



Sub-sea Configuration

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Americas Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883



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CHAPTER 1

SLTE Mode

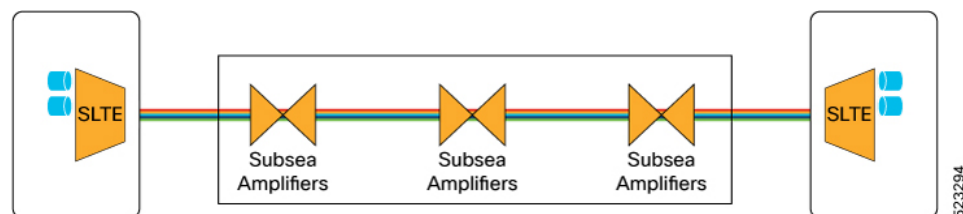
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Overview

Feature Name	Release	Feature Description
SLTE	Cisco IOS XR Release 7.10.1	NCS 1010 now comes with Submarine Line Terminating Equipment (SLTE) capabilities. NCS 1010 optical line system can maintain constant output power at SLTE with a configurable attenuation profile, which subsea systems require.

NCS1010 OLT-C and ILA-C equipment can operate in Submarine Line Terminating Equipment (SLTE) mode. In SLTE mode EDFA of OLT-C and ILA-C are required to be set in the Power Control Mode with a configurable target power. Customer can configure attenuation profile for the entire spectrum consisting actual channels and ASE channels.

Figure 1:



Prerequisites to Enable SLTE mode on NCS1010

Following are the pre-requisites to enable SLTE mode on NCS1010:

1. All optical applications must be disabled, such as APC, Link Tuner, Gain estimator.

- OSC controller must be in shut down state.

Use the following sample configuration to shut down OSC controller:

- `(config)#controller osc 0/0/0/0`
- `config-Osc)#shutdown`
- `(config-Osc)#commit`

- EDFA Safety Control mode must be in disabled state.

SLTE Work Flow

The following sections describe how to bring up Subsea channels work-flow:

Day 0 (Without Channel Configuration)

- By default – OLT(SLTE) fills the complete spectrum with the ASE.
- EDFA is configured in constant power mode (default is gain mode) and EDFA safety must be disabled.
- All optical apps (APC, Link Tuner and gain estimator) must be disabled followed by OSC controller.
- Configure the ASE attenuation profile for all 1548 slices.

The OLT box comes up with default attenuation of 25dB for all the slices.

Day 1 Configuration

- Define the channel and the attenuation profile (both Egress and Ingress) of the channel at the slice level.
- Create the XC for the corresponding channel first (per channel) and then attenuation profile for the corresponding channel, one channel at a time.

If there are multiple channels, create XC at a time for one channel and corresponding slices attenuation is configured as per the suggested values. This is to minimize power fluctuation on the line.



Note ASE loading does not happen automatically if the channel fails, user should delete the XC and switch to the ASE attenuation profile.

Configuring Subsea SLTE

Configuring Power Control

To configure Power and Gain Control, use the following commands:

configure

controller OTS R/S/I/P egress-ampli-safety-control-mode [power-control | gain-control default]

```
commit
```

```
end
```

User must manually create the channel, further we can run the script to create an cross connect for this channel.

Use the following configuration to create the channel manually:

```
(config)#hw-module location 0/0/NXR0 terminal-ampli grid-mode flex
(config-hwmod-olt-flexi)#channel-id 2 centre-freq 196.025 width 75
(config-hwmod-olt-flexi)#commit
Tue May 30 21:40:34.987 IST
(config-hwmod-olt-flexi)#end
```

Use the following sample configuration to display hardware module location and status:

```
#show hw-module location 0/0/NXR0 terminal-ampli
Tue May 30 21:41:09.026 IST
```

Legend:

```
NXC          - Channel not cross-connected
ACTIVE - Cslice attenuation in egress directionchannel cross-connected to data port
ASE          - Channel filled with ASE
FAILED - Data channel failed, pending transition to ASE
```

```
Location:          0/0/NXR0
```

```
Status:            Provisioned
```

Flex Grid Info

Channel Number	Centre Frequency (THz)	Channel Width (GHz)	Channel Status
Overlapping Channels			
2	196.025000	75.000	NXC
- , -			

