500M, 750M, 1G, 2G, 5G, 10G
Editions	Standard, Enterprise, Premium
Region	North America, Europe Middle East and Africa, Latin America, Asia Pacific
Term	12 months, 36 months, 60 months

An Operator can assign different types of Edge licenses from the 324 types of licenses available with various combinations.

Apart from the above list, Arista offers a trial version of license with the following attributes:

Table 67: Trial Licenses- Components and Supported Attributes

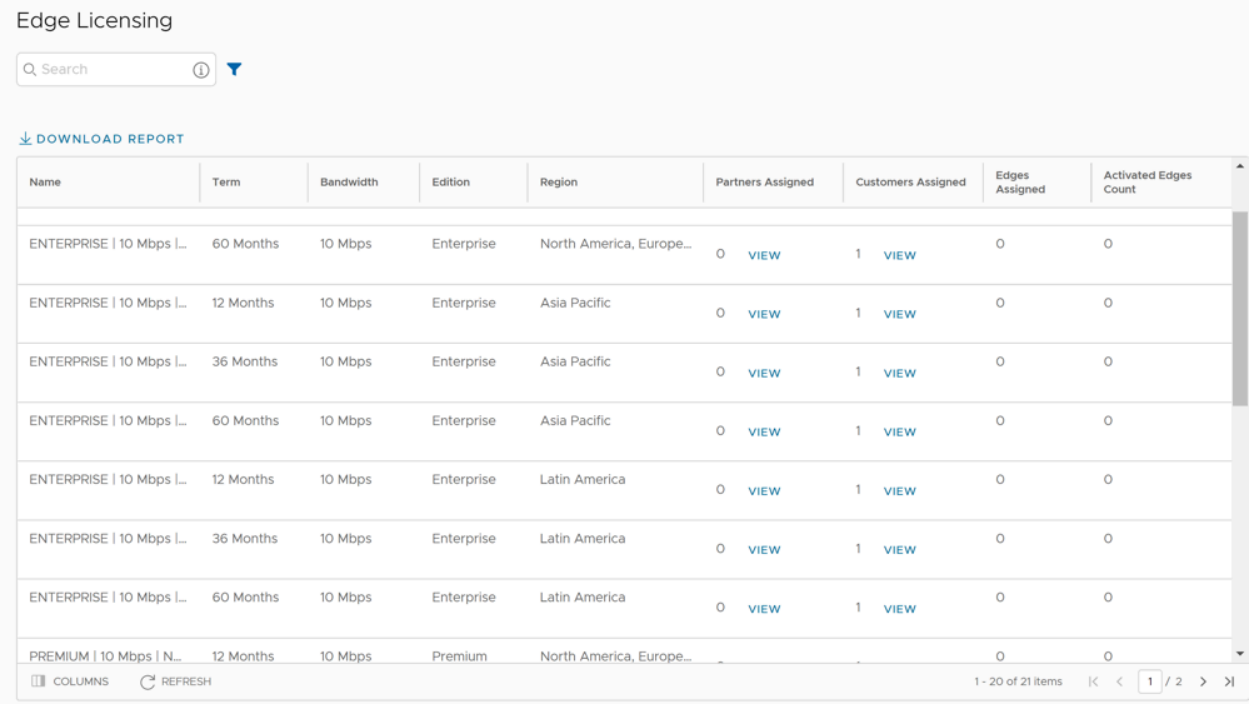
Component	Supported Attributes
Bandwidth	10 Gbps
Edition	POC
Region	North America, Europe Middle East and Africa, Asia Pacific and Latin America
Term	60 Months

Note: You can assign the **POC** license to a customer as a trial. When required, you can upgrade the license to any required Edition.

To access the Edge Licensing feature:

1. In the **Operator** portal, select **Edge Image Management**, and then from the left menu, select **Edge Licensing**.

   Figure 17-1: Edge Licensing



2. You can view the following options on this page:

   Table 68: Edge Licensing- Options and Descriptions

Option	Description
Search	Enter a term to search for a matching text across the table. You can select the advanced search option to use filters to narrow down the search results.
Download Report	Select this option to download a report of the licenses, associated customers, and Edges in a CSV format.
Columns	Select the columns to be displayed in the table.
Refresh	Select this option to refresh the displayed list of licenses.

3. Selecting the **View** link under the **Partners assigned** column, displays the Edge license details of the selected Partner.
4. Selecting the **View** link under the **Customers assigned** column, displays the Edge license details of the selected Customer.

To assign Edge Licenses to new Partners, see Create New Partner.

To manage and assign Edge Licenses to existing Partners, see Manage Edge Licenses for Partners.

To assign Edge Licenses to new Customers, see Create New Customer.

To manage and assign Edge Licenses to existing Customers, see Manage Edge Licenses for Customers.

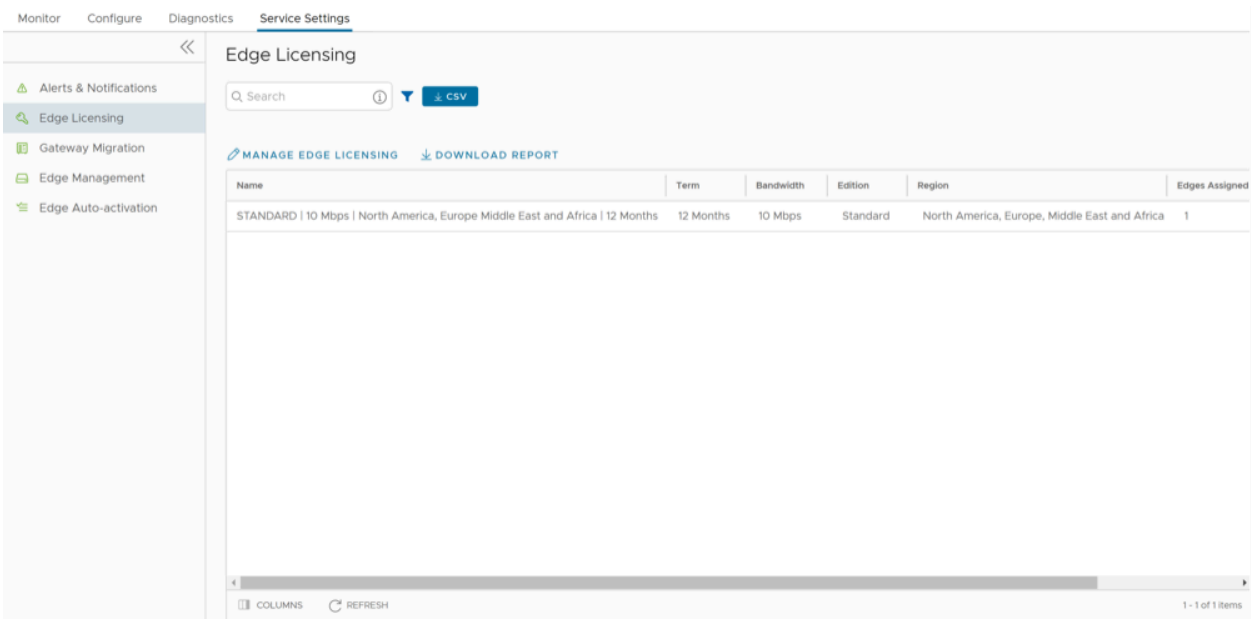
17.1 Manage Edge Licenses for Partners

An Operator can manage the Edge Licenses and assign them to Partners.

Following the below procedure to manage and assign Edge Licenses to existing partners. To assign Edge Licenses to new Partners, see Create New Partner.

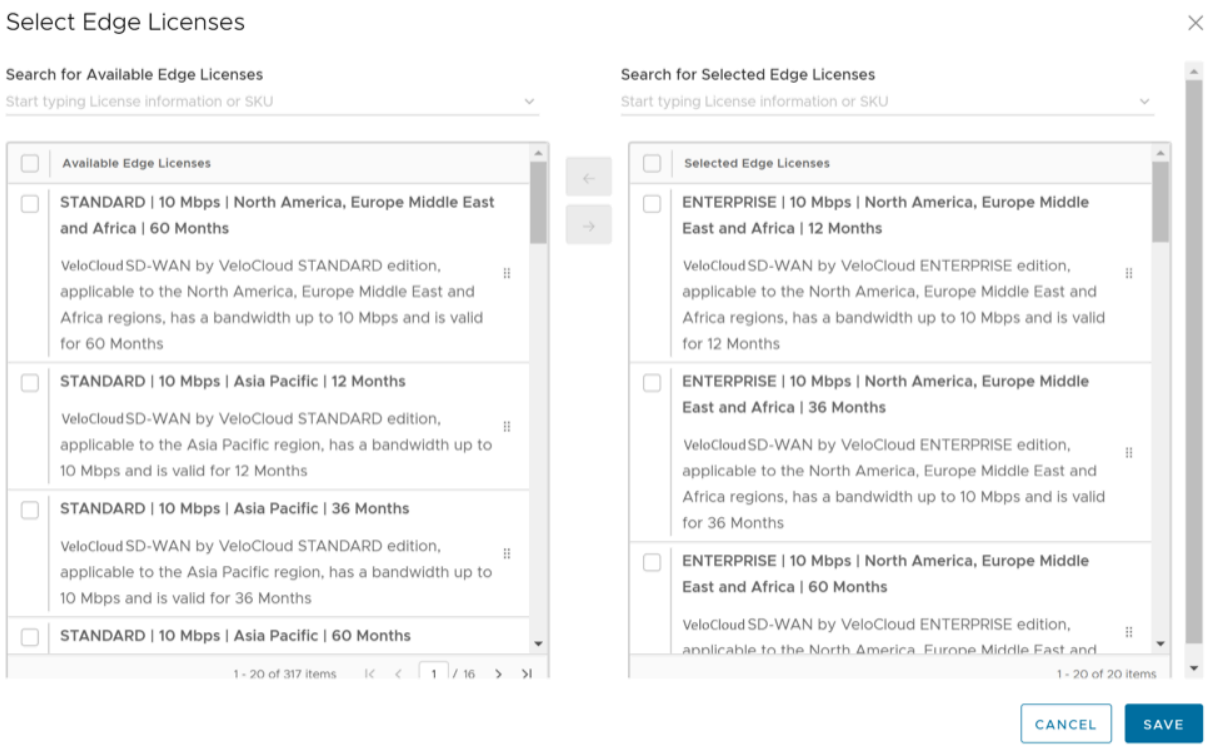
1. In the **Operator** portal, select **Manage Partners**.
2. Select the link to a Partner name to navigate to the **Partner** portal.
3. In the **Partner** portal, select **Edge Management**, and then from the left menu, select **Edge Licensing**.

Figure 17-2: Edge Licensing



4. Select **Manage Edge Licensing**.

Figure 17-3: Manage Edge Licensing



5. In the **Select Edge Licenses** window, choose the relevant licenses based on the Bandwidth, Term, Edition, and Region.
6. Select **Save**.
   The selected licenses are displayed in the **Edge Licensing** window.

Select **Download Report** to generate a report of the licenses along with the associated customers and SD-WAN Edges in a CSV format.

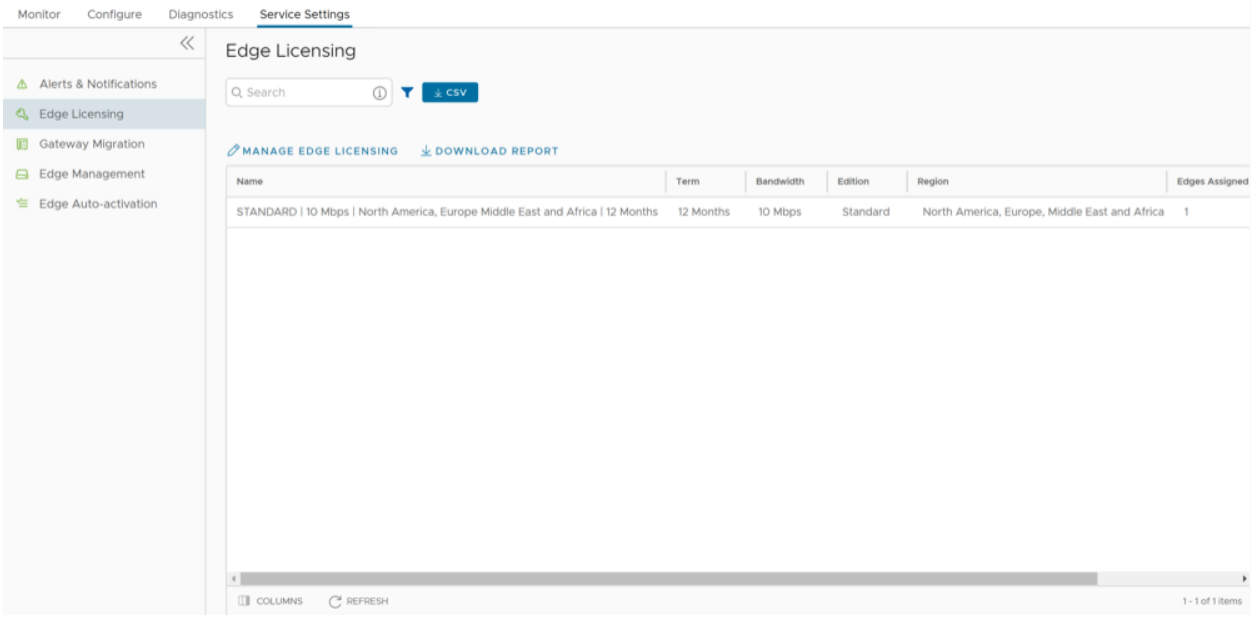
17.2 Manage Edge Licenses for Customers

An Operator can manage Edge Licenses and assign them to Customers.

1. In the **Operator** portal, select **Manage Customers**.
2. Select the link to a Customer name to navigate to the **Enterprise** portal.

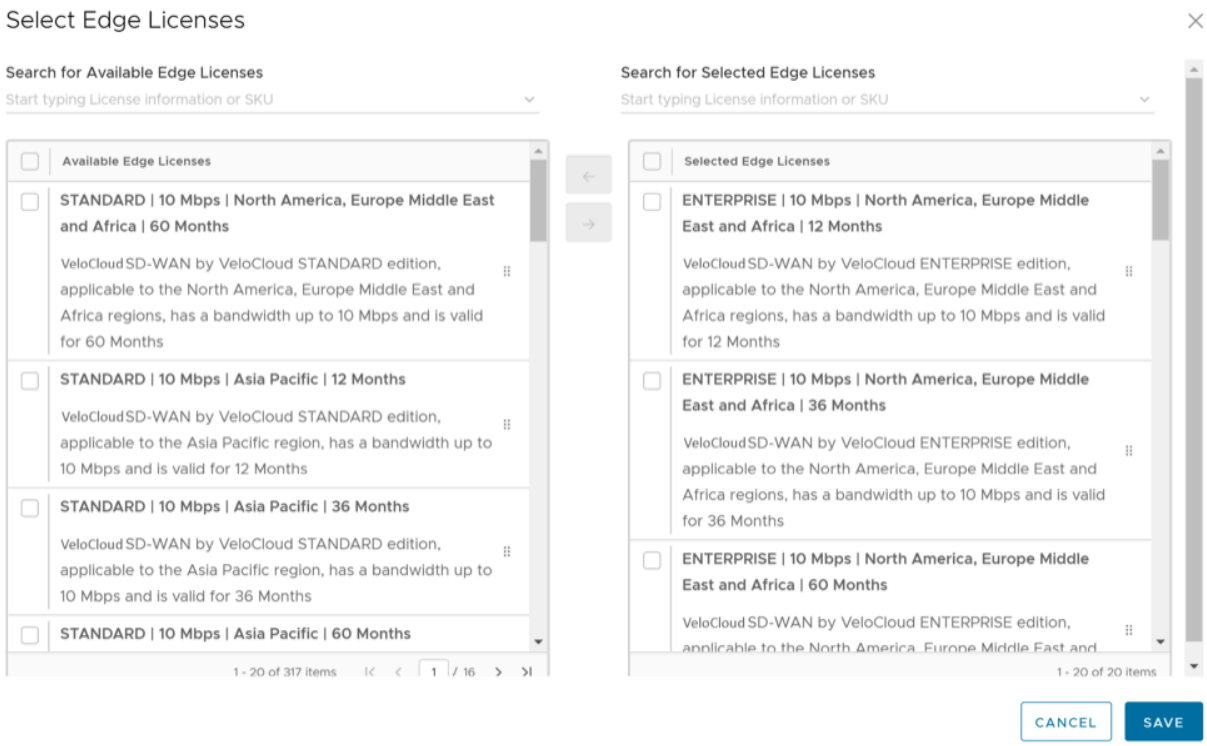
3. In the **Enterprise** portal, select **Service Settings** > **Edge Licensing**.

Figure 17-4: Edge Licensing



4. Select **Manage Edge Licensing**.

Figure 17-5: Manage Edge Licensing



5. In the **Select Edge Licenses** window, choose the relevant licenses based on the Bandwidth, Term, Edition, Region, and then move them to the **Selected Edge Licenses** pane.

> **Note:** Apart from the existing licenses, Arista offers a trial version of license with the Edition as **POC**. If you select a **POC** license, you cannot choose the other licenses.

6. Select **Save**. The selected licenses are displayed in the **Edge Licensing** window.

> **Note:**
>
> If you have selected the **POC** license, you can select **Upgrade Edge License** to upgrade the license to the next level. Choose Standard, Enterprise or Premium Edition from the list. You cannot downgrade a License type to the previous Edition.

7. Select **Report** to generate a report of the licenses and the associated VeloCloud Edges in a CSV format.

When you create an SD-WAN Edge, you can choose and assign an Edge License from the drop-down list.

