Cisco Nexus 7000 Series Network Analysis Module (NAM-NX1) Quick Start Guide

This document describes how to install the Cisco Nexus 7000 Series Network Analysis Module (NAM). It also covers the basic configuration steps to start using Prime NAM software to analyze your network traffic.

Contents

Introducing Cisco NAM-NX1

The Cisco Nexus 7000 Series Network Analysis Module (NAM) provides Prime NAM functionality for Cisco Nexus 7000 series switches. The NAM enables the switch to view your network and application performance in order to meet your service delivery goals.

NAM is installed into any one of the network module I/O slots on the Cisco 7000 series switch.

For information on the entire documentation set, see the *Cisco Prime Network Analysis Module Documentation Overview* on Cisco.com.

For a list of supported switches and software details, see the *NAM Compatibility Matrix* on Cisco.com.

Quick Start Summary

This section summarizes the tasks involved in the installation and configuration of the Cisco NAM-NX1. For detailed steps, click the hyperlinked section to be taken to that reference.

SUMMARY STEPS

1. Review the requirements and preparations for NAM module installation. See Requirements and Restrictions, page 2.

2. Install the module in a Nexus 7000 series switch. See Installing NAM Hardware in a Cisco Nexus 7000 Device, page 4. The module software boots up automatically. See Installing Prime NAM Software on the Module, page 6 if necessary.

3. Perform the prerequisite steps before configuring the NAM:

   a. Assign access VLAN for connectivity to NAM management port. See VLAN Management Port Configuration, page 7.

   b. Create SPAN sessions to monitor interfaces and/or VLANs. See SPAN Session from Nexus 7000 Series Switch, page 8.

4. Configure the NAM by setting up the module management IP address, web server, and console access. See Getting the NAM Up and Running, page 9.

Requirements and Restrictions

The following sections contain information about the Cisco NAM-NX1 requirements and restrictions:

- NAM Requirements, page 3
- Switch Requirements, page 3
- Client Requirements, page 3
- Required Tools, page 4
- Supported Devices, page 4

NAM Requirements

- Prime NAM application software release 6.0 or later
- (Optional) Ethernet cable for 1588
- (Optional) Mini-SAS cable external storage links

Specific hardware platform and version information can be found in the *NAM Compatibility Matrix* on Cisco.com. This matrix document contains updated support information that does not appear in this document. For hardware details, see the NAM datasheet on Cisco.com.

Switch Requirements

- Nexus 7000 series switch software version 6.2 or later
- One or more supervisor modules (SUP-1, SUP-2, or SUP-2E)
- Sufficient memory installed in the supervisor module to run NX-OS image version 6.2 or later
- An open slot in the chassis for the NAM service module
- Prior to NAM installation, the management VLAN must be configured on the Cisco Nexus 7000 series switch. See your switch product documentation for instructions.

Client Requirements

Each client accessing the Cisco NAM-NX1 must meet the following minimum requirements:

- IBM-compatible or Macintosh computer with 2 GHz or faster processor
- At least 1-GB RAM

The client must run one of the following operating systems:

- Windows 7
- Windows Vista with Service Pack 1
- Windows XP Professional with Service Pack 2
- Red Hat Enterprise Linux 6.1 (base server)
- Macintosh OSX 10.6+

The client requires one of the following browsers:

- Microsoft Internet Explorer 9.0 on Windows XP Professional with Service Pack 2, Windows Vista with Service Pack 1, or Windows 7
- Mozilla Firefox 17.0.5 (ESR) or later on Windows XP Professional with Service Pack 2, Windows Vista with Service Pack 1, Windows 7, FireFox on OSX, or Red Hat Enterprise Linux

For a list of the latest supported browsers, see the Cisco Prime NAM Release Notes.

All browsers require that you enable cookies, JavaScript/scripting 1.7 or later, and popup windows. If you reinstall or upgrade to a newer release, delete the cookies and clear the browser cache of each client.

Required Tools

⚠️ **Warning** **Only trained and qualified personnel should be allowed to install, replace, or service this equipment. This equipment contains an energy hazard. Disconnect the system before servicing. Statement 186**

These tools are required to install the module in the switch:

- Phillips-head screwdriver with torque capability
- Wrist strap or other personal grounding device
- Antistatic mat or antistatic foam

Whenever you handle the module, always use a wrist strap or other grounding device to prevent electrostatic discharge (ESD) which can damage the module. See the *Cisco Nexus 7000 Series Hardware Installation and Reference Guide.*

Supported Devices

For a list of supported devices and compatibility information on platform hardware and software, managed devices, and other support details, see the *NAM Compatibility Matrix*.

Installing NAM Hardware in a Cisco Nexus 7000 Device

If you purchased the Cisco Nexus 7000 switch with a Cisco NAM-NX1 service module, the Prime NAM software comes preinstalled and ready to use.

If you purchased the NAM separately, see the *Cisco Nexus 7000 Series Hardware Installation and Reference Guide* for instructions on how to install the hardware service module.

This section includes these topics:

- NAM Module, page 4
- Hardware Interfaces, page 5

NAM Module

The NAM service module plugs into a host Cisco switch running Cisco Nexus operating system (Nexus OS) software.

Cisco NAM-NX1 is a standalone module with its own startup and run-time configurations that is independent of the Cisco NX-OS configuration on the switch. The module does not have an external console port. Instead, you can launch and configure the module through the NAM management interface/port on the backplane or through the switch, with a configuration session on the module.

The NAM requires minimal configuration from the supervisor card in the switch. For detailed steps, see Configuring the NAM Software, page 7.

For instructions on how to install the service module hardware, see your *Cisco Nexus 7000 Series Hardware Installation and Reference Guide.* For details on configuring the NAM, see Configuring the NAM Software, page 7.

Hardware Interfaces

The host switch and Cisco NAM-NX1 service module use several interfaces for internal and external communication (see your *Cisco Nexus 7000 Series Hardware Installation and Reference Guide*). These interfaces are configurable from the switch using the Cisco NX-OS or the NAM CLI.

Figure 1 depicts the Cisco NAM-NX1 front panel. For a description of the front panel and LED operation, see Reading the NAM LEDs, page 21.

