CISCO SYSTEMS

Cisco Intrusion Detection System Appliance and Module Installation and Configuration Guide

Version 4.1

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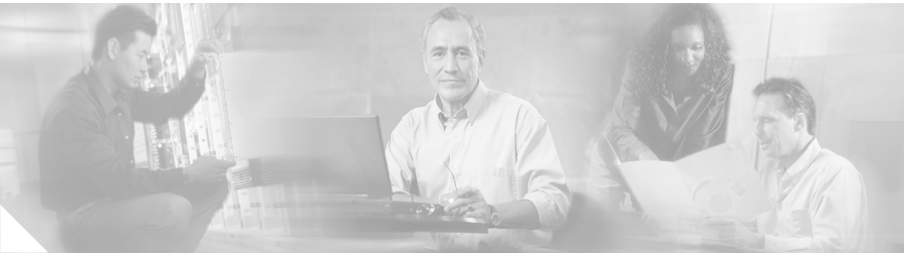
Cisco Intrusion Detection System Appliance and Module Installation and Configuration Guide

APPENDIX A



Preface

This guide describes how to install appliances and modules and provides basic configuration procedures using the CLI.

This preface contains the following topics:

Audience

This guide is intended for audiences who need to do the following:

- Install appliances and modules.
- Secure their network with sensors.
- Detect intrusion on their networks and monitor subsequent alarms.

Conventions

This guide uses the following conventions:

Item	Convention
Commands and keywords	**boldface** font
Variables for which you supply values	*italic* font
Displayed session and system information	`screen` font
Information you enter	**`boldface screen font`**
Variables you enter	*`italic screen`* font
Menu items and button names	**boldface** font
Selecting a menu item	Option > Network Preferences

Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the guide.

Caution Means reader be careful. In this situation, you might do something that could result in equipment damage or loss of data.

Warning **This warning symbol means danger. You are in a situation that could cause bodily injury. To see translations of the warnings that in this publication, refer to the Regulatory Compliance and Safety Information document that accompanied this device.**

Related Documentation

Note We sometimes update the printed and electronic documentation after original publication. Therefore, you should also review the documentation on Cisco.com for any updates.

The following product documentation is available:

- *Cisco Intrusion Detection System (IDS) Hardware and Software Version 4.1 Documentation Guide*
- *Quick Start Guide for the Cisco Intrusion Detection System Version 4.1*
- *Regulatory Compliance and Safety Information for the Cisco Intrusion Detection System 4200 Series Appliance Sensor*
- *Installing and Using the Cisco Intrusion Detection System Device Manager and Event Viewer Version 4.1*
- *Cisco Intrusion Detection System Command Reference Version 4.1*
- *Release Notes for Cisco Intrusion Detection System Version 4.1*

Refer to the *Cisco Intrusion Detection System (IDS) Hardware and Software Version 4.1 Documentation Guide* for information on how to access this documentation.

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation at this URL:

http://www.cisco.com/univercd/home/home.htm

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Cisco Technical Support Website

The Cisco Technical Support Website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day, 365 days a year, at this URL:

http://www.cisco.com/techsupport

Access to all tools on the Cisco Technical Support Website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

http://tools.cisco.com/RPF/register/register.do

Note Use the Cisco Product Identification (CPI) tool to locate your product serial number before submitting a web or phone request for service. You can access the CPI tool from the Cisco Technical Support Website by clicking the **Tools & Resources** link under Documentation & Tools. Choose **Cisco Product Identification Tool** from the Alphabetical Index drop-down list, or click the **Cisco Product Identification Tool** link under Alerts & RMAs. The CPI tool offers three search options: by product ID or model name; by tree view; or for certain products, by copying and pasting **show** command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco TAC engineer. The TAC Service Request Tool is located at this URL:

http://www.cisco.com/techsupport/servicerequest

For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco TAC engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)
EMEA: +32 2 704 55 55
USA: 1 800 553-2447

For a complete list of Cisco TAC contacts, go to this URL:

http://www.cisco.com/techsupport/contacts

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—Your network is “down,” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:

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- The Cisco *Product Catalog* describes the networking products offered by Cisco Systems, as well as ordering and customer support services. Access the Cisco Product Catalog at this URL:

  http://cisco.com/univercd/cc/td/doc/pcat/

- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:

  http://www.ciscopress.com

- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:

  http://www.cisco.com/packet

- *iQ Magazine* is the quarterly publication from Cisco Systems designed to help growing companies learn how they can use technology to increase revenue, streamline their business, and expand services. The publication

identifies the challenges facing these companies and the technologies to help solve them, using real-world case studies and business strategies to help readers make sound technology investment decisions. You can access iQ Magazine at this URL:

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

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:

  http://www.cisco.com/ipj

- World-class networking training is available from Cisco. You can view current offerings at this URL:

  http://www.cisco.com/en/US/learning/index.html

Introducing the Sensor

This chapter introduces the sensor and provides information you should know before you install the sensor. In this guide, the term “sensor” refers to all models unless specifically noted otherwise. See Supported Sensors, page 1-16, for a complete list of supported sensors and their model numbers.

This chapter contains the following topics:

Appliances

This section describes the appliance and contains the following topics:

Introducing the Appliance

The appliance is a high-performance, plug-and-play device. The appliance is a component of the Intrusion Detection System (IDS), a network-based, real-time intrusion detection system. See Supported Sensors, page 1-16, for a list of supported appliances.

You can use the Command Line Interface (CLI), IDS Device Manager, or Management Center for IDS Sensors to configure the appliance. Refer to your IDS manager documentation. To access IDS documentation on Cisco.com, refer to *Cisco Intrusion Detection System (IDS) Hardware and Software Version 4.1 Documentation Guide* that shipped with your appliance.

You can configure the appliance to respond to recognized signatures as it captures and analyzes network traffic. These responses include logging the event, forwarding the event to the IDS manager, performing a TCP reset, generating an IP log, capturing the alert trigger packet, and/or reconfiguring a router.

After being installed at key points in the network, the appliance monitors and performs real-time analysis of network traffic by looking for anomalies and misuse based on an extensive, embedded signature library. When the system detects unauthorized activity, appliances can terminate the specific connection, permanently block the attacking host, log the incident, and send an alert to the IDS manager. Other legitimate connections continue to operate independently without interruption.

Appliances can also monitor and analyze syslog messages from Cisco routers to detect and report network security policy violations.

Appliances are optimized for specific data rates and are packaged in Ethernet, Fast Ethernet, and Gigabit Ethernet configurations. In switched environments, appliances must be connected to the switch's Switched Port Analyzer (SPAN) port or VLAN Access Control list (VACL) capture port.

How the Appliance Functions

This section explains how the appliance captures network traffic.

Each appliance comes with at least two interfaces. In a typical installation, one interface monitors (sniffs) the desired network segment, and the other interface (command and control) communicates with the IDS manager and other network devices. The monitoring interface is in promiscuous mode, meaning it has no IP address and is not visible on the monitored segment.

Note With the addition of the 4-port Fast Ethernet NIC card, the IDS-4235, IDS-4250, and the IDS-4215 have six interfaces. With the addition of the 2-port XL card, the IDS-4250 has four interfaces. With the addition of the SX card, the IDS-4250 has three interfaces.

The command and control interface is always Ethernet. This interface has an assigned IP address, which allows it to communicate with the IDS manager workstation or network devices (typically a Cisco router). Because this interface is visible on the network, you should use encryption to maintain data privacy. Secure Shell (SSH) is used to protect the Command Line Interface (CLI) and the Transaction Layer Security/Secure Sockets Layer (TLS/SSL) is used to protect the IDS manager workstation. Both SSH and TLS/SSL are enabled by default on the IDS manager workstations.

