Newer Cisco SBA Guides Available

This guide is part of an older series of Cisco Smart Business Architecture designs. To access the latest Cisco SBA Guides, go to http://www.cisco.com/go/sba

Cisco strives to update and enhance SBA guides on a regular basis. As we develop a new series of SBA guides, we test them together, as a complete system. To ensure the mutual compatibility of designs in Cisco SBA guides, you should use guides that belong to the same series.

SBA

SBA

BORDERLESS NETWORKS

DEPLOYMENT GUIDE

Network Analysis Module Deployment Guide

SMART BUSINESS ARCHITECTURE

August 2012 Series

Preface

Who Should Read This Guide

This Cisco® Smart Business Architecture (SBA) guide is for people who fill a variety of roles:

- Systems engineers who need standard procedures for implementing solutions
- Project managers who create statements of work for Cisco SBA implementations
- Sales partners who sell new technology or who create implementation documentation
- Trainers who need material for classroom instruction or on-the-job training

In general, you can also use Cisco SBA guides to improve consistency among engineers and deployments, as well as to improve scoping and costing of deployment jobs.

Release Series

Cisco strives to update and enhance SBA guides on a regular basis. As we develop a series of SBA guides, we test them together, as a complete system. To ensure the mutual compatibility of designs in Cisco SBA guides, you should use guides that belong to the same series.

The Release Notes for a series provides a summary of additions and changes made in the series.

All Cisco SBA guides include the series name on the cover and at the bottom left of each page. We name the series for the month and year that we release them, as follows:

month year Series

For example, the series of guides that we released in August 2012 are the "August 2012 Series".

You can find the most recent series of SBA guides at the following sites:

Customer access: http://www.cisco.com/go/sba

Partner access: http://www.cisco.com/go/sbachannel

How to Read Commands

Many Cisco SBA guides provide specific details about how to configure Cisco network devices that run Cisco IOS, Cisco NX-OS, or other operating systems that you configure at a command-line interface (CLI). This section describes the conventions used to specify commands that you must enter.

Commands to enter at a CLI appear as follows:

```
configure terminal
```

Commands that specify a value for a variable appear as follows:

```
ntp server 10.10.48.17
```

Commands with variables that you must define appear as follows:

```
class-map [highest class name]
```

Commands shown in an interactive example, such as a script or when the command prompt is included, appear as follows:

```
Router# enable
```

Long commands that line wrap are underlined. Enter them as one command:

```
wrr-queue random-detect max-threshold 1 100 100 100 100 100
100 100 100
```

Noteworthy parts of system output or device configuration files appear highlighted, as follows:

```
interface Vlan64
  ip address 10.5.204.5 255.255.255.0
```

Comments and Questions

If you would like to comment on a guide or ask questions, please use the SBA feedback form.

If you would like to be notified when new comments are posted, an RSS feed is available from the SBA customer and partner pages.

Table of Contents

What's In This SBA Guide

Cisco SBA Borderless Networks

Cisco SBA helps you design and quickly deploy a full-service business network. A Cisco SBA deployment is prescriptive, out-of-the-box, scalable, and flexible.

Cisco SBA incorporates LAN, WAN, wireless, security, data center, application optimization, and unified communication technologies—tested together as a complete system. This component-level approach simplifies system integration of multiple technologies, allowing you to select solutions that solve your organization's problems—without worrying about the technical complexity.

Cisco SBA Borderless Networks is a comprehensive network design targeted at organizations with up to 10,000 connected users. The SBA Borderless Network architecture incorporates wired and wireless local area network (LAN) access, wide-area network (WAN) connectivity, WAN application optimization, and Internet edge security infrastructure.

Route to Success

To ensure your success when implementing the designs in this guide, you should first read any guides that this guide depends upon—shown to the left of this guide on the route below. As you read this guide, specific prerequisites are cited where they are applicable.

About This Guide

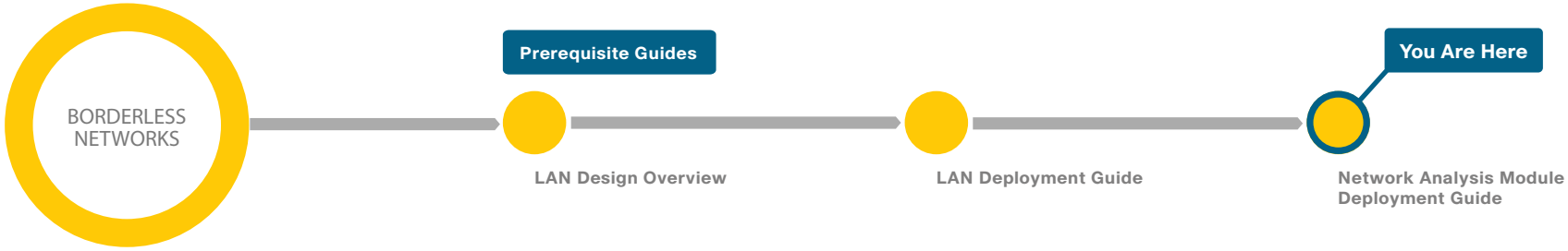
This *deployment guide* contains one or more deployment chapters, which each include the following sections:

- Business Overview—Describes the business use case for the design. Business decision makers may find this section especially useful.
- Technology Overview—Describes the technical design for the business use case, including an introduction to the Cisco products that make up the design. Technical decision makers can use this section to understand how the design works.
- Deployment Details—Provides step-by-step instructions for deploying and configuring the design. Systems engineers can use this section to get the design up and running quickly and reliably.

You can find the most recent series of Cisco SBA guides at the following sites:

Customer access: http://www.cisco.com/go/sba

Partner access: http://www.cisco.com/go/sbachannel



Introduction

Business Overview

Businesses rely on enterprise applications to help ensure efficient operations and gain competitive advantage. At the same time, IT is challenged with managing application delivery in an environment that is dynamic and distributed. The number of business applications is growing, application architectures are increasingly complex, application traffic is proliferating, and traffic patterns are difficult to predict.

In addition, driven by security, regulatory, and economic considerations, enterprises are embracing data center consolidation, server and desktop virtualization, and network and application convergence. Because of this confluence of new business demands, comprehensive application and network-visibility is no longer simply nice-to-have but is business critical. This visibility is now essential to achieving increased operational efficiency and to successfully manage the overall end-user experience.

Technology Overview

Cisco Prime Network Analysis Module (NAM), part of the overall Cisco Prime solution, is a product that:

- Provides advanced network instrumentation on the user-services layer in order to support data, voice and video services.
- Allows network administrators, managers, and engineers to gain visibility into the user-services layer with a simple workflow approach—from monitoring overall network health to analyzing a variety of detailed metrics to troubleshooting with packet-level details.
- Supports network-services layers such as application optimization
- Offers a versatile combination of real-time traffic analysis, historical analysis, packet capture capabilities, and the ability to measure user-perceived delays across the WAN.
- Provides a uniform instrumentation layer that collects data from a variety of sources, and then analyzes and presents the information. This information is available through an onboard web-based graphical user interface, and you can also export it to third-party applications.

From a Cisco SBA deployment perspective, Cisco Catalyst 6500 Series Network Analysis Module (NAM-3) is deployed in the Cisco Catalyst 6500 Series switch found in LAN core. Cisco NAM-3 takes advantage of backplane integration by simplifying manageability, lowering total cost of ownership, reducing network footprint, and reducing rack space. Cisco NAM-3 monitors traffic on the Cisco Catalyst 6500 switch via two internal 10 Gigabit data ports.

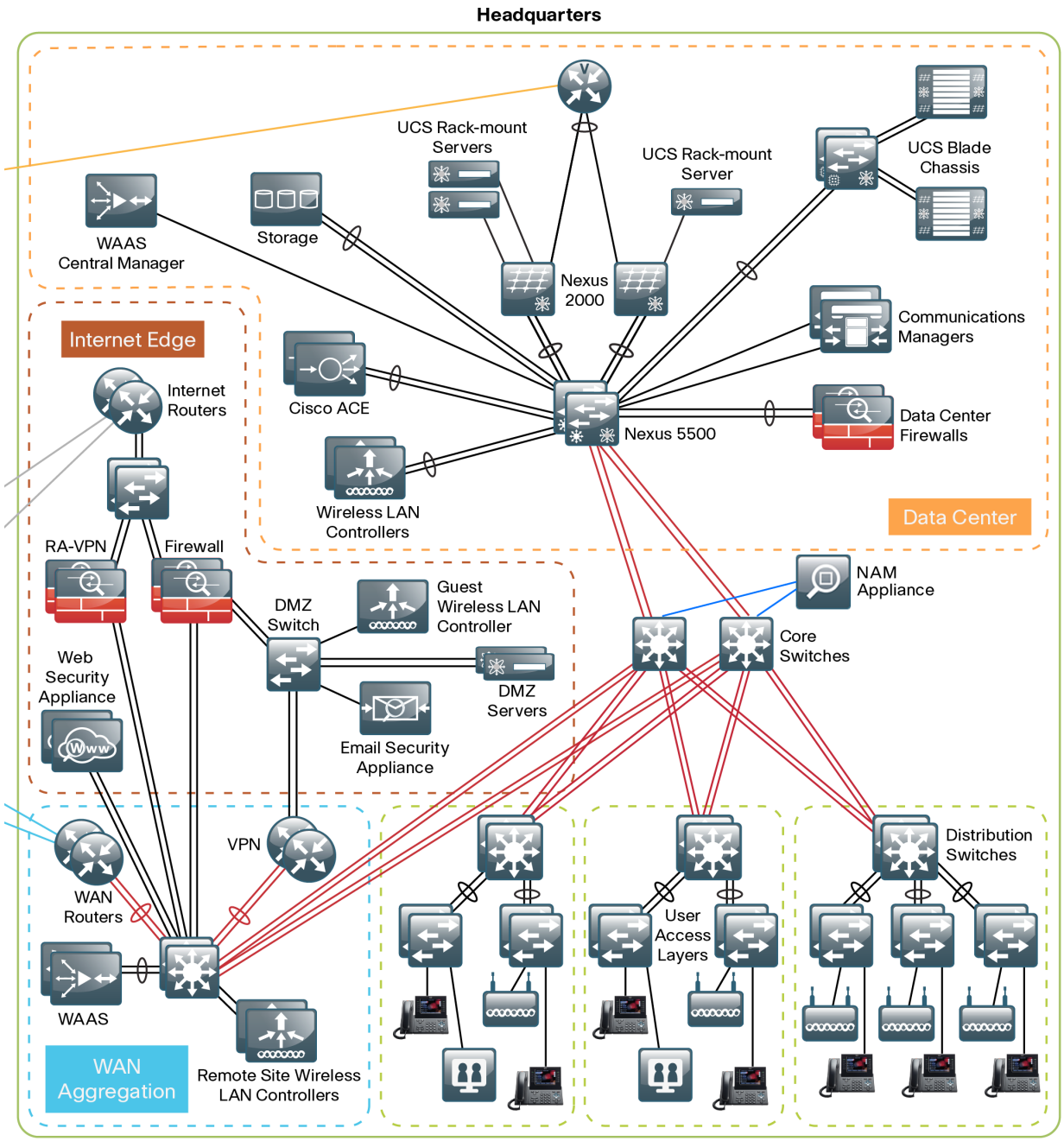
As an alternate option, the Cisco NAM 2220 appliance can be deployed in the LAN core when the core is not built using Cisco Catalyst 6500 switches, specifically when you have a collapsed LAN core and distribution layer (see Figure 1). The Cisco NAM 2220 appliance monitors traffic switches via two 10 Gigabit interfaces.

Both Cisco NAM-3 and Cisco NAM 2220's placement is effective in helping you monitor, measure, and report on the network's health at the LAN core.

Cisco Prime NAM on Cisco Services Ready Engine (SRE) 710 or 910 series as part of ISR G2 is deployed in the regional office (see Figure 2) to help you monitor, measure, and report on the network's health at the branch level.

For more information regarding the Cisco SBA network, see the LAN Deployment Guide on the following page: http://www.cisco.com/go/sba

Figure 1 - Cisco NAM providing network and application intelligence in Cisco SBA



Real-Time and Historical Application Monitoring

Cisco Prime NAM monitors traffic in real-time and provides a variety of analytics. Cisco Prime NAM delivers on-demand historical analysis from the data collected. In this category of monitoring are application recognition, analysis of top conversations, hosts, protocols, differentiated services code points, and virtual LANs (VLANs). More advanced processing includes:

- Application performance analytics, including response-time measurements and various user-experience-related metrics.
- Voice quality monitoring, which includes the ability to detect real-time streaming protocol streams and compute the mean opinion score, jitter, packet loss, and other VoIP metrics.

Application and Service Delivery with Application Performance Intelligence

To accurately assess the end-user experience, Cisco Prime NAM delivers comprehensive application performance intelligence (API) measurements. Cisco Prime NAM analyzes TCP-based client/server requests and acknowledgements to provide transaction-aware response-time statistics, such as client delay, server delay, network delay, transaction times, and connection status. This data can help you isolate application problems to the network or to the server. It can also help you quickly diagnose the root cause of the delay and thus resolve the problem while minimizing end-user impact.

API can assist busy IT staff in troubleshooting application performance problems, analyzing and trending application behavior, identifying application consolidation opportunities, defining and helping ensure service levels, and performing pre- and post-deployment monitoring of application optimization and acceleration services.

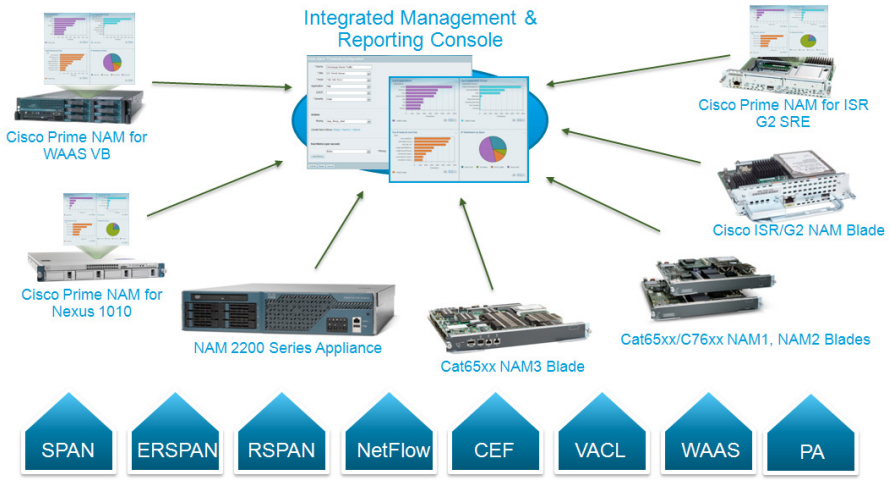
Simplified Problem Detection and Resolution

With Cisco Prime NAM, you can set thresholds and alarms on various network parameters—such as increased utilization, severe application response delays, and voice quality degradation—and be alerted to potential problems. When one or more alarms are triggered, Cisco Prime NAM can send an email alert, generate a syslog or SNMP trap, and automatically capture and decode the relevant traffic to help resolve the problem. Using a browser, the administrator can manually perform captures and view decodes through the Traffic Analyzer GUI while the data is still being captured. The capture and decode capability of the Cisco Prime NAM provides depth and insight into data analysis by using trigger-based captures, filters, decodes, a capture analysis, and error-scan toolset in order to quickly pinpoint and resolve problem areas.

Cisco Prime NAM Data Sources and Export Capabilities

In the context of Cisco Prime NAM, a data source refers to a source of traffic whose entire stream, or summaries of data from that stream, is sent to the Cisco Prime NAM for monitoring. Cisco Prime NAM can monitor a variety of data sources and compute appropriate metrics. Figure 2 provides a snapshot of all possible sources of data, and also the various export mechanisms supported by Cisco Prime NAM.

Figure 2 - Data sources for Cisco Prime NAM



This figure shows Cisco Prime NAM's role as a mediation layer tool—collecting and analyzing network data from a variety of sources and displaying the results on an integrated management and reporting console, and optionally providing data to northbound applications via representational state transfer (REST)/XML interface.