Figure 1 NAM Front Panel
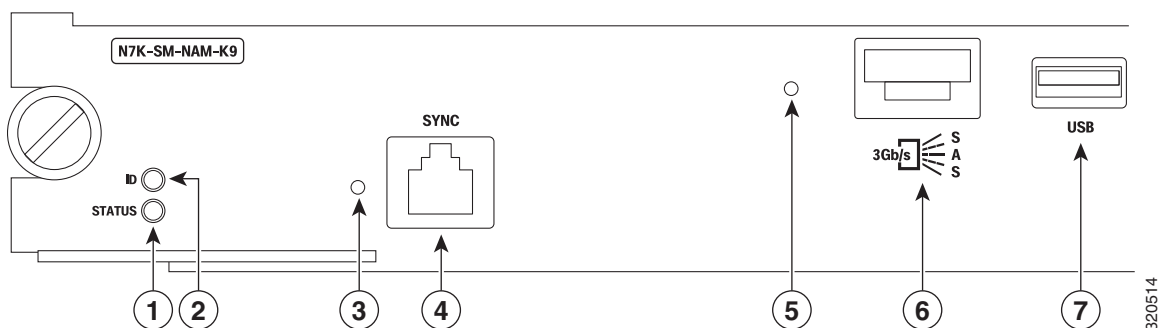
1	STATUS LED	5	SAS Link Status LED
2	ID (Beacon)	6	Mini-SAS
3	SYNC Link Status LED	7	USB (not currently used)
4	SYNC port		

To connect your hardware module and configure the interface using the switch, see your *Cisco Nexus 7000 Series Hardware Installation and Reference Guide*.

Installing Prime NAM Software on the Module

This section covers installation scenarios of Prime NAM software on a Cisco Nexus 7000 Series Network Analysis Module.

NAM ships with Prime NAM software preinstalled. Review the two scenarios that cover installation options and determine which option best fits your needs:

1. No installation required—You received a new NAM module, successfully installed it, and booted to verify the NAM is in the active state. Continue to Configuring the NAM Software, page 7.

2. Installation or upgrade required—Your module cannot reboot from the software, perform a new installation, or upgrade to a newer software version. To install your NAM software from the network, see Upgrading the Software, page 14.

After your initial installation, if you may want to upgrade to a later version of software if available. See Upgrading the Software, page 14 for instructions.

Configuring the NAM Software

You must configure the switch to communicate with the NAM and then set the configuration settings on the NAM. Perform the following tasks in the order given:

1. To place NAM in service, configure NAM using the supervisor module. This task includes configuring the VLAN management port and creating a SPAN session from the switch to the NAM. See Switch Configuration Examples for Placing the NAM in Service, page 7.

2. Set up the NAM network configuration. See Getting the NAM Up and Running, page 9.

Switch Configuration Examples for Placing the NAM in Service

This section includes the following example configurations required on the Cisco switch:

- VLAN Management Port Configuration, page 7
- SPAN Session from Nexus 7000 Series Switch, page 8

VLAN Management Port Configuration

This section describes the steps to follow in order to assign the NAM to a virtual device context (VDC) from the switch. The steps include:

1. Assign the NAM Ethernet interfaces to a VDC.

2. Create a VLAN if one does not exist.

3. Assign access to the VLAN for the NAM management port.

Once you complete these steps, continue to the next section to continue setting up a SPAN session to direct traffic to NAM. See SPAN Session from Nexus 7000 Series Switch.

This example shows how to configure a VLAN for NAM management traffic and how to assign that VLAN to the NAM management port. All commands must be executed in the VDC to which NAM belongs.

To assign the NAM to a virtual device context (VDC) from the switch:

Step 1 Verify that NAM is active:

```
switch# show service nam summary
Service         Service
Name            Type        Interface     Module    State     Version
--------------- ----------- ------------- --------- --------- ----------------
NAM7            NAM         Po4096,Po4095 7         active    6.0
```

Step 2 If you use the default VDC configuration, the NAM interfaces will be allocated to the default VDC automatically.

  a. To verify the configuration, use the command **show run vdc**:

```
N7K-8(config-monitor)# show run vdc
!Command: show running-config vdc
!Time: Wed May 29 18:47:17 2013

version 6.2(2)
no system admin-vdc
vdc N7K-8 id 1
  limit-resource module-type m1 m1xl m2xl f2e
```

> **Note** As long as the *f2e* keyword is present in the output, you can install the module in an empty slot and power it up. The interfaces will be allocated automatically. If the *f2e* keyword is missing (due to prior configuration), you need to add it as shown in step b. The f2e keyword must be present in the configuration before the module is powered up.

    b. If you are not using the default VDC configuration, manually allocate the NAM interfaces to the VDC:

```
switch# config t
Enter configuration commands, one per line.  End with CNTL/Z.
switch(config)# vdc N7K-8 id 1
switch(config)# limit-resource module-type m1 m1xl m2xl f2e
switch(config)# allocate interface ethernet 2/1 - 4
```

Step 3 (Optional) If you already have a VLAN created, skip this step. To create a VLAN to use for NAM management traffic:

```
switch# config t
switch(config)# vlan 200
switch(config-vlan)# state active
switch(config-vlan)# no shut
switch(config-vlan)# exit
switch(config)#
```

Step 4 Add the VLAN to the external interface that is used to access the NAM:

> **Note** Your configuration is dependent on your network setup. The following is an example of one of the many ways to provide external connectivity.

```
switch(config)# int e4/48
switch(config-if)# switchport
switch(config-if)# switchport mode access
switch(config-if)# switchport access vlan 200
switch(config-if)# no shut
switch(config-if)# exit
switch(config)#
```

Step 5 Assign the VLAN to the NAM management port:

```
switch(config)# analysis module 7 management-port 1 access-vlan 200
switch(config)# end
switch#
```

SPAN Session from Nexus 7000 Series Switch

To share traffic between your switch and the NAM, you must create a SPAN session that sets the NAM as the destination for the Cisco Nexus 7000 switch traffic. This section provides two example SPAN sessions commands that set the NAM as the destination for the Cisco Nexus 7000 switch traffic.

destination analysis-module <module #> data-port <port #>

The following example shows the creation of a SPAN session from the Cisco NX-OS CLI. This is the preferred method to create the SPAN session.

