

L2CP Tunneling MEF

This chapter introduces you to L2 Control Protocols (L2CP) tunneling to help initiate control packets from a local customer-edge (CE) device to a remote CE device.

Table 1: Feature History Table

Feature Name	Release Information	Feature Description
L2CP Tunneling	Release 7.4.1	This feature is now supported on routers that have Cisco NC57 line cards installed and operates in native and compatibility modes. L2 Control Protocols (L2CP) tunneling helps initiate control packets from a local customer-edge (CE) device to a remote CE device.

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L2CP Tunneling

The router supports the following tunnel protocols:

- Link Layer Discovery Protocol (LLDP)
- Link Aggregation Control Protocol (LACP)
- Operation, Administration, Management (OAM)
- Ethernet Local Management Interface (ELMI)
- Cisco Discovery Protocol (CDP)

Some of the L2 transport interfaces are:

- VPWS L2 transport main
- VPWS L2 subinterface

- L2 transport main bridge port
- L2 subinterface bridge port
- VPWS L2 bundle main port
- VPWS L2 bundle subinterface
- L2 bundle main bridge port

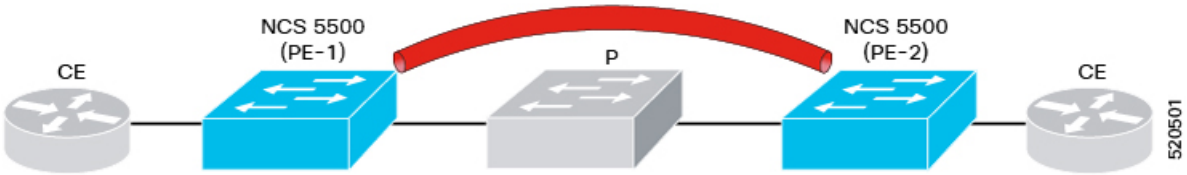
On a subinterface, when control packets such as LLDP and LACP are tunneled, the system tunnels the same control packets to the main interface.

The LACP packet for VPLS (also known as ELAN service) either gets peered or dropped.

The router tunnels Layer 2 packets between PEs.

The following figure depicts Layer 2 protocol tunneling.

Figure 1: L2CP Tunneling



L2CP packets are tunneled from NNI to NNI (depicted in red pipe). The Layer 2 traffic is sent through the Cisco NCS 5500 Series Routers, and these routers switch the traffic from end to end.

Restrictions

- VPLS service does not support LACP tunneling.
- VPWS and EVPN-VPWS services support LACP tunneling.

L2CP Protocol Support on Cisco NCS 5500 Series Router

The router supports Layer 2 peering functionalities on a per Ethernet Flow Point (EFP) basis. It supports maximum packet rate of 10 packets per second (per interface) for a protocol, and 100 packets per second for all protocols (on all interfaces).

You do not need to configure L2CP tunneling explicitly. L2CP packets are tunneled over Layer 2 tunnel by default.

The following table lists the options that are supported on the router and displays the supported defaults and configuration options for the router.

Note LLDP will not detect neighboring devices if the main interface has a sub-interface configured with **encapsulation untagged** or **encapsulation default**.

Protocol	Packet Type	Action
CDP	Untagged	Peer
LACP	Untagged	Peer
LLDP	Untagged	Peer else Tunneled
STP	Untagged	Peer
VTP	Untagged	Peer
OAM	Untagged	Peer
BPDU	Untagged	Tunneled
UDLD	Untagged	Tunneled
CDP	Tagged	Tunneled
LACP	Tagged	Tunneled
LLDP	Tagged	Tunneled
STP	Tagged	Tunneled
VTP	Tagged	Tunneled
BPDU	Tagged	Tunneled
OAM	Tagged	Tunneled
ELMI	Tagged	Tunneled
UDLD	Tagged	Tunneled

The following table lists the supported options on the router and displays the supported defaults and configuration options for the Cisco NCS 5700 Series Line Cards.

Protocol	Services and Action on Cisco NCS 5700 Series Line Cards							
	EPL1	EPL2	ELAN	E-Tree	EVPL1	EVLAN	EVTREE	Enable on Interface
STP	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Not supported
RSTP	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Not supported
LACP /LAMP	Tunnel	Tunnel	Discard	Discard	Discard	Discard	Discard	Punt
LOAM	Tunnel	Tunnel	Tunnel	Tunnel	NA	NA	NA	Drop
E-LMI	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Punt

Protocol	Services and Action on Cisco NCS 5700 Series Line Cards							
	EPL1	EPL2	ELAN	E-Tree	EVPL1	EVLAN	EVTREE	Enable on Interface
LLDP	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Punt
PTP	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Punt
ESMC /SynCE	Tunnel	Tunnel	Tunnel	Tunnel	NA	NA	NA	Not supported
CDP	Tunnel	Tunnel	Tunnel	Tunnel	NA	NA	NA	Punt
MACSEC	Tunnel	Tunnel	Tunnel	Tunnel	Not supported	Not supported	Not supported	Punt-not supported
UDLD	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Punt

Note L2CP protocols over BVI is not supported.

L2CP protocol on Cisco NCS 5700 Series Line Cards is supported from Release 7.6.1.

MEF Compliant L2CP Tunneling Services

Table 2: Feature History Table

Feature Name	Release	Description
MEF Compliant L2CP Tunneling Services	Release 7.6.1	MEF compliant Ethernet private line (EPL1) and Ethernet virtual private line (EVPL1) L2CP tunneling services enable a point-to-point Ethernet connection between a pair of dedicated User-Network Interfaces. These services provide: • Efficient and secure connections between networks. • Packet-switched network connections to enable endpoints to reside in different machines. • Enabling of virtual private networks. • Privacy

The Router supports the MEF complaint L2CP tunneling services of EPL1 and EVPL1 and their configurations.

