Revised: May 30, 2025

Cellular Interfaces for SD-Routing Devices, Release 17.16.x

What's new and changed

This table lists the features available with the current release.

Cisco IOS XE release	Feature name	Description	Supported platforms
Cisco IOS XE 17.16.1a	Configure Cellular Interfaces for SD-Routing devices	This feature introduces support to configure Cellular Interfaces for SD-Routing devices using Feature Parcels in Cisco SD-WAN Manager.	• Cisco Catalyst 8200 Series Edge platforms • Cisco Catalyst 8300 Series Edge platforms • Cisco 1000 Series Integrated Services Routers • Cisco Catalyst IR1101 Rugged Series Router • Cisco Catalyst IR1800 Rugged Series Routers • Cisco Catalyst IR8140 Heavy Duty Router • Cisco Catalyst IR8300 Rugged Series Router

Cellular Interfaces for SD-Routing devices

Enterprises generally use cellular connectivity to augment the primary WAN connection network. Industrial and Catalyst Edge platform customers now want to use cellular capabilities to connect to Cisco networks without having any dependency on configuring and managing multiple commands.

From Cisco IOS XE 17.16.1a release, customers can now configure Cellular Interfaces for SD-Routing devices using Feature Parcels in Cisco SD-WAN Manager without configuring and managing multiple commands.

Benefits

Customers easily set up their desired cellular configuration without the need to configure and manage CLI commands therefore leading to quicker deployments and easier device management.

