원격 수신자가 mLDP 트리에 대한 참가를 트리거할 때 5초 지연

목차

소개

이 문서에서는 원격 수신자가 멀티캐스트 그룹에 가입하고 인그레스 PE 라우터가 Cisco IOS® XR를 실행할 때 mLDP(Multipoint Label Distribution Protocol) 트리를 통해 멀티캐스트 트래픽을 전달하는 데 걸리는 5초 지연에 대해 설명합니다.

배경 정보

원격 수신기는 소스의 관점에서 mLDP 백본의 수신기입니다.

Cisco 버그 ID CSCvb50266으로 인해 5초 지연이 의도적으로 [도입되었습니다.](#) 기존 MVPN 수신기가 있는 경우 5초 MLDP 전달 지연

이 CDETS는 Cisco 버그 ID CSCtg68851 문제를 해결하기 위해 [생성되었습니다.](#) LC 다중 경로의 경우 기본값에서 데이터 MDT로 전환 이 히트리스되지 않음

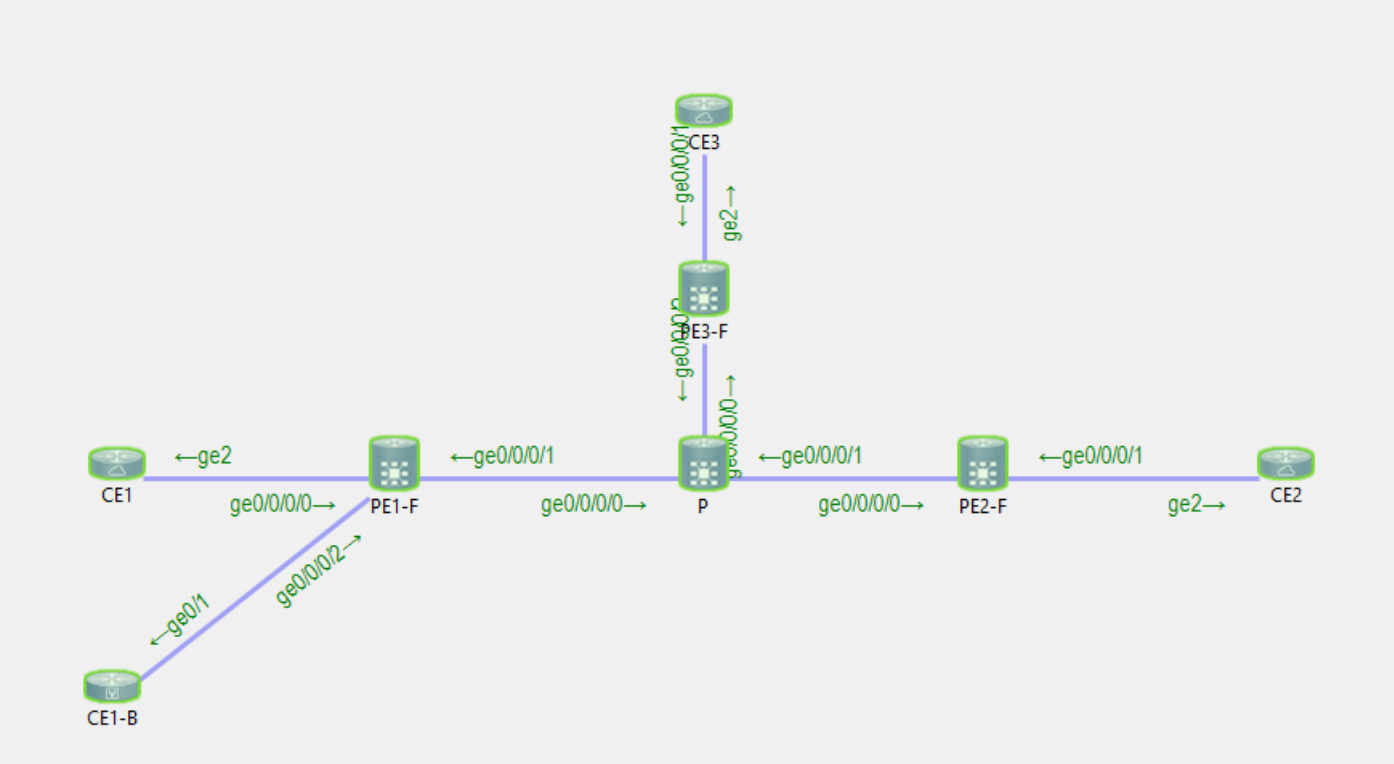
변경 사항

- 인그레스 PE 라우터가 Cisco 버그 ID CSCtg68851 이후 IOS®-XR 버전[을 실행하는 경우](#) 5초 지연이 있습니다.
- 인그레스 PE 라우터가 Cisco 버그 ID CSCvb50266 이후 IOS®-XR 버전을 실행하는 [경우](#) 5초 지연은 기본적으로 존재합니다.