To assign a license to an existing SD-WAN Edge:

1. In the **SD-WAN** service of the **Enterprise** portal, select **Configure** > **Edges**.
2. To assign license to each SD-WAN Edge, select the link to the SD-WAN Edge, and then select the License in the **Properties** section of the **Edge Overview** page. You can also select the SD-WAN Edge, and then select **Assign Edge License** to assign the license.
3. To assign a license to multiple SD-WAN Edges, select the appropriate SD-WAN Edges, select **Assign Edge License**, and then select the License.

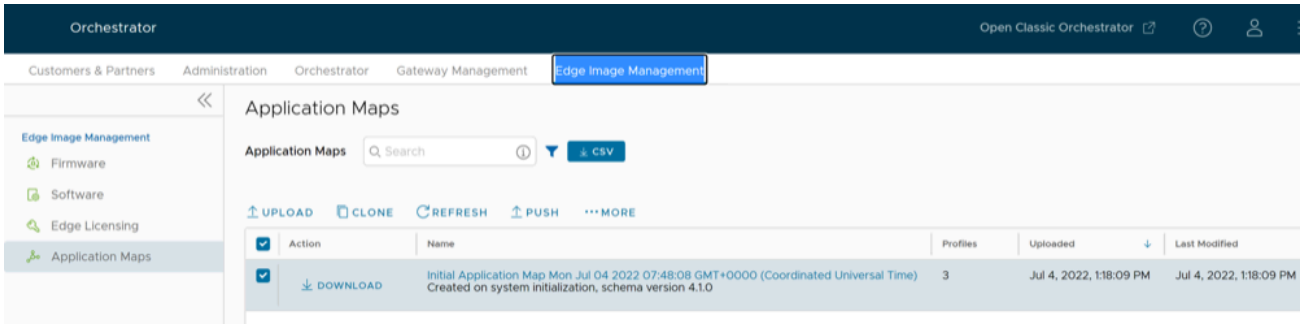
Chapter 18

Application Maps

The Application Maps are JSON files consisting of various Applications with definitions, which can be used while creating Business Policies.

In the **SD-WAN** service of the **Enterprise** Portal, select **Edge Image Management** > **Application Maps**. The following screen appears:

Figure 18-1: Application Maps



You can perform the following actions on this page:

- Upload Application Map
- Clone Application Map
- Refresh Application Map
- Push Application Map
- Edit Application Map
- Delete Application Map

1. **Upload Application Map**:

   VeloCloud SD-WAN provides an initial Application Map with possible applications. You can also upload your JSON file with Applications to be used in Business Policies.

   a. To upload a map file, select **Upload**.

   b. In the **File Upload** window, you can either drag and drop, or browse and choose the Application Map file to be uploaded.

   c. Select **Done**.

   The file is uploaded after the content is validated.

The Application Map file is in JSON format and you can customize the applications as per your requirements. The following example illustrates a customized JSON file for the application bittorrent.

```
{ "id": 15, "name": "APP_BITTORRENT", "displayName": "bittorrent", "class": 14,
 "description": "BitTorrent is a peer-to-peer protocol. [Note: bittorrent is also known
 as kadmelia.]", "knownIpPortMapping": {}, "protocolPortMapping": {}, "doNotSlowLearn": 1,
 "mustNotUseGateway": 1 }
```

2. **Clone Application Map**: You can create a new Application Map by cloning an existing Application Map.
   a. Select an existing Application Map, and then select **Clone**.
   b. In the **Clone Application Map** window, enter a new name and description for the Application.
   c. Select **Clone**.
3. **Refresh Application Map**: You can update the Application definitions, managed by third party SaaS providers, listed in the Application Map.
   a. Select one or more Application Maps, and then select **Refresh**.
      The **Refresh Application Maps** window appears, which lists the details of the selected Application Map(s) and Profile Count associated with the selected Application Map(s).
   b. Select **Refresh** to refresh the selected Application Map(s).

   Note: The Application map Refresh operation serves to update application definitions managed by third party SaaS providers (for example Microsoft Office365®). It does not push those updates to associated Edges. After Refresh, use the Push function to update Edges assigned to a selected application map.

4. **Push Application Map**: You can push the latest updates of the Application definitions available in the Application Maps to the associated VeloCloud Edges.
   a. Select an Application Map, and then select **Push**.
   b. Select **Push to Edges** to update the latest Application definitions available in the selected Application Map.

   Note: This option pushes the Application definitions only when any updates are available.

   Important: When you change an application map and push those changes to the Edges from the Orchestrator, all Edge flows are flushed. This is done to ensure all Edge flows apply the updated version of the application map. As a result, you should only push an update to a custom application map in a maintenance window which minimizes disruption from an Edge flow flush.

   Note: On Hosted Orchestrators, the Arista Cloud Operations team updates and pushes all application maps on the first Saturday of each month. The application map refresh operation serves to update application definitions managed by third-party SaaS providers (for example, Microsoft 365). The updates and pushes are scheduled to minimize the disruption to customer traffic and are as follows:

Table 69: Push Application Map- Schedule

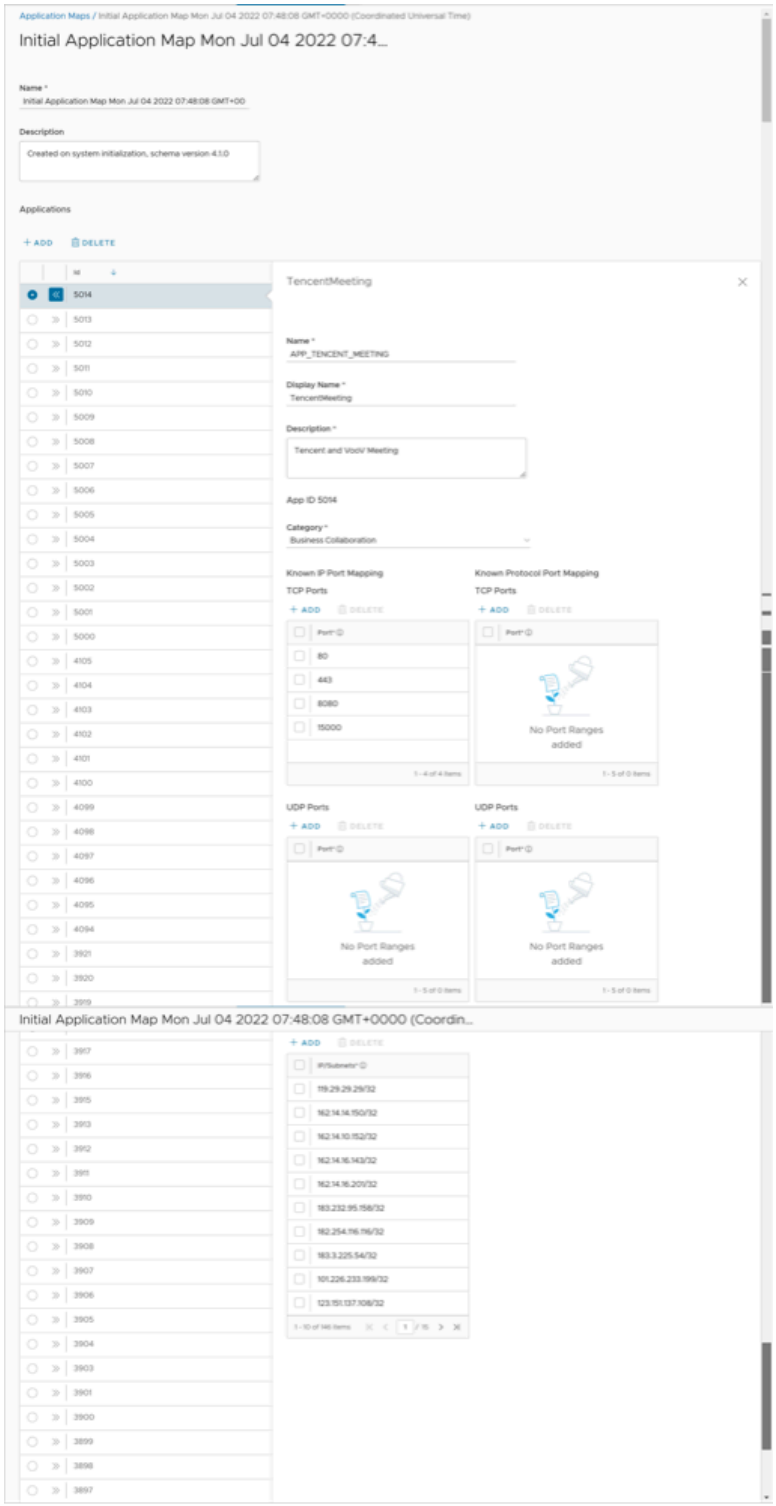
Region	Local Time	UTC Time	Day of the Month
Asia Pacific	02:00	18:00 UTC	1st Saturday of the month
Europe	02:00	00:00 UTC	1st Saturday of the month
North America	02:00	08:00 UTC	1st Saturday of the month

As noted earlier, an application map refresh and push will flush all flows for the Edges associated with that map and customers should anticipate this in the monthly maintenance window when it is performed.

5. **Edit Application Map**: You can add or update the application details available in the existing Application Maps.
   a. Select an Application Map, and then select **More** > **Edit** to edit the associated Application.
   b. Select **Add** to add a new application along with the ID. Update details like **Name**, **Display Name**, **Description**, **Category**, **TCP Ports**, **UDP Ports**, and **IP/Subnets**.
   c. Select **Delete** to delete the selected application.

d. Select **Save Changes** to save the entered details.

Figure 18-2: Edit Application Map



6. **Delete Application Map**: You can delete a selected Application Map, but you cannot delete a map that has been assigned to an Operator Profile.

   a. Select an Application Map and then select **More** > **Delete**.

b. Enter the number of Application maps selected and select **Delete**.

Chapter 19

Edge Management

Edge Management feature allows you to configure general settings, authentication, and encryption for an Edge. It allows you to activate or deactivate configuration updates for an Edge. You can also select a default Software & Firmware Image.

1. In the **Operator** portal, on the **Monitor Customers** screen, select a Customer name.
2. From the top menu, select **Service Settings**, and then from the left menu, select **Edge Management**.
3. Configure the following options.

Figure 19-1: Edge Management

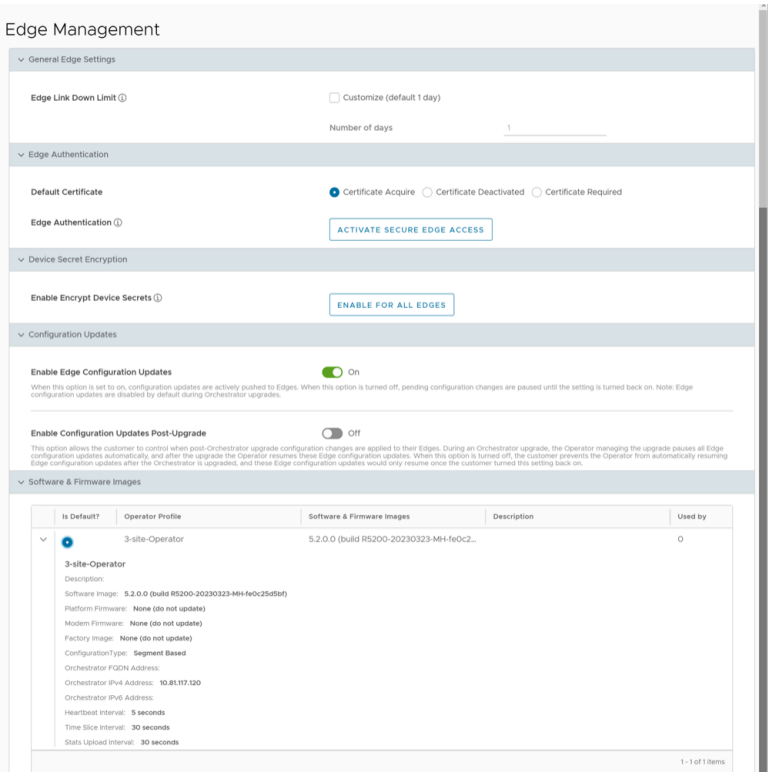


Table 70: Edge Management- Options and Descriptions

Option	Description
General Edge Settings	
Edge Link Down Limit	You can set this value for each Edge by selecting the **Customize** check box. This overrides the value set through the system property `edge.link.show.limit.sec`.
Number of days	Enter a value in the range **1** to **365**. The default value is **1**.
Edge Authentication	
Default Certificate	Choose the default option to authenticate the Edges associated to the Customer. • **Certificate Acquire**: This option instructs the Edge to acquire a certificate from the certificate authority of the SASE Orchestrator, by generating a key pair and sending a certificate signing request to the Orchestrator. Once acquired, the Edge uses the certificate for authentication to the SASE Orchestrator and for the establishment of VCMP tunnels.  **Note:** Only after acquiring the certificate, the option can be updated to **Certificate Required**. • **Certificate Deactivated**: This option instructs the Edge to use a pre-shared key mode of authentication. • **Certificate Required**: This option is selected by default, and it instructs the Edge to use the PKI certificate. Operators can change the certificate renewal time window for Edges using system properties. For additional information, contact your Operator.  **Note:** On selecting **Save Changes**, you are asked to confirm if the selected Edge authentication setting is applicable to all the impacted Edges or only the new Edges. By default, **Apply to all Edges** check box is selected.
Edge Authentication	Select the **Activate Secure Edge Access** button to allow the user to access Edges using Password-based or Key-based authentication. You can activate this option only once. But you can switch to either Password-based or Key-based authentication any number of times. For additional details, see Configure User Account Details.
Device Secret Encryption	
Enable Encrypt Device Secrets	Select the **Enable For All Edges** button to activate device secret encryption for all the Edges in the current Enterprise. This action causes restart of all the Edges. However, Edges which already have this feature activated are not affected.  **Note:** You can activate this option for individual Edges at the time of creating a new Edge. For additional information, see the topic *Provision a New Edge* in the *Arista VeloCloud SD-WAN Administration Guide*.
Configuration Updates	
Disable Edge Configuration Updates	By default, this option is activated. This option allows you to actively push the configuration updates to Edges. Slide the toggle button to turn it Off.

Option	Description
Enable Configuration Updates Post-Upgrade	By default, this option is deactivated. This option allows you to control when post-Orchestrator upgrade configuration changes are applied to their Edges. Slide the toggle button to turn it On.

4. **Software & Firmware Images**: You can view the details of the listed images and select the default image.

Note: To view this section:

- An Operator must navigate to the **Global Settings** service of the Enterprise portal, and then select **Customer Configuration** > **SD-WAN Configuration**. Select the **Allow Customer to manage software** check box. Only an Operator can add, delete, or edit an image. For additional information, see the topic *Platform Firmware and Factory Images*, in the *Arista VeloCloud SD-WAN Operator Guide*.
- A Partner user must navigate to **Manage Partner Customers**. Select **More** and perform the following:
  - Select **Update Edge Image Management**. Turn on the toggle button, and then select **Save**.
  - Select **Assign Software/Firmware Image**, and then select a Software/Firmware image from the drop-down menu. Select **Save**.

5. Select **Save Changes**.

Chapter 20

Access SD-WAN Edges Using Key-Based Authentication

This section discusses details about how to enable key-based authentication, add SSH keys, and access Edges in a more secure way.

The Secure Shell (SSH) key-based authentication is a secure and robust authentication method to access VeloCloud Edges. It provides a strong, encrypted verification and communication process between users and Edges. The use of SSH keys bypasses the need to manually enter login credentials and automates the secure access to Edges.

Note:

- Both the Edge and the Orchestrator must be using Release 5.0.0 or later for this feature to be available.
- Users with Operator Business or Business Specialist account roles cannot access Edges using key-based authentication.

Perform the following tasks to access Edges using key-based authentication:

1. Configure privileges for a user to access Edges in a secure manner.
   You must choose **Basic** access level for the user. You can configure the access level when you create a new user and choose to modify it at a later point in time. Ensure that you have Superuser role to modify the access level for a user. For additional information, see Add New User.
2. Generate a new pair of SSH keys or import an existing SSH key.
   See Add SSH Key
3. Enable key-based authentication to access Edges.
   See Enable Secure Edge Access for an Enterprise Operator.

20.1 Add SSH Key

When using key-based authentication to access Edges, a pair of SSH keys are generated: Public and Private.

The public key is stored in the database and is shared with the Edges. The private key is downloaded to your computer, and you can use this key along with the SSH username to access Edges. You can generate only one pair of SSH keys at a time. If you need to add a new pair of SSH keys, you must delete the existing pair and then generate a new pair. If a previously generated private key is lost, you cannot recover it from the Orchestrator. You must delete the key and then add a new key to gain access. For details about how to delete SSH keys, see Revoke SSH Keys.

Based on their roles, users can perform the following actions:

- All users, except users with Operator Business or Business Specialist account roles, can create and revoke SSH keys for themselves.

- Operator Super users can manage SSH keys of other Operator users, Partner users, and Enterprise users, if the Partner user and Enterprise user have delegated user permissions to the Operator.
- Partner Super users can manage SSH keys of other Partner users and Enterprise users, if the Enterprise user has delegated user permissions to the Partner.
- Enterprise Super users can manage the SSH keys of all the users within that Enterprise.
- Super users can only view and revoke the SSH keys for other users.

Note: Enterprise and Partners customers without SD-WAN service access will not be able to configure or view SSH keys related details.

To add a SSH key:

1. In the **Operator** portal, select the **User** icon that appears at the top-right side of the Window. The **User Information** panel appears.
2. Select **Add SSH Key**. The **Add SSH Key** pop-up window appears.
3. Select one of the following options to add the SSH key:
   - **Generate Key**: Use this option to generate a new pair of public and private SSH keys. Note that the generated key gets downloaded automatically. The default file format in which the SSH key is generated is `.pem`. If you are using a Windows operating system, ensure that you convert the file format from `.pem` to `.ppk`, and then import the key. For instructions to convert `.pem` to `.ppk`, see https://puttygen.com/convert-pem-to-ppk.
   - **Import Key**: Use this option to paste or enter the public key if you already have a pair of SSH keys.
4. In the **PassPhrase** field, you can choose to enter a unique passphrase to further safeguard the private key stored on your computer.

