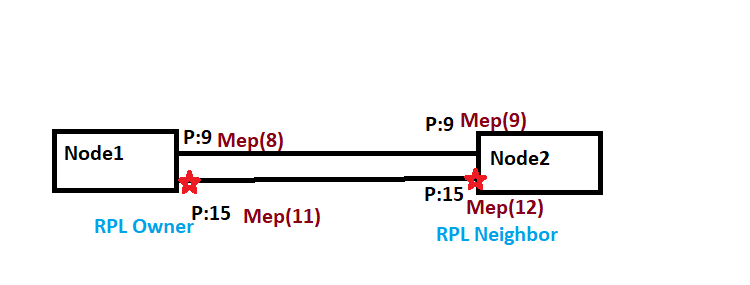
## Configuring ERPS Over Ethernet (VSI Model)

### Topology

Below 2 Node setup shows ring topology configured for Ethernet model.



#### **At Node 1:**

ISS# configure terminal

ISS(config)# set gvrp disable

ISS(config)# set gmrp disable

ISS(config)# shu span

ISS(config)# shutdown garp

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# set cli pa off

ISS(config)# vlan 1

ISS(config-vlan)# no ports

ISS(config-vlan)# end

ISS#

ISS# configure terminal

ISS(config)# interface gi 0/13

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS#

ISS# configure terminal

ISS(config)# interface gi 0/15

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS# configure terminal

ISS(config)# interface gi 0/9

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS#

ISS#

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/15.100

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/9.100

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS#

ISS# #################control vep

ISS# c t

ISS(config)# vsi 4100

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# ports add ac-gi 0/15.100 ac-gi 0/9.100

ISS(config-vsi)# no sh

ISS(config-vsi)# end

ISS# ############data vep

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/15.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/9.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS# configure terminal

ISS(config)# interface ac gi 0/13.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# ethernet cfm start

ISS(config)# ethernet cfm enable

ISS(config)# end

ISS# configure terminal

ISS(config)# ethernet cfm y1731 enable

ISS(config)# ethernet cfm offload

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# ethernet cfm domain format dns-like-name name CUS5 level 4

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 11 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 12 vsi 4100

ISS(config-ether-ecfm)# end

ISS# configure terminal

ISS(config)# ethernet cfm domain format dns-like-name name CUS4 level 4

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 8 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 9 vsi 4100

ISS(config-ether-ecfm)# exit

ISS(config)# ethernet cfm cc level 4 vsi 4100 interval three-hundred-hertz

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/9.100

ISS(config-vep)# ethernet cfm mep level 4 mpid 8 vsi 4100 active

ISS(config-vep-ether-mep)# end

ISS# configure terminal

ISS(config)# interface ac gi 0/15.100

ISS(config-vep)# ethernet cfm mep level 4 mpid 11 vsi 4100 active

ISS(config-vep-ether-mep)# end

ISS# configure terminal

ISS(config)# switch default

ISS(config-switch)# ethernet cfm cc enable level 4 vsi 4100

ISS(config-switch)# end

ISS# c t

ISS(config)# vsi 4200

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# no shu

ISS(config-vsi)# end

ISS# configure terminal

ISS(config)# no shutdown aps ring

ISS(config)# aps ring enable

ISS(config)# end

ISS# configure terminal

ISS(config)# aps ring group 1

ISS(config-ring)# aps working ac-gi 0/15.100 ac-gi 0/9.100 vlan 4100

ISS(config-ring)# aps working meg 1 me 1 mep 11 meg 2 me 1 mep 8

ISS(config-ring)# aps map working-data-vep ac-gi 0/15.200 ac-gi 0/9.200 vsi 4200

ISS(config-ring)# aps revert wtr 5 seconds

ISS(config-ring)# aps protect ac-gi 0/15.100

ISS(config-ring)# end

ISS#

ISS# ################port addition into VSI

ISS# c t

ISS(config)# vsi 4200

ISS(config-vsi)# ports add ac-gi 0/15.200

ISS(config-vsi)# ports add ac-gi 0/9.200

ISS(config-vsi)# end

ISS# ################Ring active

ISS# c terminal

ISS(config)# ap ri gr 1

ISS(config-ring)# ap gr ac

ISS(config-ring)# end

#### **At Node 2:**

ISS# configure terminal

ISS(config)# set gvrp disable

ISS(config)# set gmrp disable

ISS(config)# shu span

ISS(config)# shutdown garp

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# set cli pa off

ISS(config)# vlan 1

ISS(config-vlan)# no ports

ISS(config-vlan)# end

ISS#

ISS# configure terminal

ISS(config)# interface gi 0/13

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS#

ISS# configure terminal

ISS(config)# interface gi 0/15

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS# configure terminal

ISS(config)# interface gi 0/9

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS#

ISS#

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/15.100

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/9.100

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS#

ISS# #################control vep

ISS# c t

ISS(config)# vsi 4100

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# ports add ac-gi 0/15.100 ac-gi 0/9.100

ISS(config-vsi)# no sh

ISS(config-vsi)# end

ISS# ############data vep

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/15.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/9.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS# configure terminal

ISS(config)# interface ac gi 0/13.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# ethernet cfm start

ISS(config)# ethernet cfm enable

ISS(config)# end

ISS# configure terminal

ISS(config)# ethernet cfm y1731 enable

ISS(config)# ethernet cfm offload

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# ethernet cfm domain format dns-like-name name CUS5 level 4

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 11 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 12 vsi 4100

ISS(config-ether-ecfm)# end

ISS# configure terminal

ISS(config)# ethernet cfm domain format dns-like-name name CUS4 level 4

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 8 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 9 vsi 4100

ISS(config-ether-ecfm)# exit

ISS(config)# ethernet cfm cc level 4 vsi 4100 interval three-hundred-hertz

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/9.100

ISS(config-vep)# ethernet cfm mep level 4 mpid 9 vsi 4100 active

ISS(config-vep-ether-mep)# end

ISS# configure terminal

ISS(config)# interface ac gi 0/15.100

ISS(config-vep)# ethernet cfm mep level 4 mpid 12 vsi 4100 active

ISS(config-vep-ether-mep)# end

ISS# configure terminal

ISS(config)# switch default

ISS(config-switch)# ethernet cfm cc enable level 4 vsi 4100

ISS(config-switch)# end

ISS# c t

ISS(config)# vsi 4200

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# no shu

ISS(config-vsi)# end

ISS# configure terminal

ISS(config)# no shutdown aps ring

ISS(config)# aps ring enable

ISS(config)# end

ISS# configure terminal

ISS(config)# aps ring group 1

ISS(config-ring)# aps working ac-gi 0/15.100 ac-gi 0/9.100 vlan 4100

ISS(config-ring)# aps working meg 1 me 1 mep 12 meg 2 me 1 mep 9

ISS(config-ring)# aps map working-data-vep ac-gi 0/15.200 ac-gi 0/9.200 vsi 4200

ISS(config-ring)# aps revert wtr 5 seconds

ISS(config-ring)# aps neighbor ac-gi 0/15.100

ISS(config-ring)# end

ISS#

ISS# ################port addition into VSI

ISS# c t

ISS(config)# vsi 4200

ISS(config-vsi)# ports add ac-gi 0/15.200

ISS(config-vsi)# ports add ac-gi 0/9.200

ISS(config-vsi)# end

ISS# ################Ring active

ISS# c terminal

ISS(config)# ap ri gr 1

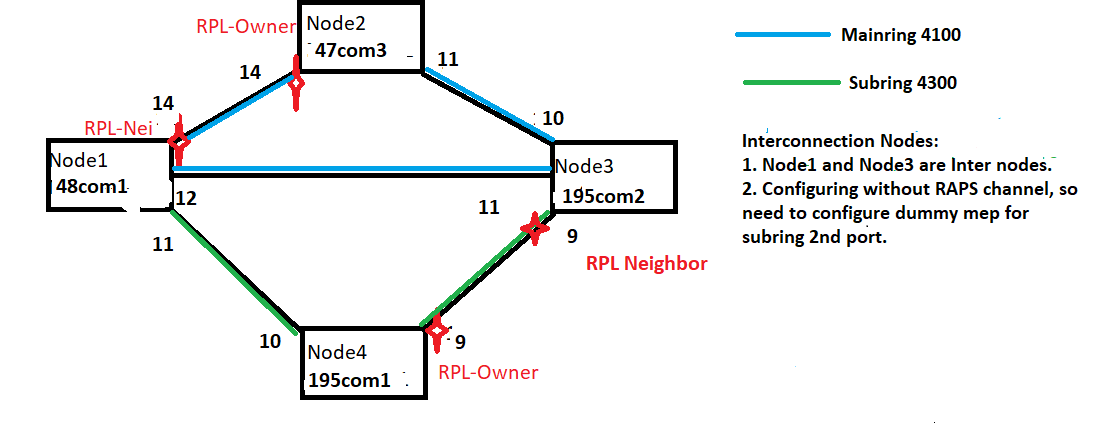
ISS(config-ring)# ap gr ac

ISS(config-ring)# end

## Configuring ERPS Subring (VSI Model)

### Topology

Below setup shows 4 node ring topology configured for subring.



#### **At Node 1:**

ISS# configure terminal

ISS(config)# set gvrp disable

ISS(config)# set gmrp disable

ISS(config)# shu span

ISS(config)# shutdown garp

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# set cli pa off

ISS(config)# vlan 1

ISS(config-vlan)# no ports

ISS(config-vlan)# end

ISS#

ISS# configure terminal

ISS(config)# interface gi 0/12

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS#

ISS# configure terminal

ISS(config)# interface gi 0/14

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS#

ISS# configure terminal

ISS(config)# interface gi 0/12

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS#

ISS# configure terminal

ISS(config)# interface gi 0/11

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS#

ISS#

ISS# configure terminal

ISS(config)# interface gi 0/15

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS# configure terminal

ISS(config)# interface ac gi 0/14.100

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/12.100

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/11.100

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS# #################control vep

ISS# c t

ISS(config)# vsi 4100

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# ports add ac-gi 0/14.100 ac-gi 0/12.100

ISS(config-vsi)# no sh

ISS(config-vsi)# end

ISS# configure terminal

ISS(config)# interface ac gi 0/14.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/15.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS# configure terminal

ISS(config)# interface ac gi 0/12.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS# configure terminal

ISS(config)# interface ac gi 0/11.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/11.300

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/12.300

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS# configure terminal

ISS(config)# interface ac gi 0/14.300

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

/\* Enable Control VSI for Subring \*/

ISS# c t

ISS(config)# vsi 4300

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# ports add ac-gi 0/11.300 ac-gi 0/12.300 ac-gi 0/14.300

ISS(config-vsi)# no sh

ISS(config-vsi)# end

/\* Enabling ECFM for Mainring \*/

ISS# c t

ISS(config)# ethernet cfm start

ISS(config)# ethernet cfm enable

ISS(config)# end

ISS# configure terminal

ISS(config)# ethernet cfm y1731 enable

ISS(config)# ethernet cfm offload

ISS(config)# end

ISS# configure terminal

ISS(config)# ethernet cfm domain format dns-like-name name CUS5 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 111 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 112 vsi 4100

ISS(config-ether-ecfm)# end

ISS# configure terminal

ISS(config)# ethernet cfm domain format dns-like-name name CUS4 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 18 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 17 vsi 4100

ISS(config-ether-ecfm)# exit

ISS(config)# ethernet cfm cc level 6 vsi 4100 interval one-sec

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/12.100

ISS(config-vep)# ethernet cfm mep level 6 mpid 18 vsi 4100 active

ISS(config-vep-ether-mep)# end

ISS# configure terminal

ISS(config)# interface ac gi 0/14.100

ISS(config-vep)# ethernet cfm mep level 6 mpid 111 vsi 4100 active

ISS(config-vep-ether-mep)# end

ISS#

ISS#

ISS# configure terminal

ISS(config)# switch default

ISS(config-switch)# ethernet cfm cc enable level 6 vsi 4100

ISS(config-switch)# end

ISS#

/\*Enable ECFM for Subring 1st port \*/

ISS# configure terminal

ISS(config)# ethernet cfm domain format dns-like-name name CUS6 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 4300

ISS(config-ether-ecfm)# mep crosscheck mpid 11 vsi 4300

ISS(config-ether-ecfm)# mep crosscheck mpid 12 vsi 4300

ISS(config-ether-ecfm)# exit

ISS(config)# ethernet cfm cc level 6 vsi 4300 interval one-sec

ISS(config)# ethernet cfm cc enable level 6 vlan 4300

ISS(config)# end

ISS# configure terminal

ISS(config)# interface ac gi 0/11.300

ISS(config-vep)# ethernet cfm mep level 6 mpid 11 vsi 4300 active

ISS(config-vep-ether-mep)# en

ISS# configure terminal

ISS(config)# switch default

ISS(config-switch)# ethernet cfm cc enable level 6 vsi 4300

ISS(config-switch)# end

/\* Dummy MEP creation for Subring 2nd port \*/

ISS# configure terminal

ISS(config)# switch default

ISS(config-switch)# ethernet cfm domain format dns-like-name name CUS8 level 7

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 4300

ISS(config-ether-ecfm)# mep crosscheck mpid 9 vsi 4300

ISS(config-ether-ecfm)# mep crosscheck mpid 10 vsi 4300

ISS(config-ether-ecfm)# end

ISS# configure terminal

ISS(config)# switch default

ISS(config-switch)# ethernet cfm domain format dns-like-name name CUS8 level 7

ISS(config-ether-ecfm)# service name CUSMA1 vlan 4300 mip-creation-criteria default

ISS(config-ether-ecfm)# end

/\*Create DATA VSI \*/

ISS# c t

ISS(config)# vsi 4200

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# no shu

ISS(config-vsi)# end

ISS# configure terminal

ISS(config)# no shutdown aps ring

ISS(config)# aps ring enable

ISS(config)# end

ISS# configure terminal

ISS(config)# aps ring group 1

ISS(config-ring)# aps working ac-gi 0/14.100 ac-gi 0/12.100 vlan 4100

ISS(config-ring)# aps working meg 1 me 1 mep 111 meg 2 me 1 mep 18

ISS(config-ring)# aps map working-data-vep ac-gi 0/14.200 ac-gi 0/12.200 vsi 4200

ISS(config-ring)# aps revert wtr 5 seconds

ISS(config-ring)# aps nei ac-gi 0/14.100

ISS(config-ring)# end

ISS# configure terminal

ISS(config)# aps ring group 2

ISS(config-ring)# aps working ac-gi 0/11.300 vlan 4300

ISS(config-ring)# aps working meg 3 me 1 mep 11 meg 4 me 1 mep 9

ISS(config-ring)# aps map working-data-vep ac-gi 0/11.200 vsi 4200

ISS(config-ring)# aps interconnection-node primary

ISS(config-ring)# aps multiple-failure primary

ISS(config-ring)# aps revert wtr 5 seconds

ISS(config-ring)# end

ISS#

/\* Associate Data vep ports in Data VSI \*/

ISS# c t

ISS(config)# vsi 4200

ISS(config-vsi)# ports add ac-gi 0/14.200

ISS(config-vsi)# ports add ac-gi 0/12.200

ISS(config-vsi)# ports add ac-gi 0/11.200

ISS(config-vsi)# ports add ac-gi 0/15.200

ISS(config-vsi)# end

ISS#

ISS# c t

ISS(config)# aps rin gr 1

ISS(config-ring)# aps gr ac

ISS(config-ring)# end

ISS# c t

ISS(config)# aps rin gr 2

ISS(config-ring)# aps gr ac

ISS(config-ring)# end

#### **At Node 2:**

ISS# configure terminal

ISS(config)# set gvrp disable

ISS(config)# set gmrp disable

ISS(config)# shut span

ISS(config)# shutdown garp

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# set cli pa off

ISS(config)# vlan 1

ISS(config-vlan)# no ports

ISS(config-vlan)# end

ISS#

ISS# configure terminal

ISS(config)# interface gi 0/14

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS#

ISS#

ISS# configure terminal

ISS(config)# interface gi 0/11

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS#

ISS#

ISS# configure terminal

ISS(config)# interface gi 0/3

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/14.100

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/11.100

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

/\* control vsi for mainring \*/

ISS# c t

ISS(config)# vsi 4100

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# ports add ac-gi 0/14.100 ac-gi 0/11.100

ISS(config-vsi)# no sh

ISS(config-vsi)# end

ISS# configure terminal

ISS(config)# interface ac gi 0/14.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/11.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/3.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

/\*Subring control VSI\*/

ISS# configure terminal

ISS(config)# interface ac gi 0/14.300

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/11.300

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# c t

ISS(config)# vsi 4300

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# ports add ac-gi 0/14.300 ac-gi 0/11.300

ISS(config-vsi)# no sh

ISS(config-vsi)# end

/\* Enabling ECFM \*/

ISS# configure terminal

ISS(config)# ethernet cfm start

ISS(config)# ethernet cfm enable

ISS(config)# end

ISS# configure terminal

ISS(config)# ethernet cfm y1731 enable

ISS(config)# ethe cfm offload

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# ethernet cfm domain format dns-like-name name CUS1 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 2 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 1 vsi 4100

ISS(config-ether-ecfm)# end

ISS# configure terminal

ISS(config)# ethernet cfm domain format dns-like-name name CUS5 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 112 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 111 vsi 4100

ISS(config-ether-ecfm)# exit

ISS(config)# ethernet cfm cc level 6 vsi 4100 interval one-sec

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/11.100

ISS(config-vep)# ethernet cfm mep level 6 mpid 2 vsi 4100 active

ISS(config-vep-ether-mep)# end

ISS# configure terminal

ISS(config)# interface ac gi 0/14.100

ISS(config-vep)# ethernet cfm mep level 6 mpid 112 vsi 4100 active

ISS(config-vep-ether-mep)# end

ISS# configure terminal

ISS(config)# switch default

ISS(config-switch)# ethernet cfm cc enable level 6 vsi 4100

ISS(config-switch)# end

/\*Creating Data VSI \*/

ISS# c t

ISS(config)# vsi 4200

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# no shu

ISS(config-vsi)# end

/\* Enable ERPS Ring \*/

ISS# c t

ISS(config)# no sh aps rin

ISS(config)# aps rin ena

ISS(config)# end

ISS# configure terminal

ISS(config)# aps ring group 1

ISS(config-ring)# aps working ac-gi 0/11.100 ac-gi 0/14.100 vlan 4100

ISS(config-ring)# aps working meg 1 me 1 mep 2 meg 2 me 1 mep 112

ISS(config-ring)# aps map working-data-vep ac-gi 0/11.200 ac-gi 0/14.200 vsi 4200