원하지 않는 경우, 숨겨진 컨피그레이션 명령으로 멀티캐스트 스트림 전송 속도를 높일 수 있습니다.

이제 DDoS 공격의 실제 사례를 살펴보겠습니다.

그림 1에서 테스트 토폴로지를 확인하십시오.



CE1은 멀티캐스트 스트림 232.1.1.1의 소스 10.100.1.5입니다.

CE2 및 CE1-B는 멀티캐스트 스트림 232.1.1.1의 수신기입니다.

테스트 1. 로컬 수신기가 없는 원격 수신기 조인

디버그 사용:

```
RP/0/0/CPU0:PE1#debug mrib vrf one route
RP/0/0/CPU0:PE1#debug mfib vrf one ipv4 encap
RP/0/0/CPU0:PE1#show debug
```

```
####  debug flags set from tty 'con0_0_CPU0'  ####
ipv4 mfwd encap flag is ON with value '0x1##one'
ipv4 mrib route flag is ON with value 'one#'
```

인그레스 PE 라우터 PE1에 로컬 수신기가 없습니다.

```
RP/0/0/CPU0:PE1#sh mrib vrf one route 232.1.1.1 10.100.1.5
No matching route in MRIB route-DB
RP/0/0/CPU0:PE1#
```

원격 수신기 CE1이 온라인 상태가 됩니다.

```
RP/0/0/CPU0:PE1#RP/0/0/CPU0:Feb 13 10:26:33.280 : mrib[1149]:   [  6] TID: 0xe0000010
(10.100.1.5,232.1.1.1) Added RPF* EID*, #A=1, #F=1, #MDT_A=0, RPF=10.2.1.5 [Lm F* LMI* TR*]
[Gi0/0/0/0 A*], Route Ver = 0x7ca
RP/0/0/CPU0:Feb 13 10:26:33.290 : ipv4_mfwd_partner[263]: Encap: encap id set  eid: 1
(10.100.1.5,232.1.1.1)
RP/0/0/CPU0:Feb 13 10:26:33.300 : mrib[1149]:   [  6] TID: 0xe0000010 (10.100.1.5,232.1.1.1)
```

```
Updated RPF EID*, #A=1, #F=1, #MDT_A=0 [Lm F LMI* MA* TR], Route Ver = 0x7cc
RP/0/0/CPU0:Feb 13 10:26:33.310 : ipv4_mfwd_partner[263]: Encap:
ip_mfwd_mrib_pre_process_encapid_update: encapid: 2, te_ole_cnt: 0,lsmid_ole_cnt: 1,
gre_ole_cnt: 0 ti_mofrr_ole_cnt: 0 flags: 0x0
RP/0/0/CPU0:Feb 13 10:26:33.310 : ipv4_mfwd_partner[263]: Encap: [2482] Encap entry created
(0xa10cb414) for eid 2 (stale N) flags 0x0
RP/0/0/CPU0:Feb 13 10:26:33.310 : ipv4_mfwd_partner[263]: Encap: [3039] RegDB entry 0xa08fd084
for LSMID 0x1d turnaround TRUE(new: Y ifh_changed N) ifhandle: b0
RP/0/0/CPU0:Feb 13 10:26:33.310 : ipv4_mfwd_partner[263]: Encap: [3533] Encap entry for eid 2
(0xa10cb414) proc done
RP/0/0/CPU0:Feb 13 10:26:33.310 : ipv4_mfwd_partner[263]: Encap: encap id update eid: 2
(10.100.1.5,232.1.1.1)
```

인그레스 PE 라우터에서 encap-ID를 설정하는 데 지연이 없습니다.

