
Configure WWAN

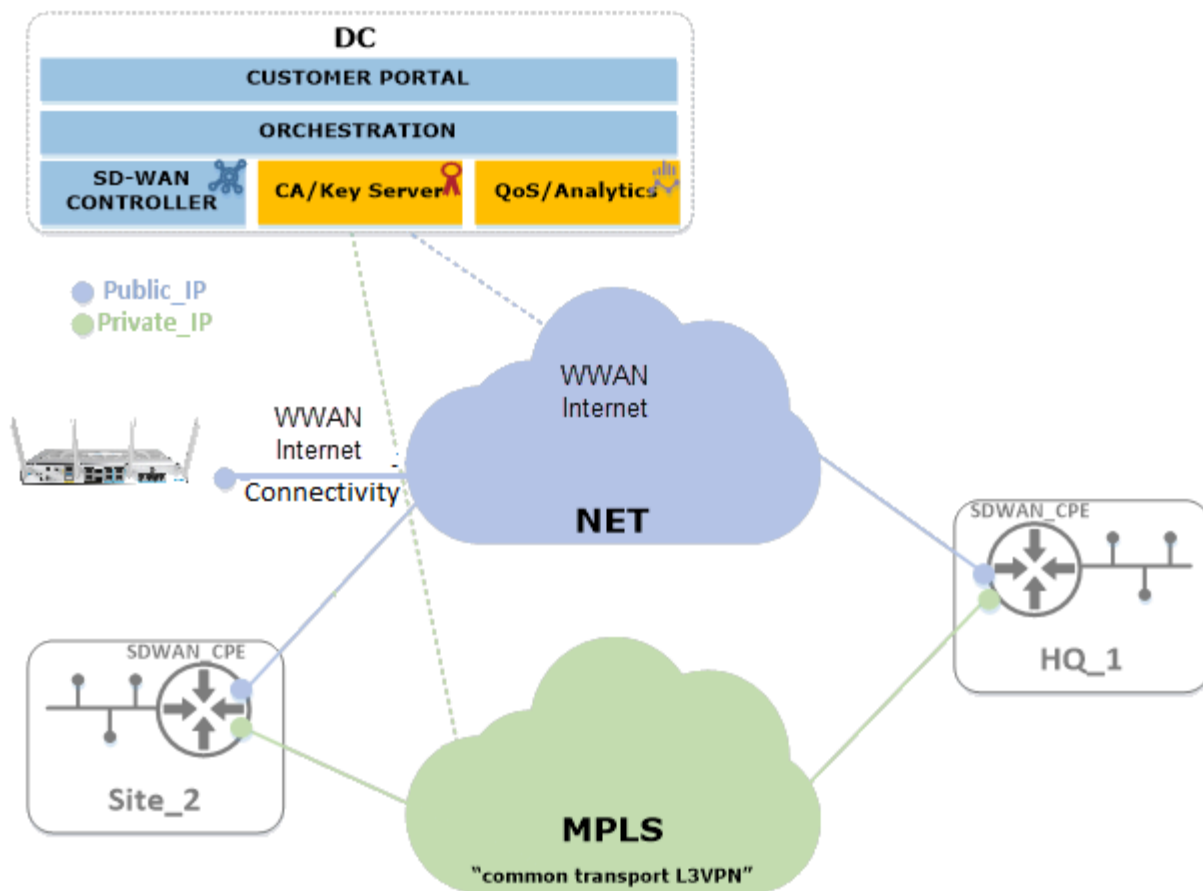
 For supported software information, click [here](#).

You can configure wireless WAN (WWAN) broadband services on a Versa Operating System™ (VOS™) device in a branch, to provide wireless connectivity to the internet. WWAN functionality is useful when a branch does not have a wired connection to the internet. You can use the WWAN services on a VOS device that has a built-in WWAN chip or that has an external USB modem, or you can connect an Android mobile phone using a USB port (referred to as *tethering*).

The term *WWAN interfaces* refers to LTE, 4G, and 5G interfaces.

Note that in Releases 21.2 and earlier, the Director GUI refers to WWAN interfaces as LTE interfaces.

The following figure shows three branches that have wireless connections to the internet. Two of the branches have wired connections to a private MPLS network and wireless connections to the internet. One of the branches has only a wireless connection to the internet.



Configure WWAN

To configure WWAN interfaces on a VOS device, you do the following:

- Obtain an WWAN link.
- Configure a WAN interface to use for WWAN.
- Configure WWAN interface properties.

Obtain a WWAN Link

Before you configure a WWAN interface, ensure that the VOS device has an internal modem or that you have an external dongle for the VOS device.

If you are using an internal modem:

- Ensure that the SIM card is activated and working.
- Ensure that the antennas are connected.

If you are using an external dongle:


- Ensure that the SIM card is activated and working.

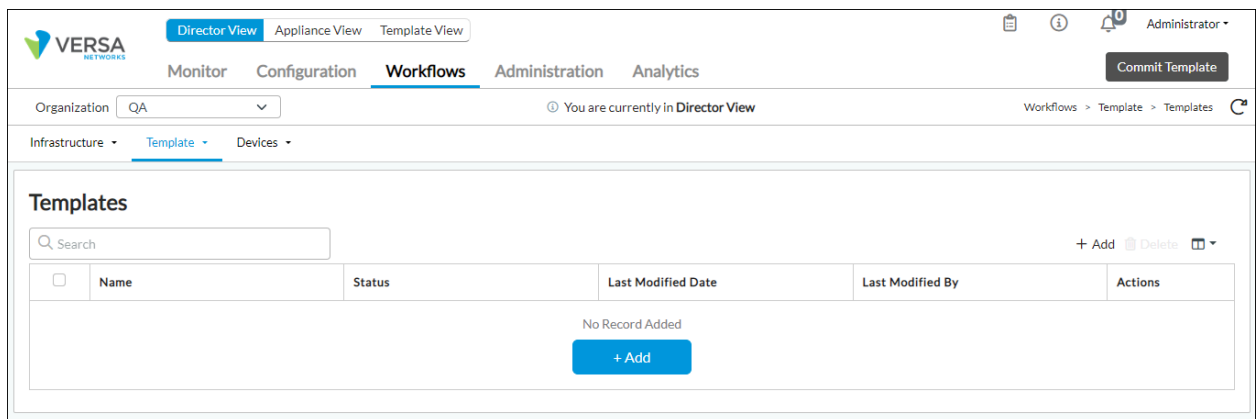
The VOS device automatically detects the dongle or SIM card, and it then retrieves its IP address.

Configure a WAN Interface To Use for WWAN

To set up WWAN services, you first configure a WWAN interface for LTE, 4G, or 5G service on a VOS WAN port, either by creating a Workflow or by modifying an existing interface. For each WAN port, you can configure up to four WWAN interfaces. Two of these interfaces can be internal, that is, for a built-in WWAN module, and two can be external, that is, for a dongle. The WWAN interfaces are automatically assigned sequential port numbers from 100 (for the first interface) through 103 (for the fourth interface). All WWAN interfaces have a single unit, which is unit 0. WWAN interfaces cannot have subinterfaces (unit numbers other than 0).