Note: This is an optional field and is available only if you have selected the **Generate Key** option.

5. In the **Duration** drop-down list, select the number of days by when the SSH key must expire.
6. Select **Add Key**.

Ensure that you enable secure Edge access for the Enterprise and switch the authentication mode from Password-based to Key-based. See Enable Secure Edge Access for an Enterprise

20.2 Revoke SSH Keys

Ensure that you have Superuser role to delete the SSH keys for other users.

To revoke your SSH key:

1. In the **Orchestrator**, select the **User** icon that appears at the top-right side of the Window. The **User Information** panel appears.
2. Select **Revoke SSH Key**.

For Other Operator Users

To revoke the SSH keys of other Operator users:

1. In the **Operator** portal, go to **Orchestrator Authentication**.
2. In the **SSH Keys** area, select the SSH usernames for which you want to delete the SSH keys.
3. Select **Actions** > **Revoke SSH Key.**

   The SSH keys for a user are automatically deleted when:

   - You change the user role to Operator Business or Business Specialist because these roles cannot access Edges using key-based authentication.
   - You delete a user from the Orchestrator.

   > **Note:** When a user is deleted or deactivated from the external SSO providers, the user can no longer access the Orchestrator. But the user's Secure Edge Access keys remain active until the user is explicitly deleted from the Orchestrator as well. Therefore, you must first delete the user from the IdP, before deleting from the Orchestrator.

20.3 Enable Secure Edge Access for an Enterprise

After adding the SSH key, you must switch the authentication mode from Password-based, which is the default mode to Key-based to access Edges using the SSH username and SSH key. The SSH username is automatically created when you create a new user.

To enable secure Edge access:

1. In the **SD-WAN** service of the **Enterprise** portal, go to **Service Settings** > **Edge Management**.
2. Select the **Enable Secure Edge Access** check box to allow the user to access Edges using Key-based authentication. Once you have activated Secure Edge Access, you cannot deactivate it.

   > **Note:** Only Operator users can enable secure Edge access for an Enterprise.

3. Select **Switch to Key-Based Authentication** and confirm your selection.

   > **Note:** Ensure that you have Super User role to switch the authentication mode.

Use the SSH keys to securely login to the Edge's CLI and run the required commands. See Secure Edge CLI Commands.

20.4 Secure Edge CLI Commands

Based on the Access Level configured, you can run the following CLI commands:

Note: Run the **`help <command name>`** to view a brief description of the command.

Table 71: Secure Edge Commands

Commands	Description	Access Level = Basic	Access Level = Privileged
Interaction Commands			
`help`	Displays a list of available commands.	Yes	Yes
`pagination`	Paginates the output.	Yes	Yes
`clear`	Clears the screen.	Yes	Yes
`EOF`	Exits the secure Edge CLI.	Yes	Yes
Debug Commands			
`edgeinfo`	Displays the Edge's hardware and firmware information. For a sample output of the command, see edgeinfo.	Yes	Yes
`seainfo`	Displays details about the secure Edge access of the user. For a sample output of the command, see seainfo.	Yes	Yes
`ping`, `ping6`	Pings a URL or an IP address.	Yes	Yes
`tcpdump`	Displays TCP/IP and other packets being transmitted or received over a network to which the Edge is attached. For a sample output of the command, see tcpdump.	Yes	Yes
`pcap`	Captures the packet data pulled from the network traffic and prints the data to a file. For a sample output of the command, see pcap.	Yes	Yes
`debug`	Runs the debug commands for Edges. Run debug-h to view a list of available commands and options. For a sample output of one of the debug commands, see debug --dpdk_ports_dump.	Yes	Yes
`diag`	Runs the remote diagnostics commands. Run **`diag -h`** to view a list of available commands and options. For a sample output of one of the **`diag`** commands, see diag ARP_DUMP.	Yes	Yes
`ifstatus`	Fetches the status of all interfaces. For a sample output of the command, see ifstatus.	Yes	Yes
`getwanconfig`	Fetches the configuration details of all WAN interfaces. Use the logical names such as "*GE3*" or "*GE4*" as arguments to fetch the configuration details of that interface. Do not use the physical names such as "*ge3*" or "*ge4*" of the WAN interfaces. For example, run **`getwanconfig GE3`** to view the configuration details of the GE3 WAN interface. Run the **`ifstatus`** command to know the interface name mappings. For a sample output of the command, see getwanconfig.	Yes	Yes
Configuration Command			
`setwanconfig`	Configures WAN interfaces (wired interfaces only). Run **`setwanconfig -h`** to view configuration options.	Yes	Yes
Edge Actions Commands			
`deactivate`	Deactivates the Edges and reapplies the initial default configuration.	No	Yes
`restart`	Restarts the SD-WAN service.	No	Yes

Commands	Description	Access Level = Basic	Access Level = Privileged
`reboot`	Reboots the Edge.	No	Yes
`shutdown`	Powers off the Edge.	No	Yes
`hardreset`	Deactivates the Edges, restores the Edge's default configuration, and restores original software version.	No	Yes
`edged`	Activates or deactivates the Edge processes.	No	Yes
`restartdhcpserver`	Restarts the DHCP server.	No	Yes
Linux Shell Command			
`shell`	Takes you into the Linux shell. Type exit to return to the secure Edge CLI.	No	Yes

20.4.1 Sample Outputs

This section provides the sample outputs of some of the commands that can be run in a secure Edge CLI.

edgeinfo

```
o10test_velocloud_net:velocli> edgeinfo Model: vmware Serial: VMware-420efa0d2a6ccb35-9b
9bee2f04f74b32 Build Version: 5.0.0 Build Date: 2021-12-07_20-17-40 Build rev: R500-20211207-
MN-8f5954619c Build Hash: 8f5954619c643360455d8ada8e49def34faa688d
```

seainfo

```
o10test_velocloud_net:velocli> seainfo { "rootlocked": false, "seauserinfo": { "o2super_velo
cloud_net": { "expiry": 1641600000000, "privilege": "BASIC" } } }
```

tcpdump

```
o10test_velocloud_net:velocli> tcpdump -nnpi eth0 -c 10 reading from file -, link-type EN10MB
 (Ethernet) 09:45:12.297381 IP6 fd00:1:1:2::2.2426 > fd00:ff01:0:1::2.2426: UDP, length 21
 09:45:12.300520 IP6 fd00:ff01:0:1::2.2426 > fd00:1:1:2::2.2426: UDP, length 21 09:45:12.399077
 IP6 fd00:1:1:2::2.2426 > fd00:ff01:0:1::2.2426: UDP, length 21 09:45:12.401382 IP6 fd00:ff01:0:1
::2.2426 > fd00:1:1:2::2.2426: UDP, length 21 09:45:12.442927 IP6 fd00:1:1:2::2.2426 >
 fd00:ff01:0:1::2.2426: UDP, length 83 09:45:12.444745 IP6 fd00:ff01:0:1::2.2426 > fd00:1:1:2::2
.2426: UDP, length 83 09:45:12.476765 IP6 fd00:ff01:0:1::2.2426 > fd00:1:1:2::2.2426: UDP, length
 64 09:45:12.515696 IP6 fd00:ff02:0:1::2.2426 > fd00:1:1:2::2.2426: UDP, length 21
```

pcap

```
o10test_velocloud_net:velocli> pcap -nnpi eth4 -c 10 The capture will be saved to file
 o10test_velocloud_net_2021-12-09_09-57-50.pcap o10test_velocloud_net:velocli> tcpdump: listening
 on eth4, link-type EN10MB (Ethernet), capture size 262144 bytes 10 packets captured 10 packets
 received by filter 0 packets dropped by kernel
```

debug

```
o10test_velocloud_net:velocli> debug --dpdk_ports_dump name port link ignore strip speed duplex
 autoneg driver ge3 0 1 0 1 1000 1 1 igb ge6 4 0 2 1 0 0 1 ixgbe ge5 5 0 2 1 0 0 1 ixgbe ge4 1
 0 2 1 0 0 0 igb sfp2 2 0 2 1 0 0 1 ixgbe sfp1 3 0 2 1 0 0 1 ixgbe net_vhost0 6 0 0 1 10000 1 0
 net_vhost1 7 0 0 1 10000 1 0
```

diag

```
o10test_velocloud_net:velocli> diag ARP_DUMP --count 10 Stale Timeout: 2min | Dead Timeout: 25min
 | Cleanup Timeout: 240min GE3 192.168.1.254 7c:12:61:70:2f:d0 ALIVE 1s LAN-VLAN1 10.10.1.137
 b2:84:f7:c1:d3:a5 ALIVE 34s
```

ifstatus

```
o10test:velocli> ifstatus { "deviceBoardName": "EDGE620-CPU", "deviceInfo": [], "edgeActivated":
 true, "edgeSerial": "HRPGPK2", "edgeSoftware": { "buildNumber": "R500-20210821-DEV-301514018f
\n", "version": "5.0.0\n" }, "edgedDisabled": false, "interfaceStatus": { "GE1": { "autonegotiat
ion": true, "duplex": "Unknown! (255)", "haActiveSerialNumber": "", "haEnabled": false,
 "haStandbySerialNumber": "", "ifindex": 4, "internet": false, "ip": "", "is_sfp": false,
 "isp": "", "linkDetected": false, "logical_id": "", "mac": "18:5a:58:1e:f9:22", "netmask":
 "", "physicalName": "ge1", "reachabilityIp": "8.8.8.8", "service": false, "speed": "Unkn",
 "state": "DEAD", "stats": { "bpsOfBestPathRx": 0, "bpsOfBestPathTx": 0 }, "type": "LAN" }, "GE2":
 { "autonegotiation": true, "duplex": "Unknown! (255)", "haActiveSerialNumber": "", "haEnabled":
 false, … … } ] }
```

getwanconfig

```
o10test_velocloud_net:velocli> getwanconfig GE3 { "details": { "autonegotiation": "on", "driver":
 "dpdk", "duplex": "", "gateway": "169.254.7.9", "ip": "169.254.7.10", "is_sfp": false,
 "linkDetected": true, "mac": "00:50:56:8e:46:de", "netmask": "255.255.255.248", "password":
 "", "proto": "static", "speed": "", "username": "", "v4Disable": false, "v6Disable": false,
 "v6Gateway": "fd00:1:1:1::1", "v6Ip": "fd00:1:1:1::2", "v6Prefixlen": 64, "v6Proto": "static",
 "vlanId": "" }, "status": "OK" }
```

Chapter 21

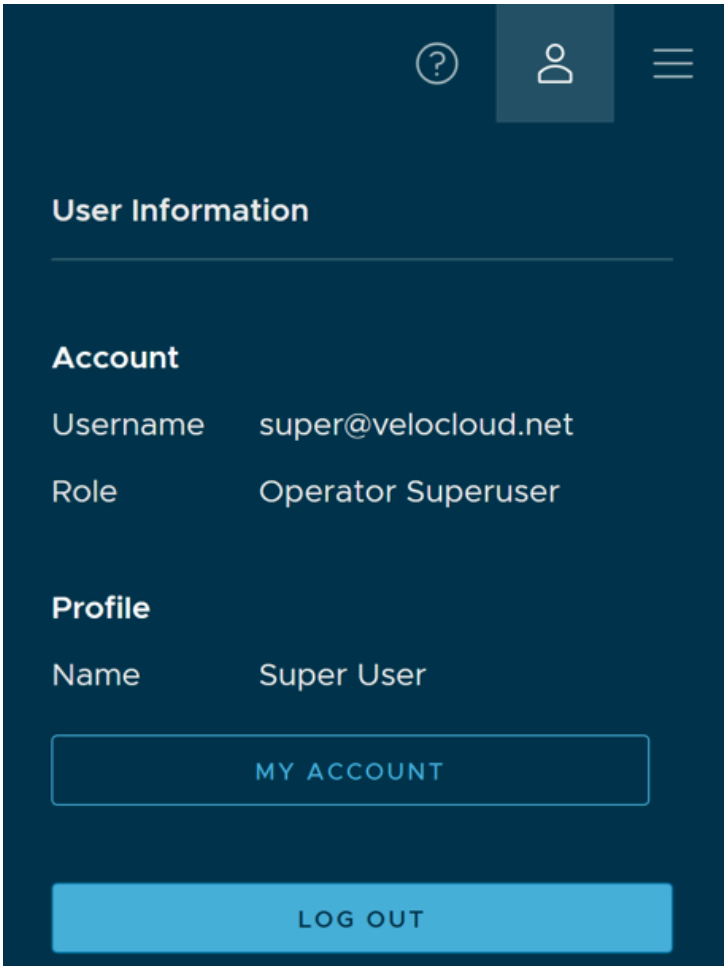
Configure User Account Details

Ensure to configure privileges for a user to access Edges in a secure manner. You must choose **Basic** access level for the user. You can configure the access level when you create a new user (under User Management), and choose to modify it at a later point in time. Ensure that you have Superuser role to modify the access level for a user.

The **My Account** page allows you to configure basic user information, SSH keys, and API tokens. You can also view the current user's role and the associated privileges.

To access the **My Account** page, follow the below steps:

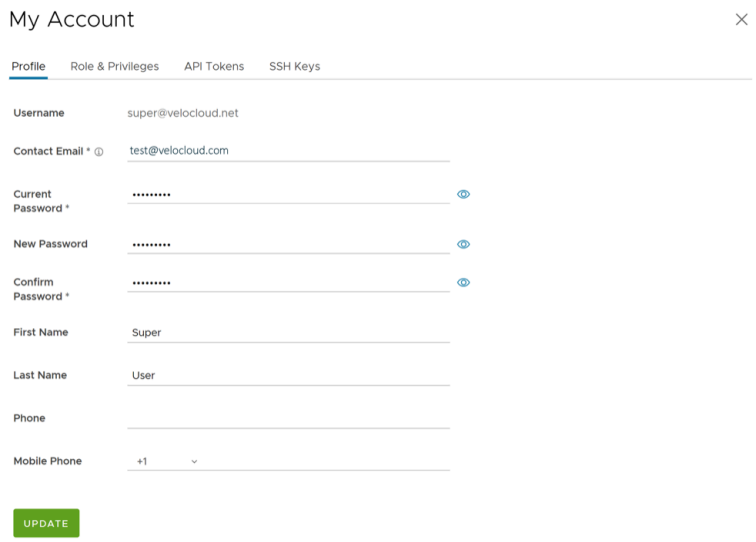
1. Select the **User** icon in the Global Navigation located at the top right of the screen.
   The **User Information** panel is displayed as shown below:
   Figure 21-1: User Information



2. Select the **My Account** button.

The following screen appears:

Figure 21-2: Profile Tab



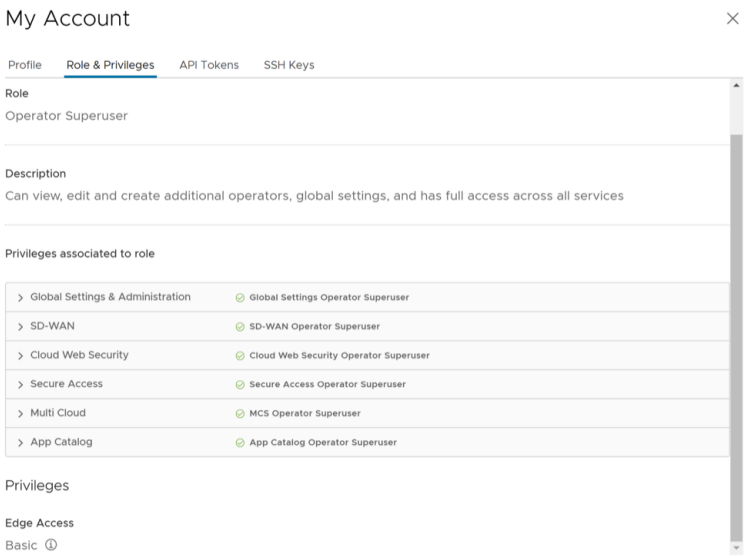
3. The **Profile** tab is displayed by default. You can update the following basic user details:

Table 72: Profile Tab- Options and Descriptions

Option	Description
Username	Displays the username and it is a read-only field.
Contact Email	Enter the primary contact email address of the user.
Current Password	Enter the current password.
New Password	Enter the new password. **Note:** Starting from the 4.5 release, the use of the special character "<" in the password is no longer supported. In cases where users have already used "<" in their passwords in previous releases, they must remove it to save any changes on the page.
Confirm Password	Re-enter the new password.
First Name	Enter the first name of the user.
Last Name	Enter the last name of the user.
Phone	Enter the primary phone number of the user.
Mobile Phone	Enter the mobile number of the user along with the country code.

