TEST CASES FOR MPLS - RSP

Created on – 07/06/2017

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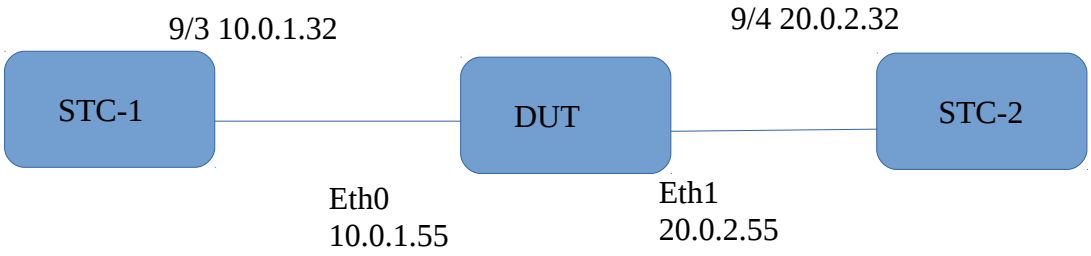
1. INTRODUCTION

This document lists test cases identified to run MPLS for RSP router project . Document is structured to provide , with each test case the set up required and output expected when each is executed.

Test cases (in section 3) are designed for a single DUT , how DUT is programmed and how it behaves in different network scenarios followed by complete topology test cases which involve upto three DUTs.

2. TEST SETUP FOR SINGLE DUT

Mentioned test setup will provide a functional DUT ready to take low level MIB commands . Two interafces of DUT are connected to STC ports . STC ports are functional and can receive and trasmit packets .



Configuration needed for this setup :

AT DUT

Run script install_tile.sh to set suitable run environemet .

Cd /rsp/metacli

sh install_tile.sh /

Now run start_setup script to start nbase-stub . Router-dcl and confd

start_setup

Now enter CLI mode

cli

System is now ready to take MIB based commands

To start fast path on DUT :

fast-path.sh start

linux-fp-sync.sh start

Now configure interafce eth0 and eth1

ifconfig eth0 10.0.1.55

ifconfig eth1 20.0.2.55

3. TEST CASES

Test cases listed are run over a single DUT . DUT will play different role in each test case . It will simulate ingress , transit or egress router.

3.1 Create Product Entities

This test case creates all entities needed to run MPLS static LSP feature.

All other test cases will use this case as base configuration followed by their own .

Test Input :

config

unhide hidemib-group

newscope

DC-I3-MIB i3EmuTable i3EmuEntry 1 i3EmuAdminStatus adminStatusUp

commit

top

DC-LMGR-MIB dcLmgrLsrEntityTable dcLmgrLsrEntityEntry 1

dcLmgrLsrEntityTranAddrType ipv4

dcLmgrLsrEntityTranAddrLen 4

dcLmgrLsrEntityTranAddr 41:03:03:03

dcLmgrLsrAutoStaticLsps true

dcLmgrLsrDisplayPhpXCs true

dcLmgrLsrEntityAdminStatus adminStatusup

commit

top

DC-I3-MIB i3EiTable i3EiEntry 1 1 0 15 i3EiIfFlags broadcast,multicast

top

DC-I3-MIB i3EaTable i3EaEntry 1 1 0 15 ipv4 0a:00:01:37

i3EaPrefixLen 32

i3EaAddressAdvertise true

i3EaBcastDestAddr ff:ff:ff:ff

commit

top

DC-I3-MIB i3EiTable i3EiEntry 1 1 0 16 i3EiIfFlags broadcast,multicast

top

DC-I3-MIB i3EaTable i3EaEntry 1 1 0 16 ipv4 14:00:02:37

i3EaPrefixLen 32

i3EaAddressAdvertise true

i3EaBcastDestAddr ff:ff:ff:ff

commit

top

DC-I3-MIB i3EmTable i3EmEntry 1 1 0

i3EmLabelSpace gen

i3EmGlobalLabelSpace true

i3EmAdminStatus adminStatusUp

commit

top

DC-I3-MIB i3EmTable i3EmEntry 1 1 15

i3EmAdminStatus adminStatusUp i3EmIfDataOnly true i3EmLabelSpace gen i3EmSignallingCaps dataOnlyIf i3EmGlobalLabelSpace true

i3EmLdpEgressLabelUsage php

commit

top

DC-I3-MIB i3EmTable i3EmEntry 1 1 16

i3EmAdminStatus adminStatusUp i3EmIfDataOnly true i3EmLabelSpace gen i3EmSignallingCaps dataOnlyIf i3EmGlobalLabelSpace true i3EmLdpEgressLabelUsage php