ISS(config-ring)# aps revert wtr 5 seconds

ISS(config-ring)# aps protect ac-gi 0/14.100

ISS(config-ring)# end

ISS# c t

ISS(config)# vsi 4200

ISS(config-vsi)# ports add ac-gi 0/11.200

ISS(config-vsi)# ports add ac-gi 0/14.200

ISS(config-vsi)# end

ISS# c t

ISS(config)# aps rin gr 1

ISS(config-ring)# aps gr ac

ISS(config-ring)# end

#### **At Node 3:**

ISS# configure terminal

ISS(config)# set gvrp disable

ISS(config)# set gmrp disable

ISS(config)# shutdown garp

ISS(config)# shut span

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# set cli pa off

ISS(config)# vlan 1

ISS(config-vlan)# no ports

ISS(config-vlan)# end

ISS# configure terminal

ISS(config)# interface gi 0/11

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS# configure terminal

ISS(config)# interface gi 0/9

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS# configure terminal

ISS(config)# interface gi 0/10

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS# configure terminal

ISS(config)# interface gi 0/13

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/11.100

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/10.100

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS# configure terminal

ISS(config)# interface ac gi 0/9.100

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

/\*Control VSI for Mainring \*/

ISS# c t

ISS(config)# vsi 4100

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# ports add ac-gi 0/11.100 ac-gi 0/10.100

ISS(config-vsi)# no sh

ISS(config-vsi)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/10.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/11.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS# configure terminal

ISS(config)# interface ac gi 0/13.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/9.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/9.300

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/11.300

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/10.300

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

/\* Control VSI for Subring \*/

ISS# c t

ISS(config)# vsi 4300

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# ports add ac-gi 0/9.300 ac-gi 0/10.300 ac-gi 0/11.300

ISS(config-vsi)# no sh

ISS(config-vsi)# end

/\* Enabling ECFM for Main Ring \*/

ISS# configure terminal

ISS(config)# ethernet cfm start

ISS(config)# ethernet cfm enable

ISS(config)# end

ISS# configure terminal

ISS(config)# ethernet cfm y1731 enable

ISS(config)# eth cfm offload

ISS(config)# end

ISS# configure terminal

ISS(config)# ethernet cfm domain format dns-like-name name CUS1 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 1 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 2 vsi 4100

ISS(config-ether-ecfm)# end

ISS# configure terminal

ISS(config)# ethernet cfm domain format dns-like-name name CUS4 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 17 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 18 vsi 4100

ISS(config-ether-ecfm)# exit

ISS(config)# ethernet cfm cc level 6 vsi 4100 interval one-sec

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/10.100

ISS(config-vep)# ethernet cfm mep level 6 mpid 1 vsi 4100 active

ISS(config-vep-ether-mep)# end

ISS# configure terminal

ISS(config)# interface ac gi 0/11.100

ISS(config-vep)# ethernet cfm mep level 6 mpid 17 vsi 4100 active

ISS(config-vep-ether-mep)# end

ISS#

ISS#

ISS# configure terminal

ISS(config)# switch default

ISS(config-switch)# ethernet cfm cc enable level 6 vsi 4100

ISS(config-switch)# end

/\* Enabling ECFM for Subring 1st port \*/

ISS# configure terminal

ISS(config)# ethernet cfm domain format dns-like-name name CUS7 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 4300

ISS(config-ether-ecfm)# mep crosscheck mpid 13 vsi 4300

ISS(config-ether-ecfm)# mep crosscheck mpid 14 vsi 4300

ISS(config-ether-ecfm)# exit

ISS(config)# ethernet cfm cc level 6 vsi 4300 interval one-sec

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/9.300

ISS(config-vep)# ethernet cfm mep level 6 mpid 14 vsi 4300 active

ISS(config-vep-ether-mep)# en

ISS#

ISS# configure terminal

ISS(config)# switch default

ISS(config-switch)# ethernet cfm cc enable level 6 vsi 4300

ISS(config-switch)# end

/\* Creating Dummy MEP for Subring 2nd port. \*/

ISS# c t

ISS(config)# switch default

ISS(config-switch)# ethernet cfm domain format dns-like-name name CUS8 level 7

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 4300

ISS(config-ether-ecfm)# mep crosscheck mpid 9 vsi 4300

ISS(config-ether-ecfm)# mep crosscheck mpid 10 vsi 4300

ISS(config-ether-ecfm)# end

ISS#

ISS# configure terminal

ISS(config)# switch default

ISS(config-switch)# ethernet cfm domain format dns-like-name name CUS8 level 7

ISS(config-ether-ecfm)# service name CUSMA1 vlan 4300 mip-creation-criteria default

ISS(config-ether-ecfm)# end

ISS#

/\* Creating Data VSI for both main and subring \*/

ISS# c t

ISS(config)# vsi 4200

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# no shu

ISS(config-vsi)# end

/\* Enabling ERPS Ring \*/

ISS# c t

ISS(config)# no sh aps rin

ISS(config)# aps rin ena

ISS(config)# end

ISS# configure terminal

ISS(config)# aps ring group 1

ISS(config-ring)# aps working ac-gi 0/10.100 ac-gi 0/11.100 vlan 4100

ISS(config-ring)# aps working meg 1 me 1 mep 1 meg 2 me 1 mep 17

ISS(config-ring)# aps map working-data-vep ac-gi 0/10.200 ac-gi 0/11.200 vsi 4200

ISS(config-ring)# aps revert wtr 5 seconds

ISS(config-ring)# end

ISS#

ISS# configure terminal

ISS(config)# aps ring group 2

ISS(config-ring)# aps working ac-gi 0/9.300 vlan 4300

ISS(config-ring)# aps working meg 3 me 1 mep 14 meg 4 me 1 mep 10

ISS(config-ring)# aps map working-data-vep ac-gi 0/9.200 vsi 4200

ISS(config-ring)# aps interconnection-node primary

ISS(config-ring)# aps multiple-failure primary

ISS(config-ring)# aps revert wtr 5 seconds

ISS(config-ring)# aps nei ac-gi 0/9.300

ISS(config-ring)# end

ISS# c t

ISS(config)# vsi 4200

ISS(config-vsi)# ports add ac-gi 0/10.200

ISS(config-vsi)# ports add ac-gi 0/9.200

ISS(config-vsi)# ports add ac-gi 0/11.200

ISS(config-vsi)# ports add ac-gi 0/13.200

ISS(config-vsi)# end

ISS#

ISS# c t

ISS(config)# aps rin gr 1

ISS(config-ring)# aps gr ac

ISS(config-ring)# end

ISS#

ISS# c t

ISS(config)# aps rin gr 2

ISS(config-ring)# aps gr ac

ISS(config-ring)# end

ISS#

#### **At Node 4:**

ISS# configure terminal

ISS(config)# set gvrp disable

ISS(config)# set gmrp disable

ISS(config)# shu span

ISS(config)# shutdown garp

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# set cli pa off

ISS(config)# vlan 1

ISS(config-vlan)# no ports

ISS(config-vlan)# end

ISS#

ISS# configure terminal

ISS(config)# interface gi 0/10

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS#

ISS# configure terminal

ISS(config)# interface gi 0/9

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS# configure terminal

ISS(config)# interface gi 0/10

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS#

ISS#

ISS#

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/9.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS# configure terminal

ISS(config)# interface ac gi 0/10.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS# configure terminal

ISS(config)# interface ac gi 0/10.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/9.300

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/10.300

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS# end

/\* Control VSI for Subring \*/

ISS# c t

ISS(config)# vsi 4300

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# ports add ac-gi 0/9.300 ac-gi 0/10.300

ISS(config-vsi)# no sh

ISS(config-vsi)# end

/\*Enabling ECFM \*/

ISS# configure terminal

ISS(config)# ethernet cfm start

ISS(config)# ethernet cfm enable

ISS(config)# end

ISS# configure terminal

ISS(config)# eth cfm off

ISS(config)# ethernet cfm y1731 enable

ISS(config)# end

ISS# c t

ISS(config)# switch default

ISS(config-switch)# ethernet cfm mip dynamic evaluation

ISS(config-switch)# ethernet cfm domain format dns-like-name name CUS6 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 4300

ISS(config-ether-ecfm)# mep crosscheck mpid 11 vsi 4300

ISS(config-ether-ecfm)# mep crosscheck mpid 12 vsi 4300

ISS(config-ether-ecfm)# end

ISS# configure terminal

ISS(config)# ethernet cfm domain format dns-like-name name CUS7 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 4300

ISS(config-ether-ecfm)# mep crosscheck mpid 13 vsi 4300

ISS(config-ether-ecfm)# mep crosscheck mpid 14 vsi 4300

ISS(config-ether-ecfm)# exit

ISS(config)# ethernet cfm cc level 6 vsi 4300 interval one-sec

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/9.300

ISS(config-vep)# ethernet cfm mep level 6 mpid 13 vsi 4300 active

ISS(config-vep-ether-mep)# end

ISS# configure terminal

ISS(config)# interface ac gi 0/10.300

ISS(config-vep)# ethernet cfm mep level 6 mpid 12 vsi 4300 active

ISS(config-vep-ether-mep)# end

ISS# configure terminal

ISS(config)# switch default

ISS(config-switch)# ethernet cfm cc enable level 6 vsi 4300

ISS(config-switch)# end

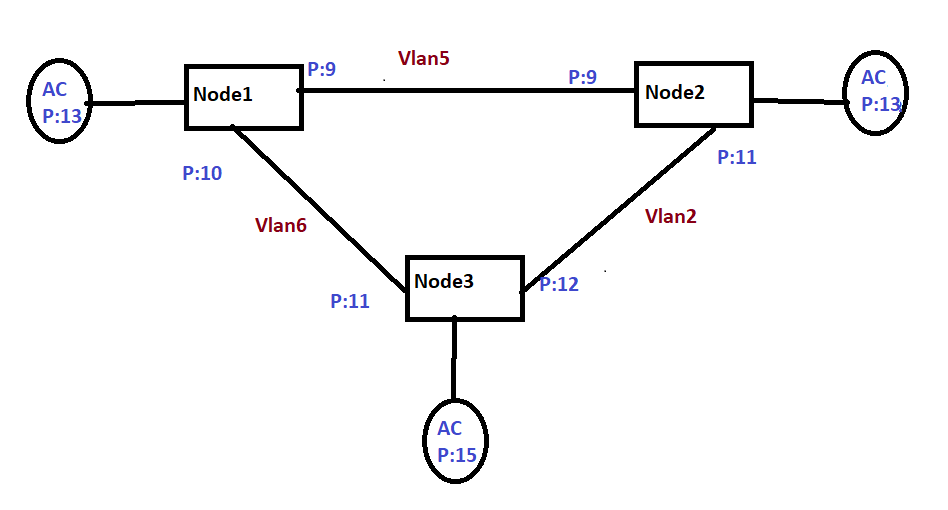
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#### 

## Configuring VPLS resiliency with MPLS-TP (ERPS over MPLS-TP – Failover Model Configs)

### Topology

Below setup shows 3 node ring topology configured for VPLS-RESILIENCY.



### Configuring ERPS RING

#### **At Node 1:**

1. Enter the Global Configuration mode.

**iss**# configure terminal

2. Disable gmrp and gvrp. Shutdown STP and start CFM.

**iss(config)# switch default**

**iss(config-switch)# shutdown spanning-tree**

**iss(config-switch)# set gmrp** disable

**iss(config-switch)# set gvrp** disable

**iss(config-switch)# shutdown garp**

**iss(config-switch)# end**

3.Configure Tunnel and Enable MPLS on port.

iss# c t

iss(config)# in gi 0/10

iss(config-if)# no shu

iss(config-if)# end

iss#

iss# c t

iss(config)# in gi 0/9

iss(config-if)# no shu

iss(config-if)# end

iss# c t

iss(config)# vlan 5

iss(config-vlan)# ports gig 0/9

iss(config-vlan)# end

iss#

iss# c t

iss(config)# vlan 6

iss(config-vlan)# ports gig 0/10

iss(config-vlan)# end

iss#

iss# c t

iss(config)# interface vlan 5

iss(config-if)# shutdown

iss(config-if)# ip unnumbered 01:00:5E:90:00:00

iss(config-if)# no shutdown

iss(config-if)# mpls ip

iss(config-if)# exit

iss(config)# en

iss#

iss# co t

iss(config)# interface vlan 6

iss(config-if)# shutdown

iss(config-if)# ip unnumbered 01:00:5E:90:00:00

iss(config-if)# no shutdown

iss(config-if)# mpls ip

iss(config)# end

iss# c t

iss(config)# mpls global-id 100 icc-id ARI123 node-id 301

iss(config)# mpls node-map-id local-map-num 10 global-id 100 node-id 101

iss(config)# mpls node-map-id local-map-num 20 global-id 100 node-id 201

iss(config)# mpls node-map-id local-map-num 30 global-id 100 node-id 301

iss(config)# end

iss# c t

iss(config)# interface mplstunnel 10

iss(config-if)# tunnel mpls destination 30 source 10 lsp-num 1

Warning: More than one tunnel can be created in the tunnel mode with the same tunnel number. In case of multiple tunnels with the same tunnel number,the tunnel specific configurations should be done inside the 'config-if-lsp'mode to associate the configurations with that specific tunnel.

iss(config-if-lsp)# tunnel mode corouted-bidirectional

iss(config-if-lsp)# tunnel type mpls-tp

iss(config-if-lsp)# tunnel mpls static in-label 200007 vlan 5 direction forward

iss(config-if-lsp)# tunnel mpls static out-label 200008 vlan 5 direction reverse

iss(config-if-lsp)# no shutdown

iss(config-if-lsp)# exit

iss(config-if)# end

iss#

iss# c t

iss(config)# interface mplstunnel 12

iss(config-if)# tunnel mpls destination 30 source 20 lsp-num 1

Warning: More than one tunnel can be created in the tunnel mode with the same tunnel number. In case of multiple tunnels with the same tunnel number,the tunnel specific configurations should be done inside the 'config-if-lsp'mode to associate the configurations with that specific tunnel.

iss(config-if-lsp)# tunnel mode corouted-bidirectional

iss(config-if-lsp)# tunnel type mpls-tp

iss(config-if-lsp)# tunnel mpls static in-label 200003 vlan 6 direction forward

iss(config-if-lsp)# tunnel mpls static out-label 200004 vlan 6 direction reverse

iss(config-if-lsp)# no shutdown

iss(config-if-lsp)# end

4.Configure VSI for AC(Attachment circuit) port.

iss# c t

iss(config)# in gi 0/13

iss(config-if)# vep-mode access

iss(config-if)# vep-encap-type dot1q-vep

iss(config-if)# map sw default

iss(config-if)# no sh

iss(config-if)# end

iss# c t

iss(config)# int ac gi 0/13.100

iss(config-vep)# map sw default

iss(config-vep)# no sh

iss(config-vep)# end

#####Control VSI

iss# c t

iss(config)# vsi 6150

iss(config-vsi)# vsi vep-type any

iss(config-vsi)# vsi service-type multipoint-to-multipoint

iss(config-vsi)# ports add ac-gi 0/13.100

iss(config-vsi)# no sh

iss(config-vsi)# end

iss# c t

iss(config)# int ac gi 0/13.200

iss(config-vep)# map sw default

iss(config-vep)# no sh

iss(config-vep)# end

###Data VSI

iss# c t

iss(config)# vsi 6151

iss(config-vsi)# vsi vep-type any

iss(config-vsi)# vsi service-type multipoint-to-multipoint

iss(config-vsi)# ports add ac-gi 0/13.200

iss(config-vsi)# no sh

iss(config-vsi)# end

5.Configure VPN and Pseudowire for Control and Data Pseudowire.

iss# c t

iss(config)# l2 vfi VFI1 manual

iss(config-vfi)# vpn 11 fdb 6150

iss(config-vfi)# neighbor global-id 100 node-id 20 genfec agi AG123456 src-ac-id 30 dst-ac-id 20 pwid 12 locallabel 250004

remotelabel 250003 encapsulation mpls no-split-horizon mplstype te 12 12

iss(config-vfi)# neighbor global-id 100 node-id 10 genfec agi AG123456 src-ac-id 30 dst-ac-id 10 pwid 2 locallabel 250007

remotelabel 250008 encapsulation mpls no-split-horizon mplstype te 10 10

iss(config-vfi)# end

iss#

iss# c t

iss(config)# l2 vfi VFI2 manual

iss(config-vfi)# vpn 12 fdb 6151

iss(config-vfi)# neighbor global-id 100 node-id 20 genfec agi AG123456 src-ac-id 30 dst-ac-id 20 pwid 14 locallabel 270004 remotelabel 270003 encapsulation mpls no-split-horizon mplstype te 12 12

iss(config-vfi)# neighbor global-id 100 node-id 10 genfec agi AG123456 src-ac-id 30 dst-ac-id 10 pwid 4 locallabel 270007 remotelabel 270008 encapsulation mpls no-split-horizon mplstype te 10 10

iss(config-vfi)# end

6.Create control pseudowire interface and enable ECFM.

iss# c t

iss(config)# in pw 2

iss(config-if)# no shutdown

iss(config-if)# ethernet cfm enable

iss(config-if)# ethernet cfm y1731 enable

iss(config-if)# en

iss#

iss# c t

iss(config)# in pw 12

iss(config-if)# no shutdown

iss(config-if)# ethernet cfm enable

iss(config-if)# ethernet cfm y1731 enable

iss(config-if)# en

7. Create Data Pseudowire Interface.

iss# c t

iss(config)# in pw 4

iss(config-if)# no shutdown

iss(config-if)# en

iss#

iss# c t

iss(config)# in pw 14

iss(config-if)# no shutdown

iss(config-if)# en

8. Map MPLS pseudowire and created control pseudowire interface.

iss# c t

iss(config)# map pwid 2 pw 2

iss(config)# map pwid 12 pw 12

iss(config)# map pwid 4 pw 4

iss(config)# map pwid 14 pw 14

iss(config)# end

9.Configure ECFM on control pseudowire.

