

Multishelf Management

This chapter explains how to manage multishelves for NCS 2006 and NCS 2015.

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NTP-L15 Connecting the NCS 2006 Multishelf Node and the NCS 2006 Subtending Shelves

Purpose	Use this procedure to connect the NCS 2006 multishelf node and the NCS 2006 subtending shelves.
Tools/Equipment	Cross-over (CAT-5) LAN cables
Prerequisite Procedures	NTP-L41 Installing and Configuring the TNC, TNCE, TSC, TSCE, TNCS, or TNCS-O Card.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note The multishelf management (MSM) ports are present on the ECU module. The MSM ports located on the left side of the ECU module correspond to the TNC/TNCE/TSC/TSCE/TNCS/TNCS-O card in Slot 1, and the MSM ports located on the right side correspond to the TNC/TNCE/TSC/TSCE/TNCS/TNCS-O card in Slot 8. For more information about the ECU module and MSM ports, see the External Connection Units.

Note If a standalone node has unsupported cards, the node cannot be converted to a node controller or a subtended shelf controller.

Note Cisco NCS multi-shelf node does not support connecting to Cisco ONS 15454 M12 subtended shelf.

Procedure

Step 1 Using a cross-over (CAT-5) LAN cable:

a) Plug one connector into the MSM port that corresponds to the TNC/TNCE/TSC/TSCE/TNCS/TNCS-O card in Slot 1 of the NCS 2006 shelf used as the node controller.

b) Plug the other connector into the MSM port that corresponds to the TNC/TNCE/TSC/TSCE/TNCS/TNCS-O card in Slot 1 of the NCS 2006 shelf used as subtending shelf.

Step 2 Using a cross-over (CAT-5) LAN cable:

a) Plug one connector into the MSM port that corresponds to the TNC/TNCE/TSC/TSCE/TNCS/TNCS-O card in Slot 8 of the NCS 2006 shelf used as the node controller.

b) Plug the other connector into the MSM port that corresponds to the TNC/TNCE/TSC/TSCE/TNCS/TNCS-O card in Slot 8 of the NCS 2006 shelf used as subtending shelf.

Step 3 Repeat Steps 1 and 2 to connect the remaining two MSM ports of the NCS 2006 shelf, used as the node controller, to the subsequent subtending NCS 2006 shelf assemblies.

Note
The node controller can support up to three subtended shelves, while each of the subtended shelf can support only two more SSCs.

Step 4 To extend the number of SSCs, using a cross-over (CAT-5) LAN cable:

a) Plug one connector to any one of the remaining MSM ports of the NCS 2006 SSCs in the first layer.

b) Plug the other connector to any one of the MSM ports of the NCS 2006 SSCs in the next layer.

c) Repeat a and b to connect the remaining MSM ports of the NCS 2006 in the first layer to the next layer.

Stop. You have completed this procedure.

NTP-G318 Connecting the NCS 2006 Multishelf Node and the NCS 2006 Subtending Shelves in a Ring Topology

Purpose	Use this procedure to connect the NCS 2006 multishelf node and the NCS 2006 subtending shelves in a ring topology.
Tools/Equipment	Cross-over (CAT-5) LAN cables
Prerequisite Procedures	NTP-L41 Installing and Configuring the TNC, TNCE, TSC, TSCE, TNCS, or TNCS-O Card.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Using a cross-over (CAT-5) LAN cable:

a) Plug one connector into the MSM port that corresponds to the TNC/TNCE/TSC/TSCE/TNCS/TNCS-O card in Slot 1 of the NCS 2006 shelf used as the node controller.

b) Plug the other connector into the MSM port that corresponds to the TNC/TNCE/TSC/TSCE/TNCS/TNCS-O card in Slot 1 of the NCS 2006 shelf used as subtending shelf.

Note
When connecting two shelves using the cross-over cables, it is possible to have shelves not having controller cards in same slots. Use corresponding MSM ports according to the controller card slots.

Step 2 Using a cross-over (CAT-5) LAN cable:

a) Plug one connector to any one of the remaining MSM ports of the NCS 2006 SSCs in the first layer.

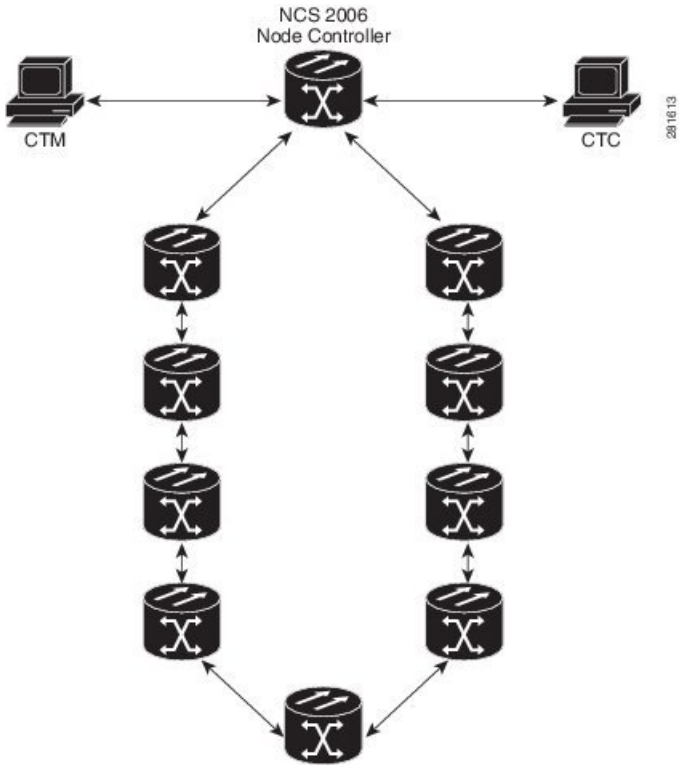
b) Plug the other connector to any one of the MSM ports of the NCS 2006 SSCs in the next layer.

c) Repeat a and b to connect the remaining MSM ports of the NCS 2006 SSCs.

After connecting all the SSCs as per Step 2, connect the last NCS 2006 SSC to the NCS 2006 node controller to complete the ring.

Note
You can connect up to a maximum of 9 SSCs in the ring topology.

Figure 1: Connecting the NCS 2006 Multishelf Node and the NCS 2006 Subtending Shelves in a Ring Topology



Stop. You have completed this procedure.

DLP-G795 Change System Mode Using LCD

For NCS 2002, NCS 2006 and NCS 2015, the system mode can be changed from ANSI (SONET) to ETSI (SDH) or vice-versa. Changing the system mode removes the provisioned data and the system reverts to the default configuration.

This is available on the single controller and dual controller cards. The node can be in a standalone or multishelf configuration.

The system mode cannot be changed under the following conditions:

- "SHELF-COMM-FAIL" alarm is present - if this alarm does occur, the user can still proceed with the mode conversion after resetting the active controller (TNCS).
- any SSC is in limited state

Purpose	This task enables the user to change the system mode using the LCD module.
Tools/ Equipment	None
Required/ As Needed	As needed
Onsite/ Remote	Onsite

Security Level	Superuser only

Procedure

Step 1 On the front panel, just below the LCD display, are three buttons, marked **Slot**, **Status** and **Port**.

Step 2 Repeatedly press the **Port** button to reach the **Mode Change Configuration** option from the main menu.

Step 3 Press the **Status** button to enter the **Mode Change Configuration** option.

Controller

Status = Mode cfg

Step 4 On the left hand side of the LCD display (the **Slot** button), the ANSI option is displayed. On the right hand side of the LCD display, (the **Port** button) , the ETSI option is displayed.

Step 5 Select the required mode, either by pressing the **Slot** or **Port** button. If the user by mistake, chooses the current mode, a relevant error message is displayed.

Step 6 On successful mode change, the LCD display reads:

Changing mode...

TNC may reset

Step 7 After successful mode change, the control card automatically reboots. In case of multishelf configuration, all the control cards reboot simultaneously.

Step 8 To verify mode change, go to the **System Mode** area in the **General** tab of CTC and confirm the current mode. Alternatively, use the **rtrv-ne-gen** TL1 command to check the current mode.

Multishelf Management in Cisco NCS 2015

The following sections describe the various multishelf LAN topologies supported in Cisco NCS 2015.

NTP-L62 Installing the SFP Module on the NCS 2015 ECU

Purpose	Use this procedure to install the SFP module in the SFP ports (M-MSM-2, P-MSM-2, M-MSM-3, and P-MSM-3 ports) of the NCS 2015 ECU. **Note** The only supported SFP is ONS-S1-100-FX.
Tools/Equipment	• Wrist strap or other personal grounding device to prevent electro-static discharge (ESD) occurrences. • Antistatic mat or antistatic foam to set the SFP on. • Fiber-optic end-face cleaning tools and inspection equipment. • Multi-mode optical fiber • ONS-S1-100-FX pluggable

Prerequisite Procedures	None.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Warning **SFP modules are Class I laser products.** Statement 1008

Warning **Because invisible laser radiation may be emitted from the aperture of the port when no cable is connected, avoid exposure to laser radiation and do not stare into open apertures.** Statement 70

Warning **Ultimate disposal of this product should be handled according to all national laws and regulations.** Statement 1040

Warning **Use of controls, adjustments, or performing procedures other than those specified may result in hazardous radiation exposure.** Statement 1057

Procedure

Step 1 Grip the sides of the SFP with your thumb and forefinger and insert the SFP into the SFP port on the ECU.