commit

top

DC-RLDF-MIB dcLmgrLdfEntityTable dcLmgrLdfEntityEntry 1

dcLmgrLdfEntityI3EntIndex 1

dcLmgrLdfEntityGALSupport true

dcLmgrLdfEntityEnableIPI true

dcLmgrLdfEntityAdminStatus adminStatusUp

commit

top

Expected Output

Following config should be verified after this test case is run

1. do show DC-I3-MIB i3EmuTable

    I3

    EMU I3 EMU OPER

    INDEX STATUS

---

1 operStatusUp

2. do show DC-LMGR-MIB dcLmgrLsrEntityTable dcLmgrLsrEntityEntry

DC

LMGR

LSR DC DC

ENTITY DC LMGR LSR LMGR LMGR DC LMGR

LSR ENTITY OPER LSC LDB LSR STATIC

INDEX STATUS STATUS COUNT P2MPACTIVE

---

1 operStatusUp active 0 false

3.do show DC-RLDF-MIB dcLmgrLdfEntityTable dcLmgrLdfEntityEntry

DC

LMGR

LDF

ENTITY DC LMGR LDF

LSR ENTITY OPER

INDEX STATUS

---

1 operStatusUp

4. ngctl list

Look for these nodes :

mpls_global_ilm, split_eth1, mux_eth1, split_eth0 , mux_eth0

These should be created in response to above configuration.

>>>>>>>>>>

For rest of the test cases we will assume Test case 3.1 configuration is running

All test cases that follow are build over test case 3.1

<<<<<<<<<<

3.2 Create Static transit LSP

This test case will program DUT as transit router . DUT is configures to receive MPLS packet with top label 20 and transmit with label swapped to 30 .

Packet flow can be tested for this configuration by generating a MPLS labeled packet from STC port 9/3 . A mpls packet with label 30 will be received at STC port 9/4 .

Test Input- 1 :

Configuration in test 3.1 followed by:

MPLS-LSR-STD-MIB mplsOutSegmentTable mplsOutSegmentEntry 1 1

mplsOutSegmentInterface 16

mplsOutSegmentPushTopLabel true mplsOutSegmentTopLabel 30

mplsOutSegmentNextHopAddrType ipv4 mplsOutSegmentNextHopAddr 14:00:02:20

commit

top

MPLS-LSR-STD-MIB mplsInSegmentTable mplsInSegmentEntry 1 1 mplsInSegmentInterface 15 mplsInSegmentLabel 20

commit

top

MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry 1 1 1 1 mplsXCAutoStaticXC yes mplsXCAdminStatus up mplsXCLspId 00:00:00:01

commit

top

Expected output

1. do show MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry

DC

LMGR MPLS MPLS

LSR MPLS MPLS XCIN XCOUT

ENTITY XCIN XCOUT MPLS SEGMENT SEGMENT

LSR MPLS SEGMENT SEGMENT MPLS XCOPER IF IF

INDEX XCINDEX INDEX INDEX XCOWNER STATUS INDEX INDEX

---

1 1 1 1 snmp up 15 16

2. do show MPLS-LSR-STD-MIB mplsOutSegmentTable mplsOutSegmentEntry

DC MPLS

LMGR OUT

LSR MPLS SEGMENT MPLS MPLS

ENTITY OUT TOP OUT OUT

LSR SEGMENT LABEL SEGMENT SEGMENT

INDEX INDEX PTR XCINDEX OWNER

---

1 1 1 snmp

3.do show MPLS-LSR-STD-MIB mplsInSegmentTable mplsInSegmentEntry

DC

LMGR

LSR MPLS IN

ENTITY MPLS IN SEGMENT MPLS IN MPLS IN

LSR SEGMENT LABEL SEGMENT SEGMENT

INDEX INDEX PTR XCINDEX OWNER

---

1 1 1 snmp

4. ngctl list

Look for newly created nodes

mplsnhlfe_XX , mplsether_XX

mpls_global_ilm, split_eth1, mux_eth1, split_eth0 , mux_eth0 nodes will also exist created on running test case 3.1 .

Test Input – 2

Using Spirent , send MPLS packet with label 20 from port 9/3 .

Expected Output

MPLS packet with label 30 should be received at Spirent port 9/4

(Traffic is received at DUT on interface eth0 , packet label is swapped and sent out via interface eth1)

3.3 Delete Static Transit LSP

This test case is written to test deletion of a Transit LSP . Deletion is user intended and caused by direct MIB configuration .

