

## Versa Class of Service

The Versa Networks lab environment consists of a fixed, pre-configured topology that will allow you to explore, configure, and manage Versa Networks CPEs by using Versa Director, the central management and orchestration platform for a Versa Secure SD-WAN solution. After completing this lab, you will be able to:

- Identify the structure of the Class of Service configuration hierarchy
- Configure Class of Service services

In this lab, you will be assigned a single CPE device (Branch device) for configuration and monitoring.

The lab environment is accessed through a remote desktop connection. The remote desktop connection opens a remote workstation, where you will use various tools to navigate and configure the lab environment. The main tool you will use in this lab is Versa Director. Versa Director can be accessed by opening the Google Chrome browser on the Remote Desktop. There is a bookmark to the Versa Director device in the Google Chrome bookmark bar.

This lab environment is a shared environment. There may be up to 5 other students in the environment. Each student has their own remote desktop, but the Versa Director is shared. Because of the shared environment, you may see configuration templates, device groups, workflows, and devices that other students have created, or that have been pre-provisioned within Versa Director. It is important that you only modify the configuration components that are assigned to you by your instructor.

During certain lab parts, the lab guide will present sample output from the GUI or the CLI. The sample outputs are SAMPLES and represent the information as it appeared during the lab guide creation. Your output may vary in some ways (some devices may or may not be present, some routes may or may not be the same, etc.) Do not be alarmed if your results vary slightly from the results shown in the lab guide. The important thing is that the lab functions in the desired manner.

