



# Network Slicing

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## Feature history of network slicing

*Table 1: Feature History*

Feature Name	Release Information	Description
Cellular Network Slicing	Cisco IOS XE Catalyst SD-WAN Release 17.16.1a Cisco Catalyst SD-WAN Manager Release 20.16.1	This feature allows multiple networks to exist on the same physical network to optimize the network for different traffic types.

## Network slicing

Network slicing is a network architecture solution that:

- partitions a single physical network into multiple virtual slices
- allows each slice to operate with customized network functions and resources
- allocates dedicated resources for diverse service types or customer requirements.

5G network slicing is supported only on 5G standalone networks. It is not available on 5G non-standalone (NSA) networks. The network provider defines a specific set of network functions and resources for each slice or service type. Service type defines the expected behavior of a network slice, specifying its features and services.

The following service types are supported in network slicing:

- Enhanced Mobile Broadband (eMBB): used for high-bandwidth and low-latency applications.

- Ultra-reliable low latency communications (URLLC): used for highly reliable and low-latency transmission requirements.
- Massive Internet of Things (MIoT): used for sending small quantities of data.

## Configure network slicing

### Before you begin

Create a configuration group for Cisco Catalyst Cellular Gateways using **Workflows > Create Cellular Gateway Group**. On the **Configuration Groups** page, the resulting configuration group is labelled cellular gateway in the **Device Solution** column.

For information about creating configuration groups and applying them to devices, see the [Using Configuration Groups](#) section of *Cisco Catalyst SD-WAN Configuration Groups, Cisco IOS XE Catalyst SD-WAN Release 17.x*.

### Procedure

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- Step 1** From the Cisco SD-WAN Manager menu, choose **Configuration > Configuration Groups**.
- Step 2** Create a [Configuration Group](#). A new configuration group is created.
- Step 3** In the configuration group, click **Add Profile**.
- Step 4** Choose **Transport & Management Profile** from the drop-down list.
- Step 5** Click **Edit** to add features to the Transport and Management profile and click **Add New Feature**.
- Step 6** Choose **Cellular Controller** from the **Add Feature** drop-down list.
- Step 7** Choose **Cellular Profile** from the **Add Feature** drop-down list.

*Table 2: Cellular Settings*

Field	Description
<b>Primary Slot</b>	Choose a SIM slot to designate it as primary. Range: 0, 1 Default: 0
<b>SIM SLOT 0 Cellular Profile</b>	
<b>Profile Id</b>	Profile ID. You can click <b>Add</b> to add multiple profiles.
<b>Access Point Name</b>	Access point name, from your service provider.
<b>Authentication Method</b>	Authentication method ( <b>none</b> , <b>pap</b> , <b>chap</b> , <b>pap_or_chap</b> ) indicated by your service provider.
<b>Username</b>	Username for authentication, as indicated by your service provider.

Field	Description
<b>Password</b>	Password for authentication, as indicated by your service provider.
<b>Packet Data Network Type</b>	Packet data network type ( <b>IPv4</b> , <b>IPv6</b> , <b>IPv4v6</b> ), as indicated by your service provider.
<b>Attach Profile</b>	Choose a attach profile from the defined profiles.
<b>Data Profile</b>	Choose a data profile from the defined profiles. You can use the same profile for the attach profile and data profile.
<b>SIM SLOT 1 Cellular Profile</b>	
See the fields described for SIM slot 0.	

**Step 8** For the configured **Cellular Controller**, choose the **Cellular Profile** or click **Add New** to add a new cellular profile.

**Step 9** Configure **Cellular Profile** using the following table.

*Table 3: Cellular Profile Settings*

Field	Description
<b>Type</b>	Choose a feature from the drop-down list.
<b>Feature Name</b>	Enter a name for the feature. The name can be up to 128 characters and can contain only alphanumeric characters.
<b>Description</b>	Enter a description of the feature. The description can be up to 2048 characters and can contain only alphanumeric characters.
<b>Profile ID</b>	Enter the identification number of the profile to use on the router. Range: 1 through 15
<b>Access Point Name</b>	Enter the name of the gateway between the service provider network and the public internet. It can be up to 32 characters long.
<b>Authentication</b>	Choose the authentication method used for the connection to the cellular network. It can be <b>none</b> , <b>pap</b> , <b>chap</b> , or <b>pap_chap</b> .
<b>Profile Username</b>	Enter the user name to use when making cellular connections for web services. It can be 1 to 32 characters. It can contain any alphanumeric characters, including spaces.
<b>Profile Password</b>	Enter the user password to use when making cellular connections for web services. The password is case-sensitive and can be clear text, or an AES-encrypted key.  From Cisco Catalyst SD-WAN Manager Release 20.15.1, when you enter the password as clear text, Cisco SD-WAN Manager encrypts the password. When you view the configuration preview, the password appears in its encrypted form.
<b>Packet Data Network Type</b>	Choose the packet data network (PDN) type of the cellular network. It can be IPv4, IPv6, or IPv4v6.

Field	Description
<b>No Overwrite</b>	Enable this option to overwrite the profile on the cellular modem. By default, this option is disabled.
<b>Slice Type</b>	Choose the network slice type (SST) for the profile. The options are: <ul style="list-style-type: none"> <li>• eMBB: Enhanced Mobile Broadband, used for high data throughput.</li> <li>• URLLC: Ultra-Reliable Low Latency Communication, used for high reliability and low latency transmission.</li> <li>• MIoT: Massive IoT, used for many devices transmitting small quantities of data.</li> </ul>
<b>Slice Differentiator</b>	Enter the slice differentiator (SD) 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
<b>Slot</b>	Enter the associated SIM slot for the profile.

## Configure network slicing using CLI

The following example shows how to configure a cellular network slicing using a CLI:

```
Device(config-controller)# profile id 3 apn apn-ns authentication none pdn-type ipv4
no-overwrite
slot Associated sim slot
slice-type Associated network slice type(SST)

Device(config-controller)# profile id 3 apn apn-ns authentication none pdn-type ipv4 slice-
type
<1-3> Slice type number: 1(eMBB), 2(URLLC), 3(MIoT)
Device(config-controller)# profile id 3 apn apn-ns authentication none pdn-type ipv4 slice-
type embb
slice-differentiator Associated Slice Differentiator(SD) <--- if SD is bypassed here,"FF
FF FF" wll be used internally as the SD to indicate that there is no SD associated with
this SST.
slot Associated sim slot

Device(config-controller)# profile id 3 apn apn-ns authentication none pdn-type ipv4 slice
type
embb slice-differentiator
<0-16777214> Slice Differentiator
Device(config-controller)#
Device(config-controller)# $ pdn ipv6 slice-type mlot slice-differentiator 6
slot Associated sim slot
```

## Verify network slicing using CLI

The following is a sample output from the **show cellular** command that displays network slicing configuration and slice type details:

```
Device# show cellular profile 6

Profile 6 = INACTIVE
-----
PDP Type = IPv6
Access Point Name (APN) = TestNSSAI6_URLLC1
Authentication = None
S-NSSAI Slice Type is URLLC
S-NSSAI Slice Differentiator = 1
```