Use the following sample configuration to see the available arguments in the script:

```
RP/0/RP0/CPU0:SITE-11(config)#load script channel_data_manager.py
Loading.Invalid Arguments!
usage: channel_data_manager.py [-h] [-c CHANNEL_ID] [-a ATTENUATION_VAL]
                               [-d DIRECTION] -t ACTION_TYPE [-f FILE_PATH]
                               [-p PORT_NUM]

optional arguments:
  -h, --help            show this help message and exit
  -c CHANNEL_ID, --channel_id CHANNEL_ID
                        Enter the channel ID within the range of 1-194
  -a ATTENUATION_VAL, --attenuation_val ATTENUATION_VAL
                        Enter the egress attenuation value in 0.1 dB
                        resolution. Valid range: 0 - 250
  -d DIRECTION, --direction DIRECTION
                        Enter the direction: 1. egress 2. ingress
  -t ACTION_TYPE, --action_type ACTION_TYPE
                        Enter the action type: 1. load-noise-data 2. load-
                        active-data
  -f FILE_PATH, --file_path FILE_PATH
                        Enter the source file path for loading the
                        egress/ingress attenuation profile. (Note: place the
                        file in root directory: /harddisk:/)
  -p PORT_NUM, --port_num PORT_NUM
                        Enter the add-drop port number
```

During the subsea channel bring-up, you can use the following script to create the XC and load the flat attenuation profile on the slices.

Use the following sample configuration to configure slice attenuation in egress direction:

```
(config)#load script channel_data_manager.py args -t load-active-data -c 2 -a 170 -p 28
Loading.
Attenuation profile taken from parameter: 170
.
Taking default direction egress!
```

Use the following sample configuration to configure slice attenuation in ingress direction:

```
(config)#load script channel_data_manager.py args -t load-active-data -c 2 -a 180 -p 28 -d
ingress
Loading.
Attenuation profile taken from parameter: 180
.
1440 bytes parsed in 2 sec (719)bytes/sec
OLT-C-SITE-2(config)#commit
```

Use the following sample configuration to display running configuration of OTS-OCH controller:

```
#show running-config controller ots-Och 0/0/0/0/2
Tue May 30 21:54:07.741 IST
controller Ots-Och0/0/0/0/2
  add-drop-channel Ots-Och0/0/0/28/2
!
```

Use the following sample configuration to delete the cross-connect and load ASE attenuation profile on the respective slices for that channel.

```
(config)#load script channel_data_manager.py args -t load-noise-data -c 2 -a 200
Loading.
Attenuation profile taken from parameter: 200
.
1449 bytes parsed in 2 sec (724)bytes/sec
RP/0/RP0/CPU0:OLT-C-SITE-2(config)#show configuration
Tue May 30 21:54:19.898 IST
!! Building configuration...
!! IOS XR Configuration 7.10.1.24I
controller Ots0/0/0/0
  egress-channel-slice 1489 attn 200
  egress-channel-slice 1490 attn 200
  egress-channel-slice 1491 attn 200
  egress-channel-slice 1492 attn 200
  egress-channel-slice 1493 attn 200
  egress-channel-slice 1494 attn 200
  egress-channel-slice 1495 attn 200
  egress-channel-slice 1496 attn 200
  egress-channel-slice 1497 attn 200
  egress-channel-slice 1498 attn 200
  egress-channel-slice 1499 attn 200
  egress-channel-slice 1500 attn 200
  egress-channel-slice 1501 attn 200
  egress-channel-slice 1502 attn 200
  egress-channel-slice 1503 attn 200
  egress-channel-slice 1504 attn 200
  egress-channel-slice 1505 attn 200
  egress-channel-slice 1506 attn 200
  egress-channel-slice 1507 attn 200
  egress-channel-slice 1508 attn 200
  egress-channel-slice 1509 attn 200
  egress-channel-slice 1510 attn 200
  egress-channel-slice 1511 attn 200
  egress-channel-slice 1512 attn 200
!
no interface Ots-Och0/0/0/0/2
end
```

Use the following sample configuration to delete cross-connect and move the channel back to not cross connected(NXC) state:

```
#show running-config controller ots-Och 0/0/0/0/2
Tue May 30 21:55:41.138 IST
% No such configuration item(s)
```