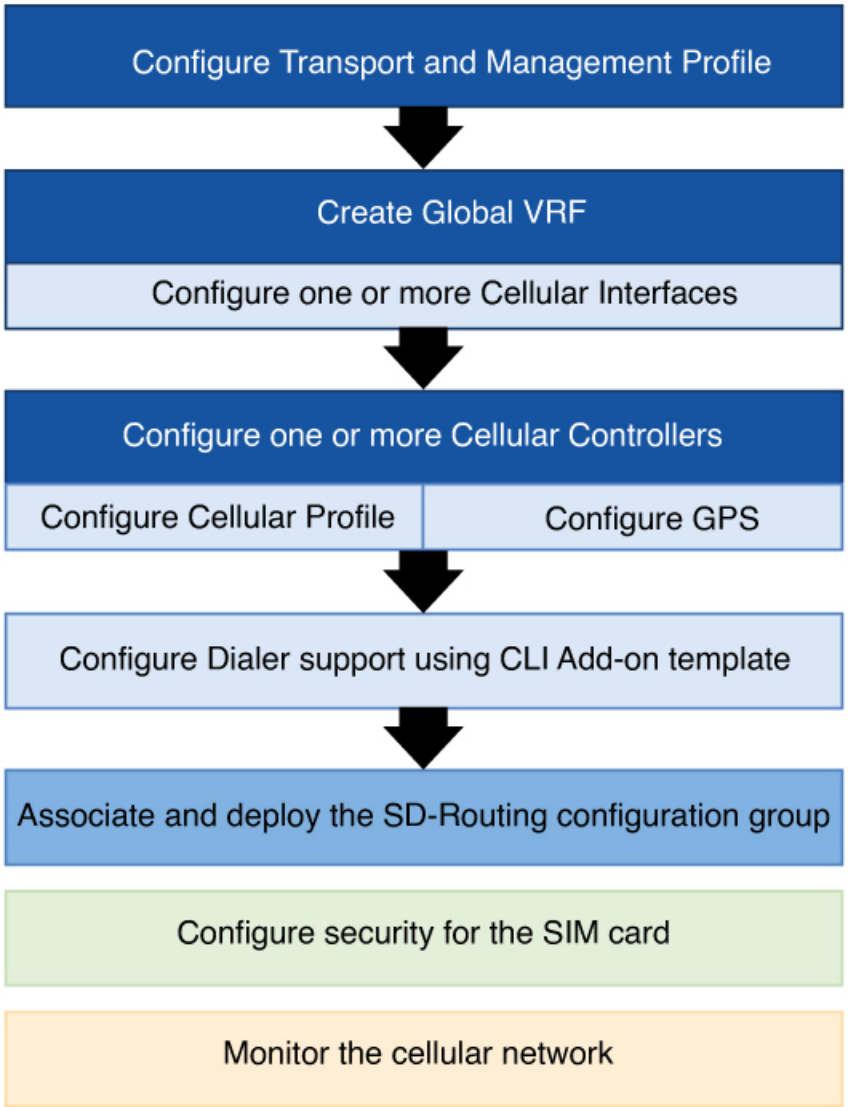
Limitations

In Cisco IOS XE 17.16.1a release, though you can configure Tracker and Tracker Group objects for the Cellular Interface, it does not track the status of the Cellular Interface.

Workflow to set up Cellular Interfaces for SD-Routing devices

These are the different stages in configuring cellular support for SD-Routing devices:

- Configure a Transport and Management profile that includes a Global VRF and configure one or more Cellular Interfaces.
- Configure a Cellular Controller that hosts the Cellular Profile and GPS.
- Configure Dialer support.
- Associate the deploy the configuration group that contains the Transport and Management profile and the CLI Add-on Profile.
- Configure security for the SIM to prevent unauthorised access to the cellular network.
- Monitor the cellular network for any errors.



Steps to configure Cellular Interfaces using Feature Parcels	To know more
Configure Global VRF	Configure the Global VRF in the Transport and Management Pro up a transport path for the cellular network. For more informatio Configure Global VRF.
Configure Cellular Interface	Configure a Cellular Interface to connect to a cellular network to LTE connectivity. For more information, see Configure Cellular
Configure a Cellular Controller	Configure the Cellular Controller for each LTE module. A Cellu Controller manages and controls cellular network connections ac central hub for managing multiple cellular devices or connection a network. For more information, see Configure Cellular Contro
Configure Cellular Profile	A Cellular Profile contains details like the Access Point Name (A authentication type, and preferred network bands, essentially cre specific configuration for accessing mobile data on a cellular net depending on the user's needs or service provider. For more info see Configure Cellular Profile.
Configure Cellular GPS	Configure the GPS details to determine the positioning of the de more information, see Configure GPS.
Configure Dialer support	Dialer configuration controls how data is sent and received over connection. For more information, see Configure Dialer support
Associate and deploy the configuration group	Provision all the configuration to one or more devices. For more inf see Associate and deploy the configuration group
Configure security for the SIM card	Configure security by using the SIM lock feature and prevent una access to the network. For more information, see Configure secur SIM card
Monitor the cellular network	Monitor cellular connectivity to ensure there are no errors in the net more information, see Monitor cellular connectivity

Configure Cellular Interfaces for SD-Routing devices using Cisco SD-WAN Manager

This section describes the various steps involved in configuring Cellular Support using Feature Parcels in Cisco SD-WAN Manager.

Ensure that the SD-Routing device has a software version of Cisco IOS XE 17.16.1a.

Configure Global VRF

This task provides details on how to configure the Global VRF in the Transport and Management Profile to set up transport for the network.

Step 1 On the Cisco Catalyst SD-WAN Manager, select **Configuration** > **Configuration Groups**. Select the solution type as **SD Routing** .

Step 2 Select a configuration group from the list that is displayed. Create a new **Transport and Management profile** or select an existing profile. Select the profile, click **Edit**.

Step 3 Select **Global VRF**. Click **Add New** to configure the Global VRF. Specify a name to identify the Global VRF. Optionally, add a description for the Global VRF.

Tip To specify a value for the parameters required for configuring a Global VRF, choose **Global**, or **Device Specific** from the drop-down list.