Test input

Test case 3.1 and 3.2 followed by following configuration:

no MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry 1 1 1 1

commit

no MPLS-LSR-STD-MIB mplsOutSegmentTable mplsOutSegmentEntry 1 1

commit

no MPLS-LSR-STD-MIB mplsInSegmentTable mplsInSegmentEntry 1 1

commit

Expected Output

1. do show MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry

% No entries found.

2.do show MPLS-LSR-STD-MIB mplsInSegmentTable mplsInSegmentEntry

% No entries found.

3. do show MPLS-LSR-STD-MIB mplsOutSegmentTable mplsOutSegmentEntry

% No entries found.

4. ngctl list

There should NOT exist these nodes :

mpls_global_ilm, split_eth1, mux_eth1, split_eth0 , mux_eth0

mplsnhlfe_XX , mplsether_XX .

Test Input – 2

Using Spirent , send MPLS packet with label 20 from port 9/3 .

Expected Output

No MPLS packet should be received at Spirent port 9/4

(Traffic is received at DUT on interface eth0 , no programming is found corresponding to label 20 and thus packet is dropped)

3.4 Create Static Egress LSP

This test case will program DUT as egress router . Labeled packets will terminate here and forwarded further as IP packets.

Packet flow can be tested by sending labeled packet from STC-2(port 9/4) . Packet will land on eth1 of DUT , label will be looked up and popped and IP packet will be forwarded out based on destination IP of packet . DIP is set to 10.0.1.32 , So packet will land on STC1(port 9/3)

Test Input:

Test case 3.1 followed by:

MPLS-LSR-STD-MIB mplsInSegmentTable mplsInSegmentEntry 1 2 mplsInSegmentInterface 16 mplsInSegmentLabel 30

commit

top

MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry 1 2 2 0 mplsXCAutoStaticXC yes mplsXCAdminStatus up mplsXCLspId 00:00:00:02

commit

top

Expected Output

1. do show MPLS-LSR-STD-MIB mplsInSegmentTable mplsInSegmentEntry

DC

LMGR

LSR MPLS IN

ENTITY MPLS IN SEGMENT MPLS IN MPLS IN

LSR SEGMENT LABEL SEGMENT SEGMENT

INDEX INDEX PTR XCINDEX OWNER

---

1 2 2 snmp

2. do show MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry

DC

LMGR MPLS MPLS

LSR MPLS MPLS XCIN XCOUT

ENTITY XCIN XCOUT MPLS SEGMENT SEGMENT

LSR MPLS SEGMENT SEGMENT MPLS XCOPER IF IF

INDEX XCINDEX INDEX INDEX XCOWNER STATUS INDEX INDEX

---

1 2 2 0 snmp up 16 0

3. ngctl list

Check for these newly created vnb nodes :

mpls_vrf0 , split_mpls_vrf0, mux_mpls_vrf0, mux_mpls_ilm_global, mplsnhlfe_XX, mux_eth1, split_eth1, mpls_ilm_global

Test Input – 2

Using Spirent , send MPLS packet with label 30 from port 9/4 .

Expected Output

IP packet with should be received at Spirent port 9/4

(Traffic is received at DUT on interface eth1 , packet label is popped and packet is sent out based on destination IP address . Packet DIP is 10.0.1.32 and therefore packet is sent out via eth0)

3.5 Delete Static Egress LSP

This test case is written to test deletion of a Egress LSP . Deletion is user intended and caused by direct MIB configuration.

Test Input

Test case 3.1 and 3.4 followed by:

MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry 1 2 2 0

commit

top

MPLS-LSR-STD-MIB mplsInSegmentTable mplsInSegmentEntry 1 2

commit

top

Expected Output

1. do show MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry

% No entries found.

2. ngctl list

There should NOT exist these nodes :

mpls_vrf0 , split_mpls_vrf0, mux_mpls_vrf0, mux_mpls_ilm_global, mplsnhlfe_XX, mux_eth1, split_eth1, mpls_ilm_global

Test Input – 2

Using Spirent , send MPLS packet with label 30 from port 9/4 .

Expected Output

No packet should be received at Spirent port 9/4

(Traffic is received at DUT on interface eth1 , No configuration is found for label 30 and thus packet is dropped)

3.6 Create Static Ingress LSP

This test case will program DUT as ingress router . IP packets enter MPLS network via this router . Label(s) are pushed onto IP packet and injected into MPLS network .