iss# c t

iss(config)# ethernet cfm start

iss(config)# ethernet cfm enable

iss(config)# ethernet cfm domain format dns-like-name name CUS6 level 6

iss(config-ether-ecfm)# service format char-string name CUSMA1 vsi 6150

iss(config-ether-ecfm)# mep crosscheck mpid 1 vsi 6150

iss(config-ether-ecfm)# en

iss# c t

iss(config)# eth cfm start

iss(config)# eth cfm ena

iss(config)# ethernet cfm domain format dns-like-name name CUS2 level 6

iss(config-ether-ecfm)# service format char-string name CUSMA1 vsi 6150

iss(config-ether-ecfm)# mep crosscheck mpid 1 vsi 6150

iss(config-ether-ecfm)# en

iss# c t

iss(config)# in pw 2

iss(config-if)# ethernet cfm mep domain CUS6 mpid 1 service CUSMA1 active

iss(config-ether-mep)# en

iss#

iss# c t

iss(config)# in pw 12

iss(config-if)# ethernet cfm mep domain CUS2 mpid 1 service CUSMA1 active

iss(config-ether-mep)# en

10.Enable BFD for monitoring control RAPS(control pseudowire)

iss# c t

iss(config)# bfd global offload

iss(config)# end

iss# c t

iss(config)# mpls oam enable

iss(config)# mpls oam meg meg1

iss(config-meg)# service me1

iss(config-meg)# mpls oam mep service me1 lsp 10 1 10 30

iss(config-meg)# end

iss# configure terminal

iss(config)# bfd session 12

iss(config-bfdsess)# bfd params sess-type single-hop

iss(config-bfdsess)# bfd mpls meg-name meg1 me-name me1

iss(config-bfdsess)# bfd params mode cc

iss(config-bfdsess)# bfd enable

iss(config-bfdsess)# en

iss# configure terminal

iss(config)# mpls oam enable

iss(config)# mpls oam meg meg2

iss(config-meg)# service me1

iss(config-meg)# mpls oam mep service me1 lsp 12 1 20 30

iss(config-meg)# end

iss#

iss# c t

iss(config)# bfd session 13

iss(config-bfdsess)# bfd params sess-type single-hop

iss(config-bfdsess)# bfd mpls meg-name meg2 me-name me1

iss(config-bfdsess)# bfd params mode cc

iss(config-bfdsess)# bfd enable

iss(config-bfdsess)# en

11.Configuring ERPS for control and data pseudowire.

iss# c t

iss(config)# no shutdown aps ring

iss(config)# aps ring enable

iss(config)# aps ring group 1

iss(config-ring)# aps monitor mplsoam

iss(config-ring)# aps service mpls-lsp-pw

iss(config-ring)# aps compatible version v2

iss(config-ring)# aps working pw 2 pw 12 vlan 6150

iss(config-ring)# aps working pseudo-wire 2 pseudo-wire 12

iss(config-ring)# aps working meg 1 me 1 mep 1 meg 2 me 1 mep 1

iss(config-ring)# aps working subportlist pw 4 subportlist pw 14

iss(config-ring)# aps revert wtr 3 seconds

iss(config-ring)# aps neighbor pw 2

iss(config-ring)# end

12. Enable MPLS-Crossconnect for both control and data VSI

iss# c t

iss(config)# int ac gi 0/13.100

iss(config-vep)# no sh

iss(config-vep)# xconnect vfi VFI1

Warning: The Ethernet port ac gigabiteth 0/13.100 configured as AC-interface should NOT be a PSN port

iss(config-vep)# end

iss# c t

iss(config)# int ac gi 0/13.200

iss(config-vep)# no sh

iss(config-vep)# xconnect vfi VFI2

Warning: The Ethernet port ac gigabiteth 0/13.200 configured as AC-interface should NOT be a PSN port

iss(config-vep)# end

/\* The following steps to shut an no-shut the interface must be followed \*\*\*/

iss# c t

iss(config)# in gi 0/10

iss(config-if)# shu

iss(config-if)# end

iss#

iss# c t

iss(config)# in gi 0/10

iss(config-if)# no shu

iss(config-if)# end

iss#

iss#

iss# c t

iss(config)# in gi 0/9

iss(config-if)# shu

iss(config-if)# end

iss#

iss# c t

iss(config)# in gi 0/9

iss(config-if)# no shu

iss(config-if)# end

13. Configuring Ring group active

iss# c t

iss(config)# aps ring gr 1

iss(config-ring)# aps group activ

iss(config-ring)# end

#### **At Node 2:**

1. Enter the Global Configuration mode.

**iss**# configure terminal

2. Disable gmrp and gvrp. Shutdown STP and start CFM.

**iss(config)# switch default**

**iss(config-switch)# shutdown spanning-tree**

**iss(config-switch)# set gmrp** disable

**iss(config-switch)# set gvrp** disable

**iss(config-switch)# shutdown garp**

**iss(config-switch)# end**

3.Configure Tunnel and Enable MPLS on port.

iss# c t

iss(config)# in gi 0/9

iss(config-if)# no shu

iss(config-if)# end

iss#

iss# c t

iss(config)# in gi 0/11

iss(config-if)# no shu

iss(config-if)# end

iss# c t

iss(config)# vlan 5

iss(config-vlan)# ports gig 0/9

iss(config-vlan)# end

iss#

iss# c t

iss(config)# vlan 2

iss(config-vlan)# ports gig 0/11

iss(config-vlan)# end

iss#

iss# c t

iss(config)# interface vlan 5

iss(config-if)# shutdown

iss(config-if)# ip unnumbered 01:00:5E:90:00:00

iss(config-if)# no shutdown

iss(config-if)# mpls ip

iss(config-if)# exit

iss(config)# en

iss#

iss# co t

iss(config)# interface vlan 2

iss(config-if)# shutdown

iss(config-if)# ip unnumbered 01:00:5E:90:00:00

iss(config-if)# no shutdown

iss(config-if)# mpls ip

iss(config)# end

iss# c t

iss(config)# mpls global-id 100 icc-id ARI123 node-id 101

iss(config)# mpls node-map-id local-map-num 10 global-id 100 node-id 101

iss(config)# mpls node-map-id local-map-num 20 global-id 100 node-id 201

iss(config)# mpls node-map-id local-map-num 30 global-id 100 node-id 301

iss(config)# end

iss# c t

iss(config)# interface mplstunnel 11

iss(config-if)# tunnel mpls destination 20 source 10 lsp-num 1

Warning: More than one tunnel can be created in the tunnel mode with the same tunnel number. In case of multiple tunnels with the same tunnel number,the tunnel specific configurations should be done inside the 'config-if-lsp'mode to associate the configurations with that specific tunnel.

iss(config-if-lsp)# tunnel mode corouted-bidirectional

iss(config-if-lsp)# tunnel type mpls-tp

iss(config-if-lsp)# tunnel mpls static out-label 200002 vlan 2 direction forward

iss(config-if-lsp)# tunnel mpls static in-label 200001 vlan 2 direction reverse

iss(config-if-lsp)# no shutdown

iss(config-if-lsp)# exit

iss(config-if)# end

iss# c t

iss(config)# interface mplstunnel 10

iss(config-if)# tunnel mpls destination 30 source 10 lsp-num 1

Warning: More than one tunnel can be created in the tunnel mode with the same tunnel number. In case of multiple tunnels with the same tunnel number,the tunnel specific configurations should be done inside the 'config-if-lsp'mode to associate the configurations with that specific tunnel.

iss(config-if-lsp)# tunnel mode corouted-bidirectional

iss(config-if-lsp)# tunnel type mpls-tp

iss(config-if-lsp)# tunnel mpls static out-label 200007 vlan 5 direction forward

iss(config-if-lsp)# tunnel mpls static in-label 200008 vlan 5 direction reverse

iss(config-if-lsp)# no shutdown

iss(config-if-lsp)# end

4.Configure VSI for AC(Attachment circuit) port.

iss# c t

iss(config)# in gi 0/13

iss(config-if)# vep-mode access

iss(config-if)# vep-encap-type dot1q-vep

iss(config-if)# map sw default

iss(config-if)# no sh

iss(config-if)# end

iss# c t

iss(config)# int ac gi 0/13.100

iss(config-vep)# map sw default

iss(config-vep)# no sh

iss(config-vep)# end

#####Control VSI

iss# c t

iss(config)# vsi 6150

iss(config-vsi)# vsi vep-type any

iss(config-vsi)# vsi service-type multipoint-to-multipoint

iss(config-vsi)# ports add ac-gi 0/13.100

iss(config-vsi)# no sh

iss(config-vsi)# end

iss# c t

iss(config)# int ac gi 0/13.200

iss(config-vep)# map sw default

iss(config-vep)# no sh

iss(config-vep)# end

###Data VSI

iss# c t

iss(config)# vsi 6151

iss(config-vsi)# vsi vep-type any

iss(config-vsi)# vsi service-type multipoint-to-multipoint

iss(config-vsi)# ports add ac-gi 0/13.200

iss(config-vsi)# no sh

iss(config-vsi)# end

5.Configure VPN and Pseudowire for Control and Data Pseudowire.

iss# c t

iss(config)# l2 vfi VFI1 manual

iss(config-vfi)# vpn 11 fdb 6150

iss(config-vfi)# neighbor global-id 100 node-id 20 genfec agi AG123456 src-ac-id 10 dst-ac-id 20 pwid 1 locallabel 250001 remotelabel 250002 encapsulation mpls no-split-horizon mplstype te 11 11

iss(config-vfi)# neighbor global-id 100 node-id 30 genfec agi AG123456 src-ac-id 10 dst-ac-id 30 pwid 2 locallabel 250008 remotelabel 250007 encapsulation mpls no-split-horizon mplstype te 10 10

iss(config-vfi)# end

iss# c t

iss(config)# l2 vfi VFI2 manual

iss(config-vfi)# vpn 12 fdb 6151

iss(config-vfi)# neighbor global-id 100 node-id 20 genfec agi AG123456 src-ac-id 10 dst-ac-id 20 pwid 3 locallabel 270001 remotelabel 270002 encapsulation mpls no-split-horizon mplstype te 11 11

iss(config-vfi)# neighbor global-id 100 node-id 30 genfec agi AG123456 src-ac-id 10 dst-ac-id 30 pwid 4 locallabel 270008 remotelabel 270007 encapsulation mpls no-split-horizon mplstype te 10 10

iss(config-vfi)# end

6.Create control pseudowire interface and enable ECFM.

iss# c t

iss(config)# in pw 1

iss(config-if)# no shutdown

iss(config-if)# ethernet cfm enable

iss(config-if)# ethernet cfm y1731 enable

iss(config-if)# en

iss#

iss# c t

iss(config)# in pw 2

iss(config-if)# no shutdown

iss(config-if)# ethernet cfm enable

iss(config-if)# ethernet cfm y1731 enable

iss(config-if)# en

7. Create Data Pseudowire Interface.

iss# c t

iss(config)# in pw 3

iss(config-if)# no shutdown

iss(config-if)# en

iss#

iss# c t

iss(config)# in pw 4

iss(config-if)# no shutdown

iss(config-if)# en

8. Map MPLS pseudowire and created control pseudowire interface.

iss# c t

iss(config)# map pwid 2 pw 2

iss(config)# map pwid 1 pw 1

iss(config)# map pwid 4 pw 4

iss(config)# map pwid 3 pw 3

iss(config)# end

9.Configure ECFM on control pseudowire.

iss# c t

iss(config)# ethernet cfm start

iss(config)# ethernet cfm enable

iss(config)# end

iss# c t

iss(config)# ethernet cfm domain format char-string name CUS1 level 6

iss(config-ether-ecfm)# service format char-string name CUSMA1 vsi 6150

iss(config-ether-ecfm)# mep crosscheck mpid 1 vsi 6150

iss(config-ether-ecfm)# en

iss#

iss# c t

iss(config)# ethernet cfm domain format char-string name CUS6 level 6

iss(config-ether-ecfm)# service format char-string name CUSMA1 vsi 6150

iss(config-ether-ecfm)# mep crosscheck mpid 1 vsi 6150

iss(config-ether-ecfm)# en

iss#

iss#

iss# c t

iss(config)# in pw 1

iss(config-if)# ethernet cfm mep domain CUS1 mpid 1 service CUSMA1 active

iss(config-ether-mep)# en

iss#

iss# c t

iss(config)# in pw 2

iss(config-if)# ethernet cfm mep domain CUS6 mpid 1 service CUSMA1 activeiss(config-ether-mep)# end

10.Enable BFD for monitoring control RAPS(control pseudowire)

iss# c t

iss(config)# bfd global offload

iss(config)# end

iss# configure terminal

iss(config)# mpls oam meg meg1

iss(config-meg)# service me1

iss(config-meg)# mpls oam mep service me1 lsp 11 1 10 20

iss(config-meg)# end

iss#

iss# configure terminal

iss(config)# bfd session 11

iss(config-bfdsess)# bfd params sess-type single-hop

iss(config-bfdsess)# bfd mpls meg-name meg1 me-name me1

iss(config-bfdsess)# bfd params mode cc

iss(config-bfdsess)# bfd enable

iss(config-bfdsess)# en

iss# configure terminal

iss(config)# mpls oam meg meg2

iss(config-meg)# service me1

iss(config-meg)# mpls oam mep service me1 lsp 10 1 10 30

iss(config-meg)# end

iss#

iss# configure terminal

iss(config)# bfd session 12

iss(config-bfdsess)# bfd params sess-type single-hop

iss(config-bfdsess)# bfd mpls meg-name meg2 me-name me1

iss(config-bfdsess)# bfd params mode cc

iss(config-bfdsess)# bfd enable

iss(config-bfdsess)# end

11.Configuring ERPS for control and data pseudowire.

iss# c t

iss(config)# no shutdown aps ring

iss(config)# aps ring enable

iss(config)# aps ring group 1

iss(config-ring)# aps monitor mplsoam

iss(config-ring)# aps service mpls-lsp-pw

iss(config-ring)# aps compatible version v2

iss(config-ring)# aps working pw 1 pw 2 vlan 6150

iss(config-ring)# aps working pseudo-wire 1 pseudo-wire 2

iss(config-ring)# aps working meg 1 me 1 mep 1 meg 2 me 1 mep 1

iss(config-ring)# aps working subportlist pw 3 subportlist pw 4

iss(config-ring)# aps revert wtr 3 seconds

iss(config-ring)# aps protect pw 2

iss(config-ring)# end

12. Enable MPLS-Crossconnect for both control and data VSI AC-port.

iss# c t

iss(config)# int ac gi 0/13.100

iss(config-vep)# no sh

iss(config-vep)# xconnect vfi VFI1

Warning: The Ethernet port ac gigabiteth 0/13.100 configured as AC-interface should NOT be a PSN port

iss(config-vep)# end

iss#

iss# c t

iss(config)# int ac gi 0/13.200

iss(config-vep)# no sh

iss(config-vep)# xconnect vfi VFI2

Warning: The Ethernet port ac gigabiteth 0/13.200 configured as AC-interface should NOT be a PSN port iss(config-vep)# end

iss# c t

iss(config)# in gi 0/11

iss(config-if)# shu

iss(config-if)# end

iss#

iss# c t

iss(config)# in gi 0/11

iss(config-if)# no shu

iss(config-if)# end

iss#

iss# c t

iss(config)# in gi 0/9

iss(config-if)# shu

iss(config-if)# end

iss#

iss# c t

iss(config)# in gi 0/9

iss(config-if)# no shu

iss(config-if)# end

13. Configuring Ring group active

iss# c t

iss(config)# aps ring gr 1

iss(config-ring)# aps group activ

iss(config-ring)# end

#### **At Node 3:**

1. Enter the Global Configuration mode.

**iss**# configure terminal

2. Disable gmrp and gvrp. Shutdown STP and start CFM.

**iss(config)# switch default**

**iss(config-switch)# shutdown spanning-tree**

**iss(config-switch)# set gmrp** disable

**iss(config-switch)# set gvrp** disable

**iss(config-switch)# shutdown garp**

**iss(config-switch)# end**

3.Configure Tunnel and Enable MPLS on port.

iss# c t

iss(config)# in gi 0/15

iss(config-if)# no shu

iss(config-if)# end

iss#

iss# c t

iss(config)# in gi 0/11

iss(config-if)# no shu

iss(config-if)# end

iss# c t

iss(config)# in gi 0/12

iss(config-if)# no shu

iss(config-if)# end

iss# c t

iss(config)# vlan 6

iss(config-vlan)# ports gig 0/11

iss(config-vlan)# end

iss#

iss# c t

iss(config)# vlan 2

iss(config-vlan)# ports gig 0/12

iss(config-vlan)# end

iss#

iss# c t

iss(config)# interface vlan 6

iss(config-if)# shutdown

iss(config-if)# ip unnumbered 01:00:5E:90:00:00

iss(config-if)# no shutdown

iss(config-if)# mpls ip

iss(config-if)# exit

iss(config)# en

iss#

iss# co t

iss(config)# interface vlan 2

iss(config-if)# shutdown

iss(config-if)# ip unnumbered 01:00:5E:90:00:00

iss(config-if)# no shutdown

iss(config-if)# mpls ip

iss(config)# end

iss# c t

iss(config)# mpls global-id 100 icc-id ARI123 node-id 201

iss(config)# mpls node-map-id local-map-num 10 global-id 100 node-id 101

iss(config)# mpls node-map-id local-map-num 20 global-id 100 node-id 201

iss(config)# mpls node-map-id local-map-num 30 global-id 100 node-id 301

iss(config)# end

iss# c t

iss(config)# interface mplstunnel 11

iss(config-if)# tunnel mpls destination 20 source 10 lsp-num 1

Warning: More than one tunnel can be created in the tunnel mode with the same tunnel number. In case of multiple tunnels with the same tunnel number,the tunnel specific configurations should be done inside the 'config-if-lsp'mode to associate the configurations with that specific tunnel.

iss(config-if-lsp)# tunnel mode corouted-bidirectional

iss(config-if-lsp)# tunnel type mpls-tp

iss(config-if-lsp)# tunnel mpls static out-label 200001 vlan 2 direction reverse

iss(config-if-lsp)# tunnel mpls static in-label 200002 vlan 2 direction forward

iss(config-if-lsp)# no shutdown

iss(config-if-lsp)# end

iss#

iss# c t

iss(config)# interface mplstunnel 12

iss(config-if)# tunnel mpls destination 30 source 20 lsp-num 1

Warning: More than one tunnel can be created in the tunnel mode with the same tunnel number. In case of multiple tunnels with the same tunnel number,the tunnel specific configurations should be done inside the 'config-if-lsp'mode to associate the configurations with that specific tunnel.

