

# DLSw+ and MSFC Frequently Asked Questions

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## Questions

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## Introduction

This document answers frequently asked questions about Data Link Switching Plus (DLSw+) and Multilayer Switch Feature Card (MSFC).

### **Q. Is DLSw+ supported on MSFC/MSFC2, and what feature set is required to run DLSw+ on MSFC/MSFC2 in the Catalyst 6500?**

**A.** Yes, DLSw+ is supported on MSFC/MSFC2. The minimum feature set required for MSFC/MSFC2 is IP Plus. For MSFC, the image name should read `c6msfc-is-mz.xxx`, and for MSFC2, the image should read `c6msfc2-is-mz.xxx`, where `xxx` is the Cisco IOS® Software Release. It is highly recommended that you use the latest release that is available to registered users.

### **Q. What is the minimum Cisco IOS Software Release that supports DLSw+ on the MSFC, and what caveats of which should I be aware, when running DLSw+ on the MSFC/MSFC2 in general?**

**A.** The minimum Cisco IOS Software Release that supports DLSw+ on the MSFC and MSFC2 is 12.1(1)E and 12.1(2)E, respectively. However, due to some well known caveats, listed in the next bullets, it is important that the latest Cisco IOS Software Release is used.

**Note:** For further information about these Cisco bug IDs, refer to the Bug Toolkit (registered customers only) and enter the specific bug ID.

- ◆ CSCds55205 DLSw+ does not work with MSFC2. Integrated in 12.1(04.04)EC and 12.1(04.04)E.
- ◆ CSCds70377 DLSw+ Ethernet Redundancy does not work on MSFC2. Integrated in 12.1(05.06)EC and 12.1(05.06)E.
- ◆ CSCdu13015, CSCdr65433, CSCdu30359 DLSw+ causes memory corruption on MSFC2. Integrated in 12.1(08a)E and 12.1(08.05)E.
- ◆ CSCdp94760 DLSw+ Ethernet Redundancy does not load balance between peers. Integrated in 12.1(03)DC, 12.1(03)DB, 012.001(002.002), 12.1(02.02)T, 12.1(02.02)PI, and 12.1(02.03)E.
- ◆ CSCdt14719 DLSw+ Ethernet Redundancy needs more modularity to better support multiple instances. Integrated in 12.2(03.04)PB, 12.1(06.05)E, 12.2(00.18)S, 12.1(06.05)EC, 12.2(00.10)PI01, 12.1(06.05)AA, 012.002(000.010), 12.2(00.09)T, and 012.001(006.005).
- ◆ CSCdp93599 Request to add DLSw Ethernet Redundancy in the MSFC platform. Integrated in 12.1(01.05)E01.
- ◆ CSCds41679 DLSw on MSFC sends wrong If bits in CANUREACH (CUR). Integrated in 12.1(05.06)E, 12.1(06)E01, 12.1(05.06)EC, 12.1(05.03)T, and 012.001(005.003).
- ◆ CSCdx20546 Possible packet encapsulation error in DLSw. Integrated in 12.1(11.05)EC, 12.2(09)S, 12.1(11.05)E, 12.1(11b)E02, and 12.1(08b)E10.

These Cisco bug IDs apply to DLSw Fast–Sequenced Transport (FST) in general:

- ◆ CSCdv07492 DLSw FST from Ethernet to Token Ring always sets if 516. Integrated in 12.2(05.01)S and 12.1(10.3).
- ◆ CSCdu34139 DLSw FST bridging from Inter–Switch Link (ISL) subinterface does not work. Integrated in 12.2(03.06)B, 12.2(04.01)S, 12.2(03.06)PB, 12.2(03.06)T, and 012.002(003.006).

## **Q. How does DLSw+ Ethernet Redundancy work, and for what is it intended?**

**A.** The DLSw+ Ethernet Redundancy feature was introduced in Cisco IOS Software Release 12.0(5)T to provide redundancy and load balancing between multiple DLSw+ peers in an Ethernet environment. The feature also enables DLSw+ to support multiple DLSw+ routers on the same transparent bridged domain that can reach the same MAC address in a switched environment. DLSw+ Ethernet Redundancy was designed for the remote branch office side, not the central site hub–end. For more information on DLSw+ Ethernet Redundancy, refer to these documents:

- ◆ DLSw Ethernet Redundancy Configuration Example
- ◆ DLSw+ Ethernet Redundancy

## **Q. Is DLSw+ Ethernet Redundancy supported on the MSFC, and what kind of software do I need with it?**

**A.** Yes, DLSw+ Ethernet Redundancy is supported on the MSFC. Refer to Question 2 for information about bugs of which you should be aware. The minimum feature IP Plus is also required. (Refer to Question 1.)