In this example, a simple SPAN session is used to direct traffic received on interface 4/1 to data-port 1 on the NAM module. Use this example to create a similar SPAN session for your NAM.

```
switch(config)# monitor session 1
switch(config-monitor)# <source> int e4/1 rx
switch(config-monitor)# <destination> analysis-module <1-10> Enter module number

switch(config-monitor)# <destination> analysis-module 7 data-port <1-2> Enter port number

switch(config-monitor)# <destination> analysis-module 7 data-port 1
switch(config-monitor)# no rate-limit
switch(config-monitor)# no shut
switch(config-monitor)# end
switch#
```

> **Note** Remember to replace the IP address, netmask, and gateway in the example with information appropriate to your switch setup.

destination interface port-channel <port-channel #>

In this example, a SPAN session sets up the module as the destination using the port channel interface. Use your Nexus 7000 Series supervisor CLI setting to create a similar SPAN session for your NAM.

```
switch(config)# monitor session 1
switch(config-monitor)# <source> int e4/1 rx
switch(config-monitor)# <destination> interface port-channel <port-channel#>
switch(config-monitor)# no rate-limit
switch(config-monitor)# no shut
switch(config-monitor)# end
switch#
```

> **Note** Do **not** use the *destination* **interface ethernet** command as it will result in an error.

For additional details on how to set up various traffic sources, see the *Cisco Prime Network Analysis Module Software User Guide*.

Getting the NAM Up and Running

After assigning the NAM to a VDC and setting up your SPAN network traffic, go to your VDC to set up the NAM IP configuration and enable the web server.

This section describes how to set the NAM IP configuration and enable the NAM web server and browser-based access to the NAM graphical user interface (GUI). After you perform these tasks, the NAM is in service. Each task includes a basic example. Your configuration setup may require different input.

> **Note** You can enable the NAM to function as an HTTP server or an HTTPS secure server, but not as both simultaneously.

To configure the module's network configuration parameters:

Step 1 Open a session on the switch CLI:

attach module <module #> processor 1

✎

Note Ensure that you are in the correct VDC. You can use the **switchto vdc** command to change VDCs.

```
Cisco7000# attach module <mod #> processor 1
Opening....
nam.localdomain login: root
Password:

Cisco Nexus 7000 Series Network Analysis Module (N7K-SM-NAM-K9) Console, 6.0
Copyright (c) 1999-2013 by Cisco Systems, Inc.

System Alert! Default password has not been changed!
Please enter a new root user password.
Enter new password:
Confirm new password:
Successfully changed password for user 'root'
```

If you have not changed the root password, enter a new password to ensure security.

🔍

Tip The default username and password for the NAM is *root/root*. As part of the installation, change the password first, although the NAM accepts anything including the default.

Step 2 Enter your IP address, network mask, and default gateway.

```
root@nam.localdomain# ip address 1.1.1.2 255.255.255.0
root@nam.localdomain# ip gateway 1.1.1.1
```

Step 3 Enable either an HTTP or HTTPS server.

a. To enable the NAM HTTP web server:

ip http server enable

b. To enable the NAM HTTPS secure web server:

ip http secure server enable

```
root@nam.localdomain# ip http server enable
```

or

```
root@nam.localdomain# ip http secure server enable
```

The following displays:

```
No web users are configured.
Please enter a web administrator username [admin]:
```

Step 4 Enter the web admin username and password.

> ![Note icon]
>
> **Note** We recommend that you change the admin password. This document is available to the public by way of Cisco.com, so all default passwords should be changed as soon as possible.

```
User admin added.
Starting httpd
root@nam.localdomain#
```

Step 5 Optionally, enable Telnet or SSH if needed.

```
root@nam.localdomain# exsession on
```

or

```
root@nam.localdomain# exsession on ssh
```

Step 6 To verify network connectivity to a known address, use the **ping** command:

```
root@nam.localdomain# ping 3.3.3.3
PING 3.3.3.3 (3.3.3.3) 56(84) bytes of data.
64 bytes from 3.3.3.3: icmp_seq=1 ttl=245 time=8.48 ms
64 bytes from 3.3.3.3: icmp_seq=2 ttl=245 time=2.61 ms
64 bytes from 3.3.3.3: icmp_seq=3 ttl=245 time=2.95 ms
64 bytes from 3.3.3.3: icmp_seq=4 ttl=245 time=2.15 ms
64 bytes from 3.3.3.3: icmp_seq=5 ttl=245 time=2.43 ms

--- 3.3.3.3 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4005ms
rtt min/avg/max/mdev = 2.153/3.728/8.483/2.391 ms
root@nam.localdomain#
```

The NAM is now on the network and is accessible using the management IP address.

Step 7 To access the NAM and confirm connectivity, use an approved Firefox or Internet Explorer browser.

> ![Note icon]
>
> **Note** For a list of supported browsers, see the *Cisco Prime* NAM *Release Notes*.

The only access to the NAM web server is the administrative user you configured when you enabled the web server. There is no secondary user option. To configure more users, see the *Prime NAM Command Reference Guide* or the *Prime NAM User Guide* on Cisco.com.

Installing and Configuring External Storage

The Cisco Nexus 7000 Series Network Analysis Module offers external storage connectivity for extended capture durations and higher capture bandwidths.

This connectivity is provided through the Mini Serial Attached SCSI (SAS, SFF-8088). The external SAS storage array is directly attached.

See Figure 2 for an overview of external data storage setup.

Figure 2   *External Storage Setup*
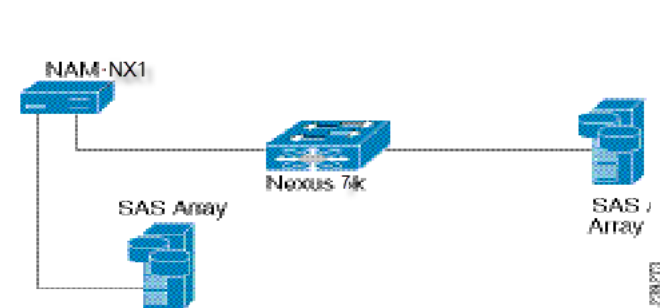
See Preparing External SAS Storage.

