

Versa SD-WAN Topologies

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:

- Analyze the configuration components of full mesh and hub-and-spoke topologies
- Configure and analyze the following topologies:
 - Full Mesh
 - Spoke-to-Hub-Only
 - Spoke-to-Spoke-via-Hub
 - Spoke-to-Spoke-Direct

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.

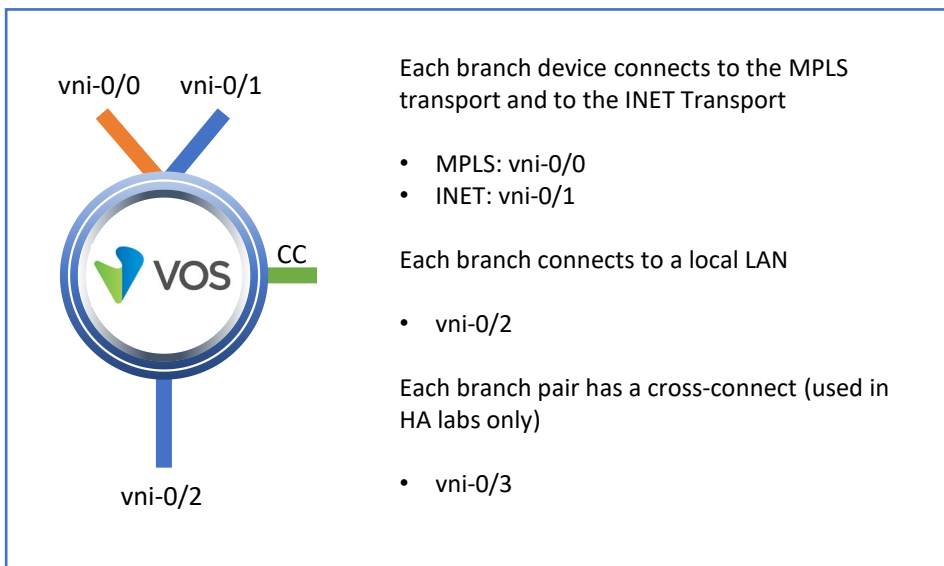
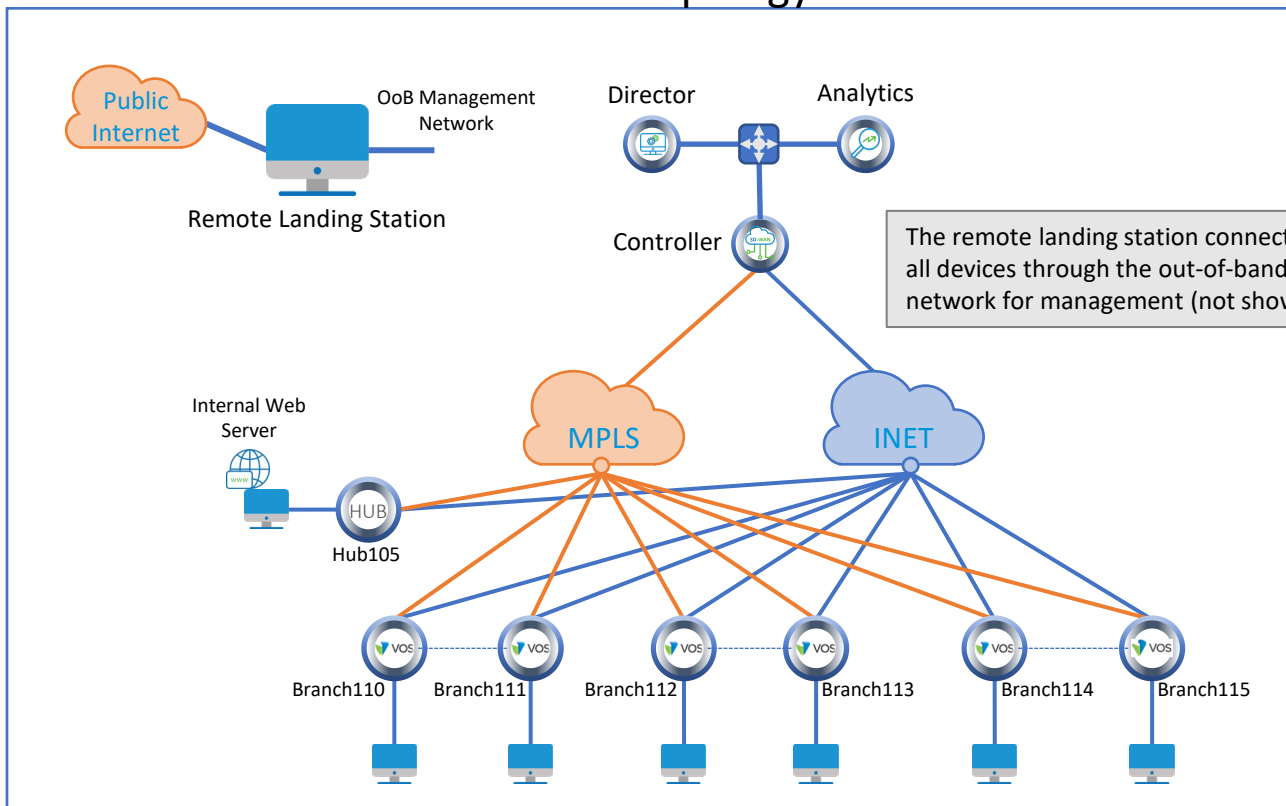
Look for these hints to help you in the labs

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.

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



Remember this! You will use it a lot!

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

Branch OoB Login: **versa**
 Branch OoB Password: **versa123**

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

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:

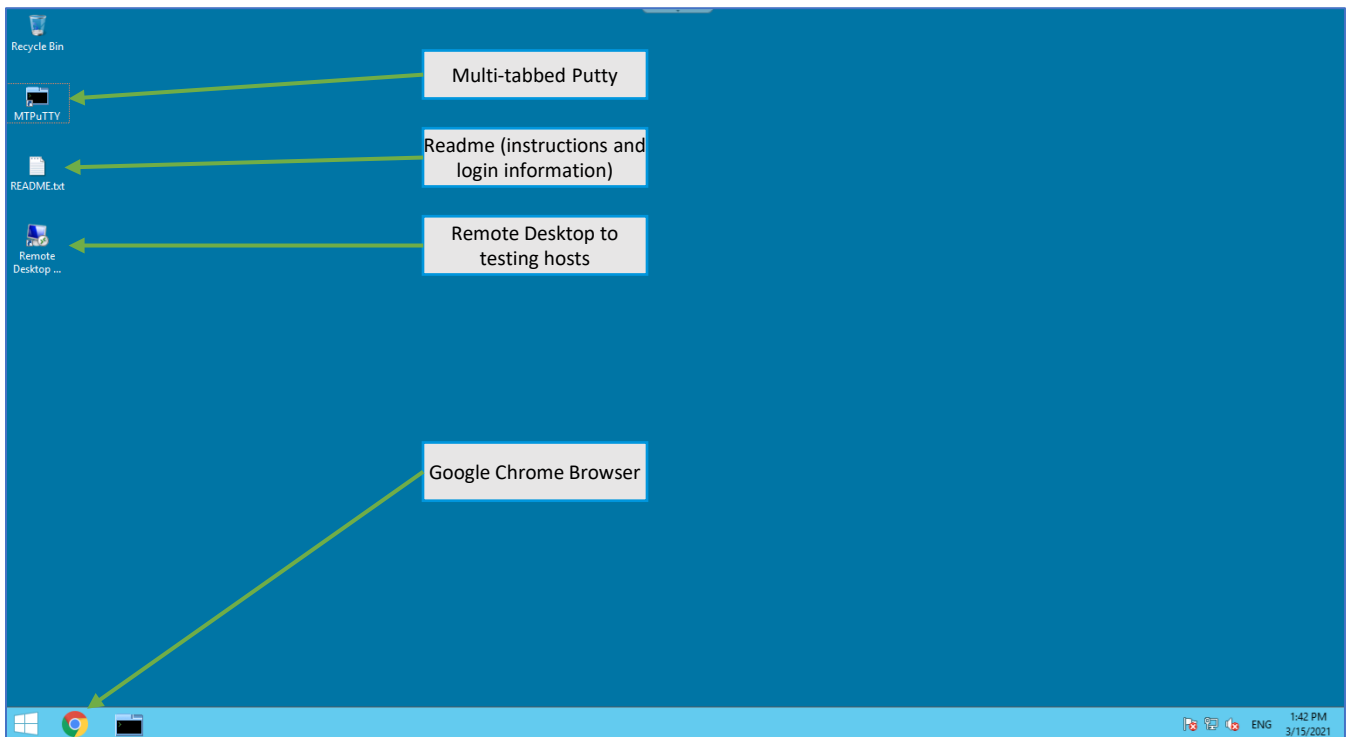
- Branch/Node/CPE Assignment
- Remote Lab Access

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:



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

Lab Exercise Overview

In this lab you will perform various tasks. You will begin by examining some pre-configured objects within Versa Director that will be used to build hub and spoke topologies. A flow of the lab exercises is:

Examine the Spoke Groups that are pre-configured in the Spoke Groups workflow table

Analyze the LAN routes learned on your device, and the BGP next-hops of the routes.