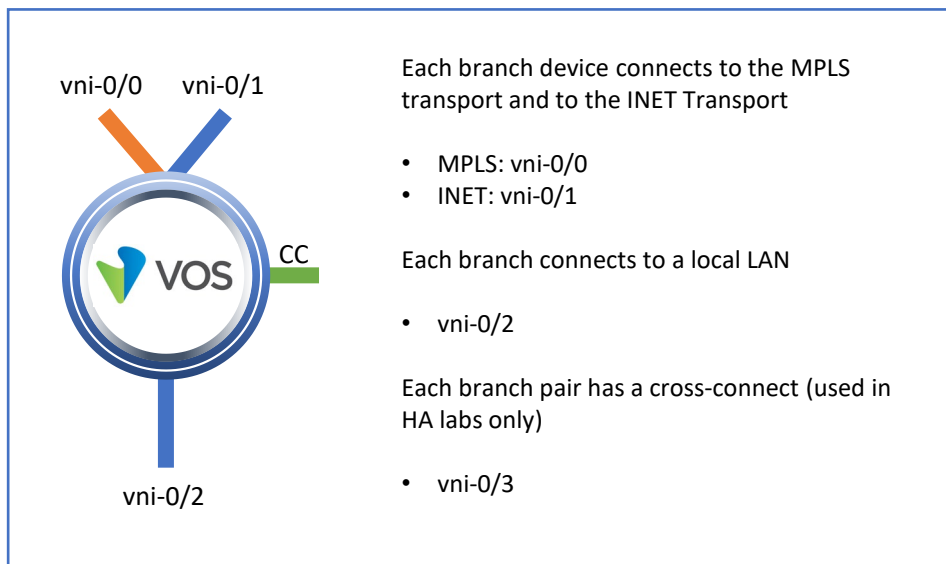
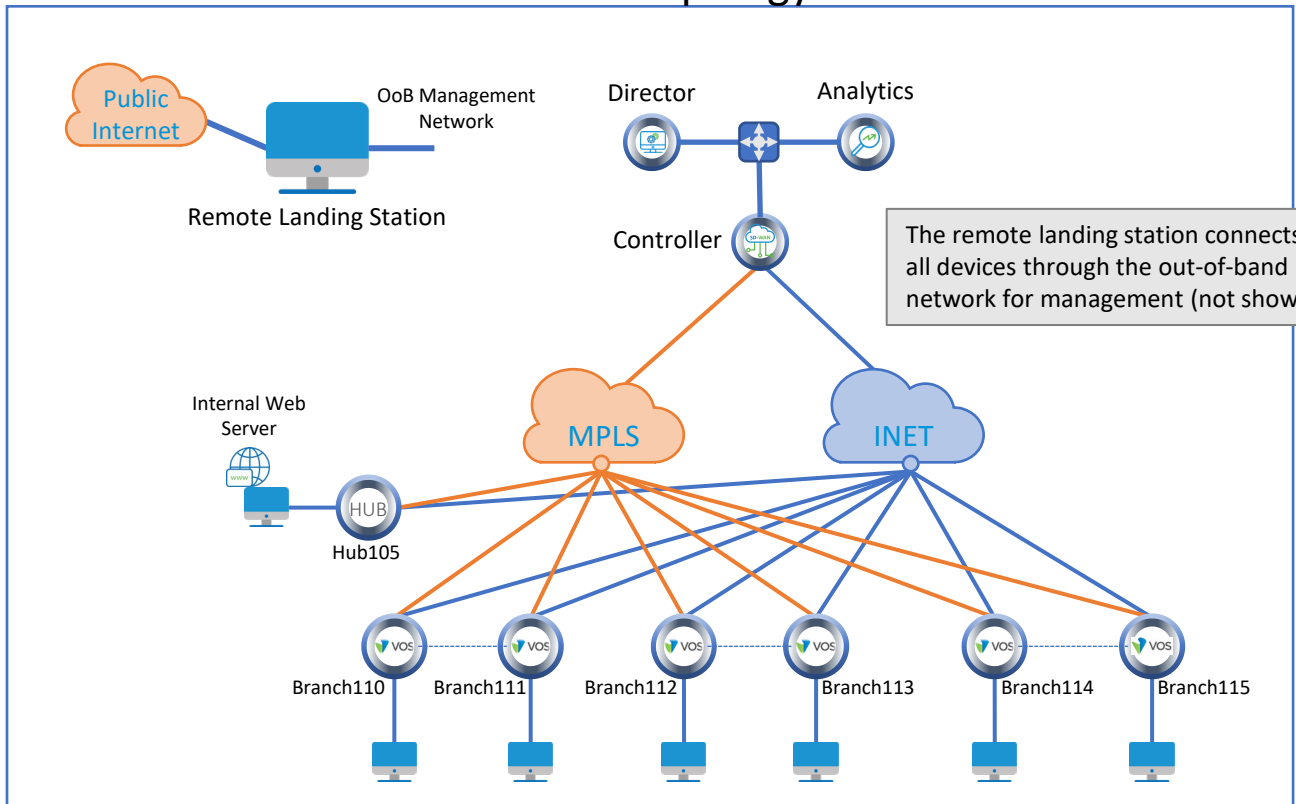
This lab guide will step you through some common tasks that are performed on Versa Director. After an introductory set of exercises, you will be asked to perform some basic tasks that will allow you to become more familiar with the environment. At the end of the lab guide you can find additional help on to how to complete the tasks, so if you have trouble with a task, please refer to the help section. If you still cannot accomplish the task, ask your instructor for assistance. In addition, you will see **hints** placed throughout the lab guide to help you along.

Look for these hints to help you in the labs

The goal of this and all lab exercises is to help you gain additional skills and knowledge. Because of this, the lab guide contains additional instruction to supplement the student guides.

Now that we've discussed what is expected, let's get started!

## Lab Topology



Versa Director Login: **labuserXYZ** (e.g. **labuser110**, **labuser111**, etc.)  
 Versa Director Password: **Versa@123**

Branch OoB Login: **admin**  
 Branch OoB Password: **versa123**

Testing Host Login: **labuserXYZ** (e.g. **labuser110**, **labuser111**, etc.)  
 Testing Host Password: **versa123**

Remember this! You will use it a lot!