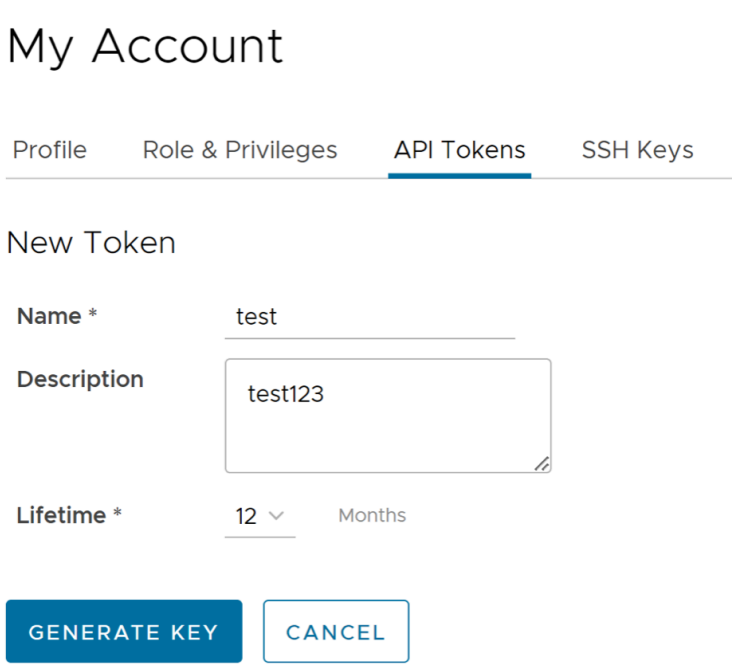
4. Select the **Role** tab to view the existing user role and description. It also displays the privileges associated with the user role.

   Figure 21-3: Role & Privileges Tab



5. Select the **API Tokens** tab.
   The following screen is displayed.

   Figure 21-4: API Tokens Tab



6. Enter a **Name** and **Description** for the token, and then choose the **Lifetime** from the drop-down menu.
7. Select **Generate Key**.

8. Select the **SSH Keys** tab to configure a Secure Shell (SSH) key-based authentication.

   The SSH key-based authentication is a secure and robust authentication method to access VeloCloud Edges. It provides a strong, encrypted verification and communication process between users and Edges. The use of SSH keys bypasses the need to manually enter login credentials and automates the secure access to Edges.

   Note:

   - Both the Edge and the Orchestrator must be using Release 5.0.0 or later for this feature to be available.
   - Users with Operator Business or Business Specialist account roles cannot access Edges using key-based authentication.

   When using key-based authentication to access Edges, a pair of SSH keys are generated- Public and Private.

   The public key is stored in the database and is shared with the Edges. The private key is downloaded to your computer, and you can use this key along with the SSH username to access Edges. You can generate only one pair of SSH keys at a time. If you need to add a new pair of SSH keys, you must delete the existing pair and then generate a new pair. If a previously generated private key is lost, you cannot recover it from the Orchestrator. You must delete the key and then add a new key to gain access.

   Based on their roles, users can perform the following actions:

   - All users, except users with Operator Business or Business Specialist account roles, can create and revoke SSH keys for themselves.
   - Operator Super users can manage SSH keys of other Operator users, Partner users, and Enterprise users, if the Partner user and Enterprise user have delegated user permissions to the Operator.
   - Partner Super users can manage SSH keys of other Partner users and Enterprise users, if the Enterprise user has delegated user permissions to the Partner.
   - Enterprise Super users can manage the SSH keys of all the users within that Enterprise.
   - Super users can only view and revoke the SSH keys for other users.

   Note: Enterprise and Partners Customers without SD-WAN service access are not able to configure or view SSH keys related details.

Select the **SSH Keys** tab, and then select the **Generate Key** button. The following screen appears:

Figure 21-5: SSH Keys Tab

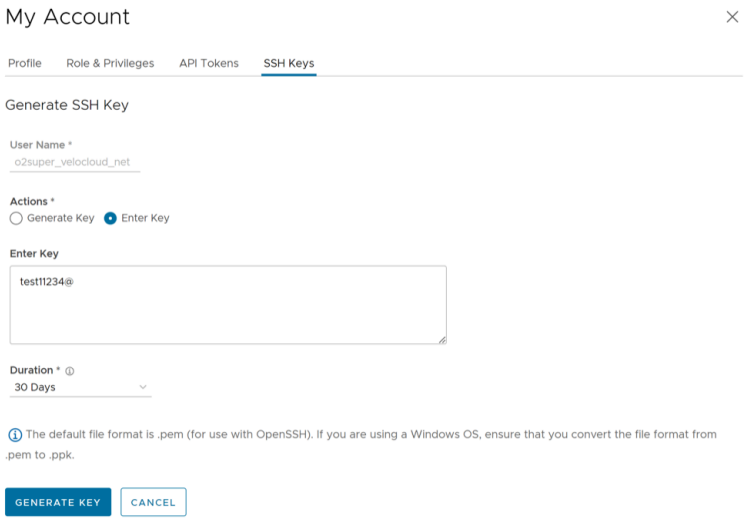


Table 73: SSH Keys Tab- Options and Descriptions

Option	Description
User Name	Displays the username and it is a read-only field.
Actions	Select either one of the following options: • **Generate key**: Use this option to generate a new pair of public and private SSH keys. **Note:** The generated key gets downloaded automatically. The default file format in which the SSH key is generated is .pem. If you are using a Windows operating system, ensure that you convert the file format from .pem to .ppk, and then import the key. For instructions to convert .pem to .ppk, see Convert Pem to Ppk File Using PuTTYgen. • **Enter key**: Use this option to paste or enter the public key if you already have a pair of SSH keys.
PassPhrase	If **Generate key** option is selected, then you have to enter a unique passphrase to further safeguard the private key stored on your computer. **Note:** This is an optional field and is available only if you select the **Generate Key** action.
Duration	Select the number of days by when the SSH key must expire.

9. Select **Generate Key**.

Note: Only one SSH Key can be created per user.

10. To deactivate an SSH token, select the **Revoke** button. A pop-up window appears, to confirm the revoke operation. Select the check box, and then select **Revoke** to permanently revoke the key.

    The SSH keys for a user are automatically deleted when:

- You change the user role to Operator Business or Business Specialist because these roles cannot access Edges using key-based authentication.
- You delete a user from the Orchestrator.

> **Note:** When a user is deleted or deactivated from the external SSO providers, the user can no longer access the Orchestrator. But the user's Secure Edge Access keys remain active until the user is explicitly deleted from the Orchestrator as well. Therefore, you must first delete the user from the IdP, before deleting from the Orchestrator.

Ensure that you enable secure Edge access for the Enterprise and switch the authentication mode from Password-based to Key-based. See Enable Secure Edge Access for an Enterprise.

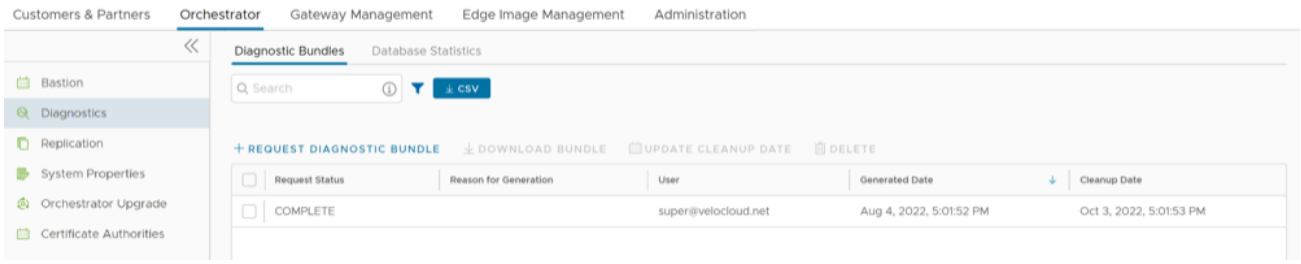
Chapter 22

Orchestrator Diagnostics

The VeloCloud Orchestrator Diagnostics bundle is a collection of diagnostic information to troubleshoot the Orchestrator. For Orchestrator on-prem installation, Operators can collect the Orchestrator Diagnostic bundle from the Orchestrator UI and provide it to the Arista Support team for offline analysis and troubleshooting.

In the Operator portal, navigate to **Orchestrator** > **System Properties**, and then set the System property `session.options.enableBastionOrchestrator` to **True** to view the **Diagnostics** tab.

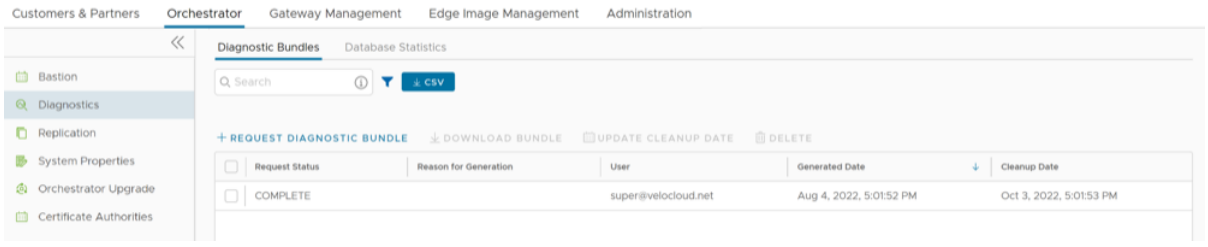
Figure 22-1: Diagnostics



The following are the options available to troubleshoot Orchestrator Diagnostics:

- **Diagnostic Bundles**: Request and download a diagnostic bundle.
- **Database Statistics**: Provides read-only access view of some of the information from a diagnostic bundle.

1. **Diagnostic Bundles**: To access the diagnostic bundles perform the following steps:
   a. In **Operator** portal, select the **Orchestrator** tab.
   b. In the left navigation pane, select **Diagnostics**.
      The **Diagnostic Bundles** page appears with the existing diagnostic bundles.
      Figure 22-2: Diagnostic Bundles



   c. The Orchestrator Diagnostics table grid includes the following information:

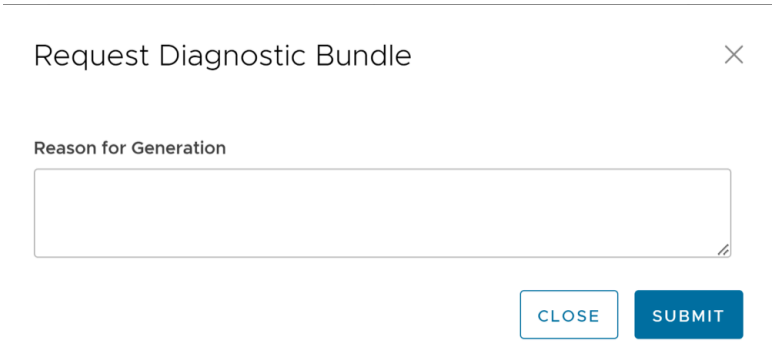
Table 74: Diagnostic Bundles- Options and Descriptions

Option	Description
Request Status	The following are the request status: • Complete • In Progress If a bundle has not completed the download, the **In Progress** status appears.
Reason for Generation	The specific reason given for generating a diagnostic bundle. Select the **Request Diagnostic Bundle** button to include a description of the bundle.
User	The individual logged into the SD-WAN Orchestrator.
Generated	The date and time when the diagnostic bundle request was sent.
Update Cleanup Date	The default **Cleanup Date** is three months after the generated date, when the bundle will be automatically deleted. If you wish to extend the cleanup date, then select the **bundle** and then select this option to make the required changes. For additional information, see the **Update Cleanup Date** section below.

d. To generate a new Diagnostic Bundle, follow the below steps:

1. Select the **Request Diagnostic Bundle** button.
2. In the **Request Diagnostic Bundle** dialog, enter the reason for generation.

   Figure 22-3: Request Diagnostic Bundle



3. Select **Submit**.

   The **Diagnostic Bundles** page displays the details of the bundle being generated, along with the status.

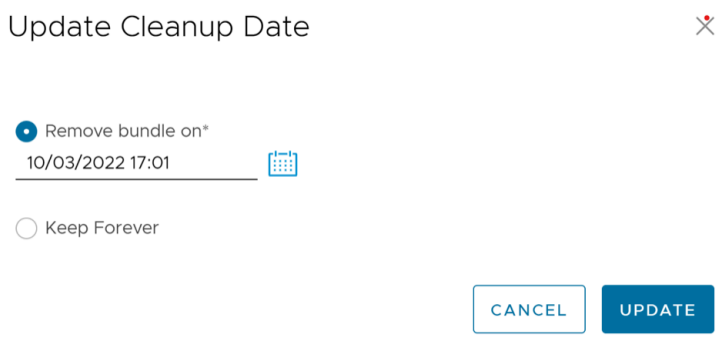
e. To search a specific diagnostic bundle, enter a relevant search text in the **Search** box. For advanced search, select the **filter** icon next to the **Search** box to filter the results by specific criteria.

f. You can download the generated Diagnostic bundles to troubleshoot an Orchestrator. To download a generated bundle, select the required check box in the **Request Status** column and select **Download Bundle**. The bundle is downloaded as a ZIP file. You can send the downloaded bundle to a Arista Support representative for debugging the data.

g. The completed bundles get deleted automatically on the date displayed in the column called **Cleanup Date**.

1. To update the cleanup date of a generated bundle, select the required check box in the **Request Status** column and select **Update Cleanup Date**.
2. In the **Update Cleanup Date** pop-up window, choose the date on which the selected bundles should be deleted and select **Update**.

   Figure 22-4: Update Cleanup Date



3. Select the **Keep Forever** check box to retain the bundle, so that the bundle does not get deleted automatically.

The Orchestrator Diagnostics table grid updates to reflect the changes to the Cleanup Date.

h. To delete a bundle manually, select the required check box in the **Request Status** column and select **Delete**.

2. **Database Statistics**: The Database Statistics tab provides read-only access view of the information from a diagnostic bundle.

a. To view it, select **Database Statistics** option available at the top of the window.

b. If you require additional information, go to the **Diagnostic Bundles** tab, request a diagnostic bundle, and download it locally.

c. The Database Statistics tab displays the following information:

Figure 22-5: Database Statistics

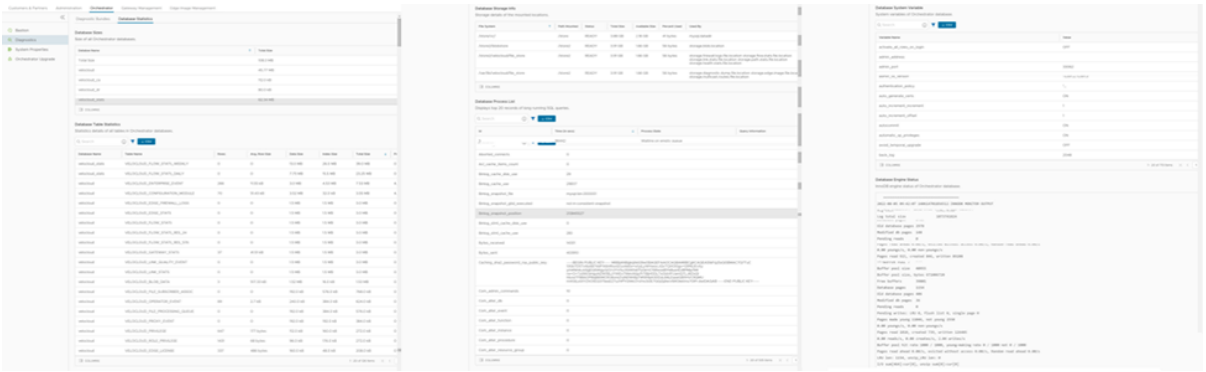


Table 75: Database Statistics- Options and Descriptions

Option	Description
Database Sizes	Sizes of the Orchestrator databases.
Database Table Statistics	Statistical details of all tables in the Orchestrator database.
Database Storage Info	Storage details of the mounted locations.
Database Process List	The top 20 records of long-running SQL queries.
Database Status Variable	The status variables of the MySQL server
Database System Variable	System variables of the MySQL server.
Database Engine Status	The InnoDB engine status of the MySQL server.

Chapter 23

Orchestrator Upgrade

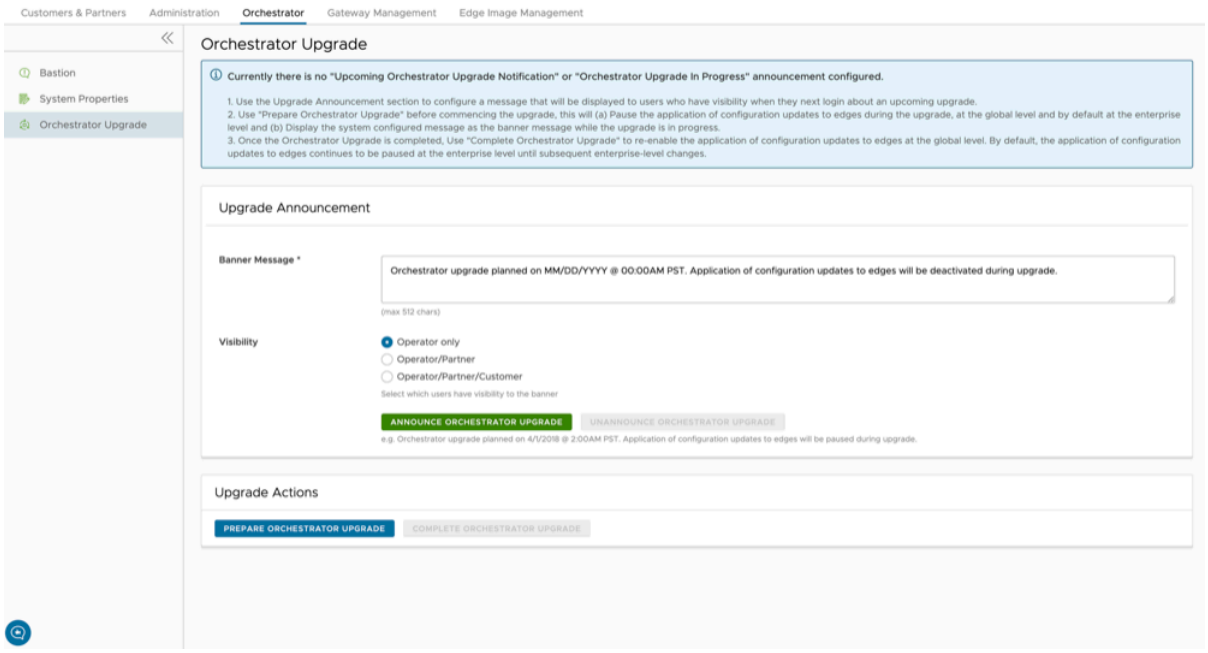
This section discusses the prerequisites and steps required to upgrade an Orchestrator. The Orchestrator allows you to configure and send a banner message about an upcoming Orchestrator upgrade. The banner is displayed to users the next time they login to the Orchestrator. You can customize the banner message and visibility for the users.

