Configure the OTN Protection

This chapter provides the Cisco IOS XR commands to add the path protection profile and switch the traffic from working to protected path.

Define the Working and Protecting Resources in an ODU Group Controller through Management Plane

Perform this task to define the working and protecting resources in an odu group controller through management plane.

Procedure

Step 1 **configure**

Step 2 **controller odu-group-mp** *group-id-of-the-controller* **signal {Ethernet | FC | OTN | SDH | Sonet} odu-type** *type-of-the-odu*

Example:

```
RP/0/RP0:hostname# controller odu-group-mp 5 signal OTN odu-type odu1
```

This creates the ODU group controller. The ODU Group MP value ranges from 1 to 65535.

Step 3 **protecting-controller** *name-of-the-controller Rack/Slot/Instance/Port*

Example:

```
RP/0/RP0:hostname (config-odu-group-mp5)# protecting-controller odu1 0/0/0/1
```

Defines an ODUk (HO/LO) controller as the protecting resource in the ODU group controller.

Step 4 **working-controller** *name-of-the-controller Rack/Slot/Instance/Port*

Example:

```
RP/0/RP0:hostname (config-odu-group-mp5)# working-controller odu1 0/0/0/1
```

Defines an ODUk (HO/LO) controller as the working resource in the ODU group controller.

Step 5 **commit**

Example: Define Working and Protecting Resources in an ODU Group Controller

The following example defines working and protecting resources in the ODU group controller using Cisco IOS XR commands:

```
RP/0/RP0:hostname# configure terminal
RP/0/RP0:hostname# controller odu-group-mp 5 signal otn odu-type odu1
RP/0/RP0:hostname(config-odu-group-mp5)# protecting-controller odu1 0/0/0/1
RP/0/RP0:hostname(config-odu-group-mp5)# working-controller odu1 0/0/0/1
RP/0/RP0:hostname(config-odu-group-mp5)#exit
```

Configure the Protection Attributes of an ODU Group Controller

Perform this task to configure the protection attributes of an odu group controller.

Procedure

Step 1 **configure**

Step 2 **controller odu-group-mp** *group-id-of-the-controller* **signal {Ethernet | FC | OTN | SDH | Sonet} odu-type** *type-of-the-odu*

Example:

```
RP/0/RP0:hostname# controller odu-group-mp 5 signal OTN odu-type odu1
```

This creates the ODU group controller. The ODU Group MP value ranges from 1 to 65535.

Step 3 **protection-attributes {connection-mode | protection-mode | protection-type | timers}** *SNC mode-of-the-protection-attributes*

Example:

```
RP/0/RP0:hostname (config-odu-group-mp5)# protection-attributes connection-mode snc-i
```

Configures the connection mode of all the protecting resources in the ODU group controller. You can configure the connection mode as SNC/I, SNC/N, or SNC/S.

Step 4 **protection-attributes {connection-mode | protection-mode | protection-type | timers}** *mode-of-the-protection-attributes*

Example:

```
RP/0/RP0:hostname (config-odu-group-mp5)# protection-attributes protection-mode revertive
wait-to-restore-time 300

RP/0/RP0:hostname (config-odu-group-mp5)# protection-attributes protection-mode nonrevertive
```

Configures the protection mode of all the protecting resources in the ODU group controller. You can configure the protection mode as revertive or non revertive. The value of wait-to-restore-time ranges from 300 to 720 seconds and default value is 300 seconds.

Step 5 **protection-attributes {connection-mode | protection-mode | protection-type | timers}** *type-of-the-protection-attributes*

Example:

```
RP/0/RP0:hostname (config-odu-group-mp5)# protection-attributes protection-type APSuni
```

Configures the protection type of all the protecting resources in the ODU group controller. You can configure the protection type as 1+1 bidirectional APS, 1+1 unidirectional APS or 1+1 no APS.

Step 6 **protection-attributes {connection-mode | protection-mode | protection-type | timers} hold-off time** *timer-of-the-protection-attributes*

Example:

```
RP/0/RP0:hostname (config-odu-group-mp5)# protection-attributes timers hold-off-time 100
```

Configures hold-off timer for the ODU group controller. The valid range for the hold-off timer is from 100 to 10000 seconds.

Step 7 **commit**

Example: Configure Protection Attributes of an ODU Group Controller

The following example shows configure protection attributes of an ODU group using Cisco IOS XR commands:

```
RP/0/RP0:hostname# configure terminal
RP/0/RP0:hostname# controller odu-group-mp 5
RP/0/RP0:hostname(config-odu-group-mp5)#  protection-attributes connection-mode snc-i
RP/0/RP0:hostname(config-odu-group-mp5)#  protection-attributes protection-type APSuni
RP/0/RP0:hostname(config-odu-group-mp5)#  protection-attributes protection-mode revertive
wait-to-restore-time 300
RP/0/RP0:hostname(config-odu-group-mp5)#  protection-attributes timers hold-off-time 100
RP/0/RP0:hostname(config-te-gmpls-tun-0x7)#  commit
```

Add a Path Protection Profile

Perform this task to add a path protection profile.