## Interface Addresses

CPE	vni-0/0	vni-0/1	vni-0/2
Branch110	192.168.19.110/24	192.168.20.110/24	172.16.110.1/24
Branch111	192.168.19.111/24	192.168.20.111/24	172.16.111.1/24
Branch112	192.168.19.112/24	192.168.20.112/24	172.16.112.1/24
Branch113	192.168.19.113/24	192.168.20.113/24	172.16.113.1/24
Branch114	192.168.19.114/24	192.168.20.114/24	172.16.114.1/24
Branch115	192.168.19.115/24	192.168.20.115/24	172.16.115.1/24
MPLS Gateway	192.168.19.3		
INET Gateway		192.168.20.3	

## Controller Addresses

MPLS	MPLS Gateway	INET	INET Gateway
192.168.17.3/24	192.168.17.1	192.168.18.3/24	192.168.18.1

## Exercise 1: Connect to the remote lab environment

The first lab exercise is to become familiar with how to connect to the remote lab environment. Your instructor should have reviewed the following information with you prior to starting:

- Branch/Node/CPE Assignment
- Remote Lab Access

If you have not yet been assigned a branch device, please contact the instructor as this is a shared environment, and each student will configure and monitor a specific branch node.

Question: What node is assigned to you in the lab topology? \_\_\_\_\_

Follow the instructions provided by your instructor to connect to the remote lab environment.

Once you have started your remote desktop session, you will be presented with the remote desktop:

The screenshot shows a remote desktop session titled "Session Closing in 7d" on a Windows desktop. The desktop background is green. On the left side, there are icons for Recycle Bin, MTP-PTTY, README.txt, and Remote Desktop... Blue arrows point from text boxes to these icons: "Multi-Tabbed Putty" points to MTP-PTTY, "Access Instructions for lab components" points to README.txt, and "Remote Desktop to testing hosts" points to Remote Desktop... At the bottom left, blue arrows point from text boxes to the Google Chrome and Multi-Tabbed Putty icons in the taskbar: "Google Chrome for Versa Director access" points to Chrome, and "Multi-Tabbed Putty" points to the Putty icon. In the center, a large white box titled "Refresh remote desktop session" contains a list of branch nodes with their IP addresses:

Branch	MPLS	INET	LAN
branch110:	192.168.19.110/24	192.168.20.110/24	172.16.110.1/24
branch111:	192.168.19.111/24	192.168.20.111/24	172.16.111.1/24
branch112:	192.168.19.112/24	192.168.20.112/24	172.16.112.1/24
branch113:	192.168.19.113/24	192.168.20.113/24	172.16.113.1/24
branch114:	192.168.19.114/24	192.168.20.114/24	172.16.114.1/24
branch115:	192.168.19.115/24	192.168.20.115/24	172.16.115.1/24

Below this list is a box: "Controller IP address for onboarding: 192.168.17.3". To the right, there are two login boxes. The top one is titled "Director Login" and lists user names (labuser110-115) and a password (Versa@123). The bottom one is titled "Shell Access to Branches (SSH)" and lists a user name (admin) and password (versa123). The bottom right corner of the desktop shows the Versa Networks logo and system tray icons including the date and time (10:31 AM 5/12/2022).

On the remote desktop, open the Google Chrome browser window. The Google Chrome browser window contains a bookmark to the Versa Director. Log into the Versa Director with the username associated with your assigned branch device:

CPE	Username	Password
Branch110	labuser110	Versa@123
Branch111	labuser111	Versa@123
Branch112	labuser112	Versa@123
Branch113	labuser113	Versa@123
Branch114	labuser114	Versa@123
Branch115	labuser115	Versa@123

## Exercise 2: Configure Adaptive Shaping

In the following lab exercises, you will:

- Locate the Adaptive Services configuration parameters
- Configure Adaptive Shaping
- Verify Adaptive Shaping

**Note:** Configuration modifications in this lab will be performed in Appliance Context mode (directly on your device) and will not be performed through device templates.

**Note:** The images in this lab are for demonstration purposes only. Your lab experience may differ from the images provided in the lab guide.

In this lab part you will identify the configuration components required that will allow your device to advertise its local interface speed to the remote devices. Testing of the changes you make on your device will be verified by logging into the Hub device, as changes made on your device will advertise your link rates to the hub, and the hub will apply dynamic shapers towards your device.