To create a Workflow template for a WWAN WAN interface, follow the steps below. This procedure describes how to configure an interface with WWAN-specific features. For information about configuring other interface features, see [Create Device Templates](#) in the [Configure Basic Features](#) article.

1. In Director view:
 - a. Select the Workflows tab in the top menu bar.
 - b. Select Template > Templates in the horizontal menu bar. The table in the main pane lists the existing templates.
 - c. Click the  Add icon to create a template for WWAN interfaces.



- d. The Create Template popup window displays. For the seven tabs on this popup window, provide configuration information, as described in the following steps. Required information is indicated with a red asterisk. Click Next to move to the next tab in sequence and Back to move to the previous tab, or select a tab to move directly to its window.
2. In the Basic tab, configure basic interface properties. Enter information for the following fields.

Director View
Appliance View
Template View

Monitor
Configuration
Workflows
Administration
Analytics

Commit Template

Organization QA
You are currently in Director View
Workflows > Template > Templates

Infrastructure
Template
Devices

1 BASIC
2 INTERFACES
3 TUNNELS
4 ROUTING
5 INBOUND NAT
6 MANAGEMENT SERVERS
7 REVIEW

Configure Basic

Basic

Name *

Template Type

SDWAN Post Staging

Device Type

Name

SDWAN

☒ Full Mesh
☐ Hub
☐ Hub Controller
☐ Spoke

Subscription

Solution Tier *

---Please Select---

Service Bandwidth *

---Please Select---

License Year *

1 Years

Solution Add on Tier *

---Please Select---

+

No Records to Display

Organizations

Organization *

Select Option

Firewall Service

None

Sub Organizations *

Select Option

Firewall Service

None

+

No Records to Display

Controllers

Controller *

---Please Select---

+

No Records to Display

Redundant Pair

☐ Enable
☐ VRRP
☐ Cloud CPE

Redundant Pair Type

---Please Select---

Redundant Template Name

Analytics & Software Version

Analytics Cluster

---Please Select---

Preferred Software Version

---Please Select---

Resource Tags

Resource Tags

Add Tag

Cancel
Back
Save
Next

Field	Description
Name (Required)	Enter a name for the template. <i>Value:</i> Text string from 1 through 255 characters <i>Default:</i> None
Template Type (Required)	Select the template type SD-WAN Post-Staging.
Device Type	<p>Select the device type based on the solution tier:</p> <ul style="list-style-type: none"> ◦ vCPE—For routing tiers (ProNet, Net Pro, Advanced Routing) or security tiers (NGFW, UTM). ◦ SD-WAN—For Prime SD-WAN, Prime Secure, Premier Secure, and Premier Elite SD-WAN. <p>If you select SD-WAN, select the topological role of the VOS device:</p> <ul style="list-style-type: none"> ◦ Full Mesh—Click for a device in a full-mesh topology. This is the default. ◦ Hub—Click to have the device be a hub in a hub-and-spoke topology. If you select this device type, the Region field is enabled. Select the region. ◦ Hub Controller—Click to have the device act as a hub and a Controller for the spokes. Selecting this device type enables the Region and Staging fields. Select the region. ◦ Spoke—Click to have the device be a spoke in a hub-and-spoke topology. Selecting this device type enables the Spoke Group field. Select the name of the spoke group. For more information, see Create an SD-WAN Spoke Group. <p><i>Default:</i> Full Mesh</p>
Subscription (Group of Fields)	
◦ Solution Tier (Required)	Select the solution tier that corresponds to the license that the device is using.
◦ Service Bandwidth (Required)	Select the bandwidth to use for solution tier that corresponds to the license that the device is using.
◦ License Year (Required)	Select the validity period for the license.
◦ Solution Add-On Tier	Select a solution tier for the post-staging template and click the Add icon.

Organizations (Group of Fields)	
◦ Organization (Required)	Select the organization to which the template applies.
◦ Firewall Service	Select the type of security protocol to be implemented in the template: <ul style="list-style-type: none"> ◦ NGFW (next-generation firewall) ◦ SFW (stateful firewall)
◦ Suborganizations (Required)	For full-mesh and hub device types, select the name of the suborganization associated with the template.
Controllers	For full-mesh and hub device types, select name of the controller associated with the template and click the Add icon.
Redundant Pair (Group of Fields)	
◦ Enable	Click to create a redundant template. You should create a redundant pair when active-active redundancy is required.
◦ VRRP	Click to enable VRRP.
◦ Cloud CPE	Click to enable cloud-based solutions.
◦ Redundant Pair Type	Select redundant pair type.
◦ Redundant Template Name	Enter the name of the redundant template.
Analytics and Software Version (Group of Fields)	
◦ Analytics Cluster	Select an analytics cluster.
◦ Preferred Software Version	Select the preferred version of the software that should be deployed on Versa Director. The preferred software version applies to zero-touch provisioning (ZTP). During ZTP, Versa Director upgrades a branch to the preferred version, if applicable. The preferred version can be backward compatible for up to two previous VOS versions.
Resource Tags	(For Releases 22.1.1 and later.) Enter the RBAC resource permission tag name.

- Click Next. In the Configure Interfaces screen, select a model from the Device Model drop-down list. In the Virtual Ports box, click Configure. This example uses a CSG1300 device.

Director View | Appliance View | Template View

Monitor | Configuration | **Workflows** | Administration | Analytics

Organization: Select Option | You are currently in Director View | Workflows > Template > Templates

Infrastructure | **Template** | Devices

Progress: BASIC (1) | **INTERFACES (2)** | TUNNELS (3) | ROUTING (4) | INBOUND NAT (5) | MANAGEMENT SERVERS (6) | REVIEW (7)

Configure Interfaces

Device Port Configuration

Device Model: CSG1300 | NIC Port: None | **Configure**

Virtual Ports: WWAN: 0 | WIFI: 0 | IRB: 0 | **Configure**

Without Port Mapping | **With Port Mapping**

Diagram of CSG1300 device showing ports and VNI mappings:

- Management Port (default=10.10.10.10) - vni-0/2
- Console Port - vni-0/1
- vni-0/0
- vni-0/3
- vni-0/4
- vni-0/5
- vni-0/6
- vni-0/7
- vni-0/8
- vni-0/9
- vni-0/10
- vni-0/11
- vni-0/12
- vni-0/13
- vni-0/14
- vni-0/15

Legend: Management (yellow), WAN (blue), LAN (green), WAN-LAN (purple), Cross (orange), PPPoE (red)

+ Add Parameterized WAN Interface

Port	Interface	VLAN ID	Network Name	Organizations	Priority	IPv4	IPv6	Circuit Type	Circuit Media	Circuit Tags	Sub Interface	Actions
No Record Added												

Cancel | Back | Save | Next

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- In the Virtual Port screen, click Add in the WWAN box to configure WWAN (for LTE, 4G, or 5G) on the SD-WAN. You can create up to four WWANs on the WAN interface.