When responding to attacks, the appliance can do the following:

- Insert TCP resets via the monitoring interface.

  Note The TCP reset action is only appropriate as an action selection on those signatures that are associated with a TCP-based service. If selected as an action on non-TCP-based services, no action is taken. Additionally, TCP resets are not guaranteed to tear down an offending session because of limitations in the TCP protocol. On the IDS-4250-XL, TCP resets are sent through the TCP Reset interface.

- Make access control list (ACL) changes on routers that the appliance manages.

Note ACLs may block only future traffic, not current traffic.

- Generate IP session logs

  IP session logs are used to gather information about unauthorized use. IP log files are written when a certain event or events occur that you have configured the appliance to look for.

Because the appliance is not in the data path, it has a negligible impact on network performance. However, there are limitations on the data speeds it can monitor.

Your Network Topology

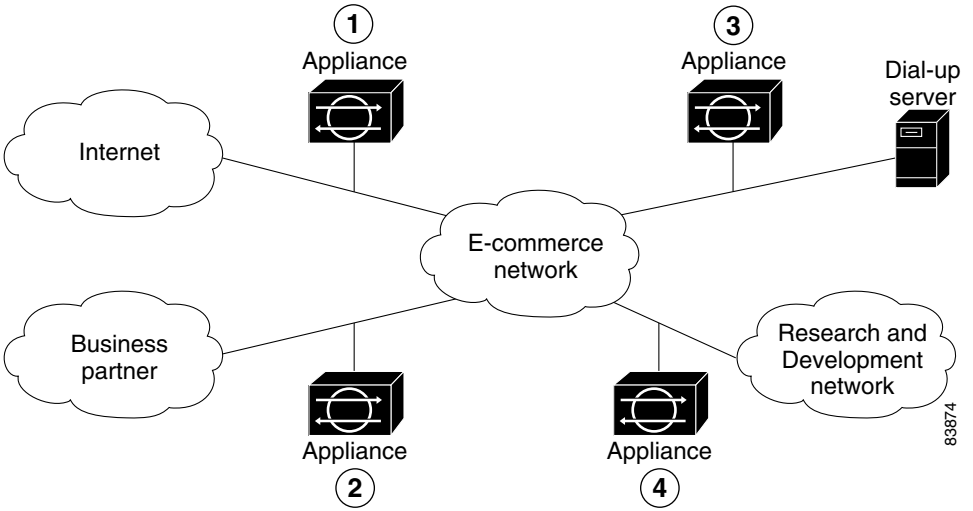
Before you deploy and configure your appliances, you should understand the following about your network:

- The size and complexity of your network.
- Connections between your network and other networks (and the Internet).
- The amount and type of network traffic on your network.

This knowledge will help you determine how many appliances are required, the hardware configuration for each appliance (for example, the size and type of network interface cards), and how many IDS managers are needed.

The appliance monitors all traffic across a given network segment. With that in mind, you should consider all the connections to the network you want to protect. These connections fall into four categories, or locations, as illustrated in Figure 1-1 on page 1-5.

Figure 1-1 Major Types of Network Connections



In location one, the appliance is placed to monitor traffic between the E-commerce (protected) network and the Internet. This is referred to as perimeter protection and is the most common deployment for an appliance. This location can be shared with firewall protection and is discussed in Placing an Appliance on Your Network, page 1-6.

In location two, the appliance is monitoring an extranet connection with a business partner. Although most companies have defined policies on the use and security of this type of connection, there is no guarantee that the network of a partner is adequately protected. Consequently, an outsider may enter your network through this type of connection. These extranet connections may have firewalls as well.

In location three, the appliance is monitoring the network side of a remote access server. Although this connection may be only for employee use, it could be vulnerable to external attack.

In location four, the appliance is monitoring an intranet connection. For example, the protected network of one department may contain an e-commerce site where all the access types described so far are required. The network of another department may contain company-specific research and development or other engineering information and should be given additional protection.

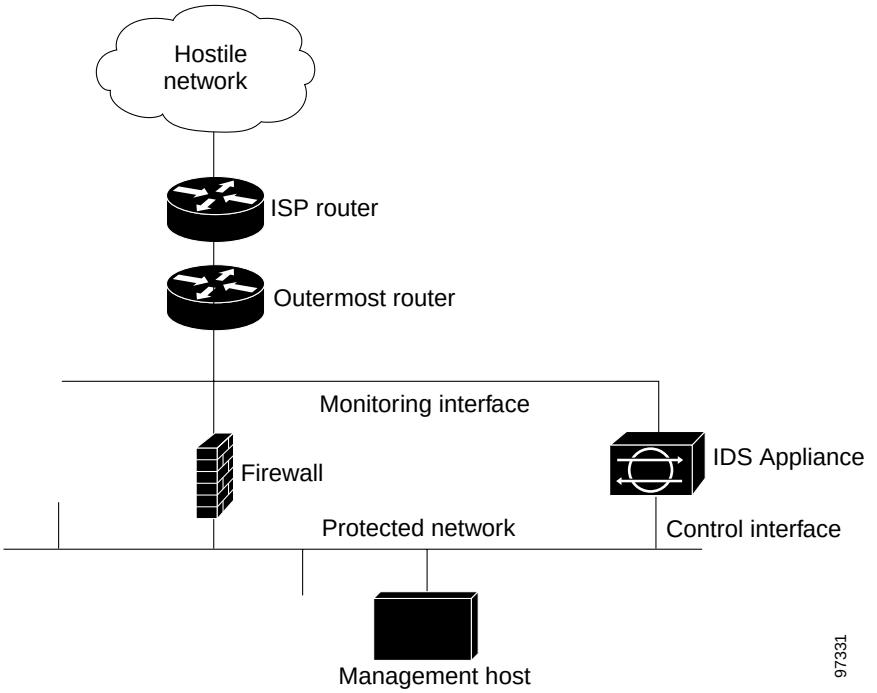
Determine which segments of the network you want to monitor to determine the location for the appliance. Remember, each appliance maintains a security policy configured for the segment it is monitoring. The security policies can be standard across the organization or unique for each appliance. You may consider changing your network topology to force traffic across a given monitored network segment. There are always operational trade-offs when going through this process. The end result should be a rough idea of the number of appliances required to protect the desired network.

Placing an Appliance on Your Network

You can place an appliance in front of or behind a firewall. Each position has benefits and drawbacks.