The following components are required for a complete adaptive shaping configuration:

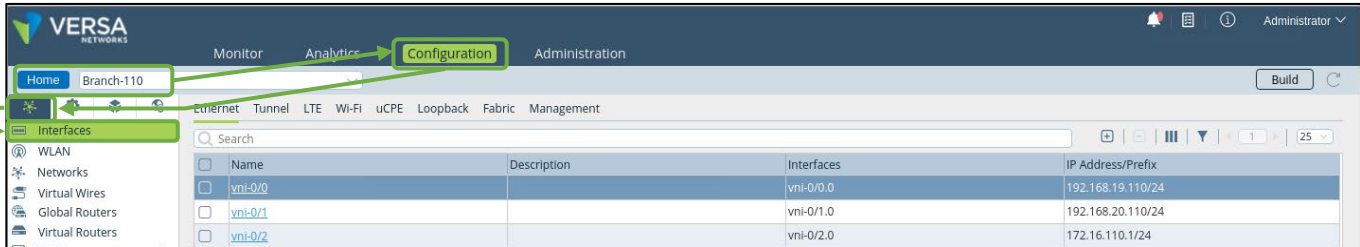
- Shaping configured on the local interfaces (in order to apply dynamic shapers towards remote sites)
- The local circuit speeds must be defined (this provides the value that will be used to trigger Advertised Link Rate adjustments)
- Adaptive Shaping function: This adds the Advertised Link Rate value to remote sites using MP-BGP (Versa-Private Route), and defines the circumstances that will trigger an update
- Inbound Shaper: This defines the Advertised Link Rate value that is advertised by the device

The hub already has shaping configured on its WAN interfaces, and therefore will respond to advertised link rate information sent from your site. In this lab you will begin by configuring the local site circuit bandwidth. You will configure a different bandwidth for the MPLS and INET links.

You will perform the lab configuration from the Appliance Context mode and not through device templates. To open the Appliance Context mode for your device, navigate to *Administration > Appliances* and locate your device in the appliances list. Click on your device to open your appliance.

From your Appliance Context mode, click the *Configuration* tab to access your device configuration.

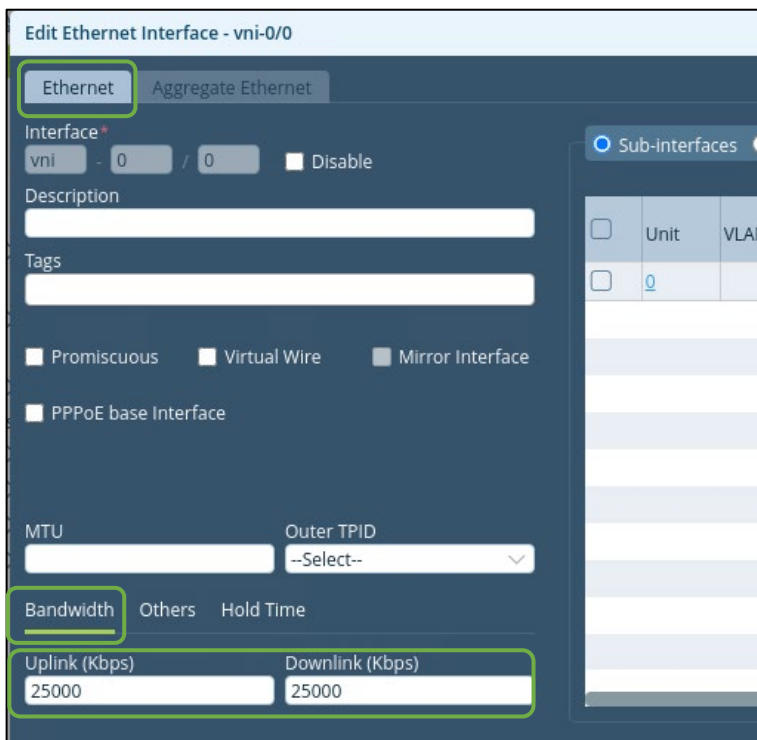
The circuit speeds are configured under the *Networking > Interfaces* configuration. Open the Interfaces configuration dashboard:



The WAN interfaces are vni-0/0 (MPLS link) and vni-0/1 (INET link).

Click on the vni-0/0 interface to open the interface configuration. In the Ethernet tab, locate the Bandwidth setting. It should be blank.