Virtual Port

Virtual Port Configuration

WWAN

Add

WIFI

Add

IRB

Add

WAN Interfaces(0)

L2 Interfaces(0)

LAN Interfaces(0)

Port

Interface

VLAN ID

Network Name

Priority

IPv4

IPv6

Circuit Type

Circuit Media

Circuit Tags

Actions

No Record Added

OK

Cancel

- Enter configuration information for each WAN interface. For each WWAN instance, the device automatically assigns a port number, which is a value from 100 through 103.

Virtual Port

Virtual Port Configuration

WWAN

Add

WIFI

Add

IRB

Add

Port Type

WAN

Interface Name *

vni-0/100

VLAN ID *

0

Network Name *

---Please Select---

Organizations

QA

IPv4

DHCP

IPv6

None

Priority

---Please Select---

Circuit Type

---Please Select---

Circuit Media

---Please Select---

Circuit Tags

+ Add

Circuit Provider

Allow SSH To CPE

Link Monitor

Nexthop

Remote IP

Bandwidth (Kbps)

Downlink

Uplink

DNS

Primary

Secondary

APN

Name


PIN

User Name

Password



Add





Cancel






Field	Description
◦ Port Type	By default, the port type is WAN.
◦ Interface Name (Required)	Prepopulated with the vni interface and subinterface numbers based on the port you select in the Device Port Configuration box.
◦ VLAN ID (Required)	Enter the VLAN identifier for the subinterfaces. To parameterize the VLAN ID, click the  Parameterize icon.
◦ Network Name (Required)	<p>Select the network to which the WAN interface connects. To create a new network name, click + Add New in the network name drop-down list. In the Add Network Name popup window, enter the following information and then click OK.</p> <div data-bbox="857 909 1624 1501"> <div> Add Network Name </div> <div> Name * <input type="text"/> </div> <div> Description <input type="text"/> </div> <div> Transport Domain * <div> 0 selected </div> + Transport Domain </div> <div> OK </div> </div>

- Name (Required)—Enter a name for the WAN interface.
- Description—Enter an interface description
- Transport Domain (Required)—Click to select the transport domain:
 - Internet
 - MPLS

Field	Description
	<ul style="list-style-type: none"> To create a transport domain, click + Transport Domain and enter the following information: <div> <div>Create Transport Domain</div> <div> <div>Name *</div> <input type="text"/> </div> <div> <div>Description</div> <input type="text"/> </div> <div> <div>Transport Domain ID *</div> <input type="text"/> </div> <div>OK</div> </div> <ul style="list-style-type: none"> Name— (Required) Enter a transport domain name. Description—Enter a transport domain description. Transport Domain ID —(Required) Enter a transport domain ID.
<ul style="list-style-type: none"> Organizations 	Select the organization to which the WWAN interface belongs.
<ul style="list-style-type: none"> IPv4 	<p>Use IPv4 addressing on the WAN interface:</p> <ul style="list-style-type: none"> None Static—Use static IP address. When you select Static, a bind-data variable for the interface's static address is automatically generated in the template. DHCP—Use DHCP to obtain an IP address. The WWAN interfaces are configured as DHCP only.
<ul style="list-style-type: none"> IPv6 	Use IPv6 addressing on the WAN interface:

Field	Description
	<ul style="list-style-type: none"> None Static—Use static IP address. When you select Static, a bind-data variable for the interface's static address is automatically generated in the template. DHCP—Use DHCP to obtain an IP address.
<ul style="list-style-type: none"> Priority 	<p>Select a number for the link priority for WAN traffic. A default forwarding profile is automatically created that is based on the WAN circuit priority. If you do not assign a priority, the WAN interface is added to the default forwarding profile, but it has no circuit priority.</p> <p><i>Range:</i> 1 through 8</p> <p><i>Default:</i> None</p> <p>To parameterize the priority, click the  Parameterize icon.</p>
<ul style="list-style-type: none"> Circuit Type 	<p>Select the access circuit type:</p> <ul style="list-style-type: none"> Broadband IP MPLS
<ul style="list-style-type: none"> Circuit Media 	<p>Select physical medium used by the access circuit:</p> <ul style="list-style-type: none"> Cable DSL Ethernet LTE T1 T3
<ul style="list-style-type: none"> Circuit Tag 	<p>Enter a text list of circuit tags and, then click the  Add icon.</p>

Field	Description
◦ Circuit Provider	Enter the access circuit service provider's name.
◦ Allow SSH to CPE	Click to allow SSH sessions to the CPE device on the underlay IP address of WAN interface.
Link Monitor (Group of Fields)	
◦ Next Hop	Click to enable link monitoring for next-hop reachability.
◦ Remote IP	Enter a remote IP address for remote IP reachability through this WAN link to detect link failures. To parameterize the remote IP, click the  Parameterize icon.
Bandwidth (Group of Fields)	
◦ Downlink	<p>Enter the bandwidth available on the link for downloading data, in kilobytes per second (Kbps). To parameterize the downlink, click the  Parameterize icon.</p> <p><i>Range:</i> 1 through 10000000 Kbps</p> <p><i>Default:</i> None</p>
◦ Uplink	<p>Enter the bandwidth available on the link for uploading data, in kilobytes per second (Kbps). To parameterize the uplink, click the  Parameterize icon.</p> <p><i>Range:</i> 1 through 10000000 Kbps</p> <p><i>Default:</i> None</p>
DNS (Group of Fields)	
◦ Primary	Enter the primary DNS server. To parameterize the primary DNS, click the  Parameterize icon.

Field	Description
<ul style="list-style-type: none"> Secondary 	Enter the secondary DNS server. To parameterize the secondary DNS, click the  Parameterize icon.
Access Point Name (APN) (Group of Fields)	
<ul style="list-style-type: none"> Name 	Enter the APN that you received from your service provider. To parameterize the APN name, click the  Parameterize icon.
<ul style="list-style-type: none"> Pin 	For a USB modem that is locked with a pin, enter a pin number. To parameterize the pin, click the  Parameterize icon.
<ul style="list-style-type: none"> Username 	Enter the username provided by the service provider to use to access the wireless WAN. This username is used when a CDMA modem prompts for a username. To parameterize the username, click the  Parameterize icon.
<ul style="list-style-type: none"> Password 	Enter the password provided by the service provider to access the wireless WAN. This password is used when a CDMA modem prompts for a password. Click Show/Hide to view the new password. To parameterize the password, click the  Parameterize icon.

6. Click the  Add icon to add the WWAN interface (for LTE, 4G, or 5G service), and then click OK.

Virtual Port
✕

Virtual Port Configuration

WWAN

1 Add More

WIFI

Add

IRB

Add

WAN Interfaces(1)
L2 Interfaces(0)
LAN Interfaces(0)

<input type="checkbox"/>	Port	Interface	VLAN ID	Network Name	Priority	IPv4	IPv6	Circuit Type	Circuit Media	Circuit Tags	Actions
<input type="checkbox"/>	100	vni-0/100	0	WAN2-Public		DHCP					

Showing 1 - 1

OK

Cancel

- Configure other interface features as desired. Layer 2 and LAN interfaces do not apply to WWAN interfaces.
- Click Create/Recreate to deploy the workflow template.