iss(config-if-lsp)# tunnel mode corouted-bidirectional

iss(config-if-lsp)# tunnel type mpls-tp

iss(config-if-lsp)# tunnel mpls static out-label 200003 vlan 6 direction forward

iss(config-if-lsp)# tunnel mpls static in-label 200004 vlan 6 direction reverse

iss(config-if-lsp)# no shutdown

iss(config-if-lsp)# end

4.Configure VSI for AC(Attachment circuit) port.

iss# c t

iss(config)# in gi 0/15

iss(config-if)# vep-mode access

iss(config-if)# vep-encap-type dot1q-vep

iss(config-if)# map sw default

iss(config-if)# no sh

iss(config-if)# end

iss# c t

iss(config)# int ac gi 0/15.100

iss(config-vep)# map sw default

iss(config-vep)# no sh

iss(config-vep)# end

#####Control VSI

iss# c t

iss(config)# vsi 6150

iss(config-vsi)# vsi vep-type any

iss(config-vsi)# vsi service-type multipoint-to-multipoint

iss(config-vsi)# ports add ac-gi 0/15.100

iss(config-vsi)# no sh

iss(config-vsi)# end

iss# c t

iss(config)# int ac gi 0/15.200

iss(config-vep)# map sw default

iss(config-vep)# no sh

iss(config-vep)# end

###Data VSI

iss# c t

iss(config)# vsi 6151

iss(config-vsi)# vsi vep-type any

iss(config-vsi)# vsi service-type multipoint-to-multipoint

iss(config-vsi)# ports add ac-gi 0/15.200

iss(config-vsi)# no sh

iss(config-vsi)# end

5.Configure VPN and Pseudowire for Control and Data Pseudowire.

iss# c t

iss(config)# l2 vfi VFI1 manual

iss(config-vfi)# vpn 11 fdb 6150

iss(config-vfi)# neighbor global-id 100 node-id 10 genfec agi AG123456 src-ac-id 20 dst-ac-id 10 pwid 1 locallabel 250002 remotelabel 250001 encapsulation mpls no-split-horizon mplstype te 11 11

iss(config-vfi)# neighbor global-id 100 node-id 30 genfec agi AG123456 src-ac-id 20 dst-ac-id 30 pwid 12 locallabel 250003 remotelabel 250004 encapsulation mpls no-split-horizon mplstype te 12 12

iss(config-vfi)# end

iss# c t

iss(config)# l2 vfi VFI2 manual

iss(config-vfi)# vpn 12 fdb 6151

iss(config-vfi)# neighbor global-id 100 node-id 10 genfec agi AG123456 src-ac-id 20 dst-ac-id 10 pwid 3 locallabel 270002 remotelabel 270001 encapsulation mpls no-split-horizon mplstype te 11 11

iss(config-vfi)# neighbor global-id 100 node-id 30 genfec agi AG123456 src-ac-id 20 dst-ac-id 30 pwid 14 locallabel 270003 remotelabel 270004 encapsulation mpls no-split-horizon mplstype te 12 12

iss(config-vfi)# end

6.Create control pseudowire interface and enable ECFM.

iss# c t

iss(config)# in pw 1

iss(config-if)# no shutdown

iss(config-if)# ethernet cfm enable

iss(config-if)# ethernet cfm y1731 enable

iss(config-if)# en

iss#

iss# c t

iss(config)# in pw 12

iss(config-if)# no shutdown

iss(config-if)# ethernet cfm enable

iss(config-if)# ethernet cfm y1731 enable

iss(config-if)# en

7. Create Data Pseudowire Interface.

iss# c t

iss(config)# in pw 3

iss(config-if)# no shutdown

iss(config-if)# en

iss#

iss# c t

iss(config)# in pw 14

iss(config-if)# no shutdown

iss(config-if)# en

8. Map MPLS pseudowire and created control pseudowire interface.

iss# c t

iss(config)# map pwid 12 pw 12

iss(config)# map pwid 1 pw 1

iss(config)# map pwid 14 pw 14

iss(config)# map pwid 3 pw 3

iss(config)# end

9.Configure ECFM on control pseudowire.

iss# c t

iss(config)# ethernet cfm start

iss(config)# ethernet cfm enable

iss(config)# ethernet cfm domain format dns-like-name name CUS1 level 6

iss(config-ether-ecfm)# service format char-string name CUSMA1 vsi 6150

iss(config-ether-ecfm)# mep crosscheck mpid 1 vsi 6150

iss(config-ether-ecfm)# en

iss# c t

iss(config)# eth cfm start

iss(config)# eth cfm ena

iss(config)# ethernet cfm domain format dns-like-name name CUS2 level 6

iss(config-ether-ecfm)# service format char-string name CUSMA1 vsi 6150

iss(config-ether-ecfm)# mep crosscheck mpid 1 vsi 6150

iss(config-ether-ecfm)# en

iss# c t

iss(config)# in pw 1

iss(config-if)# ethernet cfm mep domain CUS1 mpid 1 service CUSMA1 active

iss(config-ether-mep)# en

iss# c t

iss(config)# in pw 12

iss(config-if)# ethernet cfm mep domain CUS2 mpid 1 service CUSMA1 active

iss(config-ether-mep)# en

10.Enable BFD for monitoring control RAPS(control pseudowire)

iss# c t

iss(config)# bfd global offload

iss(config)# end

iss# c t

iss(config)# mpls oam meg meg1

iss(config-meg)# service me1

iss(config-meg)# mpls oam mep service me1 lsp 11 1 10 20

iss(config-meg)# end

iss# configure terminal

iss(config)# bfd session 11

iss(config-bfdsess)# bfd params sess-type single-hop

iss(config-bfdsess)# bfd mpls meg-name meg1 me-name me1

iss(config-bfdsess)# bfd params mode cc

iss(config-bfdsess)# bfd enable

iss(config-bfdsess)# en

iss#

iss# c t

iss(config)# mpls oam meg meg2

iss(config-meg)# service me1

iss(config-meg)# mpls oam mep service me1 lsp 12 1 20 30

iss(config-meg)# end

iss# configure terminal

iss(config)# bfd session 13

iss(config-bfdsess)# bfd params sess-type single-hop

iss(config-bfdsess)# bfd mpls meg-name meg2 me-name me1

iss(config-bfdsess)# bfd params mode cc

iss(config-bfdsess)# bfd enable

iss(config-bfdsess)# en

11.Configuring ERPS for control and data pseudowire.

iss# c t

iss(config)# no shutdown aps ring

iss(config)# aps ring enable

iss(config)# aps ring group 1

iss(config-ring)# aps monitor mplsoam

iss(config-ring)# aps service mpls-lsp-pw

iss(config-ring)# aps compatible version v2

iss(config-ring)# aps working pw 1 pw 12 vlan 6150

iss(config-ring)# aps working pseudo-wire 1 pseudo-wire 12

iss(config-ring)# aps working meg 1 me 1 mep 1 meg 2 me 1 mep 1

iss(config-ring)# aps working subportlist pw 3 subportlist pw 14

iss(config-ring)# aps revert wtr 3 seconds

iss(config-ring)# end

12. Enable MPLS-Crossconnect for both control and data VSI AC-port.

iss# c t

iss(config)# int ac gi 0/15.100

iss(config-vep)# no sh

iss(config-vep)# xconnect vfi VFI1

Warning: The Ethernet port ac gigabiteth 0/15.100 configured as AC-interface should NOT be a PSN port

iss(config-vep)# end

iss# c t

iss(config)# int ac gi 0/15.200

iss(config-vep)# no sh

iss(config-vep)# xconnect vfi VFI2

Warning: The Ethernet port ac gigabiteth 0/15.200 configured as AC-interface should NOT be a PSN port

iss(config-vep)# end

iss# c t

iss(config)# in gi 0/12

iss(config-if)# shu

iss(config-if)# end

iss#

iss# c t

iss(config)# in gi 0/12

iss(config-if)# no shu

iss(config-if)# end

iss#

iss#

iss# c t

iss(config)# in gi 0/11

iss(config-if)# shu

iss(config-if)# end

iss#

iss# c t

iss(config)# in gi 0/11

iss(config-if)# no shu

iss(config-if)# end

iss#

iss#

13. Configuring Ring group active

iss# c t

iss(config)# aps ring gr 1

iss(config-ring)# aps group activ

iss(config-ring)# end

### Show command Output

At Node1:

1. Show mpls l2 summary

Ensure both control and data Pseudowire in UP Status.

iss# show mpls l2 summary

Local intf Local circuit Dest address PW Status VC ID

---------- ------------- ------------- --------------- -----------

acGi0/13.100 Ethernet - up 12 acGi0/13.100 Ethernet - up 2 acGi0/13.200 Ethernet - up 14 acGi0/13.200 Ethernet - up 4 Total number of PWsunknown: 0up: 4down: 0 dormant: 0lowerlayerdown: 0admin down: 0

2. Show bfd session summary

Ensure BFD session is in UP State

iss# sh bfd sess sum

Context default

Session Index:12

Session Status : enabled, Session Admin Status : start

Version:1, desired tx interval:1s , required rx interval:1s

Multiplier:3, diag:0, My discr:12, your discr:12, state UP, D/C/M/A:0/0/0/0

Context default  
  
Session Index:13  
  
Session Status : enabled, Session Admin Status : start  
Version:1, desired tx interval:1s , required rx interval:1s   
Multiplier:3, diag:0, My discr:13, your discr:13, state UP, D/C/M/A:0/0/0/0

3.Show aps ring

Ensure ring is in IDLE state after all configurations.

iss# sh ap ri

Switch default

Ring Id 1

---------------------------------------------------------

Ring Name : Ring1RAPS Vlan Id : 6150Operating Mode : RevertiveRecovery Method : AutoERPS Compatible Version : Version2Ring State : Idle

Status : Active

Wait-to-restore timer : Not Running

Wait-to-block timer : Not Running

Hold timer : Not Running

Guard timer : Not Running

TC Propagation Status : Disable

TC Propagation Ring List : None

Inter Connection Node : none

Multiple Failure : DisabledMonitoring Mechanism : MPLS Oam--More-Node ID, BPR bit Pair =====================Ring Port 1 - (00:01:02:03:04:01 , 1)Ring Port 2 - (00:01:02:03:04:01 , 1)  
This node is RPL Neighbour. RPL Neighbour port is pw2  
Ring node is configured with virtual channel Ring Port Link Status Command Port Status ----------------------------------------------------------------- pw2 Not Failed None Blocked

pw12 Not Failed None UnBlocked

Line Card Information

-----------------------

Ring Port 1 (pw2): Local

Ring Port 2 (pw12): Local

Ring Port1 SubPortList

----------------------pw 4Ring Port2 SubPortList----------------------pw 14

At Node2:

1 . Show mpls l2 summary

Ensure both control and data Pseudowire in UP Status.

iss# sh mpls l2 summary Local intf Local circuit Dest address PW Status VC ID ---------- ------------- ------------- --------------- ----------- acGi0/13.100 Ethernet - up 1 acGi0/13.100 Ethernet - up 2 acGi0/13.200 Ethernet - up 3 acGi0/13.200 Ethernet - up 4 Total number of PWs unknown: 0 up: 4 down: 0 dormant: 0 lowerlayerdown: 0 admin down: 0

2. Show bfd session summary

Ensure BFD session is in UP State.

iss# sh bfd sess sum

Context default

Session Index:11

Session Status : enabled, Session Admin Status : start

Version:1, desired tx interval:1s , required rx interval:1s

Multiplier:3, diag:0, My discr:11, your discr:11, state UP, D/C/M/A:0/0/0/0

Context default  
 Session Index:12  
 Session Status : enabled, Session Admin Status : start  
 Version:1, desired tx interval:1s , required rx interval:1s   
 Multiplier:3, diag:0, My discr:12, your discr:12, state UP, D/C/M/A:0/0/0/0

3. Show aps ring

Ensure Ring is in IDLE state

iss# sh ap riSwitch default Ring Id 1 ---------------------------------------------------------Ring Name : Ring1RAPS Vlan Id : 6150Operating Mode : RevertiveRecovery Method : AutoERPS Compatible Version : Version2Ring State : Idle Status : Active Wait-to-restore timer : Not RunningWait-to-block timer : Not RunningHold timer : Not RunningGuard timer : Not RunningTC Propagation Status : DisableTC Propagation Ring List : NoneInter Connection Node : noneMultiple Failure : DisabledMonitoring Mechanism : MPLS Oam

--More--

Node ID, BPR bit Pair

=====================

Ring Port 1 - (00:01:02:03:04:01 , 1)

Ring Port 2 - (00:01:02:03:04:01 , 1)

This node is RPL Owner. RPL Port is pw2Ring node is configured with virtual channel Ring Port Link Status Command Port Status ----------------------------------------------------------------- pw1 Not Failed None UnBlocked pw2 Not Failed None Blocked Line Card Information-----------------------Ring Port 1 (pw1): Local Ring Port 2 (pw2): Local Ring Port1 SubPortList----------------------

pw 3

Ring Port2 SubPortList

----------------------

pw 4

At Node3

1. Show mpls l2 summary

Ensure both control and data Pseudowire in UP Status.

iss# sh mpls l2 summary Local intf Local circuit Dest address PW Status VC ID ---------- ------------- ------------- --------------- ----------- acGi0/15.100 Ethernet - up 1 acGi0/15.100 Ethernet - up 12 acGi0/15.200 Ethernet - up 3 acGi0/15.200 Ethernet - up 14 Total number of PWs unknown: 0 up: 4 down: 0 dormant: 0 lowerlayerdown: 0 admin down: 0

2. Show bfd session summary

Ensure BFD session is in UP state.

iss# sh bfd sess sum

Context default

Session Index:11

Session Status : enabled, Session Admin Status : start

Version:1, desired tx interval:1s , required rx interval:1s

Multiplier:3, diag:0, My discr:11, your discr:11, state UP, D/C/M/A:0/0/0/0

Context default  
 Session Index:13  
  
 Session Status : enabled, Session Admin Status : start  
Version:1, desired tx interval:1s , required rx interval:1s

Multiplier:3, diag:0, My discr:13, your discr:13, state UP, D/C/M/A:0/0/0/0

3. show aps ring

Ensure Ring is in IDLE state.

iss# sh ap riSwitch default Ring Id 1 ---------------------------------------------------------Ring Name : Ring1RAPS Vlan Id : 6150Operating Mode : RevertiveRecovery Method : AutoERPS Compatible Version : Version2Ring State : Idle Status : Active Wait-to-restore timer : Not RunningWait-to-block timer : Not RunningHold timer : Not RunningGuard timer : Not RunningTC Propagation Status : DisableTC Propagation Ring List : NoneInter Connection Node : noneMultiple Failure : DisabledMonitoring Mechanism : MPLS Oam--More-Node ID, BPR bit Pair =====================Ring Port 1 - (00:01:02:03:04:01 , 1)Ring Port 2 - (00:01:02:03:04:01 , 1)  
Ring node is configured with virtual channel  
  
 Ring Port Link Status Command Port Status ----------------------------------------------------------------- pw1 Not Failed None UnBlocked pw12 Not Failed None UnBlocked Line Card Information

-----------------------

Ring Port 1 (pw1): Local

Ring Port 2 (pw12): Local

Ring Port1 SubPortList

----------------------

pw 3 Ring Port2 SubPortList --------------------- pw 14

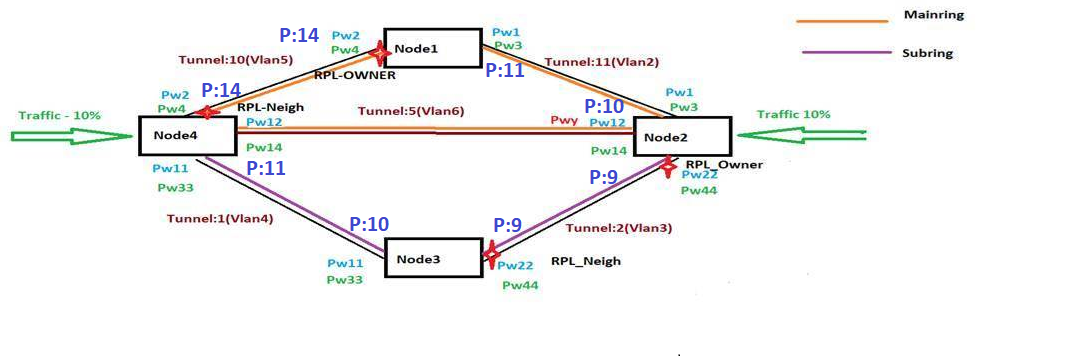
## VPLS Resiliency : Subring (XGS Method Configs).

Please follow below configs in case of XGS method.

Incase of Failover method, need to do Step6 (VPLS creation(xconnect)) only after Step10(Erps configs) and then enable ring active.

### Topology

Below setup shows 4 node ring topology configured for subring.



### Configuring ERPS Subring

#### **At Node 1:**

1. Enable global config mode and bringup respective ports.

ISS# c t

ISS(config)# shutdown spanning-tree

ISS(config)# set gmrp disable

ISS(config)# set gvrp disable

ISS(config)# shutdown garp

ISS(config)# end

ISS# c t

ISS(config)# in gi 0/14

ISS(config-if)# no shu

ISS(config-if)# end

ISS# c t

ISS(config)# int gi 0/11

ISS(config-if)# no sh

ISS(config-if)# end

ISS# c t

ISS(config)# vlan 2

ISS(config-vlan)# ports gig 0/11

ISS(config-vlan)# end

ISS# c t

ISS(config)# vlan 5

ISS(config-vlan)# ports gig 0/14

ISS(config-vlan)# end

2.Enable VLAN interface and MPLS.

ISS# c t

ISS(config)# interface vlan 2

ISS(config-if)# shutdown

ISS(config-if)# ip unnumbered 01:00:5E:90:00:00

ISS(config-if)# no shutdown

ISS(config-if)# mpls ip

ISS(config-if)# exit

ISS(config)#

ISS(config)# interface vlan 5

ISS(config-if)# shutdown

ISS(config-if)# ip unnumbered 01:00:5E:90:00:00

ISS(config-if)# no shutdown

ISS(config-if)# mpls ip

ISS(config-if)# exit

ISS(config)# en

3.Configure VPLS tunnel for particular IVR.

