



## New Features for Cisco IOS XE 17.13.1

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### IPv4 and IPv6 Multicast Over DLEP

DLEP Multicast is now supported with IOS XE 17.13.1. See the following configuration examples:

#### IPv4 Multicast

Global Command Examples:

```
ip multicast-routing distributed
ip pim rp-address <rp ip addr> [access-list for group]
```

Physical Interface Command Examples:

```
interface GigabitEthernet0/0/1
  ip address 28.28.28.1 255.255.255.0
  ip pim sparse-mode
  ip igmp version 3
  negotiation auto
  ipv6 address 1111::3/120
ipv6 enable
```

VMI Command Examples:

```
interface vmi 5
ip pim sparse-mode
```

Loopback Command Examples:

```
interface Loopback0
ip address 7.7.7.7 255.255.255.255
ip pim sparse-mode
ipv6 address 2000::2/128
ipv6 enable
```

#### IPv6 Multicast

Global Command Examples:

```

ipv6 pim
ipv6 multicast-routing
ipv6 pim rp-address <rp ipv6 addr> [access-list for group]

```

#### Physical Interface Command Examples:

```

interface GigabitEthernet0/0/2
ip address 38.38.38.1 255.255.255.0
ip igmp version 3
ipv6 mld version 2
negotiation auto
ipv6 address 1111::3/120
ipv6 enable
ipv6 pim register-source loopback0

```

#### VMI Command Examples:

```

interface vmi 5
ip pim sparse-mode

```

#### Loopback Command Examples:

```

interface Loopback0
ip address 7.7.7.7 255.255.255.255
ip pim sparse-mode
ipv6 address 2000::2/128
ipv6 enable

```

### Remove Commands

#### Remove Command Examples:

```

Router(config-if)# no ip dlep vtemplate 1
Router(config-if)# no int vmi 1
Router(config-if)# no int Virtual-Template 1

```

### Show Commands

#### Show Command Examples:

```

show ip interface brief
show dlep config
show dlep clients
show dlep neighbors

```

## IPv6 Control Plane for DLEP

IOS-XE 17.13.1 supports DLEP control plane session support on an IPv6 network. When both the router and radio are running an IPv6 stack, the router can initiate DLEP session setup over IPv6. Both manual mode and auto discovery mode are supported. When the router is configured with an IPv6 address and transport layer port details of listening radio, the router initiates DLEP session setup in manual mode.

## New Command Line Interface

You can choose auto discovery mode by using the following new CLI:

```
<no> ip dlep set peer-discovery-mode ipv6
```

When Auto discovery mode is set using the above command, the router starts sending peer discovery signals as in the following example:

```

Destination IPv6 address: FF02::1:7
Destination UDP Port    : 854
Source IPv6 address.   : Global IPv6 address configured on DLEP interface or sub-interface
Source UDP Port.       : 55555

```

Upon receipt of discovery signals the radio responds with offer signals that consist of IPv6 connection point TLV as defined in DLEP RFC 8175.

The router uses the received IPv6 address and transport port number to further establish a DLEP TCP session with the radio node. Once the TCP connection is established, rest of DLEP state machine is common between manual mode and IPv6 auto discovery mode.

When the router DLEP interface is configured with dual stack, DLEP auto discovery starts depending on the configured mode. By default, the router starts with IPv4 discovery mode.

Current IOS-XE implementation assumes the IPv6 DLEP offer signal consists of IPv6 connection point TLV or nothing. When the IPv6 connection point TLV is missing in the offer signal, the router picks radio IPv6 address and transport layer port number from foreign socket from which offer signal is received.

The IPv6 address offered by the radio can be link local address of radio interface or any configured global IPv6 address. The router can establish DLEP session with either of them.




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**Note** Any IPv4 connection point TLV received in IPv6 offer signal is ignored by the router.

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DLEP session mode on the router interface is independent of session mode configured on other interfaces. The router can simultaneously support any of following modes on different interfaces:

- IPv4 manual configuration
- IPv4 auto discovery
- IPv6 manual configuration
- IPv6 auto discovery

The following example shows adding a sample manual mode ipv6 control plane configuration:

```
ip dlep vtemplate 1 port 11813 tcp port 11913 client ipv6 193::104 port 913
```

## Switching DLEP Session Mode on the Router Interface

The following are Guidelines/Limitations:

- Changing the DLEP session mode due to a configuration change on the interface requires a virtual template reconfiguration on the interface to force the mode change.
- Changing the IPv6 address on the router DLEP interface when there is active session is not recommended. Any such change needs to be followed by virtual template reconfiguration on the interface.
- Ensure global IPv6 address is configured on the interface prior to enabling DLEP.
- A valid virtual template and vmi interface mapped to the physical interface needs to be present.
- Configuration for auto discovery needs to be in the following order:

```

interface GigabitEthernet <x/x/x>
  ip dlep set peer-discovery-mode ipv6
  ip dlep vtemplate 1

```

- The command **ip dlep set peer-discovery-mode ipv6** gets removed when removing the dlep vtemplate configuration from the interface, for example, **no ip dlep vtemplate 1** and has to be reconfigured to enable it again.