인그레스 PE 라우터에서 생성된 멀티캐스트 전달 항목입니다.

```
RP/0/0/CPU0:PE1#show mrib vrf one route 232.1.1.1 10.100.1.5

IP Multicast Routing Information Base
Entry flags: L - Domain-Local Source, E - External Source to the Domain,
   C - Directly-Connected Check, S - Signal, IA - Inherit Accept,
   IF - Inherit From, D - Drop, ME - MDT Encap, EID - Encap ID,
   MD - MDT Decap, MT - MDT Threshold Crossed, MH - MDT interface handle
   CD - Conditional Decap, MPLS - MPLS Decap, EX - Extranet
   MoFE - MoFRR Enabled, MoFS - MoFRR State, MoFP - MoFRR Primary
   MoFB - MoFRR Backup, RPFID - RPF ID Set, X - VXLAN
Interface flags: F - Forward, A - Accept, IC - Internal Copy,
   NS - Negate Signal, DP - Don't Preserve, SP - Signal Present,
   II - Internal Interest, ID - Internal Disinterest, LI - Local Interest,
   LD - Local Disinterest, DI - Decapsulation Interface
   EI - Encapsulation Interface, MI - MDT Interface, LVIF - MPLS Encap,
   EX - Extranet, A2 - Secondary Accept, MT - MDT Threshold Crossed,
   MA - Data MDT Assigned, LMI - mLDP MDT Interface, TMI - P2MP-TE MDT Interface
   IRMI - IR MDT Interface

(10.100.1.5,232.1.1.1) RPF nbr: 10.2.1.5 Flags: RPF
 Up: 00:02:29
 Incoming Interface List
   GigabitEthernet0/0/0/0 Flags: A, Up: 00:02:2
 Outgoing Interface List
   Lmdtone Flags: F LMI MA TR, Up: 00:02:29

RP/0/0/CPU0:PE1#show mfib vrf one route 232.1.1.1 10.100.1.5 detail

IP Multicast Forwarding Information Base
Entry flags: C - Directly-Connected Check, S - Signal, D - Drop,
 IA - Inherit Accept, IF - Inherit From, EID - Encap ID,
 ME - MDT Encap, MD - MDT Decap, MT - MDT Threshold Crossed,
 MH - MDT interface handle, CD - Conditional Decap,
 DT - MDT Decap True, EX - Extranet, RPFID - RPF ID Set,
 MoFE - MoFRR Enabled, MoFS - MoFRR State, X - VXLAN
Interface flags: F - Forward, A - Accept, IC - Internal Copy,
 NS - Negate Signal, DP - Don't Preserve, SP - Signal Present,
 EG - Egress, EI - Encapsulation Interface, MI - MDT Interface,
 EX - Extranet, A2 - Secondary Accept
Forwarding/Replication Counts: Packets in/Packets out/Bytes out
Failure Counts: RPF / TTL / Empty Olist / Encap RL / Other

(10.100.1.5,232.1.1.1),  Flags:  EID , FMA: 0x10000 ,
 Up: 00:02:48
 Last Used: 00:00:01
```

```
 SW Forwarding Counts: 168/168/16800
 SW Replication Counts: 168/0/0
 SW Failure Counts: 0/0/0/0/0
 Route ver: 0x7d0
 MVPN Info :-
   Associated Table ID : 0xe0000000
   MDT Handle: 0x0, MDT Probe:Y [Y], Rate:Y, Acc:Y
   MDT SW Ingress Encap V4/V6, Egress decap: 0 / 0, 0
   Encap ID: 2, RPF ID: 0
   Local Receiver: False, Turnaround: False
 Lmdtone Flags:  F LMI TR, Up:00:02:48
 GigabitEthernet0/0/0/0 Flags:  A, Up:00:02:48
```