ISS# c t

ISS(config)# mpls global-id 100 icc-id ARI123 node-id 101

ISS(config)# mpls node-map-id local-map-num 10 global-id 100 node-id 101

ISS(config)# mpls node-map-id local-map-num 20 global-id 100 node-id 201

ISS(config)# mpls node-map-id local-map-num 30 global-id 100 node-id 301

ISS(config)# mpls node-map-id local-map-num 40 global-id 100 node-id 401

ISS(config)# end

ISS#

ISS# c t

ISS(config)# interface mplstunnel 11

ISS(config-if)# tunnel mpls destination 20 source 10 lsp-num 1

Warning: More than one tunnel can be created in the tunnel mode with the

same tunnel number. In case of multiple tunnels with the same tunnel number,

the tunnel specific configurations should be done inside the 'config-if-lsp'

mode to associate the configurations with that specific tunnel.

ISS(config-if-lsp)# tunnel mode corouted-bidirectional

ISS(config-if-lsp)# tunnel type mpls-tp

ISS(config-if-lsp)# tunnel mpls static out-label 200002 vlan 2 direction forward

ISS(config-if-lsp)# tunnel mpls static in-label 200001 vlan 2 direction reverse

ISS(config-if-lsp)# no shutdown

ISS(config-if-lsp)# exit

ISS(config-if)# end

ISS# c t

ISS(config)# interface mplstunnel 10

ISS(config-if)# tunnel mpls destination 40 source 10 lsp-num 1

Warning: More than one tunnel can be created in the tunnel mode with the

same tunnel number. In case of multiple tunnels with the same tunnel number,

the tunnel specific configurations should be done inside the 'config-if-lsp'

mode to associate the configurations with that specific tunnel.

ISS(config-if-lsp)# tunnel mode corouted-bidirectional

ISS(config-if-lsp)# tunnel type mpls-tp

ISS(config-if-lsp)# tunnel mpls static out-label 200007 vlan 5 direction forward

ISS(config-if-lsp)# tunnel mpls static in-label 200008 vlan 5 direction reverse

ISS(config-if-lsp)# no shutdown

ISS(config-if-lsp)# end

ISS#

ISS# c t

ISS(config)# in gi 0/16

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q-vep

ISS(config-if)# map sw default

ISS(config-if)# no shu

ISS(config-if)# end

ISS#

4. Configure VSI(control and Data) for Attachment circuit.

ISS# c t

ISS(config)# int ac gi 0/16.200

ISS(config-vep)# map sw default

ISS(config-vep)# no sh

ISS(config-vep)# end

ISS#

ISS# c t

ISS(config)# int ac gi 0/16.100

ISS(config-vep)# map sw default

ISS(config-vep)# no sh

ISS(config-vep)# end

ISS#

ISS#

ISS# c t

ISS(config)# vsi 6150

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# vsi service-type multipoint-to-multipoint

ISS(config-vsi)# ports add ac-gi 0/16.100

ISS(config-vsi)# no sh

ISS(config-vsi)# end

ISS#

ISS# c t

ISS(config)# vsi 6151

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# vsi service-type multipoint-to-multipoint

ISS(config-vsi)# ports add ac-gi 0/16.200

ISS(config-vsi)# no sh

ISS(config-vsi)# end

5. Configuring control and data pseudowire.

ISS# #RAPS1 VFI

ISS# c t

ISS(config)# l2 vfi VFI1 manual

ISS(config-vfi)# vpn 11 fdb 6150

ISS(config-vfi)# neighbor global-id 100 node-id 20 genfec agi AG123456 src-ac-id 10 dst-ac-id 20 pwid 1 locallabel 250001 remotelabel 250002 encapsulation mpls no-split-horizon mplstype te 11 11

ISS(config-vfi)# neighbor global-id 100 node-id 40 genfec agi AG123456 src-ac-id 10 dst-ac-id 40 pwid 2 locallabel 250008 remotelabel 250007 encapsulation mpls no-split-horizon mplstype te 10 10

ISS(config-vfi)# end

ISS#

ISS#

ISS# #DATA VFI

ISS# c t

ISS(config)# l2 vfi VFI2 manual

ISS(config-vfi)# vpn 12 fdb 6151

ISS(config-vfi)# neighbor global-id 100 node-id 20 genfec agi AG123456 src-ac-id 10 dst-ac-id 20 pwid 3 locallabel 270001 remotelabel 270002 encapsulation mpls no-split-horizon mplstype te 11 11

ISS(config-vfi)# neighbor global-id 100 node-id 40 genfec agi AG123456 src-ac-id 10 dst-ac-id 40 pwid 4 locallabel 270008 remotelabel 270007 encapsulation mpls no-split-horizon mplstype te 10 10

ISS(config-vfi)# end

ISS#

6. Enabling VPLS for Control Pseudowire.

ISS# c t

ISS(config)# int ac gi 0/16.100

ISS(config-vep)# no sh

ISS(config-vep)# xconnect vfi VFI1

Warning: The Ethernet port ac gigabiteth 0/16.100 configured as AC-interface should NOT be a PSN port

ISS(config-vep)# end

ISS#

/\* Enabling VPLS for Data Pseudowire. \*/

ISS# c t

ISS(config)# int ac gi 0/16.200

ISS(config-vep)# no sh

ISS(config-vep)# xconnect vfi VFI2

Warning: The Ethernet port ac gigabiteth 0/16.200 configured as AC-interface should NOT be a PSN port

ISS(config-vep)# end

7. Configure ECFM for control pseudowire and create interfaces for Data pseduowire.

ISS# c t

ISS(config)# in pw 1

ISS(config-if)# no shutdown

ISS(config-if)# ethernet cfm enable

ISS(config-if)# ethernet cfm y1731 enable

ISS(config-if)# ex

ISS(config)#

ISS(config)# in pw 2

ISS(config-if)# ethernet cfm enable

ISS(config-if)# ethernet cfm y1731 enable

ISS(config-if)# no shutdown

ISS(config-if)# ex

ISS(config)# in pw 3

ISS(config-if)# no shutdown

ISS(config-if)# ex

ISS(config)# in pw 4

ISS(config-if)# no shutdown

ISS(config-if)# en

/\* Mapping MPLS pseudowire into created Pseudowire interface\*/

ISS# c t

ISS(config)# map pwid 1 pw 1

ISS(config)# map pwid 2 pw 2

ISS(config)# map pwid 3 pw 3

ISS(config)# map pwid 4 pw 4

ISS(config)# en

ISS#

8. Create ECFM MEP for control pseudowire for RAPS Tx/Rx .

ISS# c t

ISS(config)# ethernet cfm start

ISS(config)# ethernet cfm enable

ISS(config)# end

ISS# c t

ISS(config)# ethernet cfm domain format char-string name CUS1 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 6150

ISS(config-ether-ecfm)# mep crosscheck mpid 1 vsi 6150

ISS(config-ether-ecfm)# en

ISS#

ISS# c t

ISS(config)# ethernet cfm domain format char-string name CUS6 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 6150

ISS(config-ether-ecfm)# mep crosscheck mpid 1 vsi 6150

ISS(config-ether-ecfm)# en

ISS# c t

ISS(config)# in pw 1

ISS(config-if)# ethernet cfm mep domain CUS1 mpid 1 service CUSMA1 active

ISS(config-ether-mep)# en

ISS# c t

ISS(config)# in pw 2

ISS(config-if)# ethernet cfm mep domain CUS6 mpid 1 service CUSMA1 active

ISS(config-ether-mep)# en

ISS#

9. Enable BFD offload and creating session.

ISS# c t

ISS(config)# bfd glob offload

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# mpls oam meg meg1

ISS(config-meg)# service me1

ISS(config-meg)# mpls oam mep service me1 lsp 11 1 10 20

ISS(config-meg)# end

ISS# configure terminal

ISS(config)# bfd session 21

ISS(config-bfdsess)# bfd params sess-type single-hop

ISS(config-bfdsess)# bfd mpls meg-name meg1 me-name me1

ISS(config-bfdsess)# bfd params mode cc

ISS(config-bfdsess)# bfd enable

ISS(config-bfdsess)# en

ISS# configure terminal

ISS(config)# mpls oam meg meg2

ISS(config-meg)# service me1

ISS(config-meg)# mpls oam mep service me1 lsp 10 1 10 40

ISS(config-meg)# end

ISS# configure terminal

ISS(config)# bfd session 22

ISS(config-bfdsess)# bfd params sess-type single-hop

ISS(config-bfdsess)# bfd mpls meg-name meg2 me-name me1

ISS(config-bfdsess)# bfd params mode cc

ISS(config-bfdsess)# bfd enable

ISS(config-bfdsess)# en

10. Configure ERPS Ring by associating pseudowires.

ISS# c t

ISS(config)# no shutdown aps ring

ISS(config)# aps ring enable

ISS(config)# aps ring group 1

ISS(config-ring)# aps monitor mplsoam

ISS(config-ring)# aps service mpls-lsp-pw

ISS(config-ring)# aps compatible version v2

ISS(config-ring)# aps working pw 1 pw 2 vlan 6150

ISS(config-ring)# aps working pseudo-wire 1 pseudo-wire 2

ISS(config-ring)# aps working meg 1 me 1 mep 1 meg 2 me 1 mep 1

ISS(config-ring)# aps working subportlist pw 3 subportlist pw 4

ISS(config-ring)# aps revert wtr 3 seconds

ISS(config-ring)# aps protect pw 2

ISS(config-ring)# end

11. Configure Ring active.

ISS# c t

ISS(config)# aps ring group 1

ISS(config-ring)# aps gr active

ISS(config-ring)# end

#### **At Node 2:**

ISS# c t

ISS(config)# shutdown spanning-tree

ISS(config)# set gmrp disable

ISS(config)# set gvrp disable

ISS(config)# shutdown garp

ISS(config)# end

ISS#

ISS# c t

ISS(config)# int gi 0/9

ISS(config-if)# no sh

ISS(config-if)# end

ISS#

ISS# c t

ISS(config)# in gi 0/13

ISS(config-if)# no shu

ISS(config-if)# end

ISS#

ISS# c t

ISS(config)# in gi 0/11

ISS(config-if)# no shu

ISS(config-if)# end

ISS# c t

ISS(config)# in gi 0/10

ISS(config-if)# no shu

ISS(config-if)# end

ISS#

ISS# c t

ISS(config)# vlan 2

ISS(config-vlan)# ports gig 0/10

ISS(config-vlan)# end

ISS#

ISS# c t

ISS(config)# vlan 3

ISS(config-vlan)# ports gig 0/9

ISS(config-vlan)# end

ISS# c t

ISS(config)# vlan 6

ISS(config-vlan)# ports gig 0/11

ISS(config-vlan)# end

ISS#

ISS# co t

ISS(config)# interface vlan 2

ISS(config-if)# shutdown

ISS(config-if)# ip unnumbered 01:00:5E:90:00:00

ISS(config-if)# no shutdown

ISS(config-if)# mpls ip

ISS(config-if)# exit

ISS(config)#

ISS(config)# interface vlan 3

ISS(config-if)# shutdown

ISS(config-if)# ip unnumbered 01:00:5E:90:00:00

ISS(config-if)# no shutdown

ISS(config-if)# mpls ip

ISS(config-if)# exit

ISS(config)# en

ISS#

ISS# c t

ISS(config)# interface vlan 6

ISS(config-if)# shutdown

ISS(config-if)# ip unnumbered 01:00:5E:90:00:00

ISS(config-if)# no shutdown

ISS(config-if)# mpls ip

ISS(config-if)# exit

ISS(config)# en

ISS# c t

ISS(config)# mpls global-id 100 icc-id ARI123 node-id 201

ISS(config)# mpls node-map-id local-map-num 10 global-id 100 node-id 101

ISS(config)# mpls node-map-id local-map-num 20 global-id 100 node-id 201

ISS(config)# mpls node-map-id local-map-num 30 global-id 100 node-id 301

ISS(config)# mpls node-map-id local-map-num 40 global-id 100 node-id 401

ISS(config)#end

ISS(config)# c t

ISS(config)# interface mplstunnel 11

ISS(config-if)# tunnel mpls destination 10 source 20 lsp-num 1

Warning: More than one tunnel can be created in the tunnel mode with the

same tunnel number. In case of multiple tunnels with the same tunnel number,

the tunnel specific configurations should be done inside the 'config-if-lsp'

mode to associate the configurations with that specific tunnel.

ISS(config-if-lsp)# tunnel mode corouted-bidirectional

ISS(config-if-lsp)# tunnel type mpls-tp

ISS(config-if-lsp)# tunnel mpls static out-label 200001 vlan 2 direction forward

ISS(config-if-lsp)# tunnel mpls static in-label 200002 vlan 2 direction reverse

ISS(config-if-lsp)# no shutdown

ISS(config-if-lsp)# end

ISS# c t

ISS(config)# interface mplstunnel 2

ISS(config-if)# tunnel mpls destination 30 source 20 lsp-num 1

Warning: More than one tunnel can be created in the tunnel mode with the

same tunnel number. In case of multiple tunnels with the same tunnel number,

the tunnel specific configurations should be done inside the 'config-if-lsp'

mode to associate the configurations with that specific tunnel.

ISS(config-if-lsp)# tunnel mode corouted-bidirectional

ISS(config-if-lsp)# tunnel type mpls-tp

ISS(config-if-lsp)# tunnel mpls static out-label 200004 vlan 3 direction forward

ISS(config-if-lsp)# tunnel mpls static in-label 200003 vlan 3 direction reverse

ISS(config-if-lsp)# no shutdown

ISS(config-if-lsp)# exit

ISS(config-if)# end

ISS#

ISS# c t

ISS(config)# interface mplstunnel 5

ISS(config-if)# tunnel mpls destination 40 source 20 lsp-num 1

Warning: More than one tunnel can be created in the tunnel mode with the

same tunnel number. In case of multiple tunnels with the same tunnel number,

the tunnel specific configurations should be done inside the 'config-if-lsp'

mode to associate the configurations with that specific tunnel.

ISS(config-if-lsp)# tunnel mode corouted-bidirectional

ISS(config-if-lsp)# tunnel type mpls-tp

ISS(config-if-lsp)# tunnel mpls static out-label 200066 vlan 6 direction forward

ISS(config-if-lsp)# tunnel mpls static in-label 200077 vlan 6 direction reverse

ISS(config-if-lsp)# no shutdown

ISS(config-if-lsp)# end

ISS# c t

ISS(config)# in gi 0/13

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q-vep

ISS(config-if)# map sw default

ISS(config-if)# no shu

ISS(config-if)# end

ISS#

ISS# c t

ISS(config)# int ac gi 0/13.200

ISS(config-vep)# map sw default

ISS(config-vep)# no sh

ISS(config-vep)# end

ISS#

ISS# c t

ISS(config)# int ac gi 0/13.100

ISS(config-vep)# map sw default

ISS(config-vep)# no sh

ISS(config-vep)# end

ISS#

ISS#

ISS# c t

ISS(config)# vsi 6150

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# vsi service-type multipoint-to-multipoint

ISS(config-vsi)# ports add ac-gi 0/13.100

ISS(config-vsi)# no sh

ISS(config-vsi)# end

ISS#

ISS# c t

ISS(config)# vsi 6151

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# vsi service-type multipoint-to-multipoint

ISS(config-vsi)# ports add ac-gi 0/13.200

ISS(config-vsi)# no sh

ISS(config-vsi)# end

ISS#

ISS# c t

ISS(config)# int ac gi 0/13.300

ISS(config-vep)# map sw default

ISS(config-vep)# no sh

ISS(config-vep)# end

ISS#

ISS#

ISS# c t

ISS(config)# vsi 6152

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# vsi service-type multipoint-to-multipoint

ISS(config-vsi)# ports add ac-gi 0/13.300

ISS(config-vsi)# no sh

ISS(config-vsi)# end

ISS#

ISS# c t

ISS(config)# int ac gi 0/13.400

ISS(config-vep)# map sw default

ISS(config-vep)# no sh

ISS(config-vep)# end

ISS#

ISS#

ISS# c t

ISS(config)# vsi 6153

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# vsi service-type multipoint-to-multipoint

ISS(config-vsi)# ports add ac-gi 0/13.400

ISS(config-vsi)# no sh

ISS(config-vsi)# end

ISS#########################MAINRING PW Creation

ISS############ #RAPS1 VFI

ISS# c t

ISS(config)# l2 vfi VFI1 manual

ISS(config-vfi)# vpn 11 fdb 6150

ISS(config-vfi)# neighbor global-id 100 node-id 10 genfec agi AG123456 src-ac-id 20 dst-ac-id 10 pwid 1 locallabel 250002 remotelabel 250001 encapsulation mpls no-split-horizon mplstype te 11 11

ISS(config-vfi)# neighbor global-id 100 node-id 40 genfec agi AG123456 src-ac-id 20 dst-ac-id 40 pwid 12 locallabel 250003 remotelabel 250004 encapsulation mpls no-split-horizon mplstype te 5 5

ISS(config-vfi)# end

ISS#

ISS#

ISS# ###########DATA VFI

ISS# c t

ISS(config)# l2 vfi VFI2 manual

ISS(config-vfi)# vpn 12 fdb 6151

ISS(config-vfi)# neighbor global-id 100 node-id 10 genfec agi AG123456 src-ac-id 20 dst-ac-id 10 pwid 3 locallabel 270002 remotelabel 270001 encapsulation mpls no-split-horizon mplstype te 11 11

ISS(config-vfi)# neighbor global-id 100 node-id 40 genfec agi AG123456 src-ac-id 20 dst-ac-id 40 pwid 14 locallabel 270003 remotelabel 270004 encapsulation mpls no-split-horizon mplstype te 5 5

ISS(config-vfi)# ######SUBRING DATA VSI

ISS(config-vfi)# neighbor global-id 100 node-id 30 genfec agi AG123456 src-ac-id 20 dst-ac-id 30 pwid 44 locallabel 270013 remotelabel 270014 encapsulation mpls no-split-horizon mplstype te 2 2

ISS(config-vfi)# end

ISS# end

ISS#

ISS# c t

ISS(config)# int ac gi 0/13.100

ISS(config-vep)# no sh

ISS(config-vep)# xconnect vfi VFI1

Warning: The Ethernet port ac gigabiteth 0/13.100 configured as AC-interface should NOT be a PSN port

ISS(config-vep)# end

ISS# c t

ISS(config)# int ac gi 0/13.200

ISS(config-vep)# no sh

ISS(config-vep)# xconnect vfi VFI2

Warning: The Ethernet port ac gigabiteth 0/13.200 configured as AC-interface should NOT be a PSN port

ISS(config-vep)# end

ISS#

ISS# ###############################Subring PW Creation

ISS# #RAPS1 VFI

ISS# c t

ISS(config)# l2 vfi VFI3 manual

ISS(config-vfi)# vpn 13 fdb 6152

ISS(config-vfi)# neighbor global-id 100 node-id 30 genfec agi AG123456 src-ac-id 20 dst-ac-id 30 pwid 22 locallabel 250013 remotelabel 250014 encapsulation mpls no-split-horizon mplstype te 2 2

ISS(config-vfi)# end

ISS# c t

ISS(config)# int ac gi 0/13.300

ISS(config-vep)# no sh

ISS(config-vep)# xconnect vfi VFI3

Warning: The Ethernet port ac gigabiteth 0/13.300 configured as AC-interface should NOT be a PSN port

ISS(config-vep)# end

ISS# c t

ISS(config)# in pw 1

ISS(config-if)# no shutdown

ISS(config-if)# ethernet cfm enable

ISS(config-if)# ethernet cfm y1731 enable

ISS(config-if)# ex

ISS(config)# end

ISS# c t

ISS(config)# in pw 22

ISS(config-if)# no shutdown

ISS(config-if)# ethernet cfm enable

ISS(config-if)# ethernet cfm y1731 enable

ISS(config-if)# en

ISS# c t

ISS(config)# in pw 12

ISS(config-if)# no shutdown

ISS(config-if)# ethernet cfm enable

ISS(config-if)# ethernet cfm y1731 enable

ISS(config-if)# en

ISS# c t

ISS(config)# in pw 3

ISS(config-if)# no shutdown

ISS(config-if)# en

ISS#

ISS# c t

ISS(config)# in pw 14

ISS(config-if)# no shutdown

ISS(config-if)# en

ISS#

ISS# c t

ISS(config)# in pw 44

ISS(config-if)# no shutdown

ISS(config-if)# en

ISS#

ISS################Mapping MPLS pseudowire to created pseudowire interface.