Using the SPAN feature, Cisco Prime NAMs can monitor traffic from physical ports, VLANs, or Cisco EtherChannel connections of the local switch or router. To support the selective monitoring of large amounts of traffic or the gathering of traffic from WAN interfaces, VLAN access control list (VACL) can filter traffic before it is sent to Cisco Prime NAMs. NetFlow can provide analysis of real-time and historical traffic usage to obtain a broad view of how the network is performing. Remote SPAN (RSPAN) or Encapsulated Remote SPAN (ERSPAN) extends troubleshooting to remote parts of the network. Using Cisco Express Forwarding (CEF), Cisco Prime NAM directly monitors and analyzes the WAN data-streams from the packets traversing the router interfaces to the internal Cisco NAM interface. Cisco Wide Area Application Services (WAAS) Flow Agent from Cisco Wide Area Application

Engine (WAE) provides key data about the pre- and post-optimized network. This allows Cisco Prime NAM to identify potential candidates for WAN optimization based on Flow Agent data. Cisco Performance Agent (PA) is a licensed software feature of Cisco IOS that encapsulates application performance analytics, traffic statistics, and WAN optimization metrics in a NetFlow Version 9 template-based format and reports to the Cisco Prime NAM. Cisco PA provides visibility into branch-office applications traffic and performance. By using the instrumentation built into the Cisco infrastructure, Cisco Prime NAM offers more ways to see and understand what's happening on your network.

Notes

Deployment Details

This section describes how to configure Cisco Catalyst 6500 Series NAM-3, the Cisco NAM 2220 appliance and Cisco Prime NAM on Cisco ISR G2 SRE to establish network connectivity, how to configure IP parameters, and how to perform other required administrative tasks by using the Cisco Prime NAM command-line interface. This section also provides information about how to get started with the Cisco Prime NAM GUI, and how to perform various system management tasks.

Process

Preparing Cisco ACS for NAM Web User Authentication

1. Add NAM to the ACS Network Devices list
2. Define the command set permitted by ACS
3. Configure the NAM Access Policies

Procedure 1 Add NAM to the ACS Network Devices list

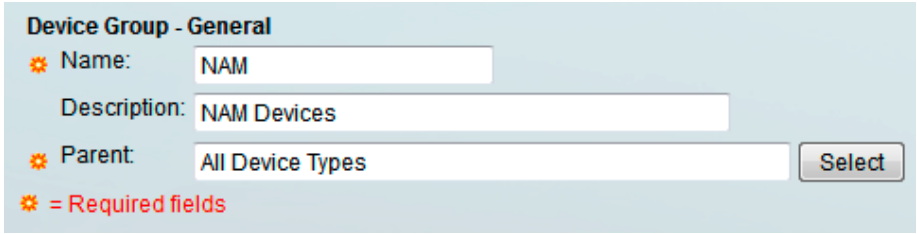
Step 1: Log into Cisco ACS via https://ACS.cisco.local.

Step 2: Navigate to **Network Resources** > **Network Device Groups** > **Device Type** and click **Create**.

Step 3: Enter a group name for NAM devices in the **Name** field. In this case NAM is used.

Step 4: Enter an appropriate description in the **Description** field. In this case NAM Devices is used.

Step 5: Click **Submit** to apply the configuration to the ACS.



Step 6: Navigate to **Network Resources** > **Network Devices and AAA Clients** and click **Create**.

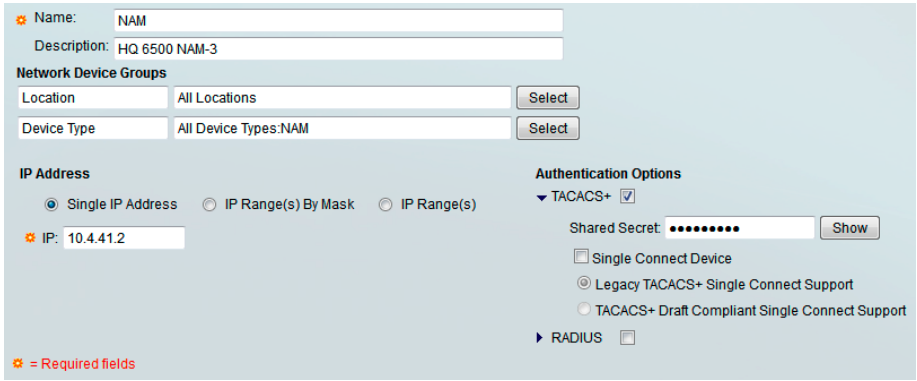
Step 7: In the Network Devices and AAA Clients configuration page enter the following values.

- Name — NAM
- Description — HQ Core NAM-3
- IP — 10.4.40.2
- TACACS+ — **Selected**
- Shared Secret — SecretKey

Step 8: Click the Select button that is to the right of the Device Type field.

Step 9: Drop down the **All Device Types** list and select the device group (NAM) created in Step 2. Click **OK** to insert the Device Type.

Step 10: Click **Submit** to add the NAM to the network device list in ACS.



Procedure 2 Define the command set permitted by ACS

Step 1: Navigate to **Policy Elements** > **Authorization and Permissions** > **Device Administration** > **Command Sets** and click **Create**.

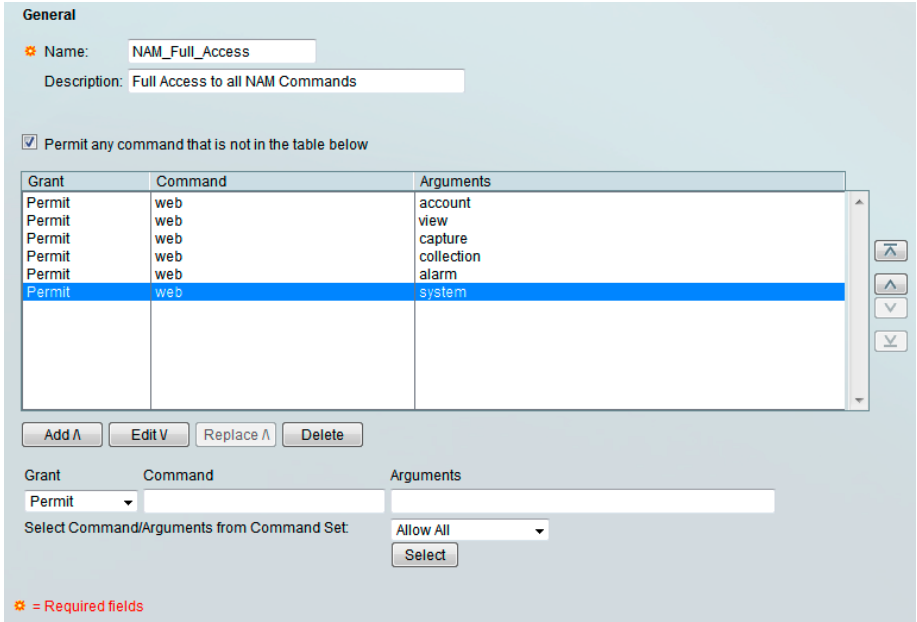
Step 2: In the **Name** field enter NAM_Full_Access and in the **Description** field enter Full Access to all NAM Commands.

Step 3: Select **Permit any commands that is not in the table below**.

Step 4: Using the table below, add all the web commands available on a NAM by entering each data row into the **Grant**, **Command**, and **Arguments** fields and clicking **Add**.

Grant	Command	Arguments
Permit	web	account
Permit	web	view
Permit	web	capture
Permit	web	collection
Permit	web	alarm
Permit	web	system

Step 5: Click **Submit** to finalize configuration of the command set.

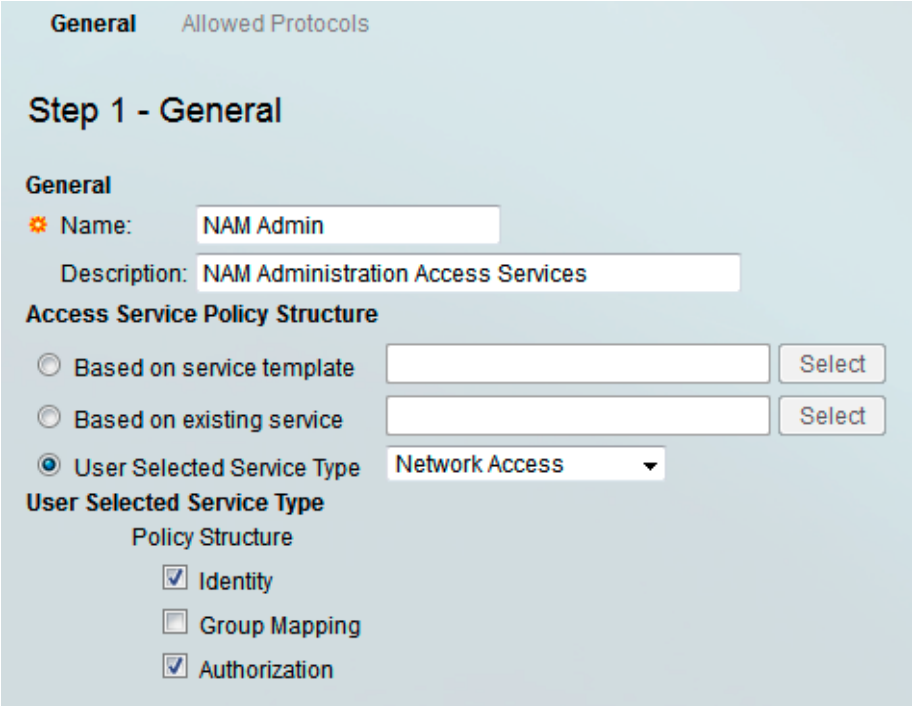


Procedure 3 Configure the NAM Access Policies

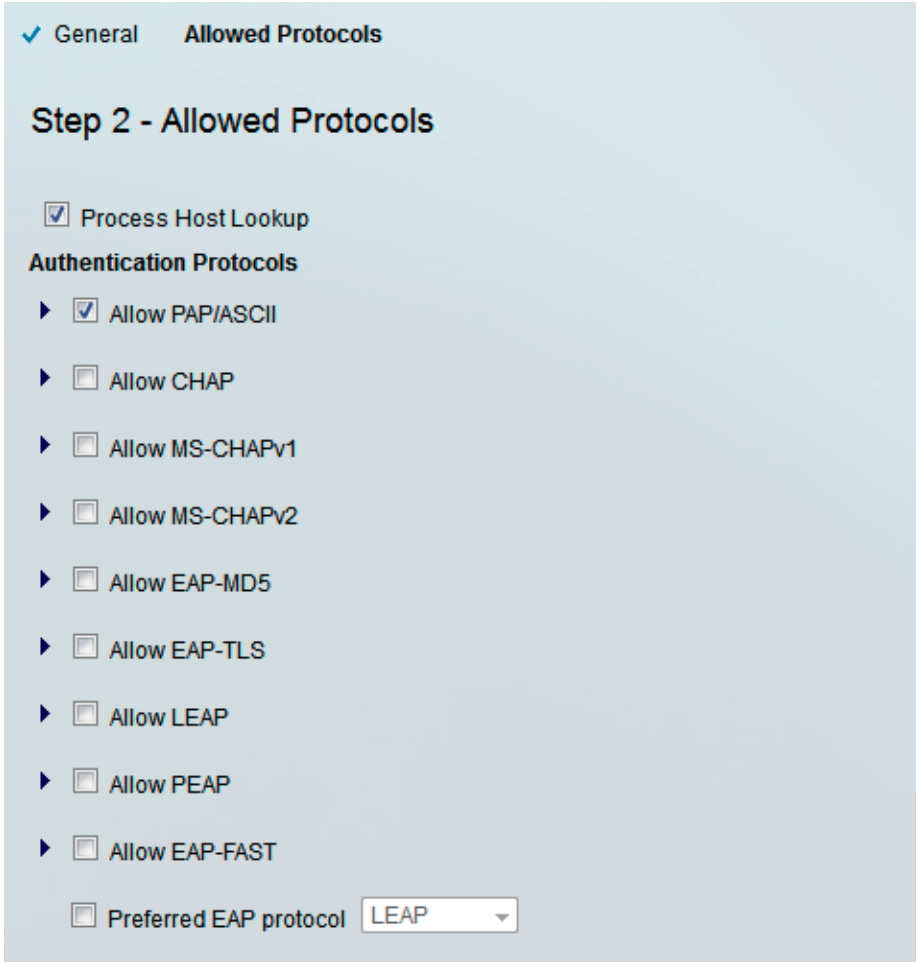
Step 1: Navigate to **Access Policies** > **Access Services** and click **Create**.

Step 2: In the Access Services configuration section fill out the **Name** and **Description** fields. In this example NAM Admin and NAM Administration Access Services are used.

Step 3: Select **User Selected Service Type** then, using the drop down to the right of the selected radio button, select **Network Access** and click **Next**.



Step 4: In Step 2 select **Allow PAP/ASCII**. Click **Finish**.



Step 5: A dialog box regarding the modification of Service Selection policy will appear. Click **Yes** to navigate to the Service Selection Rules page and click **Create** to make a rule.

Step 6: In the **Name** field enter an appropriate name. In this case NAM Admin is used. Make sure **Enabled** is selected under **Status**.

Step 7: Under the Conditions section select **Protocol**. In the fields to the right ensure **match** is selected. Click the **Select** button next to these fields.

Step 8: A dialog page appears. Select **Tacacs** and click **OK**.

Step 9: Under the Conditions section select **Compound Condition**. Ensure **NDG** is selected under **Dictionary** and click the **Select** button to the right of the Dictionary selection.

Step 10: A dialog box appears. Select **Device Type** and clock **OK**.

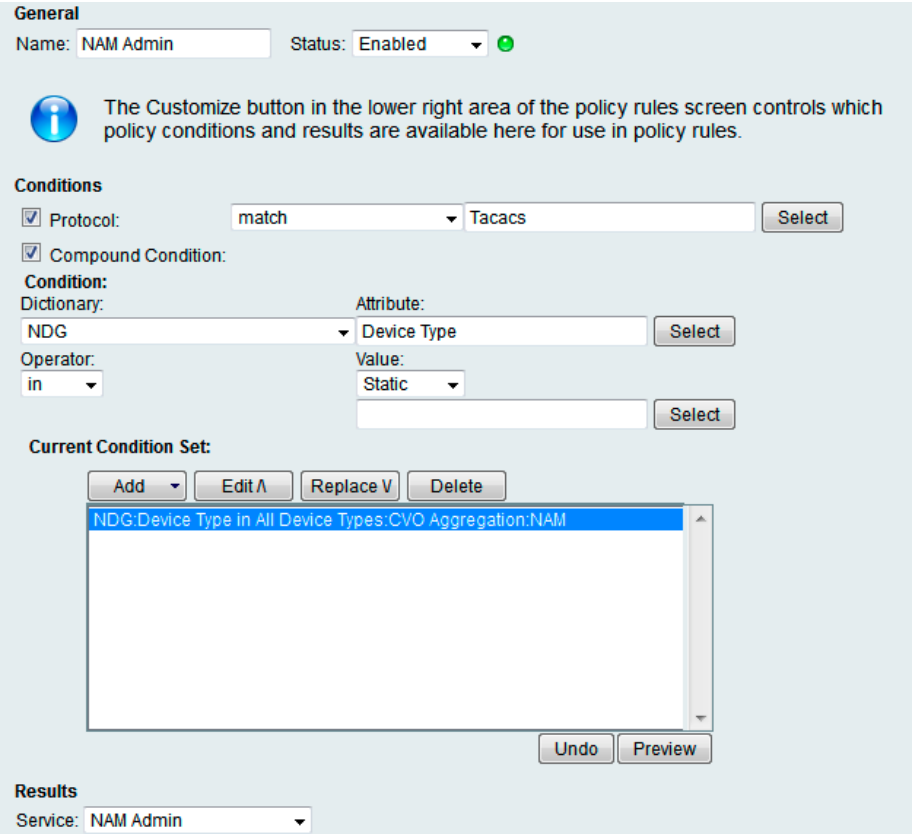
Step 11: In the **Value** selection ensure **Static** is selected in the dropdown and click the **Select** button next to the Value field.

Step 12: In the dialog box that appears drop down the **All Device Types** list and select the device group created in Procedure 1, Step 2. In this case the name selected is NAM. Click **OK**.

Step 13: Under the Current Condition Set click **Add**.

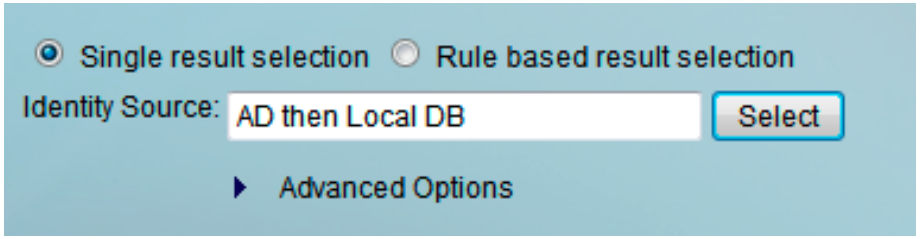
Step 14: In the Results section, use the drop down next to **Service** and select the Access Service created in Step 6. In this example NAM Admin.

Step 15: Ensure the new rule is placed above any default TACAS or RADIUS rules by selecting the NAM Admin rule and pressing the up arrow until it is appropriately placed.



Step 16: Navigate to **Access Policies** > **Access Services** > **NAM Admin** > **Identity** and click **Select**.

