Establish Connection to a Node

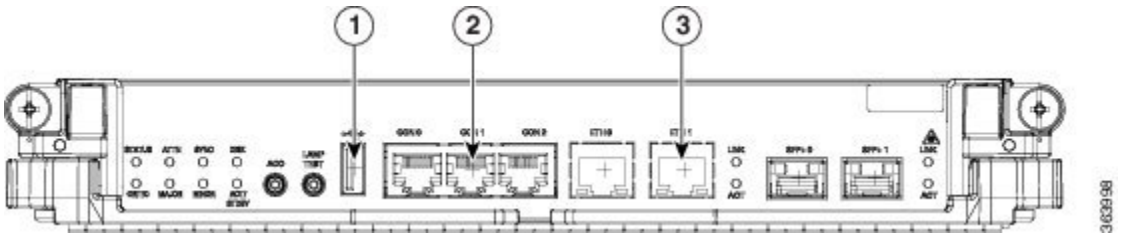
After installing the hardware, boot the Cisco NCS 4016 Series System. Connect to the XR VM console port and power on the system. The system completes the boot process using the pre-installed operating system (OS) image. If no image is available within the system, the system can be booted using an external bootable USB drive. For more details on booting the system using USB drive, see Perform Disaster Recovery

After booting is complete, establish a connection to the node.

Connect to the XR VM Console Port and Power the System

Use the XR VM console port on the Route Processor (RP) to connect to Network Convergence System (NCS) 4016 system. If required, subsequent connections can be established through the management port, after it is configured.

There are the three console ports on the RP. Console port 2 is for the XR VM.



1	External USB Port

2	XR VM Console Port
3	XR VM Management Port

Step 1 Connect a terminal to the XR VM console port of the RP.

Step 2 Start the terminal emulation program on your workstation.
The console settings are 115200 bps, 8 data bits, 2 stop bits and no parity.

Step 3 Power on the system.
Press the power switch up to turn on the power shelves. As the system boots up, you will see boot process details on the console screen of the terminal emulation program.

Step 4 Press **Enter**.
When the system prompts you to enter the root-system username, it indicates that the boot process is complete. If the prompt does not appear, wait for a while to give the system more time to complete the initial boot procedure, then press **Enter**.

Important If the boot process fails, it may be because the pre-installed image on the system is corrupt. In this case, the router can be booted using an external bootable USB drive. For details see, Create a Bootable USB Drive Using Shell Script and Boot the Router Using USB.

What to Do Next

Specify the root username and password.

Access the System Admin VM Console

All system administration and hardware management setups are performed from the System Admin VM.

Step 1 Login to the XR VM console as the root user.

Step 2 **admin**

Example:
```
RP/0/RP0:hostname#admin
```
After you enter the System Admin VM console, the router prompt changes to
```
sysadmin-vm:0_RP0#
```

Step 3 (Optional) **exit**

Example:
```
sysadmin-vm:0_RP0#exit
```
Return to the XR VM CLI from the System Admin VM CLI.

Alternate Method to Access the System Admin VM

Instead of executing the **admin** command, you can access the System Admin prompt by directly connecting to the System Admin VM console port. Console port 1 on the RP is for System Admin VM. While connecting to the System Admin VM console port, enter the System Admin username and password, when prompted. For more details about System Admin VM username and password, see the chapter Create User Profiles and Assign Privileges.

Important It is not possible to access the XR VM through the System Admin VM console port.

Configure the XR VM Management Port

To use the XR VM Management port for system management and remote communication, you must configure an IP address and a subnet mask for the management ethernet interface. To communicate with devices on other networks (such as remote management stations or TFTP servers), configure the network subnet or host route to the default gateway.

Before You Begin

- Consult your network administrator or system planner to procure IP addresses and a subnet mask for the management interface.
- Physical port Ethernet 0 on RP is the management port. Ensure that the port is connected to management network.