Step 2 Slide the SFP through the slot until you hear a click. The click indicates that the SFP is locked into the slot.

Step 3 To connect the multi-mode optical fiber, attach the appropriate optical fiber cable directly to the LC-type connector of the SFP.

Stop. You have completed this procedure.

NTP-L63 Configure a Cisco Catalyst 3560 (Active and Standby) for a Multishelf Node

Purpose	This procedure uses Cisco IOS to configure the Cisco Catalyst 3560 for a multishelf node configuration. For more information about the Catalyst 3560, refer to the Catalyst 3560 product documentation.

Tools/Equipment	None
Prerequisite Procedures	None
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Superuser

Note When Cisco Catalysts are used in a multishelf node configuration, the Cisco Catalysts can be used for other applications as long as they do not interfere with the VLAN settings of the multishelf node configuration.

Procedure

Step 1 At the Cisco IOS command line interface (CLI) for the Catalyst switch, enter the following spanning tree commands:

Example:

```
Switch(config)#spanning-tree mode rapid-pvst
Switch(config)#no spanning-tree optimize bpdu transmission
Switch(config)#spanning-tree extend system-id
```

Step 2 For a 24-port catalyst switch, enter the following commands to configure Ports 1 through 23. Replace *port* with the port number (1 through 23) and repeat for each port:

Example:

```
Switch(config)#interface FastEthernet0/
port
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 2
```

Step 3 For a 24-port catalyst switch, enter the following commands to configure Port 24. Replace *port* with the port number.

Example:

```
Switch(config)#interface FastEthernet0/
port
Switch(config-if)#switchport mode access
```

Step 4 Enter the following interface commands:

Example:

```
Switch(config)#interface GigabitEthernet0/1
Switch(config)#no ip address
Switch(config)#ip http server
Switch(config)#interface GigabitEthernet0/2
Switch(config)#no ip address
```

```
Switch(config)#ip http server
Switch(config)#interface Vlan 1
Switch(config)#no ip address
Switch(config)#no ip route-cache
Switch(config)#ip http server
```

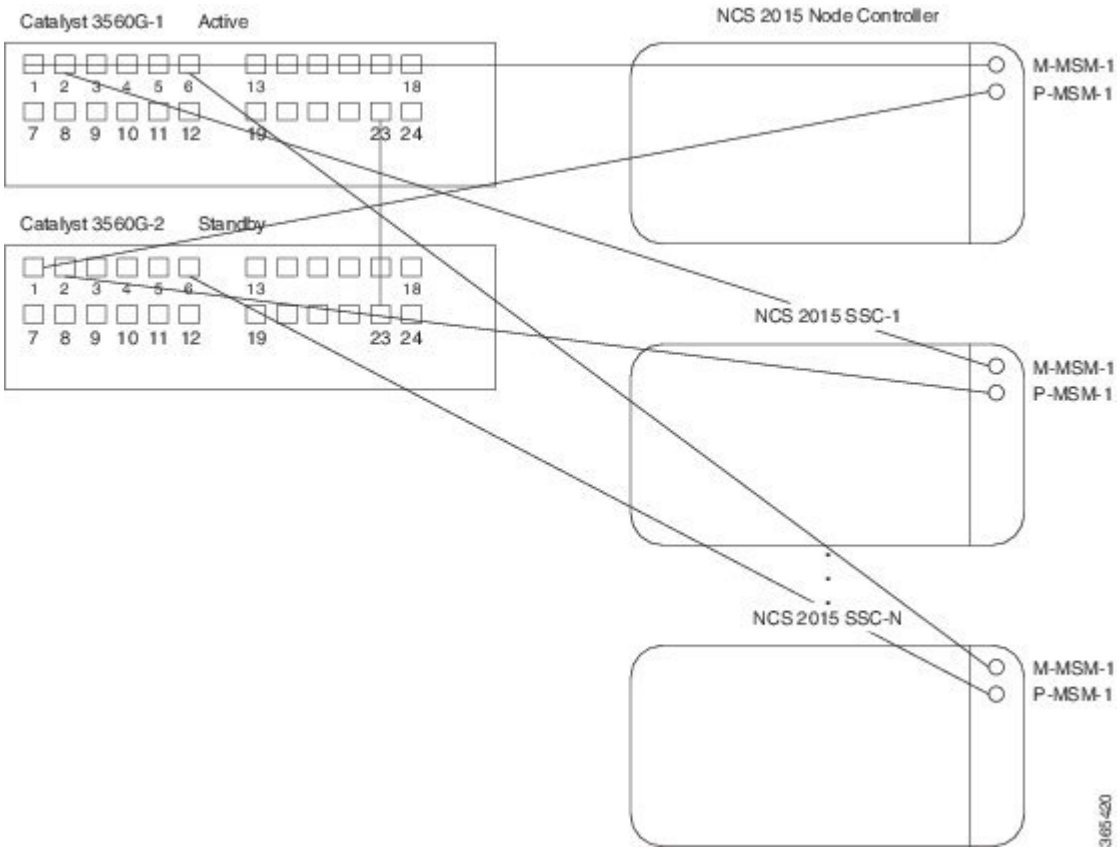
Step 5 Enter the following commands to configure authentication:

Example:

```
Switch(config)#line con 0
Switch(config)#line vty 0 4
Switch(config-line)#password yyyyyy
Switch(config-line)#login
Switch(config-line)#line vty 5 15
Switch(config-line)#password yyyyyy
Switch(config-line)#login
Switch(config-line)#end
```

Stop. You have completed this procedure.

Figure 2: Cisco Catalyst Switch 3560 for NCS 2015 Multishelf Node



NTP-L64 Connect the ONS 15454 Node Controller to an MS-ISC-100T Card

Purpose	Use this procedure to connect a ONS 15454 node controller to two MS-ISC-100T cards.
Tools/Equipment	5.9 in. (0.15 m) CAT-5 LAN cable (2) 19.69 in. (0.5 m) CAT-5 LAN cable (1) 84 in. (2.13 m) EAP cables (2)
Prerequisite Procedures	"NTP-G15 Install the Common Control Cards" in the "Cisco ONS 15454 Hardware Installation Guide". "DLP-G371 Install the Ethernet Adapter Panel" in the "Cisco ONS 15454 Hardware Installation Guide".
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

To connect the MS-ISC-100T cards to the node controller shelf and set up protection, complete the following substeps (see the figure below).

a) Using the 5.9 in. (0.15 m) CAT-5 LAN cable, plug one connector into the NC port of the MS-ISC-100T card located on the left side of the node controller shelf (Slots 1 to 6) and plug the other connector into the front panel (RJ-45 connector) of the TCC3 card in Slot 7.

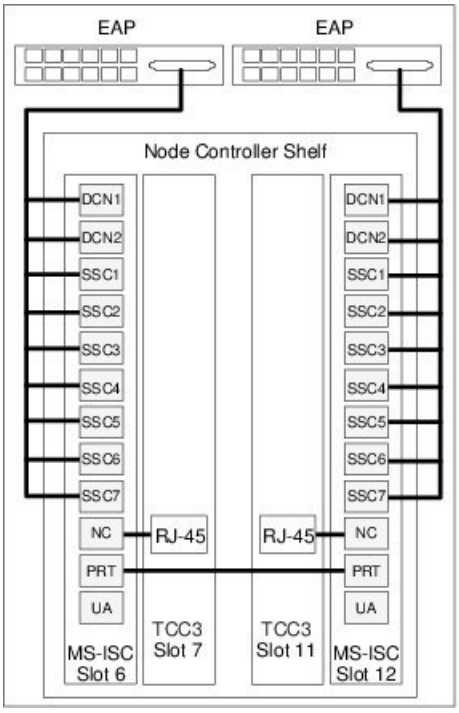
b) Using the 5.9 in. (0.15 m) CAT-5 LAN cable, plug one connector into the NC port of the MS-ISC-100T card located on the right side of the node controller shelf (Slots 12 to 17) and the other end into the front panel (RJ-45 connector) of the TCC3 card in Slot 11.

c) Using the 19.69 in. (0.5 m) CAT-5 LAN cable, plug one connector into the PRT port of the MS-ISC-100T card located on the left side of the node controller shelf (Slots 1 to 6) and plug the other connector into the PRT port of the MS-ISC-100T card located on the right side of the node controller shelf (Slots 12 to 17).

d) Plug the nine connectors on one end of the EAP cable into the two DCN ports and the seven subtending shelf controller (SSC) ports of the MS-ISC-100T card located on the left side of the node controller shelf (Slots 1 to 6). Plug the other end of the EAP cable into the multishelf port on the left EAP.

e) Plug the nine connectors on one end of the EAP cable into the two DCN ports and the seven SSC ports of the MS-ISC-100T card in the right side of the NC shelf (Slots 12 to 17). Plug the other end of the EAP cable into the multishelf port on the right EAP.

