Network Topology

MD1

DES-3200-1   DES-3200-2

DGS-3700-1   MD2   DGS-3700-2

P1   P1   P2   P1   P2   P1

MEP/ MIP   MEP/ MIP

MEP (Probe)   MEP (Reflector)

MEP2   MEP2

━━━ **MD1**

━━━ **MD2**

MIP   MIP   MIP   MIP

MEP1   MEP1
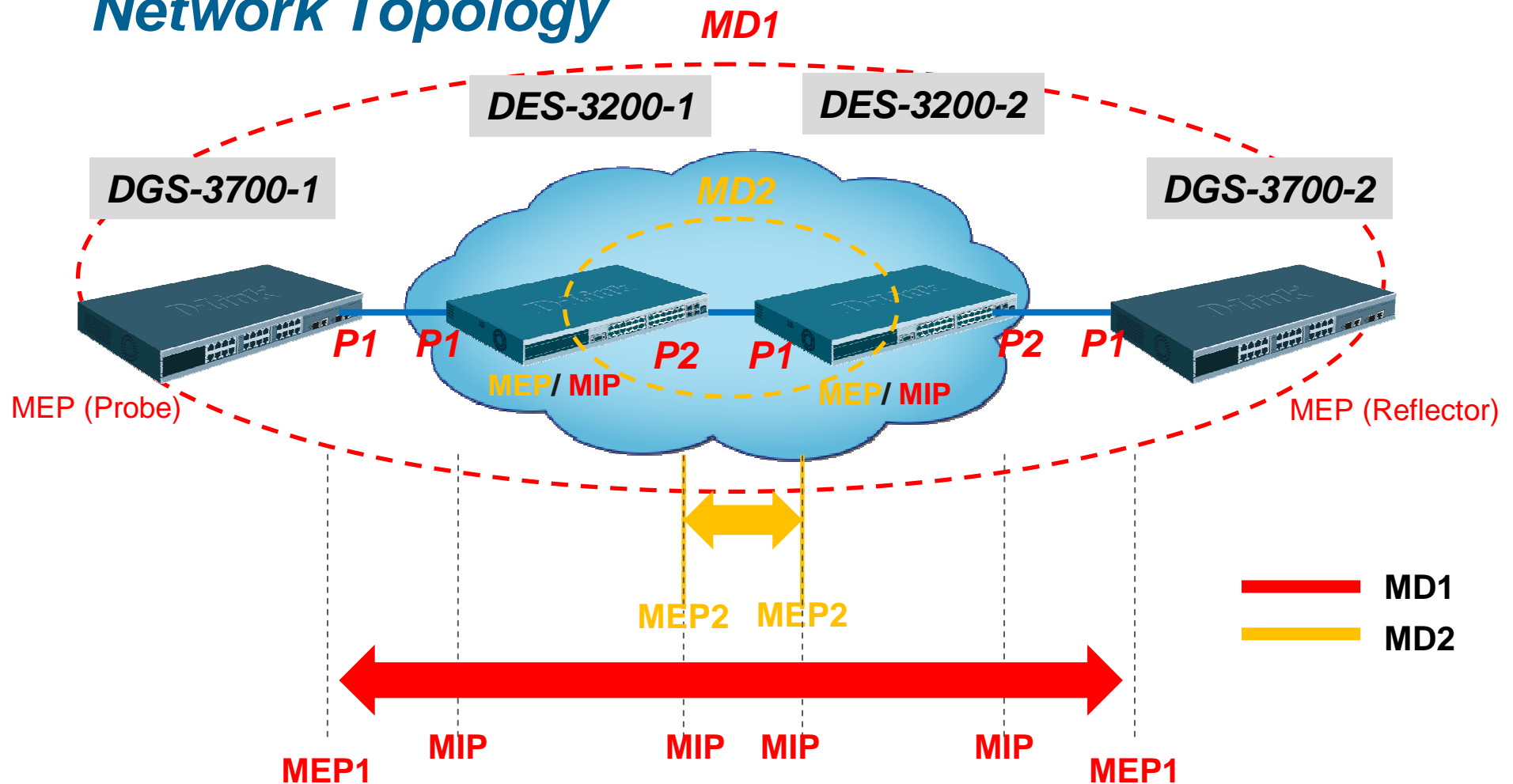
The Goals:

1. Create 2 Maintenance Domains, **MD1** & **MD2.** MD1 & MD2's ports are overlapping.
2. **MD1** includes **2 MEPs** & **4 MIPs**.
3. **MD2** includes **2 MEPs.**
4. Make sure the **CCM (Continuity Check Message)** is transmitted between MEPs
5. Use the **Linktrace** feature to track the path (hop-by-hop) to a destination MP
6. Use the **Loopback** feature to verify connectivity to a particular MP