ISS# c t

ISS(config)# map pwid 1 pw 1

ISS(config)# map pwid 12 pw 12

ISS(config)# map pwid 22 pw 22

ISS(config)# map pwid 3 pw 3

ISS(config)# map pwid 14 pw 14

ISS(config)# map pwid 44 pw 44

ISS(config)# en

ISS#

#################Enable ECFM only for control PW

ISS# c t

ISS(config)# ethernet cfm start

ISS(config)# ethernet cfm enable

ISS(config)# ethernet cfm domain format char-string name CUS1 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 6150

ISS(config-ether-ecfm)# mep crosscheck mpid 1 vsi 6150

ISS(config-ether-ecfm)# en

ISS#

ISS# c t

ISS(config)# ethernet cfm domain format char-string name CUS2 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 6150

ISS(config-ether-ecfm)# mep crosscheck mpid 1 vsi 6150

ISS(config-ether-ecfm)# en

ISS#

ISS#

ISS# c t

ISS(config)# in pw 1

ISS(config-if)# ethernet cfm mep domain CUS1 mpid 1 service CUSMA1 active

ISS(config-ether-mep)# en

ISS#

ISS# c t

ISS(config)# in pw 12

ISS(config-if)# ethernet cfm mep domain CUS2 mpid 1 service CUSMA1 active

ISS(config-ether-mep)# en

###################################Subring : Mep creation

for 1st port######################

ISS# c t

ISS(config)# in pw 22

ISS(config-if)# no shutdown

ISS(config-if)# ethernet cfm enable

ISS(config-if)# ethernet cfm y1731 enable

ISS(config-if)# en

ISS# c t

ISS(config)# ethernet cfm start

ISS(config)# ethernet cfm enable

ISS(config)# ethernet cfm domain format char-string name CUS3 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 6152

ISS(config-ether-ecfm)# mep crosscheck mpid 111 vsi 6152

ISS(config-ether-ecfm)# en

ISS#

ISS# c t

ISS(config)# in pw 22

ISS(config-if)# ethernet cfm mep domain CUS3 mpid 111 service CUSMA1 active

ISS(config-ether-mep)# en

################Dummy MEP creation for subring 2nd port ################################

ISS# configure terminal

ISS(config)# switch default

ISS(config-switch)# ethernet cfm domain format dns-like-name name CUS4 level 7

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vlan 6152

ISS(config-ether-ecfm)# mep crosscheck mpid 11 vlan 6152

ISS(config-ether-ecfm)# mep crosscheck mpid 12 vlan 6152

ISS(config-ether-ecfm)# end

ISS# c t

ISS(config)# switch default

ISS(config-switch)# ethernet cfm domain format dns-like-name name CUS4 level 7

ISS(config-ether-ecfm)# service name CUSMA1 vlan 6152 mip-creation-criteria default

ISS(config-ether-ecfm)# end

##################Enabling BFD Session

ISS# c t

ISS(config)# bfd glob off

ISS(config)# end

ISS#

ISS# c t

ISS(config)# mpls oam meg meg1

ISS(config-meg)# service me1

ISS(config-meg)# mpls oam mep service me1 lsp 11 1 20 10

ISS(config-meg)# end

ISS# configure terminal

ISS(config)# bfd session 21

ISS(config-bfdsess)# bfd params sess-type single-hop

ISS(config-bfdsess)# bfd mpls meg-name meg1 me-name me1

ISS(config-bfdsess)# bfd params mode cc

ISS(config-bfdsess)# bfd enable

ISS(config-bfdsess)# en

ISS#

ISS# c t

ISS(config)# mpls oam meg meg2

ISS(config-meg)# service me1

ISS(config-meg)# mpls oam mep service me1 lsp 5 1 20 40

ISS(config-meg)# end

ISS# configure terminal

ISS(config)# bfd session 25

ISS(config-bfdsess)# bfd params sess-type single-hop

ISS(config-bfdsess)# bfd mpls meg-name meg2 me-name me1

ISS(config-bfdsess)# bfd params mode cc

ISS(config-bfdsess)# bfd enable

ISS(config-bfdsess)# en

ISS# ISS# c t

ISS(config)# mpls oam meg meg3

ISS(config-meg)# service me1

ISS(config-meg)# mpls oam mep service me1 lsp 2 1 20 30

ISS(config-meg)# end

ISS# configure terminal

ISS(config)# bfd session 23

ISS(config-bfdsess)# bfd params sess-type single-hop

ISS(config-bfdsess)# bfd mpls meg-name meg3 me-name me1

ISS(config-bfdsess)# bfd params mode cc

ISS(config-bfdsess)# bfd enable

ISS(config-bfdsess)# en

############Configure Ring for created control and Data PW.

ISS# c t

ISS(config)# no shutdown aps ring

ISS(config)# aps ring enable

ISS(config)# aps ring group 1

ISS(config-ring)# aps monitor mplsoam

ISS(config-ring)# aps service mpls-lsp-pw

ISS(config-ring)# aps compatible version v2

ISS(config-ring)# aps working pw 1 pw 12 vlan 6150

#ISS(config-ring)# aps working pseudo-wire 1 pseudo-wire 12

ISS(config-ring)# aps working meg 1 me 1 mep 1 meg 2 me 1 mep 1

ISS(config-ring)# aps working subportlist pw 3 subportlist pw 14

ISS(config-ring)# aps revert wtr 3 seconds

ISS(config-ring)# end

ISS#

ISS# c t

ISS(config)# no shutdown aps ring

ISS(config)# aps ring enable

ISS(config)# aps ring group 2

ISS(config-ring)# aps monitor mplsoam

ISS(config-ring)# aps service mpls-lsp-pw

ISS(config-ring)# aps compatible version v2

ISS(config-ring)# aps working pw 22 vlan 6152

ISS(config-ring)# aps working pseudo-wire 22

ISS(config-ring)# aps working meg 3 me 1 mep 111 meg 4 me 1 mep 12

ISS(config-ring)# aps working subportlist pw 44

ISS(config-ring)# aps interconnection-node primary

ISS(config-ring)# aps multiple-failure primary

ISS(config-ring)# aps revert wtr 3 seconds

ISS(config-ring)# aps protect pw 22

ISS(config-ring)# end

############Make ring group active.

ISS# c t

ISS(config)# aps rin gr 1

ISS(config-ring)# aps group active

ISS(config-ring)# end

ISS# c t

ISS(config)# aps rin gr 2

ISS(config-ring)# aps group active

ISS(config-ring)# end

ISS#

#### **At Node 3:**

ISS# c t

ISS(config)# shutdown spanning-tree

ISS(config)# set gmrp disable

ISS(config)# set gvrp disable

ISS(config)# shutdown garp

ISS(config)# end

ISS#

ISS# #L2 VLAN Creation

ISS# c t

ISS(config)# int ran gi 0/9-11

ISS(config-if-range)# no sh

ISS(config-if-range)# end

ISS#

ISS# c t

ISS(config)# vlan 3

ISS(config-vlan)# ports gig 0/9

ISS(config-vlan)# end

ISS# c t

ISS(config)# vlan 4

ISS(config-vlan)# ports gig 0/10

ISS(config-vlan)# end

ISS# co t

ISS(config)# interface vlan 3

ISS(config-if)# shutdown

ISS(config-if)# ip unnumbered 01:00:5E:90:00:00

ISS(config-if)# no shutdown

ISS(config-if)# mpls ip

ISS(config-if)# exit

ISS(config)# end

ISS# c t

ISS(config)# interface vlan 4

ISS(config-if)# shutdown

ISS(config-if)# ip unnumbered 01:00:5E:90:00:00

ISS(config-if)# no shutdown

ISS(config-if)# mpls ip

ISS(config-if)# exit

ISS(config)# en

ISS# c t

ISS(config)# mpls global-id 100 icc-id ARI123 node-id 301

ISS(config)# mpls node-map-id local-map-num 10 global-id 100 node-id 101

ISS(config)# mpls node-map-id local-map-num 20 global-id 100 node-id 201

ISS(config)# mpls node-map-id local-map-num 30 global-id 100 node-id 301

ISS(config)# mpls node-map-id local-map-num 40 global-id 100 node-id 401

ISS(config)# end

ISS# ############################ SUbring tunnel

ISS# c t

ISS(config)# interface mplstunnel 1

ISS(config-if)# tunnel mpls destination 40 source 30 lsp-num 1

Warning: More than one tunnel can be created in the tunnel mode with the

same tunnel number. In case of multiple tunnels with the same tunnel number,

the tunnel specific configurations should be done inside the 'config-if-lsp'

mode to associate the configurations with that specific tunnel.

ISS(config-if-lsp)# tunnel mode corouted-bidirectional

ISS(config-if-lsp)# tunnel type mpls-tp

ISS(config-if-lsp)# tunnel mpls static out-label 200006 vlan 4 direction forward

ISS(config-if-lsp)# tunnel mpls static in-label 200005 vlan 4 direction reverse

ISS(config-if-lsp)# no shutdown

ISS(config-if-lsp)# exit

ISS(config-if)# end

ISS# c t

ISS(config)# interface mplstunnel 2

ISS(config-if)# tunnel mpls destination 20 source 30 lsp-num 1

Warning: More than one tunnel can be created in the tunnel mode with the

same tunnel number. In case of multiple tunnels with the same tunnel number,

the tunnel specific configurations should be done inside the 'config-if-lsp'

mode to associate the configurations with that specific tunnel.

ISS(config-if-lsp)# tunnel mode corouted-bidirectional

ISS(config-if-lsp)# tunnel type mpls-tp

ISS(config-if-lsp)# tunnel mpls static in-label 200004 vlan 3 direction reverse

ISS(config-if-lsp)# tunnel mpls static out-label 200003 vlan 3 direction forward

ISS(config-if-lsp)# no shutdown

ISS(config-if-lsp)# exit

ISS(config-if)# end

ISS# c t

ISS(config)# in gi 0/13

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q-vep

ISS(config-if)# map sw default

ISS(config-if)# no sh

ISS(config-if)# end

ISS#

ISS# c t

ISS(config)# int ac gi 0/13.200

ISS(config-vep)# map sw default

ISS(config-vep)# no sh

ISS(config-vep)# end

ISS#

ISS#

ISS# c t

ISS(config)# vsi 6151

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# vsi service-type multipoint-to-multipoint

ISS(config-vsi)# ports add ac-gi 0/13.200

ISS(config-vsi)# no sh

ISS(config-vsi)# end

ISS#

ISS# c t

ISS(config)# in gi 0/13

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q-vep

ISS(config-if)# map sw default

ISS(config-if)# no sh

ISS(config-if)# end

ISS# c t

ISS(config)# int ac gi 0/13.300

ISS(config-vep)# map sw default

ISS(config-vep)# no sh

ISS(config-vep)# end

ISS#

ISS#

ISS# c t

ISS(config)# vsi 6152

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# vsi service-type multipoint-to-multipoint

ISS(config-vsi)# ports add ac-gi 0/13.300

ISS(config-vsi)# no sh

ISS(config-vsi)# end

ISS#

ISS###################### ##RAPS1 VFI

ISS# c t

ISS(config)# l2 vfi VFI3 manual

ISS(config-vfi)# vpn 13 fdb 6152

ISS(config-vfi)# neighbor global-id 100 node-id 40 genfec agi AG123456 src-ac-id 30 dst-ac-id 40 pwid 11 locallabel 250015 remotelabel 250016 encapsulation mpls no-split-horizon mplstype te 1 1

ISS(config-vfi)# neighbor global-id 100 node-id 20 genfec agi AG123456 src-ac-id 30 dst-ac-id 20 pwid 22 locallabel 250014 remotelabel 250013 encapsulation mpls no-split-horizon mplstype te 2 2

ISS(config-vfi)# end

ISS#

ISS#

ISS####################### #DATA VFI

ISS# c t

ISS(config)# l2 vfi VFI2 manual

ISS(config-vfi)# vpn 12 fdb 6151

ISS(config-vfi)# neighbor global-id 100 node-id 40 genfec agi AG123456 src-ac-id 30 dst-ac-id 40 pwid 33 locallabel 270015 remotelabel 270016 encapsulation mpls no-split-horizon mplstype te 1 1

ISS(config-vfi)# neighbor global-id 100 node-id 20 genfec agi AG123456 src-ac-id 30 dst-ac-id 20 pwid 44 locallabel 270014 remotelabel 270013 encapsulation mpls no-split-horizon mplstype te 2 2

ISS(config-vfi)# end

ISS#

ISS# c t

ISS(config)# int ac gi 0/13.300

ISS(config-vep)# no sh

ISS(config-vep)# xconnect vfi VFI3

Warning: The Ethernet port ac gigabiteth 0/13.300 configured as AC-interface should NOT be a PSN port

ISS(config-vep)# end

ISS#

ISS# c t

ISS(config)# int ac gi 0/13.200

ISS(config-vep)# no sh

ISS(config-vep)# xconnect vfi VFI2

Warning: The Ethernet port ac gigabiteth 0/13.200 configured as AC-interface should NOT be a PSN port

ISS(config-vep)# end

ISS#

#############Enable ECFM only for control PW.

ISS# c t

ISS(config)# in pw 11

ISS(config-if)# no shutdown

ISS(config-if)# ethernet cfm enable

ISS(config-if)# ethernet cfm y1731 enable

ISS(config-if)# en

ISS#

ISS# c t

ISS(config)# in pw 22

ISS(config-if)# no shutdown

ISS(config-if)# ethernet cfm enable

ISS(config-if)# ethernet cfm y1731 enable

ISS(config-if)# en

ISS#

ISS# c t

ISS(config)# in pw 33

ISS(config-if)# no shutdown

ISS(config-if)# en

ISS#

ISS# c t

ISS(config)# in pw 44

ISS(config-if)# no shutdown

ISS(config-if)# en

ISS#

ISS# c t

ISS(config)# map pwid 11 pw 11

ISS(config)# map pwid 22 pw 22

ISS(config)# map pwid 33 pw 33

ISS(config)# map pwid 44 pw 44

ISS(config)# end

ISS#

ISS# c t

ISS(config)# ethernet cfm start

ISS(config)# ethernet cfm enable

ISS(config)# ethernet cfm domain format char-string name CUS5 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 6152

ISS(config-ether-ecfm)# mep crosscheck mpid 1 vsi 6152

ISS(config-ether-ecfm)# en

ISS#

ISS# c t

ISS(config)# ethernet cfm domain format char-string name CUS3 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 6152

ISS(config-ether-ecfm)# mep crosscheck mpid 111 vsi 6152

ISS(config-ether-ecfm)# en

ISS#

ISS# c t

ISS(config)# in pw 11

ISS(config-if)# ethernet cfm mep domain CUS5 mpid 1 service CUSMA1 active

ISS(config-ether-mep)# en

ISS#

ISS# c t

ISS(config)# in pw 22

ISS(config-if)# ethernet cfm mep domain CUS3 mpid 111 service CUSMA1 active

ISS(config-ether-mep)# en

ISS#####################Enable BFD Session.

ISS# c t

ISS(config)# bfd glob offload

ISS(config)# end

ISS# c t

ISS(config)# mpls oam meg meg3

ISS(config-meg)# service me1

ISS(config-meg)# mpls oam mep service me1 lsp 2 1 30 20

ISS(config-meg)# end

ISS# configure terminal

ISS(config)# bfd session 23

ISS(config-bfdsess)# bfd params sess-type single-hop

ISS(config-bfdsess)# bfd mpls meg-name meg3 me-name me1

ISS(config-bfdsess)# bfd params mode cc

ISS(config-bfdsess)# bfd enable

ISS(config-bfdsess)# en

ISS#

ISS# c t

ISS(config)# mpls oam enable

ISS(config)# mpls oam meg meg4

ISS(config-meg)# service me1

ISS(config-meg)# mpls oam mep service me1 lsp 1 1 30 40

ISS(config-meg)# end

ISS# configure terminal

ISS(config)# bfd session 24

ISS(config-bfdsess)# bfd params sess-type single-hop

ISS(config-bfdsess)# bfd mpls meg-name meg4 me-name me1

ISS(config-bfdsess)# bfd params mode cc

ISS(config-bfdsess)# bfd enable

ISS(config-bfdsess)# en

ISS##############Configuring ERPS Ring.