Packet flow can be tested by sending IP packet from STC-2(port 9/3) . Packet will land on eth0 of DUT , DIP based lookup will happen , configured labels will be pushed and packet will be forwarded out via configured interface (eth1) to land on STC-2 (port 9/4)

Test Input

Test case 3.1 followed by

MPLS-LSR-STD-MIB mplsOutSegmentTable mplsOutSegmentEntry 1 2

mplsOutSegmentInterface 16

mplsOutSegmentPushTopLabel true mplsOutSegmentTopLabel 40

mplsOutSegmentNextHopAddrType ipv4 mplsOutSegmentNextHopAddr 14:00:02:20

commit

top

MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry 1 3 0 2 mplsXCAutoStaticXC yes mplsXCAdminStatus up mplsXCLspId 00:00:00:03

commit

top

DC-RLDF-MIB dcLmgrLdfFtnStaticTable dcLmgrLdfFtnStaticEntry 1 1 ipv4 28:00:04:20 32 dcLmgrLdfFtnStatOutLbl 40 dcLmgrLdfFtnStatOutIfIdx 16

commit

top

Expected Output

1. do show MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry

DC

LMGR MPLS MPLS

LSR MPLS MPLS XCIN XCOUT

ENTITY XCIN XCOUT MPLS SEGMENT SEGMENT

LSR MPLS SEGMENT SEGMENT MPLS XCOPER IF IF

INDEX XCINDEX INDEX INDEX XCOWNER STATUS INDEX INDEX

---

1 3 0 2 snmp up 0 16

2.do show MPLS-LSR-STD-MIB mplsOutSegmentTable mplsOutSegmentEntry

DC MPLS

LMGR OUT

LSR MPLS SEGMENT MPLS MPLS

ENTITY OUT TOP OUT OUT

LSR SEGMENT LABEL SEGMENT SEGMENT

INDEX INDEX PTR XCINDEX OWNER

---

1 2 3 snmp

3. do show DC-RLDF-MIB dcLmgrLdfFtnTable dcLmgrLdfFtnEntry

DC DC DC DC DC DC

LMGR DC LMGR DC LMGR LMGR LMGR LMGR LMGR

LDF LMGR DC LMGR DC LMGR LDF DC LMGR LDF FTN LDF LDF LDF LDF

FTN LDF DC LMGR LDF FTN LDF FTN DC LMGR FTN LDF FTN NHOP DC LMGR DC LMGR FTN FTN FTN FTN

LSR FTN LDF FTN FEC PRE IP ADDR LDF FTN TOP OUT IF ADDR LDF FTN LDF FTN VLAN NUM OUT OUT

INDEX VRF ID FEC TYPE LEN TYPE FEC ADDR LBL IDX TYPE NHOP ADDR NHOP MAC ID LBL LBL1 LBL2

---

1 1 hostAddr 32 ipv4 28:00:04:20 40 16 ipv4 14:00:02:20 --ERROR-- 0 1 0 0

4. ngctl list

Check for these VNB nodes:

tnnlXX, mux_XX, mplsnhlfe_XX, mplsether_XX, split_eth1, mux_eth1

5. route -n

40.0.4.32 0.0.0.0 255.255.255.255 UH 5 0 0 tnnlXX

6. ip link show

An entry for interafce tnnlXX

XX = XC handle (unsigned long)

Test Input – 2

Using Spirent , send IP packet with dip = 40.0.4.32 port 9/3 .

Expected Output

Labeled packet (label = 40) should be received at port 9/4.

(Traffic is received at DUT on interface eth0 , DIP lookup is done and packet is forwarded via tnnlXX interface which in turn uses eth1 interface to eject packet)

3.7 Delete Static Ingress LSP

This test case is written to test deletion of a Ingress LSP . Deletion is user intended and caused by direct MIB configuration.

Test Input

Test case 3.1 and 3.6 followed by:

no DC-RLDF-MIB dcLmgrLdfFtnStaticTable dcLmgrLdfFtnStaticEntry 1 1 ipv4 28:00:04:20 32

commit

top

MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry 1 3 0 2

commit

top

Expected Output

1. do show DC-RLDF-MIB dcLmgrLdfFtnTable dcLmgrLdfFtnEntry

% No entries found.

2. do show MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry

% No entries found.

3. route -n

No route for 40.0.4.32 should exist .

4. ngctl list

These nodes should not exist :

tnnlXX, mux_XX, mplsnhlfe_XX, mplsether_XX, split_eth1, mux_eth1

5. ip link show

No entry for tnnlXX.

Test Input – 2

Using Spirent , send IP packet with dip = 40.0.4.32 port 9/3 .