테스트 2. 로컬 수신자를 사용하여 원격 수신기 조인

인그레스 PE1에 로컬 수신기가 있습니다.

```
RP/0/0/CPU0:PE1#show mrib vrf one route 232.1.1.1 10.100.1.5


IP Multicast Routing Information Base
Entry flags: L - Domain-Local Source, E - External Source to the Domain,
   C - Directly-Connected Check, S - Signal, IA - Inherit Accept,
   IF - Inherit From, D - Drop, ME - MDT Encap, EID - Encap ID,
   MD - MDT Decap, MT - MDT Threshold Crossed, MH - MDT interface handle
   CD - Conditional Decap, MPLS - MPLS Decap, EX - Extranet
   MoFE - MoFRR Enabled, MoFS - MoFRR State, MoFP - MoFRR Primary
   MoFB - MoFRR Backup, RPFID - RPF ID Set, X - VXLAN
Interface flags: F - Forward, A - Accept, IC - Internal Copy,
   NS - Negate Signal, DP - Don't Preserve, SP - Signal Present,
   II - Internal Interest, ID - Internal Disinterest, LI - Local Interest,
   LD - Local Disinterest, DI - Decapsulation Interface
   EI - Encapsulation Interface, MI - MDT Interface, LVIF - MPLS Encap,
   EX - Extranet, A2 - Secondary Accept, MT - MDT Threshold Crossed,
   MA - Data MDT Assigned, LMI - mLDP MDT Interface, TMI - P2MP-TE MDT Interface
   IRMI - IR MDT Interface

(10.100.1.5,232.1.1.1) RPF nbr: 10.2.1.5 Flags: RPF
 Up: 00:57:15
 Incoming Interface List
   GigabitEthernet0/0/0/0 Flags: A, Up: 00:57:15
 Outgoing Interface List
   GigabitEthernet0/0/0/2 Flags: F NS, Up: 00:57:15
```

디버그 사용:

```
RP/0/0/CPU0:PE1#debug mrib vrf one route
RP/0/0/CPU0:PE1#debug mfib vrf one ipv4 encap

RP/0/0/CPU0:PE1#show debug

####  debug flags set from tty 'con0_0_CPU0'  ####
ipv4 mfwd encap flag is ON with value '0x1##one'
ipv4 mrib route flag is ON with value 'one#'

RP/0/0/CPU0:PE1#show mfib vrf one route 232.1.1.1 10.100.1.5 detail

IP Multicast Forwarding Information Base
Entry flags: C - Directly-Connected Check, S - Signal, D - Drop,
 IA - Inherit Accept, IF - Inherit From, EID - Encap ID,
```

```
 ME - MDT Encap, MD - MDT Decap, MT - MDT Threshold Crossed,
 MH - MDT interface handle, CD - Conditional Decap,
 DT - MDT Decap True, EX - Extranet, RPFID - RPF ID Set,
 MoFE - MoFRR Enabled, MoFS - MoFRR State, X - VXLAN
Interface flags: F - Forward, A - Accept, IC - Internal Copy,
 NS - Negate Signal, DP - Don't Preserve, SP - Signal Present,
 EG - Egress, EI - Encapsulation Interface, MI - MDT Interface,
 EX - Extranet, A2 - Secondary Accept
Forwarding/Replication Counts: Packets in/Packets out/Bytes out
Failure Counts: RPF / TTL / Empty Olist / Encap RL / Other

(10.100.1.5,232.1.1.1),  Flags:  , FMA: 0x10001 ,
 Up: 00:59:35
 Last Used: 00:00:01
 SW Forwarding Counts: 3566/3566/356600
 SW Replication Counts: 3566/3566/356600
 SW Failure Counts: 0/0/0/0/0
 Route ver: 0x3410
 MVPN Info :-
   MDT Handle: 0x0, MDT Probe:N [N], Rate:Y, Acc:Y
   MDT SW Ingress Encap V4/V6, Egress decap: 0 / 0, 0
   EG count: 1
   Encap ID: 0, RPF ID: 0
   Local Receiver: True, Turnaround: False
 GigabitEthernet0/0/0/0 Flags:  A, Up:00:59:35
 GigabitEthernet0/0/0/2 Flags:  NS EG, Up:00:59:35
```

아직 원격 수신기가 없기 때문에 encap-ID는 0입니다.