Step 17: On the resulting dialog box select the identity source intended to be used for authentication on the NAM. In this example AD the Local DB is selected. Press **OK** to apply the Identity Source and **Save Changes** to modify the Access Service.



Step 18: Navigate to **Access Policies** > **Access Services** > **NAM Admin** > **Authorization** and click **Create**.

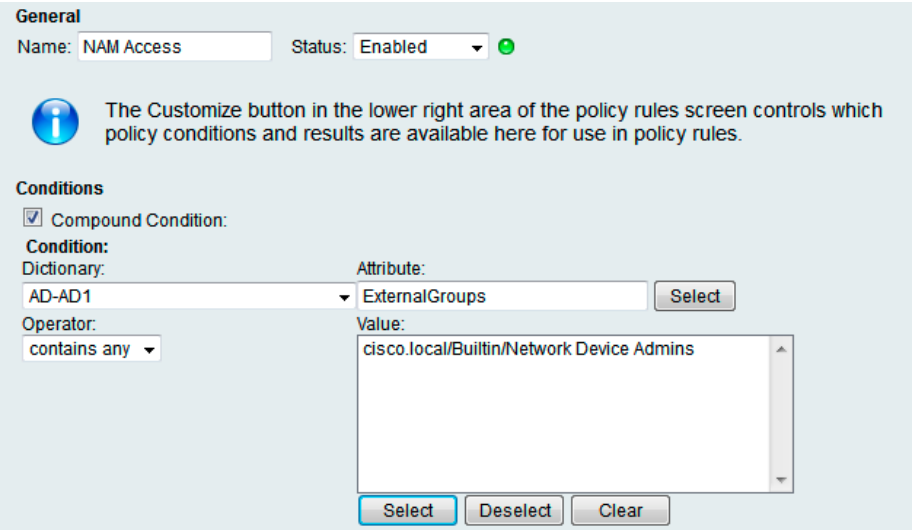
Step 19: In the **Name** field enter an appropriate rule name. In this example NAM Access is used.

Step 20: Select Compound Condition and under the **Dictionary** drop down select the source of authorization for the NAM web access; in this case AD-AD1. To the right of the Attribute field click the **Select** button.

Step 21: In the resulting dialog box select **ExternalGroups** and click **OK**.

Step 22: Under the Value field click the **Select** button.

Step 23: When the next page appears select the group intended to have access to the NAM web UI. In this example the cisco.local/Builtin/Network Device Admins is selected. Click **OK**.



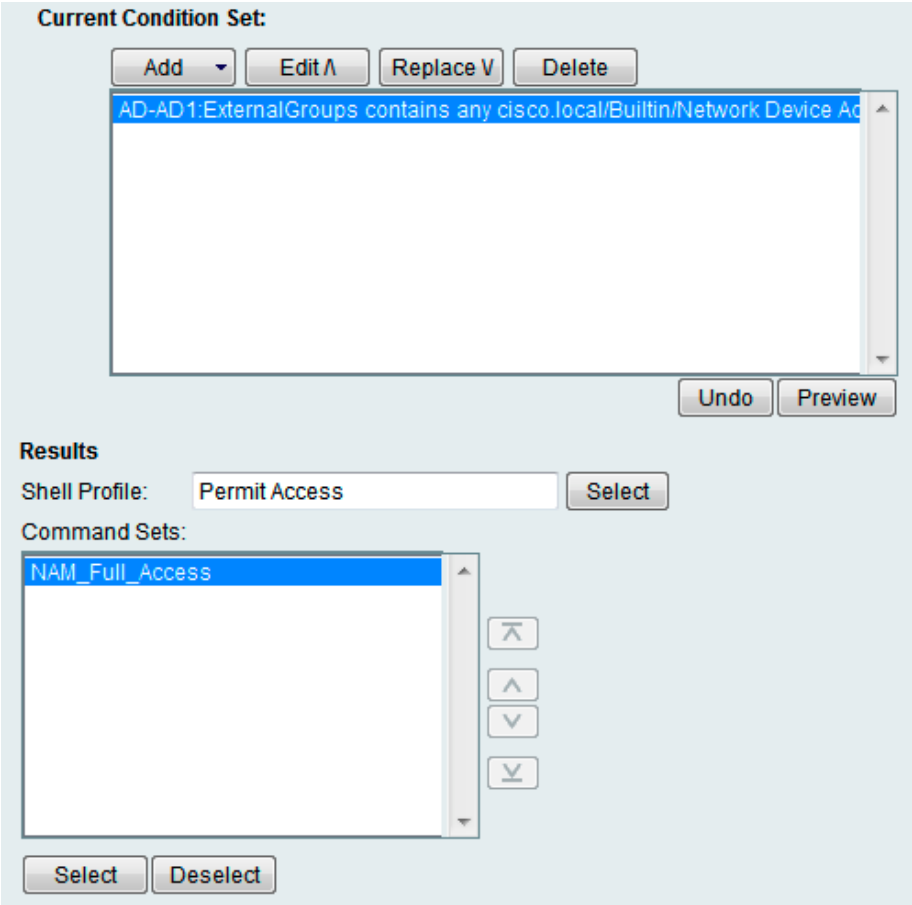
Step 24: Click **Add** to apply the new condition to the Current Condition Set.

Step 25: To the Right of the **Shell Profile** click **Select**. In the resulting window select **Permit Access** and click **OK**.

Step 26: Under the **Command Sets** field click **Select**.

Step 27: In the resulting page select the command set created earlier in Procedure 2, Step 1, NAM_Full_Access. Click **OK**.

Step 28: Click **OK** to save the Access Service Authorization.



Process

Configuring the Cisco Catalyst 6500 Series NAM-3

1. Install Cisco NAM-3
2. Log in to Cisco NAM Traffic Analyzer GUI
3. Verify SNMP
4. Configure NAM for user authentication
5. Verify the managed device parameters
6. Create a SPAN session for capture
7. Set up sites
8. View the home dashboard

Procedure 1 Install Cisco NAM-3

Step 1: In the Cisco Catalyst 6500 switch, insert Cisco NAM into any available slot (except the slot reserved for supervisor modules).

Step 2: Verify Cisco NAM is running.

```
C6509-1#show module
Mod Ports Card Type                              Model
Serial No.
--- ----- ------------------------------------- ----------------
-- -----------
  1   24  CEF720 24 port 1000mb SFP              WS-X6824-SFP
SAL1533MAVH
  2    4  Trifecta NAM Module                    WS-SVC-NAM-3-K9
SAL16063ZHB
  4    8  DCEF2T 8 port 10GE                     WS-X6908-10G
SAL16020LYU
  5    5  Supervisor Engine 2T 10GE w/ CTS (Acti VS-SUP2T-10G
SAL1534NB4Q

Mod MAC addresses                        Hw     Fw           Sw
Status
--- ---------------------------------- ------ ------------ ------
------ -------
  1  0007.7d90.5050 to 0007.7d90.5067   1.0    12.2(18r)S1
15.0(1)SY1   Ok
  2  e8b7.4829.b0d8 to e8b7.4829.b0e7   1.1    12.2(50r)SYL
15.0(1)SY1   Ok
  4  70ca.9bc5.e4f8 to 70ca.9bc5.e4ff   1.1    12.2(50r)SYL
15.0(1)SY1   Ok
  5  44d3.ca7b.c840 to 44d3.ca7b.c847   1.1    12.2(50r)SYS
15.0(1)SY1   Ok

Mod  Sub-Module                  Model              Serial
Hw     Status
---- --------------------------- ------------------ -----------
------- -------
  1  Distributed Forwarding Card WS-F6K-DFC4-A      SAL1534N0K4
1.0    Ok
 2/0 NAM Application Processor   SVC-APP-PROC-1     SAL16063SD2
1.0    Ok
  4  Distributed Forwarding Card WS-F6K-DFC4-E      SAL16010BPL
1.1    Ok
  5  Policy Feature Card 4       VS-F6K-PFC4        SAL1535P6WS
1.0    Ok
  5  CPU Daughterboard           VS-F6K-MSFC5       SAL1537PPAT
1.1    Ok

Base PID:
Mod  Model         Serial No.
---- -----------   ----------
  2 WS-SVC-APP-HW-1    SAL16063ZHB

Mod  Online Diag Status
---- -------------------
  1  Pass
  2  Pass
 2/0 Pass
  4  Pass
  5  Pass
```

Step 3: Configure a management VLAN for Cisco NAM.

```
vlan [id]
 name [VLAN Name]
interface vlan [id]
 description [description]
 ip address [ip-address] [subnet]
 exit
analysis module [slot] management-port 1 access-vlan [id]
end
```

Example:

```
vlan 141
 name NAM
!
interface Vlan141
 description NAM Management
 ip address 10.4.41.1 255.255.255.252
 no shutdown
!
analysis module 2 management-port 1 access-vlan 141
```

Step 4: Open a session into Cisco NAM.

```
session slot [slot] processor 1
```

Step 5: Log in to Cisco NAM using the username root and default password root.

```
Cisco Prime Network Analysis Module
nam.localdomain login: root
Password: root
Cisco Network Analysis Module (WS-SVC-NAM-2) Console, 5.1(2)
Copyright (c) 1999-2011 by Cisco Systems, Inc.
```

Step 6: Change the root password.

```
System Alert! Default password has not been changed!
Please enter a new root user password.
Enter new UNIX password:*******
Enter the new password for the root user.
Retype new UNIX password:*******
passwd: password updated successfully
root@nam.localdomain#
```

Step 7: Configure Cisco NAM for network connectivity:

```
ip address [ip-address] [subnet-mask]
ip gateway [ip-address]
ip domain [domain-name]
ip host [name]
ip nameserver [ip-address]
```

Example:

```
root@nam.localdomain# ip address 10.4.41.2 255.255.255.252
root@nam.localdomain# ip gateway 10.4.41.1
root@nam.localdomain# ip domain cisco.local
root@nam.cisco.local# ip host nam
root@nam.cisco.local# ip nameserver 10.4.48.10
```

Step 8: Verify that the network configuration is as shown.

```
root@nam.cisco.local# show ip
IP ADDRESS:              10.4.41.2
SUBNET MASK:             255.255.255.252
IP BROADCAST:            10.4.41.3
DNS NAME:                NAM.CISCO.LOCAL
DEFAULT GATEWAY:         10.4.48.1
NAMESERVER(S):           10.4.48.10
HTTP SERVER:             DISABLED
HTTP SECURE SERVER:      DISABLED
HTTP PORT:               80
HTTP SECURE PORT:        443
TACACS+ CONFIGURED:      NO
TELNET:                  DISABLED
SSH:                     DISABLED
```

Step 9: Configure Cisco NAM for network time.

```
time
sync ntp [ntp server]
zone [timezone]
exit
```

Step 10: Example:

```
root@NAM.cisco.local# time
Entering into subcommand mode for this command.
Type 'exit' to apply changes and come out of this mode.
Type 'cancel' to discard changes and come out of this mode.
root@NAM.cisco.local(sub-time)# sync ntp 10.4.48.17
root@NAM.cisco.local(sub-time)# zone PST8PDT
root@NAM.cisco.local(sub-time)# exit
```

Step 11: Verify that the network time configuration is as shown.

```
root@NAM.cisco.local# show time
NAM synchronize time to:          NTP
NTP server1:                      10.4.48.17
NAM time zone:                    PST8PDT
Current system time:              Thu Jun 28 16:04:01 PDT
2012
```

Step 12: Enable SSH for direct access to the appliance.

```
root@nam.cisco.local# exsession on ssh
```

Step 13: Enable the Cisco NAM Traffic Analyzer web secure server.

```
root@nam.cisco.local# ip http secure server enable
Enabling HTTP server...
```

Step 14: Enter a web username and password. The default username and password are both **admin**.

```
No web users configured!
Please enter a web administrator username [admin]:admin
New password:*******
Confirm password:*******
User admin added.
```

Step 15: Verify that SSH and HTTPS are enabled as shown.

```
root@nam.cisco.local# show ip
IP ADDRESS:              10.4.41.2
SUBNET MASK:             255.255.255.252
IP BROADCAST:            10.4.41.3
DNS NAME:                NAM.CISCO.LOCAL
DEFAULT GATEWAY:         10.4.48.1
NAMESERVER(S):           10.4.48.10
HTTP SERVER:             DISABLED
HTTP SECURE SERVER:      ENABLED
HTTP PORT:               80
HTTP SECURE PORT:        443
TACACS+ CONFIGURED:      NO
TELNET:                  DISABLED
SSH:                     ENABLED
```

Procedure 2 Log in to Cisco NAM Traffic Analyzer GUI

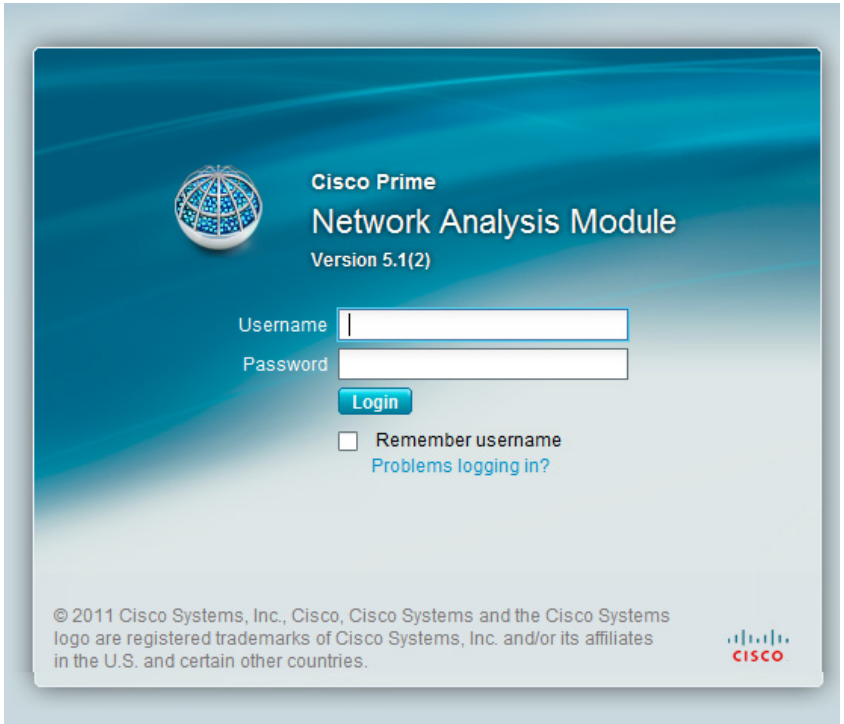
After you have configured the Cisco NAM Traffic Analyzer web server and enabled access to it, you should log in. This verifies that the web server is working.

Step 1: In your browser's address box, enter the full hostname of the Cisco Catalyst 6500 Series NAM-3, such as:

https://machine_name.domain

(Example: nam.cisco.local)

Step 2: When the login window appears, enter the administrator username and password that you configured in Procedure 1, Step 11, and then click **Login**.



Procedure 3 Verify SNMP

Verify that all devices within your network, such as the managed device connected to Cisco NAM, have simple network management protocol (SNMP) configured.

Step 1: If necessary, configure SNMP in order to facilitate communication between the managed device and Cisco NAM. Configure the SNMP read-write community strings on the managed device.

```
snmp-server community cisco RO
snmp-server community cisco123 RW
```

Procedure 4 Configure NAM for user authentication

If you have a centralized TACACS+ server, configure secure user authentication as the primary method for user authentication (login) and user authorization (configuration) by enabling AAA authentication for access control. AAA controls all management access to the Cisco NAM (HTTPS).

Tech Tip

A local web administrator was created on the Cisco NAM during setup. This user account provides the ability to manage the device in case the centralized TACACS+ server is unavailable, or if you do not have a TACACS+ server in your organization.

Step 1: On the NAM Web UI, navigate to **Administration** > **Users** > **TACACS+**.

Step 2: Enter the following values in the TACACS+ configuration page.

- Enable TACACS+ Authentication and Authorization — **Selected**
- Primary TACACS+ Server — 10.4.48.15
- Secret Key — SecretKey
- Verify Secret Key — SecretKey

Step 3: Click **Submit** to apply the configuration to the NAM.

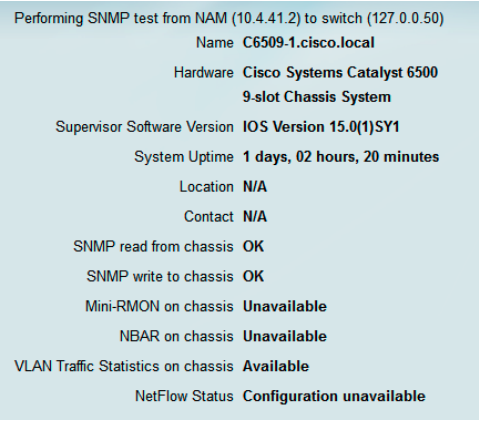
Procedure 5 Verify the managed device parameters

Now you need to verify the managed device parameters in Cisco NAM.