Figure 3: Connecting the EAP to the Node Controller



Stop. You have completed this procedure.

NTP-L65 Configure the MS-ISC-100T Card for a ONS 15454 Multishelf Node for Non-Default Public and Private VLAN IDs

Purpose	Use this procedure to configure the MS-ISC-100T Card for a multi-shelf node for non-default public and private VLAN IDs.
Tools/Equipment	Voltmeter
Prerequisite Procedures	None
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 At the Cisco IOS command line interface (CLI) for the MS-ISC-100T card, enter the following spanning tree commands:

Example:

```
Router(config)# bridge
public VLAN ID
 protocol rstp
Router(config)# bridge public VLAN ID
 forward-time 5
Router(config)# bridge
public VLAN ID
 max-age 10
Router(config)# bridge
private VLAN ID
 protocol rstp
Router(config)# bridge
private VLAN ID
 forward-time 5
Router(config)# bridge
private VLAN ID
 max-age 10
```

Step 2 Enter the following commands to configure the ports DCN 1 and DCN 2:

Example:

```
(Router(config)#interface FastEthernet0
(Router(config-if)# no ip address
(Router(config-if)# no ip route-cache
(Router(config-if)# bridge-group
public VLAN ID
(Router(config)#interface FastEthernet1
(Router(config-if)# no ip address
(Router(config-if)# no ip route-cache
(Router(config-if)# bridge-group
public VLAN ID
```

Step 3 Enter the following commands to configure ports SSC 1 through SSC 7. Replace *port* with the port number (2 to 8) and repeat for each port.

Example:

```
(Router(config)#interface FastEthernet
port
(Router(config-if)# no ip address
(Router(config-if)# no ip route-cache
 (Router(config-if)# bridge-group
private VLAN ID
```

Step 4 Enter the following commands to configure port NC (port 9):

Example:

```
Router(config)#interface FastEthernet9
```

```
(Router(config-if)no ip address
(Router(config-if)no ip route-cache
Router(config)#interface FastEthernet9.2
(Router(config-if)dot1Q
public VLAN ID
 native
(Router(config-if)no ip route-cache
(Router(config-if)no snmp trap link-status
(Router(config-if)bridge-group
public VLAN ID
Router(config)#interface FastEthernet9.2
(Router(config-if)encapsulation dot1Q
private VLAN ID
(Router(config-if)no ip route-cache
(Router(config-if)no snmp trap link-status
(Router(config-if) bridge-group
private VLAN ID
```

Step 5 Enter the following commands to configure port PRT (port 10):

Example:

```
Router(config)# interface FastEthernet10
(Router(config-if)no ip address
(Router(config-if)no ip route-cache
Router(config)#interface FastEthernet10.1
(Router(config-if)encapsulation dot1Q
public VLAN ID
 native
(Router(config-if)no ip route-cache
(Router(config-if)no snmp trap link-status
(Router(config-if)bridge-group
public VLAN ID
(Router(config-if)bridge-group public VLAN ID priority 0
!
Router(config)#interface FastEthernet10.2
(Router(config-if)encapsulation dot1Q
private VLAN ID

(Router(config-if)no ip route-cache
(Router(config-if)no snmp trap link-status
(Router(config-if)bridge-group
private VLAN ID
(Router(config-if)bridge-group
private VLAN ID
 priority 0
Router(config)#interface FastEthernet11
Router(config)# no ip address
Router(config)#no ip route-cache
Router(config)# shutdown
```

Step 6 Enter the following interface commands:

Example:

```
(Router(config)# interface POS0
(Router(config)# no ip address
(Router(config)# no ip route-cache
(Router(config)# shutdown
(Router(config)# crc 32
(Router(config)# interface POS1
(Router(config)# no ip address
```

```
(Router(config)# no ip route-cache
(Router(config)# shutdown
(Router(config)# crc 32
(Router(config)# ip classless
(Router(config)# no ip http server
```

Stop. You have completed this procedure.

Cisco NCS 2015 Node Controller (NC) and NCS 2015 Subtending Shelves (SSC)

When the NCS 2015 shelf is used as the NC, up to 10 NCS 2015 shelves can be subtended. The control cards supported on the NCS 2015 shelf are TNCS and TNCS-O.

Scenario 1 : Using Only RJ-45 Ports, Only One NCS 2015 SSC Can Be Connected to the NCS 2015 NC

1. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into the M-MSM-1 port that corresponds to the control card in Slot 1 of the NC.
   b. Plug the other connector into the M-MSM-1 port that corresponds to the control card in Slot 1 of the SSC.
2. Using another cross-over (CAT-5) LAN cable:
   a. Plug one connector into the P-MSM-1 port that corresponds to the control card in Slot 17 of the NC.
   b. Plug the other connector into the P-MSM-1 port that corresponds to the control card in Slot 17 of the SSC.

Scenario 2 : Using RJ-45 and SFP MSM-M and MSM-P Ports, Up to 10 NCS 2015 SSCs Can Be Connected To the NCS 2015 NC

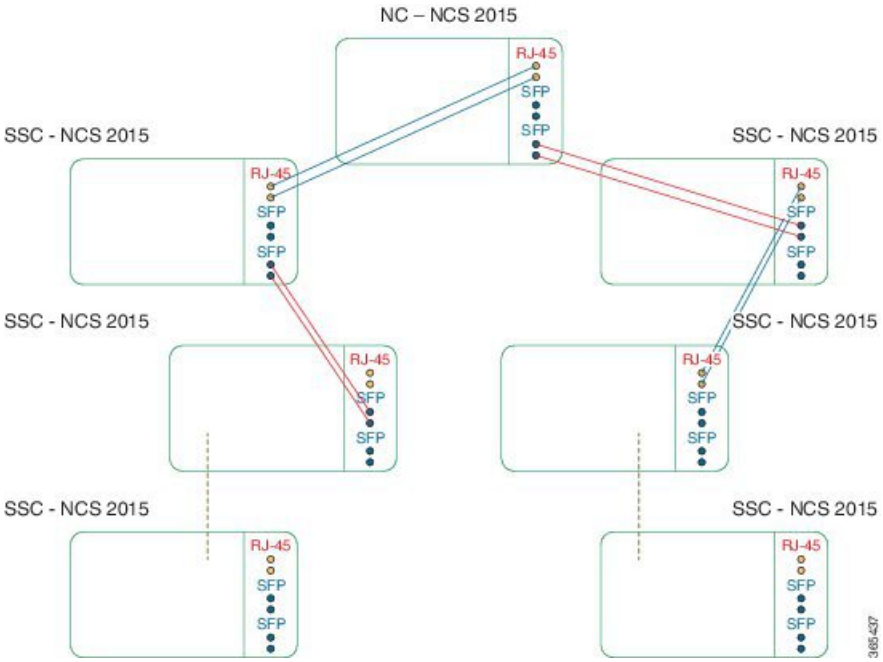
1. Install the SFP module in the SFP ports of the NCS 2015 ECU. For more information, see NTP-L62 Installing the SFP Module on the NCS 2015 ECU, on page 5.
2. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into the M-MSM-1 port that corresponds to the control card in Slot1 of the NC.
   b. Plug the other connector into the M-MSM-1 port that corresponds to the control card in Slot 1 of the SSC 1.
3. Using another cross-over (CAT-5) LAN cable:
   a. Plug one connector into the P-MSM-1 port that corresponds to the control Slot 17 of the NC.
   b. Plug the other connector into the P-MSM-1 port that corresponds to the control in Slot 17 of the SSC 1.
4. Using a multi-mode fiber optic cable:
   a. Plug one connector into the M-MSM-3 port that corresponds to the control card in Slot 1 of the NC.
   b. Plug the other connector into the M-MSM-2 port that corresponds to the control card in Slot 1 of the SSC 2.
5. Using another multi-mode fiber optic cable:

a. Plug one connector into the P-MSM-3 port that corresponds to the control card in Slot 17 of the NC.
b. Plug the other connector into the P-MSM-2 port that corresponds to the control card in Slot 17 of the SSC 2.