To upgrade an Orchestrator, perform the following steps:

1. **Configure Orchestrator Upgrade Announcement**: The **Upgrade Announcement** area enables you to configure and send a message about an upcoming upgrade. To send an Orchestrator Upgrade announcement, perform the following steps:
   a. In the **Operator** Portal, select the **Orchestrator** tab, and go to **Orchestrator Upgrade** in the left navigation pane.

      The **Orchestrator Upgrade** screen appears.

      Figure 23-1: Orchestrator Upgrade



   b. Under Upgrade Announcement, set the banner message and visibility for the users.

Table 76: Orchestrator Upgrade- Options and Descriptions

Option	Description
Banner Message	Enter the required **Banner Message** in the textbox to announce the status of an upcoming upgrade. A popup message appears indicating that you have successfully created your announcement, and your banner message displays at the top of the Orchestrator.
Visibility	You can choose the banner **Visibility** for the users. By default, **Operator only** is selected.

c. Select the **Announce Orchestrator Upgrade** button to display the banner message.

   A popup message appears indicating that you have successfully created your announcement, and that your banner message displays at the top of the Orchestrator.

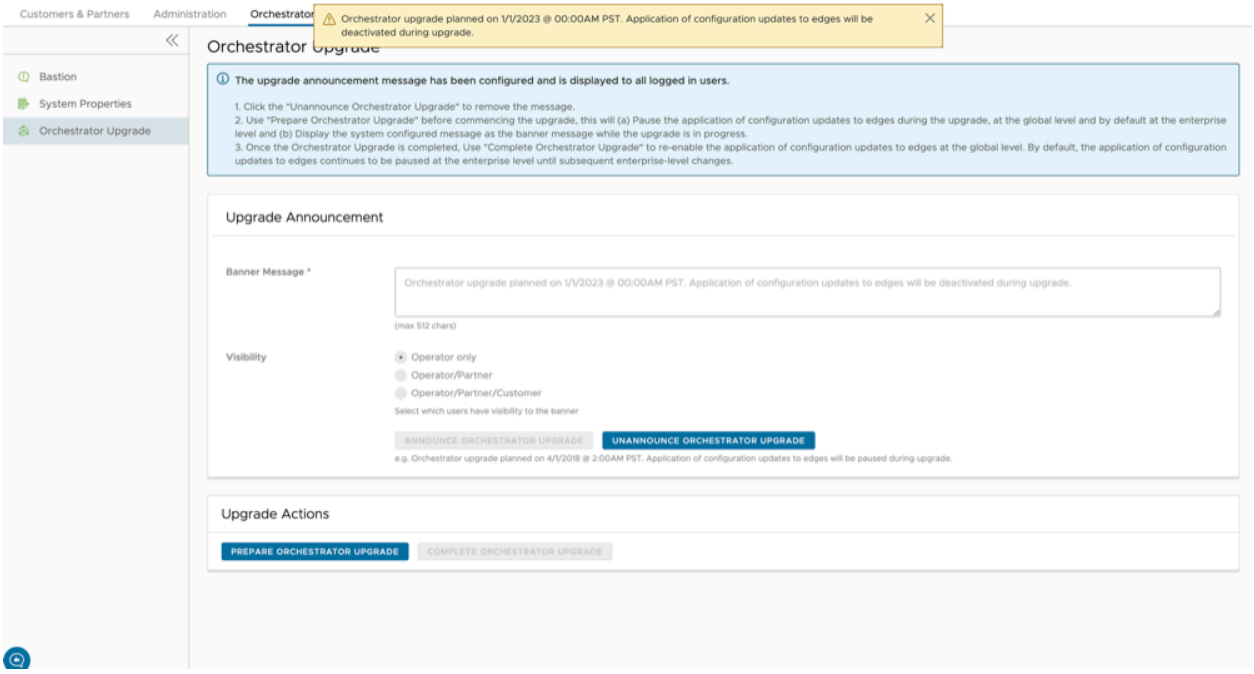
d. If you want to remove the announcement from the Orchestrator, select the **Unannounce Orchestrator Upgrade** button.

   A popup message appears indicating that you have successfully unannounced the Orchestrator upgrade.

2. **Prepare Orchestrator Upgrade**: After you have configured the Orchestrator upgrade banner message and visibility for the users, select the **Prepare Orchestrator Upgrade** button.

   This pauses the application of the configuration updates of Edges during the upgrade, at the global level and by default at the enterprise level. It displays the system configured message as the banner message while the upgrade is in progress.

Figure 23-2: Prepare Orchestrator Upgrade



Contact the Arista Support to prepare for the Orchestrator upgrade. Collect the following information prior to contacting the Support team:

- Provide the current and target Orchestrator versions, for example: current version (i.e. 2.5.2 GA-20180430), target version (3.3.2 p2).

> **Note:** For the current version, this information can be found on the top, right corner of the Orchestrator by selecting the **Help** icon.

- Provide a screenshot of the replication dashboard of the Orchestrator as shown below.
  - Hypervisor Type and version (i.e. vSphere 6.7)
  - Commands from the Orchestrator:

    > **Note:** Commands must be run as root (e.g. **`sudo <command>`** or **`sudo -i`**).

    - Run the script `/opt/vc/scripts/vco_upgrade_check.sh` to check:
      - LVM layout
      - Memory Information
      - CPU Information
      - Kernel Parameters
      - Some system properties
      - ssh configurations
      - MySQL schema and database sizes
      - File_store locations and sizes
    - Copy of `/var/log`

      ```
      tar -czf /store/log-`date +%Y%M%S`.tar.gz --newer-mtime="36 hours ago" /var/log
      ```

    - From the Standby Orchestrator:

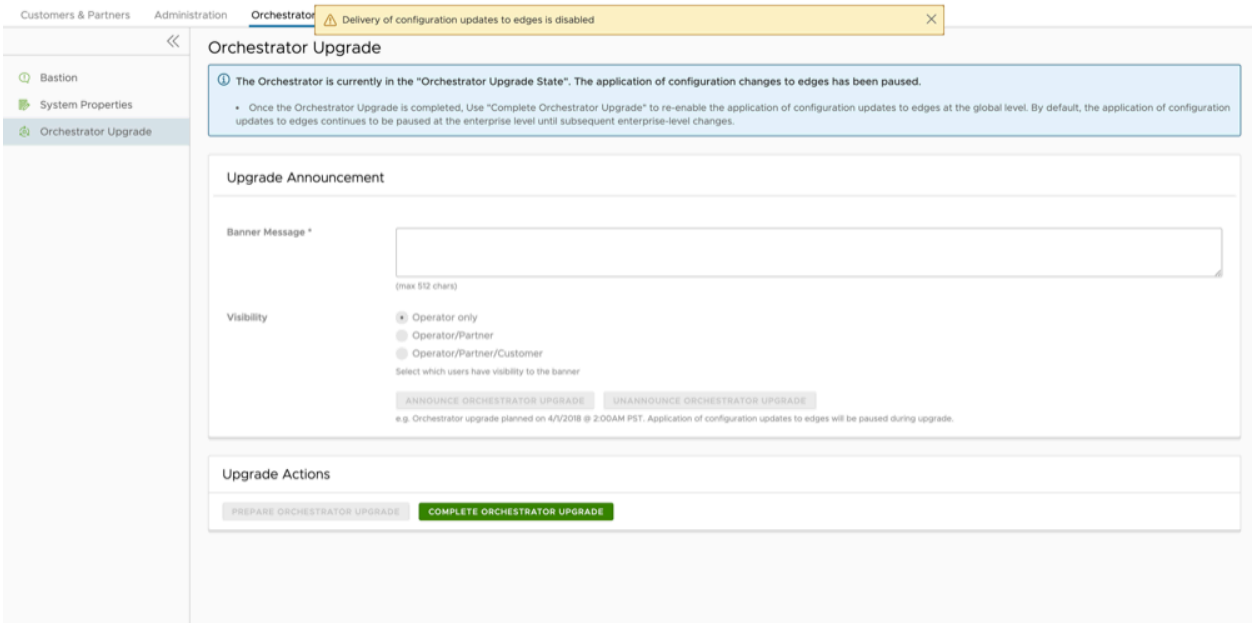
      ```
      sudo mysql --defaults-extra-file=/etc/mysql/velocloud.cnf velocloud -e 'SHOW SLAVE
       STATUS \G'
      ```

    - From the Active Orchestrator:

      ```
      sudo mysql --defaults-extra-file=/etc/mysql/velocloud.cnf velocloud -e 'SHOW MASTER
       STATUS \G'
      ```

3. **Complete Orchestrator Upgrade**: After you have complete the Orchestrator upgrade, select the **Complete Orchestrator Upgrade** button under **Upgrade Actions**. This re-enables the application of the configuration updates of Edges at the global level.

Figure 23-3: Complete Orchestrator Upgrade



   a. To verify that the status of the upgrade is complete, run the following command to display the correct version number for all the packages:

```
dpkg -l|grep vco
```

   b. When you are logged in as an Operator, you can confirm if the same version displays by selecting the **Help** icon at the top right corner of the page.

More information regarding how to upgrade the Orchestrator can be found in the following sections of the *Arista Orchestrator Deployment and Monitoring Guide*:

- Upgrade VeloCloud Orchestrator with DR Deployment
- Upgrade VeloCloud Orchestrator from Version 3.3.2 or 3.4 to Version 4.0

Chapter 24

Replication

Information regarding how to set up VeloCloud Orchestrator Replication, also known as disaster recovery (DR), is available in the section *Configure VeloCloud Orchestrator Disaster Recovery* of the *Arista Orchestrator Deployment and Monitoring Guide*.

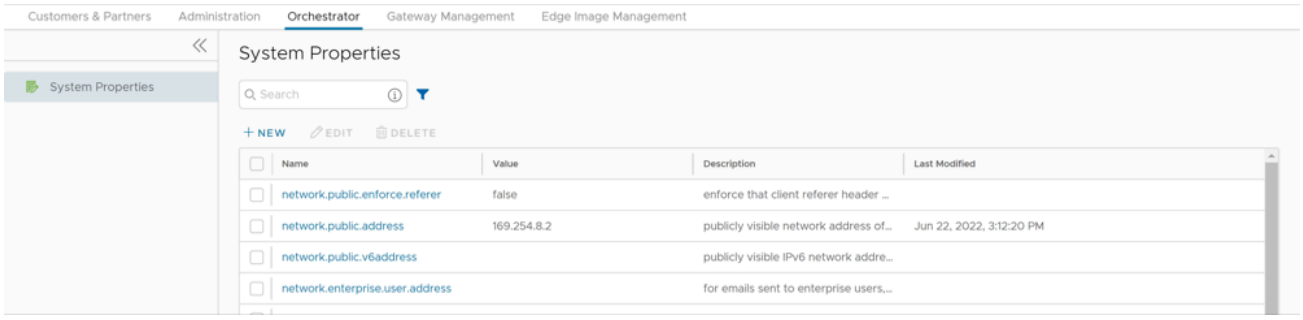
Chapter 25

System Properties

Arista provides System Properties to configure various features and options available in the **Orchestrator** portal.

In the **Operator** portal, navigate to the **System Properties** page, which lists the available pre-defined system properties. See List of System Properties, which lists some of the system properties that you can modify as an Operator.

Figure 25-1: System Properties



To configure a system property:

1. In the **Operator** portal, go the **Orchestrator** > **System Properties**.
2. Select **New System Property** to add a new property.

3. In the **New System Property** window, configure the following parameters:

Figure 25-2: New System Property

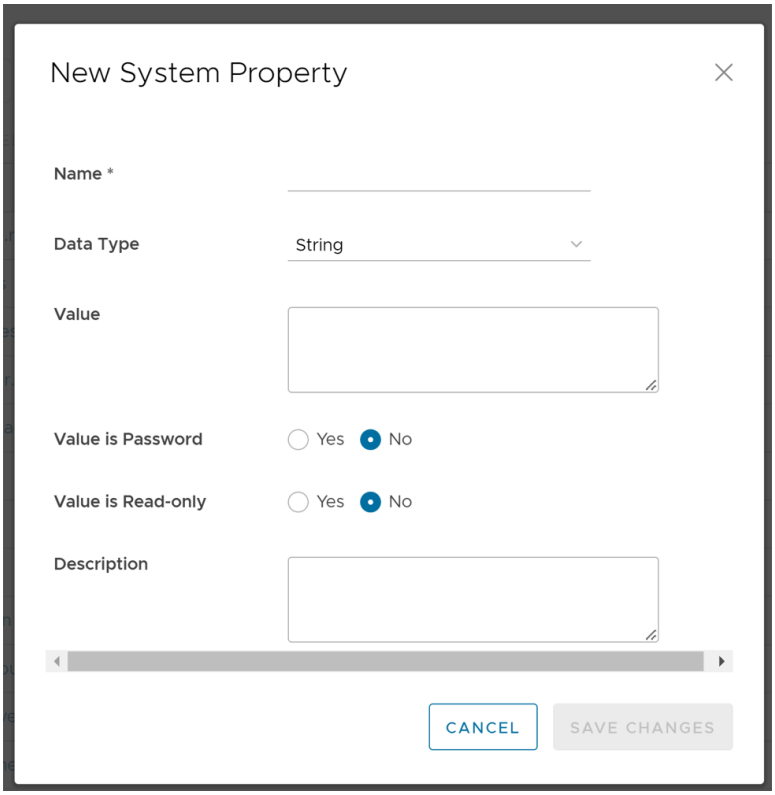


Table 77: New System Property- Options and Descriptions

Option	Description
Name	Enter the **Name** for the new system property.
Data Type	Choose the required **Data Type** from the drop-down menu.
Value	Enter the **Value** for the property according to the data type.
Value is Password	Select **Yes** or **No** as required.
Value is Read-only	Select **Yes** or **No** for as required.
Description	Enter the **Description** for the new system property

4. Select **Save Changes**.
5. You can use the **Search** field to find a specific system property.

> **Note:** It is recommended to contact Arista Support before making changes to the system properties.

See the section titled, *List of System Properties* in the *Arista Orchestrator Deployment and Monitoring Guide*, which lists some of the system properties that you can modify as an Operator.

Chapter 26

External Certificate Authority

The External Certificate Authority (CA) feature is for large enterprises and government customers who deploy an on-premise Orchestrator and have a requirement to use their own certificate authority (CA) rather than the default self-signed Orchestrator certificate authority. This section covers how to enable and configure External CA.

When External CA is configured, instead of the Orchestrator receiving a certificate signing request (CSR) and issuing the device certificates itself, the Orchestrator is required to pass the CSR to an external CA for issuance of the certificate. The device certificate will be returned to the Orchestrator and sent to the Edge or Gateway.

A customer using this feature would be expected to have deployed a commercial certificate authority, for example from PrimeKey (EJBCA PKI), or in some cases, may have implemented their own proprietary CA.

Beginning with Release 5.1.0, an Orchestrator where external CA is activated may be configured with two new API-ready modes:

- **Manual Mode** provides support for any certificate authority and provides flexibility and control with the user manually performing each step in the certificate process.
- **Asynchronous Mode** provides support for any certificate authority with the ability to script the manual steps and automating the recurring tasks.

These modes are added to **Synchronous or Automated Mode**, which was the first mode introduced. With Synchronous mode, the Orchestrator integrates directly with an external CA (which, for Release 5.0.0 and forward, offered PrimeKey EJBCA PKI as the only available external certificate authority) and through REST APIs for certificate request, renewal, and revocation.

Enable External CA

The External CA feature is enabled through two System Properties. Enabling these system properties may only be done by an Operator with a Superuser role.

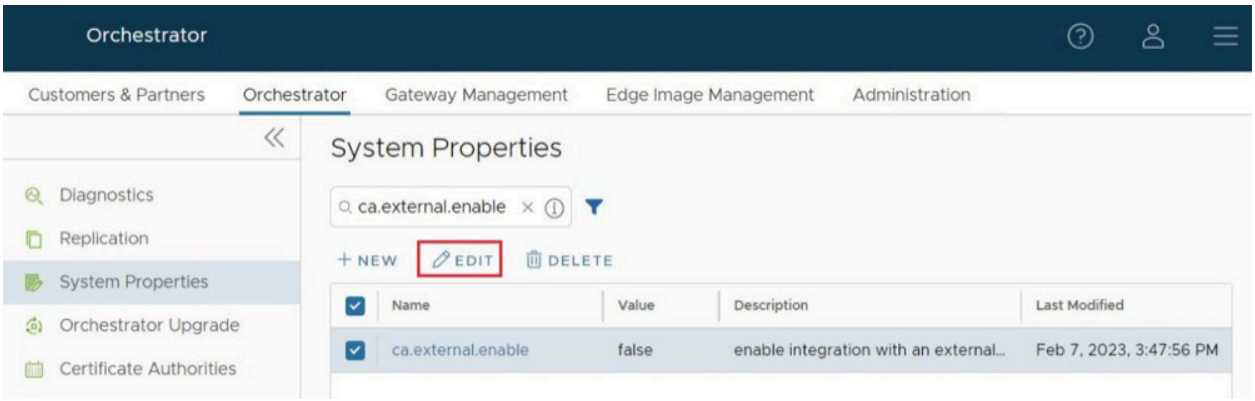
The first system property that must be enabled is `ca.external.configuration`. This property is manually created with a JSON data type and the JSON is populated consistent with the example seen below in the Sample External CA Configuration section.