Based on the SNMP configuration of the switch, Cisco NAM-3 will be able to automatically communicate with its host Cisco Catalyst 6500.

Step 1: Navigate to **Setup** > **Managed Device** > **Device Information**.

Step 2: Verify the **SNMP read from chassis** and **SNMP write to chassis** fields show **OK**.



Procedure 6 Create a SPAN session for capture

For providing traffic to Cisco NAM-3 for analysis, a SPAN session is required on the managed device. You can use the Cisco NAM GUI to create a SPAN session.

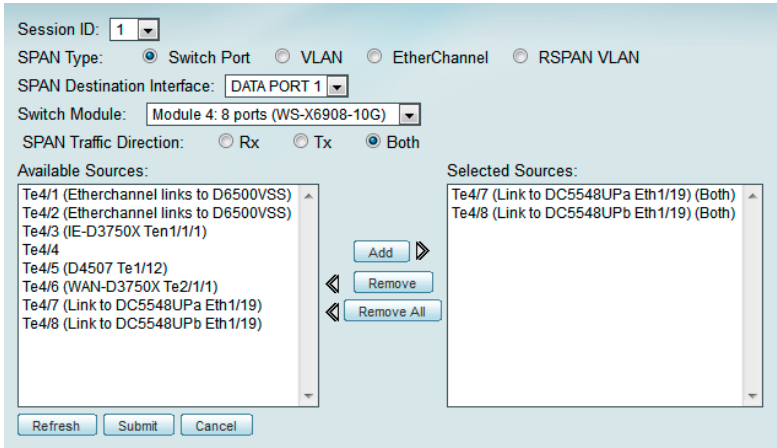
Step 1: Navigate to **Setup** > **Traffic** > **SPAN Sessions**, and then click **Create**.

Step 2: For **SPAN Type**:

- If you want to monitor a physical interface, select **Switch Port**.
- If you want to monitor an EtherChannel interface, select **EtherChannel**.

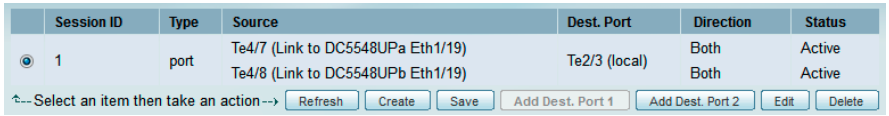
Step 3: Using the **Switch Module** drop down select the module you wish to choose sources from for monitoring. The **Available Sources** list will populate with ports from that module and their relative port descriptions.

Step 4: Move the interfaces you want to monitor from **Available Sources** to **Selected Sources**.



Step 5: Click **Submit**. The SPAN session is created.

Step 6: In the active SPAN session window, click **Save**. This saves the SPAN session currently in the running-configuration to the startup-configuration.

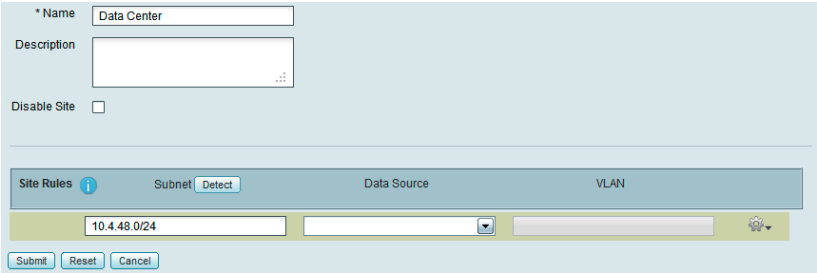


Procedure 7 Set up sites

Setting up sites in Cisco NAM enables site-level monitoring. You create a site for the campus and a site for the data center.

Step 1: Navigate to **Setup** > **Network** > **Sites**, and then click **Create**. The Site Configuration window appears.

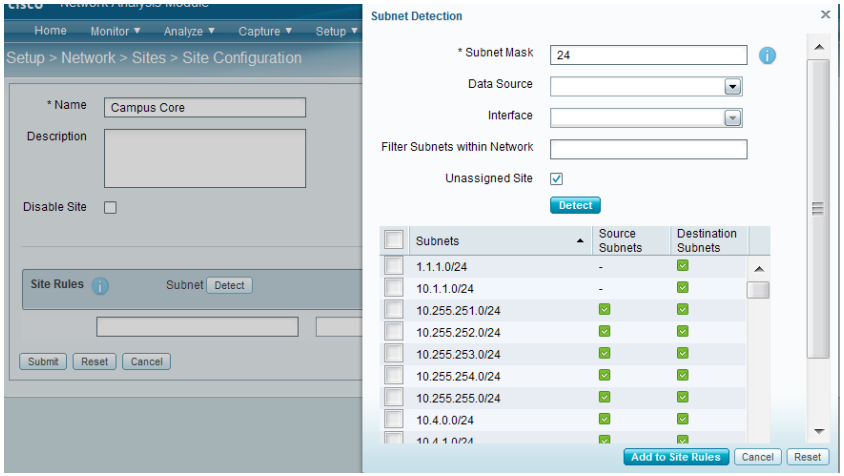
Step 2: Specify the site name and the associated subnet, and then click **Submit**.



Step 3: If you want to display all the subnets available as seen by Cisco NAM, click **Detect**.

Step 4: In the Subnet Detection window, enter the desired value in the Subnet Mask field, and then click **Detect.**

Step 5: Select the appropriate rows, and then click **Add to Site Rules**.



Procedure 8 View the home dashboard

Step 1: After creating sites, in the menu, click **Home**.

The home dashboard links to Monitor > Overview > Traffic Summary. The Traffic Summary Overview dashboard provides information of Top N Applications, Top N Application Groups, Top N Hosts (In and Out), IP Distribution by Bits, Top N DSCP, and Top N VLAN.

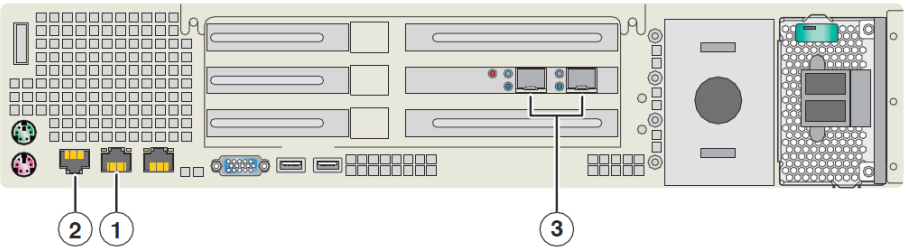
Process

Configuring the Cisco NAM 2220 Appliance

1. Connect the management port
2. Connect a console terminal
3. Connect the monitoring ports
4. Install the Cisco NAM appliance
5. Secure Cisco NAM 2220
6. Log in to Cisco NAM Traffic Analyzer GUI
7. Configure NAM for user authentication
8. Verify SNMP
9. Configure the managed device parameters
10. Create a SPAN session for capture
11. Set up sites
12. View the home dashboard

As illustrated in Figure 3, you set up your Cisco NAM 2220 appliance for connections to a management port (#1), a console terminal (#2), and the monitoring ports (#3).

Figure 3 - Cisco NAM 2220 appliance back panel



Procedure 1 Connect the management port

The Cisco NAM 2220 appliance management port, shown in location #1 in Figure 3, is an RJ-45 10BASE-T/100BASE-TX/1000BASE-T network interface connector.

Step 1: Connect one end of a Cat5E UTP cable to the management port on the appliance.

Step 2: Connect the other end of the cable to a switch in your network.

Procedure 2 Connect a console terminal

The Cisco NAM 2220 appliance console port, shown in location #2 in Figure 3, is an RJ-45 serial (console) connector.

Step 1: Connect a console terminal that is using a PC running terminal-emulation software to the console port on the Cisco NAM 2220 appliance.

Procedure 3 Connect the monitoring ports

The Cisco NAM 2220 appliance monitoring ports are shown in location #3 in Figure 3. Each monitoring port supports a 10 GB long range (LR) or short range (SR) XFP transceiver module.

Step 1: Connect the Cisco NAM 2220 appliance directly to the core switch by running a fiber optical cable from a 10 GB Ethernet port on the remote device to DataPort 1 on the Cisco NAM 2220 appliance.

Tech Tip

The XFP slot on the right of the Cisco NAM 2220 appliance provides input to logical DataPort 1, and the slot on the left provides input to logical DataPort 2.

Procedure 4 Install the Cisco NAM appliance

Step 1: Connect to the console of the appliance and log in using the username root and default password root.

```
Cisco NAM 2220 Appliance (NAM2220)
nam.localdomain login: root
Password: root
Cisco NAM 2220 Appliance (NAM2220) Console, 4.0
Copyright (c) 1999-2008 by Cisco Systems, Inc.
```

Step 2: Change the root password.

```
System Alert! Default password has not been changed!
Please enter a new root user password.
Enter new UNIX password:******
Enter the new password for the root user.
Retype new UNIX password:******
passwd: password updated successfully
root@nam.cisco.local#
```

Step 3: Configure Cisco NAM for network connectivity.

```
ip address [ip-address] [subnet-mask]
ip gateway [ip-address]
ip domain [domain-name]
ip host [name]
ip nameserver [ip-address]
```

Example:

```
root@nam.localdomain# ip address 10.4.41.2 255.255.255.252
root@nam.localdomain# ip gateway 10.4.41.1
root@nam.localdomain# ip domain cisco.local
root@nam.cisco.local# ip host nam
root@nam.cisco.local# ip nameserver 10.4.48.10
```

Step 4: Verify that the network configuration is as follows.

```
root@nam.cisco.local# show ip
IP ADDRESS:              10.4.41.2
SUBNET MASK:             255.255.255.252
IP BROADCAST:            10.4.41.3
DNS NAME:                NAM.CISCO.LOCAL
DEFAULT GATEWAY:         10.4.41.1
NAMESERVER(S):           10.4.48.10
HTTP SERVER:             DISABLED
HTTP SECURE SERVER:      DISABLED
HTTP PORT:               80
HTTP SECURE PORT:        443
TACACS+ CONFIGURED:      NO
TELNET:                  DISABLED
SSH:                     DISABLED
```

Step 5: Configure Cisco NAM for network time.

```
time
sync ntp [ntp server]
zone [timezone]
exit
```

Example:

```
root@NAM.cisco.local# time
Entering into subcommand mode for this command.
Type 'exit' to apply changes and come out of this mode.
Type 'cancel' to discard changes and come out of this mode.
root@NAM.cisco.local(sub-time)# sync ntp 10.4.48.17
root@NAM.cisco.local(sub-time)# zone PST8PDT
root@NAM.cisco.local(sub-time)# exit
```

Step 6: Verify that the network time configuration is as shown.

```
root@NAM.cisco.local# show time
NAM synchronize time to:          NTP
NTP server1:                      10.4.48.17
NAM time zone:                    PST8PDT
Current system time:              Thu Jun 28 16:04:01 PDT
2012
```

Procedure 5 Secure Cisco NAM 2220

To increase security for Cisco NAM, in this section you:

- Enable secure sockets layer (SSL) on the Cisco NAM 2220 appliance for secure, encrypted HTTP sessions.
- Enable secure shell (SSH) protocol for secure Telnet to Cisco NAM.

Step 1: Download the crypto patch from the following location: http://www.cisco.com/cisco/software/navigator.html

Step 2: Navigate to **Network Management and Automation > Network Analysis Module (NAM) Products**, select the appropriate Cisco NAM form-factor, and then navigate to **All Releases > 5 > 5.1.2**.

Step 3: Click **Download Now** on the following file: **nam-app.5-1-2.cryptoK9.patch.1-0.bin**

Step 4: Copy the crypto patch to a directory accessible to FTP.

Step 5: Install the patch.

```
root@nam.cisco.local# patch [ftp-url]
```

where **ftp-url** is the FTP location and the name of the strong crypto patch.

```
root@nam.cisco.local# patch ftp://10.4.48.11/nam-app.5-1-2.
cryptoK9.patch.1-0.bin
Proceeding with installation. Please do not interrupt.
If installation is interrupted, please try again.
Downloading nam-app.5-1-2.cryptoK9.patch.1-0.bin. Please
wait...
ftp://10.4.48.11/nam-app.5-1-2.cryptoK9.patch.1-0.bin (2K)
/usr/local/nam/patch/wor  [#######################]       2K
2248 bytes transferred in 0.01 sec (306.60k/sec)
Verifying nam-app.5-1-2.cryptoK9.patch.1-0.bin. Please wait...
Patch nam-app.5-1-2.cryptoK9.patch.1-0.bin verified.
Applying /usr/local/nam/patch/workdir/nam-app.5-1-2.cryptoK9.
patch.1-0.bin. Please wait...
##################################        (100%)
########################################## [100%]
Patch applied successfully.
```

Step 6: Verify that the patch has been installed successfully.

```
root@nam.cisco.local# show patches
MON SEP 20 13:39:58 2010 PATCH: NAM-APP.STRONG-CRYPTO-
PATCHK9-5.1.2-0 DESCRIPTION: STRONG CRYPTO PATCH FOR NAM.
```

Step 7: Reboot Cisco NAM to the newly installed image.

```
root@nam.cisco.local# reboot
```

Step 8: Enable SSH for direct access to the appliance.

```
root@nam.cisco.local# exsession on ssh
```

Step 9: Enable the Cisco NAM Traffic Analyzer web secure server.

```
root@nam.cisco.local# ip http secure server enable
Enabling HTTP server...
```

Step 10: Enter a web username and password. The default username and password are both **admin**.

```
No web users configured!
Please enter a web administrator username [admin]:admin
New password:******
Confirm password:******
User admin added.
```

Step 11: Verify that SSH and HTTPS are enabled as shown.

```
root@nam.cisco.local# show ip
IP ADDRESS:             10.4.41.2
SUBNET MASK:            255.255.255.252
IP BROADCAST:           10.4.41.3
DNS NAME:               NAM.CISCO.LOCAL
DEFAULT GATEWAY:        10.4.41.1
NAMESERVER(S):          10.4.48.10
HTTP SERVER:            DISABLED
HTTP SECURE SERVER:     ENABLED
HTTP PORT:              80
HTTP SECURE PORT:       443
TACACS+ CONFIGURED:     NO
TELNET:                 DISABLED
SSH:                    ENABLED
```

Procedure 6 Log in to Cisco NAM Traffic Analyzer GUI

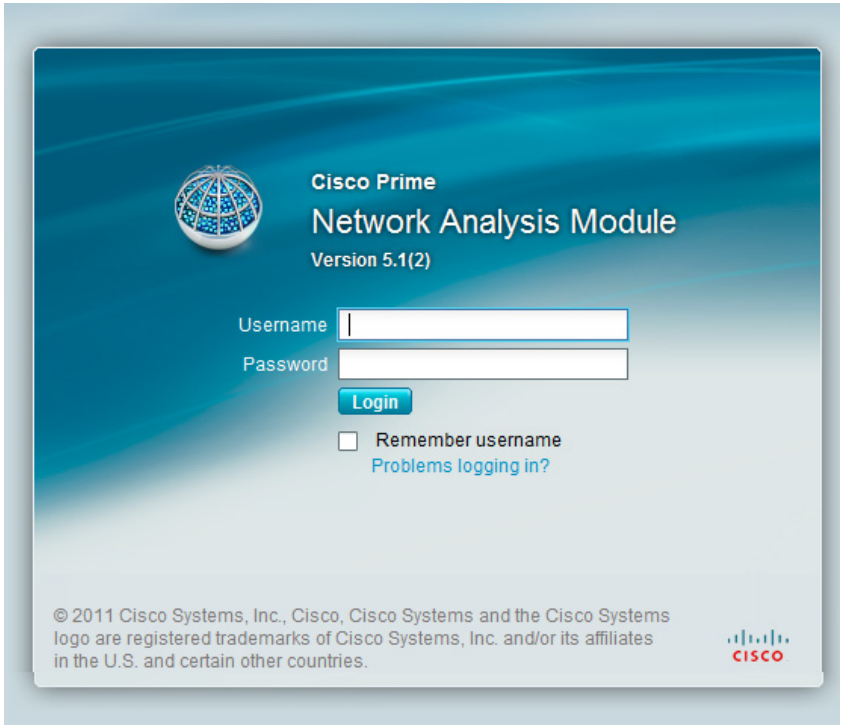
After you have configured the NAM Traffic Analyzer web server and enabled access to it, you should log in. This verifies that the web server is working.