Connectivity Fault Management Configurations

DGS-3700-1

enable cfm
config cfm ports 1 state enable
create cfm md md1 level 1
create cfm ma ma1 md md1
config cfm ma ma1 md md1 vlanid 1 mip auto sender_id defer ccm_interval 10sec
config cfm ma ma1 md md1 mepid_list add 5-6
create cfm mep mep1 mepid 5 md md1 ma ma1 direction outward port 1
config cfm mep mepname mep1 pdu_priority 7
config cfm mep mepname mep1 state enable
config cfm mep mepname mep1 ccm enable

DES-3200-1

enable cfm
config cfm ports 1-2 state enable
create cfm md md1 level 1
create cfm ma ma1 md md1
config cfm ma ma1 md md1 vlanid 1 mip auto sender_id defer ccm_interval 10sec
config cfm ma ma1 md md1 mepid_list add 5-6

create vlan v2 tag 2
config vlan v2 add tagged 2
create cfm md md2 level 2
create cfm ma ma2 md md2
config cfm ma ma2 md md2 vlanid 2 mip auto sender_id defer ccm_interval 10sec
config cfm ma ma2 md md2 mepid_list add 7-8
create cfm mep mep2 mepid 7 md md2 ma ma2 direction outward port 2
config cfm mep mepname mep2 pdu_priority 7
config cfm mep mepname mep2 state enable
config cfm mep mepname mep2 ccm enable

Connectivity Fault Management Configurations

DES-3200-2
enable cfm
config cfm ports 1-2 state enable
create cfm md md1 level 1
create cfm ma ma1 md md1
config cfm ma ma1 md md1 vlanid 1 mip auto sender_id defer ccm_interval 10sec
config cfm ma ma1 md md1 mepid_list add 5-6

create vlan v2 tag 2
config vlan v2 add tagged 1
create cfm md md2 level 2
create cfm ma ma2 md md2
config cfm ma ma2 md md2 vlanid 2 mip auto sender_id defer ccm_interval 10sec
config cfm ma ma2 md md2 mepid_list add 7-8
create cfm mep mep2 mepid 8 md md2 ma ma2 direction outward port 1
config cfm mep mepname mep2 pdu_priority 7
config cfm mep mepname mep2 state enable
config cfm mep mepname mep2 ccm enable

DGS-3700-2
enable cfm
config cfm ports 1 state enable
create cfm md md1 level 1
create cfm ma ma1 md md1
config cfm ma ma1 md md1 vlanid 1 mip auto sender_id defer ccm_interval 10sec
config cfm ma ma1 md md1 mepid_list add 5-6
create cfm mep mep1 mepid 6 md md1 ma ma1 direction outward port 1
config cfm mep mepname mep1 pdu_priority 7
config cfm mep mepname mep1 state enable
config cfm mep mepname mep1 ccm enable