Preparing External SAS Storage

Configure the Storage Array

Reference your vendor user guide for proper configuration of the array. The NAM is independent of most array settings, but some are important for accessibility and performance.

When configuring the Logical Unit Numbers (LUNs) on the array, there is often a Segment Size setting. Larger segment sizes can improve write speeds. Use a segment size as large as possible, up to 512 KB. Multiple LUNs can be configured on a single array. This module supports up to 32 LUNs.

It is important to map the module SAS address to the LUNs. Most storage arrays require this mapping for security reasons, ensuring that only certain hosts (for example, a NAM) can access the LUNs. Each NAM has a unique SAS address, so this step must be performed for each NAM and for each LUN.

The NAM SAS address can be found using the CLI command **remote-storage sas local-address**. Many storage arrays automatically detect the SAS address once connected to the NAM.

```
root@nam.domain# remote-storage sas local-address
Local SAS Address: 5003223-0-0000-0000
```

Some SAS storage arrays do not properly negotiate the SAS base address of the front panel port. The port is a wide port because it consists of four SAS lanes. Each lane has its own SAS address, and any one of the four addresses can be considered the base address for the wide port. Ensure you map all four SAS addresses in the storage array configuration.

The previous remote storage CLI command returned a SAS address of 5003223000000000 for the first lane. The other three lanes have consecutive addresses: 5003223000000001, 5003223000000002, and 5003223000000003. All four of those addresses need to be mapped in the storage array configuration.

Connect the Storage Array

After the storage array is configured, connect it to the NAM using the SFF-8088 cable. The module supports SFF-8088 cables up to 6 M. Be sure to use the correct host-connect port on the array as indicated by the vendor user guide. The array can be connected while the NAM is running.

Some arrays come with multiple storage controller modules, and the module ownership must often be mapped to each LUN. This mapping is a common security feature.

The LUN number can help you identify one LUN from others of the same external storage array. This number is unique to each particular array, meaning two LUNs from different arrays can have the same number. If the new LUNs do not show up in the list, then the NAM cannot access them. This problem is likely due to a configuration error on the array.

You can now use the SAS external storage from within the NAM. For more information, see the *Cisco Prime Network Analysis Module Software User Guide*.

Upgrading and Recovering Your Software

Cisco occasionally provides upgrades to Prime NAM software that you can download and install on your module. You may also need to restore your module software in the case of a catastrophic failure.

Before upgrading your NAM software, we recommend that you backup your configuration as explained in Backing Up Your Configuration, page 13.

After upgrading or restoring your module software, you can restore that configuration and resume network monitoring if you previously backed up your configuration.

This section includes:

- Upgrading the Software, page 14

  To perform a new software installation or upgrade, download a version of the current Prime NAM software and use a single CLI command.

- Backing Up Your Configuration, page 13

  To upload your saved configuration to an archive server, use the command-line interface.

- Performing a Recovery Installation, page 14

  To perform a recovery installation when your can no longer boot the NAM application, use the helper utility.

- Restoring Your Configuration, page 17

  To restore your previous NAM configuration, use the command-line interface. (Optional)

Backing Up Your Configuration

Before you begin the upgrade process, we recommend that you perform a complete backup of your current NAM configuration. This includes the unique changes you have made to the NAM using the GUI or CLI. Any local data is not saved.

Note Ensure you have a backup configuration file. You can save time and frustration if you need to reformat or repartition due to a hard disk failure.

To back up your current configuration, use the NAM CLI **config upload** command like the following:

config upload ftp://*user:password@server//path/filename*

For example:

config upload ftp://*admin:secret@10.10.10.10//archive/nam_config*

The **config upload** command sends a copy of the NAM running configuration to the destination you specify. The copy of your configuration is stored in a back-up configuration file with an ending suffix of **.config** as in NAM_**host-nam-nx1-6.0.config**. The destination address must be a valid server name and directory path where you have read and write permissions. If a filename is not identified, NAM creates a default file name.

Upgrading the Software

To install the software if the module is not booting properly or to upgrade to a newer software version:

Step 1 To download the NAM application software from Cisco.com enter the following URL:

http://software.cisco.com/download/navigator.html

Step 2 Select **Cloud and Systems Management > Network Analysis Module (NAM) Products** and download the file that begins with nam-nx1, as in **nam-nx1.x-x-x.bin.gz** (where **x-x-x** is the NAM software release number). The file is described as the NAM Application Image.

Step 3 Download the NAM application software to the same server where you archived your NAM configuration.

Step 4 Use the commands as needed from the list of upgrade commands shown in Table 1.

Table 1   Common Upgrade Commands

Configuration Mode	Command	Purpose
host.domain#	**upgrade ftp://***user:password@server//path/file name*	Upgrade the running NAM. Use this option if you do not want to lose data and configuration files. This command is the same as option 1 in the helper utility.
	upgrade ftp://*user:password@server//path/file name* **reformat**	Perform a reformat install which removes all data and configuration files. This command is the same as option 2 in the helper utility.

For example, use the NAM CLI command **upgrade** to perform the software upgrade:

```
upgrade ftp://admin:secret@10.10.10.10//archive/nam_software/nam-nx1.6.x.x.bin.gz
```

or

```
upgrade http://admin:secret@10.10.10.10//archive/nam_software/nam-nx1.6.x.x.bin.gz
```

Performing a Recovery Installation

If your module suffers a catastrophic event, such as hard disk corruption, and you can no longer boot the NAM application, use the helper utility to reinstall Cisco Prime NAM application software.

To access the helper utility to install the NAM recovery and NAM software images, perform the following procedure on the switch CLI console:

> **Note**   Log in with user or admin privileges to perform this task.

Step 1   Download both the NAM recovery and software images from Cisco.com to a connected TFTP server.

The recovery helper file contains the term *helper* (for example, *nam-app-x86_64.6-0-1-lfbff-helper.SSA*).

Step 2   Ensure that the NAM module is set up for the correct VLAN using the supervisor CLI.

```
analysis module X management-port 1 access-vlan YY
```

where *X* is the slot where the NAM module is placed and *YY* is the routable VLAN to use for NAM connectivity.