Step 1: In your browser's address box, enter the full hostname of the Cisco NAM 2200 Series appliance, such as:

https://machine_name.domain

(Example: nam.cisco.local)

Step 2: When the login window appears, enter the administrator username and password that you configured in Procedure 5, Step 11 and then click **Login**.



Procedure 7 Configure NAM for user authentication

If you have a centralized TACACS+ server, configure secure user authentication as the primary method for user authentication (login) and user authorization (configuration) by enabling AAA authentication for access control. AAA controls all management access to the Cisco NAM (HTTPS).

Tech Tip

A local web administrator was created on the Cisco NAM during setup. This user account provides the ability to manage the device in case the centralized TACACS+ server is unavailable, or if you do not have a TACACS+ server in your organization.

Step 1: On the NAM Web UI, navigate to **Administration** > **Users** > **TACACS+**.

Step 2: Enter the following values in the TACACS+ configuration page.

- Enable TACACS+ Authentication and Authorization — **Selected**
- Primary TACACS+ Server — 10.4.48.15
- Secret Key — SecretKey
- Verify Secret Key — SecretKey

Step 3: Click **Submit** to apply the configuration to the NAM.

After you connect an output interface of a managed device to the monitoring ports of the Cisco NAM 2220 appliance, you must also configure the managed device to send data to that interface.

Procedure 8 Verify SNMP

Verify that all devices within your network, such as the managed device connected to Cisco NAM, have SNMP configured.

Step 1: If necessary, configure SNMP in order to facilitate communication between the managed device and Cisco NAM. Configure the SNMP read-write community strings on the managed device.

```
snmp-server community cisco RO
snmp-server community cisco123 RW
```

Procedure 9 Configure the managed device parameters

Now you need to configure the managed device parameters in Cisco NAM.

Step 1: Navigate to **Setup** > **Managed Device** > **Device Information**.

Step 2: Enter the managed device IP address. Enter the same IP address that was configured on the managed device. (Example: 10.4.40.252.)

Step 3: Enter the **SNMP v1/v2c RW Community String**. You must enter the same read-write community string (example: cisco123) that was configured on the managed device, otherwise Cisco NAM won't be able to communicate via SNMP with the managed device.

Step 4: In the **Verify String** box, enter the SNMP read-write community string again.

Step 5: After you enter the managed device parameters, click **Test Connectivity.** The Connectivity Test dialog box opens.

Step 6: On the Connectivity Test dialog box, verify that the **SNMP Read from Managed Device** and **SNMP Write from Managed Device** parameters have a status of **OK**, and then click **Close**

Step 7: On the Device Information page, click **Submit**.

Procedure 10 Create a SPAN session for capture

For providing traffic to Cisco NAM 2220 for analysis, a SPAN session is required on the managed device. You can use the Cisco NAM appliance GUI to create a SPAN session.

Tech Tip

Ensure the interface intended to be used as the Remote Destination Port is not shutdown before creating the SPAN session. Using the NAM web interface will only configure the monitoring configuration but it will not bring up the interface if it is down.

Step 1: Navigate to **Setup** > **Traffic** > **SPAN Sessions**, and then click **Create**.

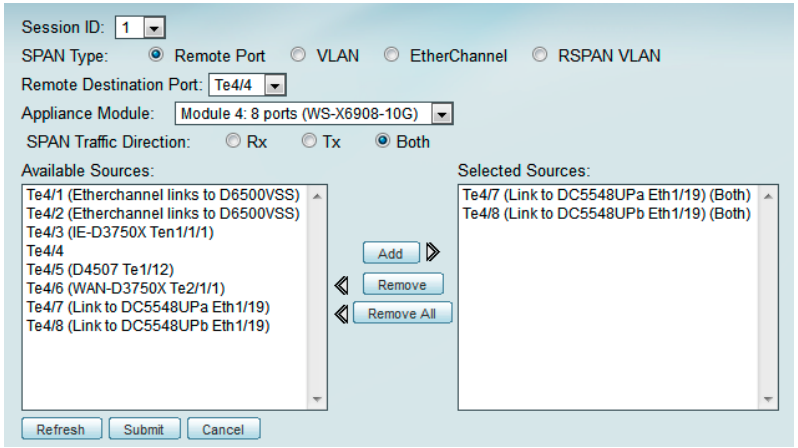
Step 2: For **SPAN Type**:

- If you want to monitor a physical interface, select **Switch Port**.
- If you want to monitor an EtherChannel interface, select **EtherChannel**.

Step 3: Select the **Remote Destination Port** to align with optical 10 GB Ethernet port that was used in Procedure 3, Step 1.

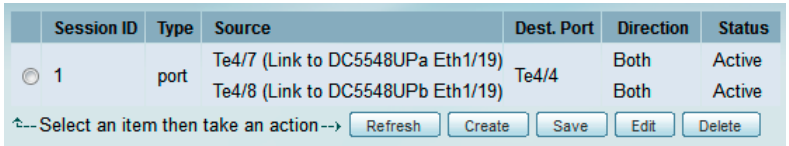
Step 4: Using the **Switch Module** drop down select the module you wish to choose sources from for monitoring. The **Available Sources** list will populate with ports from that module and their relative port descriptions.

Step 5: Move the interfaces you want to monitor from **Available Sources** to **Selected Sources**.



Step 6: Click **Submit**. The SPAN session is created.

Step 7: In the active SPAN session window, click **Save**. This saves the SPAN session currently in the running-configuration to the startup-configuration.



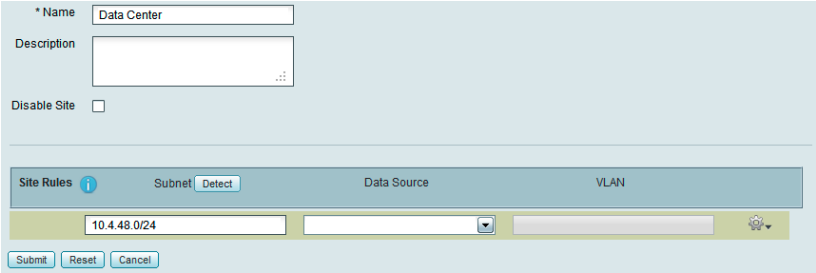
	Session ID	Type	Source	Dest. Port	Direction	Status
	1	port	Te4/7 (Link to DC5548UPa Eth1/19)	Te4/4	Both	Active
			Te4/8 (Link to DC5548UPb Eth1/19)		Both	Active

Procedure 11 Set up sites

Setting up sites in Cisco NAM enables site-level monitoring. You create a site for the campus and a site for the data center.

Step 1: Navigate to **Setup** > **Network** > **Sites**, and then click **Create**. The Site Configuration window appears.

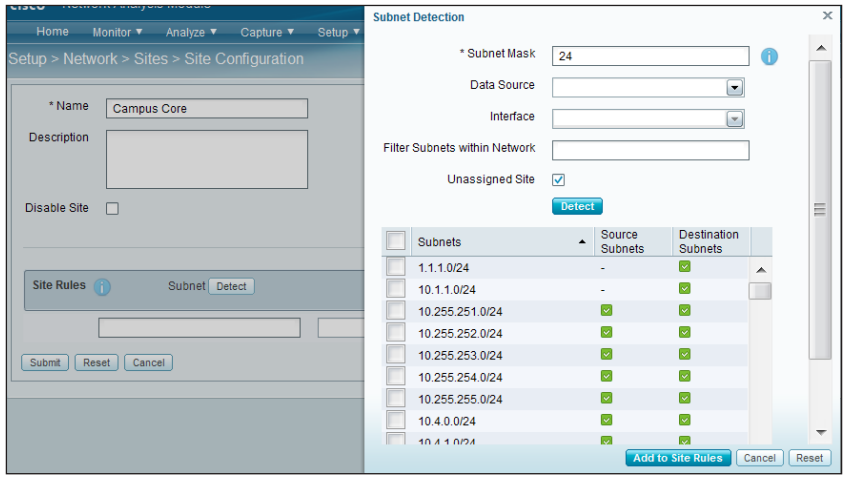
Step 2: Specify the site name and the associated subnet, and then click **Submit**.



Step 3: If you want to display all the subnets available as seen by Cisco NAM, click **Detect**.

Step 4: In the Subnet Detection window, enter the desired value in the Subnet Mask field, and then click **Detect.**

Step 5: Select the appropriate rows, and then click **Add to Site Rules**.



Procedure 12 View the home dashboard

Step 1: After creating sites, in the menu, click **Home**.

The home dashboard links to Monitor > Overview > Traffic Summary. The Traffic Summary Overview dashboard provides information of Top N Applications, Top N Application Groups, Top N Hosts (In and Out), IP Distribution by Bits, Top N DSCP and Top N VLAN.

Process

Configuring Cisco Prime NAM on Cisco ISR G2 SRE

1. Install Cisco Prime NAM on SRE
2. Secure Cisco Prime NAM on SRE
3. Log in to Cisco NAM Traffic Analyzer GUI
4. Configure NAM for user authentication
5. Enable Cisco NAM packet monitoring
6. Set up sites
7. View the home dashboard

Requirements:

- Cisco Integrated Services Router (ISR) 2911, 2921, 2951, 3925 or 3945.
- Open slot for either Service Ready Engine (SRE) 710, or 910 module.
- IOS release 15.1(4)M or later.
- Cisco Prime NAM software 5.1(2) for SRE, downloaded from the Cisco website to a local FTP server.

Procedure 1 Install Cisco Prime NAM on SRE

Step 1: Download the Cisco Prime NAM 5.1(2) software from the following location: http://www.cisco.com/cisco/software/navigator.html

Step 2: Navigate to **Network Management and Automation** > **Network Analysis Module (NAM) Products**, select the appropriate NAM form-factor, and then navigate to **All Releases** > **5** > **5.1.2**.

Step 3: Click **Download Now** on the following file: **nam-app-x86_64.5-1-2.bin.gz.zip**

Step 4: Copy the downloaded image to a local FTP server and unzip the contents into a folder.

Step 5: Log in to Cisco ISR G2 and configure the SRE interface for router-side (internal) and module-side (Cisco NAM management) connectivity.

```
interface sm [slot]/0
ip address [router-side-ip-address] [subnet-mask]
service-module [ip address module-side-ip-address] [subnet-mask]
service-module ip default-gateway [gateway-ip-address]
no shutdown
```

Example:

```
interface sm 4/0
 ip address 10.5.0.17 255.255.255.252
 service-module ip address 10.5.0.18 255.255.255.252
 service-module ip default-gateway 10.5.0.17
 no shutdown
```

Step 6: Verify interface configuration via show run.

The following example shows the configuration of the internal interface between Cisco SM-SRE and the router.

```
Router# show running-config interface SM4/0
interface SM4/0
 ip address 10.5.0.17 255.255.255.0
 service-module fail-open
 service-module ip address 10.5.0.18 255.255.255.252
 service-module ip default-gateway 10.5.0.17
```

Next, if AAA has been enabled on the router, configure an AAA exemption for SRE devices.

Configuring an exemption on the router is required because when AAA is enabled on the router, you will be prompted for both a router login and a Cisco NAM login; which can be confusing. Disabling the initial router authentication requires you to create an AAA method, which you then apply to the specific line configuration on the router associated with the SRE.

Step 7: Create the AAA login method.

```
aaa authentication login MODULE none
```

Step 8: Determine which line number is assigned to SRE. The example output below shows line 67.

```
RS200-3925-1# show run | begin line con 0
line con 0
 logging synchronous
line aux 0
line 67
 no activation-character
 no exec
 transport preferred none
 transport input all
 transport output pad telnet rlogin lapb-ta mop udptn v120 ssh
 stopbits 1
 flowcontrol software
line vty 0 4
 transport preferred none
 transport input ssh
```

Step 9: Restrict access to the SRE console by creating an access-list. The access-list number is arbitrary, but the IP address must match the address assigned to the SM interface in the Step 5.

```
access-list 67 permit 10.5.0.17
```

Step 10: Assign the method to the appropriate line.

```
line 67
 login authentication MODULE
 access-class 67 in
 transport output none
```

Step 11: Install Cisco Prime NAM on a SRE. This command will take about 15 or 20 minutes to complete.

```
service-module sm [slot]/0 install url [url]
```

Example:

```
Router# service-module sm 4/0 install url ftp://10.4.48.11/
NAM/nam-app-x86_64.5-1-2.bin.gz
```

Step 12: Open a session into Cisco NAM:

```
service-module SM [slot]/0 session
```

Step 13: Log in to Cisco NAM using the username root and default password root.

```
RS200-3945-1# service-module SM 4/0 session

Cisco Prime Network Analysis Module
nam.localdomain login: root
Password:

Cisco SM-SRE Network Analysis Module (SM-SRE-910-K9) Console,
5.1(2)
Copyright (c) 1999-2011 by Cisco Systems, Inc.
```

Step 14: Change the root password.

```
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'
root@nam.localdomain#
```

Step 15: Configure NAM for network connectivity.

```
ip domain [domain-name]
ip host [name]
ip nameserver [ip-address]
```

Example:

```
root@nam.localdomain# ip domain cisco.local
root@nam.cisco.local# ip host nam
root@nam.cisco.local# ip nameserver 10.4.48.10
```

Step 16: Verify the network configuration is as follows:

```
root@nam.cisco.local# show ip
IP ADDRESS:              10.5.0.18
SUBNET MASK:             255.255.255.252
IP BROADCAST:            10.5.0.19
DNS NAME:                NAM.CISCO.LOCAL
DEFAULT GATEWAY:         10.5.0.17
NAMESERVER(S):           10.4.48.10
HTTP SERVER:             DISABLED
HTTP SECURE SERVER:      DISABLED
HTTP PORT:               80
HTTP SECURE PORT:        443
TACACS+ CONFIGURED:      NO
TELNET:                  DISABLED
SSH:                     DISABLED
```

Step 17: Configure Cisco NAM for network time.

```
time
sync ntp [ntp server]
zone [timezone]
exit
```

Example:

```
root@NAM.cisco.local# time
Entering into subcommand mode for this command.
Type 'exit' to apply changes and come out of this mode.
Type 'cancel' to discard changes and come out of this mode.
root@NAM.cisco.local(sub-time)# sync ntp 10.4.48.17
root@NAM.cisco.local(sub-time)# zone PST8PDT
root@NAM.cisco.local(sub-time)# exit
```

Step 18: Verify that the network time configuration is as shown.

```
root@NAM.cisco.local# show time
NAM synchronize time to:          NTP
NTP server1:                      10.4.48.17
NAM time zone:                    PST8PDT
Current system time:              Thu Jun 28 16:04:01 PDT
2012
```

Procedure 2 Secure Cisco Prime NAM on SRE

To increase security for Cisco NAM, in this section you:

- Enable secure sockets layer (SSL) on the NAM for secure, encrypted HTTP sessions.
- Enable secure shell (SSH) protocol for secure Telnet to NAM.

Step 1: Enable SSH for direct access to Cisco Prime NAM on SRE.

```
root@nam.cisco.local# exsession on ssh
```

Step 2: Enable the Cisco NAM traffic analyzer web secure server.

```
root@nam.cisco.local# ip http secure server enable
Enabling HTTP server...
```

Step 3: Enter a web username and password. The default username and password are both **admin**.

```
No web users configured!
Please enter a web administrator username [admin]:admin
New password:*******
Confirm password:*******
User admin added.
```

Step 4: Verify that SSH and HTTPS are enabled as shown.

```
root@nam.cisco.local# show ip
IP ADDRESS:              10.5.0.18
SUBNET MASK:             255.255.255.252
IP BROADCAST:            10.5.0.19
DNS NAME:                NAM.CISCO.LOCAL
DEFAULT GATEWAY:         10.5.0.17
NAMESERVER(S):           10.4.48.10
HTTP SERVER:             DISABLED
HTTP SECURE SERVER:      ENABLED
HTTP PORT:               80
HTTP SECURE PORT:        443
TACACS+ CONFIGURED:      NO
TELNET:                  DISABLED
SSH:                     ENABLED
```

Procedure 3 Log in to Cisco NAM Traffic Analyzer GUI

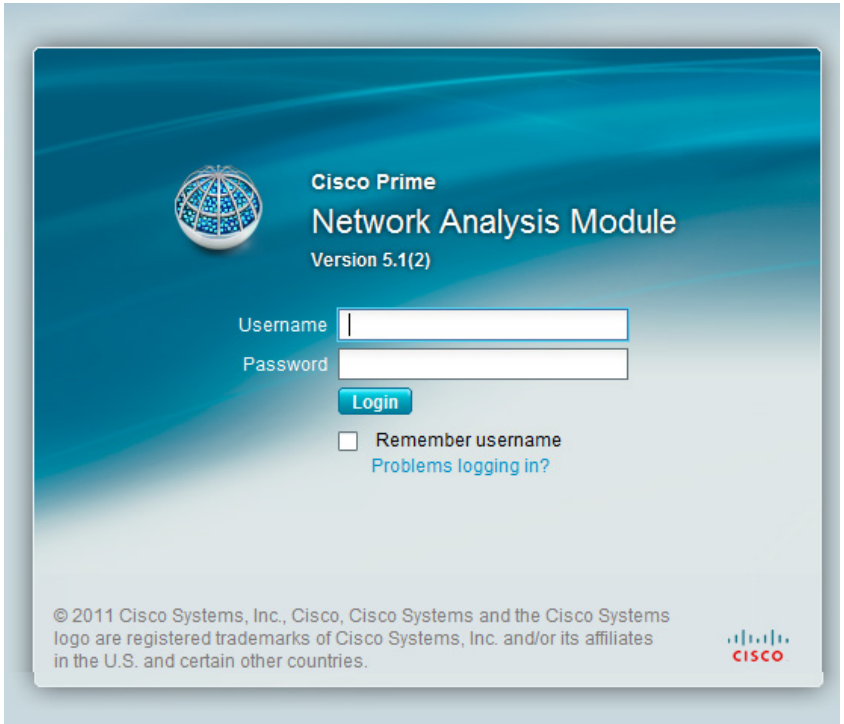
After you have configured the Cisco NAM Traffic Analyzer web server and enabled access to it, you should log in. This verifies that the web server is working.