Create a new device template, named after your username and device ID, that is configured as a spoke device configuration (you will use a Device Template Workflow to create the new template)
The template will be configured with the S2H-Only spoke group

Create a new device group named after your username and device ID that references the new template you created

Create a new device group named after your username and device ID that references the new template you created

Re-assign your device to the new device group using the Device Workflow and redeploy the device workflow

Commit the template to reconfigure your device

Analyze the LAN routes learned on your device, and the BGP next-hops of the routes.

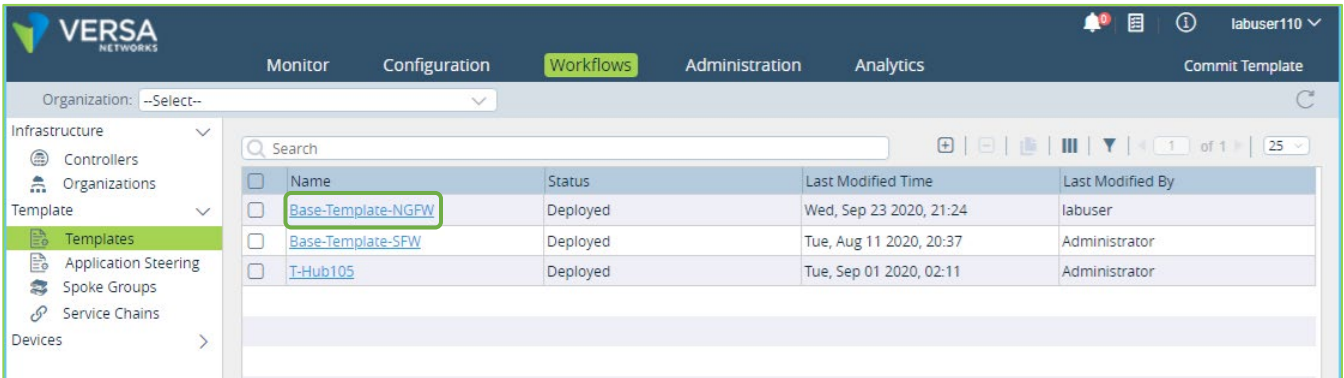
Analyze the LAN routes learned on your device, and the BGP next-hops of the routes.

Modify the spoke group in your template workflow to S2SviaH, re-deploy the workflow to recreate the template, then you will commit the template to your device

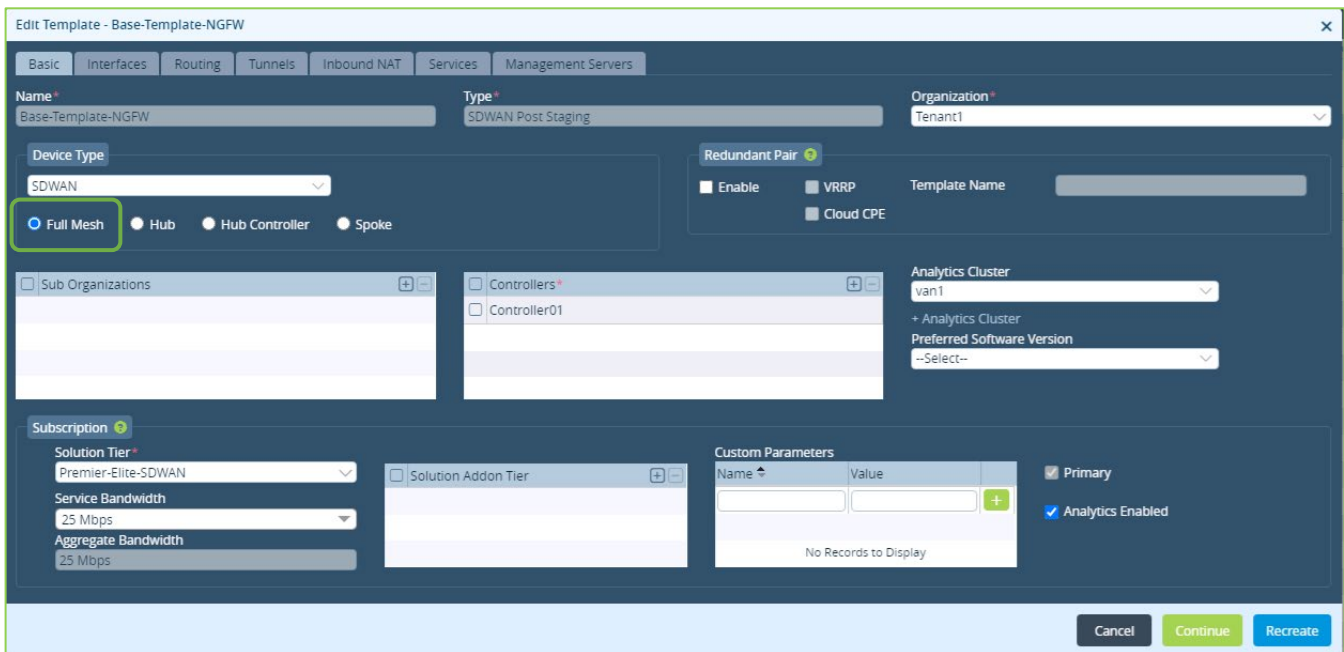
Analyze the LAN routes learned on your device, and the BGP next-hops (remote gateway) of the routes.

Exercise 2: Examine Full Mesh Configuration and Reachability

Open the Workflows tab in Versa Director and navigate to the *Template > Templates* dashboard. Locate the Base-Template-NGFW template workflow and click on the workflow to open it for viewing.



The Base-Template-NGFW workflow creates a device template that is configured for Full Mesh topology.

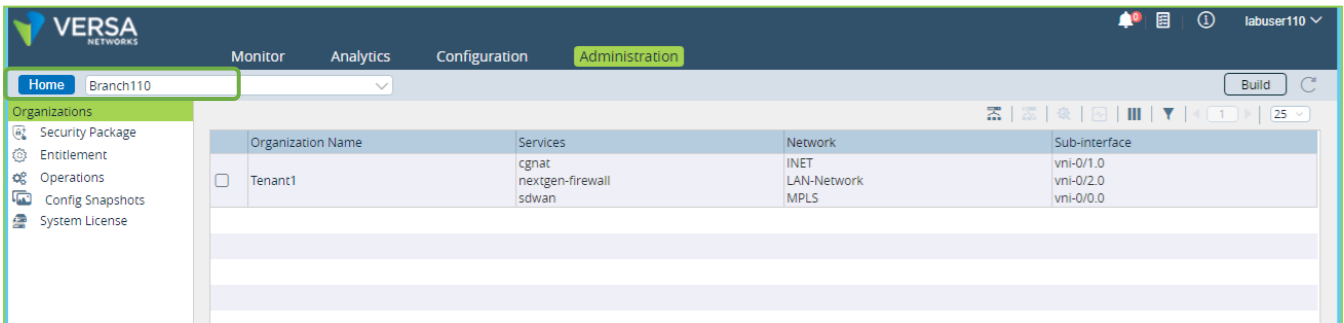


The Full Mesh setting creates default BGP policies policies that send all routes to the Versa Controllers, and that allow all routes received from the Versa Controllers. This creates a forwarding plane that has visibility of and that can forward to all remote CPE devices.

Click *Cancel* to close the Template Workflow. DO NOT MAKE ANY CHANGES!