Step 3   Reset the NAM module on the supervisor (SUP) CLI:

```
reload module X
```

where *X* is the slot where the NAM module is located.

Step 4   Access the NAM console from the SUP CLI:

```
attach console module X processor 1
```

where *X* is the slot number where the NAM module is located.

You see a boot up sequence on the session terminal, or a rommon prompt. You must get to the rommon prompt to start the recovery process.

Look for this output during bootup:

```
Break out with <ESC>
```

Step 5   Press **Esc** within 10 seconds to see the rommon prompt.

```
t0-rommon 1 >
```

Step 6   After the rommon prompt displays, set up networking by adding your parameters for the TFTP server and file path variables.

The following list describes the parameters that must be set:

  - IP_ADDRESS—NAM IP address on the switch vlan as designated on the switch
  - DEFAULT_GATEWAY—Gateway for the vLAN as designated on the switch
  - IP_SUBNET_MASK—Subnet mask on the switch vlan as designated on the switch
  - IMG_FILE—Path and name of NAM application image
  - TFTP_SERVER—TFTP server to use for downloading the recovery image
  - IMAGE – Complete path to and including the recovery image on the TFTP server

For example, enter:

```
t0-rommon 1 > TFTP_SERVER=10.1.2.3
t0-rommon 1 > IMG_FILE=/tftpboot/path/to/nam-app-x86_file_name_helper.SSA
```

where *10.1.2.3* is a running TTP server reachable from the supervisor and IMG_FILE is set to your path and NAM filename.

Step 7   Boot the recovery helper:

```
t0-rommon 1 > tftpdnld
```

Step 8 Look for the NAM helper menu. Something similar to the following displays on the console:

```
Boot Image via Proxy-Server:
TFTP_SERVER=172.20.98.174
    IMG_FILE=/tftpboot/nam/lfbff-helper.SSA

    Requesting supervisor to download image..
```

At some point, the menu displays:

```
================================================================================
Cisco Systems, Inc.
Network Analysis Module (N7K-SM-NAM-9G-K9) helper utility
Version 1.1(0.22)

-----
NAM-NX1 Boot Helper Menu
1 - Download application image and write to HDD
2 - Download application image and reformat HDD
3 - Display software versions
4 - Reset application image CLI passwords to default
5 - Change file transfer method (currently ftp/http)
6 - Send Ping
7 - Format boot flash
n - Configure network
s - Show upgrade log
f - Check and fix local disk errors
r - Exit and reset Services Engine
h - Exit and shutdown Services Engine

Selection [1234567nfsrh]:
```

Step 9 Set up the network parameters using the **n** menu item.

This menu displays:

```
Selection [1234567nfsrh]: n
-----
Configure Network interface:
1 - Configure network manually
2 - Show config
3 - Write config to application image
r - return to main menu

Selection [123r]:
```

Step 10 Select **1** to configure the network manually and follow the prompts.

Step 11 When you have finished, enter **r** to return to the main menu.

Step 12 Download and install the NAM image. For recovery, always select menu item **2**.

This prompt displays:

```
Download NAM application image via ftp/http and reformat & write to HDD URL of application
image []:
```

Step 13 Enter the full URL path to the NAM image that you used in Step 1. Press **Enter**, and confirm the installation when prompted.

Step 14 Boot into the NAM application.

Once the installation is complete, the main menu displays.

Step 15 Press **r** to reboot to the newly installed NAM application.

If you are still on the console, you see the rommon bootup sequence as well as the NAM bootup sequence. Wait for the NAM login prompt. No user interaction is needed until that point is reached.

Step 16 Log in as the **root** user using the **root** password.

Step 17 Enter a new password.

The NAM CLI displays. The recovery is complete.

To configure the NAM, proceed to the Getting the NAM Up and Running, page 9. Then, if available, restore any saved data once the configuration is complete.

Restoring Your Configuration

To restore your NAM configuration file after a system recovery, access the NAM configuration back-up file using FTP or HTTP.

config network ftp://*user:password@server//path/filename*

For example:

**config network
ftp://*admin:secret@172.10.10.11//archive/nam_config/NAM_host-nam-nx1.6.x.x.config***

restores your previous NAM.

Performing Advanced Tasks

This section describes some advanced tasks that you may need to perform.

- Resetting the NAM Root Password to the Default Value
- Accessing NAM Using a Telnet or SSH Session
- Moving Your NAM to a New VDC

Resetting the NAM Root Password to the Default Value

If you have forgotten the root password and need to reset it to the default value, enter the following from the switch: **clear service module slot x password**.

For information about how to reset the NAM root password to the default value from the NAM, see the *Cisco Prime Network Analysis Module Software User Guide*.

Accessing NAM Using a Telnet or SSH Session

This procedure explains how to open and close a Telnet or SSH session to the NAM. This procedure is not commonly performed, because you would typically use the NAM GUI to monitor and maintain the NAM. If, however, you cannot access the GUI, you may want to use Telnet or SSH to troubleshoot from the NAM CLI.

Prerequisites

- Configure the NAM system IP address. Optionally, set the NAM system hostname.
- Verify NAM network connectivity by performing one of the following ping tests:
  - From a host beyond the gateway, ping the NAM system IP address.
  - From the NAM CLI, ping the NAM system default gateway.

Telnet Prerequisites

- Enter the **exsession on** NAM CLI command.

SSH Prerequisites

- Enter the **exsession on ssh** NAM CLI command.

Summary Steps

Step 1	**telnet** {*ip-address*	*hostname*} or **ssh** {*ip-address*	*hostname*}
Step 2	At the login prompt, enter **root**.
Step 3	At the password prompt, enter your password. or If you have not changed the password from the factory-set default, enter **root** as the root password.
Step 4	Perform the tasks using the NAM CLI. When you want to end the Telnet or SSH session to the NAM and return to the Cisco IOS CLI, complete Step 5 and Step 6
Step 5	**exit**
Step 6	**logout**

For more details on NAM CLI, see the *Prime NAM Command Reference Guide*.