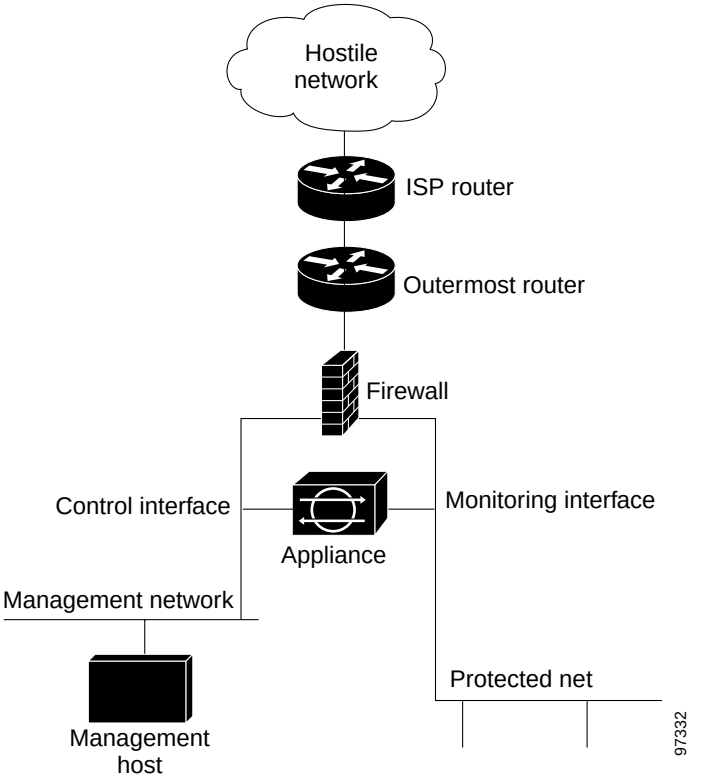
Placing an appliance in front of a firewall allows the appliance to monitor all incoming and outgoing network traffic. However, when deployed in this manner, the appliance does not detect traffic that is internal to the network. An internal attacker taking advantage of vulnerabilities in network services would remain undetected by the external appliance (see Figure 1-2 on page 1-7).

Figure 1-2 Appliance in Front of a Firewall



Placing an appliance behind a firewall allows it to monitor internal traffic, but it cannot monitor any policy violations that the firewall rejects (see Figure 1-3 on page 1-8).

Figure 1-3 Appliance Behind a Firewall



Deployment Considerations

For the appliance to effectively defend a network with a router and firewall configuration, you must do the following:

- Enable SSH services on the router if available, otherwise, enable Telnet.
- Add the router to the device management list of the appliance (via the IDS manager).

- Configure the firewall to permit the following traffic:
  - SSH or Telnet traffic from the control interface of the appliance to the router.
  - Syslog (UDP port 514) traffic from the router to the appliance.

    Note To capture policy violations on the router, the appliance must also be configured to accept syslog messages.

  - Communications (TCP ports 443 for TLS/SSL and 22 for SSH) between the appliance and any IDS manager workstation, if the firewall comes between them.

  Essentially, the firewall implements policy filtering. The appliance captures packets between the Cisco router and the firewall, and can dynamically update the ACLs of the Cisco router to deny unauthorized activity.

  Note You can also configure the appliance to manage a PIX Firewall instead of the Cisco router.

Appliance Restrictions

The following restrictions apply to using and operating the appliance:

- The appliance is not a general purpose workstation.
- Cisco Systems prohibits using the appliance for anything other than operating Cisco IDS.
- Cisco Systems prohibits modifying or installing any hardware or software in the appliance that is not part of the normal operation of the Cisco IDS.

Setting Up a Terminal Server

A terminal server is a router with multiple, low speed, asynchronous ports that are connected to other serial devices. You can use terminal servers to remotely manage network equipment, including appliances.

To set up a Cisco terminal server with RJ-45 or hydra cable assembly connections, follow these steps:

Step 1 Connect to a terminal server using one of the following methods:

- For the IDS-4215, IPS-4240, and IPS-4255:
  - For RJ-45 connections, connect a 180/rollover cable from the console port on the appliance to a port on the terminal server.
  - For hydra cable assemblies, connect a straight-through patch cable from the console port on the appliance to a port on the terminal server.
- For all other appliances, connect the M.A.S.H. adapter (part number 29-4077-01) to COM1 on the appliance and:
  - For RJ-45 connections, connect a 180/rollover cable from the M.A.S.H. adapter to a port on the terminal server.
  - For hydra cable assemblies, connect a straight-through patch cable from the M.A.S.H. adapter to a port on the terminal server.

Step 2 Configure the line/port on the terminal server as follows:

a. In enable mode, type the following configuration, where # is the line number of the port to be configured:

```
config t
line #
login
transport input all
stopbits 1
flowcontrol hardware
speed 9600
exit
exit
wr mem
```

b. If you are configuring a terminal server for an IDS-4215, IPS-4240, or IPS-4255, skip to Step 3.

Otherwise, for all other supported appliances, to direct all output to the terminal server, log in to the IDS CLI and type the following commands:

```
sensor# configure terminal
sensor(config)# display-serial
```

Output is directed to the serial port. Use the **no display-serial** command to redirect output to the keyboard/monitor.

Note You can set up a terminal server and use the IDS CLI **display-serial** command to direct all output from the appliance to the serial port. This option enables you to view system messages on a console connected to the serial port, even during the boot process. When you use this option, all output is directed to the serial port and any local keyboard/monitor connection is disabled. However, BIOS and POST messages are still displayed on the local keyboard/monitor.

Note There is only one console port on an IDS-4215, IPS-4240, and IPS-4255; therefore, the **display-serial** and **no display-serial** commands do not apply to those platforms.

Step 3 Be sure to properly close a terminal session to avoid unauthorized access to the appliance.

If a terminal session is not stopped properly, that is, if it does not receive an exit(0) signal from the application that initiated the session, the terminal session can remain open. When terminal sessions are not stopped properly, authentication is not performed on the next session that is opened on the serial port.

Tip Always exit your session and return to a login prompt before terminating the application used to establish the connection.

Caution If a connection is dropped or terminated by accident, you should reestablish the connection and exit normally to prevent unauthorized access to the appliance.

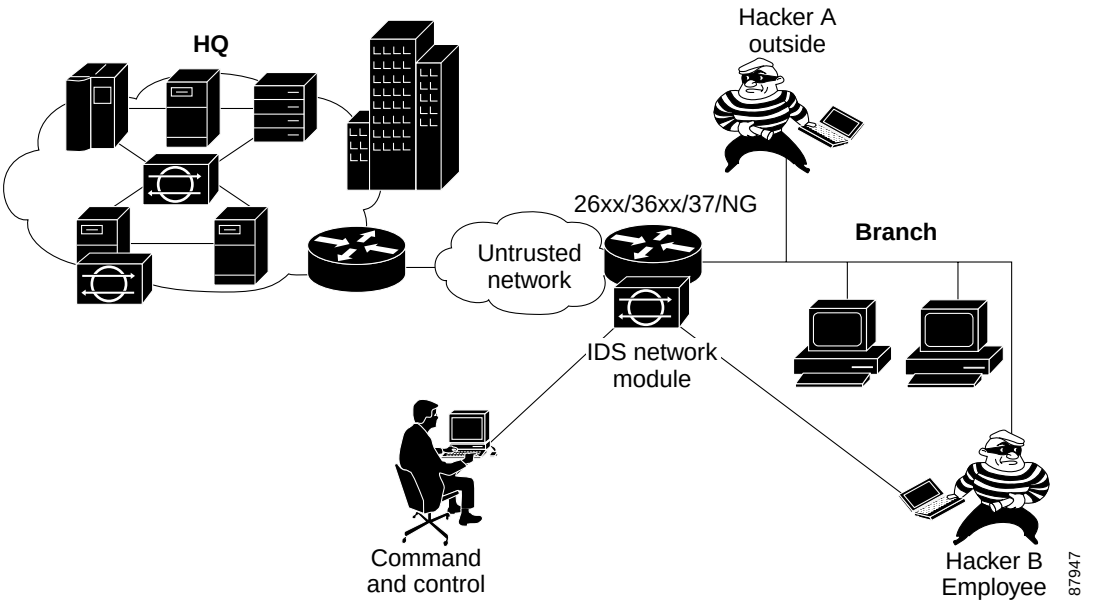
Modules

This section describes the modules and contains the following topics:

Introducing the Cisco Intrusion Detection System Network Module

The Cisco Intrusion Detection System Network Module (NM-CIDS) integrates the Cisco IDS functionality into a branch office router. With the NM-CIDS, you can implement full-featured IDS at your remote branch offices. You can install the NM-CIDS in any one of the network module slots on the Cisco 2600, 3600, and 3700 series routers. The NM-CIDS can monitor up to 45 Mbps of network traffic. See Software and Hardware Requirements, page 7-2, for a list of supported routers. Only one NM-CIDS is supported per router. Figure 1-4 on page 1-13 shows the IDS router in a branch office environment.