CE2, 원격 수신기가 온라인 상태가 됩니다.

```
RP/0/0/CPU0:PE1#RP/0/0/CPU0:Feb 13 09:13:34.390 : mrib[1149]:   [  6] TID: 0xe0000010
(10.100.1.5,232.1.1.1) Updated RPF EID*, #A=1, #F=2, #MDT_A=0 [Lm F* LMI* TR*], Route Ver =
0x3412
RP/0/0/CPU0:Feb 13 09:13:34.390 : mrib[1149]:   [ 22] Redistributed
RP/0/0/CPU0:Feb 13 09:13:34.390 : ipv4_mfwd_partner[263]: Encap:
ip_mfwd_mrib_pre_process_encapid_update: encapid: 6, te_ole_cnt: 0,lsmid_ole_cnt: 1,
gre_ole_cnt: 0 ti_mofrr_ole_cnt: 0 flags: 0x1
RP/0/0/CPU0:Feb 13 09:13:34.390 : ipv4_mfwd_partner[263]: Encap: [2482] Encap entry created
(0xa08fd9d0) for eid 6 (stale N) flags 0x1
RP/0/0/CPU0:Feb 13 09:13:34.390 : ipv4_mfwd_partner[263]: Encap: [3039] RegDB entry 0xa10b5404
for LSMID 0x1 turnaround TRUE(new: N ifh_changed N) ifhandle: b0
RP/0/0/CPU0:Feb 13 09:13:34.390 : ipv4_mfwd_partner[263]: Encap: [3533] Encap entry for eid 6
(0xa08fd9d0) proc done
RP/0/0/CPU0:Feb 13 09:13:34.410 : mrib[1149]:   [  6] TID: 0xe0000010 (10.100.1.5,232.1.1.1)
Updated RPF EID*, #A=1, #F=2, #MDT_A=0 [Lm F LMI* MA* TR], Route Ver = 0x3414
RP/0/0/CPU0:Feb 13 09:13:34.410 : mrib[1149]:   [  6] TID: 0xe0000010 (10.100.1.5,232.1.1.1)
Updated RPF EID, #A=1, #F=2, #MDT_A=0 [Lm F LMI* MA TR], Route Ver = 0x3415
RP/0/0/CPU0:Feb 13 09:13:34.410 : ipv4_mfwd_partner[263]: Encap:
ip_mfwd_mrib_pre_process_encapid_update: encapid: 7, te_ole_cnt: 0,lsmid_ole_cnt: 1,
gre_ole_cnt: 0 ti_mofrr_ole_cnt: 0 flags: 0x1
RP/0/0/CPU0:Feb 13 09:13:34.410 : ipv4_mfwd_partner[263]: Encap: [2482] Encap entry created
(0xa08fd8a8) for eid 7 (stale N) flags 0x1
RP/0/0/CPU0:Feb 13 09:13:34.410 : ipv4_mfwd_partner[263]: Encap: [3039] RegDB entry 0xa08fd824
for LSMID 0x1c turnaround TRUE(new: Y ifh_changed N) ifhandle: b0
RP/0/0/CPU0:Feb 13 09:13:34.410 : ipv4_mfwd_partner[263]: Encap: [3533] Encap entry for eid 7
(0xa08fd8a8) proc done
RP/0/0/CPU0:Feb 13 09:13:34.500 : mrib[1149]:   [  6] TID: 0xe0000010 (10.100.1.5,232.1.1.1)
Updated RPF EID, #A=1, #F=2, #MDT_A=0 [Lm F LMI* MA TR], Route Ver = 0x3416
RP/0/0/CPU0:Feb 13 09:13:34.620 : mrib[1149]:   [ 22] Redistributed
RP/0/0/CPU0:Feb 13 09:13:34.620 : mrib[1149]:   [  6] TID: 0xe0000010 (10.100.1.5,232.1.1.1)
Updated RPF EID, #A=1, #F=2, #MDT_A=0 [Lm F LMI* MA TR], Route Ver = 0x3417
RP/0/0/CPU0:Feb 13 09:13:34.620 : ipv4_mfwd_partner[263]: Encap:
```

```
ip_mfwd_mrib_pre_process_encapid_update: encapid: 7, te_ole_cnt: 0,lsmid_ole_cnt: 1,
gre_ole_cnt: 0 ti_mofrr_ole_cnt: 0 flags: 0x1
RP/0/0/CPU0:Feb 13 09:13:34.620 : ipv4_mfwd_partner[263]: Encap: [2482] Encap entry existing
(0xa08fd8a8) for eid 7 (stale N) flags 0x1
RP/0/0/CPU0:Feb 13 09:13:34.620 : ipv4_mfwd_partner[263]: Encap: [3533] Encap entry for eid 7
(0xa08fd8a8) proc done
RP/0/0/CPU0:Feb 13 09:13:39.570 : ipv4_mfwd_partner[263]: Encap: encap id set  eid: 7
(10.100.1.5,232.1.1.1)
```