Expected Output

No packet should be received at port 9/4.

(Traffic is received at DUT on interface eth0 , DIP lookup is done , no route is found and packet is dropped .)

3.8 Tunnel in Tunnel at Ingress

This test case is intended to test cases where two tunnels commence together at Ingress . DUT acts as ingress router . A tunnel is programmed which uses another underlying tunnel as transport Path.

Data Flow : IP packet is sent from port 9/3 towards eth0 of DUT. Outer tunnel label is pushed followed by underlying tunnel labels . And packet is forwarded out via out interafce of underlying tunnel (eth1) and received at STC-2 (port 9/4)

Test Input

Test case in 3.1 followed by:

MPLS-LSR-STD-MIB mplsOutSegmentTable mplsOutSegmentEntry 1 2

mplsOutSegmentInterface 16

mplsOutSegmentPushTopLabel true mplsOutSegmentTopLabel 40

mplsOutSegmentNextHopAddrType ipv4 mplsOutSegmentNextHopAddr 14:00:02:20

commit

top

MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry 1 3 0 2 mplsXCAutoStaticXC yes mplsXCAdminStatus up mplsXCLspId 00:00:00:03

commit

top

DC-RLDF-MIB dcLmgrLdfFtnStaticTable dcLmgrLdfFtnStaticEntry 1 1 ipv4 28:00:04:20 32 dcLmgrLdfFtnStatOutLbl 40 dcLmgrLdfFtnStatOutIfIdx 16

commit

top

MPLS-LSR-STD-MIB mplsOutSegmentTable mplsOutSegmentEntry 1 4

mplsOutSegmentInterface IDX

mplsOutSegmentPushTopLabel true mplsOutSegmentTopLabel 50

commit

top

MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry 1 5 0 4 mplsXCAutoStaticXC yes mplsXCAdminStatus up mplsXCLspId 00:00:00:05

commit

top

DC-RLDF-MIB dcLmgrLdfFtnStaticTable dcLmgrLdfFtnStaticEntry 1 1 ipv4 38:00:04:20 32 dcLmgrLdfFtnStatOutLbl 50 dcLmgrLdfFtnStatOutIfIdx IDX

commit

top

--Here IDX is interafce index of tnnlXX created in linux .

--Get index using command ip link show

Expected Output

1. do show MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry

DC

LMGR MPLS MPLS

LSR MPLS MPLS XCIN XCOUT

ENTITY XCIN XCOUT MPLS SEGMENT SEGMENT

LSR MPLS SEGMENT SEGMENT MPLS XCOPER IF IF

INDEX XCINDEX INDEX INDEX XCOWNER STATUS INDEX INDEX

---

1 3 0 2 snmp up 0 16

1 5 0 4 snmp up 0 41

2. do show MPLS-LSR-STD-MIB mplsOutSegmentTable mplsOutSegmentEntry

DC MPLS

LMGR OUT

LSR MPLS SEGMENT MPLS MPLS

ENTITY OUT TOP OUT OUT

LSR SEGMENT LABEL SEGMENT SEGMENT

INDEX INDEX PTR XCINDEX OWNER

---

1 2 3 snmp

1 4 5 snmp

3. do show DC-RLDF-MIB dcLmgrLdfFtnTable dcLmgrLdfFtnEntry

DC DC DC DC DC DC

LMGR DC LMGR DC LMGR LMGR LMGR LMGR LMGR

LDF LMGR DC LMGR DC LMGR LDF DC LMGR LDF FTN LDF LDF LDF LDF

FTN LDF DC LMGR LDF FTN LDF FTN DC LMGR FTN LDF FTN NHOP DC LMGR DC LMGR FTN FTN FTN FTN

LSR FTN LDF FTN FEC PRE IP ADDR LDF FTN TOP OUT IF ADDR LDF FTN LDF FTN VLAN NUM OUT OUT

INDEX VRF ID FEC TYPE LEN TYPE FEC ADDR LBL IDX TYPE NHOP ADDR NHOP MAC ID LBL LBL1 LBL2

---

1 1 hostAddr 32 ipv4 28:00:04:20 40 16 ipv4 14:00:02:20 --ERROR-- 0 1 0 0

1 1 hostAddr 32 ipv4 38:00:04:20 50 41 unknown --ERROR-- 0 1 0 0

3. route -n

40.0.4.32 0.0.0.0 255.255.255.255 UH 5 0 0 tnnlXX

56.0.4.32 0.0.0.0 255.255.255.255 UH 5 0 0 tnnl1YY

4. ngctl list

Check for these vnb nodes:

tnnlYY, mux_YY, mplsnhlfe_YY, mplsnhlfe_YY_40, mplsether_YY,

tnnlXX, mux_XX, mplsnhlfe_XX, mplsether_YY,

split_eth1, mux_eth1

5. ip link show

two new interafces tnnlXX and tnnlYY

Test Input – 2

Using Spirent , send IP packet with dip = 56.0.4.32 port 9/3 .