Only after `ca.external.configuration` is created and enabled, should the Operator enable the second system property: `ca.external.enable`.

1. On the Orchestrator, select **System Properties**.

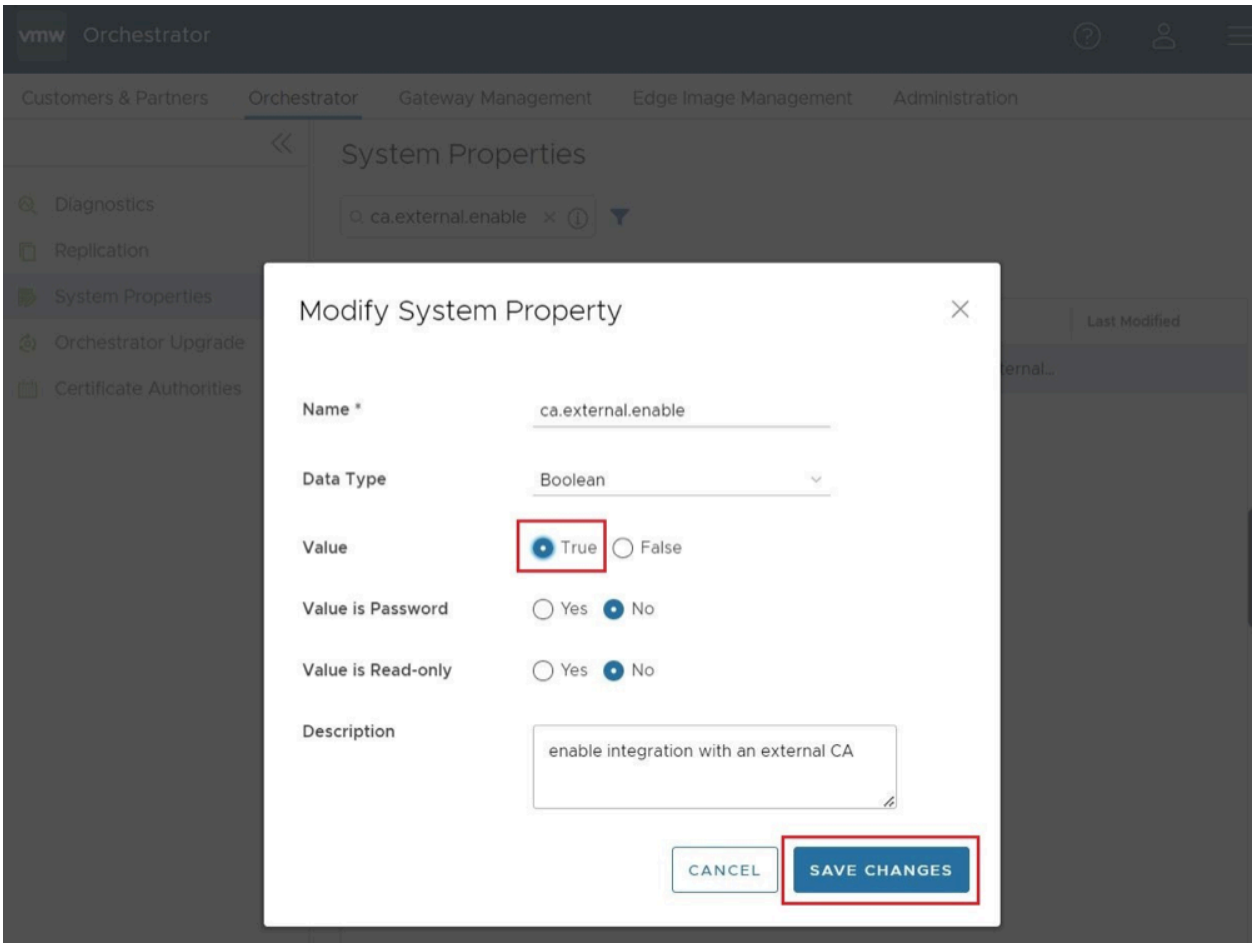
2. Using the search box on the **System Properties** page enter `ca.external.enable` as shown in the images below.

Figure 26-1: System Properties



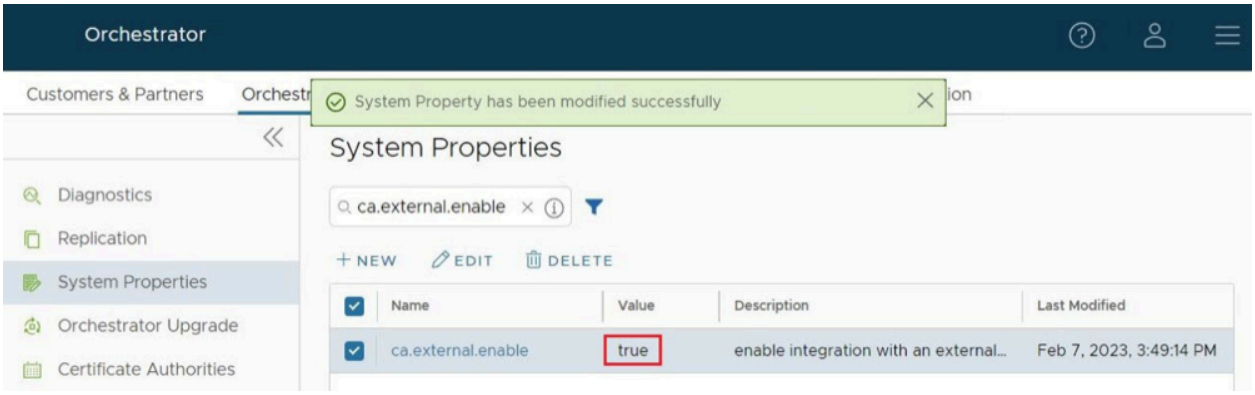
3. Once the `ca.external.enable` property is located, either select on that property or check the box and select **Edit**.
4. Change the `ca.external.enable` property to **True** and select **Save Changes** to complete the change as shown in the image below.

Figure 26-2: Modify System Property



The **System Property** page displays a confirmation that the property was successfully modified, and will now show that `ca.external.enable` is **True**.

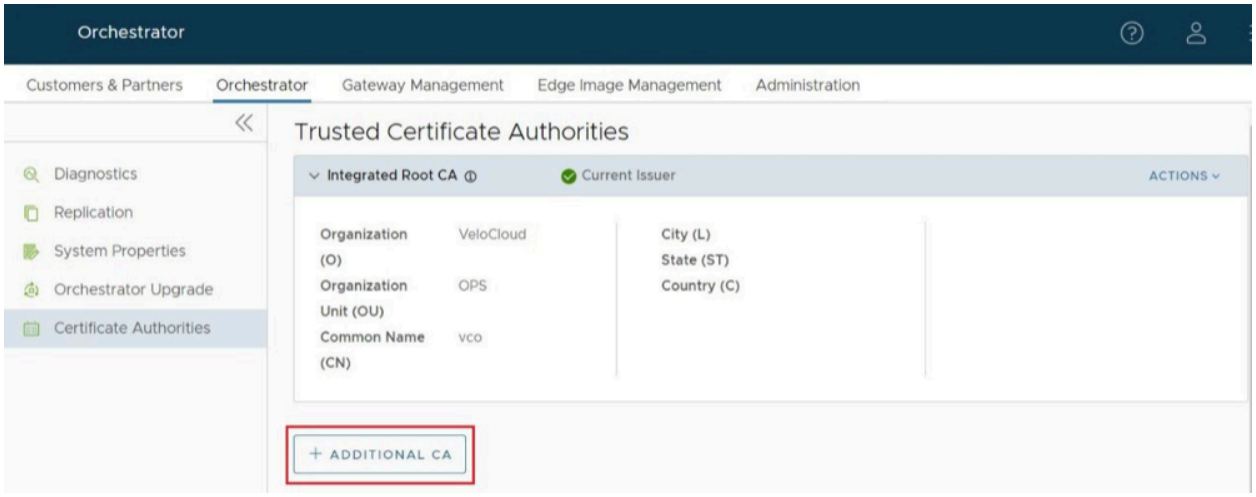
Figure 26-3: Confirmation Message



Configure External CA

Having enabled the External CA System Property, the Operator can now select **Orchestrator** > **Certificate Authorities** to begin configuring an external certificate authority.

Figure 26-4: Certificate Authorities

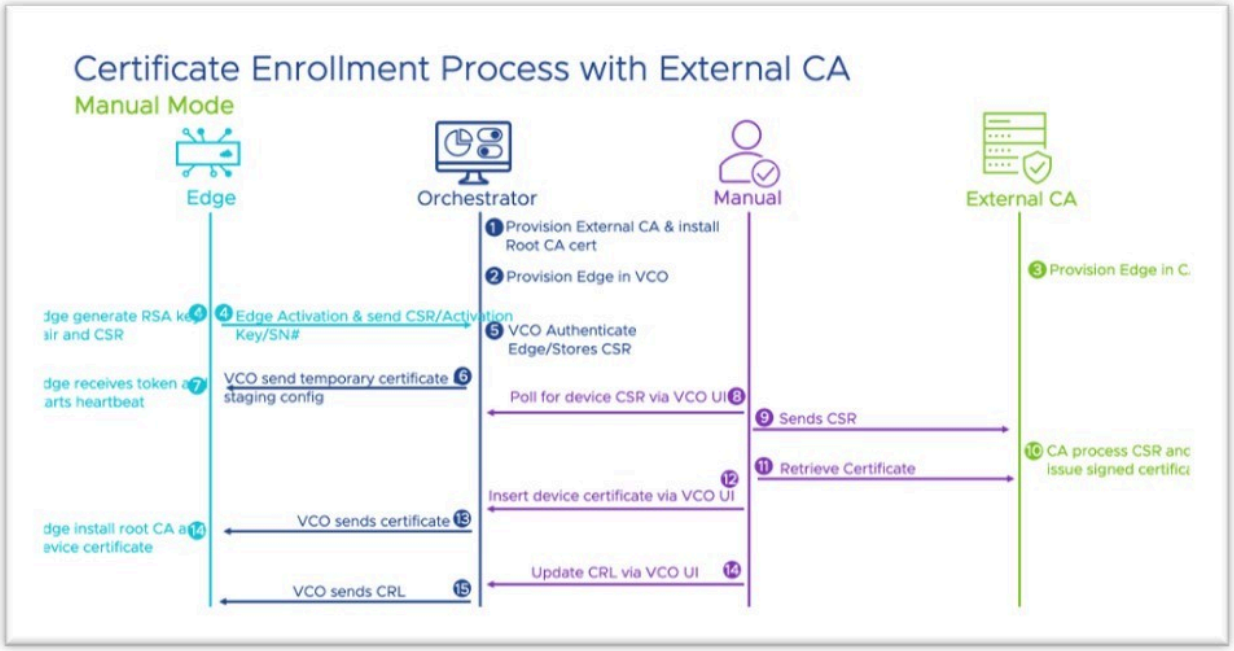


Configuring External CA can be done using one of three modes:

1. **Automated (Synchronous)**: With **Automated** mode, only one external certificate authority is supported: PrimeKey EJBCA PKI.

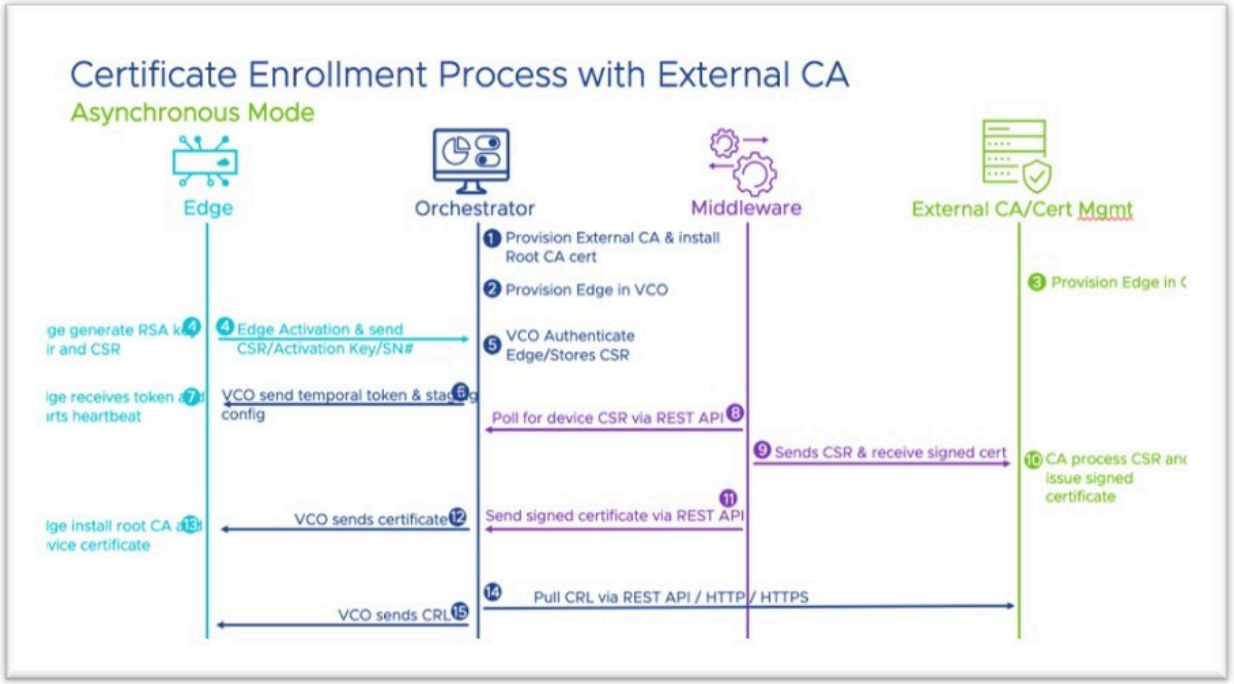
2. **Manual**: Manual mode provides support for any certificate authority and provides flexibility and control with the user manually performing each step in the certificate process.

Figure 26-5: Manual Mode



3. **Asynchronous**: Asynchronous mode provides support for any certificate authority with the ability to script the manual steps while automating the recurring tasks.

Figure 26-6: Asynchronous Mode

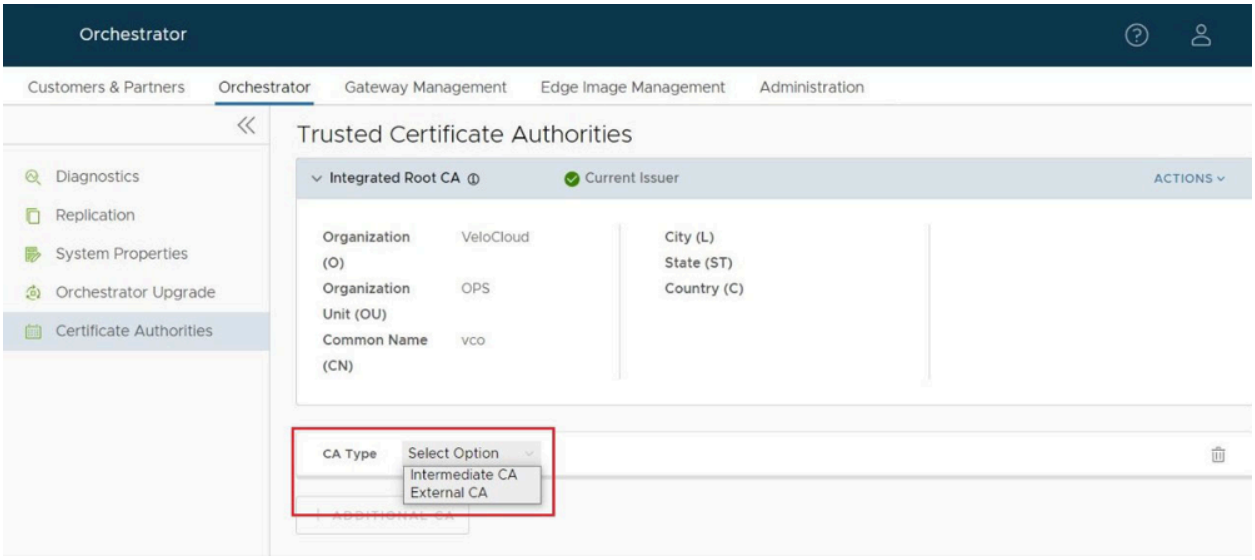


Limitations:

- External CA can only be enabled on an On-Premise Orchestrator managed by a single customer. This feature is not available on Orchestrators hosted by Arista.
- On an Orchestrator using Release 5.0.0, this feature can only use PrimeKey EJBCA PKI as an external CA.

