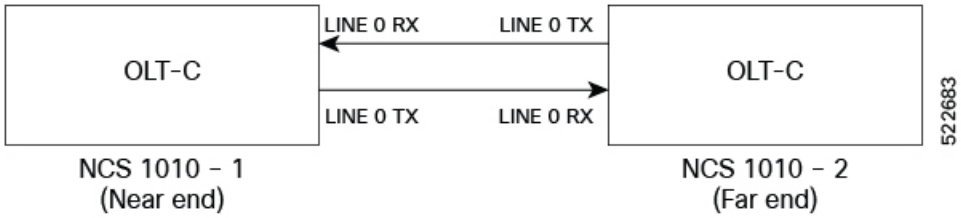
Span Loss

This chapter describes the Span Loss optical application for Cisco NCS 1010.

Overview of Span Loss

The Span Loss calculation is an automatic calculation of span losses between NCS 1010 nodes. The span loss verification algorithm calculates span loss by comparing power measurements at line Tx/Rx port at far end and line Rx/Tx port at near end. The algorithm raises the *Span Loss Value Out Of Range* alarm if span loss is not within configured thresholds.

Figure 1: Sample two node topology



For example, in the previous figure, the **Tx Span Loss** on NCS 1010-1 is the difference in signal power between LINE 0 TX on NCS 1010-1 and LINE 0 RX on NCS 1010-2.

The span loss application reports the span loss value for a span every 90 seconds. If span loss changes, for example when a change in fiber loss occurs, the span loss application typically takes 90 seconds to update the span loss.

On a Raman span with Raman tuning enabled, span loss verification reports the following values:

- **Span loss with pumps off:** This measurement is the difference in power values between the DFB-Tx/Rx of the remote node and the DFB-Rx/Tx of the local node. This measurement also includes a timestamp. When a Raman span is up, the span loss application latches on to the difference in power between DFB-Tx and DFB-Rx before Raman tuning turns the Raman pumps on.
- **Apparent span loss:** This measurement is based on the power values of C band, L band and Optical Service Channel (OSC). For a Raman span, the span loss application uses this span loss value to raise the *Span Loss Value Out Of Range* alarm.

- **Estimated span loss:** This value is based on Raman gain that is achieved by Raman tuning application. Estimated span loss value is based on Raman gain that is achieved when safety loop was closed and tuning was performed. Raman tuning application reports the Raman gain measurement. When you disable Raman tuning, the span loss application does not compute the Estimated span loss.

  Estimated span loss = Apparent span loss + Raman gain

- **Span loss**: For non-Raman spans, the span loss algorithm calculates span loss by comparing Tx/Rx power measurement at line port at far end and Rx/Tx power measurement at line port at near end.

View Span Loss Values

Use the **show olc span-loss** command to view the Tx span loss and Rx span loss.

Note **Rx Span Loss** values are not available on a network where one NCS 1010 node is upgraded to R25.3.1 while other nodes are on an earlier software version.

The following sample shows the output of the **show olc span-loss** command on a Raman span with Raman tuning enabled.

```
RP/0/RP0/CPU0:ios#show olc span-loss
Mon Apr 11 09:33:00.398 UTC

Controller name                          : Ots0/0/0/0
Neighbour RID                            : 10.1.1.2
Apparent Rx Span Loss                    : 7.7 dB
Rx Span Loss (with pumps off)            : 23.2 dB
Rx Span Loss (with pumps off) measured at : 2022-04-11 07:42:26
Estimated Rx Span Loss                   : 23.5 dB
Apparent Tx Span Loss                    : 17.5 dB
Tx Span Loss (with pumps off)            : 33.3 dB
Tx Span Loss (with pumps off) measured at : 2022-04-11 07:42:56
Estimated Tx Span Loss                   : 33.5 dB
```

The following sample shows the output of the **show olc span-loss** command on a Raman span with Raman tuning disabled. In this sample output, Raman tuning is disabled on both Ots0/0/0/0 and Ots0/0/0/2 on the near end node. The far end nodes have Raman tuning enabled.

```
RP/0/RP0/CPU0:ios#show olc span-loss
Mon Jun 20 06:51:58.601 UTC

Controller name                          : Ots0/0/0/0
Neighbour RID                            : 10.1.1.5
Apparent Rx Span Loss                    : 16.3 dB
Rx Span Loss (with pumps off)            : 16.4 dB
Rx Span Loss (with pumps off) measured at : 2022-06-20 05:53:52
Estimated Rx Span Loss                   : NA
Apparent Tx Span Loss                    : 5.8 dB
Tx Span Loss (with pumps off)            : 21.6 dB
Tx Span Loss (with pumps off) measured at : 2022-06-20 05:54:08
Estimated Tx Span Loss                   : 18.6 dB


Controller name                          : Ots0/0/0/2
Neighbour RID                            : 10.1.1.3
Apparent Rx Span Loss                    : 27.1 dB
Rx Span Loss (with pumps off)            : 30.3 dB
Rx Span Loss (with pumps off) measured at : 2022-06-20 06:51:22
```

```
Estimated Rx Span Loss                    : NA
Apparent Tx Span Loss                     : 6.4 dB
Tx Span Loss (with pumps off)             : 19.2 dB
Tx Span Loss (with pumps off) measured at : 2022-06-20 05:54:08
Estimated Tx Span Loss                    : 19.6 dB
```

The following sample shows the output of the **show olc span-loss** command on a non-Raman span.

```
RP/0/RP0/CPU0:ios#show olc span-loss
Mon Apr 11 09:37:31.950 UTC

Controller name                           : Ots0/0/0/0
Neighbour RID                             : 10.91.1.90
Rx Span Loss                              : 10.2 dB
Rx Span Loss (with pumps off)             : NA
Rx Span Loss (with pumps off) measured at : NA
Estimated Rx Span Loss                    : NA
Tx Span Loss                              : 9.7 dB
Tx Span Loss (with pumps off)             : NA
Tx Span Loss (with pumps off) measured at : NA
Estimated Tx Span Loss                    : NA
```

Configure Span Loss Thresholds

Use this task to configure span loss thresholds.

Procedure

Step 1 Select the controller on which the span loss thresholds need to be configured after entering into the optical applications configuration mode.

Example:

```
RP/0/RP0/CPU0:ios(config)#optical-line-control
RP/0/RP0/CPU0:ios(config-olc)#controller ots 0/0/0/0
```

Step 2 Configure the minimum and maximum span loss threshold values.

Example:

```
RP/0/RP0/CPU0:ios(config)#span-loss min 100
RP/0/RP0/CPU0:ios(config)#span-loss max 200
```

The system raises a SPAN-LOSS-OUT-OF-RANGE alarm if span loss is greater than the maximum threshold or less than the minimum threshold.

Step 3 Commit the changes and exit all the configuration modes.

Example:

```
RP/0/RP0/CPU0:ios(config-olc-ots)#commit
RP/0/RP0/CPU0:ios(config-olc)#exit
RP/0/RP0/CPU0:ios(config)#exit
```