Step 1: In your browser's address box, enter the full hostname of Cisco Prime NAM, such as:

https://machine_name.domain

(Example: nam.cisco.local)

Step 2: When the login window appears, enter the administrator username and password that you configured in Procedure 2, Step 3 and then click **Login**.



Procedure 4 Configure NAM for user authentication

If you have a centralized TACACS+ server, configure secure user authentication as the primary method for user authentication (login) and user authorization (configuration) by enabling AAA authentication for access control. AAA controls all management access to the Cisco NAM (HTTPS).

Tech Tip

A local web administrator was created on the Cisco NAM during setup. This user account provides the ability to manage the device in case the centralized TACACS+ server is unavailable, or if you do not have a TACACS+ server in your organization.

Step 1: On the NAM Web UI, navigate to **Administration** > **Users** > **TACACS+**.

Step 2: Enter the following values in the TACACS+ configuration page.

- Enable TACACS+ Authentication and Authorization — **Selected**
- Primary TACACS+ Server — 10.4.48.15
- Secret Key — SecretKey
- Verify Secret Key — SecretKey

Step 3: Click **Submit** to apply the configuration to the NAM.

Procedure 5 Enable Cisco NAM packet monitoring

You can enable Cisco NAM packet monitoring on router interfaces that you want to monitor through the internal Cisco NAM interface.

Step 1: Enable Cisco NAM packet monitoring on the routers LAN interface. Cisco Express Forwarding sends an extra copy of each IP packet that is received from or sent out on that interface to the Cisco NAM through the SRE interface on the router and the internal Cisco NAM interface.

```
ip cef
interface type [slot/port]
 analysis-module monitoring
```

Example:

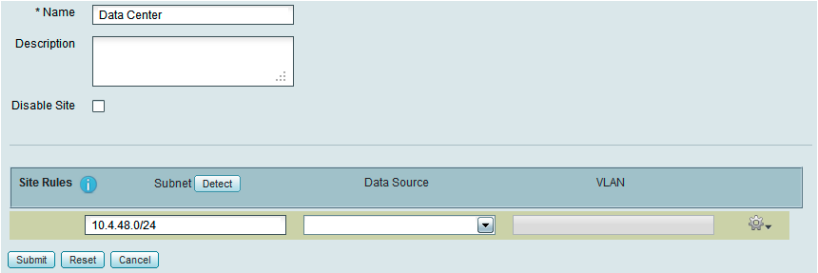
```
ip cef
!
interface GigabitEthernet 0/0
 analysis-module monitoring
```

Procedure 6 Set up sites

Setting up sites in Cisco NAM enables site-level monitoring. You create a site for the campus and a site for the data center.

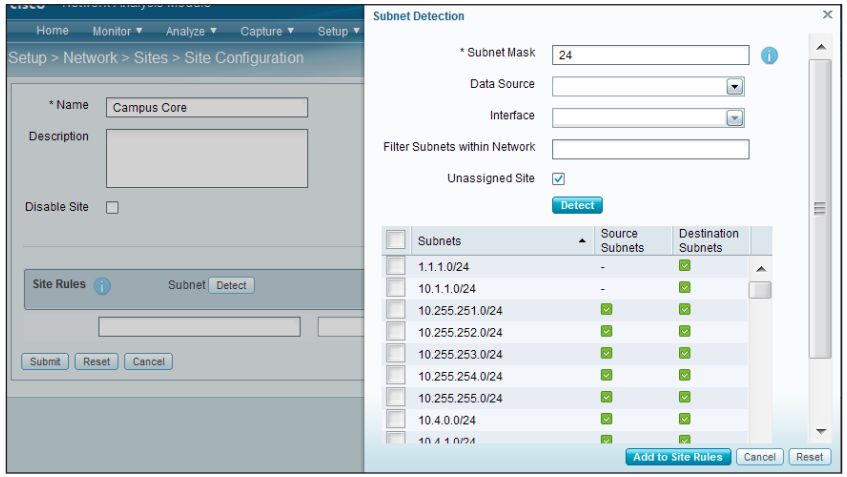
Step 1: Navigate to **Setup** > **Network** > **Sites**, and then click **Create**. The Site Configuration window appears.

Step 2: Specify the site name and the associated subnet, and then click **Submit**.



Step 3: If you want to display all the subnets available as seen by Cisco NAM, click **Detect**.

Step 4: In the Subnet Detection window, enter the desired value in the Subnet Mask field, and then click **Detect.** Select the appropriate rows, and then click **Add to Site Rules**.



Procedure 7 View the home dashboard

Step 1: After creating sites, in the menu, click **Home**.

The home dashboard links to Monitor > Overview > Traffic Summary. The Traffic Summary Overview dashboard provides information of Top N Applications, Top N Application Groups, Top N Hosts (In and Out), IP Distribution by Bits, Top N DSCP and Top N VLAN.

Notes

Day 1+ Scenarios

This section walks you through two common analysis scenarios; troubleshooting poor application performance and troubleshooting poor voice quality.

Process

Troubleshooting Application Performance

1. Monitor SharePoint response time
2. Drill-down SharePoint response time
3. Analyze SharePoint response time trend
4. Analyze network vs. server congestion
5. Analyze SharePoint server
6. Set up packet capture session
7. Set up Cisco NAM alarm email
8. Set alarm actions
9. Set alarm thresholds
10. View alarm summary
11. Decode triggered packet capture
12. Scan for packet capture errors

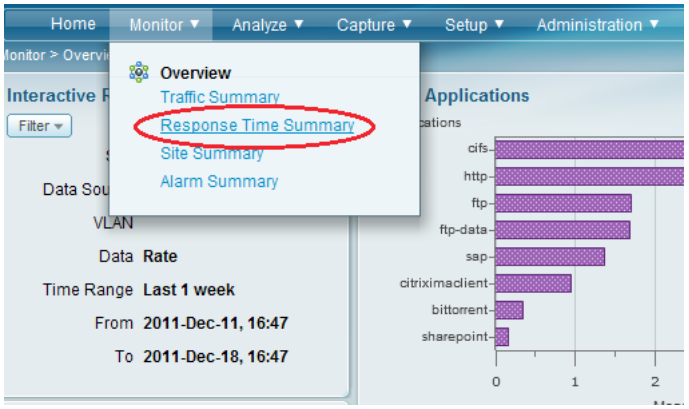
In this scenario, you are an IT network manager. You have currently deployed the Cisco Catalyst 6500 Series NAM-3 or Cisco NAM 2220 appliance in the campus and have configured a data center site.

Users have complained about intermittent SharePoint access delays in the last week. You are not sure where the SharePoint performance degradation occurred or why, so you undertake the following procedures.

Procedure 1 Monitor SharePoint response time

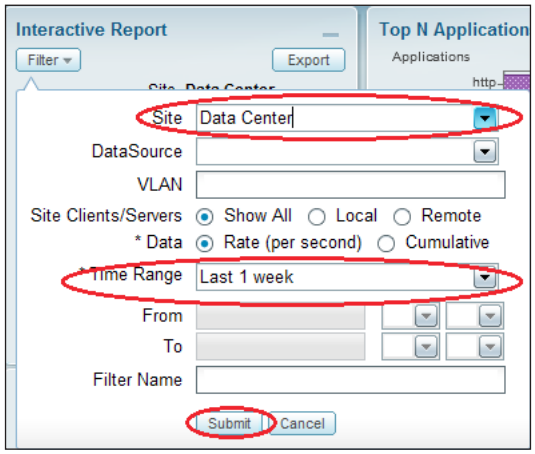
Because all application servers are hosted in the data center, and clients in the campus core are experiencing delays, you obtain an overview of application performance in the Response Time Summary dashboard.

Step 1: Navigate to **Monitor** > **Overview** > **Response Time Summary**.



Step 2: In the Interactive Report pane on the left, select **Filter.**

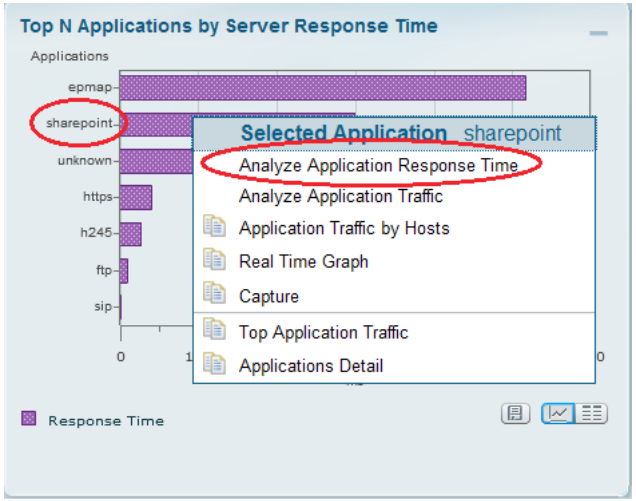
Step 3: In the **Site** list, choose **Data Center**, and in the **Time Range** list, choose **Last 1 week**, and then click **Submit**. You can now view application performance at the campus to the data center.



Procedure 2 Drill-down SharePoint response time

Noticing SharePoint's response time degradation (in the Top N Application by Server Response Time report), you drill down to analyze SharePoint.

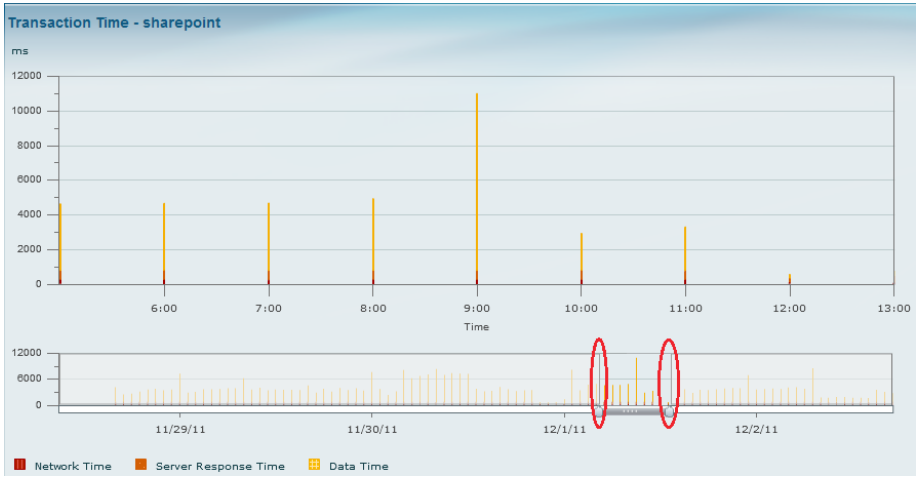
Step 1: In the Top N Applications by Server Response Time report, click **SharePoint**, and then choose **Analyze Application Response Time**.



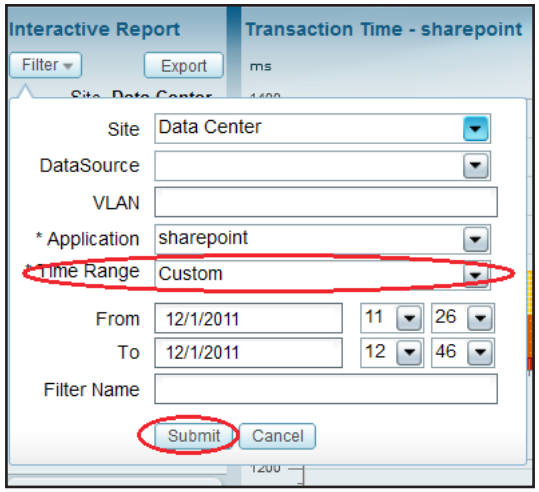
Procedure 3 Analyze SharePoint response time trend

In the SharePoint response time trend analysis, you observe a spike in overall response time. You zoom in to the time interval and note the clients that were affected, as well as a list of affected servers.

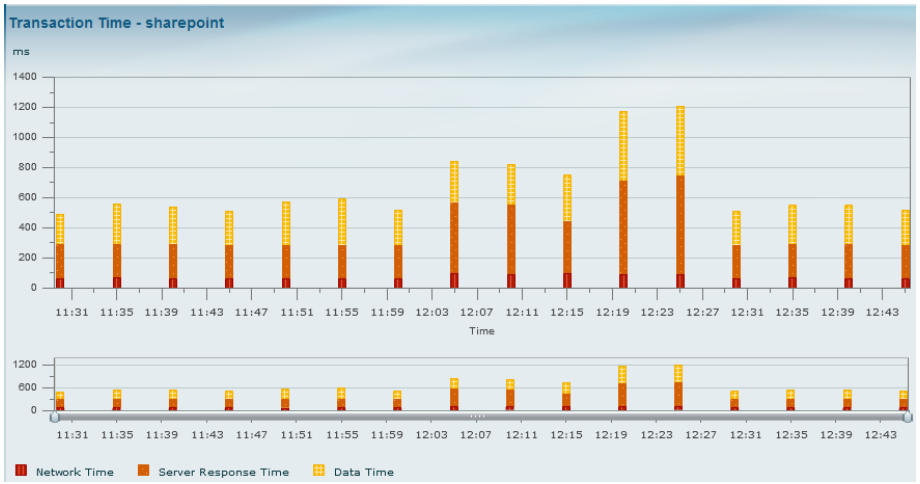
Step 1: In the **Analyze** > **Response Time** > **Application** dashboard, zoom to a spike in SharePoint response time by moving the left slider to a start point of the time-interval of interest and the right slider to the end point of the interval of interest.



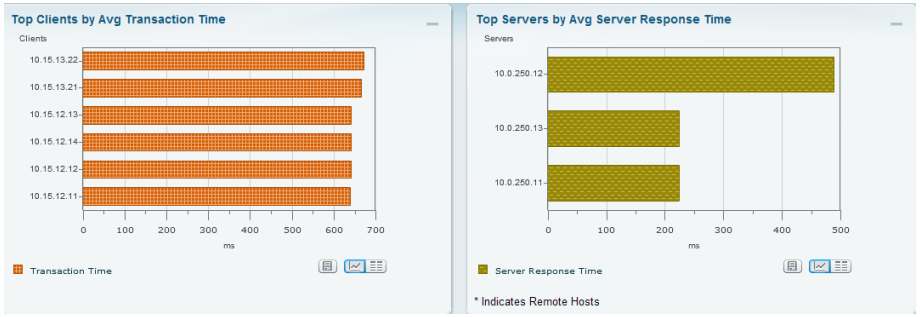
Step 2: Obtain more granular detail by clicking **Filter**, and in the **Time Range** list, choosing **Custom**. Specify a time range from 12/1/2011 at 11:26 to 12/1/2011 at 12:46, as shown, and then click **Submit**.



The transaction time for application SharePoint appears.



Step 3: Scroll down to view top clients and servers that were affected by poor SharePoint response time during this interval.



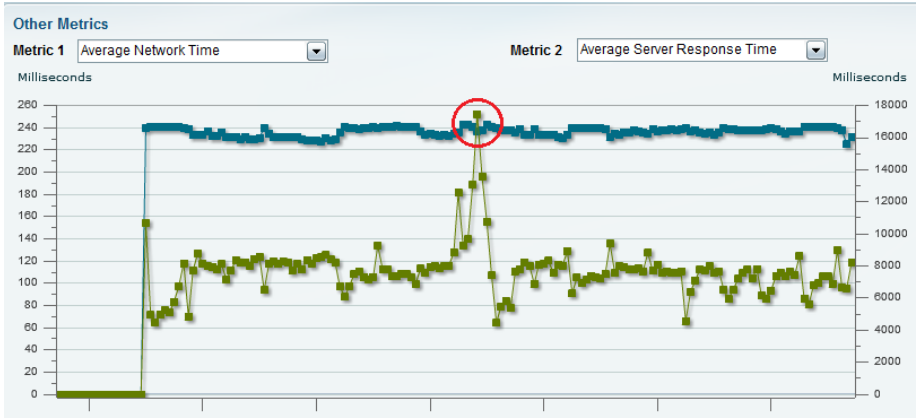
Procedure 4 Analyze network vs. server congestion

To determine if the cause is from a network congestion issue or a server issue, you analyze the network time and the application transaction time. Since the network time is constant (no network delay), you have determined the root cause is an application delay from an overloaded server.