Configure WWAN Interface Properties

You configure WWAN interface properties for LTE, 4G, or 5G service in a post-staging template.

- In Director view:
 - Select the Configuration tab in the top menu bar.
 - Select Templates in the horizontal menu bar.
 - Select an organization in the left menu bar.
 - Select a post-staging template from the main pane. The view changes to Appliance view.
- Select the WWAN tab in the horizontal menu bar. The table in the main pane lists the existing interfaces.

Director View
Appliance View
Template View

Administrator

Monitor
Configuration
Workflows
Administration
Analytics

Template: Bionic-5G

You are currently in Template View

Configuration > QA > Device Template

Networking
Services
Objects & Connectors
Others

Interfaces
WLAN
T1/E1 Auth
Networks
Virtual Wires
Global Routers

VNI
AE
ENet
IRB
T1/E1
Tunnel
DSL
WWAN
Wi-Fi
uCPE
Loopback
Fabric
Management

Search

+ Add
Delete

<input type="checkbox"/>	Name	Description	Interfaces	IP Address/Prefix	APN	PIN	Username
<input type="checkbox"/>	vni-0/100		vni-0/100.0	DHCPv4			

Rows per page: 25
Showing 1 - 1 of 1

- Click the Add icon to configure the WWAN interface properties. In the Add WWAN Interface popup window, enter information for the following fields.

https://docs.versa-networks.com/Secure_SD-WAN/01_Configuration_from_Director/Common_Configuration/Configure_WWAN

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Add WWAN Interface

Interface *

--Select--

▼

☐ Disable

Description

Tags

MTU

72...9000

Bandwidth

WWAN

Uplink (Kbps) ⚙

1...10000000

Downlink (Kbps) ⚙

1...10000000

Subinterfaces

☐

Unit

VLAN ID

IPv4

DHCPv4

DHCPv6

MTU

☐



0

OK

Cancel

Field	Description
Interface (Required)	Select the interface on which to configure WWAN.
Disable	Click to not activate the WWAN interface after you configure it.
Description	Enter a text description for the interface. <i>Value:</i> Text string from 1 through 255 characters <i>Default:</i> None
Tags	Enter a text string or phrase to associate with the interface. Tags allow you to locate an WWAN interface when you perform a filtered search of all interfaces. <i>Value:</i> Text string from 1 through 255 characters <i>Default:</i> None
MTU	Enter the maximum transmission unit (MTU) size, in bytes, of the largest packet that the port can receive or transmit.
Subinterfaces	WWAN interfaces cannot have subinterfaces (unit numbers other than 0).

4. Select the Bandwidth tab, and enter information for the following fields.

Field	Description
Autoconfiguration	Click to enable autoconfiguration.
URI	Enter the URI of the website to use for autoconfiguration.
Uplink	<p>Enter the maximum available bandwidth of the link while uploading data, in kilobytes per second (Kbps). The maximum available bandwidth is a function of the Ethernet card in the device. For example, a 1-GB Ethernet card can support a maximum uplink speed of 1 GB. To parameterize the uplink speed, click the  Parameterize icon. If you configure SD-WAN traffic steering, this value is used by the selection connection method that selects how to forward a traffic flow when multiple available WAN paths have the highest priority. For more information, see Configure SD-WAN Traffic Steering. Note that this value does not affect the CoS (QoS) configuration on the interface.</p> <p><i>Range:</i> 1 through 10000000 Kbps</p> <p><i>Default:</i> None</p>
Downlink	<p>Enter the maximum available bandwidth of the link while downloading data, in kilobytes per second (Kbps). The maximum available bandwidth is a function of the Ethernet card in the device. For example, a 1-GB Ethernet card can support a maximum downlink speed of 1 GB. To parameterize the downlink speed, click the  Parameterize icon. If you configure SD-WAN traffic steering, this value is used by the selection connection method that selects how to forward a traffic flow when multiple available WAN paths have the highest priority. For more information, see Configure SD-WAN Traffic Steering. Note that this value does not affect the CoS (QoS) configuration on the interface.</p> <p><i>Range:</i> 1 through 10000000 Kbps</p> <p><i>Default:</i> None</p>

5. To configure the WWAN to use when the modem fails to connect automatically, select the WWAN tab, and enter

https://docs.versa-networks.com/Secure_SD-WAN/01_Configuration_from_Director/Common_Configuration/Configure_WWAN

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information for the following fields.

Add WWAN Interface

Interface *

--Select--

☐ Disable

Description

Tags

MTU

72...9000

Bandwidth

WWAN

APN

PIN

Username

Password

Radio Tech

LTE

Allow Bands

Select options

Block Bands

Select options

NR5G

Allow Bands

Select options

Block Bands

Select options

WCDMA

Allow Bands

Select options

Block Bands

Select options

Subinterfaces

☐

Unit

VLAN ID

IPv4

DHCPv4

DHCPv6



MTU

☐

0

OK

Cancel

Field	Description
APN	Enter the access point name (APN) that you received from your service provider. To parameterize the APN, click the  Parameterize icon.
PIN	For a USB modem that is locked with a PIN, enter the PIN number. To parameterize the PIN, click the  Parameterize icon.
Username	Enter the username provided by the service provider to use to access the wireless WAN. This username is used when a CDMA modem prompts for username.
Password	Enter the password provided by the service provider to use to access the wireless WAN. This password is used when a CDMA modem prompts for password.
Radio Technologies (Group of Fields)	(For Releases 22.1.4 and later.) Allow or block specific sets of bands associated with radio technologies on the modem.
<ul style="list-style-type: none"> LTE 	Select the LTE modem bands: <ul style="list-style-type: none"> Allow Bands—Select the bands to allow for LTE. Block Bands—Select the bands to block for LTE.
<ul style="list-style-type: none"> NR5G 	Select the NR5G bands: <ul style="list-style-type: none"> Allow Bands—Select the bands to allow for NR5G. Block Bands—Select the bands to block for NR5G.
<ul style="list-style-type: none"> WCDMA 	Select the WCDMA bands: <ul style="list-style-type: none"> Allow Bands—Select the bands to allow for WCDMA . Block Bands—Select the bands to block for WCDMA.
Subinterfaces	Select a subinterface and enter values for the following parameters:

	<ul style="list-style-type: none"> ◦ Unit—Enter the unit number of the subinterface. ◦ VLAN ID—Enter the virtual LAN ID. <i>Range:</i> 0 through 4094 ◦ IPv4—Enter the maximum transmission unit size, in bytes, of largest protocol data unit (PDU) that the port can receive or transmit. ◦ DHCPv4—Click to use DHCPv4 to obtain an address for the subinterface. ◦ DHCPv6—Click to use DHCPv6 to obtain an address for the subinterface. ◦ MTU—Enter the maximum transmission unit size, in bytes, of largest protocol data unit the post can receive or transmit in bytes.
--	--