6. Using a multi-mode fiber optic cable:
   a. Plug one connector into the M-MSM-3 port that corresponds to the control card in Slot 1 of SSC 1.
   b. Plug the other connector into the M-MSM-2 port that corresponds to the control card in Slot 1 of the SSC 3.
7. Using another multi-mode fiber optic cable:
   a. Plug one connector into the P-MSM-3 port that corresponds to the control card in Slot 17 of SSC 1.
   b. Plug the other connector into the P-MSM-2 port that corresponds to the control card in Slot 17 of the SSC 3.
8. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into the M-MSM-1 port that corresponds to the control card in Slot1 of SSC 2.
   b. Plug the other connector into the M-MSM-1 port that corresponds to the control card in Slot 1 of the SSC 4.
9. Using another cross-over (CAT-5) LAN cable:
   a. Plug one connector into the P-MSM-1 port that corresponds to the control card in Slot 17 of SSC 2.
   b. Plug the other connector into the P-MSM-1 port that corresponds to the control card in Slot 17 of the SSC 4.
10. Connect the remaining SSCs by repeating Steps 6 through 9.

The scenario is illustrated in the figure below.

Figure 4: NCS 2015 SSCs Connected to NCS 2015 NC Using RJ-45 and SFP Ports



Scenario 3: Using SFP MSM-M and MSM-P Ports, Up to 10 NCS 2015 SSCs Can Be Connected To the NCS 2015 NC

1. Install the SFP module in the SFP ports of the NCS 2015 ECU. For more information, see NTP-L62 Installing the SFP Module on the NCS 2015 ECU, on page 5
2. Using a multi-mode fiber optic cable:
   a. Plug one connector into the M-MSM-2 port that corresponds to the control card in Slot1 of the NC.
   b. Plug the other connector into the M-MSM-2 port that corresponds to the control card in Slot 1 of the SSC 1.
3. Using another multi-mode fiber optic cable:
   a. Plug one connector into the P-MSM-2 port that corresponds to the control card in Slot 17 of the NC.
   b. Plug the other connector into the P-MSM-2 port that corresponds to the control card in Slot 17 of the SSC 1.
4. Using a multi-mode fiber optic cable:
   a. Plug one connector into the M-MSM-3 port that corresponds to the control card in Slot 1 of the NC.
   b. Plug the other connector into the M-MSM-2 port that corresponds to the control card in Slot 1 of the SSC 2.
5. Using another multi-mode fiber optic cable:
   a. Plug one connector into the P-MSM-3 port that corresponds to the control card in Slot 17 of the NC.
   b. Plug the other connector into the P-MSM-2 port that corresponds to the control card in Slot 17 of the SSC 2.

6. Using a multi-mode fiber optic cable:
   a. Plug one connector into the M-MSM-3 port that corresponds to the control card in Slot 1 of SSC 1.
   b. Plug the other connector into the M-MSM-2 port that corresponds to the control card in Slot 1 of the SSC 3.
7. Using another multi-mode fiber optic cable:
   a. Plug one connector into the P-MSM-3 port that corresponds to the control card in Slot 17 of SSC 1.
   b. Plug the other connector into the P-MSM-2 port that corresponds to the control card in Slot 17 of the SSC 3.
8. Using a multi-mode fiber optic cable:
   a. Plug one connector into the M-MSM-3 port that corresponds to the control card in Slot 1 of SSC 2.
   b. Plug the other connector into the M-MSM-2 port that corresponds to the control card in Slot 1 of the SSC 4.
9. Using another multi-mode fiber optic cable:
   a. Plug one connector into the P-MSM-3 port that corresponds to the control card in Slot 17 of SSC 2.
   b. Plug the other connector into the P-MSM-2 port that corresponds to the control card in Slot 17 of the SSC 4.
10. Connect the remaining SSCs by repeating Steps 6 through 9.

Scenario 4: Using Cisco Catalyst Switch 3650, Up to 10 NCS 2015 SSCs Can Be Connected To the NCS 2015 NC

1. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into Port 1 of the active Catalyst 3560.
   b. Plug the other connector into the M-MSM-1 port of the NC.
2. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into Port 1 of the standby Catalyst 3560.
   b. Plug the other connector into the P-MSM-1 port of the NC.
3. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into Port 23 of the active Catalyst 3560.
   b. Plug the other end into Port 23 of the standby Catalyst 3560.
4. To connect a SSC to the Catalyst 3560 switches, use a cross-over (CAT-5) LAN cable.
   a. Plug one connector into the M-MSM-1 port of the SSC.
   b. Plug the other end into Port 2 of the active Catalyst 3560.
   c. Using a cross-over (CAT-5) LAN cable, plug one connector into the P-MSM-1 port of the SSC.
   d. Plug the other end into Port 2 of the standby Catalyst 3560.
5. Repeat Step 4 to connect the remaining SSCs using ports 3 through 11on the Catalyst 3560 switches.

6. To configure the active and standby Catalyst 3560, complete the NTP-L63 Configure a Cisco Catalyst 3560 (Active and Standby) for a Multishelf Node, on page 6

Cisco NCS 2015 Node Controller, ONS 15454, NCS 2006, and NCS 2015 as Subtending Shelves

When a Cisco NCS 2015 shelf is used as the node controller, a mix of 15 ONS 15454, NCS 2006, and NCS 2015 shelves can be subtended. The maximum number of NCS 2015 shelves that can be subtended is 10.

The control cards supported are:

- NCS 2015 shelf: TNCS, TNCS-O
- NCS 2006 shelf: TNCE, TSCE, TNCS, TNCS-O
- ONS 15454 shelf: TCC3

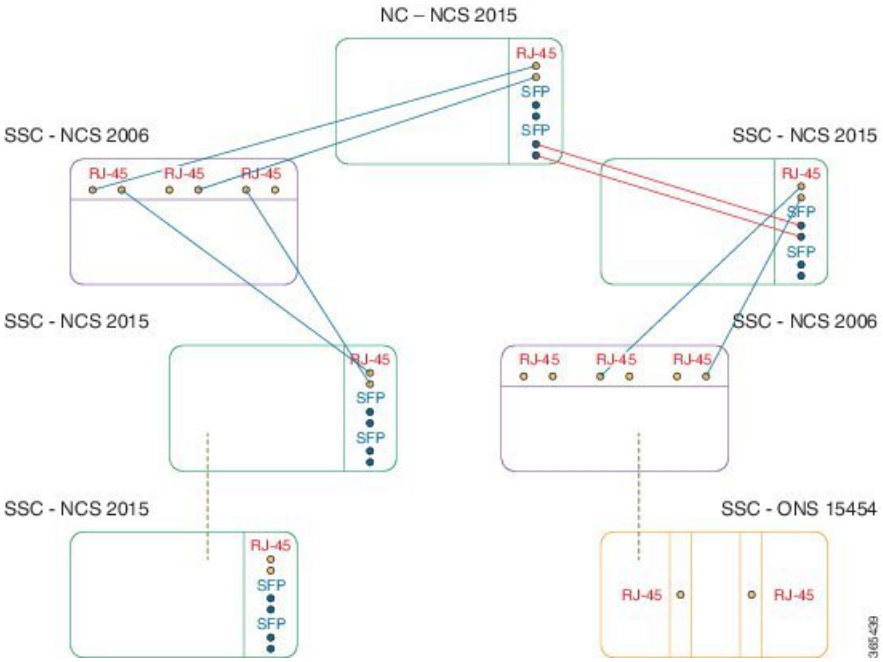
Scenario 1: Using RJ-45 and SFP MSM-M and MSM-P Ports, ONS 15454, NCS 2006, and NCS 2015 SSCs Can Be Connected to the NCS 2015 NC

1. Install the SFP module in the SFP ports of the ECU in NCS 2015 SSCs. For more information, see NTP-L62 Installing the SFP Module on the NCS 2015 ECU, on page 5.
2. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into the M-MSM-1 port of the NCS 2015 NC that corresponds to the control card in Slot 1.
   b. Plug the other end into the MSM port of the NCS 2006 SSC 1 that corresponds to the control card in Slot 1.
3. Using another cross-over (CAT-5) LAN cable:
   a. Plug one connector into the P-MSM-1 port of the NCS 2015 NC that corresponds to the control card in Slot 17.
   b. Plug the other end into the MSM port of the NCS 2006 SSC 1 that corresponds to the control card in Slot 8.
4. Using a multi-mode fiber optic cable:
   a. Plug one connector into the M-MSM-3 port that corresponds to the control card in Slot 1 of the NC.
   b. Plug the other connector into the M-MSM-2 port that corresponds to the control card in Slot 1 of the SSC 2.
5. Using another multi-mode fiber optic cable:
   a. Plug one connector into the P-MSM-3 port that corresponds to the control card in Slot 17 of the NC.
   b. Plug the other connector into the P-MSM-2 port that corresponds to the control card in Slot 17 of the SSC 2.
6. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into the MSM port of the NCS 2006 SSC 1 that corresponds to the control card in Slot 1.
   b. Plug the other end into the M-MSM-1 port of the NCS 2015 SSC 3 that corresponds to the control card in Slot 1.