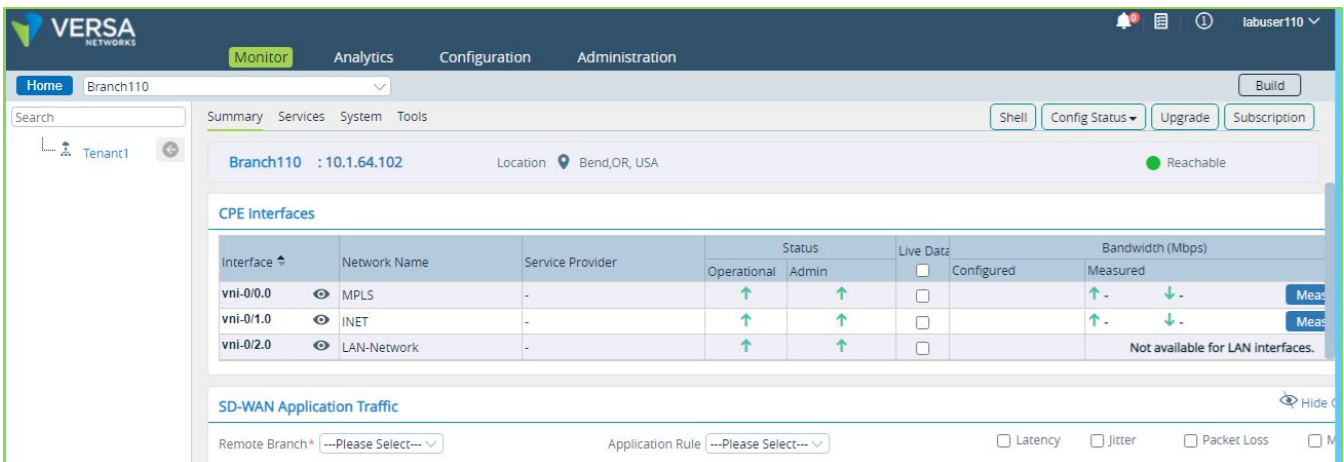
Next you'll analyze the full mesh reachability by using Versa Director and the Monitor tab (Appliance Context mode).

From Versa Director, navigate to *Administration > Appliances* and locate your device in the Appliances table. Click on your appliance to open the Appliance Context mode of your device.



Example of Branch110 Device Context Mode

From device context mode of your device, click on *Monitor* to open the device monitoring dashboard. Locate and select the *Services* tab to open the services monitoring dashboard. You will be examining the *Route* service to identify what routes and remote nodes are present and visible to your device.



Branch110 : 10.1.64.102 Location Bend,OR, USA Reachable

Services: SDWAN, NGFW, CGNAT, IPSEC, Sessions, VPN Clients

Networking: Interfaces, Routes, BGP, OSPF, OSPFv3, BFD, DHCP, DNS Stats, COS, VRRP, LEF, ARP, IP-SLA, Endpoints, PIM, IGMP, dot1x, RIP

Dest Prefix	Interface Name	Protocol	Age	Next Hop
+10.0.1.0/24	ptvi2	BGP	6d02h48m	10.1.64.1
+10.0.33.0/24	ptvi2	BGP	6d02h48m	10.1.64.1
+10.0.128.1/32	ptvi2	BGP	6d02h48m	10.1.64.1
+10.0.192.1/32	ptvi2	BGP	6d02h48m	10.1.64.1
+10.1.0.1/32	Indirect	SDWANR	1w3d23h	0.0.0.0
10.1.0.1/32	ptvi2	BGP	6d02h48m	10.1.64.1
+10.1.0.101/32	Indirect	SDWANR	6d02h48m	0.0.0.0
+10.1.0.102/32	directly connected	local	1w3d23h	0.0.0.0
+10.1.0.103/32	Indirect	SDWANR	6d02h44m	0.0.0.0
+10.1.0.104/32	Indirect	SDWANR	6d02h41m	0.0.0.0

You can filter the routes listed by entering filter text in the Search box

Locate the SDWAN routes in the route table. SDWAN routes are routes that are advertised and received as Versa-Private routes (node advertisements). Note that each remote device advertises 2 SDWAN routes. The first is the endpoint used for clear-channel reachability, and the second is the endpoint used for encrypted-channel reachability. In the example, the clear-channel tunnel endpoint begins with the prefix 10.1.0.X/32 and the encrypted-channel endpoint begins with prefix 10.1.64.x/32.

Select the Tenant1-LAN-VR routing table from the routing table dropdown list.

Services: SDWAN, NGFW, CGNAT, IPSEC, Sessions, VPN Clients

Tenant1-Control-VR | IPv4

- Select--
- INET-Transport-VR
- MPLS-Transport-VR
- Tenant1-Control-VR
- Tenant1-LAN-VR**

Dest Prefix	Interface Name
+10.0.128.1/32	ptvi2
+10.0.192.1/32	ptvi2
+10.1.0.1/32	Indirect
10.1.0.1/32	ptvi2
+10.1.0.101/32	Indirect
+10.1.0.102/32	directly connected
+10.1.0.103/32	Indirect
+10.1.0.104/32	Indirect

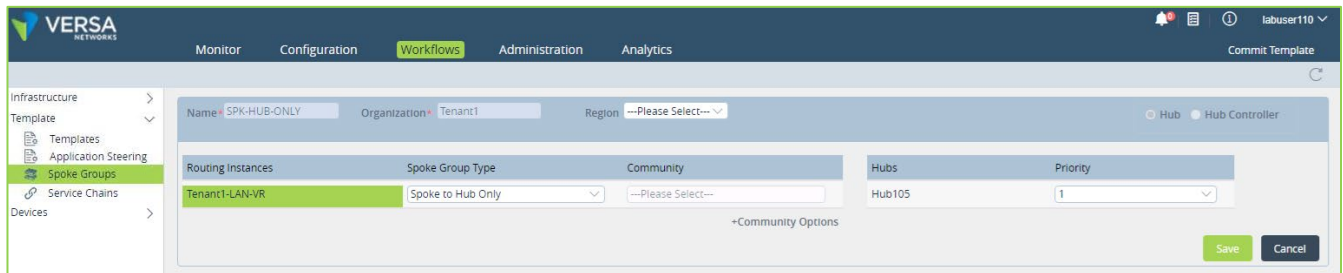
Exercise 3: Examine Spoke Groups

In the next part of the lab exercise, you will examine the pre-configured spoke groups using Versa Director. The spoke groups are created and can be viewed through the *Workflows > Template > Spoke Groups* dashboard.

There are 4 pre-configured spoke groups:

- **SPK-SPK-HUB:** Configured as a spoke-to-spoke-via-hub spoke group, with hub 105 as the hub device.
- **SK-HUB-ONLY:** Configured as a spoke-to-hub-only spoke group, with hub 105 as the hub device.
- **SPKTOSPK-DIRECT-MESHGRP-101:** Configured as a Spoke to Spoke Direct spoke group, with BGP community 101 added to the group.
- **SPKTOSPK-DIRECT-MESHGRP-102:** Configured as a Spoke to Spoke Direct spoke group, with BGP community 102 added to the group.

Spoke to Hub Only



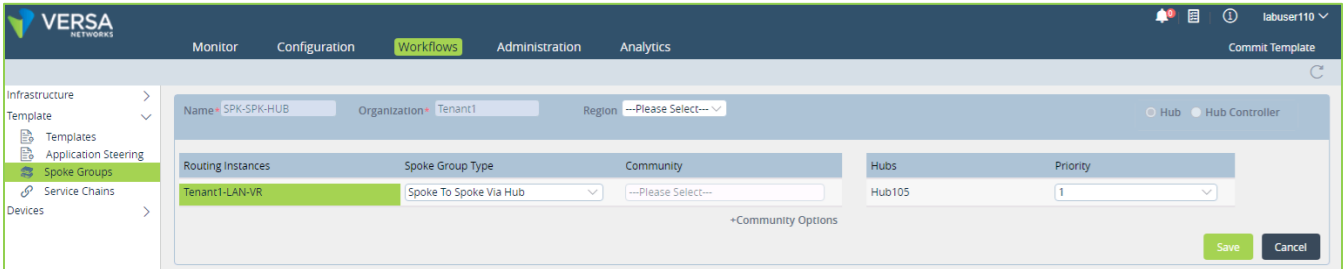
Click on the **SPK-HUB-ONLY** spoke group to view its configuration.