Examples

Opening and Closing a Telnet Session to the NAM Using the NAM System IP Address

```
nam_host> telnet 172.10.10.15
Trying 172.10.10.15 ... Open

Cisco Prime NAM sw on Nexus7K (N7K-SM-NAM-K9) Console, 6.0(1)
Copyright (c) 1999-2013 by Cisco Systems, Inc.

login: root
Password: <password>
Terminal type: vt100

WARNING! Default password has not been changed!
root@nam.company.com#
root@nam.company.com# logout

[Connection to 172.20.105.15 closed by foreign host]
nam_host>
```

Opening and Closing an SSH Session to the NAM Using the NAM System Hostname

```
host [/home/user] ssh -l root@namappl
root@namappl's password: <password>
Terminal type: vt100

Cisco Prime NAM sw on Nexus7K (N7K-SM-NAM-K9) Console, 6.0(1)
Copyright (c) 1999-2013 by Cisco Systems, Inc.

WARNING! Default password has not been changed!
root@namappl.company.com#
root@namappl.company.com# logout

Connection to namappl closed.
host [/home/user]
```

Moving Your NAM to a New VDC

This section describes how to move your NAM to another virtual device context (VDC).

Before you begin, ensure the VDC has been created and is set to accept F2e type modules.

```
switch(config-monitor)# show run vdc
version 6.2(2)
vdc VDC4 id 4
  limit-resource module-type m1 m1xl m2xl f2e
```

Add the **f2e** keyword if it is not present in the configuration.

For more details on how to check if the NAM can be moved to your VDC, see your Cisco Nexus 7000 product documentation.

Ensure that you are in the correct VDC by using the **switchto vdc** command.

The following example shows the commands to perform for the move.

```
config t
vdc <vdc_name>
allocate interface e<NAM_slot_#>/1
```

Troubleshooting and Reference

The service modules undergo extensive testing before they leave the factory. If you encounter problems, use the information in this section to help isolate problems or to eliminate the module as the source of the problem.

Note The procedures in this section assume that you are troubleshooting the initial Cisco NAM-NX1 startup, and that the module is in the original factory configuration. If you have removed or replaced components or changed any default settings, these recommendations may not apply.

This section covers some trouble events that may occur on a module. It focuses on those events that may frequently occur.

This section contains:

More troubleshooting and frequently asked questions can be found in the *Cisco Prime Network Analysis Module Software User Guide*.

Troubleshooting Guidelines

Before an initial startup, verify the following:

- Module is correctly seated in the chassis and the STATUS LED is on.
- The appropriate supervisor card is installed and running.
- The chassis software boots successfully.

Shutting Down and Starting Up the Cisco NAM-NX1

⚠️

Caution   Do not remove the NAM from the switch until the module has shut down completely and the STATUS LED is OFF. You risk disk corruption if you remove the module from the switch before the NAM completely shuts down.

To avoid corrupting the NAM hard disk, you must correctly shut down the NAM before you remove it from the chassis or disconnect the power. You can initiate this shutdown procedure by entering commands at the supervisor module CLI prompt or the NAM CLI prompt. To ensure a graceful shutdown, use the CLI command **out-of-service module <module_number>**.

Step 1   Open a session on the switch CLI:

attach module *module_number* **processor 1**

✎

Note   Ensure that you are in the correct VDC. You can use the **switchto vdc** command to change VDCs.

```
Cisco7000# attach module <mod #> processor 1
Opening....
nam.localdomain login: root
Password:
```

Step 2   Shut down the NAM:

```
root@nam.company.com# out-of-service module module_number
...
```

✎

Note   If disk corruption occurs, you can recover the disk by upgrading the application image again with the **--reformat** option.

The shutdown process can take several minutes. The STATUS LED turns off when the NAM shuts down and then blinks red. For more details on the shutdown and start up commands, see the *Cisco Prime NAM Command Reference Guide*.

Reading the NAM LEDs

This section describes the location and meaning of the LEDs for the module.

Figure 1 on page 6 shows the front-panel LEDs for the NAM module. Table 1 defines the LED states.

Table 2   *Front Panel LED Descriptions*

Number	Name	Color	Description
1	STATUS LED	Green	The NAM is operational. All diagnostic tests pass.
		Orange	Indicates one of three conditions: • The NAM is running through its boot and self-test diagnostic sequence. • The NAM is disabled/not in service. • The NAM is the shutdown process (coming up or shutting down).
		Red	Indicates one of three conditions: • The module has detected a slot ID parity error and cannot power on or boot up. • The module is not fully inserted, and it is not making a reliable connection with the supervisor. • The module has failed diagnostic tests and has powered down.
		Blinking Red	Blinks after NAM power turns off.
		Off	The NAM power is off.
2	ID (Beacon)	Blue	When activated works as a standard service LED. Available for the operator to turn on so the operational staff can locate the card in a stack. The NX-OS CLI command is **locator-led mod** *<mod #>*.
		Off	This module is not being identified.
3	Sync Link Status LED	Green	The port is active (the link is connected).
		Off	The port is not active or the link is not connected.
4	SYNC	—	RJ45 1 Gigabit Ethernet 1588 time synchronization port.
5	SAS Link Status LED	Green	The port is active (the link is connected and active).
		Orange	The port is disabled or is not initializing.
		Flashing orange	The port is faulty and disabled.
		Off	The port is not active or the link is not connected.
6	Mini-SAS	—	Attached SCSI Storage port. Use min-serial (mini-SAS) to store larger packet captures for offline analysis.
7	USB	—	Not currently used.

Replacing the NAM Memory or Hard Disk

The NAM memory or hard disk can be replaced using the following instructions:

Note   For safety precautions, see the Safety Guidelines section.

Warning   **Use an ESD or antistatic wrist strap, a conductive foam pad or mat (recommended), and follow all necessary antistatic standards when handling hard disk drives.**

Step 1   Shut down the module using the CLI **out-of-service module** *module_number* to ensure a graceful shutdown. Wait until the lights go off and unplug it.

Step 2   Carefully remove the NAM module out of the switch slot.

Step 3   To remove old memory DIMMs, push down on the white latches. All size DIMMs are uncovered, not screwed in, and not soldered, and there is no other component blocking them, so they can be easily removed.

Step 4   Follow all necessary antistatic standards in handling the hard disk drives.

Step 5   If a hard drive is already installed, you can remove it by unfastening the four screws that attach it to the drive tray with a Number 2 Phillips screwdriver.