Next you determine if the root cause is from a network delay or server delay.

Step 1: On the Transaction Time report page, scroll down further to the **Other Metrics** chart.

Step 2: In the **Metric 1** list, choose **Average Network Time**, which represents network delay. In the **Metric 2** list, choose **Average Server Response Time**, which represents server application delay.



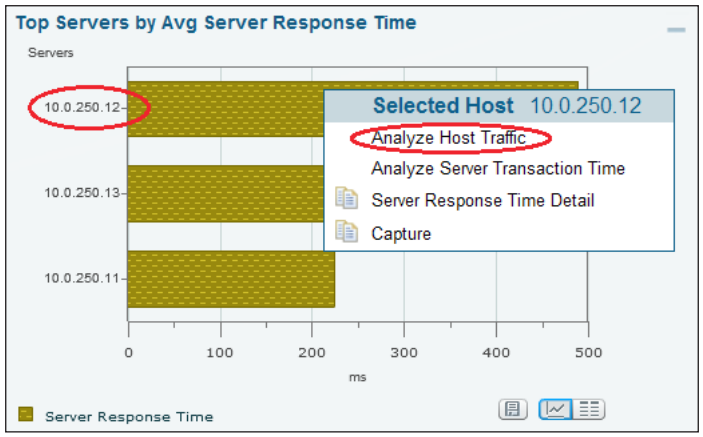
Step 3: Examine the resulting data. Based on the spike in the green line (average server response time) and the consistency of the blue line (average network time), you infer the issue stems from a delay from the application server.

Procedure 5 Analyze SharePoint server

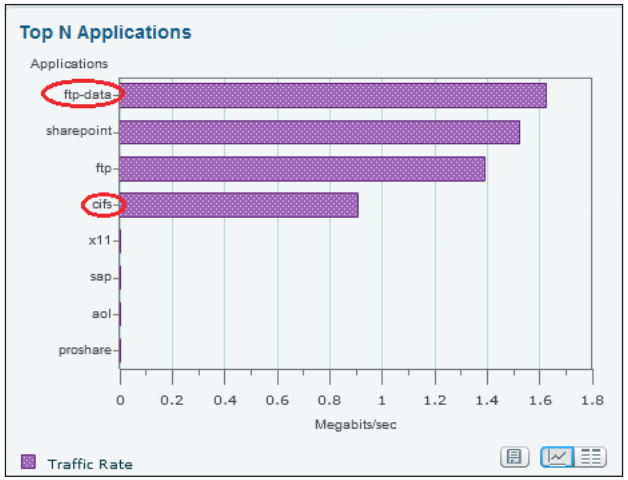
Because you can infer that the issue stems from a delay on the application server, look at applications other than SharePoint that might be causing the delay.

Step 1: Scroll back up and view the Top Servers by Avg Server Response Time chart.

Step 2: Further analyze this server by clicking **10.0.250.12**, and then clicking **Analyze Host Traffic**.



Step 3: From the 10.0.250.12 analysis dashboard, scroll down to view applications running on this server in **Top N Applications**. You notice that in addition to the business-critical application on this server, SharePoint, FTP and CIFS are also running. You realize that many users are downloading the latest Windows 7 patch hosted on this server, which affected SharePoint as well.



Step 4: Take corrective action by ensuring that existing and future Windows patches are hosted on a different server.

Procedure 6 Set up packet capture session

To take a proactive approach moving forward, you create alarms to alert you via email and trigger a packet-capture based on SharePoint response-time normal-trend values.

Step 1: Navigate to **Capture** > **Packet Capture/Decode** > **Sessions**, and then click **Create**. The Capture Settings window appears.

Step 2: In the **Name** box, type SharePoint_Capture.

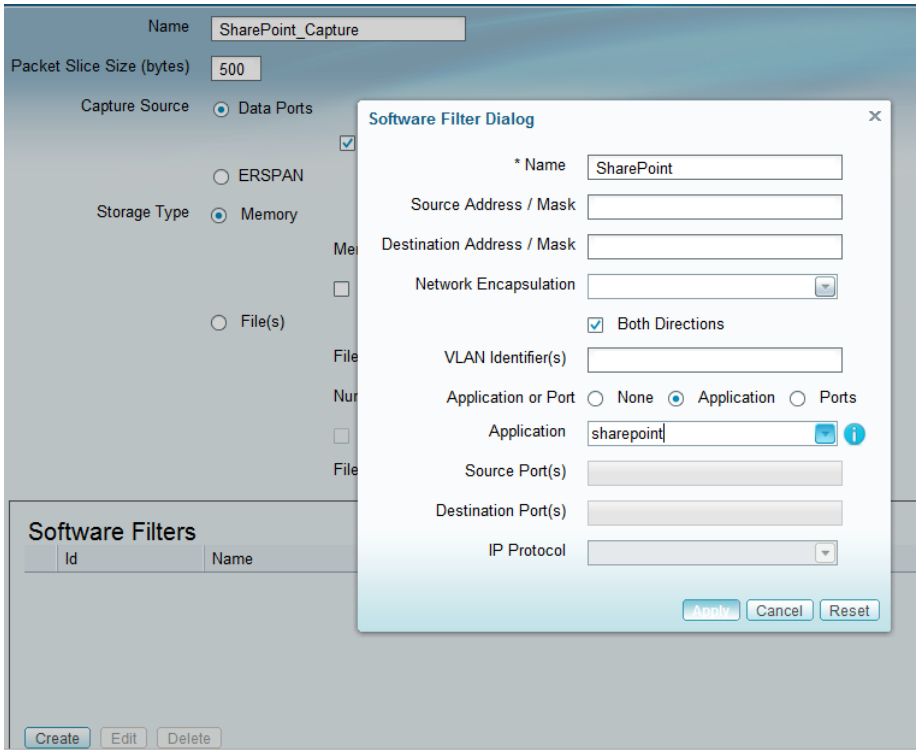
Step 3: Under **Capture Source**, choose **DATA PORTs**. Leave the **Packet Slice Size** at 500 bytes (the default), to limit the size of the capture packets.

Step 4: Under **Storage Type**, choose **Memory,** and then in the **Memory Size** field, enter **100**.

Step 5: In the **Software Filters** pane, click **Create.** The Software Filter dialog box appears.

Step 6: Enter the following values:

- Name—SharePoint
- Both Directions—selected
- Application or Port—Application
- Application—sharepoint



Step 7: Click **Apply**, and then click **Submit.** The capture session is created.

Procedure 7 Set up Cisco NAM alarm email

Step 1: Navigate to **Administration** > **System** > **E-Mail Setting**, and then choose **Enable Mail**.

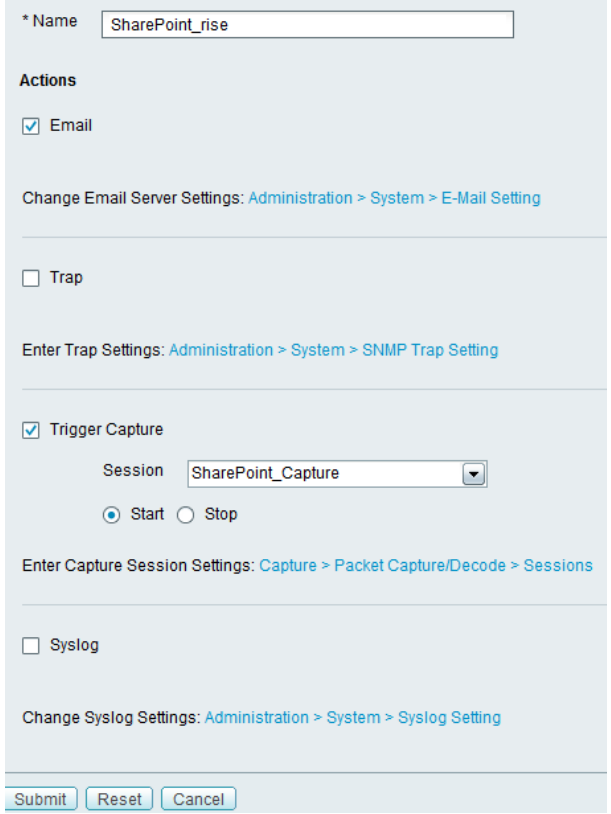
Step 2: Enter the hostname of the **External Mail Server**.

Step 3: In the **Mail Alarm to** field, enter one or more email addresses that will receive the Cisco NAM alarm mail. Use a space to separate multiple email addresses.

Step 4: Click **Submit**.

Procedure 8 Set alarm actions

Step 1: Navigate to **Setup** > **Alarms** > **Actions** and click **Create**.



Step 2: Enter a description of the alarm event. (Example: SharePoint_rise.)

Step 3: Under **Actions**, select **Email**. When threshold on the rising value is violated, an email alert will be sent to the email you specified in Procedure 7.

Step 4: Select **Trigger Capture**, and then under **Session**, choose **SharePoint_Capture** (configured in Procedure 6) and select **Start**. This starts a packet capture when the threshold on the rising value is violated.

Step 5: Click **Submit**.

The Alarm Events table displays the newly configured Alarm Event in its list.

Step 6: To create a second event for the falling edge alarm action, repeat steps 1-5 with the following changes.

- Name—SharePoint_fall
- Trigger Capture—Stop

Procedure 9 Set alarm thresholds

Step 1: Navigate to **Setup** > **Alarms** > **Thresholds**. The Alarm Events table displays any configured Alarm Events.

Step 2: Click **Create**, and then click the **Response Time** tab.

Step 3: Enter a name for the response time threshold. Example: SharePoint_ResponseTime.

Step 4: In the **Application** list, choose **sharepoint**.

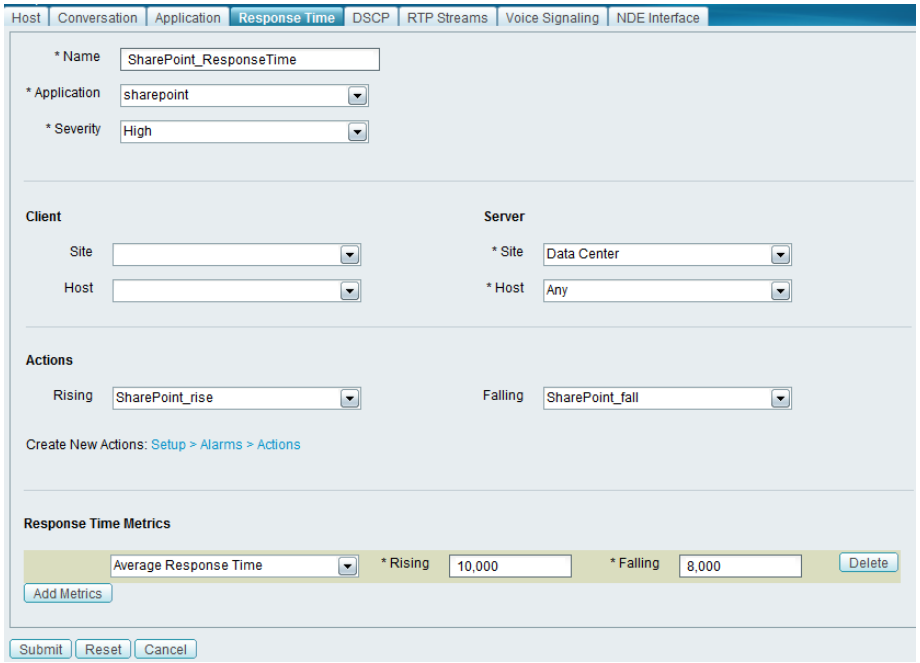
Step 5: Under **Server**, choose the **Site** as **Data Center** and the **Host** as **Any** (because there is more than one server in the data center hosting SharePoint).

Step 6: Under **Actions**, choose the alarm actions you created in Procedure 8 for the rising edge of the threshold and the falling edge of the threshold. In this example, SharePoint_rise is associated with the rising action and SharePoint_fall is associated with the falling action.

Step 7: Under **Response Time Metrics**, choose **Average Response Time** and set the **Rising** value to **10,000** milliseconds and **Falling** value to **8,000** milliseconds.

Tech Tip

You can add more metrics for this threshold by clicking **Add Metrics**.



Step 8: Click **Submit**.

Procedure 10 View alarm summary

When you receive an email alert that SharePoint response time has exceeded your configured threshold, you can use the Cisco NAM dashboard to learn more details of the alarm, as well as analyze the triggered packet capture. To help reduce time and effort in analyzing the packet capture, invoke Error Scan to quickly view just the packets with anomalies.

Step 1: Navigate to **Monitor** > **Overview** > **Alarm Summary** and view the Top N Applications by Alarm Count chart.

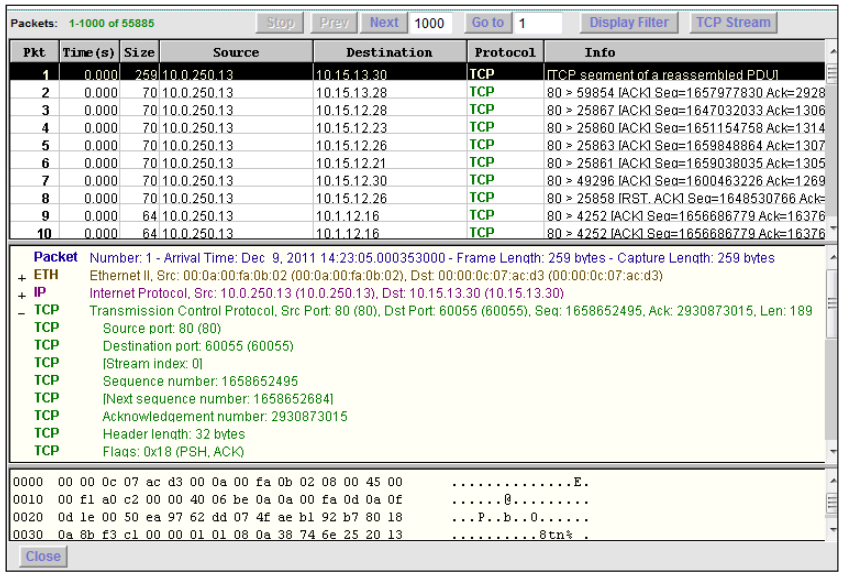
Step 2: Identify the SharePoint application.

Step 3: Click **SharePoint**, and then click **All Alarms**. Additional details appear.

Procedure 11 Decode triggered packet capture

Step 1: Navigate to **Capture** > **Packet Capture/Decode** > **Sessions**, and then select the **SharePoint_Capture** (configured in Procedure 6) that was triggered when the SharePoint threshold was violated.

Step 2: Click **Decode**. A dialog box showing packet decode appears.



Procedure 12 Scan for packet capture errors

Step 1: Navigate to **Capture** > **Packet Capture/Decode** > **Sessions**, and then select **SharePoint_Capture**.

Step 2: If the capture is in progress, click **Stop**.

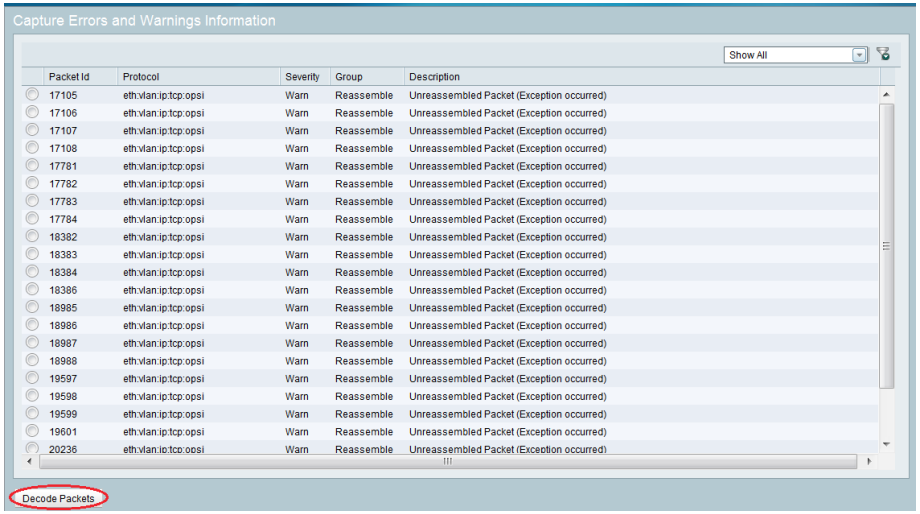
Step 3: Click **Save To File**.