ISS# c t

ISS(config)# no shutdown aps ring

ISS(config)# aps ring enable

ISS(config)# aps ring group 2

ISS(config-ring)# aps monitor mplsoam

ISS(config-ring)# aps service mpls-lsp-pw

ISS(config-ring)# aps compatible version v2

ISS(config-ring)# aps working pw 11 pw 22 vlan 6152

ISS(config-ring)# aps working pseudo-wire 11 pseudo-wire 22

ISS(config-ring)# aps working meg 3 me 1 mep 1 meg 4 me 1 mep 111

ISS(config-ring)# aps working subportlist pw 33 subportlist pw 44

ISS(config-ring)# aps interconnection-node primary

ISS(config-ring)# aps multiple-failure primary

ISS(config-ring)# aps revert wtr 3 seconds

ISS(config-ring)# aps nei pw 22

ISS(config-ring)# end

#################Make APS group active.

ISS# c t

ISS(config)# aps rin gr 2

ISS(config-ring)# aps gr active

ISS(config-ring)# end

ISS#

#### **At Node 4:**

ISS# c t

ISS(config)# shutdown spanning-tree

ISS(config)# set gmrp disable

ISS(config)# set gvrp disable

ISS(config)# shutdown garp

ISS(config)# end

ISS#

ISS#

ISS# #L2 VLAN Creation

ISS# c t

ISS(config)# int ran gi 0/11-15

ISS(config-if-range)# no neg

ISS(config-if-range)# speed 10000

ISS(config-if-range)# no sh

ISS(config-if-range)# end

ISS#

ISS# c t

ISS(config)# vlan 4

ISS(config-vlan)# ports gig 0/11

ISS(config-vlan)# end

ISS# c t

ISS(config)# vlan 5

ISS(config-vlan)# ports gig 0/14

ISS(config-vlan)# end

ISS#

ISS# c t

ISS(config)# vlan 6

ISS(config-vlan)# ports gig 0/12

ISS(config-vlan)# end

ISS# #L3 VLAN Creation

ISS# co t

ISS(config)# interface vlan 4

ISS(config-if)# shutdown

ISS(config-if)# ip unnumbered 01:00:5E:90:00:00

ISS(config-if)# no shutdown

ISS(config-if)# mpls ip

ISS(config-if)# exit

ISS(config)#

ISS(config)# interface vlan 5

ISS(config-if)# shutdown

ISS(config-if)# ip unnumbered 01:00:5E:90:00:00

ISS(config-if)# no shutdown

ISS(config-if)# mpls ip

ISS(config-if)# exit

ISS(config)# en

ISS#

ISS# co t

ISS(config)# interface vlan 6

ISS(config-if)# shutdown

ISS(config-if)# ip unnumbered 01:00:5E:90:00:00

ISS(config-if)# no shutdown

ISS(config-if)# mpls ip

ISS(config-if)# exit

ISS(config)#

ISS(config)# c t

ISS(config)# mpls global-id 100 icc-id ARI123 node-id 401

ISS(config)# mpls node-map-id local-map-num 10 global-id 100 node-id 101

ISS(config)# mpls node-map-id local-map-num 20 global-id 100 node-id 201

ISS(config)# mpls node-map-id local-map-num 30 global-id 100 node-id 301

ISS(config)# mpls node-map-id local-map-num 40 global-id 100 node-id 401

ISS(config)# end

ISS#

ISS# #Tunnels are configured over the VLAN's part of the MPLS network

ISS# c t

ISS(config)# interface mplstunnel 1

ISS(config-if)# tunnel mpls destination 30 source 40 lsp-num 1

Warning: More than one tunnel can be created in the tunnel mode with the

same tunnel number. In case of multiple tunnels with the same tunnel number,

the tunnel specific configurations should be done inside the 'config-if-lsp'

mode to associate the configurations with that specific tunnel.

ISS(config-if-lsp)# tunnel mode corouted-bidirectional

ISS(config-if-lsp)# tunnel type mpls-tp

ISS(config-if-lsp)# tunnel mpls static in-label 200006 vlan 4 direction reverse

ISS(config-if-lsp)# tunnel mpls static out-label 200005 vlan 4 direction forward

ISS(config-if-lsp)# no shutdown

ISS(config-if-lsp)# exit

ISS(config-if)# end

ISS# c t

ISS(config)# interface mplstunnel 10

ISS(config-if)# tunnel mpls destination 10 source 40 lsp-num 1

Warning: More than one tunnel can be created in the tunnel mode with the

same tunnel number. In case of multiple tunnels with the same tunnel number,

the tunnel specific configurations should be done inside the 'config-if-lsp'

mode to associate the configurations with that specific tunnel.

ISS(config-if-lsp)# tunnel mode corouted-bidirectional

ISS(config-if-lsp)# tunnel type mpls-tp

ISS(config-if-lsp)# tunnel mpls static in-label 200007 vlan 5 direction reverse

ISS(config-if-lsp)# tunnel mpls static out-label 200008 vlan 5 direction forward

ISS(config-if-lsp)# no shutdown

ISS(config-if-lsp)# exit

ISS(config-if)# end

ISS#

ISS# c t

ISS(config)# interface mplstunnel 5

ISS(config-if)# tunnel mpls destination 20 source 40 lsp-num 1

Warning: More than one tunnel can be created in the tunnel mode with the

same tunnel number. In case of multiple tunnels with the same tunnel number,

the tunnel specific configurations should be done inside the 'config-if-lsp'

mode to associate the configurations with that specific tunnel.

ISS(config-if-lsp)# tunnel mode corouted-bidirectional

ISS(config-if-lsp)# tunnel type mpls-tp

ISS(config-if-lsp)# tunnel mpls static in-label 200066 vlan 6 direction reverse

ISS(config-if-lsp)# tunnel mpls static out-label 200077 vlan 6 direction forward

ISS(config-if-lsp)# no shutdown

ISS(config-if-lsp)# end

ISS#c t

ISS(config)# in gi 0/15

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q-vep

ISS(config-if)# map sw default

ISS(config-if)# no sh

ISS(config-if)# end

ISS#

ISS# c t

ISS(config)# int ac gi 0/15.100

ISS(config-vep)# map sw default

ISS(config-vep)# no sh

ISS(config-vep)# end

ISS# c t

ISS(config)# vsi 6150

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# vsi service-type multipoint-to-multipoint

ISS(config-vsi)# ports add ac-gi 0/15.100

ISS(config-vsi)# no sh

ISS(config-vsi)# end

ISS# c t

ISS(config)# int ac gi 0/15.200

ISS(config-vep)# map sw default

ISS(config-vep)# no sh

ISS(config-vep)# end

ISS#

ISS#

ISS# c t

ISS(config)# vsi 6151

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# vsi service-type multipoint-to-multipoint

ISS(config-vsi)# ports add ac-gi 0/15.200

ISS(config-vsi)# no sh

ISS(config-vsi)# end

ISS#

ISS# c t

ISS(config)# int ac gi 0/15.300

ISS(config-vep)# map sw default

ISS(config-vep)# no sh

ISS(config-vep)# end

ISS#

ISS#

ISS# c t

ISS(config)# vsi 6152

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# vsi service-type multipoint-to-multipoint

ISS(config-vsi)# ports add ac-gi 0/15.300

ISS(config-vsi)# no sh

ISS(config-vsi)# end

ISS#

ISS# ###########################################MAINRING PW

ISS#

ISS# #PW creation

ISS# ####################RAPS1 VFI

ISS# c t

ISS(config)# l2 vfi VFI1 manual

ISS(config-vfi)# vpn 11 fdb 6150

ISS(config-vfi)# neighbor global-id 100 node-id 20 genfec agi AG123456 src-ac-id 40 dst-ac-id 20 pwid 12 locallabel 250004 remotelabel 250003 encapsulation mpls no-split-horizon mplstype te 5 5

ISS(config-vfi)# neighbor global-id 100 node-id 10 genfec agi AG123456 src-ac-id 40 dst-ac-id 10 pwid 2 locallabel 250007 remotelabel 250008 encapsulation mpls no-split-horizon mplstype te 10 10

ISS(config-vfi)# end

ISS#

ISS#

ISS# ###############################################DATA VFI

ISS# c t

ISS(config)# l2 vfi VFI2 manual

ISS(config-vfi)# vpn 12 fdb 6151

ISS(config-vfi)# neighbor global-id 100 node-id 20 genfec agi AG123456 src-ac-id 40 dst-ac-id 20 pwid 14 locallabel 270004 remotelabel 270003 encapsulation mpls no-split-horizon mplstype te 5 5

ISS(config-vfi)# neighbor global-id 100 node-id 10 genfec agi AG123456 src-ac-id 40 dst-ac-id 10 pwid 4 locallabel 270007 remotelabel 270008 encapsulation mpls no-split-horizon mplstype te 10 10

ISS(config-vfi)#

ISS(config-vfi)# ###################subring Data VSI

ISS(config-vfi)# neighbor global-id 100 node-id 30 genfec agi AG123456 src-ac-id 40 dst-ac-id 30 pwid 33 locallabel 270016 remotelabel 270015 encapsulation mpls no-split-horizon mplstype te 1 1

ISS(config-vfi)# end

ISS# end

ISS#

ISS# ####################################SUBRING PW

ISS###################### #RAPS1 VFI

ISS# c t

ISS(config)# l2 vfi VFI3 manual

ISS(config-vfi)# vpn 13 fdb 6152

ISS(config-vfi)# neighbor global-id 100 node-id 30 genfec agi AG123456 src-ac-id 40 dst-ac-id 30 pwid 11 locallabel 250016 remotelabel 250015 encapsulation mpls no-split-horizon mplstype te 1 1

ISS(config-vfi)# #neighbor global-id 100 node-id 10 genfec agi AG123456 src-ac-id 40 dst-ac-id 10 pwid 22 locallabel 250017 remotelabel 250018 encapsulation mpls no-split-horizon mplstype te 4 4

ISS(config-vfi)# end

ISS#

ISS#

ISS# c t

ISS(config)# int ac gi 0/15.100

ISS(config-vep)# no sh

ISS(config-vep)# xconnect vfi VFI1

Warning: The Ethernet port ac gigabiteth 0/15.100 configured as AC-interface should NOT be a PSN port

ISS(config-vep)# end

ISS# c t

ISS(config)# int ac gi 0/15.200

ISS(config-vep)# no sh

ISS(config-vep)# xconnect vfi VFI2

Warning: The Ethernet port ac gigabiteth 0/15.200 configured as AC-interface should NOT be a PSN port

ISS(config-vep)# end

ISS#

ISS# c t

ISS(config)# int ac gi 0/15.300

ISS(config-vep)# no sh

ISS(config-vep)# xconnect vfi VFI3

Warning: The Ethernet port ac gigabiteth 0/15.300 configured as AC-interface should NOT be a PSN port

ISS(config-vep)# end

############Configure ECFM only for control PW.

ISS# c t

ISS(config)# in pw 2

ISS(config-if)# no shutdown

ISS(config-if)# ethernet cfm enable

ISS(config-if)# ethernet cfm y1731 enable

ISS(config-if)# en

ISS#

ISS# c t

ISS(config)# in pw 11

ISS(config-if)# no shutdown

ISS(config-if)# ethernet cfm enable

ISS(config-if)# ethernet cfm y1731 enable

ISS(config-if)# en

ISS#

ISS# c t

ISS(config)# in pw 12

ISS(config-if)# no shutdown

ISS(config-if)# ethernet cfm enable

ISS(config-if)# ethernet cfm y1731 enable

ISS(config-if)# en

ISS#

ISS# c t

ISS(config)# in pw 4

ISS(config-if)# no shutdown

ISS(config-if)# en

ISS#

ISS# c t

ISS(config)# in pw 14

ISS(config-if)# no shutdown

ISS(config-if)# en

ISS#

ISS# c t

ISS(config)# in pw 33

ISS(config-if)# no shutdown

ISS(config-if)# en

ISS#

ISS#

ISS#

ISS# c t

ISS(config)# map pwid 2 pw 2

ISS(config)# map pwid 11 pw 11

ISS(config)# map pwid 12 pw 12

ISS(config)# end

ISS#

ISS# c t

ISS(config)# map pwid 4 pw 4

ISS(config)# map pwid 14 pw 14

ISS(config)# map pwid 33 pw 33

ISS(config)# end

ISS#

ISS#

ISS#

ISS# c t

ISS(config)# ethernet cfm start

ISS(config)# ethernet cfm enable

ISS(config)# ethernet cfm domain format char-string name CUS6 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 6150

ISS(config-ether-ecfm)# mep crosscheck mpid 1 vsi 6150

ISS(config-ether-ecfm)# en

ISS#

ISS# c t

ISS(config)# ethernet cfm domain format char-string name CUS2 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 6150

ISS(config-ether-ecfm)# mep crosscheck mpid 1 vsi 6150

ISS(config-ether-ecfm)# en

ISS#

ISS#

ISS# c t

ISS(config)# in pw 2

ISS(config-if)# ethernet cfm mep domain CUS6 mpid 1 service CUSMA1 active

ISS(config-ether-mep)# en

ISS#

ISS# c t

ISS(config)# in pw 12

ISS(config-if)# ethernet cfm mep domain CUS2 mpid 1 service CUSMA1 active

ISS(config-ether-mep)# en

ISS# ##########################Subring

ISS# c t

ISS(config)# ethernet cfm start

ISS(config)# ethernet cfm enable

ISS(config)# ethernet cfm domain format char-string name CUS5 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 6152

ISS(config-ether-ecfm)# mep crosscheck mpid 1 vsi 6152

ISS(config-ether-ecfm)# en

ISS#

ISS# c t

ISS(config)# in pw 11

ISS(config-if)# ethernet cfm mep domain CUS5 mpid 1 service CUSMA1 active

ISS(config-ether-mep)# en

ISS#

####################Dummy MEP creation for Subring 2nd port.

ISS# configure terminal

ISS(config)# switch default

ISS(config-switch)# ethernet cfm domain format dns-like-name name CUS4 level 7

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vlan 6152

ISS(config-ether-ecfm)# mep crosscheck mpid 11 vlan 6152

ISS(config-ether-ecfm)# mep crosscheck mpid 12 vlan 6152

ISS(config-ether-ecfm)# end

ISS# c t

ISS(config)# switch default

ISS(config-switch)# ethernet cfm domain format dns-like-name name CUS4 level 7

ISS(config-ether-ecfm)# service name CUSMA1 vlan 6152 mip-creation-criteria default

ISS(config-ether-ecfm)# end

ISS#

########################Configure BFD Session

ISS# c t

ISS(config)# bfd glob off

ISS(config)# end

ISS# c t

ISS(config)# mpls oam enable

ISS(config)# mpls oam meg meg1

ISS(config-meg)# service me1

ISS(config-meg)# mpls oam mep service me1 lsp 10 1 40 10

ISS(config-meg)# end

ISS# configure terminal

ISS(config)# bfd session 22

ISS(config-bfdsess)# bfd params sess-type single-hop

ISS(config-bfdsess)# bfd mpls meg-name meg1 me-name me1

ISS(config-bfdsess)# bfd params mode cc

ISS(config-bfdsess)# bfd enable

ISS(config-bfdsess)# en

ISS# configure terminal

ISS(config)# mpls oam enable

ISS(config)# mpls oam meg meg2

ISS(config-meg)# service me1

ISS(config-meg)# mpls oam mep service me1 lsp 5 1 40 20

ISS(config-meg)# end

ISS#

ISS# c t

ISS(config)# bfd session 25

ISS(config-bfdsess)# bfd params sess-type single-hop

ISS(config-bfdsess)# bfd mpls meg-name meg2 me-name me1

ISS(config-bfdsess)# bfd params mode cc

ISS(config-bfdsess)# bfd enable

ISS(config-bfdsess)# en

ISS#

ISS# c t

ISS(config)# mpls oam enable

ISS(config)# mpls oam meg meg3

ISS(config-meg)# service me1

ISS(config-meg)# mpls oam mep service me1 lsp 1 1 40 30

ISS(config-meg)# end

ISS# configure terminal

ISS(config)# bfd session 24

ISS(config-bfdsess)# bfd params sess-type single-hop

ISS(config-bfdsess)# bfd mpls meg-name meg3 me-name me1

ISS(config-bfdsess)# bfd params mode cc

ISS(config-bfdsess)# bfd enable

ISS(config-bfdsess)# en

####################Configure ERPS Ring.

ISS# c t

ISS(config)# no shutdown aps ring

ISS(config)# aps ring enable

ISS(config)# aps ring group 1

ISS(config-ring)# aps monitor mplsoam

ISS(config-ring)# aps service mpls-lsp-pw

ISS(config-ring)# aps compatible version v2

ISS(config-ring)# aps working pw 2 pw 12 vlan 6150

ISS(config-ring)# aps working pseudo-wire 2 pseudo-wire 12

ISS(config-ring)# aps working meg 1 me 1 mep 1 meg 2 me 1 mep 1

ISS(config-ring)# aps working subportlist pw 4 subportlist pw 14

ISS(config-ring)# aps revert wtr 3 seconds

ISS(config-ring)# aps nei pw 2

ISS(config-ring)# end

ISS#

ISS# ##############subring

ISS# c t

ISS(config)# no shutdown aps ring

ISS(config)# aps ring enable

ISS(config)# aps ring group 2

ISS(config-ring)# aps monitor mplsoam

ISS(config-ring)# aps service mpls-lsp-pw

ISS(config-ring)# aps compatible version v2

ISS(config-ring)# aps working pw 11 vlan 6152

nmhTestv2FsErpsRingVlanId, CfaIsVsiId exists

ISS(config-ring)# aps working pseudo-wire 11

ISS(config-ring)# aps working meg 3 me 1 mep 1 meg 4 me 1 mep 11

ISS(config-ring)# aps working subportlist pw 33

ISS(config-ring)# aps interconnection-node primary

ISS(config-ring)# aps multiple-failure primary

ISS(config-ring)# aps revert wtr 3 seconds

ISS(config-ring)# end

ISS# c t

ISS(config)# aps ring gr 1

ISS(config-ring)# aps gr active

ISS(config-ring)# end

ISS# c t

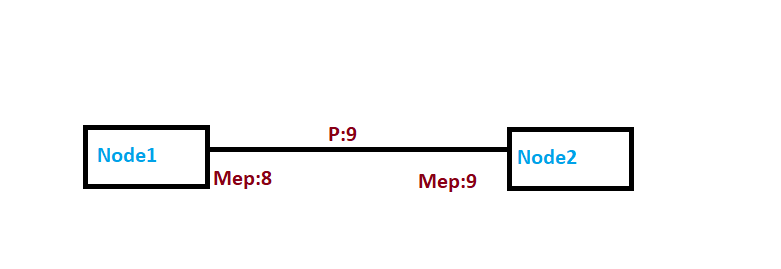
ISS(config)# aps rin gr 2

ISS(config-ring)# aps gr active

ISS(config-ring)# end

## Configuring Loss/Delay Measurement(LM/DM) using ECFM.

### Topology

Below setup shows 2 node topology for LM/DM.