Figure 1-4 NM-CIDS in the Branch Office Router



The NM-CIDS has one internal 10/100 Ethernet port that connects to the router's backplane. There is also one external 10/100-based Ethernet port that is used for device management (management of other routers and/or PIX Firewalls to perform shunning) and command and control of the NM-CIDS by IDS managers.

The NM-CIDS communicates with the router to exchange control and state information for bringing up and shutting down the NM-CIDS and to exchange version and status information. The NM-CIDS processes packets that are forwarded from selected interfaces on the router to the IDS interface on the NM-CIDS. The NM-CIDS analyzes the captured packets and compares them against a rule set of typical intrusion activity called signatures. If the captured packets match a defined intrusion pattern in the signatures, the NM-CIDS can take one of two actions: it can make ACL changes on the router to block the attack, or it can send a TCP reset packet to the sender to stop the TCP session that is causing the attack.

In addition to analyzing captured packets to identify malicious activity, the NM-CIDS can also perform IP session logging that can be configured as a response action on a per-signature basis. When the signature fires, session logs are created over a specified time period in a TCPDump format. You can view these logs using Ethereal or replay the IP session using tools such as TCP Replay.

Note The NM-CIDS does not support sending syslog messages to a syslog server if there is an intrusion event, nor does it support Simple Network Management Protocol (SNMP) traps.

You can manage and retrieve events from the NM-CIDS through the CLI or through one of these IDS managers—IDS Device Manager or Management Center for IDS Sensors. For instructions on accessing IDS documentation on Cisco.com, refer to *Cisco Intrusion Detection System (IDS) Hardware and Software Version 4.1 Documentation Guide* that shipped with your NM-CIDS.

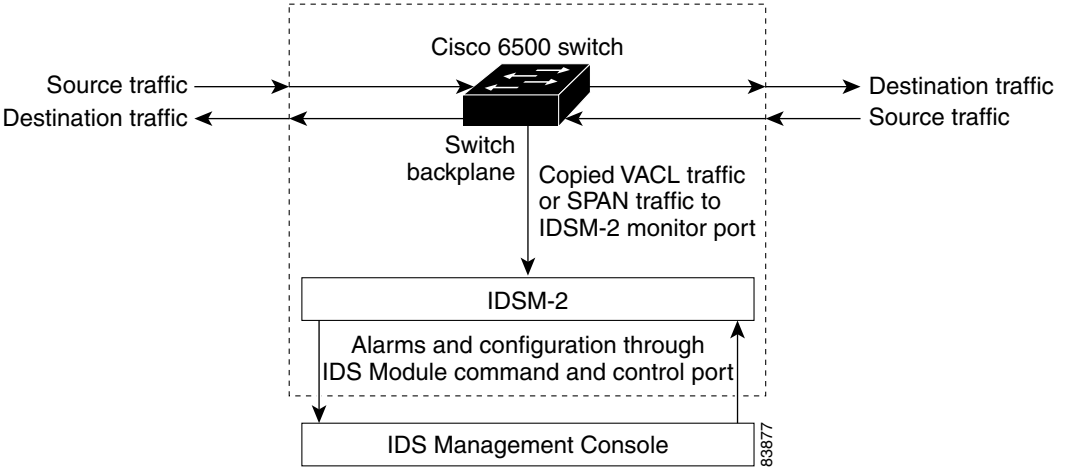
The IDS requires a reliable time source. All the events (alerts) must have the correct time stamp, otherwise, you cannot correctly analyze the logs after an attack. You cannot manually set the time on the NM-CIDS. The NM-CIDS gets its time from the Cisco router in which it is installed. Routers do not have a battery so they cannot preserve a time setting when they are powered off. You must set the router's clock each time you power up or reset the router, or you can configure the router to use NTP time synchronization. We recommend NTP time synchronization. You can configure either the NM-CIDS itself or the router it is installed in to use NTP time synchronization. See Setting the Time on Sensors, page 1-18, for more information.

Introducing the Cisco Catalyst 6500 Series Intrusion Detection System Services Module

The Cisco Catalyst 6500 Series Intrusion Detection System Services Module (IDSM-2) is a switching module that performs intrusion detection in the Catalyst 6500 series switch. You can use the CLI, IDS Device Manager, or Management Center for IDS Sensors to configure the IDSM-2. For instructions on accessing the IDS documentation on Cisco.com, refer to the *Cisco Intrusion Detection System (IDS) Hardware and Software Version 4.1 Documentation Guide* that shipped with your IDSM-2.

The IDSM-2 performs network sensing—real-time monitoring of network packets through packet capture and analysis. The IDSM-2 captures network packets and then reassembles and compares the packet data against attack signatures indicating typical intrusion activity. Network traffic is either copied to the IDSM-2 based on security VLAN access control lists (VACLs) in the switch or is copied to the IDSM-2 through the switch's Switched Port Analyzer (SPAN) port feature. These methods route user-specified traffic to the IDSM-2 based on switch ports, VLANs, or traffic type to be inspected. (See Figure 1-5.)

Figure 1-5 IDSM-2 Block Diagram



The IDSM-2 searches for patterns of misuse by examining either the data portion and/or the header portion of network packets. Content-based attacks contain potentially malicious data in the packet payload, whereas, context-based attacks contain potentially malicious data in the packet headers.

You can configure the IDSM-2 to generate an alert when it detects potential attacks. Additionally, you can configure the IDSM-2 to transmit TCP resets on the source VLAN, generate an IP log, and/or initiate blocking countermeasures on a firewall or other managed device. Alerts are generated by the IDSM-2 through the Catalyst 6500 series switch backplane to the IDS manager, where they are logged or displayed on a graphical user interface.

Supported Sensors

Table 1-1 lists the sensors (appliances and modules) that are supported in this document and that are supported by the most recent Cisco IDS software.

Note For instructions on how to obtain the most recent Cisco IDS software, see Obtaining Cisco IDS Software, page 9-1.

Caution Installing the most recent Cisco IDS software (version 4.1) on unsupported sensors may yield unpredictable results. We do not support software installed on unsupported platforms.

Table 1-1 Supported Sensors

Model Name	Part Number	Optional Interfaces
Appliances		
IDS-4210	IDS-4210 IDS-4210-K9 IDS-4210-NFR	— — —
IDS-4215	IDS-4215-K9 IDS-4215-4FE-K9	IDS-4FE-INT= —
IDS-4220	IDS-4220-E	—
IDS-4230	IDS-4230-FE	—
IDS-4235	IDS-4235-K9	IDS-4FE-INT=
IDS-4250	IDS-4250-TX-K9 IDS-4250-SX-K9 IDS-4250-XL-K9	IDS-4FE-INT=, IDS-4250-SX-INT=, IDS-XL-INT= IDS-XL-INT= —
IPS-4240	IPS-4240-K9	—

Table 1-1 Supported Sensors (continued)

Model Name	Part Number	Optional Interfaces
Appliances		
IPS-4255	IPS-4255-K9	—
Network Modules		
NM-CIDS	NM-CIDS-K9	—
Services Modules		
IDSM-2	WS-SVC-IDSM2-K9	—

Note The IDS-4215-4FE-K9 is the IDS-4215-K9 with the optional 4FE card (IDS-4FE-INT=) installed at the factory.