Expected Output

Labeled packet (label = 40 | 50) should be received at port 9/4.

(Traffic is received at DUT on interface eth0 , DIP lookup is done and packet is forwarded via tnnlYY interface which in turn uses tnnlXX interface to forward packet)

3.9 Delete Tunnel in Tunnel at Ingress

This test case involves two deletion scenarios:

a) Outer tunnel is deleted

b) Underlying tunnel deleted

Test Input for a)

Test input for test 3.1 and 3.8 followed by :

no DC-RLDF-MIB dcLmgrLdfFtnStaticTable dcLmgrLdfFtnStaticEntry 1 1 ipv4 38:00:04:20 32

commit

top

no MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry 1 5 0 4

no MPLS-LSR-STD-MIB mplsOutSegmentTable mplsOutSegmentEntry 1 4

commit

top

Expected Output

1. do show DC-RLDF-MIB dcLmgrLdfFtnStaticTable dcLmgrLdfFtnStaticEntry

DC LMGR

DC LMGR DC LMGR LDF FTN DC LMGR DC LMGR

LDF FTN LDF FTN STAT FEC LDF FTN LDF FTN DC LMGR LDF

STAT STAT ADDR STAT FEC STAT FEC FTN STAT

LSR IDX VRF ID TYPE ADDR PRE LEN OPER STAT

---

1 1 ipv4 28:00:04:20 32 operStatusUp

4. do show MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry

DC

LMGR MPLS MPLS

LSR MPLS MPLS XCIN XCOUT

ENTITY XCIN XCOUT MPLS SEGMENT SEGMENT

LSR MPLS SEGMENT SEGMENT MPLS XCOPER IF IF

INDEX XCINDEX INDEX INDEX XCOWNER STATUS INDEX INDEX

---

1 3 0 2 snmp up 0 16

2. route -n

No entry for route 56.0.4.32

3. ip link show

Only one tnnl interface exists tnnl_XX

4. ngctl list

These nodes will not exist :

tnnlYY, mux_YY, mplsnhlfe_YY, mplsnhlfe_YY_40, mplsether_YY

Test Input – 2 -A)

Using Spirent , send IP packet with dip = 56.0.4.32 port 9/3 .

Expected Output

No packet should be received at port 9/4.

(Traffic is received at DUT on interface eth0 , DIP lookup is done , no route exists and packet is dropped)

Test input for B)

Test case 3.1 and 3.8 followed by:

no DC-RLDF-MIB dcLmgrLdfFtnStaticTable dcLmgrLdfFtnStaticEntry 1 1 ipv4 28:00:04:20 32

commit

no MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry 1 3 0 2

commit

Expected Output

1. do show MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry

DC

LMGR MPLS MPLS

LSR MPLS MPLS XCIN XCOUT

ENTITY XCIN XCOUT SEGMENT SEGMENT

LSR MPLS SEGMENT SEGMENT MPLS MPLS XCOPER IF IF

INDEX XCINDEX INDEX INDEX XCOWNER STATUS INDEX INDEX

---

1 5 0 4 snmp lowerLayerDown 0 43

2.do show DC-RLDF-MIB dcLmgrLdfFtnStaticTable dcLmgrLdfFtnStaticEntry

DC LMGR

DC LMGR DC LMGR LDF FTN DC LMGR DC LMGR

LDF FTN LDF FTN STAT FEC LDF FTN LDF FTN DC LMGR LDF

STAT STAT ADDR STAT FEC STAT FEC FTN STAT

LSR IDX VRF ID TYPE ADDR PRE LEN OPER STAT

---

1 1 ipv4 38:00:04:20 32 operStatusUp

3. ngctl list

No such vnb node :

tnnlYY, mux_YY, mplsnhlfe_YY, mplsnhlfe_YY_40, mplsether_YY,

tnnlXX, mux_XX, mplsnhlfe_XX, mplsether_YY,

split_eth1, mux_eth1

4. route -n

No route entry for 40.0.4.32 and 56.0.4.32

5. ip link show

No interface entry for tnnlXX tnnlYY

Test Input – 2 -A)

Using Spirent , send IP packet with dip = 56.0.4.32 port 9/3 .