## **Q. Are there any disadvantages in running DLSw+ on the MSFC?**

**A.** Yes. Because the Catalyst 6500 does not support Token Ring, and Ethernet does not support Routing Information Field (RIF), DLSw+ has no way to determine whether

end-station device MAC addresses are sourced locally or remotely. This can result in problems with bridge loops, which can cause a Systems Network Architecture (SNA) session disruption. DLSw+ is also process intensive; to run any significant volume of DLSw traffic on the MSFC is counterproductive to the real purpose of a Layer 3 switch. For example, you have greater granularity in router CPU power and scalability with a 7200 Network Processing Engine/Network Service Engine (NPE/NSE) to handle the workload and failover redundancy requirements, than with the MSFC.

**Note:** You can run DLSw+ on an external router with an Inter-Switch Link (ISL) sub-interface instead of running DLSw+ on the MSFC.

**Q. Are there any performance figures to enable me to compare MSFC against other platforms for DLSw+ with TCP?**

A. Yes, there is a white paper on DLSw+ TCP Performance that shows the percentage of the CPU that is utilized on various Cisco Router platforms as a function of data frames transported between two DLSw+ TCP peers.

**Q. Is DLSw+ Fast-Sequenced Transport (FST) encapsulation supported on the MSFC or MSFC2?**

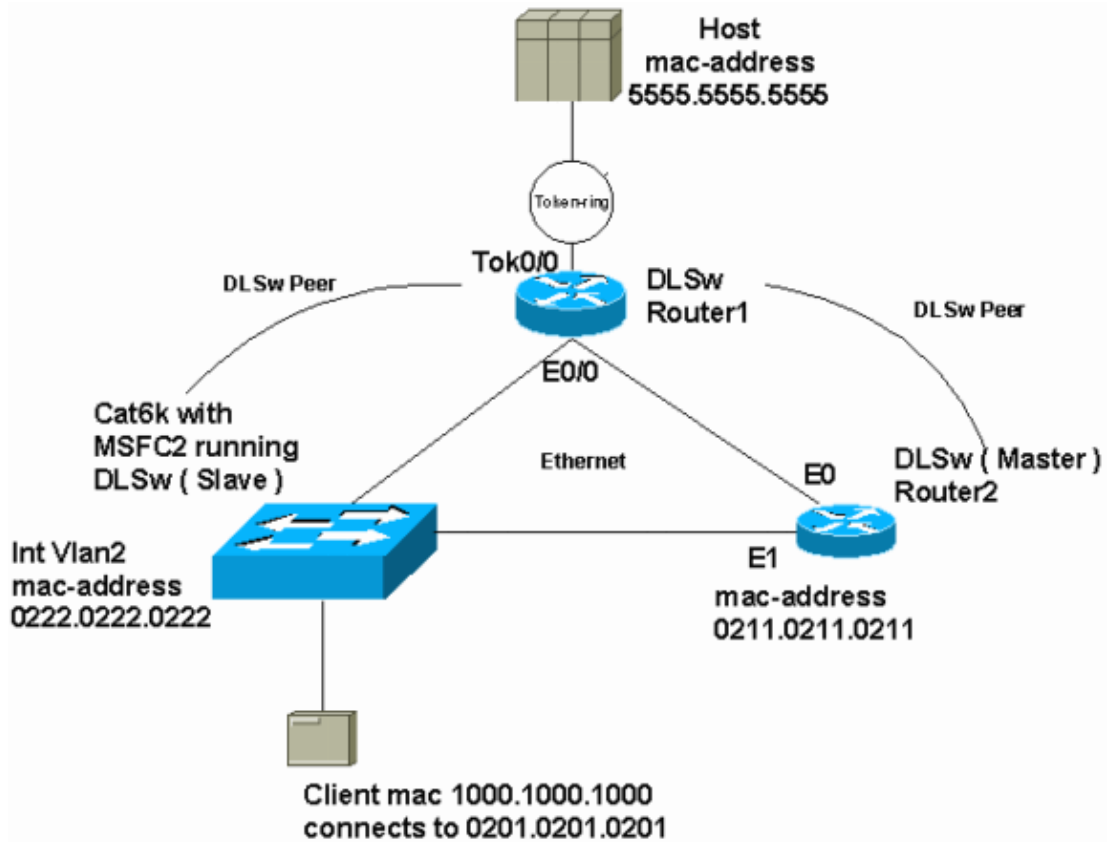
A. Yes, FST is supported on the MSFC from Cisco IOS Software Release 12.1(8.5)E2 (refer to Cisco bug ID CSCdu47920 ( registered customers only) ), and from Cisco IOS Software Release 12.1(9.5)E for MSFC2 (refer to Cisco bug ID CSCdu47927 ( registered customers only) ).