The following IDS appliance models are legacy models and are not supported in this document:

- NRS-2E
- NRS-2E-DM
- NRS-2FE
- NRS-2FE-DM
- NRS-TR
- NRS-TR-DM
- NRS-SFDDI
- NRS-SFDDI-DM
- NRS-DFDDI
- NRS-DFDDI-DM
- IDS-4220-TR
- IDS-4230-SFDDI
- IDS-4230-DFDDI

Note The WS-X6381, the IDSM, is a legacy model and is not supported in this document.

Note The IDS-4210 and IDS-4220-E require memory upgrades to support the latest IDS software. See Upgrading the Memory, page 2-3, for more information.

Setting the Time on Sensors

The sensor requires a reliable time source. All events (alerts) must have the correct GMT and local time stamp, otherwise, you cannot correctly analyze the logs after an attack. When you initialize your sensor, you set up the time zones and summer time settings. See Initializing the Sensor, page 10-2, for more information.

Here is a summary of ways to set the time on sensors:

- For appliances
  - Use the **clock set** command to set the time. This is the default.

    Refer to *Cisco Intrusion Detection System Command Reference Version 4.1* for information on the **clock set** command.
  - Use Network Timing Protocol (NTP).

    You can configure your appliance to get its time from an NTP time synchronization source. See Configuring a Cisco Router to be an NTP Server, page 10-22. You will need the NTP server IP address, the NTP key ID, and the NTP key value. You can set up NTP on the appliance during initialization or you can configure NTP later. See Configuring the Sensor to Use an NTP Server as its Time Source, page 10-21, for more information.

    Note We recommend that you use an NTP time synchronization source.

- For IDSM-2
  - The IDSM-2 can automatically synchronize its clock with the switch time. This is the default.

Note The GMT time is synchronized between the switch and the IDSM-2. The time zone and summer time settings are not synchronized between the switch and the IDSM-2.

Caution Be sure to set the time zone and summertime settings on both the switch and the IDSM-2 to ensure that the GMT time settings are correct. The IDSM2's local time will be incorrect if the timezone and/or summertime settings do not match between the IDSM-2 and the switch.

  - Use NTP.

You can configure your IDSM-2 to get its time from an NTP time synchronization source. See Configuring a Cisco Router to be an NTP Server, page 10-22. You will need the NTP server IP address, the NTP key ID, and the NTP key value. You can configure the IDSM-2 to use NTP during initialization or you can set up NTP later. See Configuring the Sensor to Use an NTP Server as its Time Source, page 10-21, for more information.

Note We recommend that you use an NTP time synchronization source.

- For NM-CIDS
  - The NM-CIDS can automatically synchronize its clock with the clock in the router chassis in which it is installed (parent router). This is the default.

Note The GMT time is synchronized between the parent router and the NM-CIDS. The time zone and summer time settings are not synchronized between the parent router and the NM-CIDS.

Caution Be sure to set the time zone and summertime settings on both the parent router and the NM-CIDS to ensure that the GMT time settings are correct. The NM-CIDS's local time will be incorrect if the timezone and/or summertime settings do not match between the NM-CIDS and the router.

– Use NTP.

You can configure your NM-CIDS to get its time from an NTP time synchronization source, such as a Cisco router other than the parent router. See Configuring a Cisco Router to be an NTP Server, page 10-22. You will need the NTP server IP address, the NTP key ID, and the NTP key value. You can configure the NM-CIDS to use NTP during initialization or you can set up NTP later. See Configuring the Sensor to Use an NTP Server as its Time Source, page 10-21, for more information.

Note We recommend that you use an NTP time synchronization source.

Installation Preparation

To prepare for installing sensors, follow these steps:

Step 1 Review the safety precautions outlined in the *Regulatory Compliance and Safety Information for the Cisco Intrusion Detection System 4200 Series Appliance Sensor* that shipped with your sensor.

Step 2 To familiarize yourself with the location of IDS documentation on Cisco.com, read the *Cisco Intrusion Detection System (IDS) Hardware and Software Version 4.1 Documentation Guide* that shipped with your sensor.

Step 3 Obtain the *Release Notes for the Cisco Intrusion Detection System Version 4.1* from Cisco.com and completely read them before proceeding with the installation.

Step 4 Unpack the sensor.

Step 5 Place the sensor in an ESD-controlled environment.

See Working in an ESD Environment, page 1-21, for the procedure.

Step 6 Place the sensor on a stable work surface.

Step 7 Refer to the chapter that pertains to your sensor model.

Working in an ESD Environment

Work on ESD-sensitive parts only at an approved static-safe station on a grounded static dissipative work surface, for example, an ESD workbench or static dissipative mat.

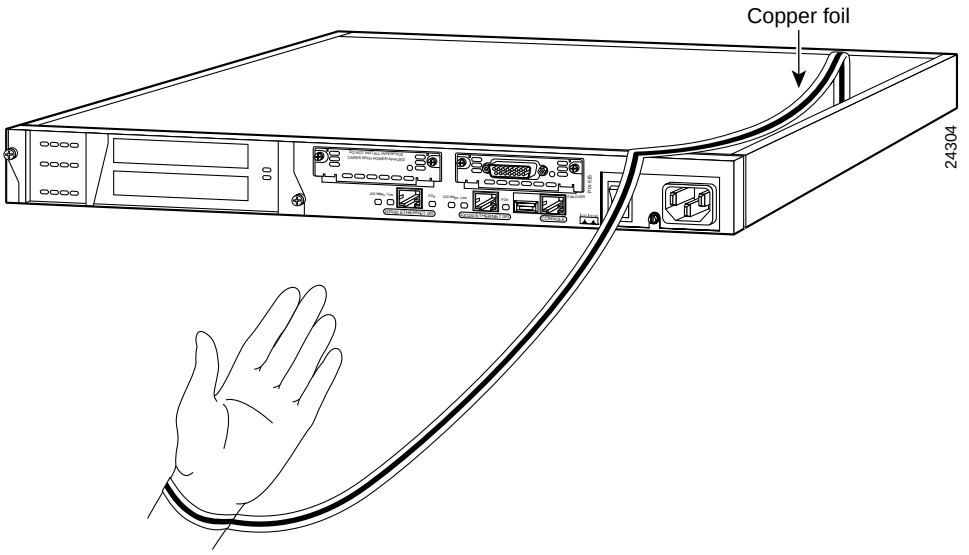
To remove and replace components in a sensor, follow these steps:

Step 1 Remove all static-generating items from your work area.

Step 2 Use a static dissipative work surface and wrist strap.

Note Disposable wrist straps, typically those included with an upgrade part, are designed for one time use.

Step 3 Attach the wrist strap to your wrist and to the terminal on the work surface. If you are using a disposable wrist strap, connect the wrist strap directly to an unpainted metal surface of the chassis.



Step 4 Connect the work surface to the chassis using a grounding cable and alligator clip.

Caution Always follow ESD-prevention procedures when removing, replacing, or repairing components.

Note If you are upgrading a component, do not remove the component from the ESD packaging until you are ready to install it.

Installing the IDS-4210

This chapter describes the IDS-4210 and how to install it and its accessories.

Note IDS-4215 replaces the IDS-4210, which will no longer be sold after July 2003.