The spoke group has the following parameters:

- **Routing Instances:** This identifies the customer LAN-facing routes that will be advertised to the hub within this spoke group.
- **Spoke Group Type:** This determines the reachability (topology) of the hub-and-spoke deployment. Routing policy will be configured on devices that belong to this spoke group to determine which routes are accepted from the controller, what community values are added to BGP route redistribution policies, etc.
- **Community:** Used for Spoke-to-Spoke Direct only (adds an extra region/group specific BGP community).
- **Hubs:** Allows you to list the hubs from which received routes will be accepted (uses BGP routing policy to accept/reject routes received from hubs).
- **Priority:** The priority of the routes received from the hubs (uses BGP policy/Local Preference to adjust the priority of routes received from hubs). Multiple hubs can be configured, each with a different priority.

Click **Cancel** to close the dialog without making any changes.

Spoke to Spoke via Hub

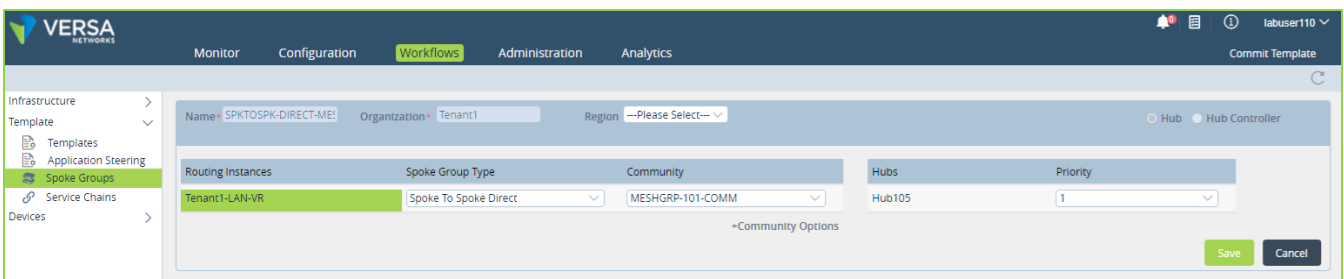


Click on the **SPK-SPK-HUB** spoke group to view its configuration.

The spoke group has the following same parameter set as the Spoke to Hub Only topology. However, when a spoke group is designated as Spoke To Spoke Via Hub type, the BGP policies created by Versa Director for the CPE devices add different community values to routes advertised by the CPE devices. These new community values allow the hub to re-process and re-advertise the routes to other devices (with the hub set as the BGP next-hop). These policies are managed and coordinated by Versa Director automatically, and the administrator does not have to manage them directly.

Click **Cancel** to close the dialog without making any changes.

Spoke to Spoke Direct



Click on the **SPKTOSPK-DIRECT-MESHGRP-101** spoke group to view its configuration.

The spoke group has the same parameters as the other spoke group types, but adds an additional BGP community parameter to define the mesh group to which the devices will belong. All devices assigned to the same mesh group will be able to form point-to-point tunnels between devices. Devices that do not have the same BGP community assigned will behave as Spoke to Spoke Via Hub, and will be required to forward traffic through the hub to reach the remote networks.

Click the Community drop-down to view the options.

These options are named communities that the administrator configures.

Click the *+Community Options* link to view the BGP community dialog.

Name	Community ID
MESHGRP-101-COMM	101
MESHGRP-102-COMM	102

BGP Communities consist of 2 parts. The Versa Director user interface allows the administrator to configure the 2nd part of the community value (the Community ID value show above). This allows Versa Director to ensure that different organizations cannot assign the same complete community value to a mesh group, and maintains multi-tenant routing consistency. In the example, if another organization in a multi-tenant environment assigns the same mesh group community value of 101, the complete community value will still be unique in the control plane, as the first part of the BGP community will be organization specific.

Click **Cancel** to close the Community Options dialog without making any changes.

Click **Cancel** again to close the Spoke Group dialog.

Exercise 4: Add Device to a Spoke Group

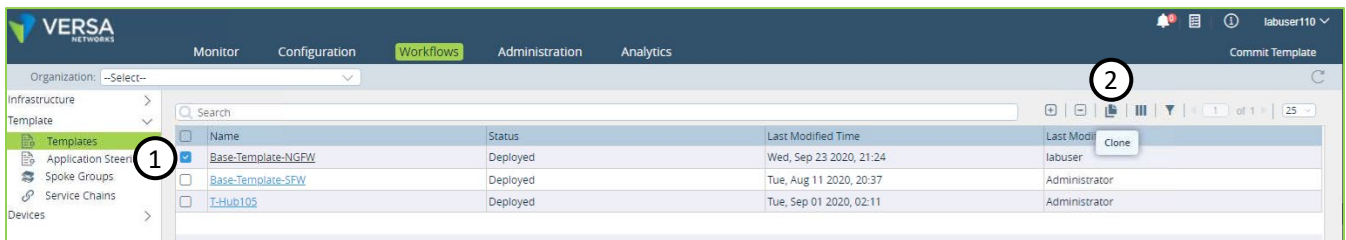
In the next part of the lab exercise, you will create a Device Template Workflow that will be used to configure devices to be part of a Spoke-to-Hub-Only topology. The tasks that will be complete in this lab exercise are:

- Create a new template using a Template Workflow.
- The template workflow should be configured as a Spoke topology, with the SPK-HUB-ONLY spoke group.
- The template workflow can be created by cloning the Base-Template-NGFW Template Workflow, giving it a new name, and changing the topology type.
- Create a new device group that references the new template.
- Assigning your device to the new device group. You can use your device workflow to perform this re-assignment.
- Commit the template to the device.

The following steps will walk you through these processes.

Create a new device template with a device template workflow.

1. Navigate to the *Workflows > Template > Templates* dashboard. From the Templates workflow table, check the box next to the Base-Template-NGFW workflow. This will enable the *Clone* button on the task bar.
2. Click the *Clone* button to create a clone (copy) of the workflow.



In the Clone Template dialog, rename the workflow to a name that is unique to your user-id/branch-id and the topology type. e.g. *labuser110-spoke-hub-template*

Change the Device Type to *Spoke* and select *SPK-HUB-ONLY* as the Spoke Group.

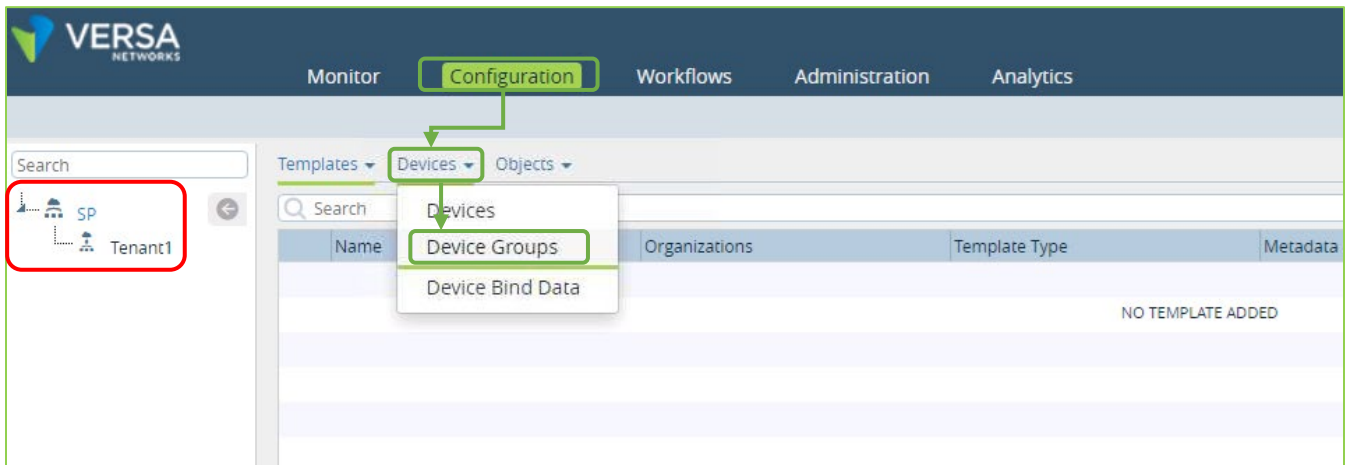
All other parameters of the workflow should remain the same.