Note This feature is applicable only to the Distributed Disaggregated Chassis (DDC).

The following table lists the MEF compliant L2CP tunneling services and their actions with protocol.

Table 3: MEF Compliant L2CP Tunneling Services

Protocol	Services and Action		
	EPL1 (Local Xconnect, VPWS)	**EVPL1 (Local Xconnect, VPWS with VLAN)**	**Enable on Interface**
STP	Tunnel	Tunnel	Not supported
RSTP	Tunnel	Tunnel	Not supported
MSTP	Tunnel	Tunnel	Not supported
PVRST *1	Not supported	Not supported	Not supported
Pause	Not supported	Not supported	Not supported
LACP /LAMP	Tunnel	Discard	Punt
LOAM	Tunnel	NA	Punt
E-LMI	Tunnel	Tunnel	Punt
LLDP	Tunnel	Tunnel	Punt
PTP	Tunnel	Tunnel	Punt
ESMC/SynCE	Tunnel	NA	Punt
CDP	Tunnel	NA	Punt
MACSEC	Tunnel	Not supported	Not supported
UDLD	Tunnel	Tunnel	Punt

1 *

PVRST is not MEF defined protocol. It is included for the completeness.

Configure MEF 2.0 Compliant L2CP Tunneling Services

Cisco IOS XR software Release 7.6.1 supports MEF 2.0 complaint L2CP tunneling services of EPL1 and EVPL1.

Configure EPL1

Configuration Example

```
Router# configure
Router(config)# l2vpn
Router(config-l2vpn)# xconnect group 1
Router(config-l2vpn-xc)# p2p 1
Router(config-l2vpn-xc-p2p)# interface bundle-Ether 101
Router(config-l2vpn-xc-p2p)# interface bundle-Ether 102
Router(config-l2vpn-xc-p2p)# commit
```

Running Configuration

```
Router# show run l2vpn xconnect group 1
l2vpn
 xconnect group 1
  p2p 1
   interface Bundle-Ether101
   interface Bundle-Ether102
  !
 !
!
```

Verification

```
Router# show l2vpn xconnect group 1
Legend: ST = State, UP = Up, DN = Down, AD = Admin Down, UR = Unresolved,
        SB = Standby, SR = Standby Ready, (PP) = Partially Programmed,
        LU = Local Up, RU = Remote Up, CO = Connected, (SI) = Seamless Inactive

XConnect                   Segment 1                         Segment 2
Group      Name       ST   Description            ST       Description            ST
------------------------   ------------------------------   ------------------------------
1          1          UP   BE101                     UP       BE102                     UP
```

Configure EVPL1

Configuration Example

```
Router# configure
Router(config)# l2vpn
Router(config-l2vpn)# xconnect group 10
Router(config-l2vpn-xc)# p2p 10
Router(config-l2vpn-xc-p2p)# interface bundle-Ether 101.1
Router(config-l2vpn-xc-p2p)# interface bundle-Ether 102.1
Router(config-l2vpn-xc-p2p)# commit
```

Running Configuration

```
Router# show run l2vpn xconnect group 10
l2vpn
 xconnect group 10
  p2p 10
```

```
   interface Bundle-Ether101.1
   interface Bundle-Ether102.1
  !
 !
!
```

Verification

```
Router# show l2vpn xconnect group 10
Legend: ST = State, UP = Up, DN = Down, AD = Admin Down, UR = Unresolved,
        SB = Standby, SR = Standby Ready, (PP) = Partially Programmed,
        LU = Local Up, RU = Remote Up, CO = Connected, (SI) = Seamless Inactive

XConnect                    Segment 1                       Segment 2
Group      Name       ST    Description            ST       Description            ST
------------------------    ------------------------------  ------------------------------
10          10        UP    BE101.1                UP       BE102.1                  UP
```

Cisco NC57 Compatibility Mode: L2CP Tunneling

Table 4: Feature History Table

Feature Name	Release Information	Feature Description
Cisco NC57 Compatibility Mode: L2CP Tunneling	Release 7.5.1	This feature is now supported on routers that have Cisco NC57 line cards installed and operate in compatibility mode. L2 Control Protocols (L2CP) tunneling helps initiate control packets from a local customer-edge (CE) device to a remote CE device.

L2CP Support Matrix for Cisco NC57 Compatibility Mode

Table 5:

Services	EDPL1	EDPL2	ELAN	E-Tree	EVPL1	EVLAN	EVTREE	Enable on Interface	EPLAN/ EVPLAN+ BVI data points
STP	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Not supported	Discard
RSTP	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Not supported	Discard
MSTP	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Not supported	Discard
PVRST	Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	Discard

Services	EDPL1	EDPL2	ELAN	E-Tree	EVPL1	EVLAN	EVTREE	Enable on Interface	EPLAN/ EVPLAN+ BVI data points
Pause	Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	Discard
LACP/ LAMP	Tunnel	Tunnel	Discard	Discard	Discard	Discard	Discard	Punt	Discard Only physical
LOAM	Tunnel	Tunnel	Tunnel	Tunnel	NA	NA	NA	Punt	Discard Only physical
E-LMI	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Punt	Discard Only physical E-LMI is not supported on subinterface.
LLDP	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Punt	Discard
PTP	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Punt	Discard
ESMC/ SynCE	Tunnel	Tunnel	Tunnel	Tunnel	NA	NA	NA	Punt	Discard
CDP	Tunnel	Tunnel	Tunnel	Tunnel	NA	NA	NA	Punt	Discard
MACSEC	Tunnel	Tunnel	Tunnel	Tunnel	Not Supported	Not Supported	Not Supported	Not Supported	Discard
UDLD	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Tunnel	Punt	Discard