Note If you purchased an IDS-4210 before July 2003, you must upgrade the memory to 256 MB to install Cisco IDS 4.1. See Upgrading the Memory, page 2-3 for more information. If you purchase an IDS-4210 during July, it comes from the factory with the memory upgrade and version 4.1 installed.

This chapter contains the following sections:

Front Panel Features and Indicators

Figure 2-1 on page 2-2shows the front panel indicators on the IDS-4210.

Figure 2-1 Front Panel Features

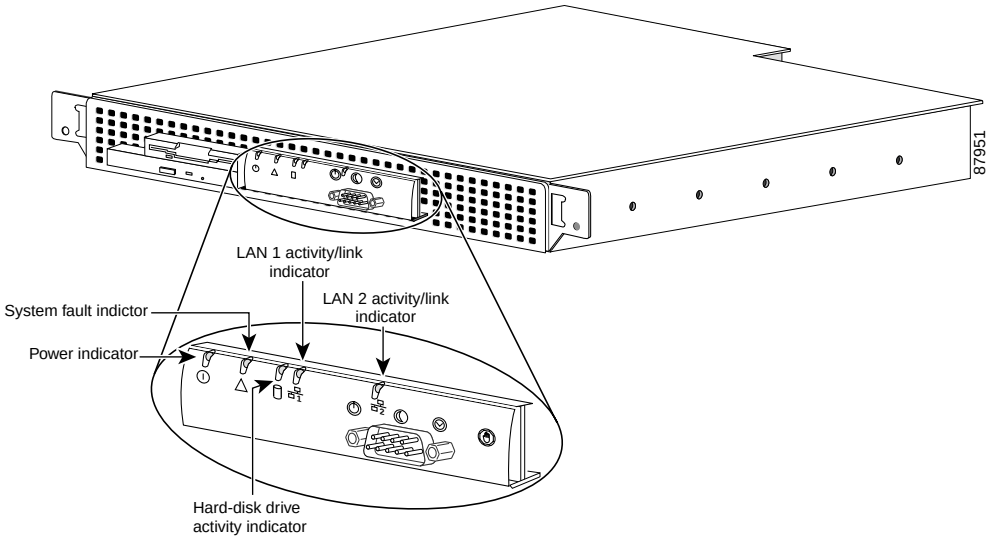


Table 2-1 describes the appearance and function of the front panel indicators.

Table 2-1 Front Panel Indicators

Indicator	Color	Function
Power	Green	Lights up when the system is connected to an AC power source; blinks when the system is in sleep mode.
System fault	Amber	Blinks during system startup or when a system fault is detected.
Hard-disk drive activity	Green	Blinks when hard-disk drive activity occurs.
LAN1 activity/link	Amber	Lights up when the LAN1 connector is linked to an Ethernet port; blinks when activity occurs on this channel.
LAN2 activity/link	Amber	Lights up when the LAN2 connector is linked to an Ethernet port; blinks when activity occurs on this channel.

Upgrading the Memory

The IDS-4210, IDS-4210-K9, IDS-4210-NFR, and IDS-4220-E sensors must have 512 MB RAM to support Cisco IDS 4.1 software. If you are upgrading an existing IDS-4210, IDS-4210-K9, IDS-4210-NFR, or IDS-4220-E sensor to version 4.1, you must insert additional Dual In-line Memory Modules (DIMMs) (see part numbers below for supported DIMMs) to upgrade the memory to the required 512 MB minimum.

The following DIMMs are supported:

- For IDS-4210 sensors, you insert one additional 256 MB DIMM (Part number IDS-4210-MEM-U) for a total of 512 MB.
- For the IDS-4220-E sensor, you insert two additional 128 MB DIMMs (Part number IDS-4220-MEM-U) for a total of 512 MB.

Note Do not install an unsupported DIMM. Doing so nullifies your warranty.

Caution Be sure to read the safety warnings in the *Regulatory Compliance and Safety Information for the Cisco Intrusion Detection System 4200 Series Appliance Sensor* and follow proper safety procedures when performing these steps.

To upgrade the memory, follow these steps:

Step 1 Log in to the CLI.

Step 2 Prepare the appliance to be powered off:

```
sensor# reset powerdown
```

Wait for the power down message before continuing with Step 3.

Note You can also power down the sensor from IDM or IDS MC.

Step 3 Power off the appliance.

Step 4 Remove the power cord and other cables from the appliance.

Step 5 Place the appliance in an ESD-controlled environment.

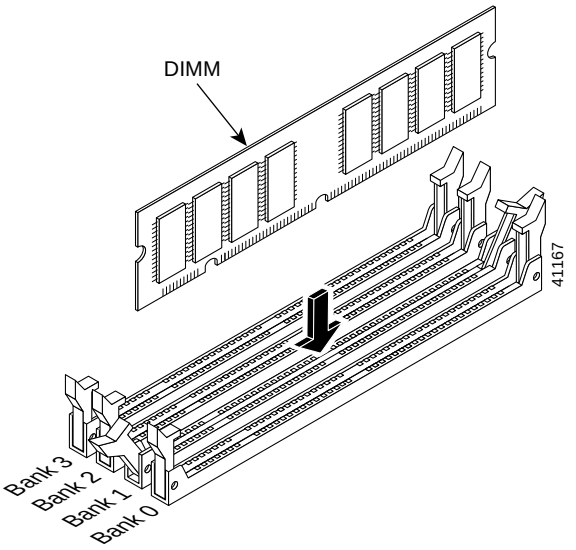
See Working in an ESD Environment, page 1-21, for more information.

Step 6 Remove the chassis cover by unscrewing the screw(s) on the front of the cover and sliding the cover straight back.

Note IDS-4210 sensors have a single screw on the front cover. IDS-4220 sensors have three screws spaced evenly across the front cover.

Step 7 Locate the DIMM sockets and select an empty DIMM socket next to the existing DIMM.

Note On IDS-4210 sensors, the existing DIMM is installed in socket 0. The angled position of the DIMM sockets make installing an additional DIMM in socket 1 difficult if a DIMM occupies socket 0. Therefore, you should first remove the existing DIMM from socket 0, place the new DIMM in socket 1, and then place the existing DIMM back in socket 0.



Step 8 Locate the ejector tabs on either side of the DIMM socket. Press down and out on tabs to open the slot in the socket.

Step 9 Install the new DIMM (one at a time if you are installing more than one), by positioning the DIMM into the socket and pressing it into place.

Note Do not force the DIMM into the socket. Alignment keys on the DIMM ensure that it only fits in the socket one way. If you need additional leverage, you can gently press down on the DIMM with your thumbs while pulling up on the ejector tabs.

Step 10 Replace the chassis cover and reconnect the power.

Step 11 Power on the sensor and ensure the new memory total is correct.

Note If the memory total does not reflect the added DIMMs, repeat Steps 1 through 4 to ensure the DIMMs are seated correctly in the socket.

Installing the IDS-4210

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030**

Caution Be sure to read the safety warnings in the *Regulatory Compliance and Safety Information for the Cisco Intrusion Detection System 4200 Series Appliance Sensor* and follow proper safety procedures when performing these steps.

Note If you purchased an IDS-4210 before July 2003, you must upgrade the memory to 256 MB to install Cisco IDS 4.1. See Upgrading the Memory, page 2-3, for more information. If you purchase an IDS-4210 during July, it comes from the factory with the memory upgrade and version 4.1 installed.

To install the IDS-4210 on your network, follow these steps:

Step 1 Position the appliance on the network.