Click **Recreate** button to save the workflow and to create a new template based on the workflow parameters.

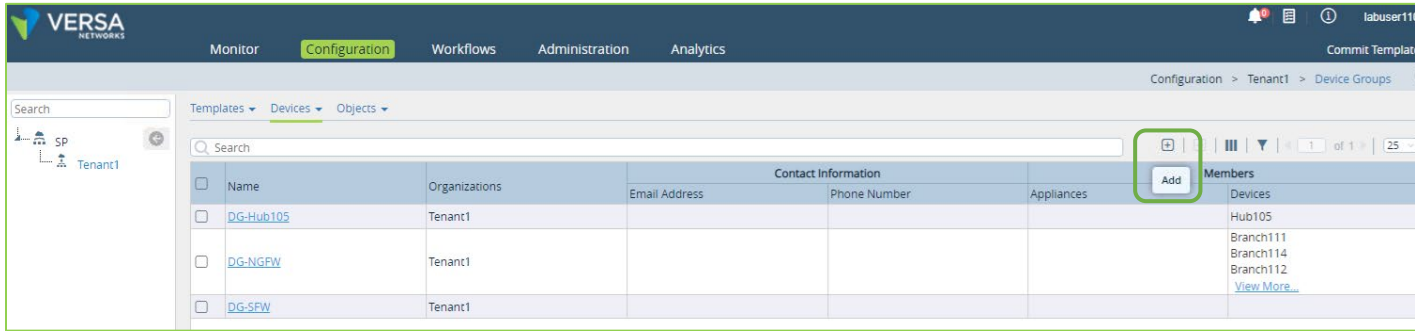
Example Workflow Clone

Create a new device group that is associated with the new template.

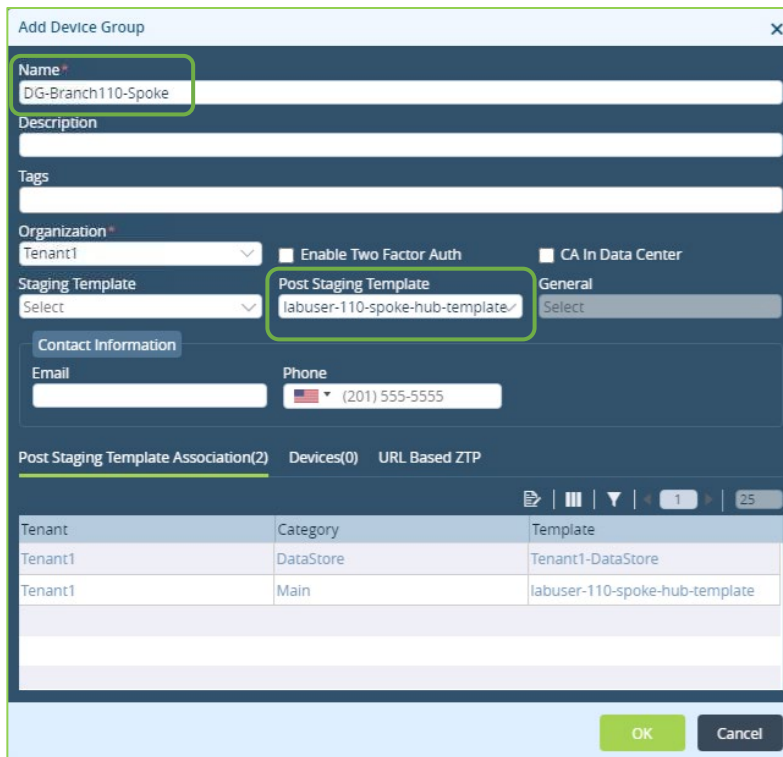
1. Navigate to the *Configuration > Devices > Device Groups* dashboard. Ensure that the *Tenant1* organization is selected on the left-side menu.
2. From the Device Groups dashboard, click the + button to create a new device group.
3. Give the device group a unique name based on your node or user ID, and associate the device group with the device template you created in the previous exercise.



Step 1



Step 2



Step 3

Question: Where do you find the complete list of templates that are associated with the device group, and that will be used as sources for the final device configurations?

Answer: The Post Staging Template Association table shows all of the templates that will be used to build the final device configurations. This includes the Common Template (DataStore) and any service templates that will be applied to the configuration.

Change the device group to which your device belongs

In the next steps you will re-assign your device to the device group you created in the previous steps, which will assign a new configuration to your device.

1. Navigate to the *Workflows > Devices > Devices* dashboard and locate the workflow that is associated with your device in the table (this is the workflow that was used to create your device in the pre-staging environment).
2. Click your device workflow to open the workflow for modification.
3. In the *Basic* tab of your device workflow, assign the new device group you created in the previous steps to the device.
4. Click the *Redeploy* button to recreate your device in Versa Director. This will re-configure the device parameters within Versa Director, but the changes still need to be pushed to the end device with the Commit Template function.

Name	Global Device ID	Status	Last Modified Time	Last Modified By
Branch110	102	Deployed	Thu, Mar 11 2021, 12:27	labuser
Branch111	103	Deployed	Tue, Mar 09 2021, 10:05	labuser
Branch112	104	Deployed	Tue, Mar 09 2021, 10:18	labuser
Branch113	105	Deployed	Tue, Mar 09 2021, 10:07	labuser
Branch114	106	Deployed	Tue, Mar 09 2021, 10:08	labuser
Branch115	107	Deployed	Tue, Mar 09 2021, 10:09	labuser
Hub105	101	Deployed	Tue, Aug 11 2020, 12:01	Administrator

Steps 1 and 2

Add Device - Branch110

Basic | Location Information | Device Service Template | Bind Data

Name*: Branch110 | Global Device ID*: 102 | Organization*: Tenant1

Deployment Type: CPE-Baremetal Device | Serial Number: SN-Branch110 | Device Groups*: DG-Branch110-Spoke

Admin Contact Information: Email: | Phone Number: (201) 555-5555

Subscription: Service Bandwidth: Select options | Aggregate Bandwidth: | +Device Group

Buttons: Cancel | Save | Continue | Redeploy

Steps 3 and 4

Commit the Template to Your Device

In the next steps you will commit the changes to your device. You do this by applying the device group settings to the appliances through the Commit Template process.

1. Click the *Commit Template* button in the top-right corner of Versa Director.
2. In the Commit dialog, select Tenant1 from the organization dropdown menu.
3. Select your template from the Select Template dropdown menu.
4. Locate your Device Group in the Device Groups table, and mark the box next to your device.
5. Click *OK* to commit the template.

The screenshot shows the 'Commit' dialog box. At the top, there are two dropdown menus: 'Organization' (set to 'Tenant1') and 'Select Template' (set to 'labuser-110-spoke-hub-template'). Below these are radio buttons for 'Template' (selected) and 'Service Template', and a 'Reboot' checkbox. Further down are radio buttons for 'Auto Merge', 'Overwrite' (selected), and a help icon. The 'Device Groups' section contains a table with the following data:

<input type="checkbox"/>	Devices	Device Type	Template State	Appliance State	Device Modified	Differences	Association
<input checked="" type="checkbox"/>	DG-Branch110-Spoke						
<input checked="" type="checkbox"/>	Branch110	Branch	IN_SYNC	IN_SYNC	✓	👁	📄

At the bottom right, there are 'OK' and 'Cancel' buttons. A note box in the center reads: 'Note: Your view may appear different from the example. This will depend on how many other lab students have created device groups when you reach this step.'

Steps 2 through 5

Verify the Changes to Your Device

The output of the following steps will depend on where the other lab participants are in the process. If you are the first person to reach this point in the lab, it will appear that the changes have not been applied – this is because the hub-and-spoke routes are filtered based on the routing policies configured on other devices.

1. Navigate to *Administration > Appliances* and locate your appliance in the table.
2. Click your appliance name to open the Appliance Context mode of your appliance.
3. In Appliance Context mode, navigate to the *Services* tab, then click the *Routes* button.
4. In the Routes table, ensure that the Tenant1-Control-VR route table is selected.
5. Analyze the nodes that are visible to the appliance.