6. Click OK.

Use WWAN for Staging

To use WWAN for staging, specify the **-w** option with the staging script. In this option, specify the VNI number to use for staging. To use vni-100 on the WAN for WWAN and DHCP, run the staging.py staging script with the **-w 100 -d** options. The following example uses vni-100:

```
[admin@Internet-Box: ~]# staging.py -w 100 -d
Commit complete.
```

When running the staging script, you can also indicate the APN configuration parameters, such as username, password, and PIN:

```
[admin@Internet-Box: ~] # cd /opt/versa/scripts/
[admin@Internet-Box: scripts] # ./staging.py --help
Please execute with sudo
[admin@Internet-Box: scripts] # sudo ./staging.py --help
[sudo] password for admin:
usage: staging.py [-h] [-l LOCAL_ID] [-r REMOTE_ID] [-n SERIAL_NUMBER]
                [-c CONTROLLER] [-c6 CONTROLLER6] [-t {staging,prestaging}]
                [-w
{0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,4
[-v VLAN] [-s STATIC] [-s6 STATIC6] [-g GATEWAY]
[-g6 GATEWAY6] [-d] [-d6] [-a] [-gt GLOBAL_TENANT_ID]
[-lk LOCAL_PSK] [-rk REMOTE_PSK] [-p] [-pu PPPOE_USER]
[-pp PPPOE_PASSWORD] [-ps PPPOE_SERVICE]
[-pa PPPOE_ACCESS_CONCENTRATOR] [-wu WWAN_USER]
[-wp WWAN_PASSWORD] [-wapn WWAN_APN] [-wpin WWAN_PIN]
```

Setup branch staging config

optional arguments:

https://docs.versa-networks.com/Secure_SD-WAN/01_Configuration_from_Director/Common_Configuration/Configure_WWAN

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```

-h, --help          show this help message and exit
-l LOCAL_ID, --local-id LOCAL_ID
                    Local id-string/email
-r REMOTE_ID, --remote-id REMOTE_ID

.
.
.

wu WWAN_USER, --wwan_user WWAN_USER
                    wwan username
-wp WWAN_PASSWORD, --wwan-password WWAN_PASSWORD
                    wwan password
-wapn WWAN_APN, --wwan-apn WWAN_APN
                    wwan apn name
-wpin WWAN_PIN, --wwan-pin WWAN_PIN
                    wwan simpin
.
.
.
-wpin WWAN_PIN, --wwan-pin WWAN_PIN
                    wwan simpin

```

Stage the device using URL-based ZTP or a staging script.

- If you use URL-based ZTP, ZTP automatically tries all the available interfaces on the device.
- If you use the staging script, specify the options **-w 100 -d**. The **-w** option specifies WAN port 100, and so the WWAN interface vni-0/100 is used for the WAN transport. The **-d** option uses DHCP to retrieve an IP address for the WAN link.

Verify the WWAN Configuration

To check the WWAN interface:

1. Display detailed information from the service provider:

```

admin@LTE-Branch2-cli> show interfaces detail vni-0/100.0

Interface: vni-0/100.0
  Tenant      : 2
  Vlan-Id     : 0
  Administrative status : up
  Operational status  : up
  Protocols Down    : n/a
  Interface index   : 1061
  Interface Role    : external
  MAC address      : 02:aa:bb:cc:dd:01
  IP address       : [ 100.90.234.63/25 ]
  Obtained from DHCP : True
  DHCP Server IP   : 100.90.234.64
  DHCP Lease Time  : 2018-04-17 13:49:11

```

```

DHCP Lease Expiry   : 2018-04-17 15:49:11
Name Server 1 Address : 198.224.173.135
Name Server 2 Address : 198.224.174.135
Routing instance    : LTE-Transport-VR (11)
Host interface      : wwanusb0
MTU                  : 1500
Duplex / Speed      : full-duplex / 1Gbps
  RX packets:14937 errors:0
  RX bytes:4739180
  TX packets:29012 errors:0
  TX bytes:8375223

```

2. Display the status of the WWAN interface:

```

admin@versa-VOS-cli> show interfaces wwan status brief
INTERFACE INTERFACE          CONNECTION VENDOR
PRODUCT
NAME      STATUS      HW STATUS      STATUS  ID   ID   HW VENDOR NAME      HW
MODEL NAME      IMEI
-----
vni-0/100 Configured   Modem Detected Connected 1199 9071 Sierra Wireless, Inc. Sierra_
Wireless_MC7455_Qualco 359072060692577
vni-0/101 Not configured
vni-0/102 Not configured
vni-0/103 Not configured

```

3. Display the status of the WWAN interface's carrier:

```

admin@LTE-Branch2-cli> show interfaces wwan status carrier-brief | tab
INTERFACE          CURRENT
OPERATOR
NAME      STATE      NUMBER      TECH      SIGNAL RSSI      RX      TX
OPERATOR NAME      ADDRESS      PREFIX GATEWAY      DNS      RSRP      SNR      ID
UPTIME BYTES      BYTES
-----
vni-0/100 connected 6692686037 lte    65    '-73.00' dBm '-10.00' dB '-103.00' dBm '4.40' dB
311480 Verizon Wireless 100.90.234.63 25    100.90.234.64 198.224.173.135 3720 4543528
7404415
vni-0/
101
vni-0/
102
vni-0/103

```

4. Display location information about the WWAN interface:

```

admin@versa-VOS-cli> show interfaces wwan status cell-location
TRACKING
INTERFACE          AREA  GLOBAL
NAME      MCC MNC NETWORK NAME      CODE  CELL ID
-----
vni-0/100 311 480 Verizon Wireless 7942 7975180
vni-0/101
vni-0/102

```

5. Display the status of WWAN interface lte-info vni-0/100:

```
admin@Dual-LTE-Branch2-cli> show interfaces wwan status lte-info vni-0/100
interfaces wwan status lte-info vni-0/100
band                B4
bandwidth           "15 Mhz"
ant0-rssi           -72
ant0-rsrp           "-99 dBm"
ant1-rssi           -70
ant1-rsrp           "-93 dBm"
rx-channel          2075
tx-channel          20075
serving-cell-id     0513FB16
serving-physical-cell-id 172
serving-snr         15
serving-rsrq        -9.7
serving-rsrp        -93.9
serving-rssi        -65.7
neighbour1-physical-cell-id 285
neighbour1-rsrq     -19.5
neighbour1-rsrp     108.2
neighbour1-rssi     -77.9
carrier-aggregation "NOT ASSIGNED"
[ok][2021-06-09 17:51:34]
admin@Dual-LTE-Branch2-cli>
```

Monitor and Analyze WWAN Interface Operation

This section describes how to monitor the operation of WWAN interfaces for LTE, 4G, or 5G service from the Director GUI and how to analyze the operation of WWAN interfaces from an Analytics node.

WWAN network signal level and performance are measured by the following signals:

- Reference Signal Received Power (RSRP)
- Reference Signal Received Quality (RSRQ)
- Received Signal Strength Indicator (RSSI)
- Signal to Interference-and-Noise Ratio (SINR)

The following tables provide value ranges for these signal measurements so that you can determine the signal strength and quality of the VOS WWAN modem.

The following tables provide approximate values for these signals so that you can determine whether the VOS WWAN modem has excellent signal strength or quality (shown in green on the Director Monitor screen), good signal strength or quality (shown in yellow), fair to poor strength or quality (shown in orange), or no signal (shown in red).

RSRP	Signal Strength	Color in Director and Analytics	Description
≥ -80 dBm	Excellent	Green	Strong signal with maximum data speeds
-80 dBm to -90 dBm	Good	Yellow	Strong signal with good data speeds
-90 dBm to -100 dBm	Fair to poor	Orange	Reliable data speeds may be attained, but marginal data with drop-outs is possible. As this value approaches -100 dBm, performance will drop drastically.
≤ -100 dBm	No signal	Red	Disconnection.

RSRQ	Signal Strength	Color in Director and Analytics	Description
≥ -10 dB	Excellent	Green	Strong signal with maximum data speeds
-10 dB to -15 dB	Good	Yellow	Strong signal with good data speeds
-15 dB to -20 dB	Fair to poor	Orange	Reliable data speeds may be attained, but marginal data with drop-outs is possible. As this value approaches -20 dB, performance will drop drastically.
≤ -20 dB	No signal	Red	Disconnection.

RSSI	Signal Strength	Color in Director and Analytics	Description
≥ -65 dBm	Excellent	Green	Strong signal with maximum data speeds
-65 dBm to -75 dBm	Good	Yellow	Strong signal with good data speeds
-75 dBm to -85 dBm	Fair	Orange	Fair but useful, fast, and reliable data speeds may be attained, but marginal data with dropouts is possible.
-85 dBm to -95 dBm	Poor	Orange	Performance will drop drastically.
≤ -95 dBm	No signal	Red	Disconnection.

SINR	Signal Strength	Color in Director and Analytics	Description
≥ 20 dB	Excellent	Green	Strong signal with maximum data speeds
0 dB to 13 dB	Fair to poor	Orange	Reliable data speeds may be attained, but marginal data with drop-outs is possible. As this value approaches 0, performance will drop drastically.
≤ 0 dB	No signal	Red	Disconnection.
13 dB to 20 dB	Good	Yellow	Strong signal with good data speeds

Monitor WWAN Interface Operation

To monitor the operation of a WWAN interface for LTE, 4G, or 5G:

1. In Director view, select the Monitor tab in the top menu bar.
2. Select the Devices tab in the horizontal menu bar and select a device. The view changes to Appliance view.

	Name	Mgmt. Address	Tags	Type	Service Start Time	Software Versio	Organizations	Status			
								Config Sync	Reachability	Service	Loc
<input type="checkbox"/>	AM-DLP-NODE	10.0.0.34	T1	Branch		21.3.2-GA	QA,Versa	Unknown	✗	Unkno...	
<input type="checkbox"/>	Ananda-Stolen-Device-Site-1	10.0.0.64		Branch	Mon, Apr 24 2023, 16:00	22.1.1-GA - W...	QA	✓	✓	Up	
<input type="checkbox"/>	Apurva-Home	10.0.0.12		Branch	Tue, Apr 25 2023, 10:41	21.2.2-GA - W...	QA,Versa	✓	✓	Up	
<input type="checkbox"/>	Apurva-Home-2	10.0.0.32		Branch		21.3.1-GA - W...	QA,Versa	Unknown	✗	Unkno...	
<input type="checkbox"/>	Bionic-5G-1300	10.0.0.26		Branch	Mon, Apr 03 2023, 16:57	22.1.1-GA - W...	QA	✓	✓	Up	
<input type="checkbox"/>	Bionic-Dell-LTE	10.0.0.36		Branch		21.2.2-GA - W...	QA	Unknown	✗	Unr	
<input type="checkbox"/>	CSG355-LTE-DICE	10.0.0.60		Branch	Wed, Apr 26 2023, 11:51	21.3.1-GA - W...	QA	✓	✓		

- In the device details pane, select the Summary tab in the horizontal menu bar, and then select a WWAN interface to view the WWAN interface status and signal strength.

Interface	Network Name	Service Provider	Status		Live Data	Bandwidth (Mbps)	
			Operational	Admin		Configured	Measured
> vni-0/0.0	WAN1-Public	-	↑	↑	<input type="checkbox"/>	↑ 0.00	↓ 0.00
> vni-0/1.0	WAN2-Public	-	↓	↑	<input type="checkbox"/>	↑ 0.00	↓ 0.00
> vni-0/100.0	LTE-Public	-	📶	↑	<input type="checkbox"/>	↑ 0.00	↓ 0.00
> vni-0/13.0	LAN	-	↑	↑	<input type="checkbox"/>		
> vni-0/3.0	LAN2	-	↓	↑	<input type="checkbox"/>		

- Click WWAN Info tab to display information about the WWAN interfaces for LTE, 4G, or 5G service. The table in the main pane displays operational information about the WWAN interface, including the signal strength and network information.

vni-0/100.0 LTE-Public ↑ 0.00 ↓ 0.00 Measure					
Interface Info WWAN Info					
Device & SIM Info	HW Vendor Name	HW Model Name	IMEI	IMSI	ICCID
	Quectel	RM502Q-AE	867826050494293	001012345678901	89600120031000000019
WAN Info	Number	Vendor ID	Product ID	Hardware Status	
	-	2c7c	0800	Modem Detected	
4G LTE	IP / Mask	Gateway	DNS	MAC Address	
	-	-	-	02:aa:bb:cc:dd:01	
Volume and Bandwidth	Status	APN	Current Tech	Operator ID	Operator Name
	Not Connected	-	-	310410	-
	Signal Strength (%)	Signal Strength(RSRP)	Signal Strength(RSRQ)	Signal Strength(RSSI)	Signal To Noise Ratio
	75	-93.00 dBm	-9.00 dB	-67.00 dBm	5.80 dB
	Tx Bytes	Rx Bytes	Total Bytes	Uptime	
	-	-	-	-	


Analyze LTE Interface Operation

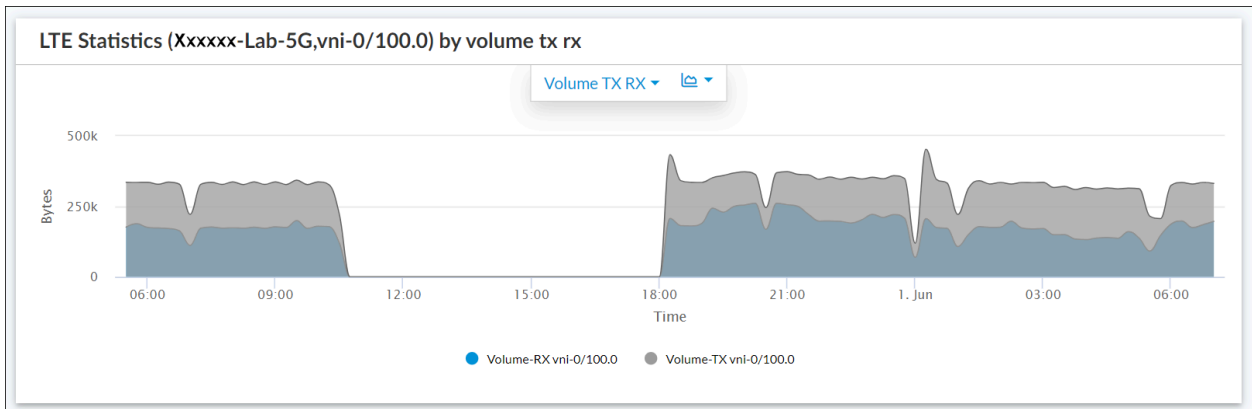
To view analysis information about the operation of an LTE interface:


1. In Director view, select the Analytics tab in the top menu bar.
2. Select Dashboards > System > Interfaces in the left menu bar.
3. Click the LTE Interfaces tab to view statistics about the LTE interfaces.

The screenshot shows the Versa Networks Director View interface. The top navigation bar includes 'Director View', 'Appliance View', and 'Template View'. The left sidebar contains 'Dashboard', 'Logs', 'Reporting', and 'Admin'. The main content area is titled 'SYSTEM.interfaces > LTE' and shows a table of LTE Statistics. The table has columns for Appliance, Interface, Avg Duration (ms), Volume-RX (Bytes), Volume-TX (Bytes), Volume (Bytes), Bandwidth RX (bps), and Bandwidth. The data row shows 'Sairam-Lab-5G' for the appliance and 'vni-0/100.0' for the interface, with an average duration of 17h 25m and various volume and bandwidth metrics.

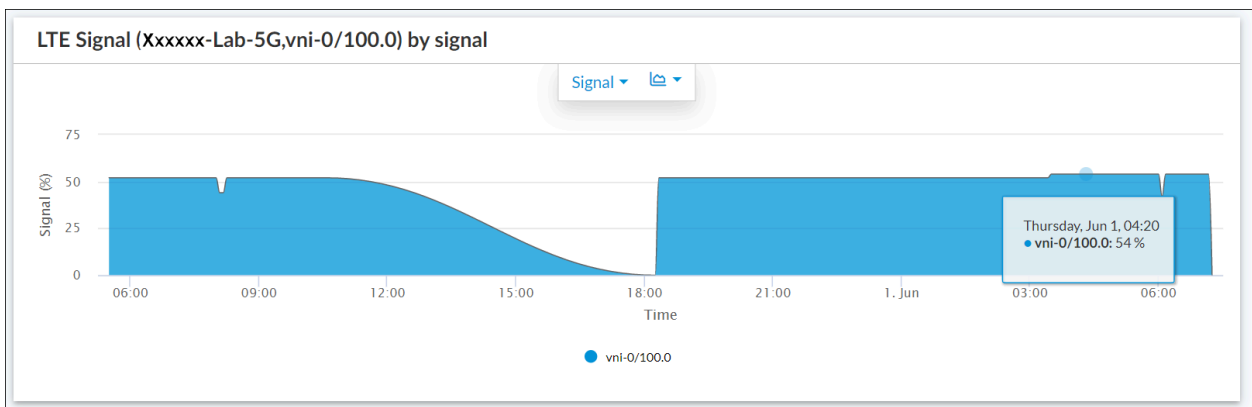
Appliance	Interface	Avg Duration (ms)	Volume-RX (Bytes)	Volume-TX (Bytes)	Volume (Bytes)	Bandwidth RX (bps)	Bandwidth
Sairam-Lab-5G	vni-0/100.0	17h 25m	12.57 M	22.84 M	35.41 M	0	0


4. Click the  icon to view detailed LTE interface statistics.
 - a. Transmit and receive volume and LTE signal strength



- Click the Volume TX RX drop-down list to select the view type. The view type can be one of the following:
 - Volume TX RX
 - Volume RX
 - Volume TX
 - Total Bandwidth
 - Bandwidth TX RX
- Click the  Chart drop-down list to select the current graphical data representation. The format can be Area, Bar, Line, Scatter, or Stacked Bar.

b. RSRP of the LTE signal



- Click the Signal drop-down list to select the view type. The view type can be one of the following:
 - Signal
 - RSSI
 - SNR
 - RSRP
 - RSRQ
- Click the  Chart drop-down list to select the current graphical data representation. The format can be Area, Bar, Line, Scatter, or Stacked Bar.

c. LTE statistics

LTE Statistics (Xxxxxx-Lab-5G,vni-0/100.0)					Show 10 entries	
Interface	Volume-RX (Bytes)	Volume-TX (Bytes)	Bandwidth RX (bps)	Bandwidth TX (bps)		
vni-0/100.0	12.57 M	22.84 M	0	0		
Showing 1 to 1 of 1 entries					Previous	1 Next

- Click the Chart Menu icon and click Copy, CSV, or PDF to copy or to save the information as CSV or PDF file.

d. LTE events

LTE Events (Xxxxxx-Lab-5G,vni-0/100.0)								Show 10 entries	
Receive Time	Appliance	Interface	State	IMEI	Operator	Access tech	LTE IP		
Jun 1st 2023, 7:15:00 AM IST	Sairam-Lab-5G	vni-0/100.0	Connected	3GPP		imei:	867826050022649		
May 31st 2023, 6:15:00 PM IST	Sairam-Lab-5G	vni-0/100.0	Connected	867826050022649	T-Mobile	5g	192.0.0.2		
Showing 1 to 2 of 2 entries								Previous	1 Next

e. LTE statistics logs

LTE Stats logs (Xxxxxx-Lab-5G,vni-0/100.0)									Show 10 entries	
Receive Time	Appliance	Interface	Signal (%)	RSSI (dBm)	RSRQ (dB)	RSRP (dBm)	SNR (dB)			
Jun 1st 2023, 7:10:00 AM IST	Sairam-Lab-5G	vni-0/100.0	54.00%	0	-11	-86	11			
Jun 1st 2023, 7:05:00 AM IST	Sairam-Lab-5G	vni-0/100.0	54.00%	0	-11	-86	12			
Jun 1st 2023, 7:00:00 AM IST	Sairam-Lab-5G	vni-0/100.0	54.00%	0	-11	-86	12			
Jun 1st 2023, 6:55:00 AM IST	Sairam-Lab-5G	vni-0/100.0	54.00%	0	-11	-86	12			
Jun 1st 2023, 6:50:00 AM IST	Sairam-Lab-5G	vni-0/100.0	54.00%	0	-11	-86	12			
Jun 1st 2023, 6:45:00 AM IST	Sairam-Lab-5G	vni-0/100.0	54.00%	0	-11	-86	11			
Jun 1st 2023, 6:40:00 AM IST	Sairam-Lab-5G	vni-0/100.0	54.00%	0	-11	-89	9			
Jun 1st 2023, 6:35:00 AM IST	Sairam-Lab-5G	vni-0/100.0	54.00%	0	-11	-86	12			
Jun 1st 2023, 6:30:01 AM IST	Sairam-Lab-5G	vni-0/100.0	54.00%	0	-11	-86	12			
Jun 1st 2023, 6:25:01 AM IST	Sairam-Lab-5G	vni-0/100.0	54.00%	0	-11	-86	12			
Showing 1 to 10 of 209 entries									Previous	1 2 3 4 5 ... 21 N

Troubleshoot WWAN Interfaces

1. Display information about all the connected USB devices on the VOS device:

