

UPSR Path Protection

Table 1: Feature History

Feature Name	Release Information	Feature Description
CEM and IP IW Feature Parity for NCS4200-1T8S-20CS and NCS4200-3GMS Interface Modules	Cisco IOS XE Bengaluru 17.4.1	Support for UPSR IPv6 on NCS4200-1T8S-20CS and NCS4200-3GMS Interface Module.

A Unidirectional Path Switching Ring (UPSR) is a unidirectional network with two rings, one ring used as the working ring and the other as the protection ring. The same signal flows through both rings, one clockwise and the other counterclockwise. It is called UPSR because monitoring is done at the path layer. A node receives two copies of the electrical signals at the path layer, compares them, and chooses the one with the better quality. If part of a ring between two ADMs fails, the other ring still can guarantee the continuation of data flow. UPSR, like the one-plus-one scheme, has fast failure recovery.

UPSR Path Protection is supported at a VT level and an STS level.

Once a signal fail condition or a signal degrade condition is detected, the hardware initiates an interrupt to software that switches from the working path to the protection path. Nonrevertive options are valid for UPSR path protection.

Note 1X OC-192 and 8X OC-48 interface modules only supports the nonrevertive option. The nonrevertive option is the default mode.

Note When an active link of UPSR and APS is configured on the same interface module and the interface module reloads, the convergence number for UPSR circuits to switch to backup is high ranging 100–200 ms. When each circuit is configured separately, the convergence time is always under 50 ms.

The maximum scale supported on UPSR at system level is 1000 circuits.

The UPSR path protection supports the following feature:

- SONET local connect and cross connect are supported at VT-15 CEP, STS-1c, STS-3c, STS-12c, and STS-48c levels. UPSR is also supported on TDM endpoints that are mapped to a pseudowire. T1 SAToP,

T3 SAToP, and CT3 are supported on an UPSR ring only with local connect mode. Cross connect of T1, T3, and CT3 circuits to UPSR are not supported until Cisco IOS XE Fuji 16.8.x.

Starting with Cisco IOS XE Fuji 16.9.x, the cross connect of T1, T3, and CT3 circuits to UPSR is supported. For xconnect with the CT3 mode, the CEM protection group interface only supports the VT-15 mode. For cross-connect configuration, see *Configuring UPSR*.

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Restrictions for iMSG UPSR Path Protection

- UPSR Dual Ring Interconnect (DRI) is not supported.
- UPSR Dual Node Interconnect (DNI) is not supported.
- T1 or E1 and T3 or E3 configurations are not supported, and only the OCx-related configuration is supported.
- HDLC UPSR supports 510 PPP or HDLC pseudowire per group for an interface module and 1020 PPP or HDLC pseudowire for a router.
- APS group number of 255 and UPSR group ID of 1 cannot be configured on the same router.

Configuring iMSG UPSR

To configure protection group for iMSG UPSR, enter the following commands:

```
enable
configure terminal
protection-group 401 type STS48c
controller protection-group 401
type STS48c
channel-group 0
end
```

Configuring UPSR

Protection Group Configuration

```
enable
configure terminal
protection-group 401 type STS48c
controller protection-group 401
type STS48c
cem-group 19001 cep
end
```

Cross-connect Configuration with the CT3 mode

For cross connect with the CT3 mode, the CEM protection group interface supports only the VT-15 mode.

```
protection-group 2 type vt1.5
controller protection-group 2
type vt1.5
cem-group 16002 unframed

controller sonet 0/4/0
sts-1 1
mode vt-15
vtg 1 t1 2 protection-group 2 working

controller sonet 0/5/0
sts-1 1
mode vt-15
vtg 1 t1 2 protection-group 2 protect
```

Configuring UPSR Work and Protection Path Configuration

UPSR Work Path Configuration:

```
enable
configure terminal
controller MediaType 0/3/6
mode sonet
controller sonet 0/3/6
rate oc48
sts-1 1 - 48 mode sts-48c
protection-group 401 working
end
```

UPSR Protect Path Configuration:

```
enable
configure terminal
controller MediaType 0/12/6
mode sonet
controller sonet 0/12/6
rate oc48
sts-1 1 - 48 mode sts-48c
protection-group 401 protect
end
```

Verifying UPSR Configuration

Use the **show protection-group** command to verify UPSR configuration:

```
show protection-group
PGN   Type    Working I/f                Protect I/f              Active Status
-------------------------------------------------------------------------------
401   STS48C  SONET0/3/6.1-48            SONET0/12/6.1-48           W         A
-------------------------------------------------------------------------------
Status legend:D=Deleted FO=Force SF=SignalFailure SD=SignalDegrade
                        FL=Fail M=Manual L=Lockout C=Clear A=Auto
 (W)=working, (P)=protect
```