Expected Output

No packet should be received at port 9/4.

(Traffic is received at DUT on interface eth0 , DIP lookup is done , no route exists and packet is dropped)

3.10 Tunnel in Tunnel at Transit

This test case is intended to test cases where a Tunnel uses another tunnel as its transport path . DUT acts as transit router where underlying tunnel starts. A tunnel is programmed which uses another underlying tunnel as transport Path.

Data Flow : IP packet is sent from port 9/3 towards eth0 of DUT. Outer tunnel label is swapped followed by underlying tunnel label being pushed . And packet is forwarded out via out interafce of underlying tunnel (eth1) and received at STC-2 (port 9/4)

Test Input

Test case 3.1 followed by :

MPLS-LSR-STD-MIB mplsOutSegmentTable mplsOutSegmentEntry 1 2

mplsOutSegmentInterface 16

mplsOutSegmentPushTopLabel true mplsOutSegmentTopLabel 40

mplsOutSegmentNextHopAddrType ipv4 mplsOutSegmentNextHopAddr 14:00:02:20

commit

top

MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry 1 3 0 2 mplsXCAutoStaticXC yes mplsXCAdminStatus up mplsXCLspId 00:00:00:03

commit

top

DC-RLDF-MIB dcLmgrLdfFtnStaticTable dcLmgrLdfFtnStaticEntry 1 1 ipv4 28:00:04:20 32 dcLmgrLdfFtnStatOutLbl 40 dcLmgrLdfFtnStatOutIfIdx 16

commit

top

MPLS-LSR-STD-MIB mplsOutSegmentTable mplsOutSegmentEntry 1 3

mplsOutSegmentInterface 98

mplsOutSegmentPushTopLabel true mplsOutSegmentTopLabel 50

commit

top

MPLS-LSR-STD-MIB mplsInSegmentTable mplsInSegmentEntry 1 3 mplsInSegmentInterface 15 mplsInSegmentLabel 35

commit

top

MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry 1 4 3 3 mplsXCAutoStaticXC yes mplsXCAdminStatus up mplsXCLspId 00:00:00:04

commit

top

Expected Output:

1. ngctl list

Check for these nodes:

mplsnhlfe_YY, mplsnhlfe_YY_40, mplsether_YY,

tnnlXX, mux_XX, mplsnhlfe_XX, mplsether_YY,

split_eth1, mux_eth1, split_eth0, mux_eth0

2. do show DC-RLDF-MIB dcLmgrLdfFtnStaticTable dcLmgrLdfFtnStaticEntry

DC LMGR

DC LMGR DC LMGR LDF FTN DC LMGR DC LMGR

LDF FTN LDF FTN STAT FEC LDF FTN LDF FTN DC LMGR LDF

STAT STAT ADDR STAT FEC STAT FEC FTN STAT

LSR IDX VRF ID TYPE ADDR PRE LEN OPER STAT

---

1 1 ipv4 28:00:04:20 32 operStatusUp

3.do show MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry

DC

LMGR MPLS MPLS

LSR MPLS MPLS XCIN XCOUT

ENTITY XCIN XCOUT SEGMENT SEGMENT

LSR MPLS SEGMENT SEGMENT MPLS MPLS XCOPER IF IF

INDEX XCINDEX INDEX INDEX XCOWNER STATUS INDEX INDEX

---

1 3 0 2 snmp up 0 16

1 4 3 3 snmp up 15 45

4. route -n

40.0.4.32 0.0.0.0 255.255.255.255 UH 5 0 0 tnnlXX

5. ip link show

interface by the name tnnlXX

XX= XC handle assigned by CP (unsigned long)

Test Input – 2 -A)

Using Spirent , send MPLS packet (label = 35) from Spirent port 9/3 .

Expected Output

MPLS packet (label = 40 | 50) should be received at Spirent port 9/4

(Traffic is received at DUT on interface eth0 , label is configured to perform a swap operation followed by exit via tnnl interafce)

3.11 Delete Tunnel in Tunnel at Transit

This test case involves two deletion scenarios:

a) Outer tunnel XC is deleted

b) Underlying tunnel deleted

Test Input for a)