See Placing an Appliance on Your Network, page 1-6 for information on the best places to position an appliance.

Step 2 Attach the power cord to the appliance and plug it in to a power source (a UPS is recommended).

Note When you first plug an IDS-4210 into a power source, it powers on momentarily and then powers off leaving the Network Interface Card (NIC) link lights lit. This is normal behavior. Press the power switch to boot the system into operation.

Step 3 Use the dual serial communication cable (PN 72-1847-01, included in the accessory kit) to attach a laptop to the COM1 port of the IDS appliance (see Table 2-2 for a list of the terminal settings), or connect a keyboard and monitor to the appliance.

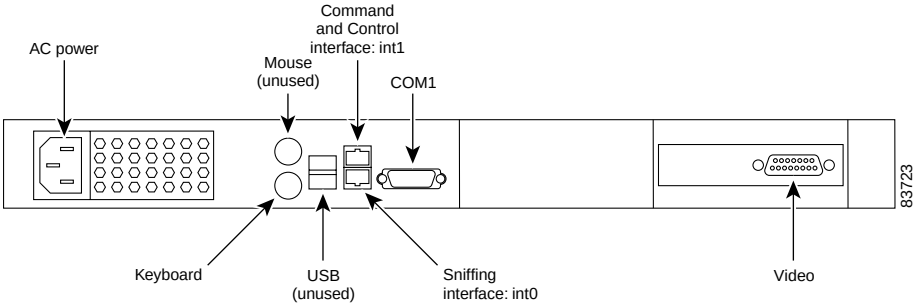
Table 2-2 Terminal Settings

Terminal	Setting
Bits per second	9600
Data bits	8
Parity	None
Stop bits	1
Flow control	Hardware or RTS/CTS

Caution We recommend that you use the dual serial communication cable (PN 72-1847-01, included in the accessory kit) rather than a keyboard and monitor, because some keyboards and monitors may be incompatible with the appliance.

Note You can use a 180/rollover or straight-through patch cable to connect the appliance to a port on a terminal server with RJ-45 or hydra cable assembly connections. Use a M.A.S.H adapter (part number 29-4077-02) to connect the appropriate cable to a port on the terminal server. See Setting Up a Terminal Server, page 1-9 for the instructions for setting up a terminal server.

Step 4 Attach the network cables.



- int0 is the sensing port.
- int1 is the command and control port.

Step 5 Upgrade the memory on the appliance.

See Upgrading the Memory, page 2-3, for the procedure.

Caution You must upgrade the memory on the IDS-4210 to a minimum of 512 MB before you can install the most recent Cisco IDS software version.

Step 6 Power on the appliance.

Step 7 Initialize your appliance.

See Initializing the Sensor, page 10-2, for the procedure.

Step 8 Upgrade your appliance to the latest Cisco IDS software.

See Obtaining Cisco IDS Software, page 9-1, for the procedure.

Step 9 Assign the interfaces.

See Assigning and Enabling the Sensing Interface, page 10-9, for the procedure.

You are now ready to configure intrusion detection on your appliance.

Installing the Accessories

You can install a bezel, and center or front mounting brackets for your IDS-4210.

This section contains the following topics:

Accessories Package Contents

The following items are shipped in the accessories package for the IDS-4210:

- Cisco IDS-4210 bezel
- Power cable
- Network patch cable
- Computer interconnection cable
- Dual serial communication cable
- Rack mounting brackets

- Documentation and software
  - Cisco IDS recovery/upgrade CD
  - Cisco Documentation CD
  - *Cisco Intrusion Detection System (IDS) Hardware and Software Version 4.1 Documentation Guide*
  - *Regulatory Compliance and Safety Information for the Cisco Intrusion Detection System 4200 Series Appliance Sensor*

Installing and Removing the Bezel

You can install a Cisco bezel for the IDS-4210.

To install and remove the bezel on the IDS-4210, follow these steps:

Step 1 To insert the bezel on the appliance, follow these steps:

a. Align the bottom tabs on the bezel with the slots on the appliance.

b. Align the side tabs on the bezel with the slots on the appliance.

c. Press the bezel into the appliance.

Step 2 To remove the bezel from the appliance, press the side tabs and pull.

Installing Center Mount Brackets

You need the following tools and supplies to install the brackets in a two-post, open-frame relay rack:

- #2 Phillips screwdriver
- Masking tape or felt-tip pen to mark the mounting holes to be used

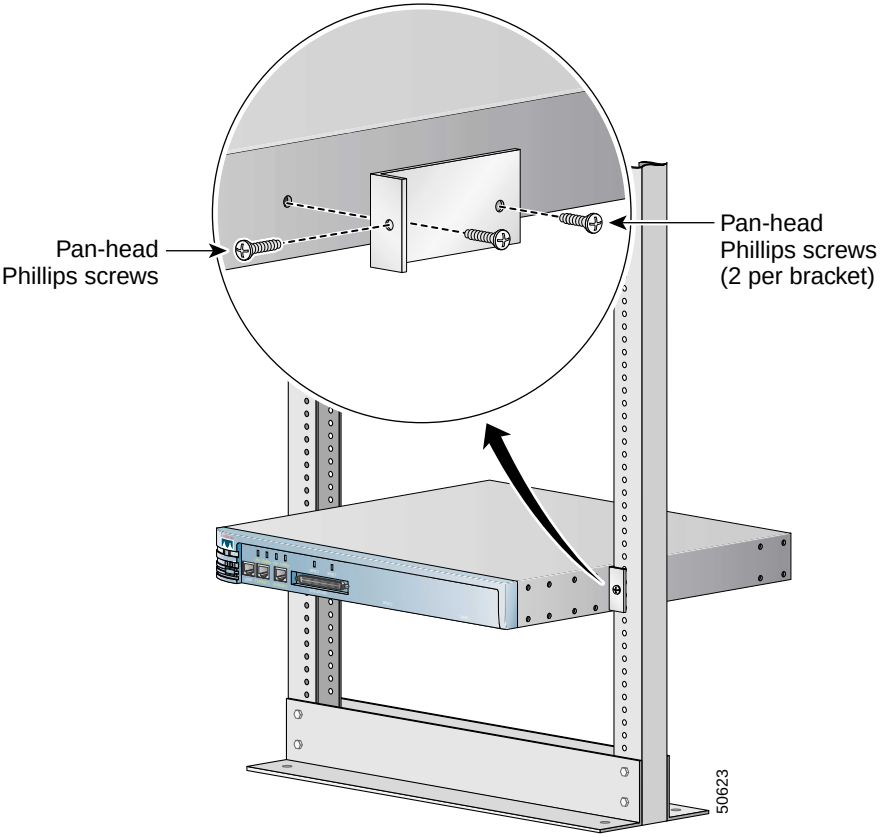
To install the center mount brackets in a two-post, open-frame relay rack, follow these steps:

Step 1 Determine where you want to place your appliance.

Step 2 Mark the upper and lower mounting positions on the two posts.

Step 3 Locate one of the two brackets and align it over the two threaded holes on the side of the appliance (see Figure 2-2).

Figure 2-2 Installing Center Mount Brackets



Step 4 Secure the bracket to the appliance chassis using two screws (see Figure 2-2).

Step 5 Repeat Step 4 to install the remaining bracket on the other side of the appliance.

Step 6 Lift the appliance into position between the two posts with the hole in the mounting bracket aligned one hole above the mark you made in the two posts (see Figure 2-2).

Step 7 Secure the appliance to the rack using a screw through the mounting bracket to the front of the left and right posts (see Figure 2-2 on page 2-10).