### Configuring LM/DM using ECFM.

To calculate loss measurement need to initiate data traffic(minimal rate) and trigger LM packet.

#### **At Node 1:**

ISS# configure terminal

ISS(config)# set gvrp disable

ISS(config)# set gmrp disable

ISS(config)# shu span

ISS(config)# shutdown garp

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# set cli pa off

ISS(config)# vlan 1

ISS(config-vlan)# no ports

ISS(config-vlan)# end

ISS#

ISS# ###########Spirent port

ISS# configure terminal

ISS(config)# interface gi 0/13

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS#

ISS# configure terminal

ISS(config)# interface gi 0/9

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/13.100

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/9.100

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS#

ISS# #################control vep

ISS# c t

ISS(config)# vsi 4100

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# ports add ac-gi 0/9.100 ac-gi 0/13.100

ISS(config-vsi)# no sh

ISS(config-vsi)# end

ISS#

ISS# ############data vep

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/13.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/9.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# ethernet cfm start

ISS(config)# ethernet cfm enable

ISS(config)# end

ISS# configure terminal

ISS(config)# ethernet cfm y1731 enable

ISS(config)# ethernet cfm offload

ISS(config)# end

ISS# configure terminal

ISS(config)# ethernet cfm domain format dns-like-name name CUS4 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 8 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 9 vsi 4100

ISS(config-ether-ecfm)# end

ISS# c t

ISS(config)# eth cfm traceroute cache

ISS(config)# ethernet cfm cc level 6 vsi 4100 interval one-sec

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/9.100

ISS(config-vep)# ethernet cfm mep level 6 mpid 8 vsi 4100 active

ISS(config-vep-ether-mep)# set frame loss threshold near-end 5000

ISS(config-vep-ether-mep)# set frame loss threshold far-end 5000

ISS(config-vep-ether-mep)# end

ISS# configure terminal

ISS(config)# switch default

ISS(config-switch)# ethernet cfm cc enable level 6 vsi 4100

ISS(config-switch)# end

#### **At Node 2:**

ISS# configure terminal

ISS(config)# set gvrp disable

ISS(config)# set gmrp disable

ISS(config)# shu span

ISS(config)# shutdown garp

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# set cli pa off

ISS(config)# vlan 1

ISS(config-vlan)# no ports

ISS(config-vlan)# end

ISS#

ISS# ###########Spirent port

ISS# configure terminal

ISS(config)# interface gi 0/13

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS#

ISS# configure terminal

ISS(config)# interface gi 0/9

ISS(config-if)# map switch default

ISS(config-if)# vep-mode access

ISS(config-if)# vep-encap-type dot1q

ISS(config-if)# no shutdown

ISS(config-if)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/13.100

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/9.100

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS#

ISS# #################control vep

ISS# c t

ISS(config)# vsi 4100

ISS(config-vsi)# vsi vep-type any

ISS(config-vsi)# ports add ac-gi 0/9.100 ac-gi 0/13.100

ISS(config-vsi)# no sh

ISS(config-vsi)# end

ISS#

ISS# ############data vep

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/13.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/9.200

ISS(config-vep)# map switch default

ISS(config-vep)# no shutdown

ISS(config-vep)# end

ISS#

ISS# configure terminal

ISS(config)# ethernet cfm start

ISS(config)# ethernet cfm enable

ISS(config)# end

ISS# configure terminal

ISS(config)# ethernet cfm y1731 enable

ISS(config)# ethernet cfm offload

ISS(config)# end

ISS# configure terminal

ISS(config)# ethernet cfm domain format dns-like-name name CUS4 level 6

ISS(config-ether-ecfm)# service format char-string name CUSMA1 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 8 vsi 4100

ISS(config-ether-ecfm)# mep crosscheck mpid 9 vsi 4100

ISS(config-ether-ecfm)# end

ISS# c t

ISS(config)# eth cfm traceroute cache

ISS(config)# ethernet cfm cc level 6 vsi 4100 interval one-sec

ISS(config)# end

ISS#

ISS# configure terminal

ISS(config)# interface ac gi 0/9.100

ISS(config-vep)# ethernet cfm mep level 6 mpid 9 vsi 4100 active

ISS(config-vep-ether-mep)# set frame loss threshold near-end 5000

ISS(config-vep-ether-mep)# set frame loss threshold far-end 5000

ISS(config-vep-ether-mep)# end

ISS# configure terminal

ISS(config)# switch default

ISS(config-switch)# ethernet cfm cc enable level 6 vsi 4100

ISS(config-switch)# end

#### **Commands To Trigger LM/DM packet.**

Delay Measurement

Need to issue remote MAC for calculating Delay.

eth cfm frame delay start type two-way level 4 mac 00:02:02:03:04:0a count 10

Loss Measurement

Need to issue remote MAC for calculating Loss.

ethernet cfm frame loss start level 4 vlan 4100 direction outward mac 00:02:02:03:04:0a interval one-sec count 1

#### **Show command.**

Loss Measurement.

Iss# show ethernet cfm frame loss buffer detail

Interface : acGi0/13.100

MEP-ID : 9

Level : 6

VLAN-ID : 4100

ISID : -

peer mac-address near-end loss far-end loss measurement time taken

----------------- ------------- ------------ ----------------------

00:02:02:03:04:03 0 0 20ms

00:02:02:03:04:03 0 9 20ms

--- 00:03:02:03:04:17 single-ended frame loss statistics ---

timestamp = Thu Apr 5 17:30:35 2001, packets sent = 2, packets received = 2, --🡪triffere

near-end loss max/avg/min = 9/6/0,

far-end loss max/avg/min = 9/5/0

Delay Measurement

Iss# show ethernet cfm frame delay buffer detail

peer mac-address    frame-delay    IFDV       FDV  
-----------------   -----------    ----       ---

00:00:00:00:00:00   1.451ms        0.000ms    0.000ms

00:00:00:00:00:00   1.362ms        0.000ms    0.000ms

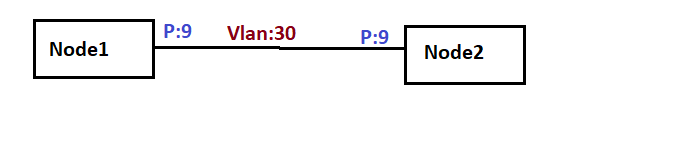
00:00:00:00:00:00   1.428ms        0.000ms    0.000ms

--- 00:02:02:03:04:01 two-way frame delay statistics ---  
timestamp = Sun Feb 11 03:13:39 2001, packets sent = 3, packets received = 3,  
delay min/avg/max = 1.362ms/1.413ms/1.451ms,  
variation avg IFDV/FDV = 0.000ms/0.000ms

## Configuring Loss/DelayMeasurement(LM/DM) using MPLS-OAM

### Topology

Below setup shows 2 node topology for LM.



### Configuring LM/DM using MPLS-OAM

#### **At Node 1:**

1. Configure MPLS and VLAN on respective ports for MPLS Tunnel.

iss# configure terminal

iss(config)# shutdown spanning-tree

iss(config)# set gmrp disable

iss(config)# set gvrp disable

iss(config)# shutdown garp

iss(config)# shutdown dot1x

iss(config)# end

iss# c t

iss(config)# interface gigabitethernet 0/9

iss(config-if)# map switch default

iss(config-if)# no shutdown

iss(config-if)# end

iss# configure terminal

iss(config)# interface vlan 30

iss(config-if)# shutdown

iss(config-if)# ip unnumbered 01:00:5e:90:00:00

iss(config-if)# no shutdown

iss(config-if)# mpls ip

iss(config-if)# end

iss# configure terminal

iss(config)# vlan 1

iss(config-vlan)# no ports

iss(config-vlan)# end

iss#

iss# configure terminal

iss(config)# vlan 30

iss(config-vlan)# ports gigabitethernet 0/9

iss(config-vlan)# exit

iss(config)# end

1. Configure Tunnel on MPLS port.

iss# configure terminal

iss(config)# mpls global-id 100 icc-id ARI123 node-id 101

iss(config)# mpls node-map-id local-map-num 10 global-id 100 node-id 101

iss(config)# mpls node-map-id local-map-num 20 global-id 100 node-id 102

iss(config)# mpls node-map-id local-map-num 30 global-id 100 node-id 103

iss(config)# end

iss# c t

iss(config)# interface mplstunnel 1

iss(config-if)# tunnel mpls destination 20 source 10 lsp-num 1

Warning: More than one tunnel can be created in the tunnel mode with the

same tunnel number. In case of multiple tunnels with the same tunnel number,

the tunnel specific configurations should be done inside the 'config-if-lsp'

mode to associate the configurations with that specific tunnel.

iss(config-if-lsp)# tunnel type mpls-tp

iss(config-if-lsp)# tunnel mode corouted-bidirectional

iss(config-if-lsp)# tunnel mpls static in-label 200001 vlan 30 direction reverse

iss(config-if-lsp)# tunnel mpls static out-label 200004 vlan 30 direction forward

iss(config-if-lsp)# no sh

iss(config-if-lsp)# end

iss#

1. Configure Interface for Attachment circuit.

iss# c t

iss(config)# int g 0/13

iss(config-if)# vep-mode access

iss(config-if)# vep-encap-type dot1q-vep

iss(config-if)# map sw default

iss(config-if)# no sh

iss(config-if)# end

iss#

iss# c t

iss(config)# int ac gi 0/13.100

iss(config-vep)# map sw default

iss(config-vep)# no sh

iss(config-vep)# end

iss#

iss# c t

iss(config)# vsi 6150

iss(config-vsi)# vsi vep-type any

iss(config-vsi)# vsi service-type multipoint-to-multipoint

iss(config-vsi)# ports add ac-gi 0/13.100

iss(config-vsi)# no sh

iss(config-vsi)# end

iss#

1. Configure Pseudowire for respective AC Interface.

iss# c t

iss(config)# sw default

iss(config-switch)# l2 vfi R1R2R3 manual

iss(config-vfi)# vpn 2 fdb 6150

iss(config-vfi)# neighbor global-id 100 node-id 20 genfec agi AG123456 src-ac-id 10 dst-ac-id 20 pwid 3 locallabel 250001 remotelabel 240001 control-word enable encapsulation mpls no-split-horizon mplstype te 1 1

iss(config-vfi)# pseudowire-oam pwid 3 local-cc-type ttl local-cv-type lsp bfd-ip-encap-fault bfd-ip-encap-fault-status-notify bfd-ach-encap-fault bfd-ach-encap-fault-status-notify

iss(config-vfi)# end

iss#

iss# c t

iss(config)# int ac gi 0/13.100

iss(config-vep)# no sh

iss(config-vep)# xconnect vfi R1R2R3

Warning: The Ethernet port ac gigabiteth 0/13.100 configured as

AC-interface should NOT be a PSN port

iss(config-vep)# end

1. Configuring OAM for respective pseudowire

iss# c t

iss(config)# switch default

iss(config-switch)# y1731-mplstp oam enable

iss(config-switch)# y1731-mplstp oam start

iss(config-switch)# y1731-mplstp oam domain level 6

iss(config-mpls-ecfm)# service name me1 service-type pw icc ICC123 umc UMC123

iss(config-mpls-ecfm)# mep crosscheck mpid 10 service me1

iss(config-mpls-ecfm)# mep crosscheck mpid 20 service me1

iss(config-mpls-ecfm)# y1731-mplstp oam mep 20 service me1 active rmep 10 pw 3

iss(config-mpls-mep)# end

iss# ################CC transmission

iss# c t

iss# switch default

iss# y1731-mplstp oam cc enable level 6 service me1

iss# end

#### **At Node 2:**

1. Configure MPLS and VLAN on respective ports for MPLS Tunnel.

iss# configure terminal

iss(config)# shutdown spanning-tree

iss(config)# set gmrp disable

iss(config)# set gvrp disable

iss(config)# shutdown garp

iss(config)# shutdown dot1x

iss(config)# end

iss# c t

iss(config)# interface gigabitethernet 0/9

iss(config-if)# map switch default

iss(config-if)# no shutdown

iss(config-if)# end

iss# configure terminal

iss(config)# interface vlan 30

iss(config-if)# shutdown

iss(config-if)# ip unnumbered 01:00:5e:90:00:00

iss(config-if)# no shutdown

iss(config-if)# mpls ip

iss(config-if)# end

iss# configure terminal

iss(config)# vlan 1

iss(config-vlan)# no ports

iss(config-vlan)# end

iss#

iss# configure terminal

iss(config)# vlan 30

iss(config-vlan)# ports gigabitethernet 0/9

iss(config-vlan)# exit

iss(config)# end

1. Configure Tunnel on MPLS port.

iss# configure terminal

iss(config)# mpls global-id 100 icc-id ARI123 node-id 102

iss(config)# mpls node-map-id local-map-num 10 global-id 100 node-id 101

iss(config)# mpls node-map-id local-map-num 20 global-id 100 node-id 102

iss(config)# mpls node-map-id local-map-num 30 global-id 100 node-id 103

iss(config)# end

iss# c t

iss(config)# interface mplstunnel 1

iss(config-if)# tunnel mpls destination 10 source 20 lsp-num 1

Warning: More than one tunnel can be created in the tunnel mode with the

same tunnel number. In case of multiple tunnels with the same tunnel number,

the tunnel specific configurations should be done inside the 'config-if-lsp'

mode to associate the configurations with that specific tunnel.

iss(config-if-lsp)# tunnel type mpls-tp

iss(config-if-lsp)# tunnel mode corouted-bidirectional

iss(config-if-lsp)# tunnel mpls static in-label 200004 vlan 30 direction reverse

iss(config-if-lsp)# tunnel mpls static out-label 200001 vlan 30 direction forward

iss(config-if-lsp)# no sh

iss(config-if-lsp)# end

iss#

1. Configure Interface for Attachment circuit.

iss# c t

iss(config)# int g 0/13

iss(config-if)# vep-mode access

iss(config-if)# vep-encap-type dot1q-vep

iss(config-if)# map sw default

iss(config-if)# no sh

iss(config-if)# end

iss#

iss# c t

iss(config)# int ac gi 0/13.100

iss(config-vep)# map sw default

iss(config-vep)# no sh

iss(config-vep)# end

iss#

iss# c t

iss(config)# vsi 6150

iss(config-vsi)# vsi vep-type any

iss(config-vsi)# vsi service-type multipoint-to-multipoint

iss(config-vsi)# ports add ac-gi 0/13.100

iss(config-vsi)# no sh

iss(config-vsi)# end

iss#

1. Configure Pseudowire for respective AC Interface.

iss# c t

iss(config)# sw default

iss(config-switch)# l2 vfi R1R2R3 manual

iss(config-vfi)# vpn 2 fdb 6150

iss(config-vfi)# neighbor global-id 100 node-id 10 genfec agi AG123456 src-ac-id 20 dst-ac-id 10 pwid 3 locallabel 240001 remotelabel 250001 control-word enable encapsulation mpls no-split-horizon mplstype te 1 1

iss(config-vfi)# pseudowire-oam pwid 3 local-cc-type ttl local-cv-type lsp bfd-ip-encap-fault bfd-ip-encap-fault-status-notify bfd-ach-encap-fault bfd-ach-encap-fault-status-notify

iss(config-vfi)# end

iss#

iss# c t

iss(config)# int ac gi 0/13.100

iss(config-vep)# no sh

iss(config-vep)# xconnect vfi R1R2R3

Warning: The Ethernet port ac gigabiteth 0/13.100 configured as

AC-interface should NOT be a PSN port

iss(config-vep)# end

1. Configuring OAM for respective pseudowire

iss# c t

iss(config)# switch default

iss(config-switch)# y1731-mplstp oam enable

iss(config-switch)# y1731-mplstp oam start

iss(config-switch)# y1731-mplstp oam domain level 6

iss(config-mpls-ecfm)# service name me1 service-type pw icc ICC123 umc UMC123

iss(config-mpls-ecfm)# mep crosscheck mpid 10 service me1

iss(config-mpls-ecfm)# mep crosscheck mpid 20 service me1

iss(config-mpls-ecfm)# y1731-mplstp oam mep 10 service me1 active rmep 20 pw 3

iss(config-mpls-mep)# end

iss# ################CC transmission

iss# c t

iss# switch default

iss# y1731-mplstp oam cc enable level 6 service me1

iss# end

#### **Commands To Trigger LM/DM packet.**

Delay Measurement

Need to trigger DM packet using Remote MEP Id.

**ethernet cfm frame delay start type two-way level 6 mpid 20 count 5**

Loss Measurement

Need to trigger LM packet using Remote MEP Id.

**ethernet cfm frame loss  start level 6 mpid 10 count 4**

#### **Show command**

Iss# show ethernet cfm frame loss buffer detail

Interface : acGi0/13.100

MEP-ID : 9

Level : 6

VLAN-ID : 4100

ISID : -

peer mac-address near-end loss far-end loss measurement time taken

----------------- ------------- ------------ ----------------------

00:02:02:03:04:03 0 0 20ms

00:02:02:03:04:03 0 9 20ms

--- 00:03:02:03:04:17 single-ended frame loss statistics ---

timestamp = Thu Apr 5 17:30:35 2001, packets sent = 2, packets received = 2,

near-end loss max/avg/min = 9/6/0,

far-end loss max/avg/min = 9/5/0

Delay Measurement

Iss# show ethernet cfm frame delay buffer detail

peer mac-address    frame-delay    IFDV       FDV  
-----------------   -----------    ----       ---

00:00:00:00:00:00   1.451ms        0.000ms    0.000ms

00:00:00:00:00:00   1.362ms        0.000ms    0.000ms

00:00:00:00:00:00   1.428ms        0.000ms    0.000ms

--- 00:02:02:03:04:01 two-way frame delay statistics ---  
timestamp = Sun Feb 11 03:13:39 2001, packets sent = 3, packets received = 3,  
delay min/avg/max = 1.362ms/1.413ms/1.451ms,  
variation avg IFDV/FDV = 0.000ms/0.000ms