7. Using another cross-over (CAT-5) LAN cable:
   a. Plug one connector into the MSM port of the NCS 2006 SSC 1 that corresponds to the control card in Slot 8.
   b. Plug the other end into the P-MSM-1 port of the NCS 2015 SSC 3 that corresponds to the control card in Slot 17.
8. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into the M-MSM-1 port of the NCS 2015 SSC 2 that corresponds to the control card in Slot 1.
   b. Plug the other end into the MSM port of the NCS 2006 SSC 4 that corresponds to the control card in Slot 1.
9. Using another cross-over (CAT-5) LAN cable:
   a. Plug one connector into the P-MSM-1 port of the NCS 2015 SSC 2 that corresponds to the control card in Slot 17.
   b. Plug the other end into the MSM port of the NCS 2006 SSC 4 that corresponds to the control card in Slot 8.
10. To connect a NCS 2015 or NCS 2006 SSC to a ONS 15454 SSC:
    a. Using a cross-over (CAT-5) LAN cable, plug one connector into the M-MSM-1 port of NCS 2015 SSC or the MSM port of the NCS 2006 SSC that corresponds to the control card in Slot 1.
    b. Plug the other end into the RJ-45 port of the control card in Slot 7 of ONS 15454 SSC.
    c. Using another cross-over (CAT-5) LAN cable, plug one connector into the P-MSM-1 port of NCS 2015 SSC or the MSM port of the NCS 2006 SSC that corresponds to the control card in Slot 17 or Slot 8 respectively.
    d. Plug the other end into the RJ-45 port of the control card in Slot 11 of ONS 15454 SSC.
11. Repeat the above steps to connect the remaining SSCs in a daisy chain.

The scenario is illustrated in the figure below.

Figure 5: NCS 2015, NCS 2006, and ONS 15454 SSCs Connected to NCS 2015 NC Using RJ-45 and SFP Ports



Scenario 2: Using Cisco Catalyst Switch 3650, Up to 15 ONS 15454, NCS 2006, and NCS 2015 SSCs Can Be Connected To the NCS 2015 NC Through RJ-45 Ports

1. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into Port 1 of the active Catalyst 3560.
   b. Plug the other connector into the M-MSM-1 port of the NC.
2. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into Port 1 of the standby Catalyst 3560.
   b. Plug the other connector into the P-MSM-1 port of the NC.
3. Plug the other connector into the P-MSM-1 port of the NC.
   a. Plug one connector into Port 23 of the active Catalyst 3560.
   b. Plug the other end into Port 23 of the standby Catalyst 3560.
4. To connect all the SSCs to the Catalyst 3560 switches, use a cross-over (CAT-5) LAN cable.
   a. Plug one connector into:
      1. M-MSM-1 port of NCS 2015 SSC that corresponds to the control card in Slot 1
      2. MSM port of NCS 2006 SSC that corresponds to the control card in Slot 1.
      3. RJ-45 port of the control card in Slot 7 of ONS 15454 SSC.
   b. Plug the other end into Port 2 of the active Catalyst 3560.

c. Using a cross-over (CAT-5) LAN cable, plug one connector into:
   1. P-MSM-1 port of NCS 2015 SSC that corresponds to the control card in Slot 17
   2. MSM port of NCS 2006 SSC that corresponds to the control card in Slot 8.
   3. RJ-45 port of control card in Slot 11 of ONS 15454 SSC.

d. Plug the other end into Port 2 of the standby Catalyst 3560.

5. To configure the active and standby Catalyst 3560, complete the NTP-L63 Configure a Cisco Catalyst 3560 (Active and Standby) for a Multishelf Node, on page 6

Cisco NCS 2006 Node Controller, and ONS 15454, NCS 2006, and NCS 2015 Subtending Shelves

When a Cisco NCS 2006 shelf is used as the node controller, a mix of 15 ONS 15454, NCS 2006, and NCS 2015 shelves can be subtended. The maximum number of NCS 2015 shelves that can be subtended is 10.

Scenario 1: Using RJ-45 and SFP MSM-M and MSM-P Ports, ONS 15454, NCS 2006, and NCS 2015 SSCs Can Be Connected To the NCS 2006 NC.

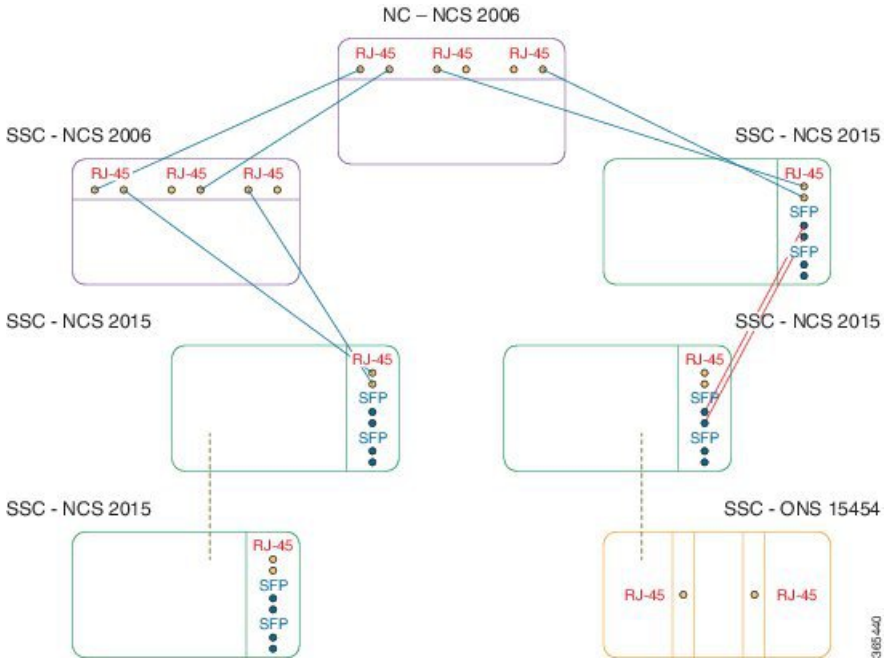
1. Install the SFP module in the SFP ports of the ECU in NCS 2015 SSCs. For more information, see NTP-L62 Installing the SFP Module on the NCS 2015 ECU, on page 5.
2. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into the MSM port of the NCS 2006 NC that corresponds to the control card in Slot 1.
   b. Plug the other end into the MSM port of the NCS 2006 SSC 1 that corresponds to the control card in Slot 1.
3. Using another cross-over (CAT-5) LAN cable:
   a. Plug one connector into the MSM port of the NCS 2006 NC that corresponds to the control card in Slot 8.
   b. Plug the other end into the MSM port of the NCS 2006 SSC 1 that corresponds to the control card in Slot 8.
4. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into the MSM port of the NCS 2006 NC that corresponds to the control card in Slot 1.
   b. Plug the other end into the M-MSM-1 port of the NCS 2015 SSC 2 that corresponds to the control card in Slot 1.
5. Using another cross-over (CAT-5) LAN cable:
   a. Plug one connector into the MSM port of the NCS 2006 NC that corresponds to the control card in Slot 8.
   b. Plug the other end into the P-MSM-1 port of the NCS 2015 SSC 2 that corresponds to the control card in Slot 17.
6. Using a cross-over (CAT-5) LAN cable:

a. Plug one connector into the MSM port of the NCS 2006 SSC1 that corresponds to the control card in Slot 1.
b. Plug the other end into the M-MSM-1 port of the NCS 2015 SSC 3 that corresponds to the control card in Slot 1.

7. Using another cross-over (CAT-5) LAN cable:
   a. Plug one connector into the MSM port of the NCS 2006 SSC 1 that corresponds to the control card in Slot 8.
   b. Plug the other end into the P-MSM-1 port of the NCS 2015 SSC 3 that corresponds to the control card in Slot 17.
8. Using a multi-mode fiber optic cable:
   a. Plug one connector into the M-MSM-2 port of the NCS 2015 SSC 2 that corresponds to the control card in Slot 1.
   b. Plug the other connector into the M-MSM-2 port of the NCS 2015 SSC 4 that corresponds to the control card in Slot 1.
9. Using another multi-mode fiber optic cable:
   a. Plug one connector into the P-MSM-2 port of the NCS 2015 SSC 2 that corresponds to the control card in Slot 17.
   b. Plug the other connector into the P-MSM-2 port of the NCS 2015 SSC 4 that corresponds to the control card in Slot 17.
10. To connect a NCS 2015 or NCS 2006 SSC to a ONS 15454 SSC, use a cross-over (CAT-5) LAN cable:
    a. Plug one connector into the M-MSM-1 port of NCS 2015 SSC or the MSM port of the NCS 2006 SSC that corresponds to the control card in Slot 1.
    b. Plug the other end into the RJ-45 port of the control card in Slot 7 of ONS 15454 SSC.
11. Using another cross-over (CAT-5) LAN cable:
    a. Plug one connector into the P-MSM-1 port of NCS 2015 SSC or the MSM port of the NCS 2006 SSC that corresponds to the control card in Slot 17 or Slot 8 respectively.
    b. Plug the other end into the RJ-45 port of the control card in Slot 11 of ONS 15454 SSC.
12. Repeat Steps 6 through 11 to connect the remaining SSCs.