Table 1: Basic Configuration

Option	Description
Enhance ECMP keying	Click the toggle button to enable the use in the ECMP hash key of Layer 4 source and destination ports, in addition to the combination of the source, and destination IP addresses, as the ECMP hash key. ECMP keying is Off by default.

Table 2: DNS

Option	Description
IP address	Enter the IP address of the primary DNS server in this VRF. This IP address is used for resolving the Cisco SD-WAN Validator hostname.

Table 3: Host Mapping

Option	Description
Hostname	Enter the hostname of the DNS server. The limit is 128 characters.
List of IP	Enter IP addresses to associate with the hostname. Separate the entries with commas.

Table 4: IPv4 Static Route

Option	Description
Network Address	Enter the IPv4 address or prefix, in decimal four-point-dotted notation, to configure the VRF.
Subnet Mask	Enter the subnet mask for the prefix or the IP address. You can also choose a subnet mask from the drop-down list.
Gateway	Select Interface and specify these details • Interface Name: Specify a valid interface or choose a value from the drop-down list. • Administrative distance: Specify the administrative distance for the route.

Table 5: IPv6 Static Route

Option	Description
Prefix	Enter the IPv6 address or prefix, in decimal four-point-dotted notation, and the prefix length of the IPv6 static route to configure in the VRF.

Option	Description
Gateway	Select Interface and specify these details • Interface Name: Specify a valid interface or choose a value from the drop-down list . • Administrative distance: Specify the administrative distance for the route.

Table 6: NAT

Option	Description
NAT Enable	Click on the toggle button to enable NAT.
Add NAT Interfaces	Specify how internal users and external users should access internet or exchange information with devices on the internet.
Add Static NAT	Add a static NAT mapping. This creates a static translation of real addresses to mapped addresses.
Add Static NAT Subnet	Add subnet details for static NAT mapping. Define the subnet for the NAT mapping.
Add NAT Port Forward	Add NAT port forwarding rules to define how to direct traffic coming to a specific port on a public IP address to a specific internal IP address and port within the local network. This allows external users to access services hosted on devices within a private network.
Add Dynamic NAT	Add Dynamic NAT rules. This defines how local address is mapped to a global address dynamically. Unlike static mapping, there is no manual definition of mapping between a private and public address.

Step 4 Click **Save**.

What's next

Configure Cellular Interface.

Configure Cellular Interface

Configure a Cellular Interface to connect to a network and enable LTE connectivity. This task covers details on how to configure the Cellular Interface.

Step 1 On the Cisco Catalyst SD-WAN Manager, select **Configuration** > **Configuration Groups**. Select the solution type as **SD Routing**.

Step 2 Select a Configuration Group from the list that is displayed. Create a new **Transport and Management profile** or select an existing profile. Select the profile, click **Edit**.

Step 3 Select the Global VRF created as part of the steps in Configure Global VRF. Click + to add a feature. Select **Cellular Interface**. Select **Add New**. Specify a name to identify the Cellular Interface. Enter details to configure the Cellular Interface.

Tip To specify a value for the parameters required for configuring a Global VRF, choose **Global**, or **Device Specific** from the drop-down list.

Table 7: Basic Configuration

Option	Description
Shutdown	Click the toggle button to enable the interface. By default this interface is disabled.
Control Connection	Click the toggle button to enable control connections**.** By default, the control connections are turned off.
Bind Interface	In case of bind mode, each loopback is bound to a physical interface and traffic destinated to loopback is carried to and from mapped physical interface. This can be used when customers have connected subnets on transport side, and can use loopback to form control connections and data tunnels.
Connection Preference	Set a numerical value for **Connection Preference**. The range is from 0 to 8 with 8 being the highest priority for this interface to establish control connections with Cisco SD-WAN Manager. The default value is 5.
Enable IPv6	Click the toggle button to support IPv6 network for data services.
Interface name	Specify a name for the interface.
Description	Specify a description for the interface.
DHCP Helper	A DHCP helper interface forwards BOOTP (Broadcast) DHCP requests that it receives from the specified DHCP servers. This is useful for forcing unequal load sharing between different interfaces, for increasing the number of IP addresses in a LAN when no more IPs are available from the subnet, and for resolving issues with discontinuous subnets and classful routing protocol. Enter up to eight IPv4 addresses separated by a comma.