## Auto Discovery Mode Fallback

The default DLEP session auto discovery mode is IPv4. There is no fallback from IPv4 to IPv6 or vice versa depending on failure of the current mode. Ensure both the router and radio are configured so that auto discovery mode is same.

## SD-WAN Remote Access (SD-WAN RA)

SD-WAN RA is now supported on the IoT routers with IOS XE 17.13.1. SD-WAN RA is a combination of two features:

- IOS-XE SD-WAN
- IOS-XE FlexVPN Remote Access Server




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**Note** All IoT devices only support the SD-WAN RA Client.

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Information on SD-WAN Remote Access can be found in the following guide:

[Cisco Catalyst SD-WAN Remote Access](#)

### Additional Documentation

Additional documentation for SDWAN/vManage is available at the following links:

- [User Documentation for Cisco IOS XE Catalyst SD-WAN Release 17](#)
- [Cisco Catalyst SD-WAN](#)
- [Cisco SD-WAN Support Information](#)
- [Cisco vManage Monitor Overview](#)
- [Managing the SD-Routing Device Using Cisco SD-WAN Manager](#)

## Change in CLI Output for the FN980 5G Modem

This release has a different output to the **show cellular 0/x/0 radio band** command. The module will no longer display the 5G-SA band information by default. However, once the 5G-SA has been enabled, the band information will then be displayed.

See the following command examples using an IR1101 running IOS XE 17.13.1 with an FN980 modem:

```
IR1101#show cellular 0/1/0 radio band
```

```
LTE bands supported by modem:
```

```

- Bands 2 4 5 12 14 26 29 30 46 48 66.
LTE band Preference settings for the active sim(slot 1):
- Bands 2 4 5 12 14 26 29 30 46 48 66.

NR5G NSA bands supported by modem:
- Bands 2 5 12 66 77.
NR5G NSA band Preference settings for the active sim(slot 1):
- Bands 2 5 12 66 77.

3G bands supported by modem:
Index: <none>
3G band Preference settings for the active sim(slot 1):
Index: <none>

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Band index reference list:

For LTE and 5G, indices 1-128 correspond to bands 1-128.

For 3G, indices 1-64 maps to the 3G bands mentioned against each above.

IR1101#
IR1101#show cellular 0/1/0 hard

*Nov  8 12:13:31.969: Graphit 5G RSRP/RSRQ LTE modem:[1]
Modem Firmware Version = MOH.030202
Host Firmware Version = A0H.000302
Device Model ID = FN980
International Mobile Subscriber Identity (IMSI) = 001010123456789
International Mobile Equipment Identity (IMEI) = 359661100035795
Integrated Circuit Card ID (ICCID) = 89860000502000180722
Mobile Subscriber Integrated Services
Digital Network-Number (MSISDN) =
Modem Status = Modem Online
Current Modem Temperature = 40 deg C
PRI version = 1080-114, Carrier = Generic GCF
OEM PRI version = 1080-114
IR1101#

IR1101#show cellular 0/1/0 radio band

LTE bands supported by modem:
- Bands 1 2 3 4 5 7 8 12 13 14 17 18 19 20 25 26 28 29 30 32 34 38 39 40 41 42 43 46 48 66
  71.
LTE band Preference settings for the active sim(slot 0):
- Bands 1 2 3 4 5 7 8 12 13 14 17 18 19 20 25 26 28 29 30 32 34 38 39 40 41 42 43 46 48 66
  71.

NR5G NSA bands supported by modem:
- Bands 1 2 3 5 7 8 12 20 25 28 38 40 41 48 66 71 77 78 79.
NR5G NSA band Preference settings for the active sim(slot 0):
- Bands 1 2 3 5 7 8 12 20 25 28 38 40 41 48 66 71 77 78 79.

NR5G SA bands supported by modem:
- Bands <none>
NR5G SA band Preference settings for the active sim(slot 0):
- Bands <none>

3G bands supported by modem:
Index:
 23 - UMTS Band 1: 2100 MHz (IMT)
 24 - UMTS Band 2: 1900 MHz (PCS A-F)
 26 - UMTS Band 4: 1700 MHz (AWS A-F)
 27 - UMTS Band 5: US 850 MHz (CLR)

```

```
50 - UMTS Band 8: 900 MHz (E-GSM)
51 - UMTS Band 9: Japan 1700 MHz
61 - UMTS Band 19: 800 MHz (800 Japan)
3G band Preference settings for the active sim(slot 0):
Index:
23 - UMTS Band 1: 2100 MHz (IMT)
24 - UMTS Band 2: 1900 MHz (PCS A-F)
26 - UMTS Band 4: 1700 MHz (AWS A-F)
27 - UMTS Band 5: US 850 MHz (CLR)
50 - UMTS Band 8: 900 MHz (E-GSM)
51 - UMTS Band 9: Japan 1700 MHz
61 - UMTS Band 19: 800 MHz (800 Japan)
```

```
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```

Band index reference list:

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IR1101#