The scenario is illustrated in the figure below.

Figure 6: NCS 2015, NCS 2006, and ONS 15454 SSCs Connected to NCS 2006 NC Using RJ-45 and SFP Ports



Scenario 2: Using Cisco Catalyst Switch 3650, ONS 15454, NCS 2006, and NCS 2015 SSCs Can Be Connected To the NCS 2006 NC

1. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into Port 1 of the active Catalyst 3560.
   b. Plug the other connector into the MSM port of the NC corresponding to the control card in Slot 1.
2. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into Port 1 of the standby Catalyst 3560.
   b. Plug the other connector into the MSM port of the NC corresponding to Slot 8.
3. Using a cross-over (CAT-5) LAN cable, plug one connector into Port 23 of the active Catalyst 3560. Plug the other end into Port 23 of the standby Catalyst 3560.
4. To connect all the SSCs to the Catalyst 3560 switches, use a cross-over (CAT-5) LAN cable.
   a. Plug one connector into:
   b. M-MSM-1 port of NCS 2015 SSC that corresponds to the control card in Slot 1
   c. MSM port of NCS 2006 SSC that corresponds to the control card in Slot 1.
   d. RJ-45 port of the control card in Slot 7 of ONS 15454 SSC.
   e. Plug the other end into Port 2 of the active Catalyst 3560.
   f. Using a cross-over (CAT-5) LAN cable, plug one connector into:
   g. P-MSM-1 port of NCS 2015 SSC that corresponds to the control card in Slot 17
   h. MSM port of NCS 2006 SSC that corresponds to the control card in Slot 8.
   i. RJ-45 port of the control card in Slot 11 of ONS 15454 SSC.
   j. Plug the other end into Port 2 of the standby Catalyst 3560.

5. To configure the active and standby Catalyst 3560, complete the NTP-L63 Configure a Cisco Catalyst 3560 (Active and Standby) for a Multishelf Node, on page 6.

Cisco ONS 15454 Node Controller, and ONS 15454, NCS 2006, and NCS 2015 Subtending Shelves

When a Cisco ONS 15454 shelf is used as the node controller, a mix of 15 ONS 15454, NCS 2006, and NCS 2015 shelves can be subtended. The maximum number of NCS 2015 shelves that can be subtended is 10.

The control cards supported are:

- NCS 2015 shelf: TNCS, TNCS-O
- NCS 2006 shelf: TNCE, TSCE, TNCS, TNCS-O
- ONS 15454 shelf: TCC3



Note Usage of TCC3 card as the node controller is recommended.

- The software package supported in this topology is the Cisco ONS 15454 DWDM package.

Scenario 1: Using RJ-45 and SFP MSM-M and MSM-P Ports, ONS 15454, NCS 2006 and NCS 2015 SSCs Can Be Connected to the ONS 15454 NC.

When an ONS 15454 is used as the node controller, a mix of 15 ONS 15454, NCS 2006, and NCS 2015 shelves can be subtended through the MS-ISC-100T card connected to the node controller.

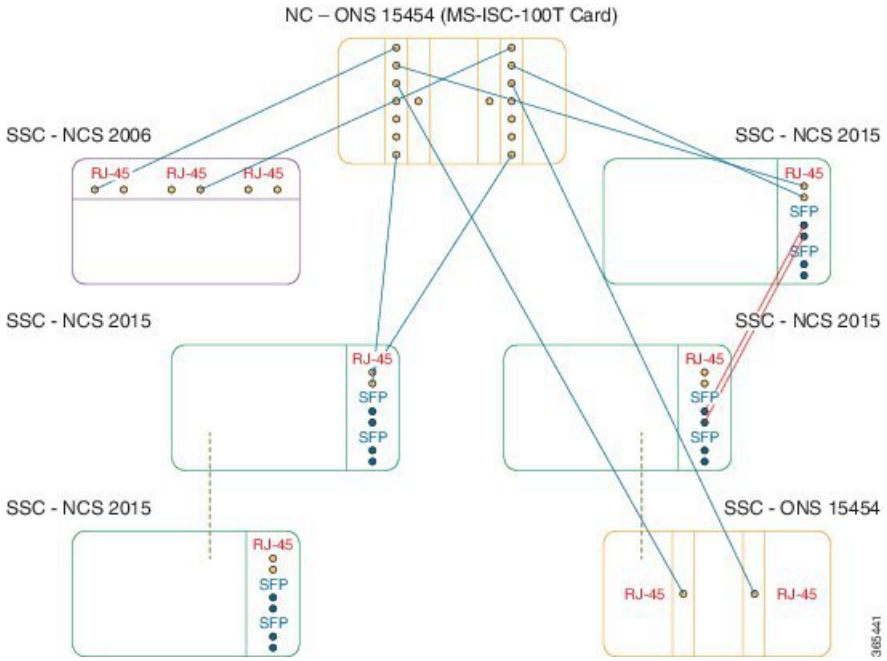
1. To connect the ONS 15454 NC to two MS-ISC-100T cards, complete the NTP-L64 Connect the ONS 15454 Node Controller to an MS-ISC-100T Card, on page 9.
2. To configure the MS-ISC-100T cards, complete the NTP-L65 Configure the MS-ISC-100T Card for a ONS 15454 Multishelf Node for Non-Default Public and Private VLAN IDs, on page 10.
3. To install the SFP module in the SFP ports of the ECU in NCS 2015 SSCs, complete the NTP-L62 Installing the SFP Module on the NCS 2015 ECU, on page 5.
4. Using a cross-over (CAT-5) LAN cable:.
   a. Plug one connector into the SSC1 port on the left EAP.
   b. Plug the other end of the connector into one of the following:
   c. MSM port of the NCS 2006 SSC that corresponds to the control card in Slot 1.
   d. RJ-45 port of the control card in Slot 1 of ONS 15454 SSC.
   e. M-MSM-1 port of the NCS 2015 SSC that corresponds to the control card in Slot 1.
5. Using another cross-over (CAT-5) LAN cable:
   a. Plug one connector into the SSC1 port on the right EAP.
   b. Plug the other end of the connector into one of the following:
   c. MSM port of the NCS 2006 SSC that corresponds to the control card in Slot 8.
   d. RJ-45 port of the control card in Slot 11 of ONS 15454 SSC.
   e. P-MSM-1 port of the NCS 2015 SSC that corresponds to the control card in Slot 17.
6. Connect two NCS 2015 SSCs by:

a. Using a multi-mode fiber optic cable, plug one connector into the M-MSM-2 port of NCS 2015 SSC x that corresponds to the control card in Slot 1.
b. Plug the other connector into the M-MSM-2 port of another NCS 2015 SSC y that corresponds to the control card in Slot 1.
c. Using another multi-mode fiber optic cable, plug one connector into the P-MSM-2 port of NCS 2015 SSC x that corresponds to the control card in Slot 17.
d. Plug the other connector into the P-MSM-2 port of NCS 2015 SSC y that corresponds to the control card in Slot 17.

7. Repeat Steps 4 through 6 to connect the remaining SSCs.

The scenario is illustrated in the figure below.

Figure 7: NCS 2015, NCS 2006, and ONS 15454 SSCs Connected to ONS 15454 NC Using RJ-45 and SFP Ports



Scenario 2: Using Cisco Catalyst Switch 3650, ONS 15454, NCS 2006, and NCS 2015 SSCs Can Be Connected to the ONS 15454 NC

1. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into Port 1 of the active Catalyst 3560.
   b. Plug the other connector into the MSM port of the NC corresponding to the control card in Slot 7.
2. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into Port 1 of the standby Catalyst 3560.
   b. Plug the other connector into the MSM port of the NC corresponding to Slot 11.
3. Using a cross-over (CAT-5) LAN cable, plug one connector into Port 23 of the active Catalyst 3560. Plug the other end into Port 23 of the standby Catalyst 3560.
4. To connect all the SSCs to the Catalyst 3560 switches, use a cross-over (CAT-5) LAN cable.
   a. Plug one connector into:

b. M-MSM-1 port of NCS 2015 SSC that corresponds to the control card in Slot 1
c. MSM port of NCS 2006 SSC that corresponds to the control card in Slot 1.
d. RJ-45 port of the control card in Slot 7 of ONS 15454 SSC.
e. Plug the other end into Port 2 of the active Catalyst 3560.
f. Using a cross-over (CAT-5) LAN cable, plug one connector into:
g. P-MSM-1 port of NCS 2015 SSC that corresponds to the control card in Slot 17
h. MSM port of NCS 2006 SSC that corresponds to the control card in Slot 8.
i. RJ-45 port of the control card in Slot 11 of ONS 15454 SSC.
j. Plug the other end into Port 2 of the standby Catalyst 3560.