encap-ID는 encap-ID가 생성되고 MRIB(Multicast Routing Information Base)가 OIL(Outgoing Interface List)의 VRF(Virtual Routing and Forwarding)용 MDT(Labeled MDT) 인터페이스로 업데이트된 후 7초, 5초로 설정됩니다.

```
RP/0/0/CPU0:PE1#show mrib vrf one route 232.1.1.1 10.100.1.5

IP Multicast Routing Information Base
Entry flags: L - Domain-Local Source, E - External Source to the Domain,
   C - Directly-Connected Check, S - Signal, IA - Inherit Accept,
   IF - Inherit From, D - Drop, ME - MDT Encap, EID - Encap ID,
   MD - MDT Decap, MT - MDT Threshold Crossed, MH - MDT interface handle
   CD - Conditional Decap, MPLS - MPLS Decap, EX - Extranet
   MoFE - MoFRR Enabled, MoFS - MoFRR State, MoFP - MoFRR Primary
   MoFB - MoFRR Backup, RPFID - RPF ID Set, X - VXLAN
Interface flags: F - Forward, A - Accept, IC - Internal Copy,
   NS - Negate Signal, DP - Don't Preserve, SP - Signal Present,
   II - Internal Interest, ID - Internal Disinterest, LI - Local Interest,
   LD - Local Disinterest, DI - Decapsulation Interface
   EI - Encapsulation Interface, MI - MDT Interface, LVIF - MPLS Encap,
   EX - Extranet, A2 - Secondary Accept, MT - MDT Threshold Crossed,
   MA - Data MDT Assigned, LMI - mLDP MDT Interface, TMI - P2MP-TE MDT Interface
   IRMI - IR MDT Interface

(10.100.1.5,232.1.1.1) RPF nbr: 10.2.1.5 Flags: RPF
 Up: 01:04:11
 Incoming Interface List
   GigabitEthernet0/0/0/0 Flags: A, Up: 01:04:11
 Outgoing Interface List
   Lmdtone Flags: F LMI MA TR, Up: 00:03:33
   GigabitEthernet0/0/0/2 Flags: F NS, Up: 01:04:11

RP/0/0/CPU0:PE1#show mfib vrf one route 232.1.1.1 10.100.1.5 detail

IP Multicast Forwarding Information Base
Entry flags: C - Directly-Connected Check, S - Signal, D - Drop,
 IA - Inherit Accept, IF - Inherit From, EID - Encap ID,
 ME - MDT Encap, MD - MDT Decap, MT - MDT Threshold Crossed,
 MH - MDT interface handle, CD - Conditional Decap,
 DT - MDT Decap True, EX - Extranet, RPFID - RPF ID Set,
 MoFE - MoFRR Enabled, MoFS - MoFRR State, X - VXLAN
Interface flags: F - Forward, A - Accept, IC - Internal Copy,
 NS - Negate Signal, DP - Don't Preserve, SP - Signal Present,
 EG - Egress, EI - Encapsulation Interface, MI - MDT Interface,
 EX - Extranet, A2 - Secondary Accept
Forwarding/Replication Counts: Packets in/Packets out/Bytes out
Failure Counts: RPF / TTL / Empty Olist / Encap RL / Other

(10.100.1.5,232.1.1.1),  Flags:  EID , FMA: 0x10001 ,
 Up: 01:04:25
 Last Used: 00:00:00
 SW Forwarding Counts: 3856/3856/385600
 SW Replication Counts: 3856/3856/385600
 SW Failure Counts: 0/0/0/0/0
```

```
 Route ver: 0x3417
 MVPN Info :-
   Associated Table ID : 0xe0000000
   MDT Handle: 0x0, MDT Probe:Y [Y], Rate:Y, Acc:Y
   MDT SW Ingress Encap V4/V6, Egress decap: 0 / 0, 0
   EG count: 1
   Encap ID: 7, RPF ID: 0
   Local Receiver: True, Turnaround: False
 Lmdtone Flags:  F LMI TR, Up:00:03:47
 GigabitEthernet0/0/0/0 Flags:  A, Up:01:04:25
 GigabitEthernet0/0/0/2 Flags:  NS EG, Up:01:04:25
```

따라서 원격 수신기는 이 멀티캐스트 스트림을 수신하는 데 추가로 5초의 지연이 발생합니다.

참고: LMDT 인터페이스가 MRIB에 즉시 추가되었고 LMDT 인터페이스도 F 플래그와 함께 MFIB에 즉시 추가되었지만 캡슐화 ID가 설정되지 않았습니다.

MFIB의 캡슐화 ID가 5초 지연 후에 설정되었습니다.