Procedure

Step 1 **configure**

Step 2 **mpls traffic-eng**

Example:

```
RP/0/RP0:hostname (config)# mpls traffic-eng
```

Enters the MPLS traffic-eng configuration mode.

Step 3 **attribute-set {auto-backup | auto-mesh | p2mp-te | path-option | path-protection-aps | xro}** *name-of-the-path-protection-aps*

Example:

```
RP/0/RP0:hostname (config-mpls-te)# attribute-set path-protection-aps abc
```

Specifies the attribute set name. The maximum length for attribute set name is 32 characters.

Step 4 **sub-network connection-mode {SNC-I | SNC-N | SNC-S}**

Example:

```
RP/0/RP0:hostname (config-te-attribute-set)# sub-network connection-mode
    SNC-N
```

Specifies the sub-network connection mode.

Step 5 **protection-type {1-plus-1-BDIR-APS | a-plus-1-UNIDIR-APS | 1-plus-1-UNIDIR-NO-APS}**

Example:

```
RP/0/RP0:hostname (config-te-attribute-set)# protection-type
    1-plus-1-BDIR-APS
```

Specifies the protection type.

Step 6 **protection-mode** *mode-of-the-protection*

Example:

```
RP/0/RP0:hostname (config-te-attribute-set)# protection-mode revertive
```

Specifies the protection mode.

Step 7 **timers [hold-off | wait-to-restore]**

Example:

```
RP/0/RP0:hostname (config-te-attribute-set)# timers hold-off 350
```

Specifies the timers value in seconds. The value of hold-off timer ranges from 100 to 10000 seconds. The value for wait to restore timer ranges from 300 to 720 seconds.

Step 8 **exit**

Example:

```
RP/0/RP0:hostname (config-mpls-attribute-set)# exit
```

Exits the attribute set mode.

Step 9 **gmpls nni**

Example:

```
RP/0/RP0:hostname (config-mpls-te)# gmpls nni
```

Enters the GMPLS NNI mode.

Step 10 **controller odu-group-te** *tunnel-ID*

Example:

```
RP/0/RP0:hostname (config-te-gmpls-nni)# controller Odu-Group-Te 7
```

Specifies the tunnel ID. The value ranges from 0 to 63535.

Step 11 **path-protection attribute-set** *name-of-the-path-protection attribute-set*

Example:

```
RP/0/RP0:hostname (config-te-gmpls-tun-0x7)# path-protection attribute-set abc1
```

Specifies the attribute set name. The maximum length for attribute set name is 32 characters.

Step 12 **commit**

Example: Add a Path Protection Profile

The following example shows how to add a path protection profile using Cisco IOS XR commands:

```
RP/0/RP0:hostname# configure terminal
RP/0/RP0:hostname# mpls traffic-eng
RP/0/RP0:hostname(config-mpls-te)# attribute-set path-protection-aps abc
RP/0/RP0:hostname(config-te-attribute-set)# sub-network connection-mode SNC-N
RP/0/RP0:hostname(config-te-attribute-set)#  protection-type 1-plus-1-BDIR-APS
RP/0/RP0:hostname(config-te-attribute-set)#  protection-mode revertive
RP/0/RP0:hostname(config-te-attribute-set)#  timers hold-off 350
RP/0/RP0:hostname(config-te-attribute-set)#  exit
RP/0/RP0:hostname(config-mpls-te)#  gmpls nni
RP/0/RP0:hostname(config-te-gmpls-nni)#  controller Odu-Group-Te 7
RP/0/RP0:hostname(config-te-gmpls-tun-0x7)#  path-protection attribute-set abc1
RP/0/RP0:hostname(config-te-gmpls-tun-0x7)#  commit
```

Perform a Lockout

Perform this task to perform a lockout.

Procedure

Step 1 **configure**

Step 2 **controller odu-group-mp** *group id-of-the-controller*

Example:

```
RP/0/RP0:hostname(config) # controller odu-group-mp 1
```

Enters the ODU group controller mode.

Step 3 **protection-switching operate lockout odu-dest** *name-of-the-controllerRack/Slot/Instance/Port*

Example:

```
RP/0/RP0:hostname (config-odu-group-mp1)# protection-switching operate lockout odu-dest
odu0 0/0/0/0
```

Configures an ODUk controller as a locked out resource in the ODU group controller.

Step 4 **commit**

Perform a Forced Switch

Perform this task to perform a forced switch.

Procedure

odu-group {mp | te} *group id-of-the-odu-group* **forced odu-dest** *name-of-the-controller Rack/Slot/Instance/Port*

Example:

```
RP/0/RP0:hostname # odu-group mp 1 forced odu-dest odu1 0/0/0/1
```

Configures ODU0 to carry the traffic in a network.

Perform a Manual Switch

Perform this task to perform a manual switch.

Procedure

odu-group {mp | te} *group id-of-the-controller* **manual odu-dest** *name-of-the-controller Rack/Slot/Instance/Port*

Example:

```
RP/0/RP0:hostname # odu-group mp 1 manual odu-dest odu0 0/0/0/1
```

Configures ODU0 to carry the traffic in a network. Switches the traffic manually from the working to the protected path.