SUMMARY STEPS

1. **configure**
2. **interface MgmtEth** *rack/slot/instanceport*
3. **ipv4 address** *ipv4-address subnet-mask*
4. **ipv4 address** *ipv4 virtual address subnet-mask*
5. **no shutdown**
6. **exit**
7. **router static address-family ipv4 unicast** *subnet or host route default-gateway*
8. **commit**

DETAILED STEPS

Step 1 **configure**

Step 2 **interface MgmtEth** *rack/slot/instanceport*

Example:

```
RP/0/RP0:hostname(config)#interface mgmtEth 0/RP0/CPU0/0
```

Enters interface configuration mode for the management interface of the primary RP.

Step 3 **ipv4 address** *ipv4-address subnet-mask*

Example:
```
RP/0/RP0:hostname(config-if)#ipv4 address 10.1.1.1 255.0.0.0
```
Assigns an IP address and a subnet mask to the interface.

Step 4 **ipv4 address** *ipv4 virtual address subnet-mask*

Example:
```
RP/0/RP0:hostname(config-if)#ipv4 address 1.70.31.160 255.255.0.0
```
Assigns a virtual IP address and a subnet mask to the interface.

Step 5 **no shutdown**

Example:
```
RP/0/RP0:hostname(config-if)#no shutdown
```
Places the interface in an "up" state.

Step 6 **exit**

Example:
```
RP/0/RP0:hostname(config-if)#exit
```
Exits the Management interface configuration mode.

Step 7 **router static address-family ipv4 unicast** *subnet or host route default-gateway*

Example:
```
RP/0/RP0:hostname(config)#router static address-family ipv4 unicast 0.0.0.0/0 12.25.0.1
```
Specifies the IP address of the default-gateway to configure a static route; this is to be used for communications with devices on other networks.

Step 8 **commit**

What to Do Next

Connect to the management port to the ethernet network. See Connecting to the XR VM Management Port, on page 4.

Connecting to the XR VM Management Port

The XR VM management port supports 10/100G optical small form-factor pluggable (SFP) units to provide high speed network connectivity. The SFPs that can be connected to the XR VM management port are:

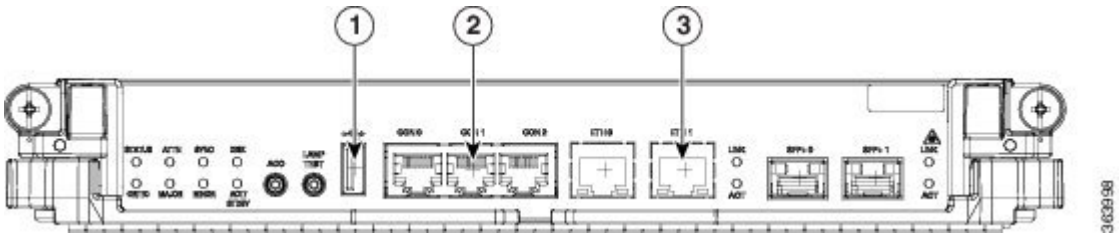
SFP module	Datasheet
Cisco SFP-10G-SR	http://www.cisco.com/en/US/prod/collateral/modules/ps5455/data_sheet_c78-455693.html
Cisco SFP-10G-LR	

SFP module	Datasheet
1000BASE-SX SFP	http://www.cisco.com/en/US/prod/collateral/modules/ps5455/ps6577/product_data_sheet0900aecd8033f885.html
1000BASE-LX/LH SFP	
1000BASE-T SFP	

Before You Begin

Configure the management port. See Configure the XR VM Management Port, on page 3.

Step 1 Connect the SFP module to the XR VM management port.
The XR VM management port on the RP is shown in this figure.



1	External USB Port
2	XR VM Console Port
3	XR VM Management Port

Step 2 Depending on the SFP module type, connect either a optical fiber or an ethernet cable to the SFP.