MEP/ MIP MAC addresses
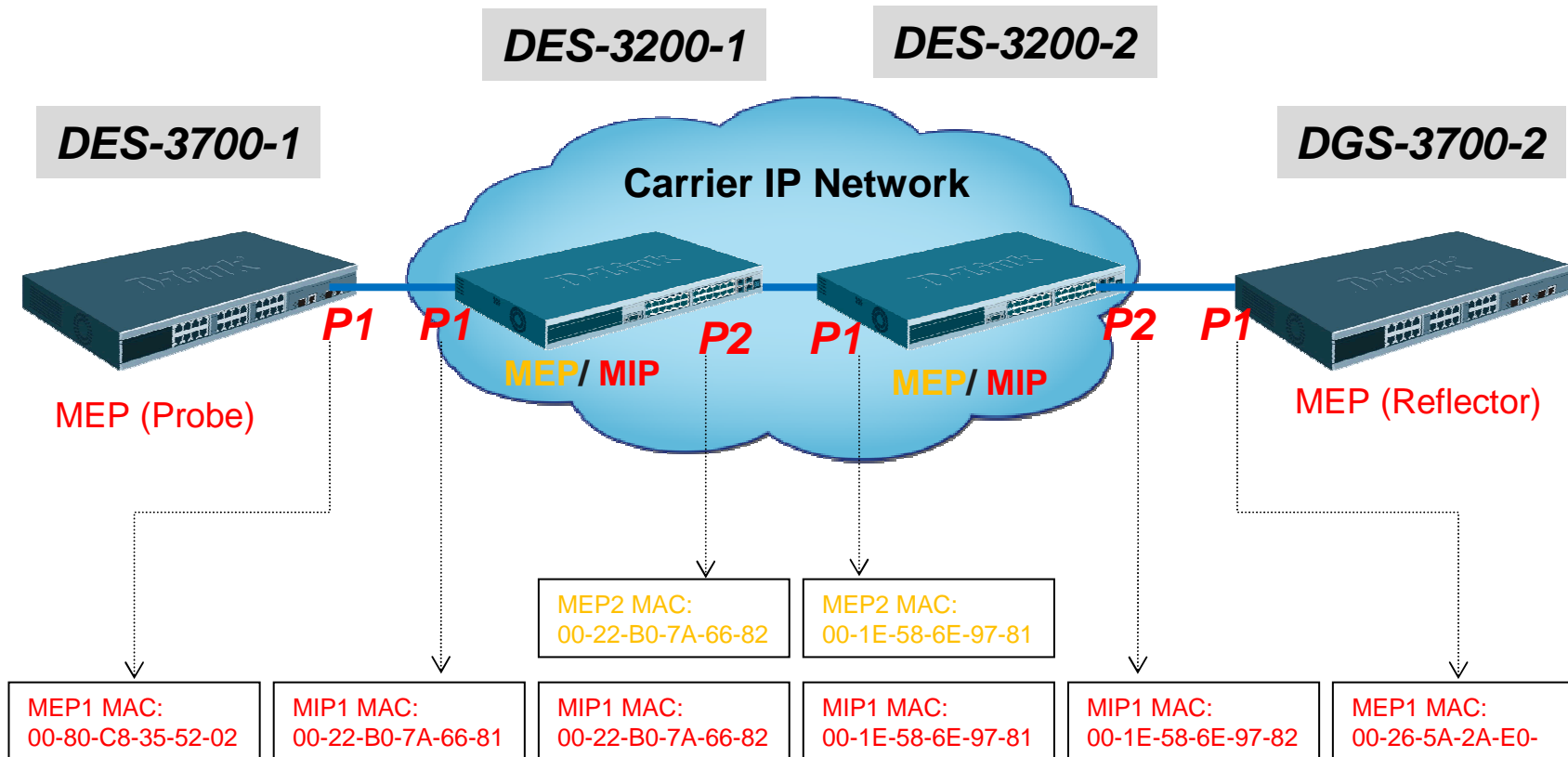
1. Display MEP MAC address:
[Usage]: show cfm ports <portlist>
Example: >show cfm ports 1

2. Display MIIP MAC address:
[Usage]: show cfm {[md <string 22> {ma <string 22>
{mepid <int 1-8191>}} | mepname <string 32>]}
Example: >show cfm md md1 ma ma1

DES-3200-1   DES-3200-2

DES-3700-1   **Carrier IP Network**   DGS-3700-2

P1   P1   P2   P1   P2   P1

MEP/ MIP   MEP/ MIP

MEP (Probe)   MEP (Reflector)

MEP2 MAC:
00-22-B0-7A-66-82

MEP2 MAC:
00-1E-58-6E-97-81

MEP1 MAC:
00-80-C8-35-52-02

MIP1 MAC:
00-22-B0-7A-66-81

MIP1 MAC:
00-22-B0-7A-66-82

MIP1 MAC:
00-1E-58-6E-97-81

MIP1 MAC:
00-1E-58-6E-97-82

MEP1 MAC:
00-26-5A-2A-E0-11

Connectivity Check Message (CCM) message

Sniff the MEP1 connection to make sure the CCM is transmitted

No.	Time	Source	Destination	Protocol	Info
1	0.000000	D-Link_35:52:02	Ieee8021_00:00:31	CFM	Type Continuity Check Message (CCM)
2	5.348126	00:26:5a:2a:e0:11	Ieee8021_00:00:31	CFM	Type Continuity Check Message (CCM)

```
⊞ Frame 2 (97 bytes on wire, 97 bytes captured)
⊟ Ethernet II, Src: 00:26:5a:2a:e0:11 (00:26:5a:2a:e0:11), Dst: Ieee8021_00:00:31 (01:80:c2:00:00:31)
   ⊞ Destination: Ieee8021_00:00:31 (01:80:c2:00:00:31)
   ⊞ Source: 00:26:5a:2a:e0:11 (00:26:5a:2a:e0:11)
     Type: IEEE 802.1ag Connectivity Fault Management (CFM) protocol (0x8902)
⊞ CFM EOAM 802.1ag/ITU Protocol, Type Continuity Check Message (CCM)
⊞ CFM CCM PDU
⊞ CFM TLVs
```

CFM Protocol	CFM PDU	Destination MAC address
Continuity Check	Continuity Check Message (CCM)	Multicast
Loopback	Loopback Message (LBM)	Unicast
Loopback	Loopback Reply (LBR)	Unicast
Linktrace	Linktrace Message (LTM)	Multicast
Linktrace	Linktrace Reply (LTR)	Unicast