Use the following sample configuration to display channel slice attenuation information:

```
OLT-C-SITE-2#show controllers ots0/0/0/0 channel-slice-attenuation-info
Tue May 30 21:46:16.182 IST
```

```
Attenuation Slices spacing      :          3.125 GHz
Attenuation Slices Range       :          1 - 1548
Slice start wavelength         :        1566.82 nm
Slice start frequency          :       191337.50 GHz
```

```
Sub Channel Attenuation information :
Ingress Channel Slice Attenuation :
```

spectrum-slice num	Attenuation values (dB)									
1 - 12	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
25.0 25.0 25.0 25.0										
13 - 24	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
25.0 25.0 25.0 25.0										
25 - 36	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
25.0 25.0 25.0 25.0										
37 - 48	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
25.0 25.0 25.0 25.0										
49 - 60	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
25.0 25.0 25.0 25.0										
61 - 72	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
25.0 25.0 25.0 25.0										
73 - 84	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
25.0 25.0 25.0 25.0										
85 - 96	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
25.0 25.0 25.0 25.0										
97 - 108	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
25.0 25.0 25.0 25.0										
109 - 120	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
25.0 25.0 25.0 25.0										
.										
.										
1525 - 1536	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
25.0 25.0 25.0 25.0										
1537 - 1548	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
25.0 25.0 25.0 25.0										

```
Egress Channel Slice Attenuation :
```

spectrum-slice num	Attenuation values (dB)									
1 - 12	25.0	25.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
15.0 15.0 15.0 15.0										
13 - 24	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
15.0 15.0 25.0 25.0										
25 - 36	25.0	25.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
15.0 15.0 15.0 15.0										
37 - 48	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
15.0 15.0 25.0 25.0										
49 - 60	25.0	25.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
15.0 15.0 15.0 15.0										

```

61 - 72          15.0  15.0  15.0  15.0          15.0  15.0  15.0  15.0
15.0  15.0  25.0  25.0          25.0  25.0  15.0  15.0          15.0  15.0  15.0  15.0
73 - 84          25.0  25.0  15.0  15.0          15.0  15.0  15.0  15.0
15.0  15.0  15.0  15.0          15.0  15.0  15.0  15.0
85 - 96          15.0  15.0  15.0  15.0          15.0  15.0  15.0  15.0
15.0  15.0  25.0  25.0          25.0  25.0  15.0  15.0          15.0  15.0  15.0  15.0
97 - 108         25.0  25.0  15.0  15.0          15.0  15.0  15.0  15.0
15.0  15.0  15.0  15.0          15.0  15.0  15.0  15.0
109 - 120        15.0  15.0  15.0  15.0          15.0  15.0  15.0  15.0
15.0  15.0  25.0  25.0
.
.
.
1477 - 1488      15.0  15.0  15.0  15.0          15.0  15.0  15.0  15.0
15.0  15.0  25.0  25.0          17.0  17.0  17.0  17.0          17.0  17.0  17.0  17.0
1489 - 1500      17.0  17.0  17.0  17.0          17.0  17.0  17.0  17.0
17.0  17.0  17.0  17.0          17.0  17.0  17.0  17.0
1501 - 1512      17.0  17.0  17.0  17.0          17.0  17.0  17.0  17.0
17.0  17.0  17.0  17.0          25.0  25.0  15.0  15.0          15.0  15.0  15.0  15.0
1513 - 1524      25.0  25.0  15.0  15.0          15.0  15.0  15.0  15.0
15.0  15.0  15.0  15.0          15.0  15.0  15.0  15.0
1525 - 1536      15.0  15.0  15.0  15.0          15.0  15.0  15.0  15.0
15.0  15.0  25.0  25.0          25.0  25.0  25.0  25.0          25.0  25.0  25.0  25.0
1537 - 1548      25.0  25.0  25.0  25.0          25.0  25.0  25.0  25.0
25.0  25.0  25.0  25.0

```

Use the following sample configuration to display module location when the channel moves from NXC to active state:

```
#show hw-module location 0/0/NXR0 terminal-ampli
Tue May 30 21:47:26.428 IST
```

Legend:

```

NXC      - Channel not cross-connected
ACTIVE   - Channel cross-connected to data port
ASE      - Channel filled with ASE
FAILED   - Data channel failed, pending transition to ASE

```

Location: 0/0/NXR0

Status: Provisioned

Flex Grid Info

Channel Number	Centre Frequency (THz)	Channel Width (GHz)	Channel Status
Overlapping Channels			
2	196.025000	75.000	ACTIVE
- , -			