Node routes will begin with a 10.x prefix (the control plane address space) and end with a value of 101 or higher (IP addresses reserved for CPE devices)

1

2

Name	Mgmt. Address	Type	Time Created	Service Start Time	Software Version	Site ID	Organizations	Snaps...	Config Synchron...	Reachability	Service	Locked
Branch110	10.1.64.102	Branch	Tue, Sep 22 2020...	Thu, Mar 04 202...	20.2.2-GA	102	Tenant1				Up	
Branch100			Tue, Mar 09 202...	Tue, Mar 09 202...	20.2.2-GA	103	Tenant1				Up	
Branch104			Tue, Mar 09 202...	Tue, Mar 09 202...	20.2.2-GA	104	Tenant1				Up	
Branch105			Tue, Mar 09 202...	Tue, Mar 09 202...	20.2.2-GA	105	Tenant1				Up	
Branch106			Tue, Mar 09 202...	Tue, Mar 09 202...	20.2.2-GA	106	Tenant1				Up	
Branch107			Tue, Mar 09 202...	Tue, Mar 09 202...	20.2.2-GA	107	Tenant1				Up	
Branch101			Tue, Aug 11 202...	Thu, Mar 04 202...	20.2.2-GA	1	Tenant1_SP				Up	
Router	192.168.99.130	Service-vnf	Tue, Sep 17 2019...	Thu, Mar 04 202...	20.2.2-GA		SP				Up	

Steps 1 and 2

3

4

5

Dest Prefix	Interface Name	Protocol	Age	Next Hop
+10.0.33.0/24	pvti2	BGP	1w5d23h	10.1.64.1
+10.0.128.1/32	pvti2	BGP	1w5d23h	10.1.64.1
+10.0.192.1/32	pvti2	BGP	1w5d23h	10.1.64.1
+10.1.0.1/32	Indirect	SDWANR	2w3d20h	0.0.0.0
10.1.0.1/32	pvti2	BGP	1w5d23h	10.1.64.1
+10.1.0.101/32	Indirect	SDWANR	1w5d23h	0.0.0.0
+10.1.0.102/32	directly connected	local	2w3d20h	0.0.0.0
+10.1.64.1/32	pvti2	SDWAN	1w5d23h	0.0.0.0
+10.1.64.101/32	Indirect	SDWANR	1w5d23h	0.0.0.0

Steps 3, 4, and 5

Control-VR Route Table Analysis

The nodes visible to your appliance in the Control-VR routing table will depend on the progress other lab users have made in their configuration. As other lab members reconfigure their devices to the hub-and-spoke topology, the node advertisements they send to the controller will be marked with BGP communities that identify the routes as spoke-sourced routes, and your appliance will begin to filter them out and remove them from the known-nodes list in the routing table.



It may take some time for other nodes to be re-configured. You can refresh the route table by selecting a different route table in the route table dropdown menu, or by clicking the browser Refresh button. Wait until remote nodes begin to disappear from the Control-VR routing table before proceeding, or ask your instructor for instructions on how to continue.

Tenant1-LAN-VR Route Table Analysis

The Tenant LAN VR is where remote routes are stored. Each remote route is associated with a remote site that is found in the Control-VR routing table. You will see the following relationships between the routes in the Tenant1-LAN-VR route table and the Control-VR route table:

- Each remote LAN in the tenant LAN VR will have a BGP next-hop (gateway address) of a remote site that is located in the Control VR (SDWAN route).
1. Select the *Tenant1-LAN-VR* route table from the routing table dropdown menu.
 2. Locate the Hub LAN in the routing table (172.16.105.0/24)
 3. As other lab members finish completing their configurations, note that the remote LANs associated with their devices are no longer listed in the routing table (you will have to refresh the browser window, or you can change the routing table in the dropdown, then change it back to re-query the device routing table). Once all other nodes have been converted to Hub-and-Spoke, the Tenant1-LAN-VR routing table should be similar to the example below.

Dest Prefix	Interface Name	Protocol	Age	Next Hop
+0.0.0.0/0	tvi-0/603.0	BGP	00:09:27	169.254.0.2
+169.254.0.2/31	tvi-0/603.0	conn	2w3d20h	169.254.0.3
+169.254.0.3/32	directly connected	local	2w3d20h	0.0.0.0
+172.16.105.0/24	Indirect	BGP	00:09:27	10.1.64.101
+172.16.110.0/24	vni-0/2.0	conn	2w3d20h	172.16.110.1
+172.16.110.1/32	directly connected	local	2w3d20h	0.0.0.0

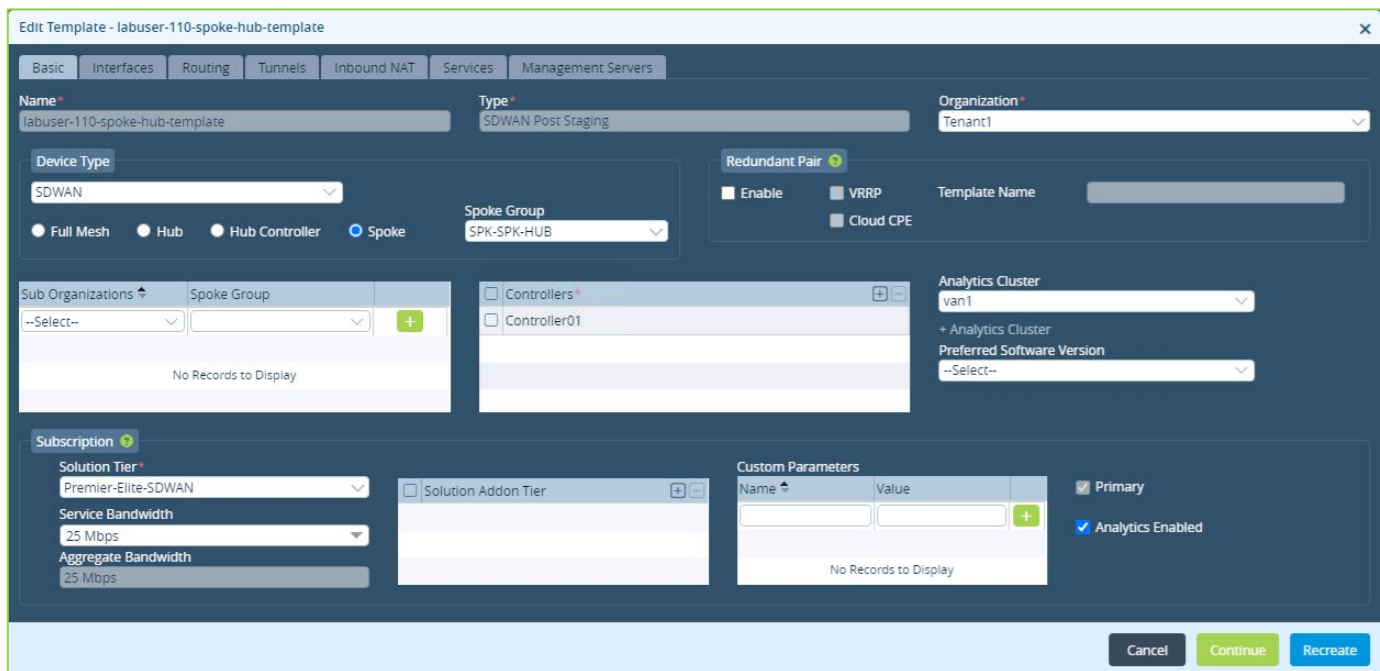


Before proceeding with the lab, verify with your instructor that other students have progressed to a point where your upcoming changes will be effective. If you proceed prior to the following steps before other students have completed their lab steps to this point, your output may not match the following examples.

Change the Hub-and-Spoke Topology Type in the Device Template

In the next steps you will change the spoke group configured in your device template workflow. This will reconfigure the corresponding template with different BGP policies which will change how routes are advertised and accepted in the SD-WAN.