What to Do Next

With a terminal emulation program, establish a SSH or telnet connection to the management interface port using its IP address. For details on configuring the IP address of the management port, see Configure the XR VM Management Port, on page 3.

Before establishing a telnet session, use the **telnet ipv4|ipv6 server max-servers** command in the XR Config mode, to set number of allowable telnet sessions to the router.

For a SSH connection, the *ncs4k-k9sec* package must be installed on the router. For details about package installation, see Install Packages.

Setting up Remote Connection

Setup remote access to establish a connection to a system remotely over the network. With a terminal emulation program, establish a SSH or telnet connection to the management interface port using its IP address.

Configuring SSH

Complete this task to setup a remote connection using Secure Shell Connection (SSH). If you want to setup a remote connection using Telnet, complete Configuring Telnet, on page 9.

Before You Begin

Connect to the XR VM console port on the Route processor.

SUMMARY STEPS

1. **configure**
2. **hostname** *hostname*
3. **domain name** *domain-name*
4. **commit**
5. Perform one of the following steps based on the requirement:
   - Generate an RSA key pair.
     - To delete the RSA key pair, use the **crypto key zeroize rsa** command.
     - This command is used for SSHv1 only.

   crypto key generate rsa [**usage keys** | **general-keys**] [*keypair-label*]For example,

   ```
   RP/0/RP0:hostname# crypto key generate rsa general-keys
   ```

   - Enables the SSH server for local and remote authentication on the system.
     - The recommended minimum modulus size is 1024 bits.
     - Generates a DSA key pair.

       To delete the DSA key pair, use the **crypto key zeroize dsa** command.
     - This command is used only for SSHv2.

   crypto key generate dsa

   For example,

   ```
   RP/0/RP0:hostname# crypto key generate dsa
   ```

6. configure
7. **ssh timeout** *seconds*
8. Do one of the following:
   - **ssh server** [**vrf** *vrf-name*]
   - ssh server v2
9. **commit**
10. show ssh
11. show ssh session details

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure**	
Step 2	**hostname** *hostname* **Example:** `RP/0/RP0:hostname(config)# hostname system1`	Configures a hostname for your Network Convergence System (NCS) 4016 system.
Step 3	**domain name** *domain-name* **Example:** `RP/0/RP0:hostname(config)# domain name cisco.com`	Defines a default domain name that the software uses to complete unqualified host names.
Step 4	**commit**	Saves the configuration changes and remains within the configuration session.

Step 5	Perform one of the following steps based on the requirement:
	• Generate an RSA key pair.
	◦ To delete the RSA key pair, use the **crypto key zeroize rsa** command.
	◦ This command is used for SSHv1 only.
	
	crypto key generate rsa [**usage keys** | **general-keys**] [*keypair-label*]For example,
	
	`RP/0/RP0:hostname# crypto key generate rsa general-keys`
	• Enables the SSH server for local and remote authentication on the system.
	◦ The recommended minimum modulus size is 1024 bits.
	◦ Generates a DSA key pair.
	To delete the DSA key pair, use the **crypto key zeroize dsa** command.
	◦ This command is used only for SSHv2.
	
	crypto key generate dsa
	For example,
	
	`RP/0/RP0:hostname# crypto key generate dsa`	

	Command or Action	Purpose
Step 6	configure **Example:** `RP/0/RP0:hostname# configure`	Enters XR Config mode.
Step 7	**ssh timeout** *seconds* **Example:** `RP/0/RP0:hostname(config)# ssh timeout 60`	(Optional) Configures the timeout value for user authentication to AAA. • If the user fails to authenticate itself to AAA within the configured time, the connection is aborted. • If no value is configured, the default value of 30 seconds is used. The range is from 5 to 120.