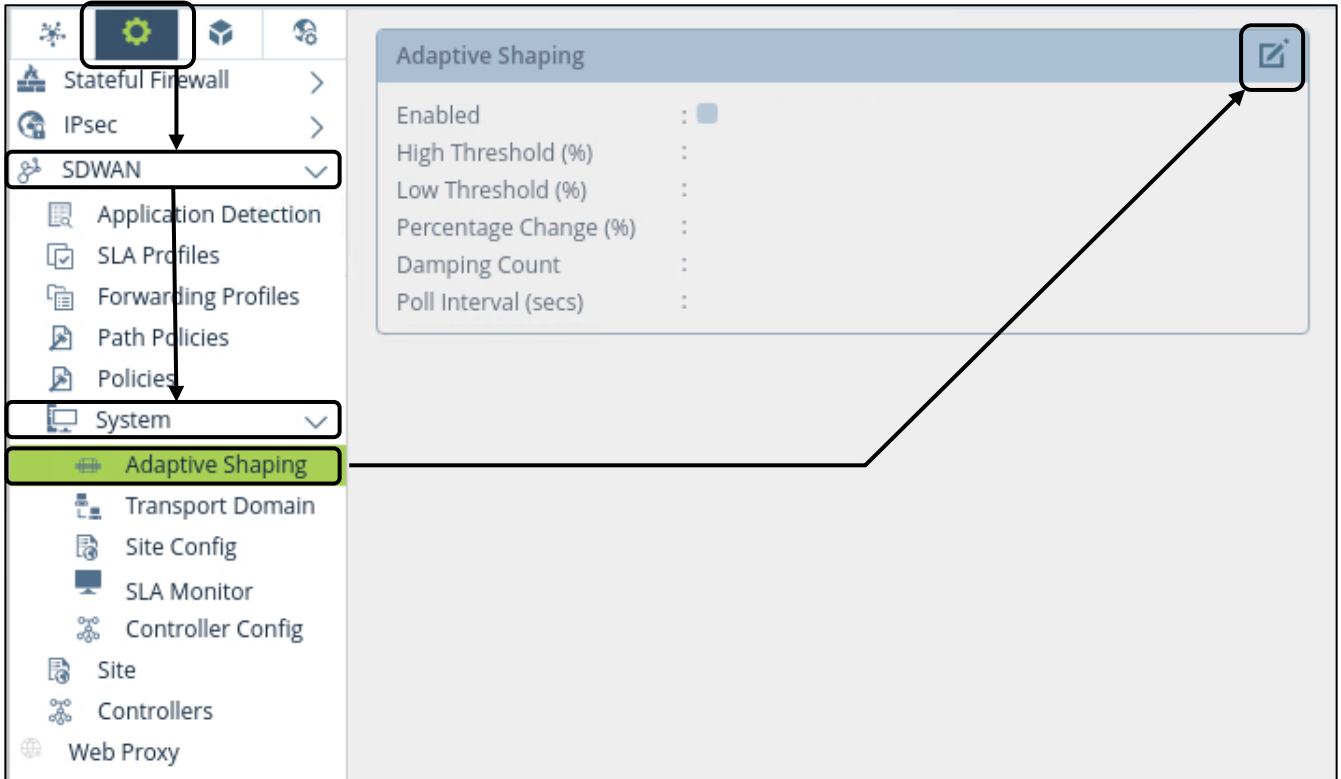
Set the Uplink and Downlink bandwidth to 25000Kbps (25mbps), then click OK to apply the setting.



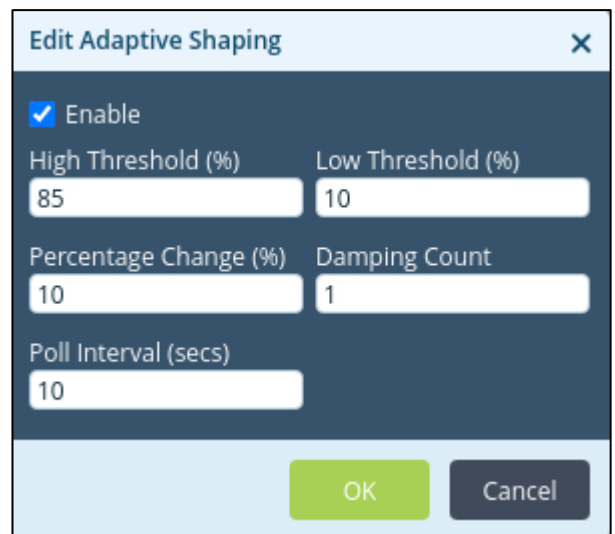
Repeat the process on the vni-0/1 interface.