**Q. Can I configure DLSw+ on two MSFC2 cards in the same chassis?**

A. DLSw+ works on an MSFC; however, no official tests have been performed with two MSFC2s in the same chassis. DLSw+ code has no way to identify that the two MSFC2s are in the same chassis, and has no supporting code for anything like this. More importantly, DLSw+ Ethernet Redundancy is designed for the remote end, not for the central site. Ethernet Redundancy still assumes a Token Ring is on the central location.

**Q. Where can I find a sample configuration for DLSw+ Ethernet Redundancy setup with an MSFC?**

A. Consider this topology:



**Note:** MSFC2 and Router2 are DLSw+ Ethernet Redundancy peers.

**Note:** That topology was assembled in a lab environment with Ethernet media used for WAN connections. In reality, this is done with serial connections.

```

!
hostname Router1
!
!
source-bridge ring-group 100
dlsw local-peer peer-id 172.17.240.68 promiscuous
!
!
interface Ethernet0/0
description ip address 172.17.240.68 255.255.255.0
ip address 172.17.240.68 255.255.255.0
ip directed-broadcast
half-duplex
!
!
interface TokenRing0/0
no ip address
ip directed-broadcast
no keepalive
ring-speed 16
source-bridge 2 1 100
source-bridge spanning
!

!
hostname MSFC2
!
dlsw local-peer peer-id 172.17.240.4
dlsw remote-peer 0 tcp 172.17.240.68

```

```

dlsw transparent switch-support
!
!
interface Vlan1
ip address 172.17.240.4 255.255.255.0
!
interface Vlan2
mac-address 0222.0222.0222
no ip address
dlsw transparent redundancy-enable 9999.9999.9999

!--- This router is Slave.

dlsw transparent map local-mac 0220.0220.0220
remote-mac aaaa.aaaa.aaaa neighbor 0211.0211.0211

!--- Note: The previous two lines of code appear on one line.

!

!
hostname Router2
!
!
source-bridge ring-group 100
dlsw local-peer peer-id 172.17.240.40
dlsw remote-peer 0 tcp 172.17.240.68
dlsw transparent switch-support
!
!
interface Ethernet0
description ip address 172.17.240.40 255.255.255.0
ip address 172.17.240.40 255.255.255.0
media-type 10BaseT
!
interface Ethernet1
mac-address 0211.0211.0211
no ip address
keepalive 30
media-type 10BaseT
dlsw transparent redundancy-enable 9999.9999.9999 master-priority 10

!--- This router is Master.

```

```

dlsw transparent map local-mac 0201.0201.0201
remote-mac aaaa.aaaa.aaaa neighbor 0222.0222.0222

!--- Note: The previous two lines of code appear on one line.

```

```
!
```

```
MSFC2# show dlsw peer
```

```

Peers:
TCP 172.17.240.68 CONNECT 8 5 conf 0 0 0 00:02:00
Total number of connected peers: 1
Total number of connections: 1

```

```
MSFC2# show dlsw transparent neighbor
```

```

Interface Vlan2
4044.4044.4044 SELF Slave
4088.4088.4088 Connected MASTER.

```

```
!--- Note: All MAC addresses show non-canonical format (Token Ring format).
```

```
MSFC2# show dlsw transparent map
```

```
Interface Vlan2
LOCAL Mac          REMOTE MAC          BACKUP
-----
4004.4004.4004    5555.5555.5555    4088.4088.4088    STATIC
4080.4080.4080    5555.5555.5555    4088.4088.4088    DYNAMIC(Passive)
```

**Note:** Because all MAC addresses in the previous command are in non-canonical format, local MAC 4004.4004.4004 (0220.0220.0220) maps to the host MAC address 5555.5555.5555 and the backup 4088.4088.4088 (0211.0211.0211), which is the other redundant DLSw peer (Router2).

**Note:** The Client is configured to connect to 0201.0201.0201 in Router2 and not the host MAC address of 5555.5555.5555. (Alternatively, it can point to MSFC2 0220.0220.0220.) When Router2 recognizes the connection request to 0201.0201.0201 (which is 4080.4080.4080 after bitswap) Router2 maps this request to the host MAC address 5555.5555.5555. This is shown in this configured command on Router2:

```
dlsw transparent map local-mac 0201.0201.0201
remote-mac aaaa.aaaa.aaaa neighbor 0222.0222.0222
```

```
!--- Note: The previous two lines of code appear on one line.
!--- aaaa.aaaa.aaaa is the host MAC address (5555.5555.5555)
!--- in canonical format.
```