```
[admin@LTE-Branch2: ~] # usb-devices
T: Bus=01 Lev=00 Prnt=00 Port=00 Cnt=00 Dev#= 1 Spd=480 MxCh= 8
D: Ver= 2.00 Cls=09(hub ) Sub=00 Prot=00 MxPS=64 #Cfgs= 1
P: Vendor=1d6b ProdID=0002 Rev=04.04
S: Manufacturer=Linux 4.4.0-116-generic ehci_hcd
S: Product=EHCI Host Controller
S: SerialNumber=0000:00:16.0
C: #Ifs= 1 Cfg#= 1 Atr=e0 MxPwr=0mA
I: If#= 0 Alt= 0 #EPs= 1 Cls=09(hub ) Sub=00 Prot=00 Driver=hub
T: Bus=01 Lev=01 Prnt=01 Port=00 Cnt=01 Dev#= 2 Spd=480 MxCh= 4
D: Ver= 2.00 Cls=09(hub ) Sub=00 Prot=01 MxPS=64 #Cfgs= 1
P: Vendor=8087 ProdID=07db Rev=00.03
C: #Ifs= 1 Cfg#= 1 Atr=e0 MxPwr=0mA
I: If#= 0 Alt= 0 #EPs= 1 Cls=09(hub ) Sub=00 Prot=00 Driver=hub
T: Bus=01 Lev=02 Prnt=02 Port=02 Cnt=01 Dev#= 3 Spd=480 MxCh= 0
D: Ver= 2.10 Cls=00(>ifc ) Sub=00 Prot=00 MxPS=64 #Cfgs= 1
P: Vendor=1199 ProdID=9071 Rev=00.06
S: Manufacturer=Sierra Wireless, Incorporated
S: Product=Sierra Wireless MC7455 Qualcomm® Snapdragon\u2122 X7 LTE-A
S: SerialNumber=LQ70964668031020
C: #Ifs= 5 Cfg#= 1 Atr=a0 MxPwr=500mA
I: If#= 0 Alt= 0 #EPs= 2 Cls=ff(vend.) Sub=ff Prot=ff Driver=option
/usr/bin/usb-devices: line 79: printf: a: invalid number
I: If#= 0 Alt= 0 #EPs= 3 Cls=ff(vend.) Sub=ff Prot=ff Driver=qmi_wwan
I: If#= 2 Alt= 0 #EPs= 3 Cls=ff(vend.) Sub=00 Prot=00 Driver=option
I: If#= 3 Alt= 0 #EPs= 3 Cls=ff(vend.) Sub=00 Prot=00 Driver=option
I: If#= 8 Alt= 0 #EPs= 3 Cls=ff(vend.) Sub=ff Prot=ff Driver=qmi_wwan
```

2. Monitor the modem manager. In the **-m** option, specify the modem number, which is a value from 0 through 3.