5. To configure the active and standby Catalyst 3560, complete the NTP-L63 Configure a Cisco Catalyst 3560 (Active and Standby) for a Multishelf Node, on page 6

Ring Topology

The control cards supported are:

- NCS 2015 shelf: TNCS, TNCS-O
- NCS 2006 shelf: TNCE, TSCE, TNCS, TNCS-O
- ONS 15454 shelf: TCC3

The following ring topologies are supported:

Scenario 1: Cisco NCS 2015 Node Controller and NCS 2015 Subtending Shelves in a Ring Topology

The ring topology can be created using only RJ-45 MSM ports, only SFP MSM ports, or a mix of RJ-45 and SFP MSM ports.You can connect up to a maximum of 9 SSCs in the ring topology.

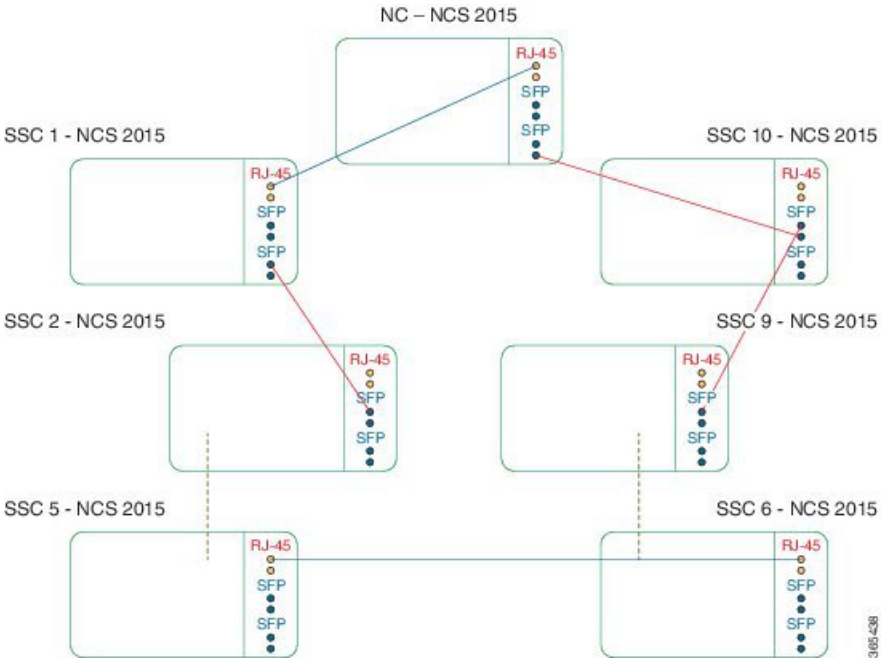
1. To create a ring topology using only RJ-45 MSM ports, perform Steps 4 through 7.
2. To create a ring topology using only SFP MSM ports, perform Steps 8 through 14.
3. To create a ring topology using a mix of RJ-45 MSM ports and SFP ports, perform Steps 15 through 18.
4. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into the M-MSM-1 port of the NC.
   b. Plug the other connector into the M-MSM-1 port of the SSC 1.
5. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into P-MSM-1 port of SSC 1.
   b. Plug the other connector into the P-MSM-1 port of the SSC 2.
6. Repeat Step 3 to connect the remaining SSCs.
7. To complete the ring, plug one connector of a cross-over (CAT-5) LAN cable into P-MSM-1 port of SSC 9. Plug the other connector into the P-MSM-1 port of the NC.
8. Using a multi-mode fiber optic cable:
   a. Plug one connector into the M-MSM-2 port of the NC that corresponds to the control card in Slot 1.
   b. Plug the other connector into the M-MSM-2 port of SSC 1 that corresponds to the control card in Slot 1.
9. Using another multi-mode fiber optic cable:

a. Plug one connector into the P-MSM-2 port of the NC that corresponds to the control card in Slot 17.
b. Plug the other connector into the P-MSM-2 port of the SSC 1 that corresponds to the control card in Slot 17.

10. Using another multi-mode fiber optic cable:
    a. Plug one connector into the M-MSM-3 port of the SSC 1 that corresponds to the control card in Slot 1.
    b. Plug the other connector into the M-MSM-2 port of the SSC 2 that corresponds to the control card in Slot 1.
11. Using another multi-mode fiber optic cable:
    a. Plug one connector into the P-MSM-3 port of the SSC 1 that corresponds to the control card in Slot 17.
    b. Plug the other connector into the P-MSM-2 port of the SSC 2 that corresponds to the control card in Slot 17.
12. Repeat Steps 10 and 11 to connect all the SSCs.
13. To complete the ring, using a multi-mode fiber optic cable:
    a. Plug one connector into the M-MSM-2 port of SSC 9 that corresponds to the control card in Slot 1.
    b. Plug the other connector into the M-MSM-3 port of the NC that corresponds to the control card in Slot 1.
14. Using another multi-mode fiber optic cable:
    a. Plug one connector into the P-MSM-2 port of the SSC 9 that corresponds to the control card in Slot 17.
    b. Plug the other connector into the P-MSM-3 port of the NC that corresponds to the control card in Slot 17.
15. Using a cross-over (CAT-5) LAN cable:
    a. Plug one connector into the M-MSM-1 port of the NC.
    b. Plug the other connector into the M-MSM-1 port of the SSC 1.
16. Using a multi-mode fiber optic cable:
    a. Plug one connector into the M-MSM-2 port of the SSC 1 that corresponds to the control card in Slot 1.
    b. Plug the other connector into the M-MSM-2 port of the SSC 2 that corresponds to the control card in Slot 1.
17. Repeat Steps 15 and 16 to connect the remaining SSCs.
18. To complete the ring, plug one connector of a multi-mode fiber optic cable into P-MSM-2 port of SSC 9. Plug the other connector into the P-MSM-3 port of the NC.

The scenario is illustrated in the figure below.

Figure 8: NCS 2015 NC and NCS 2015 SSCs in Ring Topology



Scenario 2: Using RJ-45 Ports Connect Cisco NCS 2015 Node Controller, and ONS 15454, NCS 2006, and NCS 2015 Subtending Shelves in a Ring Topology

The maximum number of NCS 2015 shelves that can be subtended is 10.

1. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into the M-MSM-1 port of the NCS 2015 NC that corresponds to the control card in Slot 1.
   b. Plug the other end into the MSM port of the NCS 2006 SSC 1 that corresponds to the control card in Slot 1.
2. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into the MSM port of the NCS 2006 SSC 1 that corresponds to the control card in Slot 8.
   b. Plug the other end into the P-MSM port of the NCS 2015 SSC 2 that corresponds to the control card in Slot 17.
3. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into the M-MSM-1 port of the NCS 2015 SSC 2 that corresponds to the control card in Slot 1.
   b. Plug the other end into the RJ-45 port of the control card in Slot 7 of ONS 15454 SSC 3.
4. Repeat Steps 2 and 3 to connect the remaining SSCs.

5. To complete the ring, plug one connector of a cross-over (CAT-5) LAN cable into P-MSM-1 port of NCS 2015 SSC 15. Plug the other connector into the P-MSM-1 port of the NC.

Scenario 3: Using RJ-45 Ports Connect Cisco NCS 2006 Node Controller, and ONS 15454, NCS 2006, and NCS 2015 Subtending Shelves in a Ring Topology

The maximum number of NCS 2015 shelves that can be subtended is 10.

1. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into the MSM port of the NCS 2006 NC that corresponds to the control card in Slot 1.
   b. Plug the other end into the MSM port of the NCS 2006 SSC 1 that corresponds to the control card in Slot 1.
2. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into the MSM port of the NCS 2006 SSC 1 that corresponds to the control card in Slot 8.
   b. Plug the other end into the P-MSM port of the NCS 2015 SSC 2 that corresponds to the control card in Slot 17.
3. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into the M-MSM-1 port of the NCS 2015 SSC 2 that corresponds to the control card in Slot 1.
   b. Plug the other end into the RJ-45 port of the control card in Slot 7of ONS 15454 SSC 3.
4. Repeat Steps 2 and 3 to connect the remaining SSCs.
5. To complete the ring, plug one connector of a cross-over (CAT-5) LAN cable into P-MSM-1 port of NCS 2015 SSC 15. Plug the other connector into the P-MSM-1 port of the NC.

Scenario 4: Using RJ-45 and SFP MSM-M and MSM-P Ports Connect Cisco NCS 2015 Node Controller, and ONS 15454, NCS 2006, and NCS 2015 as Subtending Shelves in a Ring Topology

The maximum number of NCS 2015 shelves that can be subtended is 10.