**Note:** All MAC addresses in this command are in canonical format (Ethernet format).

```
MSFC2# show dlsw transparent cache
```

```
Interface Vlan2
Circuit Cache
local addr(lsap)    remote addr(dsap)    state                Owner
```

```
Router1 has two peer connections:
```

```
Router1# show dlsw peer
```

```
Peers:                state  pkts_rx  pkts_tx  type  drops  ckts  TCP  uptime
TCP 172.17.240.40    CONNECT    9         7  prom    0     1    0  00:00:17
TCP 172.17.240.4    CONNECT    2         2  prom    0     0    0  00:00:16
Total number of connected peers: 2
Total number of connections: 2
```

```
Router1# show dlsw reach
```

```
DLSw Local MAC address reachability cache list
Mac Addr      status    Loc.    port                rif
1000.5af2.f083  FOUND    LOCAL  TokenRing0/0        06C0.0021.0640
5555.5555.5555  FOUND    LOCAL  TokenRing0/0        0640.0641.0020
```

```
DLSw Remote MAC address reachability cache list
Mac Addr      status    Loc.    peer
0800.0800.0800  FOUND    REMOTE  172.17.240.40(2065)
```

```
!--- 0800.0800.0800 is 1000.1000.1000 after bitswap.
```

```
Router1# show dlsw circuit detail
```

```
Index          local addr(lsap)    remote addr(dsap)    state                uptime
```

```
4194304017 5555.5555.5555(08) 0800.0800.0800(08) CONNECTED 00:00:15
PCEP: 617BB7C4 UCEP: 61AAB1BC
Port:To0/0 peer 172.17.240.40(2065)
Flow-Control-Tx CW:20, Permitted:39; Rx CW:20, Granted:19; Op: Repeat
Congestion: Low(02), Flow Op: Half: 0/0 Reset 0/0
RIF = 0610.0641.0020
Bytes:          18/129          Info-frames:          1/1
XID-frames:     1/2           UInfo-frames:       0/0
Total number of circuits connected: 1
```

Router2# **show dlsw transparent neighbor**

```
Interface Eth1
4088.4088.4088 SELF Master
4044.4044.4044 Rcvd Master-Accepted VALID
```

Router2# **show dlsw transparent neighbor**

```
Interface Et1
LOCAL Mac          REMOTE MAC          BACKUP
-----
4080.4080.4080 5555.5555.5555 4044.4044.4044 STATIC
4004.4004.4004 5555.5555.5555 4044.4044.4044 DYNAMIC(Passive)
```

Router2 is the MASTER and have the transparent cache:

Router2# **show dlsw transparent cache**

```
Interface Et1
Circuit Cache
local addr(lsap)  remote addr(dsap)  state      Owner
0800.0800.0800(08) 5555.5555.5555(08) POSITIVE SELF
Total number of circuits in the Cache: 1
```

Router2# **show dlsw reach**

```
DLsw Local MAC address reachability cache list
Mac Addr          status      Loc.      port          rif
0800.0800.0800   FOUND      LOCAL    Ethernet1     --no rif--
1000.5af2.f59e   FOUND      LOCAL    TokenRing0    06B0.0011.0640

DLsw Remote MAC address reachability cache list
Mac Addr          status      Loc.      peer
1000.5af2.f083   FOUND      REMOTE   172.17.240.68(2065)
5555.5555.5555   FOUND      REMOTE   172.17.240.68(2065) max-1f(8144)
```

Router2# **show dlsw peer**

```
Peers:           state      pkts_rx  pkts_tx  type  drops  ckts  TCP  uptime
TCP 172.17.240.68 CONNECT    19       17  conf    0     1    0  00:03:42
Total number of connected peers: 1
Total number of connections: 1
```

Router2# **show dlsw circuit detail**

```
Index      local addr(lsap)  remote addr(dsap)  state      uptime
1006632966 0800.0800.0800(08) 5555.5555.5555(08) CONNECTED 00:03:41
PCEP: 617880DC UCEP: 619DEFD8
Port:Et1 peer 172.17.240.68(2065)
Flow-Control-Tx CW:20, Permitted:19; Rx CW:20, Granted:39; Op: Repeat
Congestion: Low(02), Flow Op: Half: 0/0 Reset 0/0
RIF = --no rif--
Bytes:          129/18          Info-frames:          1/1
XID-frames:     2/1           UInfo-frames:       0/0
Total number of circuits connected: 1
```

---

## Related Information

- [Troubleshooting DLSw](#)
  - [End-of-Sale Announcement for Multilayer Switch Feature Card with link to Catalyst 6000 Family MSFC2 Data Sheet](#)
  - [Technical Support – Cisco Systems](#)
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