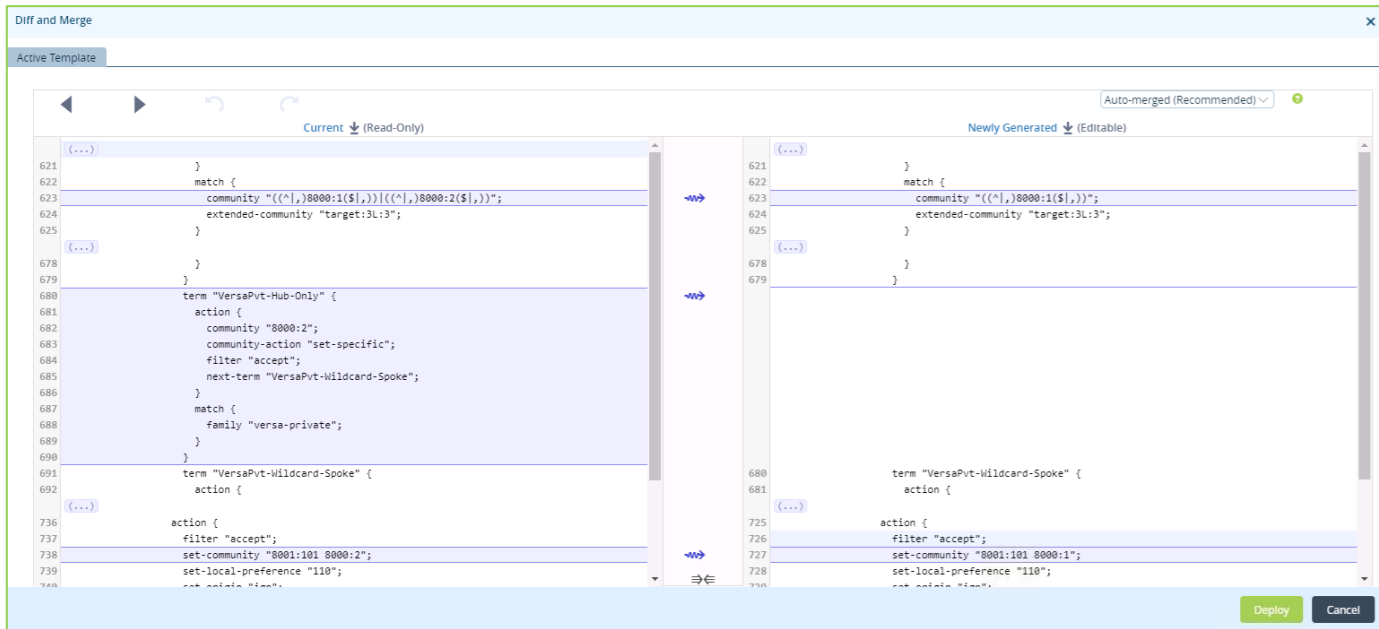
1. Navigate to the *Workflows > Template > Templates* in Versa Director.
2. Locate your Template workflow in the workflow table.
3. Click your Template workflow to open the workflow.
4. Change the Spoke Group in the workflow to the **SPK-SPK-HUB** spoke group.
5. Click *Recreate* to update the workflow and recreate the device template.
6. When prompted with the Diff and Merge page, examine the changes that will be applied to the configuration by modifying the workflow (and the template).
7. Click *Deploy* to apply the changes to the template in Versa Director.



The screenshot shows the 'Edit Template' interface in Versa Director for a template named 'labuser-110-spoke-hub-template'. The interface is divided into several sections:

- Basic Information:** Name (labuser-110-spoke-hub-template), Type (SDWAN Post Staging), and Organization (Tenant1).
- Device Type:** A dropdown menu set to 'SDWAN'. Below it are radio buttons for 'Full Mesh', 'Hub', 'Hub Controller', and 'Spoke' (which is selected).
- Spoke Group:** A dropdown menu set to 'SPK-SPK-HUB'.
- Redundant Pair:** Checkboxes for 'Enable', 'VRRP', and 'Cloud CPE'.
- Sub Organizations and Spoke Group:** A table with columns for 'Sub Organizations' and 'Spoke Group'. It shows 'No Records to Display'.
- Controllers:** A table with columns for 'Controllers'. It shows 'Controller01'.
- Analytics Cluster:** A dropdown menu set to 'van1'. Below it are '+ Analytics Cluster' and 'Preferred Software Version' dropdowns.
- Subscription:**
 - Solution Tier:** A dropdown menu set to 'Premier-Elite-SDWAN'.
 - Service Bandwidth:** A dropdown menu set to '25 Mbps'.
 - Aggregate Bandwidth:** A dropdown menu set to '25 Mbps'.
 - Solution Addon Tier:** A table with columns for 'Solution Addon Tier'. It shows 'No Records to Display'.
 - Custom Parameters:** A table with columns for 'Name' and 'Value'. It shows 'No Records to Display'.
 - Checkboxes:** 'Primary' (checked) and 'Analytics Enabled' (checked).

At the bottom right, there are three buttons: 'Cancel', 'Continue', and 'Recreate'.



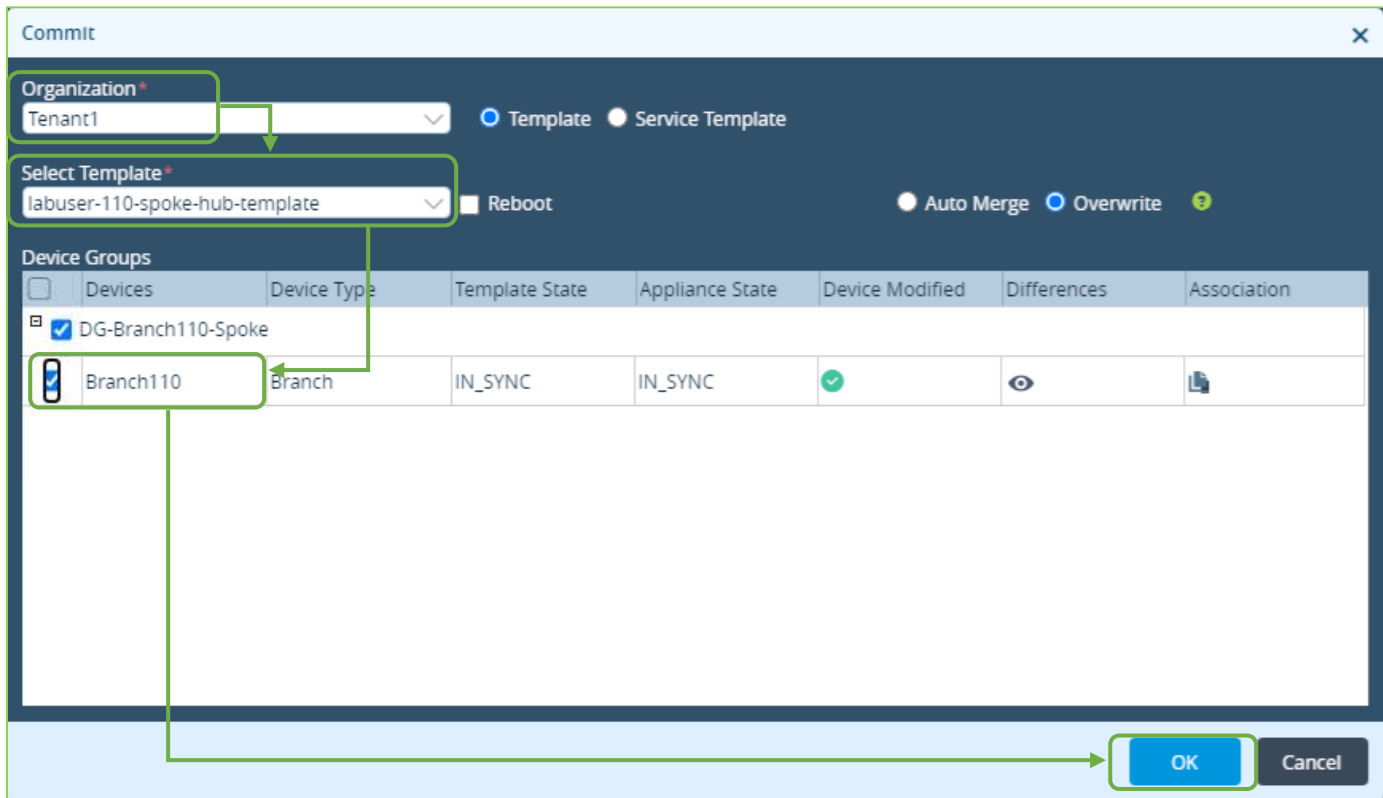
Question: What configuration parameters change when you set the device to Spoke-to-Spoke-via-Hub?

Answer: Redistribution and routing policy is changed to add different community values to routes that are sent, and a different set of routes are allowed into the device based on community values attached to received routes. The community values attached to advertised routes also allows the hub to process the routes differently in order to re-advertise the routes back to sites.