After you have configured the Uplink and Downlink speeds on the interface you need to enable Adaptive Shaping.

To enable Adaptive Shaping, navigate to Services > SDWAN > System > Adaptive Shaping. The Adaptive Shaping function is a system function. Click on the edit (Pencil) button to open the Adaptive Shaping configuration dialog.



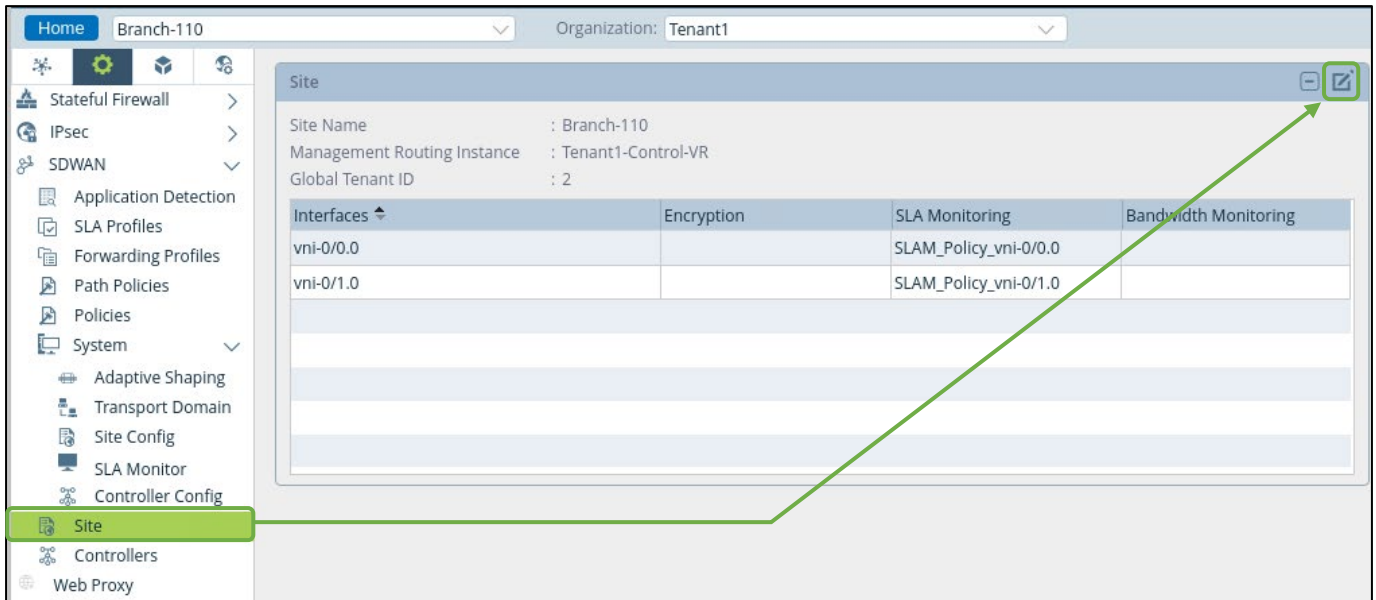
When the Edit Adaptive Shaping dialog appears, the Enable setting will automatically be checked. The default settings are shown. For our lab exercise, the default settings will work. Click the OK button to apply the changes and enable the Adaptive Shaping function. The parameters from the dialog should now appear in the Adaptive Shaping information on the main Adaptive Shaping dashboard.