Table 8: ACL

Option	Description
Ingress ACL - IPv4	Specify the name of an IPv4 access list to packets being received on the interface.
Egress ACL - IPv4	Specify the name of an IPv4 access list to packets being transmitted on the interface.

Table 9: Advanced

Option	Description
IP MTU	Specify the maximum MTU size of packets on the interface. Range: 576 through 9216 . Default value is 1500 bytes.
Interface MTU	Specify the maximum transmission unit size for frames received and transmitted on the interface. Range: 1500 through 1518 (GigabitEthernet0), 1500 through 9216 (other GigabitEthernet). Default: 1500 bytes.
TCP MSS	Specify the maximum segment size (MSS) of TPC SYN packets passing through the router. By default, the MSS is dynamically adjusted based on the interface or tunnel MTU such that TCP SYN packets are never fragmented. Range: 500 to 1460 bytes.
Autonegotiate	Toggle this option to turn on autonegotiation. This allows a cellular interface to automatically determine the best transmission parameters for a connection.

Option	Description
IP Directed Broadcast	Toggle the button to enable IP Directed Broadcast. An IP directed broadcast is an IP packet whose destination address is a valid broadcast address for some IP subnet but which originates from a node that is not itself part of that destination subnet. If directed broadcast is enabled for an interface, incoming IP packets whose addresses identify them as directed broadcasts intended for the subnet to which that interface is attached are broadcast on that subnet

Step 4 Click **Save**. Repeat the process to create additional cellular interfaces.

What's next

Configure Cellular Controller.

Configure Cellular Controller

A Cellular Controller manages and controls cellular network connections acting as a central hub for managing multiple cellular devices or connections within a network.

This task covers details on how to configure the Cellular Controller for each LTE module.

Step 1 On the Cisco SD-WAN Manager, select **Configuration** > **Configuration Groups**. Select the solution type as **SD Routing**.

Step 2 Select a configuration group created earlier. Select the Transport and Management profile created in Configure Global VRF, on page 3. Select **Add New Feature**. Select **Cellular Controller**. Select **Add New**. Enter a name and description to identify the Cellular Controller.

Tip To specify a value for the parameters required for configuring a Global VRF, choose **Global**, or **Device Specific** from the drop-down list.

Option	Description
Cellular ID	Enter the interface slot and port number in which the cellular NIM card is installed. Currently, it can be 0/1/0 or 0/2/0.
Primary SIM Slot	Choose the slot that contains the primary SIM card for the device. If the device loses service to this slot, it fails over to the secondary slot. On a device, the primary cellular SIM slot is referred to as slot 0, while a secondary SIM slot (if available) is referred to as slot 1.
SIM Failover Retries	Enter the number of consecutive unsuccessful attempts by the device to communicate with the primary SIM before failing over to the secondary slot.
SIM Failover Timeout	Enter the number of minutes that the device waits before trying to communicate with the primary SIM slot after the device detects loss of service to this slot.
Firmware Auto-SIM	Toggle the button to enable the auto-SIM feature. When this feature is enabled, the device automatically detects the service provider to which SIMs in the device belong and automatically loads the firmware for that provider.

Step 3 Click **Save**. Repeat the process to create additional cellular controllers.

What's next

Configure Cellular Profile.

Configure Cellular Profile

A Cellular Profile contains details like the Access Point Name (APN), authentication type, and preferred network bands, essentially creating a specific configuration for accessing mobile data on a cellular network depending on the user's needs or service provider.

This task covers details on how to configure a Cellular Profile that contains the Access Point Name (APN) to the base station.