Step 6   Install the new DIMMs or hard drive. Avoid extra force when removing and inserting DIMMs.

Step 7   Plug the module back into the slot. You would see the STATUS button go red, and then green when it is booting up.

Using the CLI Helper Utility for System Administrative Tasks

You can use the CLI helper utility to perform the following administrative tasks:

- Configuring Network Parameters, page 25
- Downloading an Application Image and Writing to HDD, page 26
- Downloading an Application Image and Reformatting the HDD, page 26
- Displaying Software Versions, page 26
- Resetting Application Image CLI Passwords to Default, page 26
- Changing the System File Transfer Method, page 27
- Confirming Network Connectivity Using Ping, page 27
- Formatting Boot Flash, page 27
- Accessing Upgrade History, page 27
- Fixing Local Disk Errors, page 28
- Rebooting a New Application Image, page 28
- Shutting Down the Service Module, page 28

For information about accessing the helper utility, see Performing a Recovery Installation, page 14.

Note   Select menu item **n** to configure network parameters for the module, before using menu items 1 and 2.

Figure 3   Helper Utility Menu

```
===============================================================================
        Boot Helper Menu

1 - Download application image and write to HDD
2 - Download application image and reformat HDD
3 - Display software versions
4 - Reset application image CLI passwords to default
5 - Change file transfer method (currently ftp/http)
6 - Send Ping
```

```
7 - Format boot flash
n - Configure network
s - Show upgrade log
f - Check and fix local disk errors
r - Exit and reset Services Engine
h - Exit and shutdown Services Engine

Selection [1234567nfsrh]:
```

The following sections describe the Helper Utility Menu, what each option does, and any requirements for using a particular option.

Helper Utility Menu Summary

Table 3   Helper Utility Menu Options Summary

Menu Option	Description	See...
n	Configure the network parameters for the module	Configuring Network Parameters, page 25
1	Download the application image and write it to the hard disk drive.	Downloading an Application Image and Writing to HDD, page 26
2	Download the application image and reformat the hard disk drive.	Downloading an Application Image and Reformatting the HDD, page 26
3	Display current software application versions	Displaying Software Versions, page 26
4	Reset the password for users root and admin to their default values.	Resetting Application Image CLI Passwords to Default, page 26
5	Change the file transfer method. Only FTP and HTTP are supported.	Changing the System File Transfer Method, page 27
6	Send a ping to determine if network connectivity exists.	Confirming Network Connectivity Using Ping, page 27
7	Format boot flash.	Formatting Boot Flash, page 27
s	Show upgrade log.	Accessing Upgrade History, page 27
f	Check and fix local disk errors.	Fixing Local Disk Errors, page 28
r	Exit the helper utility and power cycle (reboot) into the NAM application image.	Rebooting a New Application Image, page 28
h	Exit the helper utility and shut down the NAM module.	Shutting Down the Service Module, page 28

Configuring Network Parameters

Use **Option n** to configure the network parameters for the software.

Step 1 When the Configure Network Interface menu displays, enter **1** to configure the network manually.

```
-----
Configure Network interface:
1 - Configure network manually
2 - Show config
3 - Write config to application image
r - return to main menu
Selection [123r]: 1
```

Step 2 The utility prompts you for the IP address, netmask, and default gateway for the module.

```
Enter IP configuration:
IP address []: 172.10.10.15
netmask []: 255.255.255.25
default gateway []: 172.10.10.1

-----
Configure Network interface:
1 - Configure network manually
2 - Show config
3 - Write config to application image
r - return to main menu
Selection [123r]:
```

Step 3 To check your network configuration, enter **2**.

```
Selection [123r]: 2

eth0      Link encap:Ethernet HWaddr 00:0E:0C:EE:50:3E
          inet addr:172.10.10.15 Bcast:172.10.10.15 Mask:255.255.255.25
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:210 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:13632 (13.3 KiB)  TX bytes:0 (0.0 b)

Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
172.20.122.0    0.0.0.0         255.255.255.25 U       0        0 eth0
0.0.0.0         172.10.10.15    0.0.0.0        UG      0      0 eth0
-----
Configure Network interface:
1 - Configure network manually
2 - Show config
3 - Write config to application image
r - return to main menu
Selection [123r]:
```

Downloading an Application Image and Writing to HDD

Use **Option 1** to download a version of the current application image from an FTP server location and write the image to the hard disk.

Note If the the NAM application has already been installed and the network settings were configured, they are automatically detected by the helper. Otherwise, use **Option n** to configure the network *before* using this option.

This option downloads a version of the current application from an FTP server location or from a location you can access using HTTP. You can also download the latest the NAM software version from Cisco.com.

This URL requires you to have a Cisco service agreement and access to the Internet to download the zipped software.

Downloading an Application Image and Reformatting the HDD

Use **Option 2** to download the current application image and write the image to the hard disk.

Caution Using this option reformats the hard disk before writing the application image and destroys all data such as reports, packet captures, and configuration. Network connectivity configuration, however, is retained.

Note If the the NAM application has already been installed and the network settings were configured, they are automatically be detected by the helper. Otherwise, use **Option n** to configure the network *before* using this option.

This option downloads a version of the current application image from an FTP server location or from a location you can access using HTTP. You can also download the latest the NAM software version from Cisco.com.

This URL requires you to have a Cisco service agreement and access to the Internet to download the zipped software.