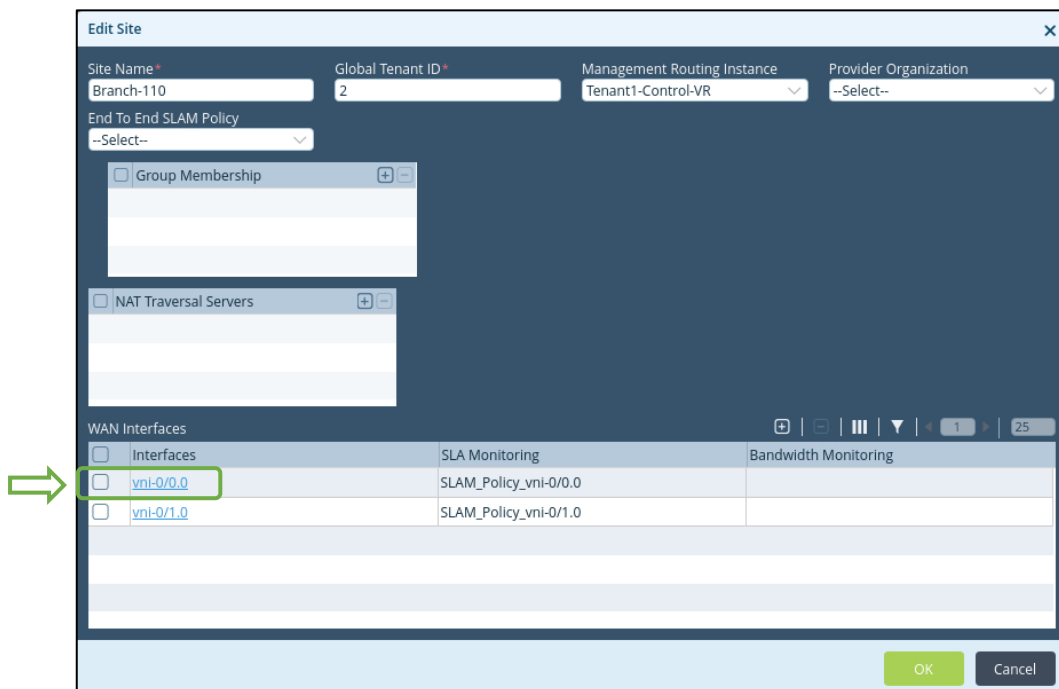


The final step to complete the Adaptive Shaping configuration is to configure the inbound shaping value. This is the value that will be advertised to the remote sites and it is found under the *Services > SDWAN > Site* parameters.

Navigate to the *Services > SDWAN > Site* hierarchy and click on the pencil icon to edit the site properties:



In the Edit Site dialog, locate the WAN interfaces. Click on the vni-0/0.0 interface to modify the interface settings.



The WAN Interfaces configuration dialog allows you to configure an Input Rate and Minimum Input Rate. The Input rate is the default rate that will be advertised to remote sites. The Minimum Input Rate is the lowest value that will be advertised to remote sites (the lowest value the Adaptive Shaping algorithm can advertise.)

Set the Shaping Input rate of your device according the table below. Each site will have a unique rate configured, which will assist in verifying the advertised rate.

**vni-0/0.0**

Branch Device	Input Rate	Minimum Input Rate
Branch110	10110	1110
Branch111	10111	1111
Branch112	10112	1112
Branch113	10113	1113
Branch114	10114	1114
Branch115	10115	1115

**vni-0/1.0**

Branch Device	Input Rate	Minimum Input Rate
Branch110	11110	1110
Branch111	11111	1111
Branch112	11112	1112
Branch113	11113	1113
Branch114	11114	1114
Branch115	11115	1115

**Edit WAN Interfaces**

Interfaces \* vni-0/0.0 Encryption --Select--

**Shaping Rate**

Rate (Kbps) Input Rate(Kbps) 10110 Minimum Input Rate(Kbps) 1110

Rate (%)

**Management Traffic**

Priority 0

**SLA Monitoring Policy**

SLA Monitoring SLAM\_Policy\_vni-0/0.0

**Bandwidth Monitoring Policy**

Bandwidth Monitoring --Select--

OK Cancel

Example of vni-0/0.0

You have finished configuring Adaptive Shaping on your branch device.

## Exercise 3: Verify the Advertised Link Rate and dynamic shapers on the Hub device

Your device should now be advertising its local link rates to the other devices in the network. You will verify your advertised link rate by logging in to the hub device. On the hub device you will verify that your advertised link rate has been received, and that the hub device has applied dynamic shapers on the tunnels to your branch device.