Step 1 On the Cisco SD-WAN Manager, select **Configuration** > **Configuration Groups**. Select the solution type as **SD Routing**.

Step 2 Select a configuration group from the list that is displayed. Select the **Transport and Management profile** created in Configure Global VRF, on page 3 click **Edit**.

Step 3 Select the Cellular Controller created earlier, click +, select **Cellular Profile**. Select **+ Add New**. Enter a name and description for the Cellular Profile. Specify these details:

Tip To specify a value for the parameters required for configuring a Global VRF, choose **Global,** or **Device Specific** from the drop-down list.

Option	Description
Profile ID	Enter a unique identifier for the profile. Valid values: Integers 1 through 16.
Access Point Name	(Optional) Enter a name to identify the cellular access point name. If no name is specified, the cellular module automatically picks the APN-based SIM-card operator. The APN is provided by the SIM card service provider.
Packet Data Network Type	(Optional) Choose the packet data network (PDN) type of the cellular network (IPv4, IPv6, or IPv4v6).
No overwrite	(Optional) This option when enabled, overwrites the profile on the cellular modem. By default, this option is disabled.
Slice type	(Optional) Choose the network slice type (SST) for the profile. The options are: • eMBB: Enhanced Mobile Broadbandu is used for high data throughput. • URLLC: Ultra-Reliable Low Latency Communication is used for high reliability and low latency transmission. • MIoT: Massive IoT is used for many devices transmitting small quantities of data.
Slice Differentiator	Enter the slice differentiator for the profile. This is an optional value that enables the user equipment (UE) to use multiple slice instances of the same SST. Range: 0 through 16777214.
Authentication	Click the toggle button to enable authentication for the access point. Choose the authentication method to attach to the cellular access point (pap, chap, pap_chap).
Profile Username	Enter a user name to use for authentication when attaching to the cellular access point.
Profile Password	Enter the password to use for authentication when attaching to the cellular access point.

Step 4 Click **Save**. Repeat the process to create additional cellular profiles.

What's next

Configure GPS.

Configure GPS

This task covers details on how to configure the GPS details for the LTE module to determine the positioning of the device.

Step 1 On the Cisco Catalyst SD-WAN Manager, select **Configuration** > **Configuration Groups**. Select the solution type as **SD Routing**.

Step 2 Select a configuration group from the list that is displayed. Select the **Transport and Management profile** created in Configure Global VRF, click **Edit**.

Step 3 Select the Cellular Controller created earlier, click +, select GPS. Select **+ Add New**. Enter a name and description for the GPS profile. Specify these details:

Option	Description
GPS	Click the toggle button to enable the GPS feature on the device.
GPS Mode	Select the GPS mode: • **MS-based**: Use mobile station–based assistance, also called assisted GPS mode, when determining position. In this mode, cell tower data is used to enhance the quality and precision in determining location, which is useful when satellite signals are poor. • **Standalone**: Use satellite information when determining position.
NMEA	Click the toggle button to enable the use of National Marine Electronics Association (NMEA) streams to be sent in UDP format to the specified destination IP and port.
Source Address	Enter the IP address of the router's interface that connects to the external device reading the NMEA stream. Specify the source IP address as 0.0.0.0 if you want it to be selected automatically based on the egress interface.
Destination Address	Enter the IP address of the external device's interface that's connected to router.
Destination Port	Enter the UDP destination port number to use to send NMEA data to the external device's interface.

Step 4 Click **Save**. Repeat the process to create additional GPS profiles.

What's next

Configure Dialer interface using CLI Add-on Profile.

Configure Dialer Interface using CLI-Add on template

A dialer interface is a virtual interface that stores and projects protocol configuration information that is common to all the LTE channels. This virtual interface controls how data is sent and received over a dial-up connection.

From release 17.17.1a, the cellular data connection is automatically configured for a single LTE interface without configuring a dialer interface.