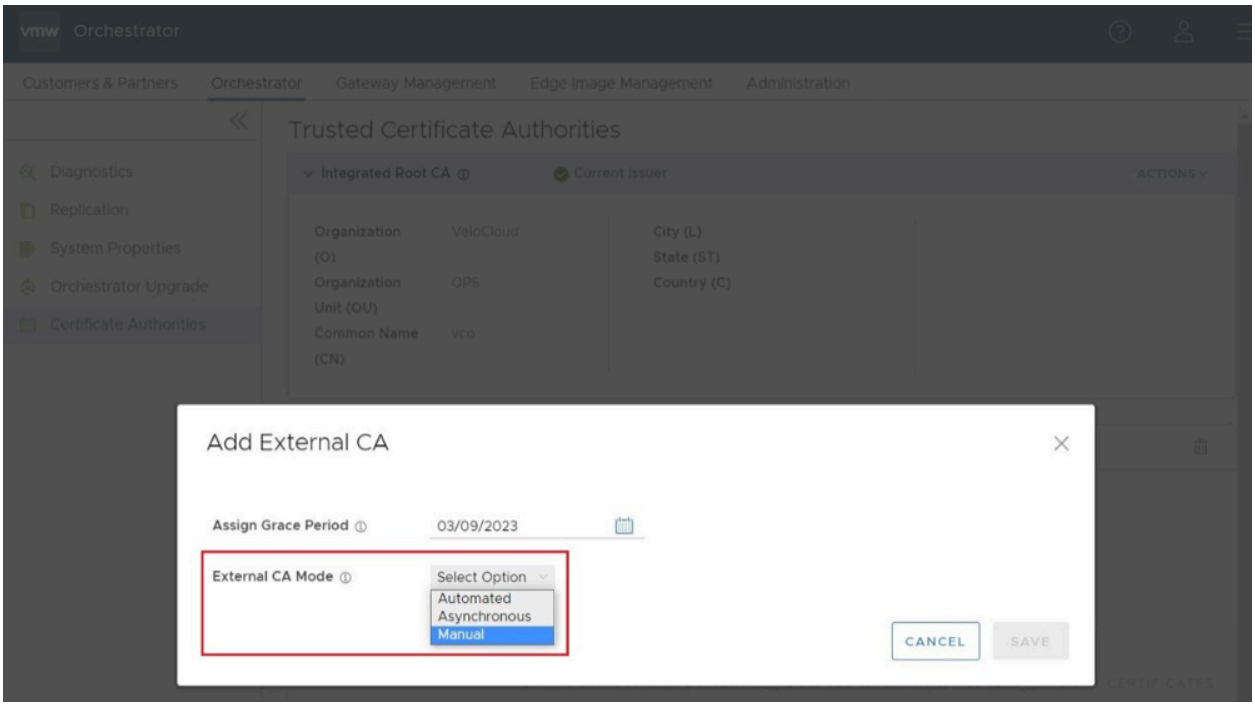
1. On the **Orchestrator** > **Certificate Authorities** page, select **+ Additional CA**.
2. After selecting **+ Additional CA**, the UI will change to **CA Type** with a drop down menu with the options of **Intermediate CA** and **External CA**. Select on **External CA**.

Figure 26-7: CA Type



3. Once External CA is selected, the screen changes to the Add External CA screen where an Operator can choose between the three previously mentioned External CA Modes: Automated (Synchronous), Asynchronous, and Manual.

Figure 26-8: External CA Mode



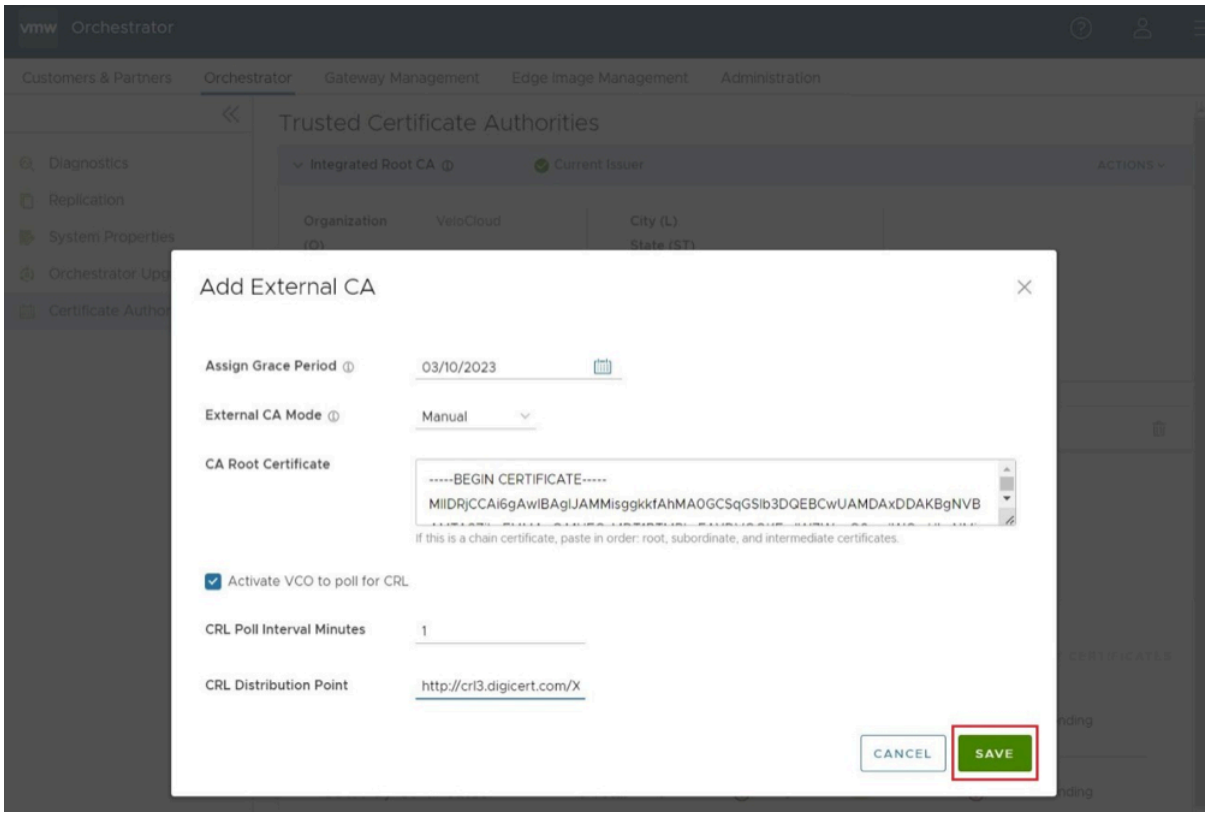
4. Having selected a CA Mode, the **Add External CA** screen changes to allow additional configuration of the external CA. This is where the Operator would paste in the **CA Root Certificate**.

   By checking the box for **Activate VCO to poll for CRL**, the Operator elects to have the Orchestrator to conduct certificate revocation checks using the Certificate Revocation List (CRL). If this option is checked, two additional configuration parameters appear to be configured by the Operator:

   a. **CRL Poll Interval in Minutes** determines how often in minutes the Orchestrator will conduct certificate revocation checking against the latest CRL.

b. **CRL Distribution Point** is the URL where the Orchestrator retrieves the latest CRL.

Figure 26-9: Add External CA



5. After the Operator has filled out all the required fields, they would select **Save**.

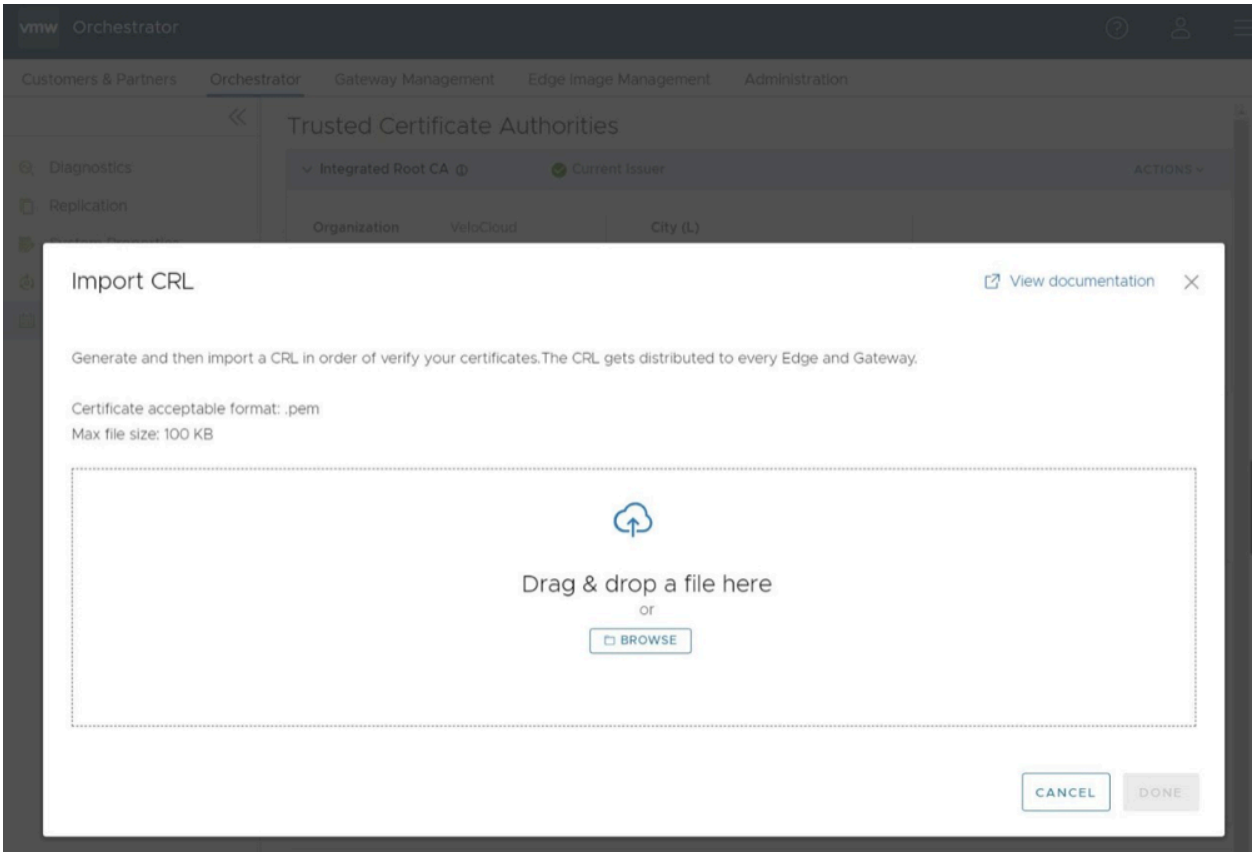
   Once an external CA is configured the Operator will have newly available options to **Import CRL** and **Download CRL**.

Figure 26-10: Import CRL

Figure 26-11: Download CRL

Using **Import CRL** while also having **Orchestrator CRL Polling** configured, an Operator can perform batch or individual imports and exports.

Figure 26-12: Import CRL



The CRL would perform a validation after any import of your certificates, and the Orchestrator distributes your CRL to every Edge and Gateway connected to your Orchestrator.

Note:

- There is a third System Property: `ca.external.caCertificate`. This System Property will appear once External CA is enabled and there is connectivity to a valid external CA. This property requires a PEM (privacy enhanced mail) encoded certificate.
- Edge/Gateway generated Certificate Sign Request (CSR) has only a Common Name (CN). While signing the CSR, the External CA adds the required subject.

Sample External CA Configuration

This section provides an example of a configuration for the `ca.external.configuration` field.


```
{ "integrationType": "SYNCHRONOUS", "csrDistinguishedName": { "CN_PID_SN": "Arista-SDWAN
" }, "synchronous": { "synchronousIntegrationType": "EJBCA", "ejbca": { "serverCaCert
ificate": "-----BEGIN CERTIFICATE-----\nMIIFFzCCA3+gAwIBAgIUGgattlewRnm/gyPxJ7PW6uJOjCc
wDQYJKoZIhvcNAQEL\nBQAwgZIxIzAhBgoJkiaJk/IsZAEBDBNyLTA1OTVhMTNjMTUzZDc2YWU1MRUwEwYD
\nVQQDDAxNYW5hZ2VtZW50Q0ExHjAcBgNVBAsMFWFtaS0wMmE0NDc0YzFmNzQ5NDBh\nODE0MDIGA1UECgwraX
AtMTAtODEtMTI1LTEzMi51cy13ZXN0LTIuY29tcHV0ZS5p\nbnRlcm5hbDAeFw0yMTAyMDQxOTA0MT
RaFw00NjAyMDUxOTA0MTNaMIGSMSMwIQYK\nCZImiZPyLGQBAQwTci0wNTk1YTEzYzE1M2Q3NmFlNT
EVMBMGA1UEAwwMTWFuYWdl\nbWVudENBMR4wHAYDVQQLDBVhbWktMDJhNDQ3NGMxZjc0OTQwYTgxNDAyBgNVBAoM
\nK2lwLTEwLTgxLTEyNS0xMzIudXMtd2VzdC0yLmNvbXB1dGUuaW50ZXJuYWwwggGi\nMA0GCSqGSIb3D
QEBAQUAA4IBjwAwggGKAoIBgQC2r0YYVKnusA7NS6aCSjbRdzMA\nNgbF1j3+aeWn6ZokjpFsk9Tav
nu0c9gETIMfVVFj6jCyTLZcHWuPt2r1aEfvuDyk\nW/u4kY8IaGSE5Z5+QH2I8gifTfegQBqFBSk8q
4dN7oOnoXFKhUgCRtTf6hd7aSji\nynyIUkEV6P/t5q+Mwql1EK6RdZzL6w9ycQOkG7mitfW4onJJcbIKy3abB/
vkiTmd8\nSQ10DyDXOzN6gwCrcUV0RfxIgd4YKN8Cj+/+bMw+It8mn5Dd/xl9FutYAQ+brZhy\nSDw5m2W66y/
znh3Fr1+DUn8b0wlgHrwPSi9i/QlOefRDMvFmjiDyXq+E/peirDyl\njVxYwn0ySgO5TympwkWw1Riibp4fJpYtw
YT4EJU85em1rD6PPrzfBPsGQeG4ljQE\nCZ2YrnOLctbv+sF5rYQzTl0lOrLMAuqJLyV4Shv+3Oj1S
zXKwkqJC0sCLcX+djmq\nYOJ9YxBke7DQKubTezHkyuk9tarEq5iHr68Ig3sCAwEAAaNjMGEwDwYDVR0TAQH/
\nBAUwAwEB/zAfBgNVHSMEGDAWgBRp8EFk1aYW+s/tweOUwuXh/xuMJzAdBgNVHQ4E\nFgQUafBBZNWmFvrP
7cHjlML14f8bjCcwDgYDVR0PAQH/BAQDAgGGMA0GCSqGSIb3\nDQEBCwUAA4IBgQCzAO0RZIHJUJw2
xbcLr2Cvr0tj+3qbY5f/LYN5GfyMk5RjLK+u\nbaius7FxpRpw40oZ/FH2ichDD4FO8ulqJt4znU3VtwJ0/
JmaY2x0XqwEI0CWiEiE\naKiSMzaHjsMvJ7gNQSfcB+QEm8IM/PSPKcxNj2+QnHtDnQwgb5iMN6n88Bjeygrk
\nJG0RH0EUJ0sQr9pXo+Gcn66b99HgEyIjojqsGC1dYzkZVHQuFH7RINfU//1OmnRN\nmb6JgjNGgbd
PKKHdWrfwrGpCiz1c44yznlkWVFrMdbLA1B+1uLpb8Xka7Hq5qZZn\nLVC0O7Q483FBa8Lkg+RXQjI
xYXgx4wkiV600UyKP1pwNSLMJvUUBmIM/Byl1h8xR\nyKIIZn7rc5wA4aKcfnJ9CUVfKCjtUPZffOW
lvMt8bDZfaloif20Z0KydJyAStl3Z\nQbsMvcA6747aQQ25JD4tid5rDeRDb2bYi7nLl+lNnhmn5ZB
4qGgnaXGj3oFDoN0R\n+kEK69DlZRNudn4=\n-----END CERTIFICATE-----", "apiCertifica
te": "-----BEGIN CERTIFICATE-----\nMIIEKzCCApOgAwIBAgIUM83EYfZz4vi4ty1EOJr+n6wMksA
wDQYJKoZIhvcNAQEL\nBQAwgZIxIzAhBgoJkiaJk/IsZAEBDBNyLTA1OTVhMTNjMTUzZDc2YWU1MRUwEwYD
\nVQQDDAxNYW5hZ2VtZW50Q0ExHjAcBgNVBAsMFWFtaS0wMmE0NDc0YzFmNzQ5NDBh\nODE0MDIGA1UECgwraX
AtMTAtODEtMTI1LTEzMi51cy13ZXN0LTIuY29tcHV0ZS5p\nbnRlcm5hbDAeFw0yMTAyMDUwMDA1MT
RaFw0yNjAyMDUwMDA1MTNaMBUxEzARBgNV\nBAMMClN1cGVyQWRtaW4wggEiMA0GCSqGSIb3DQEBAQ
UAA4IBDwAwggEKAoIBAQC/\nrPdG0oY89GGUgHbV9iG3n3Y1mPBmQ+iVBvKYD3YpM7fG+KnVQTdJLrYoH5vP7lVY
\nQj9H6pjxq0Bh53Mse2Fl9UE/Gew6IZiRd2OK9yM1xRKH7hjPB3tqFlA98mar+BYA\nGPhapmq+sSFz6
TS2ssToUllG8QgJeMxh6+vSP/Ca9O+HiDB7TqECufVv6lrL7sfK\nqfyQ5YzITKm7IGDQfdCiorwndvd1i1NB
+vviiYsk1fEW8gvRUu7wMRlzmPwxnUxd\nKmb/b7+O65md7+FlkqU6EzYMQ/224ZJonwJfzmNTO1AGt4aaJD
NKn1i5wV22xqqQ\nZvA6nrkBd+06pUwVTen1AgMBAAGjdTBzMAwGA1UdEwEB/wQCMAAwHwYDVR0jBBgw
\nFoAUafBBZNWmFvrP7cHjlML14f8bjCcwEwYDVR0lBAwwCgYIKwYBBQUHAwIwHQYD\nVR0OBBYEFFj+bk/
epA/jPXZywy1D4XV5sWlMMA4GA1UdDwEB/wQEAwIF4DANBgkq\nhkiG9w0BAQsFAAOCAYEARNN08PUMCAWI
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QhY+CQIaTLYLezVITo0bZhe0TpNqYK\nlINUWjxI8mCBBiXZZ9zxbyOqzZouZcNH12OCEqU8alTfyW0EpGYCl
emRTgXxboDK\n+uEwKH6sngYMkG0Usni4WIKBvZV2dJa5o8RhuCUFhwBJ2aHuiTq86RLrazJBE3wA\
nGvpl0ZmGVYmond3aBOYu\n-----END CERTIFICATE-----", "apiKey": "-----BEGIN PRIVATE
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```