Step 4: On the Save File dialog box, provide a **New File Name**, and then click **OK.**

Step 5: Navigate to **Capture** > **Packet Capture/Decode** > **Files**, and then select **SharePoint_Capture.pcap**.

Step 6: Click **Errors Scan.** The Capture Errors and Warnings Information dialog box opens.

Step 7: On the Capture Errors and Warnings Information dialog box, select a packet with an anomaly, and then click **Decode Packets**. You can further analyze the packet and continue troubleshooting.



Process

Analyzing and Troubleshooting Voice

1. Enable voice and RTP monitoring
2. Analyze RTP streams
3. View regional office traffic use

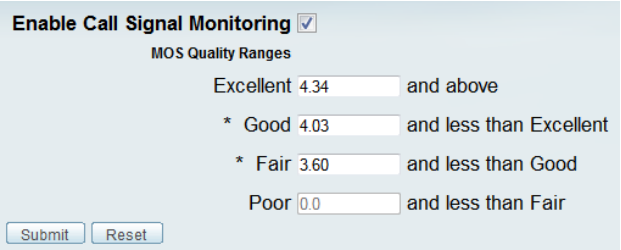
In this scenario, you are an IT network manager. You currently have deployed Cisco Prime NAM on Cisco ISR G2 SRE 710 in the Singapore regional office and have configured a regional office site and a campus site.

To resolve a scenario in which a couple of users have opened a trouble ticket that describes their recent experience of choppy audio during a call, follow the procedures below.

Procedure 1 Enable voice and RTP monitoring

Step 1: Navigate to **Setup** > **Monitoring** > **Voice**.

Step 2: Ensure that **Enable Call Signal Monitoring** is selected and that you are satisfied with the default MOS values.



Step 3: Navigate to **Setup** > **Monitoring** > **RTP Filter** and ensure that **Enable RTP Stream Monitoring** is selected.

Procedure 2 Analyze RTP streams

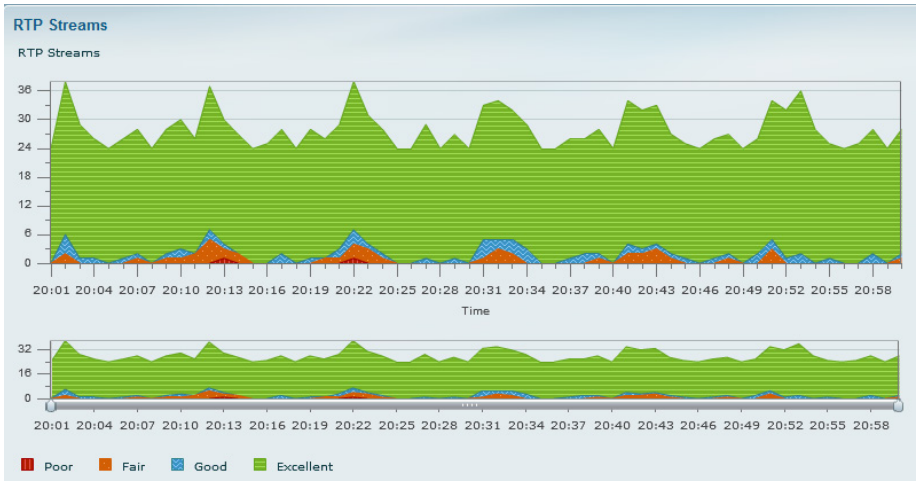
Step 1: Navigate to **Analyze** > **Media** > **RTP Streams**.

Step 2: In the Interactive Report pane on the left, click **Filter**.

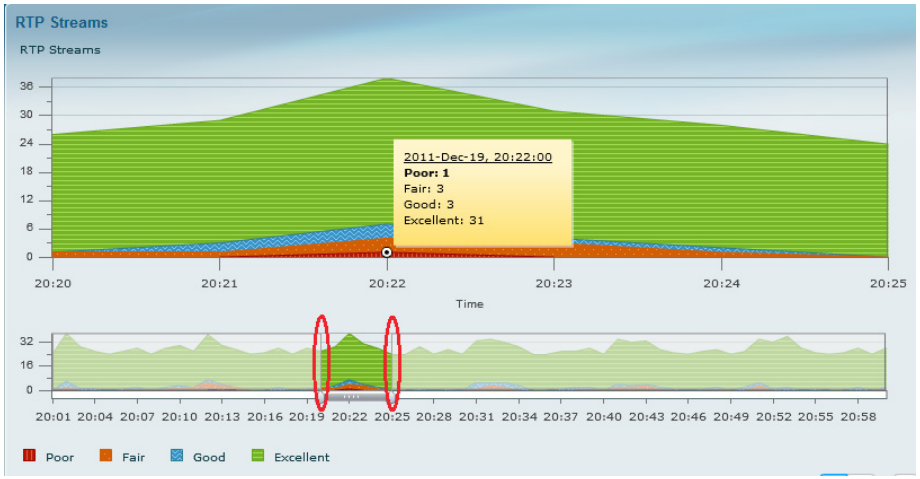
Step 3: Under **Site**, specify the regional office site.

Step 4: For **Time Range**, specify the Last 1 hour, and then click **Submit**.

The RTP Streams chart appears.

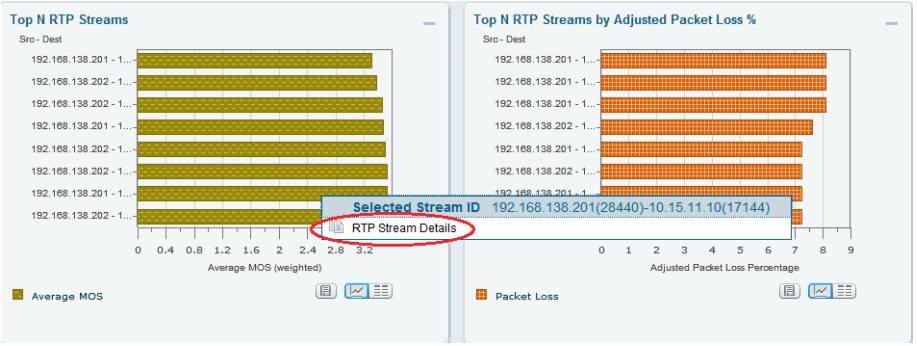


Step 5: To analyze poor MOS values, use the slider controls on the bar to zoom in to a time interval. In the following screenshot, there are a total of 41 RTP-streams, with one RTP-stream rated as poor MOS value and three RTP-streams rated as fair MOS value.

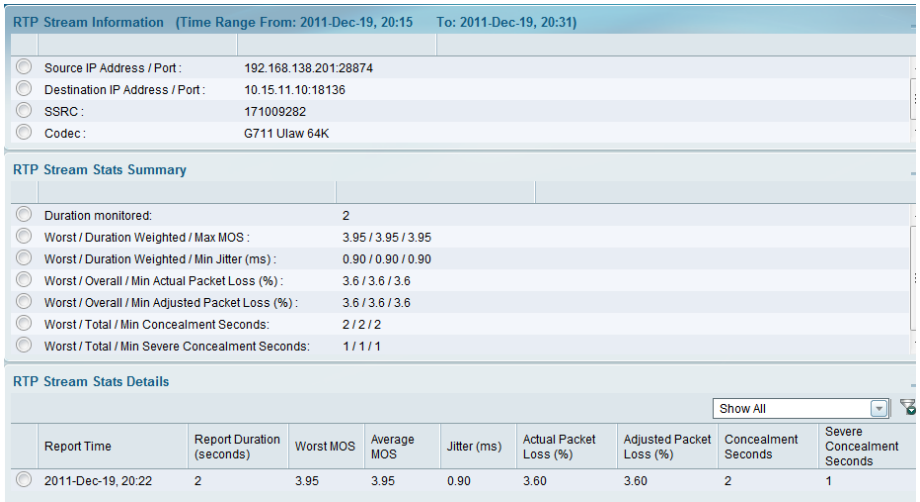


Step 6: Scroll down to view the Top N Source/Destination Endpoints, Top N RTP Stream, and Top N RTP Streams by Adjusted Packet Loss % charts.

Step 7: To further analyze a RTP-stream, select an endpoint from the Top N RTP Streams by Adjusted Packet Loss % chart, click on a data-point of interest, and then click **RTP Stream Details**.



A new dialog box appears, providing various RTP-stream information, such as codec, MOS, jitter, packet loss, RTP Stream Stats Summary, and RTP Stream Stats Details.



RTP Stream Information (Time Range From: 2011-Dec-19, 20:15 To: 2011-Dec-19, 20:31)

Source IP Address / Port :	192.168.138.201:28874
Destination IP Address / Port :	10.15.11.10:18136
SSRC :	171009282
Codec :	G711 Ulaw 64K

RTP Stream Stats Summary

Duration monitored:	2
Worst / Duration Weighted / Max MOS :	3.95 / 3.95 / 3.95
Worst / Duration Weighted / Min Jitter (ms) :	0.90 / 0.90 / 0.90
Worst / Overall / Min Actual Packet Loss (%) :	3.6 / 3.6 / 3.6
Worst / Overall / Min Adjusted Packet Loss (%) :	3.6 / 3.6 / 3.6
Worst / Total / Min Concealment Seconds:	2 / 2 / 2
Worst / Total / Min Severe Concealment Seconds:	1 / 1 / 1

RTP Stream Stats Details

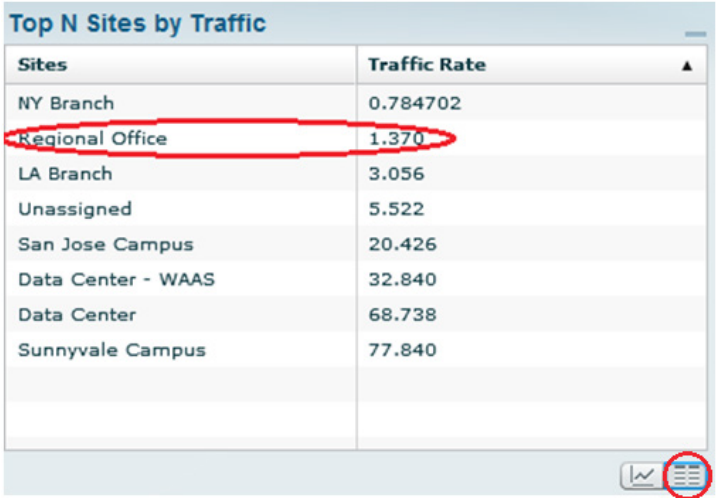
Show All

Report Time	Report Duration (seconds)	Worst MOS	Average MOS	Jitter (ms)	Actual Packet Loss (%)	Adjusted Packet Loss (%)	Concealment Seconds	Severe Concealment Seconds
2011-Dec-19, 20:22	2	3.95	3.95	0.90	3.60	3.60	2	1

Procedure 3 View regional office traffic use

Step 1: Navigate to **Monitor > Overview > Site Summary**.

Step 2: In the Top N Sites by Traffic chart grid view, observe Regional Office traffic use.



Top N Sites by Traffic

Sites	Traffic Rate
NY Branch	0.784702
Regional Office	1.370
LA Branch	3.056
Unassigned	5.522
San Jose Campus	20.426
Data Center - WAAS	32.840
Data Center	68.738
Sunnyvale Campus	77.840

Summary

Cisco Prime NAM offers flexibility in different network deployments with various form factors. This—coupled with built-in analytics for real-time monitoring, historical analysis, and threshold-based proactive troubleshooting—provides unmatched visibility into existing networks, ensures reliable delivery of applications, provides a consistent user experience, improves operating efficiency, maximizes IT investments, anticipates infrastructure changes, and helps scale to an appropriate network.

Notes

Additional Information

Cisco Prime Network Analysis Module

http://www.cisco.com/go/nam

Cisco Prime Network Analysis Module Product Family Data sheets

http://www.cisco.com/en/US/prod/collateral/netmgtsw/ps5740/ps5688/ps10113/data_sheet_c78-642316.html

Product Portfolio:

Cisco Catalyst 6500 Series Network Analysis Module (NAM-3)

http://www.cisco.com/en/US/products/ps11659/index.html

Cisco NAM 2200 Series Appliances

http://www.cisco.com/en/US/products/ps10113/index.html

Cisco Prime Network Analysis Module (NAM) for ISR G2 SRE

http://www.cisco.com/en/US/products/ps11658/index.html

Install and Configuration Guides:

Cisco Catalyst 6500 Series Network Analysis Module (NAM-3)

http://www.cisco.com/en/US/docs/net_mgmt/network_analysis_module_software/5.1_2/switch/installation/guide/instcfg.html

Cisco NAM 2200 Series Appliances

http://www.cisco.com/en/US/docs/net_mgmt/network_analysis_module_appliance/5.1/2220/Cisco_NAM_Appliances_Installation_and_Configuration_Note_2220,_5.1.html

Cisco Prime Network Analysis Module (NAM) for ISR G2 SRE

http://www.cisco.com/en/US/docs/net_mgmt/network_analysis_module_software/5.1/sm_sre/SM_SRE_incfg_5_1.html

Cisco Prime Network Analysis Module 5.1(2) User Guides

http://www.cisco.com/en/US/docs/net_mgmt/network_analysis_module_software/5.1_2/user/guide/NAM_UG512.html

Cisco Prime Network Analysis Module 5.1(2) Software Download

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

Appendix A: Product List

Network Management

Functional Area	Product Description	Part Numbers	Software
LAN Core NAM 6500 Module	Cisco Catalyst 6500 Series Network Analysis Module (NAM-3)	WS-SVC-NAM3-6G-K9	5.1(2)
LAN Core NAM Appliance	Cisco NAM 2220 Appliance with 2x10 Gigabit XFP ports	NAM2220	5.1(2)
Remote-Site NAM SRE	Cisco SRE 910 with 4-8 GB RAM, 2x 500 GB 7,200 rpm HDD, RAID 0/1, dual-core CPU configured with ISR G2	SM-SRE-910-K9	5.1(2)
	Cisco Prime NAM Software 5.1 for ISR G2 SRE SM	SM-NAM-SW-5.1-K9	
Remote-Site NAM SRE	Cisco SRE 710 with 4 GB RAM, 500 GB 7,200 rpm HDD, single-core CPU configured with Cisco ISR G2	SM-SRE-710-K9	5.1(2)
	Cisco Prime NAM Software 5.1 for ISR G2 SRE SM	SM-NAM-SW-5.1-K9	

Access Control

Functional Area	Product Description	Part Numbers	Software
Authentication Services	ACS 5.3 VMware Software and Base License	CSACS-5.3-VM-K9	5.3

LAN Core Layer

Functional Area	Product Description	Part Numbers	Software
Modular Core Layer Switch	Cisco Catalyst 6500 E-Series 6-Slot Chassis	WS-C6506-E	15.0(1)SY1 IP services
	Cisco Catalyst 6500 VSS Supervisor 2T with 2 ports 10GbE and PFC4	VS-S2T-10G	15.0(1)SY1 IP services
	Cisco Catalyst 6500 24-port GbE SFP Fiber Module w/DFC4	WS-X6824-SFP	
	Cisco Catalyst 6500 8-port 10GbE Fiber Module w/ DFC4	WS-X6908-10G-2T	

WAN Remote Site

Functional Area	Product Description	Part Numbers	Software
Modular WAN Remote-site Router	Cisco 3945 Voice Sec. Bundle, PVDM3-64, UC and SEC License PAK	C3945-VSEC/K9	15.1(4)M4 securityk9, datak9
	Cisco 3925 Voice Sec. Bundle, PVDM3-64, UC and SEC License PAK	C3925-VSEC/K9	
	Data Paper PAK for Cisco 3900 series	SL-39-DATA-K9	
Modular WAN Remote-site Router	Cisco 2951 Voice Sec. Bundle, PVDM3-32, UC and SEC License PAK	C2951-VSEC/K9	15.1(4)M4 securityk9, datak9
	Cisco 2921 Voice Sec. Bundle, PVDM3-32, UC and SEC License PAK	C2921-VSEC/K9	
	Cisco 2911 Voice Sec. Bundle, PVDM3-32, UC and SEC License PAK	C2911-VSEC/K9	
	Data Paper PAK for Cisco 2900 series	SL-29-DATA-K9	

Appendix B: Changes

This appendix summarizes the changes to this guide since the previous Cisco SBA series.

- We upgraded the NAM software to 5.1(2).
- We replaced the NAM-2 with the NAM-3.
- We made minor changes to improve the readability of this guide.

Notes

Feedback

Click here to provide feedback to Cisco SBA.

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