Displaying Software Versions

Use **Option 3** to display the current software application image version stored on your hard disk.

```
Selection [123456789dnfrh]:3


-----
NAM application version: 6.0(1) RELEASE SOFTWARE [fc2]
Helper image version: 1.1(0.22)
```

Resetting Application Image CLI Passwords to Default

Use **Option 4** to reset the password for users root and admin to their default values.

```
Restored default CLI passwords of application image.
```

Changing the System File Transfer Method

Use **Option 5** to change the file transfer method. This option is only necessary if you change the file transfer method by mistake. Only **FTP** and **HTTP** are supported.

```
Selection [123456789dnfrh]: 6
-----
Change file transfer method menu
The current file transfer method is ftp/http.
1 - Change to FTP/HTTP
r - return to main menu
```

Confirming Network Connectivity Using Ping

Use **Option 6** to send a ping to determine if network connectivity exists. When prompted, enter the IP address or full domain name of the location to send the ping.

```
IP address to ping []: 172.10.10.15

Sending 5 ICMP ECHO_REQUEST packets to 172.10.10.15.
PING 172.10.10.15 (172.10.10.15) 56(84) bytes of data.
64 bytes from 172.20.122.91: icmp_seq=1 ttl=64 time=0.151 ms
64 bytes from 172.20.122.91: icmp_seq=2 ttl=64 time=0.153 ms
64 bytes from 172.20.122.91: icmp_seq=3 ttl=64 time=0.125 ms
64 bytes from 172.20.122.91: icmp_seq=4 ttl=64 time=0.102 ms
64 bytes from 172.20.122.91: icmp_seq=5 ttl=64 time=0.166 ms

--- 172.10.10.15 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4000ms
rtt min/avg/max/mdev = 0.102/0.139/0.166/0.025 ms
```

Formatting Boot Flash

This option is mainly used by the manufacture.

Use **Option 7** to format the bootflash.

```
Format the boot flash will erase all the files.
Are you sure? [y/N] Y
```

If you choose to format the boot flash, you must reinstall NAM image. We recommend you use this option only if instructed to do so.

Accessing Upgrade History

Use **Option s** to view the details of the upgrade history.

Fixing Local Disk Errors

Use **Option f** to check for local disk errors.

```
fsck Menu
1 - Application partition
2 - (Internal) Storage partition
3 - NVRAM
r - return to main menu
```

Rebooting a New Application Image

Use **Option r** to exit the helper utility and power cycle (reboot) into the newly installed application image.

Shutting Down the Service Module

Use **Option h** to exit the helper utility and shut down the the NAM.

```
------------------------------------------------------------------------
Selection [12345678fsnrh]: h
About to exit and shutdown NAM.
Are you sure? [y/N] y
Stopping internet superserver: inetd.
Stopping OpenBSD Secure Shell server: sshd.
Stopping internet superserver: xinetd.
Stopping internet superserver: xinetd-ipv4.
: done.
Shutting down NAM (NAMxyz-RJ45-K9), part 1:
Stopping klogd . . .
Stopping syslogd . . .
Sending all processes the TERM signal... done.
Sending all processes the KILL signal... done.
Unmounting remote filesystems... done.
Deactivating swap...done.
Unmounting local filesystems...done.
Starting halt command: halt
Power down.
--------------------------------------------------------------------------------------
```

Switch CLI Quick Reference

This section includes several switch commands you can use to verify the NAM:

- show users
- show module # version / show analysis module x version
- show service nam summary

show users

To view the current users and to which line they are associated, use the **show users** command.

From the switch CLI execution mode, issue this command:

```
nam-n7k-4# show users
```

```
NAME _ _ LINE _ _ _ _ TIME _ _ _ _ IDLE _ _ _ _ _PID COMMENT
admin _ _ttyS0 _ _ _ _Aug _3 22:13 00:01 _ _ _ _5019
admin _ _pts/0 _ _ _ _Aug _5 09:56 _ . _ _ _ _ 24741 (10.16.4.12) *
admin _ _pts/1 _ _ _ _Aug _5 10:55 00:19 _ _ _ 29804 (172.11.17.109)
admin _ _pts/2 _ _ _ _Aug _5 06:46 00:45 _ _ _ _8449 (172.11.18.117)
admin _ _pts/3 _ _ _ _Aug _5 11:52 00:31 _ _ _ _2339 (172.11.19.109)
```

show module # version / show analysis module x version

To identify the version of the NAM software on the switch, use the **show module** or **show analysis module** commands:

```
nam-n7k-4(config)# show module 18

Mod     Ports  Module-Type                       Model          Status
---     -----  ------------------------------    -------------  -------
18      4      Network Analysis Module NAM-NX1   N7K-SM-NAM-9G-K9 ok

Mod     Sw            Hw
---     -----------   -------
18      6.2(2)        0.500

Mod     Application Image Description  Application Image Version
---     ----------------------------  --------------------------
18      Application linecard image    1.0(0.22)-helper           ok

Mod     MAC-Address(es)                          Serial-Num
---     ---------------------------------------  ----------
18      84-78-ac-56-b8-ba to 84-78-ac-56-b8-c3 JAF1701AEAN
Mod     Online Diag Status
---     ------------------
18      Pass

Chassis Ejector Support: Enabled
Ejector Status:
Left ejector CLOSE, Right ejector CLOSE, Module HW does support ejector
based shutdown, Ejector policy enabled.

or

namlab-n7k-5# show analysis module 4 version
App software version 6.2(1.0)
```

show service nam summary

To verify the state of the NAM (active or inactive), use the **show service nam summary** command:

```
switch# show service nam summary
Service          Service
Name             Type        Interface     Module    State     Version
---------------- ----------- ------------- --------- --------- ----------------
NAM7             NAM         Po4096,Po4095 7         active    6.0(1)
```

Related Documentation

The following sections provide references related to the Cisco Nexus 7000 Series Network Analysis Module features.

Table 4   Related Documentation

Related Topic	Document Title
Links to software downloads	*Cisco Network Analysis Module (NAM) Software* at http://www.cisco.com/en/US/products/sw/cscowork/ps5401/tsd_products_support_series_home.html
Safety and compliance	*Cisco Network Modules and Interface Cards Regulatory Compliance and Safety Information* at http://www.cisco.com/en/US/products/ps9402/prod_installation_guides_list.html
Cisco NX-OS interface commands	*Cisco Nexus 7000 Series NX-OS Interfaces Command Reference* at http://www.cisco.com/en/US/products/ps9402/prod_command_reference_list.html
Cisco Nexus 7000 Series product documentation	• *Cisco Nexus 7000 Series Hardware Installation and Reference Guide*—For information on installing the NAM module. • *Cisco Nexus 7000 Series NX-OS Release Notes* • *Cisco Nexus 7000 Series NX-OS System Management Configuration Guide*—Includes information on support for NAM in the NetFlow, SPAN, and ERSPAN.

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see *What's New in Cisco Product Documentation* at: http://www.cisco.com/c/en/us/td/docs/general/whatsnew/whatsnew.html.

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