Locate the MT-Putty shortcut on your remote desktop task bar. Open the MT-Putty application and open an SSH session to the hub device.

On the hub device, enter the command `cli` to start the command line interface. From the CLI on the hub device, enter the command `show class-of-services`. You will see output from all of the interfaces and for all of the tunnels. You will need to look for a Pipe ID that has a rate that matches your sites configured Input Shaping rate. To help you find your sites Pipe (tunnel), you can use the following command: `show class-of-services | find [your site's bandwidth setting]:e.g. show class-of-services | find 10110`

You should see output that reflects the configured inbound shaping parameter that you configured on your device in an earlier step.

```

dmin@Hub-105-cli> show class-of-services | find 10110
  Rate      : 10110 kbps
Traffic Stats:
  Queues          TX          TX          TX          Bytes  Qlen
                   Pkts        Dropped      Bytes        Dropped
tc0 network-control:
  q0: fc_nc       0           0           0           0      0
  q1: fc1         0           0           0           0      0
  q2: fc2         0           0           0           0      0
  q3: fc3         0           0           0           0      0
tc1 expedited-fwd:
  q0: fc_ef       0           0           0           0      0
  q1: fc5         0           0           0           0      0
  q2: fc6         0           0           0           0      0
  q3: fc7         0           0           0           0      0
tc2 assured-fwd:
  q0: fc_af       0           0           0           0      0
  q1: fc9         0           0           0           0      0
  q2: fc10        0           0           0           0      0
  q3: fc11        0           0           0           0      0
tc3 best-effort:
  q0: fc_be       0           0           0           0      0
  q1: fc13        0           0           0           0      0
  q2: fc14        0           0           0           0      0
  q3: fc15        0           0           0           0      0

Pipe ID      : 2
Users       : [ WAN-103:17:2:secure ]
Type        : SDWAN
Configuration :
  Rate      : 10110 kbps
Traffic Stats:
  Queues          TX          TX          TX          Bytes  Qlen
                   Pkts        Dropped      Bytes        Dropped
tc0 network-control:
  q0: fc_nc       0           0           0           0      0
  q1: fc1         0           0           0           0      0
  q2: fc2         0           0           0           0      0
  q3: fc3         0           0           0           0      0
    
```

You can use the same command to display the dynamic shaper on the hub's INET interface by issuing the same command, but substitute the INET inbound shaping rate configured on your site (e.g. 11110)

```
admin@Hub-105-cli> show class-of-services | find 11110
Rate : 11110 kbps
Traffic Stats:
  Queues          TX          TX          TX          Bytes  Qlen
                  Pkts        Dropped     Bytes      Dropped
tc0 network-control:
  q0: fc_nc       0           0           0           0      0
  q1: fc1         0           0           0           0      0
  q2: fc2         0           0           0           0      0
  q3: fc3         0           0           0           0      0
tc1 expedited-fwd:
  q0: fc_ef       0           0           0           0      0
  q1: fc5         0           0           0           0      0
  q2: fc6         0           0           0           0      0
  q3: fc7         0           0           0           0      0
tc2 assured-fwd:
  q0: fc_af       0           0           0           0      0
  q1: fc9         0           0           0           0      0
  q2: fc10        0           0           0           0      0
  q3: fc11        0           0           0           0      0
tc3 best-effort:
  q0: fc_be       0           0           0           0      0
  q1: fc13        0           0           0           0      0
  q2: fc14        0           0           0           0      0
  q3: fc15        0           0           0           0      0

Pipe ID      : 2
Users       : [ WAN-103:34:2:secure ]
Type        : SDWAN
Configuration :
Rate : 11110 kbps
Traffic Stats:
  Queues          TX          TX          TX          Bytes  Qlen
                  Pkts        Dropped     Bytes      Dropped
tc0 network-control:
  q0: fc_nc       0           0           0           0      0
  q1: fc1         0           0           0           0      0
  q2: fc2         0           0           0           0      0
  q3: fc3         0           0           0           0      0
```



**STOP!** Notify your instructor that you have completed this lab.