Apply the Device Template Configuration Changes to Your Device

Now that you have modified the configuration template associated with your device in Versa Director, you need to apply the changes to the appliance.

1. Click Commit Template in the top-right corner of Versa Director
2. In the Commit dialog, select the following:
 - Organization: Tenant1
 - Template: Your device template
 - Device Group: locate your device in the list and select it
3. Click OK to apply the configuration to your appliance.



Steps 2 and 3

Analyze the Routes in Your Appliance Control-VR

Now that you have applied the changes to your device, you will analyze how the topology change (spoke group type) affects the reachability information for your device.

1. Navigate to the *Administration > Appliances* dashboard and locate your appliance in the appliance table.
2. Click your appliance name to open the Appliance Context mode of your appliance.
3. In the Appliance Context mode of your appliance, navigate to the *Services > Routes* dashboard (ensure that the Tenant1 organization is selected on the left-side menu).
4. Ensure that the Tenant1-Control-VR routing table is selected in the routing table dropdown menu.

Administration

Total Appliances: 9

Name	Mgmt. Address	Type	Time Created	Service Start Time	Software Version	Site ID	Organizations	Snaps...	Config Synchron...	Reachability	Service	Locked
Branch110	10.1.64.102	Branch	Tue, Sep 22 2020...	Thu, Mar 04 202...	20.2.2-GA	102	Tenant1				Up	
			Tue, Mar 09 202...	Tue, Mar 09 202...	20.2.2-GA	103	Tenant1		✓	✓	Up	
			Tue, Mar 09 202...	Tue, Mar 09 202...	20.2.2-GA	104	Tenant1		✓	✓	Up	
			Tue, Mar 09 202...	Tue, Mar 09 202...	20.2.2-GA	106	Tenant1		✓	✓	Up	
			Tue, Mar 09 202...	Tue, Mar 09 202...	20.2.2-GA	107	Tenant1		✓	✓	Up	
			Tue, Aug 11 202...	Thu, Mar 04 202...	20.2.2-GA	1	Tenant1_SP		✓	✓	Up	
			Tue, Aug 11 202...	Thu, Mar 04 202...	20.2.2-GA	101	Tenant1		✓	✓	Up	
Router	192.168.99.130	Service-vnf	Tue, Sep 17 2019...	Thu, Mar 04 202...	20.2.2-GA		SP		✓	✓	Up	

Steps 1 and 2

Monitor | Analytics | Configuration | Administration

Home | Branch110

Summary | **Services** | System Tools

Branch110 : 10.1.64.102 | Location: Bend,OR,USA | Reachable

Services

- SDWAN
- NGFW
- CGNAT
- IPSEC
- Sessions
- VPN Clients

Networking

- Interfaces
- Routes**
- BGP
- OSPF
- OSPPv3
- BFD
- DHCP
- DNS Stats
- COS
- VRRP
- LEF
- ARP
- IP-SLA
- Endpoints
- PIM
- IGMP
- dot1x
- RIP

Tenant1-Control-VR | IPv4

Dest Prefix	Interface Name			
+10.0.1.0/24	ptvi2			
+10.0.33.0/24	ptvi2	BGP	1w5d23h	10.1.64.1
+10.0.128.1/32	ptvi2	BGP	1w5d23h	10.1.64.1
+10.0.192.1/32	ptvi2	BGP	1w5d23h	10.1.64.1
+10.1.0.1/32	Indirect	SDWANR	2w3d20h	0.0.0.0
10.1.0.1/32	ptvi2	BGP	1w5d23h	10.1.64.1
+10.1.0.101/32	Indirect	SDWANR	1w5d23h	0.0.0.0
+10.1.0.102/32	directly connected	local	2w3d20h	0.0.0.0
+10.1.64.1/32	ptvi2	SDWAN	1w5d23h	0.0.0.0
+10.1.64.101/32	Indirect	SDWANR	1w5d23h	0.0.0.0

Note: Depending on the progress of other students, the routes listed in your routing table may be different from the example.

Steps 3 and 4

Analyze the Routes in Your Appliance Tenant1-LAN-VR Routing Table

Next you will analyze the remote LAN routes in your Tenant1-LAN-VR routing table. Pay special attention to the Next-Hop (remote gateway) associated with each remote LAN prefix.

1. Select the Tenant1-LAN-VR routing table from the routing table dropdown list.
2. In the Tenant1-LAN-VR routing table, identify the remote LANs that are visible to your appliance.
3. Note the Next Hop associated with each remote LAN.

Dest Prefix	Interface Name	Next Hop	Origin	Age	Next Hop
+0.0.0.0/0	twi-0/603.0				
+169.254.0.2/31	twi-0/603.0				
+169.254.0.3/32	directly connected	local	2w3d20h	0.0.0.0	
+172.16.105.0/24	Indirect	BGP	00:13:11	10.1.64.101	
+172.16.110.0/24	vni-0/2.0	conn	2w3d20h	172.16.110.1	
+172.16.110.1/32	directly connected	local	2w3d20h	0.0.0.0	
+172.16.111.0/24	Indirect	BGP	00:00:35	10.1.64.101	
+172.16.112.0/24	Indirect	BGP	00:00:34	10.1.64.101	
+172.16.113.0/24	Indirect	BGP	00:00:36	10.1.64.101	
+172.16.114.0/24	Indirect	BGP	00:00:40	10.1.64.101	

Question: Why is the next-hop for all of the remote LANs the same?

Answer: The hub site accepted all of the routes it received in the BGP advertisements sent by the spokes (sites). It then reprocessed the routes based on the new community values associated with the routes and re-advertised the LAN prefixes. This process of “recycling” the routes causes the hub device to be the originator of the LAN subnets, and it is therefore the gateway to reach the LAN destinations.

Exercise 5: Reset the Lab Environment

In this lab part you will:

- Re-assign your device to the Base-Template-NGFW template by re-assigning the Device Group in your Device workflow
 - Commit the changes to reset your device configuration to the base configuration
 - Delete your user-created Device Template Workflow (which will delete the template associated with the workflow)
 - Delete the user-created Device Group that you created during this lab.
1. Navigate to the *Workflows > Devices > Device* hierarchy to display the saved Device workflows.
 2. Locate **your device** workflow in the Device Workflow table and click the workflow to open it.
 3. In the Device workflow, set the Device Group to DG-NGFW.
 4. Click *Redeploy* to update your device workflow and save the changes.

Add Device - Branch110

Basic | Location Information | Device Service Template | Bind Data

Name* Branch110 Global Device ID* 102 Organization* Tenant1

Deployment Type CPE-Baremetal Device Serial Number SN-Branch110 Device Groups* DG-NGFW

+Device Group

Admin Contact Information

Email Phone Number (201) 555-5555

Subscription

Service Bandwidth Select options Aggregate Bandwidth

Cancel Save Continue Redeploy

Navigate to the *Configuration > Devices > Device Groups* dashboard.

In the *Device Groups* table:

1. Check the box next to your user-defined device group.
2. Click the button to remove your user-defined device group.
3. Confirm the device group deletion.

Organization: Tenant1

Name	Organizations	Contact Information	Members		
		Email Address	Phone Number	Appliances	Devices
<input checked="" type="checkbox"/> DG-branch110	Tenant1				
<input type="checkbox"/> DG-Hub105	Tenant1				Hub105
<input type="checkbox"/> DG-NGFW	Tenant1				Branch111 Branch114 Branch112 View More...
<input type="checkbox"/> DG-SFW	Tenant1				

Navigate to the *Workflows > Template > Templates* dashboard.

In the *Templates* workflow table:

1. Check the box next to your user-defined template.
2. Click the button to remove your user-defined template.
3. Confirm the wokflow deletion.

Organization: --Select--

Name	Status	Last Modified Time	Delete Template By
<input type="checkbox"/> Base-Template-NGFW	Deployed	Wed, Sep 23 2020, 21:24	labuser
<input type="checkbox"/> Base-Template-SFW	Deployed	Tue, Aug 11 2020, 20:37	Administrator
<input checked="" type="checkbox"/> Template-labuser110-branch110	Deployed	Thu, Mar 11 2021, 20:25	labuser
<input type="checkbox"/> T-Hub105	Deployed	Tue, Sep 01 2020, 02:11	Administrator



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