Continuity Check Message (CCM) Group Destination MAC Addresses

01-80-C2-00-00-3y

MD Level of CCM	Four Address Bits "y"
7	7
6	6
5	5
4	4
3	3
2	2
1	1
0	0

Perform Linktrace Test between MEPs (from DGS-3700-2 to DGS3700-1)

1. Use **Linktrace** to track the **path (hop-by-hop)** to a destination **Maintenance Point**
2. Display the **MIPs** of the Linktrace path

```
#cfm linktrace 00-80-C8-35-52-02 mepname mep1
Command: cfm linktrace 00-80-C8-35-52-02 mepname mep1

Transaction ID: 0
Success.

#show cfm linktrace mepname mep1 trans_id 0
Command: show cfm linktrace mepname mep1 trans_id 0

Transaction ID: 0
From MEP mep1 to 00-80-C8-35-52-02
Start Time     : 2036-02-10 04:38:36

Hop   MEPID   MAC Address          Forwarded   Relay Action
---   -----   ------------------   ---------   ------------
1     -       00-1E-58-6E-97-82    Yes         FDB
2     -       00-1E-58-6E-97-81    Yes         FDB
3     -       00-22-B0-7A-66-82    Yes         FDB
4     -       00-22-B0-7A-66-81    Yes         FDB
5     5       00-80-C8-35-52-02    No          Hit
```

MIPs

Linktrace Packet Capture

Linktrace Message (LTM)

Linktrace Reply (LTR)

CFM Protocol	CFM PDU	Destination MAC address
Continuity Check	Continuity Check Message (CCM)	Multicast
Loopback	Loopback Message (LBM)	Unicast
	Loopback Reply (LBR)	Unicast
Linktrace	Linktrace Message (LTM)	Multicast
	Linktrace Reply (LTR)	Unicast

Perform Loopback Test

```
#cfm loopback 00-80-C8-35-52-02 mepname mep1
Command: cfm loopback 00-80-C8-35-52-02 mepname mep1

Reply from 00-80-C8-35-52-02: bytes=0 time=50ms
Reply from 00-80-C8-35-52-02: bytes=0 time=50ms
Reply from 00-80-C8-35-52-02: bytes=0 time=50ms
Reply from 00-80-C8-35-52-02: bytes=0 time=50ms


CFM loopback statistics for 00-80-C8-35-52-02:
        Packets: Sent=4, Received=4, Lost=0(0% loss).
```

Loopback Message(LBM)

No.	Time	Source	Destination	Protocol	Info
1	0.000000	00:26:5a:2a:e0:11	D-Link_35:52:02	CFM	Type Loopback Message (LBM)
2	0.001066	D-Link_35:52:02	00:26:5a:2a:e0:11	CFM	Type Loopback Reply (LBR)

```
⊞ Frame 1 (60 bytes on wire, 60 bytes captured)
⊞ Ethernet II, Src: 00:26:5a:2a:e0:11 (00:26:5a:2a:e0:11), Dst: D-Link_35:52:02 (00:80:c8:35:52:02)
⊟ CFM EOAM 802.1ag/ITU Protocol, Type Loopback Message (LBM)
      001. .... = CFM MD Level: 1
      ...0 0000 = CFM Version: 0
      CFM OpCode: Loopback Message (LBM) (3)
⊞ CFM LBM PDU
⊞ CFM TLVs
```

Loopback Reply(LBR)

No.	Time	Source	Destination	Protocol	Info
1	0.000000	00:26:5a:2a:e0:11	D-Link_35:52:02	CFM	Type Loopback Message (LBM)
2	0.001066	D-Link_35:52:02	00:26:5a:2a:e0:11	CFM	Type Loopback Reply (LBR)

```
⊞ Frame 2 (60 bytes on wire, 60 bytes captured)
⊞ Ethernet II, Src: D-Link_35:52:02 (00:80:c8:35:52:02), Dst: 00:26:5a:2a:e0:11 (00:26:5a:2a:e0:11)
⊟ CFM EOAM 802.1ag/ITU Protocol, Type Loopback Reply (LBR)
      001. .... = CFM MD Level: 1
      ...0 0000 = CFM Version: 0
      CFM OpCode: Loopback Reply (LBR) (2)
⊞ CFM LBR PDU
⊞ CFM TLVs
```

CFM Protocol	CFM PDU	Destination MAC address
Continuity Check	Continuity Check Message (CCM)	Multicast
Loopback	Loopback Message (LBM)	Unicast
	Loopback Reply (LBR)	Unicast
Linktrace	Linktrace Message (LTM)	Multicast
	Linktrace Reply (LTR)	Unicast