Test input for test 3.1 and 3.10followed by :

no MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry 1 4 3 3

commit

top

no MPLS-LSR-STD-MIB mplsInSegmentTable mplsInSegmentEntry 1 3

commit

top

no MPLS-LSR-STD-MIB mplsOutSegmentTable mplsOutSegmentEntry 1 3

commit

top

Expected Output

1. DC

LMGR MPLS MPLS

LSR MPLS MPLS XCIN XCOUT

ENTITY XCIN XCOUT SEGMENT SEGMENT

LSR MPLS SEGMENT SEGMENT MPLS MPLS XCOPER IF IF

INDEX XCINDEX INDEX INDEX XCOWNER STATUS INDEX INDEX

---

1 3 0 2 snmp up 0 16

2. ngctl list

These nodes no longer exist:

mplsnhlfe_YY, mplsnhlfe_YY_40, mplsether_YY, mux_eth0, split_eth0

Test Input for b)

Test case 3.1 and 3.10 followed by:

no DC-RLDF-MIB dcLmgrLdfFtnStaticTable dcLmgrLdfFtnStaticEntry 1 1 ipv4 28:00:04:20 32

commit

top

no MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry 1 3 0 2

commit

top

Expected Output

1. do show MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry

DC

LMGR MPLS MPLS

LSR MPLS MPLS XCIN XCOUT

ENTITY XCIN XCOUT SEGMENT SEGMENT

LSR MPLS SEGMENT SEGMENT MPLS MPLS XCOPER IF IF

INDEX XCINDEX INDEX INDEX XCOWNER STATUS INDEX INDEX

---

1 4 3 3 snmp lowerLayerDown 15 45

2. do show DC-RLDF-MIB dcLmgrLdfFtnStaticTable dcLmgrLdfFtnStaticEntry

% No entries found.

3. ngctl list

None of these nodes should exist :

mplsnhlfe_YY, mplsnhlfe_YY_40, mplsether_YY,

tnnlXX, mux_XX, mplsnhlfe_XX, mplsether_YY,

split_eth1, mux_eth1, split_eth0, mux_eth0

Test Input – 2 -A)

Using Spirent , send MPLS packet (label = 35) from Spirent port 9/3 .

Expected Output

No packet should be received at Spirent port 9/4

(Traffic is received at DUT on interface eth0 , no associated label configuration exists, packet is dropped)

3.12 Label stacking at Ingress

This test case tests case where multipla labels are pushed together at ingress .

Test input-1

MPLS-LSR-STD-MIB mplsOutSegmentTable mplsOutSegmentEntry 1 4

mplsOutSegmentInterface 43

mplsOutSegmentPushTopLabel true mplsOutSegmentTopLabel 50

commit

top

MPLS-LSR-STD-MIB mplsLabelStackTable mplsLabelStackEntry 1 1 1 mplsLabelStackLabel 20

commit

top

MPLS-LSR-STD-MIB mplsLabelStackTable mplsLabelStackEntry 1 1 2 mplsLabelStackLabel 30

commit

top

MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry 1 3 0 2 mplsXCAutoStaticXC yes mplsXCAdminStatus up mplsXCLspId 00:00:00:03 mplsXCLabelStackIndex 1

commit

top

DC-RLDF-MIB dcLmgrLdfFtnStaticTable dcLmgrLdfFtnStaticEntry 1 1 ipv4 28:00:04:20 32 dcLmgrLdfFtnStatOutLbl 40 dcLmgrLdfFtnStatOutIfIdx 16

commit

top

Expected Output

1. do show MPLS-LSR-STD-MIB mplsLabelStackTable mplsLabelStackEntry

DC

LMGR MPLS MPLS

LSR MPLS LABEL LABEL

ENTITY LABEL STACK STACK

LSR STACK LABEL LABEL

INDEX INDEX INDEX PTR

---

1 1 1

1 1 2

2. do show MPLS-LSR-STD-MIB mplsXCTable mplsXCEntry

DC

LMGR MPLS MPLS

LSR MPLS MPLS XCIN XCOUT

ENTITY XCIN XCOUT SEGMENT SEGMENT

LSR MPLS SEGMENT SEGMENT MPLS MPLS XCOPER IF IF

INDEX XCINDEX INDEX INDEX XCOWNER STATUS INDEX INDEX

---

1 3 0 2 snmp up 0 16

3. ngctl list

Check for these VNB nodes:

tnnlXX, mux_XX, mplsnhlfe_XX, mplsnhlfe_XX_20, mplsnhlfe_XX_40, mplsether_XX, split_eth1, mux_eth1

4. route -n

40.0.4.32 0.0.0.0 255.255.255.255 UH 5 0 0 tnnlXX

5. ip link show

A new interface named tnnlXX

Test Input-2

Using spirent send IP packet with dip = 40.0.4.32 from port 9/3

Expected Output

MPLS labeled packet (40 | 20 | 30) should be received at port 9/4