```
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 "host": "ip-10-81-125-132.us-west-2.compute.internal", "port": "443", "distinguishe
dName": "UID=r-0595a13c153d76ae5,CN=ManagementCA,OU=ami-02a4474c1f74940a8,O=ip-10-81-1
25-132.us-west-2.compute.internal", "certificateProfile": "ENDUSER", "endEntityProfile":
 "EMPTY" } } }
```
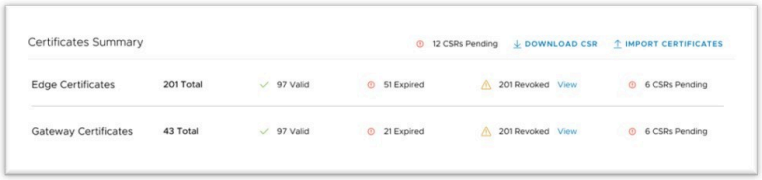


Monitoring External CA

Monitoring certificates is done on the same **Orchestrator** > **Certificate Authorities** page.

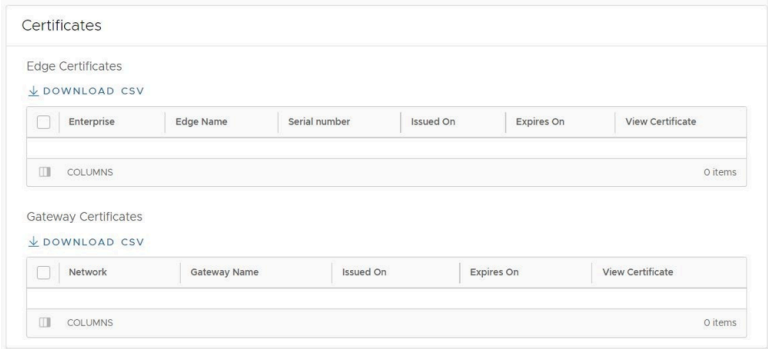
The **Certificates Summary** page provides an Operator with a visual status of key indicators for their certificates' life cycle. The Operator would also import certificates and download CSRs in this section.

Figure 26-13: Monitoring External CA



In the **Certificates** section, the Operator can download a complete list of all Edge or Gateway certificates in the .csv format.

Figure 26-14: Download CSV



An Operator, Partner, or Customer administrator can also examine a particular Edge's certificate by navigating to **Configure** > **Edge** > **Overview**.

Chapter 27

Appendix

27.1 Operator-Level Orchestrator Alerts and Events

Describes a summary of alerts and events generated within the VeloCloud Orchestrator at the Operator level.

The document provides details about all Operator-level Orchestrator events. Although these events are stored within the Orchestrator and displayed on the Orchestrator UI, most of them are generated by either an SD-WAN Gateway and/or one of its running components (MGD, PROCMON, and so on) with the exception of a few which are generated by the Orchestrator itself. You can configure notifications/alerts for events in Orchestrator only.

The following table provides an explanation for each of the columns in the "Operator-level Orchestrator Events" table:

Table 78: Operator-level Orchestrator Events

Column name	Details
EVENT	Unique name of the event
DISPLAYED ON ORCHESTRATOR UI AS	Specifies how the event is displayed on the Orchestrator.
SEVERITY	The severity with which this event is usually generated.
GENERATED BY	The SD-WAN component generating the notification can be one of the following: • VeloCloud Orchestrator • VeloCloud Gateway
GENERATED WHEN	Technical reason(s) and circumstances under which this event is generated.
RELEASE ADDED IN	The release this event was first added. If not specified, this event existed prior to release 2.5.
DEPRECATED	Specifies if the event is deprecated from a specific release.

Table 79: Operator-level Orchestrator Events

EVENT	DISPLAYED ON ORCHESTRATOR UI AS	SEVERITY	GENERATED BY	GENERATED WHEN	RELEASE ADDED IN	DEPRECATED
GATEWAY_UP	Gateway up	INFO	SASE Orchestrator	A Gateway restores after losing connectivity with the Orchestrator.		
GATEWAY_DOWN	Gateway down	INFO	SASE Orchestrator	A Gateway fails to communicate after losing connectivity with the Orchestrator.		
GATEWAY_LARGE_PKT_SIZE	Packet size limit exceeded	INFO	SD-WAN Gateway	The packet size limit incoming from a Gateway's peer exceeded.		
GATEWAY_SERVICE_FAILED	Gateway service failed	ERROR	SD-WAN Gateway	The GWD service on the Gateway fails.		
GATEWAY_BFD_NEIGHBOR_UP	BFD session established to Gateway neighbor	INFO	SD-WAN Gateway	A Gateway BFD neighbor comes back up		
GATEWAY_BFD_NEIGHBOR_DOWN	Gateway BFD neighbor unavailable	INFO	SD-WAN Gateway	A Gateway BFD neighbor comes back down		
GATEWAY_ICMP_PROBE_UNSTABLE	SD-WAN Gateway: ICMP probe unstable	ALERT	SD-WAN Gateway	The ICMP probe goes down on Partner Gateway.		
GATEWAY_REBALANCE	Gateways rebalanced	INFO	SASE Orchestrator			
PROXY_ENABLE_OPERATOR_ACCESS	Partner access delegated to operator	INFO	SASE Orchestrator			
PROXY_DISABLE_OPERATOR_ACCESS	Partner access revoked to operator	INFO	SASE Orchestrator			
VRF_ROUTEMAP_RULES_MAX_LIMIT_HIT	VRF route map rules limit exceeded	WARNING	SD-WAN Gateway	The VRF Inbound/ Outbound route map maximum limit exceeded (32).		
VRF_LIMIT_EXCEEDED	VRF limit exceeded	ALERT	SD-WAN Gateway	The VRF entries configured exceeded maximum limit (1000).		
ENABLE_EXTERNAL_CA	External CA Enabled	CRITICAL	SASE Orchestrator	The `ca.external.enable` property is set to true.	4.3.0	
DISABLE_EXTERNAL_CA	External CA Disabled	CRITICAL	SASE Orchestrator	The `ca.external.enable` property is set to false.	4.3.0	
INSERT_EXTERNAL_CA	External CA Inserted	CRITICAL	SASE Orchestrator	External CA is inserted into the VELOCLOUD_ CERTIFICATE_ AUTHORITY table and becomes a trusted issuer.	4.3.0	
CREATE_COMPOSITE_ROLE	Composite Role Created	INFO	SASE Orchestrator	A composite role is created by an Enterprise, Partner, or Operator.	4.5.0	
UPDATE_COMPOSITE_ROLE	Composite Role Updated	INFO	SASE Orchestrator	A composite role is updated by an Enterprise, Partner, or Operator.	4.5.0	
DELETE_COMPOSITE_ROLE	Composite Role Deleted	INFO	SASE Orchestrator	A composite role is deleted by an Enterprise, Partner, or Operator.	4.5.0	
CA_VALIDATION	CA validation failure	ALERT	SASE Orchestrator	The CA certificate attributes are rejected.	5.0.0	
ENI_ACTIVATION_CONFIG_SENT	ENI activation config sent	INFO	SASE Orchestrator	The activation config has been successfully sent to the ENI server.	5.0.0	

EVENT	DISPLAYED ON ORCHESTRATOR UI AS	SEVERITY	GENERATED BY	GENERATED WHEN	RELEASE ADDED IN	DEPRECATED
Auto_Rate_Limit_Enabled	Auto Rate-Limit Enabled	WARNING	SD-WAN Gateway	The auto rate-limit capability is activated on Gateways if the Gateway detects that certain Edges are sending large amount of traffic which might be causing the Gateway to be unstable and drop packets. The event message includes the information about the list of Edges (Enterprise, Rate Limit Percentage) on which the auto rate-limit is activated.	5.2.0	
Auto_Rate_Limit_Disabled	Auto Rate-Limit Disabled	WARNING	SD-WAN Gateway	Gateway auto rate-limit condition is restored.	5.2.0	
POLL_IDPS_SIGNATURE_FAIL	Failure in poll job that queries and downloads signature file from GSM	ERROR	SASE Orchestrator	When SASE Orchestrator backend poll job has failed to retrieve or download suricata signature from GSM and update profiles with the new signature metadata.	5.2.0	
IDPS_SIGNATURE_VCO_VERSION_CHECK_FAIL	Querying existing signature version from local DB failed	ERROR	SASE Orchestrator	When SASE Orchestrator backend poll job has failed to retrieve existing suricata signature version from Orchestrator's local database.	5.2.0	
IDPS_SIGNATURE_GSM_VERSION_CHECK_FAIL	Querying signature metadata from GSM failed	ERROR	SASE Orchestrator	When SASE Orchestrator backend poll job has failed to retrieve existing suricata signature metadata (that includes signature version) from GSM.	5.2.0	
IDPS_SIGNATURE_SKIP_DOWNLOAD_NO_UPDATE	Skipping signature download due to no change in signature version	INFO	SASE Orchestrator	When SASE Orchestrator backend poll job skips downloading suricata signature file due to no change in suricata signature file version.	5.2.0	
IDPS_SIGNATURE_STORE_FAILURE_NO_PATH	Filestore path not set to store signature file	ERROR	SASE Orchestrator	When SASE Orchestrator backend poll job fails to store suricata signature file due to filestore path not being set.	5.2.0	
IDPS_SIGNATURE_DOWNLOAD_SUCCESS	Successfully downloaded signature file from GSM	INFO	SASE Orchestrator	When SASE Orchestrator backend poll job successfully downloads suricata signature file from GSM.	5.2.0	
IDPS_SIGNATURE_DOWNLOAD_FAILURE	Failed to download signature file from GSM	ERROR	SASE Orchestrator	When SASE Orchestrator backend poll job fails to download suricata signature file from GSM.	5.2.0	
IDPS_SIGNATURE_STORE_SUCCESS	Successfully stored the signature file in filestore	INFO	SASE Orchestrator	When SASE Orchestrator backend poll job successfully stores the suricata signature file in local file store.	5.2.0	
IDPS_SIGNATURE_STORE_SIGNATURE_FAILURE	Failed to store the signature file in filestore	ERROR	SASE Orchestrator	When SASE Orchestrator backend poll job fails to store the suricata signature file in local file store.	5.2.0	
IDPS_SIGNATURE_METADATA_INSERT_SUCCESS	Successfully added metadata of the signature file to local DB	INFO	SASE Orchestrator	When SASE Orchestrator backend poll job successfully adds metadata of the suricata signature file to local DB.	5.2.0	

EVENT	DISPLAYED ON ORCHESTRATOR UI AS	SEVERITY	GENERATED BY	GENERATED WHEN	RELEASE ADDED IN	DEPRECATED
IDPS_SIGNATURE_METADATA_INSERT_FAILURE	Failure to add metadata of the signature file to local DB	ERROR	SASE Orchestrator	When SASE Orchestrator backend poll job fails to add metadata of the suricata signature file to local DB.	5.2.0	
SELF_HEALING_REPORT	anomaly_type: <Remote Route inconsistency>, num_routes_recovered:<number>, shr state: <DONE>	ALERT	SD-WAN Gateway	Generated when routes are detected as missing from a customer enterprise connected to a SD-WAN Gateway, and the Gateway corrects this issue by using the Self-Healing Routing feature to recover the missing routes.	5.2	

SD-WAN Gateway Capacity Events

Currently, the SD-WAN Gateway assignment is based on Geo-proximity and doesn't take SD-WAN Gateway capacity health metrics into account. To improve the Edge-to-Gateway assignment the capacity health metrics (Edge Count, Tunnel Count, PKI Activated Tunnel Count, Flow count, NAT Count, Packet Queue Watermark, and Packet Drops) are monitored periodically based on warning and critical thresholds. When any of the metrics count is above the defined warning and critical thresholds, Gateway capacity events are generated and reported to the SASE Orchestrator. These events provide the Operator and Partners a clear visibility about the Gateway health for making intelligent and correct Gateway assignments.

The following are the SD-WAN Gateway capacity events generated based on the capacity threshold limits.

Table 80: SD-WAN Gateway Capacity Events

Metric	Trigger	Event	Severity	Message	Event Detail
Edge Count	Above Warning Threshold. The Warning threshold value is 90% of following Supported values: • 4 CPU, 32G MEM - 2000 • 8 CPU, 32G MEM - 4000	GATEWAY_DEGRADED	NOTICE	Over capacity alert due to high number of connected Edges as Gateway has crossed warning threshold.	• 4 CPU: The number of connected Edges is above the warning threshold (1800). • 8 CPU: The number of connected Edges is above the warning threshold (3600).
Edge Count	Above Critical Threshold. The Critical threshold value is 95% of following Supported values: • 4 CPU, 32G MEM - 2000 • 8 CPU, 32G MEM - 4000	GATEWAY_CRITICAL	NOTICE	Over capacity alert due to high number of connected Edges as Gateway has crossed critical threshold.	• 4 CPU: The number of connected Edges is above the critical threshold (1900). • 8 CPU: The number of connected Edges is above the critical threshold (3800).
Edge Count	Below Warning Threshold	GATEWAY_STABLE	INFO	Over capacity condition due to high number of connected Edges restored.	The number of connected Edges is within the acceptable threshold.
Tunnel Count	Above Warning Threshold. The Warning threshold value is 90% of following Supported values: • 4 CPU, 32G MEM - 3000 • 8 CPU, 32G MEM - 6000	GATEWAY_DEGRADED	NOTICE	Over capacity alert due to high number of tunnels.	• 4 CPU: The number of tunnels is above the warning threshold (2700). • 8 CPU: The number of tunnels is above the warning threshold (5400).
Tunnel Count	Above Critical Threshold. The Critical threshold value is 95% of following Supported values: • 4 CPU, 32G MEM - 3000 • 8 CPU, 32G MEM - 6000	GATEWAY_CRITICAL	NOTICE	Over capacity alert due to high number of tunnels.	• 4 CPU: The number of tunnels is above the critical threshold (2850). • 8 CPU: The number of tunnels is above the critical threshold (5700).
Tunnel Count	Below Warning Threshold	GATEWAY_STABLE	INFO	Over capacity condition due to high number of tunnels restored.	The number of tunnels is within the acceptable threshold.
Flow Count	Above Warning Threshold. The Warning threshold value is 50% of Supported value 1920000.	GATEWAY_DEGRADED	NOTICE	Over capacity alert due to high number of flows.	The number of flows is above the warning threshold (960000).
Flow Count	Above Critical Threshold. The Critical threshold value is 75% of Supported value 1920000.	GATEWAY_CRITICAL	NOTICE	Over capacity alert due to high number of flows.	The number of flows is above the critical threshold (1440000)
Flow Count	Below Warning Threshold	GATEWAY_STABLE	INFO	Over capacity condition due to high number of flows restored.	The number of flows is within the acceptable threshold.
NAT Entries Count	Above Warning Threshold. The Warning threshold value is 50% of Supported value 1920000.	GATEWAY_DEGRADED	NOTICE	Over capacity alert due to high number of NAT entries.	The number of NAT entries is above the warning threshold (960000).
NAT Entries Count	Above Critical Threshold. The Critical threshold value is 75% of Supported value 1920000.	GATEWAY_CRITICAL	NOTICE	Over capacity alert due to high number of NAT entries.	The number of NAT entries is above the critical threshold (1440000).

NAT Entries Count	Below Warning Threshold	GATEWAY_STABLE	INFO	Over capacity condition due to high number of NAT entries restored.	The number of NAT entries is within the acceptable threshold.
Packet Queue Watermark	Above Critical Threshold	GATEWAY_CRITICAL	NOTICE	Over capacity alert due to high packet queue watermark.	The packet queue watermark is above the critical threshold (6000) for 5 consecutive seconds.
Packet Queue Watermark	Above Warning Threshold	GATEWAY_DEGRADED	NOTICE	Over capacity alert due to high packet queue watermark.	The packet queue watermark is above the warning threshold (2000) for 10 consecutive seconds.
Packet Queue Watermark	Below Warning Threshold	GATEWAY_STABLE	INFO	Over capacity condition due to high packet queue watermark restored.	The packet queue watermark is within the acceptable threshold.
Packet Drop Count	Above Critical Threshold	GATEWAY_CRITICAL	NOTICE	Over capacity alert due to high number of packet drops.	The number of packet drops is above the critical threshold (2000) for 5 consecutive seconds.
Packet Drop Count	Above Warning Threshold	GATEWAY_DEGRADED	NOTICE	Over capacity alert due to high number of packet drops.	The number of packet drops is above the warning threshold (500) for 10 consecutive seconds.
Packet Drop Count	Below Warning Threshold	GATEWAY_STABLE	INFO	Over capacity condition due to high number of packet drops restored.	The number of packet drops is within the acceptable threshold.

Chapter 28

References

28.1 Related Documents

The following documentation is available for ***Arista VeloCloud SD-WAN***:

- *Arista VeloCloud SD-WAN Design Guide Enhanced Firewall Services*
- *Arista VeloCloud SD-WAN Administration Guide*
- *Arista VeloCloud SD-WAN Gateway Monitoring Guide*
- *Arista VeloCloud SD-WAN Orchestrator Deployment and Monitoring Guide*
- *Arista VeloCloud SD-WAN Troubleshooting Guide*
- *Arista VeloCloud SASE Global Settings Guide*
- *Arista VeloCloud SD-WAN Partner Guide*
- *Arista VeloCloud SD-WAN API*
- *Arista VeloCloud Portal API*