Use these steps to optionally configure additional LTE interfaces on the device using the CLI Add-on template.

Step 1 On the Cisco Catalyst SD-WAN Manager, select **Create Configuration Group**. Specify a name and description and select the **CLI Configuration Group** checkbox.

Step 2 In the **Config Preview** pane, enter these commands to configure additional dialer interfaces.

```
interface Cellular0/3/0
dialer in-band
dialer idle-timeout 0
dialer watch-group 2
!
dialer watch-list 2 ip 5.6.7.8 0.0.0.0
dialer watch-list 2 delay route-check initial 60
dialer watch-list 2 delay connect 20
```

Step 3 Modify the parameters as per your requirement. Click **Save** and **Done**.

Associate and deploy the Configuration Group to an SD-Routing device

This task involves associating the Configuration Group to one or more devices and provisioning the configuration changes.

Ensure that the configuration group you select is created for SD-Routing devices.

Step 1 On Cisco SD-WAN Manager, select the **Configuration Group** created earlier.

Step 2 Click **+ Add** and select the devices from the list. Click **Save** to attach the configuration group to the selected devices.

Step 3 To provision the configuration changes, click **Deploy**.

a) Select the device on which you want to provision the configuration changes. Click **Next**.

b) For each device, review or update the IP address, hostname. Specify the password to access these devices. Click **Next**.

c) If you want to review the configuration changes, click **Preview CLI**. Select the device to view the configuration changes either inline or side by side. The configurations that are removed are highlighted in red and the new configuration is highlighted in green. To remove or add any device from the list of selected devices, click **Edit Device List**.

d) Click **Deploy** to provision the configuration changes on the devices.

Configure security for the SIM card

After configuring the Cellular Interface and Cellular Controller for SD-Routing devices, you may need to unlock the SIM card if a lock is set with a PIN. If you prefer, you can unlock the SIM card and remove the set PIN to make sure that the SIM automatically powers up and connects to the cellular network. If the SIM is in unlocked state, it remains unlocked even after the LTE firmware is upgraded or the device is rebooted.

Set a PIN to lock or unlock the SIM card

Remember

The PIN that is used to lock or unlock the SIM card should be configured using the **lte sim authenticate 0 slot** *0/1* command in a CLI configuration group or a CLI Add-On Profile in Cisco SD-WAN Manager. This PIN is used by Cisco IOS XE software to instantiate the SIM card.

Use these commands to lock or unlock a SIM card. These commands can be executed using **Tools** > **SSH** terminal in the Cisco SD-WAN Manager.

Use command	To	Example
cellular *interface* **lte sim change-pin** *current pin new pin*	Change the PIN of the SIM card if it is in a unlocked state. The new PIN - a code (4 to 8 digits long) is provided by your service provider to lock or unlock the SIM card.	`cellular 0/1/0 lte sim lock 1111 1234`
cellular *slot* **lte sim {lock | unlock}** *pin*	Locks or unlocks the SIM card using a PIN. When the SIM card is in a locked state, it is important that the correct PIN is entered to unlock the SIM card.	`cellular 0/1/0lte sim lock 1111` `cellular 0/1/0 lte sim lock 1111`

Monitor cellular connectivity for SD-Routing devices using Cisco SD-WAN Manager

Monitoring cellular WAN deployments offer critical insights into functioning of cellular WAN deployments. This section provides details on how to monitor cellular connectivity.

Monitor cellular connectivity using commands

Execute show **sd-routing control connection history** command using **Tools** > **SSH** terminal in Cisco SD-WAN Manager to display details of control connections and to view history of control connections from cellular interfaces.

Monitor cellular connectivity using the Monitor dashboard

Step 1 On the Cisco Catalyst SD-WAN Manager, choose **Monitor** > **Devices**. Select a device from the list.

Step 2 Select **Cellular** to view information such as:

- Signal Strength Signal
- Interface details and
- Status of the SIM.