Cisco 버그 ID CSCvb50266 이후 , **지연 시간은** 원격 수신자가 **조인할** 때 encap-**ID를 프로그래밍하는 데 5초입니다**. 이것이 새로운 기본 동작입니다.

동작을 확인하기 위해 **show pim vrf <> 컨텍스트**를 실행합니다.

```
RP/0/0/CPU0:PE1#show pim vrf one context

PIM context information for VRF one (0x12b70184)

VRF ID: 0x60000001
Table ID: 0xe0000010
Remote Table ID: 0xe0800010
MDT Default Group : 0.0.0.0
MDT Source : (10.100.1.1, Loopback0) Per-VRF
MDT Immediate Switch Not Configured
MDT handle: 0x0(Null)
Context Active, ITAL Active
Routing Enabled
Registered with MRIB
Not owner of MDT Interface
Raw socket req: T, act: T, LPTS filter req: T, act: T
UDP socket req: T, act: T, UDP vbind req: T, act: T
Reg Inj socket req: T, act: T, Reg Inj LPTS filter req: T, act: T
Mhost Default Interface : GigabitEthernet0/0/0/0 (publish pending: F)
Remote MDT Default Group : 0.0.0.0
Backup MLC virtual interface: Null
Neighbor-filter: -
MDT Neighbor-filter: -
```

5초의 지연을 제거하려면 이 숨겨진 명령 mdt **immediate-switch**를 실행합니다.

```
RP/0/0/CPU0:PE1#conf t
RP/0/0/CPU0:PE1(config)#multicast-routing vrf one
RP/0/0/CPU0:PE1(config-mcast-one)#address-family ipv4
RP/0/0/CPU0:PE1(config-mcast-one-ipv4)#mdt immediate-switch
RP/0/0/CPU0:PE1(config-mcast-one-ipv4)#commit
```

참고: 7.4.1부터 명령은 더 이상 숨겨지지 않습니다.

```
RP/0/0/CPU0:PE1#show pim vrf one context

PIM context information for VRF one (0x12b70184)

VRF ID: 0x60000001
Table ID: 0xe0000010
Remote Table ID: 0xe0800010
MDT Default Group : 0.0.0.0
MDT Source : (10.100.1.1, Loopback0) Per-VRF
MDT Immediate Switch Configured
MDT handle: 0x0(Null)
Context Active, ITAL Active
Routing Enabled
Registered with MRIB
Not owner of MDT Interface
Raw socket req: T, act: T, LPTS filter req: T, act: T
UDP socket req: T, act: T, UDP vbind req: T, act: T
Reg Inj socket req: T, act: T, Reg Inj LPTS filter req: T, act: T
Mhost Default Interface : GigabitEthernet0/0/0/0 (publish pending: F)
Remote MDT Default Group : 0.0.0.0
Backup MLC virtual interface: Null
Neighbor-filter: -
MDT Neighbor-filter: -
```

이 명령은 실행 중인 컨피그레이션에 표시되지 않습니다.

```
RP/0/0/CPU0:PE1#show running-config multicast-routing vrf one

multicast-routing
 vrf one
 address-family ipv4
  interface GigabitEthernet0/0/0/0
   enable
  !
  interface GigabitEthernet0/0/0/2
   enable
  !
  mdt source Loopback0
  rate-per-route
  accounting per-prefix
  bgp auto-discovery mldp
  !
  mdt partitioned mldp ipv4 p2mp
  mdt data mldp 100 immediate-switch
 !
```

immediate-*switch* 키워드를 사용하여 mdt *immediate-switch* 및 mdt *data* 명령을 모두 구성하는 것은 **지원되지 않습니다**.
다음은 이러한 컨피그레이션의 예입니다.

```
RP/0/RP0/CPU0:PE1#conf t
RP/0/RP0/CPU0:PE1(config)#multicast-routing
RP/0/RP0/CPU0:PE1(config-mcast)#vrf one
RP/0/RP0/CPU0:PE1(config-mcast-one)#address-family ipv4
RP/0/RP0/CPU0:PE1(config-mcast-one-ipv4)#mdt data mldp 100 immediate-switch
RP/0/RP0/CPU0:PE1(config-mcast-one-ipv4)#mdt immediate-switch
RP/0/RP0/CPU0:PE1(config-mcast-one-ipv4)#commit
RP/0/RP0/CPU0:PE1(config-mcast-one-ipv4)#end
RP/0/RP0/CPU0:PE1#
```