

Configuring Data Communication Channel

Table 1: Feature History

Feature Name	Release Information	Description
DCC Termination	Cisco IOS XE Bengaluru 17.4.1	DCC Termination is supported on the OCx ports for following interface modules: • 1-port OC-48/STM-16 or 4-port OC-12/OC-3 / STM-1/STM-4 + 12-port T1/E1 + 4-port T3/E3 module • 1-port OC-192 or 8-port low rate module • NCS 4200 1-port OC-192 or 8-port low rate CEM 20G bandwidth module
DCC Support	Cisco IOS XE Amsterdam 17.3.1	The Data Communication Channel (DCC) feature uses the SONET or SDH Operation Administration and Maintenance (OAM) channel to manage devices that support SONET or SDH interfaces on the following Cisco RSP3 module: • NCS 4200 1-port OC-192 or 8-port low rate CEM 20G bandwidth module

The Data Communication Channel (DCC) feature uses the SONET or SDH Operation Administration and Maintenance (OAM) channel to manage devices that support SONET or SDH interfaces. SONET or SDH standards support extensive operations, administration, management, and provisioning (OAM&P) capabilities.

The following overhead bytes are specified in the standards as the OAM channels that carry management information, alarms, and management commands:

- D1 to D3 bytes of the Section overhead

- D4 to D12 bytes of the Line overhead

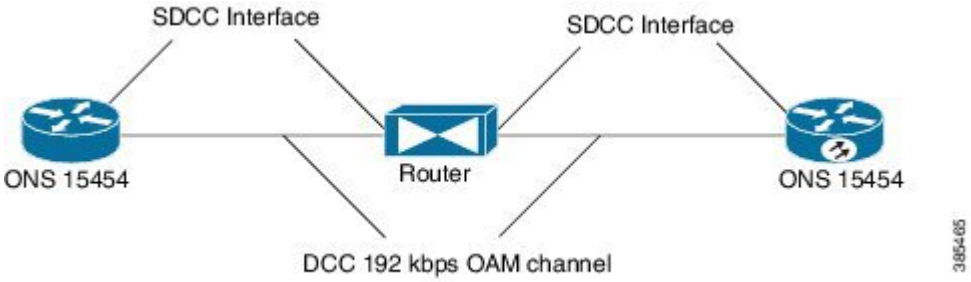
These overhead bytes are referred to as the Data Communication Channel (DCC). The Line-level DCC is a 576 kbps OAM channel; the Section-level DCC is a 192 kbps OAM channel. DCC feature uses the data communications channel to access network devices that are connected through SONET/SDH interfaces for management access.

ITU-G.7712 has defined the following three DCC network domains:

- OSI DCC network
- IP DCC network
- OSI+IP DCC network

Effective Cisco IOS XE Everest 16.6.1 release, only OSI DCC network and IP DCC network are supported, which implies that same type of network resides on either side of the router.

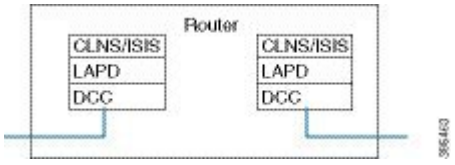
Figure 1: Implementation of DCC



As shown in the figure above, the logical interface for DCC channels is called a SONET Data Communications Channel (SDCC). Each SDCC interface is assigned an IP address. The Routing Information Protocol (RIP) is used as the routing protocol for the IP DCC network.

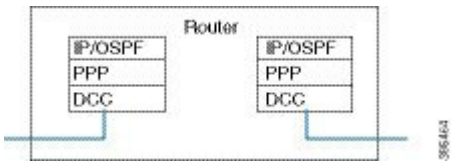
For OSI network, CLNS or ISIS protocol is used for routing and node discovery. The data layer encapsulation is LAPD.

Figure 2: DCC for OSI Network



For IP netwok, IP or OSPF protocol is used for routing and node discovery. The data layer encapsulation is PPP.

Figure 3: DCC for IP Network



Static IP configuration and PPP authentication are also supported. DCC also works with APS 1+1 protection infrastructure.

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Restrictions of DCC

- Only routing IP and OSI domains are supported; layers 4–7 of OSI model is not supported.
- DCC is not supported on NCS 4200 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth interface module in release Cisco IOS XE Cupertino 17.8.1.
- Interworking of OSPI and IP domains is not supported.
- CLNS MTU supported is 1489 on NCS4206 and NCS 4216 routers.
- CLNS interoperability with ONS is not supported.
- IS-IS packet bigger than LAPD MTU is dropped.
- 1+1 APS with CLNS mode is not supported.
- During a CRC mismatch, the interface reaches **Up** state under the LAPD UITS mode after SSO.
- Under LAPD encapsulation mode, the default LAPD role and modes are not displayed in the running configuration.
- DCC termination on APS controllers is not supported.
- The maximum number of pseudowires including TOH that you can provision on NCS4200-1T8S-20CS and NCS4200-1T8S-10CS is 5376.

Configuring PPP

To configure PPP:

```
enable
configure terminal
controller mediatype 0/3/4
mode sonet
controller sonet 0/3/4
rate oc48
dcc enable [section | line]
interface [sdcc | ldcc] 0/3/4
ip unnumbered loopback 1
encapsulation ppp
exit
interface loopback 1
ip address 10.2.2.2 255.0.0.0
router ospf 1
network 10.2.2.0 255.0.0.0 area 0
end
```

Configuring CLNS or LAPD

To configure CLNS or LAPD:

```
enable
configure terminal
controller mediatype 0/3/4
mode sonet
controller sonet 0/3/4
rate oc48
dcc enable [section | line]
interface [sdcc | ldcc] 0/3/4
encapsulation lapd
clns mtu 512
lapd role user
clns router isis R1_R2
router isis R1_R2
net 47.0039.3333.3333.3333.00
end
```



Note When you configure LAPD role user on router, you should not configure the other router as LAPD role user. It should be network and not user.

Verification of DCC Configuration

Use **show clns neighbors**, **show ip ospf neighbor**, **show ip int br | I DCC**, and **show interface SDCC** commands to verify DCC configuration.

```
#show clns neighbors
Tag R1_R2:

Tag null:
System Id       Interface     SNPA                State  Holdtime  Type Protocol
NCS4216_2       LD0/3/4       *LAPD*              Up     9         L1L2 IS-IS

Tag ethernet:
System Id       Interface     SNPA                State  Holdtime  Type Protocol
NCS4216_1       Te0/1/8       5006.ab62.6062      Up     54        L1   IS-IS
#show ip ospf neighbor
Neighbor ID     Pri   State           Dead Time   Address         Interface
10.3.3.4          1   FULL/BDR        00:00:35    10.3.3.4         TenGigabitEthernet0/1/8
10.6.6.2          0   FULL/  -        00:00:37    10.2.2.1          SDCC0/3/4
#show ip int br | i DCC
LDCC0/3/4              10.5.5.2         YES NVRAM  up                    up
SDCC0/3/6              10.2.2.1         YES TFTP   up                    down
SDCC0/3/7              10.2.2.1         YES TFTP   up                    up
SDCC0/4/7              10.8.8.8         YES TFTP   down                  down
```