New Features for Cisco IOS XE 17.12.1a

This chapter contains the following sections:

DLEP IPv6 Unicast

Previous releases of IOS XE offered support for IPv4 unicast traffic over an IPv4 DLEP session. IOS XE 17.12.1a provides support for IPv6 unicast over an IPv4 DLEP session.

This section provides a subset of the overall DLEP information that is found in the IP Routing Configuration Guide, Cisco IOS XE 17.x.

Feature Limitations

DLEP has the following restrictions and limitations:

- Multicast traffic is not supported with DLEP, but is supported with PPPOE.

- DLEP cannot be deployed with High Availability (HA) configuration.

- You must configure the VMI and Virtual-Template before attaching the Virtual-Template to a physical interface.

- The ESR6300 is connected over DLEP radio links and only 1 radio per interface (WAN port only) is supported.

- All configurations for the virtual-template need to be removed individually using the no form of the respective configuration commands, before removing the virtual-template using the no interface virtual-template command.

- Changing of configurations on the virtual-template and VMI interfaces is not supported while DLEP is enabled on the physical interface. In order to make such changes, disable DLEP by removing the DLEP configuration from the physical interface, make the changes, and re-configure DLEP on the physical interface.

- DLEP interface does not support Jumbo frames (frames > 1500 bytes in size).

- Routing of internally generated application traffic (e.g. pingv6) with source as DLEP VMI / physical interface is not supported.

• Viewing information about DLEP neighbors using the show ipv6 neighbor command is not supported.

Configuring DLEP with IPv6 Unicast

Use the following steps to configure DLEP with IPv6 Unicast.

Enable IPv6 unicast routing:

```
Router#configure terminal
Router(config)#ipv6 unicast-routing
Router(config)#end
Router#
```

Enable IPv6 on the physical interface:

```
Router#configure terminal
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#ipv6 enable
Router(config-if)#end
Router#
```

Configure the virtual template interface:

```
Router#configure terminal
Router(config)#interface virtual-template1
Router(config-if)#ip unnumbered GigabitEthernet0/0/0
Router(config-if)#ipv6 enable
Router(config-if)#ipv6 nd dad attempts 0
Router(config-if)#end
Router#
```

Configure the vmi interface:

```
Router#configure terminal
Router(config)#interface vmi1
Router(config-if)#ip unnumbered GigabitEthernet0/0/0
Router(config-if)#physical-interface GigabitEthernet0/0/0
Router(config-if)#ipv6 enable
Router(config-if)#end
Router#
```

Configure the physical interface:

```
Router#configure terminal
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#ip address 10.1.1.1 255.255.255.0
Router(config-if)#ipv6 address 1000::1/64
Router(config-if)#ip dlep vtemplate 1
Router(config-if)#end
Router#
```

Configuring EIGRP for DLEP IPv6 Unicast

Use the following steps to configure EIGRP for DLEP IPv6 Unicast:

Create the EIGRP router:

```
Router#configure terminal
Router(config)#ipv6 router eigrp 2
Router(config-rtr)#eigrp router-id 2.2.2.2
Router(config-rtr)#end
Router#
```

Configure EIGRPv6 on VMI:

```
Router#configure terminal
Router(config)#interface vmi1
Router(config-if)#ipv6 eigrp 2
Router(config-if)#no ipv6 split-horizon eigrp 2
Router(config-if)#end
Router#
```

Configuring OSPF for DLEP IPv6 Unicast

Use the following steps to configure OSPF for DLEP IPv6 Unicast.

Configure OSPF router:

```
Router#configure terminal
Router(config)#router ospfv3 1
Router(config-router)#router-id 200.200.200.200
Router(config-router)#address-family ipv6 unicast
Router(config-router-af)#end
Router#
```

Configure OSPF on the VMI interface:

```
Router#configure terminal
Router(config)#interface vmi1
Router(config-if)#ospfv3 1 ipv6 area 0
Router(config-if)#ospfv3 1 ipv6 cost dynamic
Router(config-if)#ospfv3 1 ipv6 network manet
Router(config-if)#end
Router#
```

Uncapped License Implementation

The Cisco IOS XE 17.11.1 release introduced a new throughput level called "uncapped". This release extends the new throughput level to all of the Cisco IoT routing platforms. The following is a recap of the uncapped license implementation:

Licensing Throughput Levels

The throughput level determines the bandwidth limit which is applied to encrypted traffic. There is no limit applied to the non-encrypted (clear) traffic going through a device.

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Important	To comply with global export regulations, if more than 250Mbs of encrypted traffic is required, then an "uncapped" – platform dependent – selection must be done on CCW, as well as an HSEC license.

This limit is imposed bidirectionally. This means that if the throughput limit is set to 250Mbps then up to 250Mbps of encrypted traffic can flow through the device in either direction. For example, the device can both receive and transmit up to 250Mbps of encrypted traffic. There is no limit applied on unencrypted traffic.

When the throughput level on the device is set to "uncapped" there are no limits imposed on both encrypted and unencrypted traffic flowing through it.

Note	To avoid confusion on throughput limits and IOS XE software releases, please note the following:

Cisco IOS XE release 17.11.1a and earlier running on the ESR6300, IR1800, and IR8140 platforms support boost, uncapped, and unlimited licenses. These are configured using the **platform hardware throughput level 2G** CLI.

Future Cisco IOS XE release 17.12.1a and later running on the ESR6300, IR1800, and IR8140 support the same licenses, but will be configured using the **platform hardware throughput level uncapped** CLI.

With Cisco IOS XE release 17.12.1a and later, the **platform hardware throughput level 2G** and the **platform hardware throughput level uncapped** CLIs will both provide the same throughput as the uncapped license.

The following table shows the throughput limits (also referred to as Tier license) supported on IoT devices.

Platform	25 Mbps bidirectional (Tier 0)	50 Mbps bidirectional	Up to 200 Mbps bidirectional (Tier 1)	250 Mbps bidirectional	2 Gbps	Uncapped (Tier 2)
ESR 6300	N/A	Yes	N/A	Yes	Yes	Supported starting with 17.12.1a
ESR-6300-LIC-K9	N/A	Yes	N/A	N/A	N/A	Yes
IR1101	N/A	N/A	N/A	Yes	N/A	Supported starting with 17.10.1.
IR1800	N/A	Yes	N/A	Yes	Yes	Supported starting with 17.12.1a
IR8100	N/A	Yes	Yes	Yes	Yes	Supported starting with 17.12.1a
IR8300	Yes	N/A	Yes	N/A	N/A	No