```
[admin@versa-VOS: ~] # mmcli -m 0
/org/freedesktop/ModemManager1/Modem/0 (device id 'a1ae475e8d9be21d63bfa19db19837d2595742f3')
-----
Hardware | manufacturer: 'Sierra Wireless, Incorporated'
          | model: 'MC7455'
          | revision: 'SWI9X30C_02.24.05.06 r7040 CARMD-EV-FRMWR2 2017/05/19 06:23:09'
          | supported: 'gsm-umts
          |         lte
          |         gsm-umts, lte'
          | current: 'gsm-umts, lte'
          | equipment id: '359072060692577'
-----
System   | device: '/sys/devices/pci0000:00/0000:00:16.0/usb1/1-1/1-1.3'
          | drivers: 'option1, qmi_wwan'
          | plugin: 'Sierra'
          | primary port: 'cdc-wdm0'
          | ports: 'ttyUSB0 (qcdm), ttyUSB2 (unknown), cdc-wdm0 (qmi), cdc-wdm1 (qmi), wwan0 (net),
wwan1 (net)'
-----
```

```

Numbers |      own : '4086184766'
-----
Status  |      lock: 'sim-pin2'
      | unlock retries: 'sim-pin (3), sim-pin2 (3), sim-puk (10), sim-puk2 (10)'
      |      state: 'connected'
      |      power state: 'on'
      |      access tech: 'lte'
      | signal quality: '55' (recent)
-----
Modes   |      supported: 'allowed: 2g, 3g, 4g; preferred: none'
      |      current: 'allowed: 2g, 3g, 4g; preferred: none'
-----
Bands   |      supported: 'u2100, u1800, u1900, u17iv, u850, u900, eutran-ii, eutran-iv, eutran-v, eutran-xiii'
      |      current: 'u2100, u1800, u1900, u17iv, u850, u900, eutran-ii, eutran-iv, eutran-v, eutran-xiii'
-----
IP       |      supported: 'ipv4, ipv6, ipv4v6'
-----
3GPP    |      imei: '359072060692577'
      | enabled locks: 'none'
      | operator id: '311480'
      | operator name: 'VZW'
      | subscription: 'unknown'
      | registration: 'home'
-----
SIM      |      path: '/org/freedesktop/ModemManager1/SIM/0'
-----
Bearers  |      paths: '/org/freedesktop/ModemManager1/Bearer/3'

```

3. Ensure that the SIM card is activated and working:

- Check with the service provider to ensure that the SIM card is activated.
- Check the status information to ensure that it shows that the SIM card is connected and enabled.
- Ensure that the 3GPP information shows the operator ID. If the operator name is not displayed, configure the APN to enable the interface:

```

admin@VOS-cli(config)% set interfaces vni-0/100 wwan apn vzwinternet
[ok][2018-03-12 11:10:31]
[edit]
admin@VOS-cli(config)% commit
Commit complete.

```

4. To display the WWAN interface status on the VOS device, issue the following command:

```

admin@versa-VOS-cli(config)% run show interfaces wwanstatus brief
INTERFACE NAME  INTERFACE STATUS CONNECTION  VENDOR PRODUCT NAME STATUS HW
STATUS ID ID  HW VENDOR NAME HW MODEL NAME IMEI
-----
vni-0/100 Configured Modem Detected Connected  1199 9071  Sierra Wireless, Inc. Sierra_Wireless_
MC7455_Qualco 359072060692577
vni-0/101 Not configured
vni-0/102 Not configured
vni-0/103 Not configured

```

Supported Software Information

Releases 20.2 and later support all content described in this article, except:

- Release 21.2.1 adds support for configuring uplink and downlink bandwidth on subinterfaces or units, for adaptive shaping, and for configuring IPv6.
- In Releases 22.1.1, LTE interfaces are renamed to WWAN interfaces; add support for Resource Tag field.
- Release 22.1.4 adds support to allow or block sets of bands associated with specific radio technologies on the modems.

Additional Information

[Configure Basic Features](#)

[Configure Interfaces](#)

[Configure Layer 2 Forwarding](#)

[Configure SD-WAN Traffic Steering](#)