Step 8	Do one of the following:
	• **ssh server** [**vrf** *vrf-name*]
	• ssh server v2
	
	Example:
	`RP/0/RP0:hostname(config)# ssh`
	or
	`RP/0/RP0:hostname(config)# ssh server v2`
		• (Optional) Brings up an SSH server using a specified VRF of up to 32 characters. If no VRF is specified, the default VRF is used.
		To stop the SSH server from receiving any further connections for the specified VRF, use the **no** form of this command. If no VRF is specified, the default is assumed.
		Note The SSH server can be configured for multiple VRF usage.
		• (Optional) Forces the SSH server to accept only SSHv2 clients if you configure the SSHv2 option by using the **ssh server v2** command. If you choose the **ssh server v2** command, only the SSH v2 client connections are accepted.

Step 9	**commit**	Saves the configuration changes and remains within the configuration session.
Step 10	show ssh **Example:** `RP/0/RP0:hostname# show ssh`	(Optional) Displays all of the incoming and outgoing SSHv1 and SSHv2 connections to the system.
Step 11	show ssh session details **Example:** `RP/0/RP0:hostname# show ssh session details`	(Optional) Displays a detailed report of the SSHv2 connections to and from the system.

The remote connection is configured using SSH.

What to Do Next

After the connection with the remote host is established, configure the XML agent.

Configuring Telnet

Complete this task if you want to establish a remote connection using Telnet. Is you choose to establish a remote connection using Secure Shell Connection (SSH), complete Configuring SSH, on page 6

Before You Begin

Connect to the XR VM console port on the Route processor.

SUMMARY STEPS

1. **configure**
2. **vty-pooldefault***value* **line-template vty**
3. **featuretelnet**
4. **telnet vrf-defaultipv4 servermax-servers***100*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure**	
Step 2	**vty-pooldefault***value* **line-template vty** **Example:** `RP/0/RP0:hostname(config)# vty-pool default 0 99 line-template vty`	Configures the VTY lines to control inbound telnet connections.
Step 3	**featuretelnet** **Example:** `RP/0/RP0:hostname(config)# feature telnet`	Enables the Telnet server. The default is disabled.
Step 4	**telnet vrf-defaultipv4 servermax-servers***100* **Example:** `RP/0/RP0:hostname(config)# telnet 10.0.0.1`	Sets the number of allowable telnet sessions to the router before establishing a telnet session. Starts a Telnet session to a remote device using IPv4. The default port number is 23. The range is from 1 to 65535. The default Virtual Routing and Forwarding (VRF) is the default VRF.

The remote connection is configured using Telnet.

What to Do Next

After the connection with the remote host is established, configure the XML agent.

Configuring XML Agent

Cisco Transport Controller (CTC) is used for operations, administration, maintenance and provisioning activities of the Network Convergence System (NCS) 4016 system. CTC communicates with the system using an Extensible Markup Language (XML) interface agent on the system. Before an XML session is established, use the console and enable the XML agent on the system.

To enable XML requests over Secure Shell (SSH) and Telnet, use the *xml agent tty* command in global configuration mode. To disable XML requests over SSH and Telnet, use the no form of this command.

Before You Begin

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

SUMMARY STEPS

1. **configure**
2. **xml agent tty**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure**	
Step 2	**xml agent tty** **Example:** `RP/0/RP0:hostname(config)#xml agent tty`	The agent receives XML requests from external clients and returns XML responses.

What to Do Next

After enabling the XML agent, configure HTTP server for non-secure connection and HTTPS for secure connection.

Configure HTTP

To download the Cisco Transport Controller (CTC) application to the client workstation, and to establish initial connection between CTC and the network elements, use a standard HTTP server or a secure HTTPS server protocol.

SUMMARY STEPS

1. **configure**
2. **ip http server**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure**	

Step 2	**ip http server**
	
	Example:
	`RP/0/RP0:hostname(config)#http server`
	`RP/0/RP0:hostname(config)#http server ssl`
		Note The http server and http server ssl are mutually exclusive
		The HTTP or HTTPS server is enabled.

What to Do Next

The system is configured to use CTC to access the node. Login to CTC and establish a connection to the node.