1. Install the SFP module in the SFP ports of the ECU in NCS 2015 SSCs. For more information, see NTP-L62 Installing the SFP Module on the NCS 2015 ECU, on page 5.
2. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into the M-MSM-1 port of the NCS 2015 NC that corresponds to the control card in Slot 1.
   b. Plug the other end into the MSM port of the NCS 2006 SSC 1 that corresponds to the control card in Slot 1.
3. Using a cross-over (CAT-5) LAN cable:

a. Plug one connector into the MSM port of the NCS 2006 SSC 1 that corresponds to the control card in Slot 8.

b. Plug the other end into the P-MSM port of the NCS 2015 SSC 2 that corresponds to the control card in Slot 17.

4. Using a cross-over (CAT-5) LAN cable:

   a. Plug one connector into the M-MSM-1 port of the NCS 2015 SSC 2 that corresponds to the control card in Slot 1.

   b. Plug the other end into the RJ-45 port of the control card in Slot 7 of ONS 15454 SSC 3.

5. Repeat Steps 2 and 3 to connect the remaining SSCs.

6. To complete the ring, plug one connector of a multi-mode fiber optic cable into P-MSM-2 port of NCS 2015 SSC 15. Plug the other connector into the P-MSM-2 port of the NC.

Scenario 5: Using RJ-45 and SFP MSM-M and MSM-P Ports Connect Cisco NCS 2006 Node Controller, and ONS 15454, NCS 2006, and NCS 2015 as Subtending Shelves in a Ring Topology

The maximum number of NCS 2015 shelves that can be subtended is 10.

1. Install the SFP module in the SFP ports of the ECU in NCS 2015 SSCs. For more information, see NTP-L62 Installing the SFP Module on the NCS 2015 ECU, on page 5

2. Using a cross-over (CAT-5) LAN cable:

   a. Plug one connector into the MSM port of the NCS 2006 NC that corresponds to the control card in Slot 1.

   b. Plug the other end into the MSM port of the NCS 2006 SSC 1 that corresponds to the control card in Slot 1.

3. Using a cross-over (CAT-5) LAN cable:

   a. Plug one connector into the MSM port of the NCS 2006 SSC 1 that corresponds to the control card in Slot 8.

   b. Plug the other end into the P-MSM port of the NCS 2015 SSC 2 that corresponds to the control card in Slot 17.

4. Using a cross-over (CAT-5) LAN cable:

   a. Plug one connector into the M-MSM-1 port of the NCS 2015 SSC 2 that corresponds to the control card in Slot 1.

   b. Plug the other end into the RJ-45 port of the control card in Slot 7 of ONS 15454 SSC 3.

5. Using a cross-over (CAT-5) LAN cable:

   a. Plug one connector into the RJ-45 port of the control card in Slot 11 of ONS 15454 SSC 3.

   b. Plug the other end into the P-MSM-1 port of the NCS 2015 SSC 4 that corresponds to the control card in Slot 17.

6. Using a multi-mode fiber optic cable:
   a. Plug one connector into the M-MSM-2 port of NCS 2015 SSC 4 that corresponds to the control in Slot 1.
   b. Plug the other connector into the M-MSM-2 port of NCS 2015 SSC 5 that corresponds to the control in Slot 1.
7. Repeat Steps 3 through 6 to connect the remaining SSCs.
8. To complete the ring, plug one connector of a cross-over (CAT-5) LAN cable into P-MSM-1 port of NCS 2015 SSC 15. Plug the other connector into the MSM port of the NCS 2006 NC that corresponds to the control card in Slot 8.

Scenario 6: Using RJ-45 Ports Connect Cisco ONS 15454 Node Controller, and ONS 15454, NCS 2006, and NCS 2015 Subtending Shelves in a Ring Topology



Note Usage of TCC3 card as the node controller is recommended.

- Usage of TCC3 card as the node controller is recommended.
- The maximum number of NCS 2015 shelves that can be subtended is 10.

1. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into the RJ-45 port of the control card in Slot 7 of the ONS 15454 NC.
   b. Plug the other end into the MSM port of the NCS 2006 SSC 1 that corresponds to the control card in Slot 1.
2. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into the MSM port of the NCS 2006 SSC 1 that corresponds to the control card in Slot 8.
   b. Plug the other end into the P-MSM-1 port of the NCS 2015 SSC 2 that corresponds to the control card in Slot 17.
3. Using a cross-over (CAT-5) LAN cable:
   a. Plug one connector into the M-MSM-1 port of the NCS 2015 SSC 2 that corresponds to the control card in Slot 1.
   b. Plug the other end into the RJ-45 port of the control card in Slot 7 of ONS 15454 SSC 3.
4. Repeat Steps 2 and 3 to connect the remaining SSCs.
5. To complete the ring, plug one connector of a cross-over (CAT-5) LAN cable into P-MSM-1 port of NCS 2015 SSC 15. Plug the other connector into the RJ-45 port of the control card in Slot 11 of ONS 15454 NC.

Shelf Voltage and Temperature

Note The temperature that the TNC, TNCE, TSC, or TSCE sensors measure appear on the LCD screen in the NCS 2006 chassis.

The input voltages and temperature of the NCS 2006 chassis are displayed in the **Shelf view** > **Provisioning** > **General** > **Voltage/Temperature** pane in CTC. The voltage supplied to the shelf (in millivolts) is displayed in the Voltage area of the Voltage/Temperature pane. The temperature of the shelf (in degree Celsius) is displayed in the Temperature area of the pane.

The Voltage/Temperature pane retrieves the following values for the NCS 2006 chassis:

- Voltage A—Voltage of the shelf that corresponds to power supply A, in millivolts.
- Voltage B—Voltage of the shelf that corresponds to power supply B, in millivolts.
- Chassis Temperature—Temperature of the shelf, in degrees Celsius.

In a multishelf configuration, the voltage and temperature of each shelf is displayed in the **Shelf view** > **Provisioning** > **General** > **Voltage/Temperature** pane.

Cooling Profile

The cooling profile feature allows you to control the speed of the fans in the NCS 2006 shelf depending on the I/O cards used.

Note The cooling profile feature is not supported for the NCS 2015 shelf.

CTC allows you to choose a cooling profile for NCS 2006 shelf. You can change the cooling profile in **Shelf view** > **Provisioning** > **General** > **Voltage/Temperature** pane in CTC. The supported cooling profile values are Low, Medium, and High. The default cooling profile value is High. You can change the cooling profile depending on the cards used in the shelf.

If there are multiple cards in the shelf, you must choose the cooling profile of the card that requires the highest cooling profile. For example, if the shelf has two cards with low cooling profile, three cards with medium cooling profile, and one card with high cooling profile, you must choose a high cooling profile for the shelf.

Caution The wrong cooling profile chosen for the shelf might harm the cards present in the shelf.

If a wrong cooling profile is chosen for the shelf, the COOL-MISM condition is raised on the shelf. For more information on the alarm, see the “COOL-MISM” alarm in Chapter 2, Alarm Troubleshooting of *Cisco NCS 2002 and 2006 Troubleshooting Guide.*

The following table shows the cards that require high, medium, and low cooling profile.

Table 1: Cooling Profile Values for NCS 2006 Cards

Cards with Low Cooling Profile	Cards with Medium Cooling Profile	Cards with High Cooling Profile
• 32-WSS • 32-WSS-L • 32-DMX • 32-DMX-L • 32-DMX-O	• 10GE-XP • 40-SMR1-C • 40-SMR2-C • 40-WSS-C • 40-WSS-L	• 100G-LC-C • 10X10G-LC • CFP-LC
• 40-DMX-C • 40-DMX-L • 32-MUX-O • 40-MUX-C • 40-MUX-L	• 40E-MXP-C • 40E-TXP-C • 40G-MXP-C • 40G-TXP-C • ADM-10G	

Cards with Low Cooling Profile	Cards with Medium Cooling Profile	Cards with High Cooling Profile
• 40-WXC-C • 40-WXC-L • 80-WXC-C • AD-1B • AD-1C	• AR_MXP • AR_XP • GE-XP • MXP_2.5G_10E • MXP_2.5G_10G	
• AD-2C • AD-4B • AD-4C • MD-4 • MMU	• MXP_2.5G_10X • MXP_MR_10DME • MXP_MR_10DMEX • MXP_MR_2.5G • MXPP_MR_2.5G	
• OPT-AMP-17-C • OPT-AMP-C • OPT-AMP-L • OPT-BST • OPT-BST-E • OPT-BST-L • OPT-EDFA-17 • OPT-EDFA-24 • OPT-PRE • OSCM • OSC-CSM • PSM • TDC-CC • TDC-FC • TXP_MR_10E • TXP_MR_10EX • TXP_MR_10G • TXP_MR_2.5G • TXPP_MR_2.5G	• OPT-RAMP-C • OPT-RAMP-CE • OTU2_XP • RAMAN-COP • RAMAN-CTP	