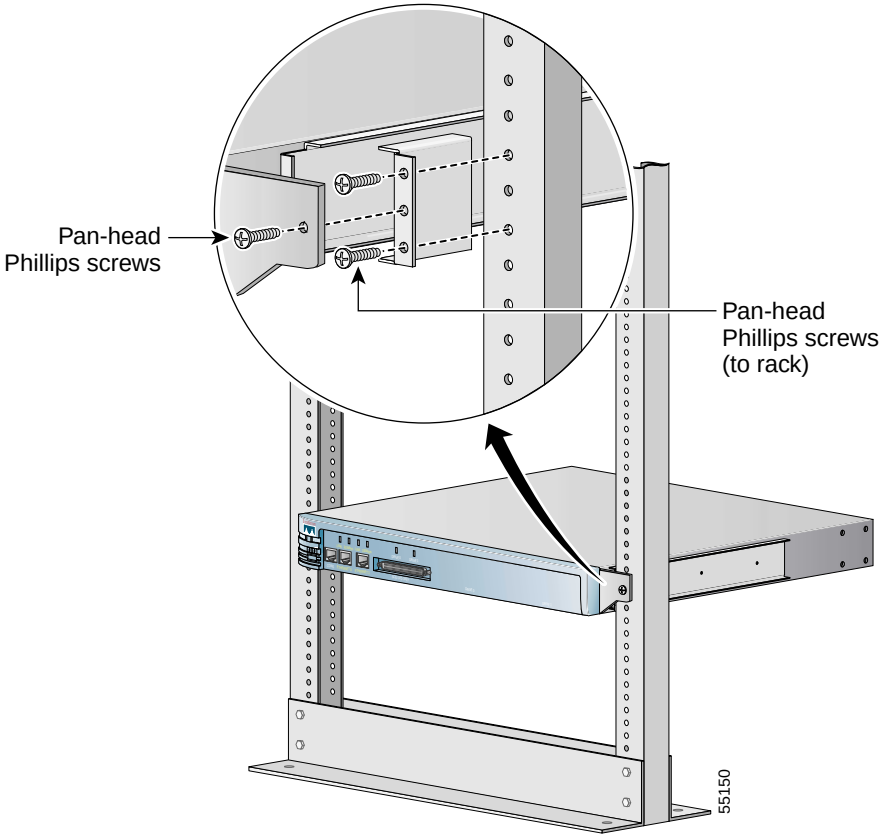
Installing Front Mount Brackets

Make sure you have the following supplies (found in the front mount bracket assembly kit) and tools to install the front mount brackets in a two-post, open-frame relay rack:

- Two chassis support brackets
- Two rack-mounting brackets
- Six screws
- #2 Phillips screwdriver

Note The front mount bracket assembly is not intended for use as a slide rail system. The server must be firmly attached to the rack, as shown in Figure 2-3 on page 2-12.

Figure 2-3 Front Mount Brackets



Caution The chassis support brackets included in this kit are rated for 50 pounds of load per pair of brackets for general use for 10,000 cycles of opening and closing. Higher cycles or frequency will lower the load rating. The chassis support brackets are meant to support the weight of only one appliance.

To install the front mount brackets, follow these steps:

Step 1 Make sure the appliance is turned off and is not plugged in to an electrical outlet.

Step 2 Use the screws provided to attach one chassis support bracket to each side of the appliance. Use three screws on each side.

Step 3 Use the screws provided with the rack to attach the rack mounting brackets to the rack.

Step 4 Slide the chassis support brackets on the appliance into the rack mounting brackets attached to the rack.

Step 5 Use the bolts provided with the rack to fasten the appliance's front flanges to the rack.

Note When you are done, the appliance should not slide on the channel bar.

Installing the IDS-4215

The Cisco IDS-4215 can monitor up to 80 Mbps of aggregate traffic and is suitable for T1/E1 and T3 environments. With the addition of the four-port fast Ethernet (4FE) card, the IDS-4215 supports five monitoring interfaces (10/100BASE-TX), which provide simultaneous protection for multiple subnets.

Note The 80-Mbps performance for the IDS-4215 is based on the following conditions: aggregation of traffic from all five monitoring interfaces, 800 new TCP connections per second, 800 HTTP transactions per second, average packet size of 445 bytes, system running Cisco IDS 4.1 sensor software.

The monitoring interfaces and the command and control interface are all 10/100BASE-TX.

This chapter describes the IDS-4215 and how to install it. It also describes the accessories and how to install them.

This chapter contains the following sections:

Front and Back Panel Features

This section describes the IDS-4215 front and back panel features and indicators. Figure 3-1 shows the front view of the IDS-4215.

Figure 3-1 IDS-4215 Front Panel Features

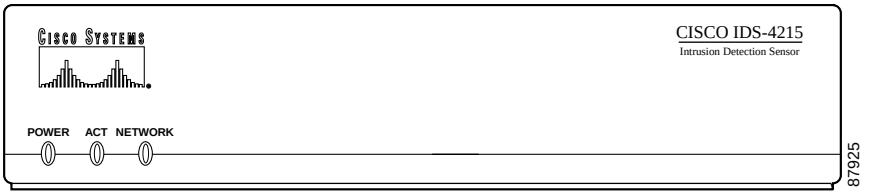


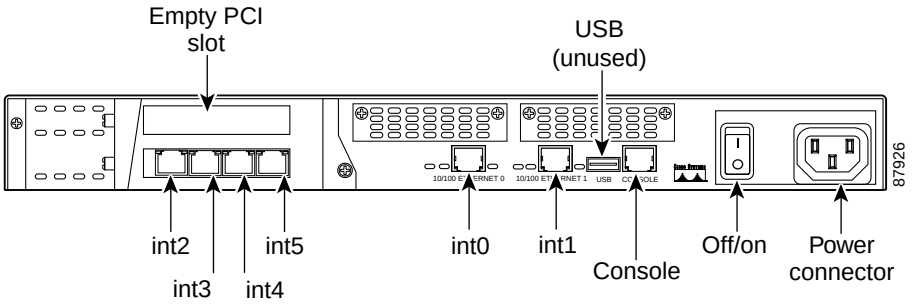
Table 3-1 describes the front panel indicators on the IDS-4215.

Table 3-1 Front Panel Indicators

Indicator	Description
POWER	Lights up when power supply is running.
ACT	Lights up when the unit has completed power-up self-test and has started the operating system and application software loading process.
NETWORK	Blinks when network traffic is passing over either of the two built-in Ethernet ports; does not indicate traffic on any of the four ports of the 4FE card.

Figure 3-2 shows the back view of the IDS-4215.

Figure 3-2 IDS-4215 Back Panel Features



The built-in Ethernet ports have three indicators per port and the 4FE card has two indicators per port. Figure 3-3 shows the back panel indicators.

Figure 3-3 IDS-4215

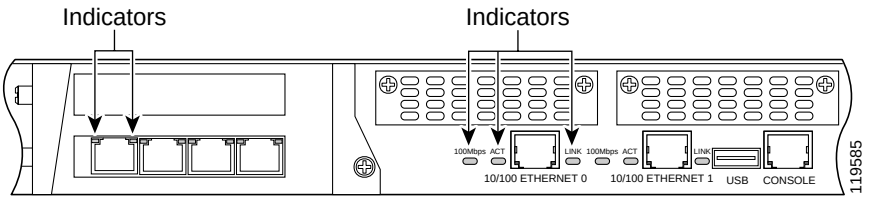


Table 3-2 lists the back panel indicators.

Table 3-2 Back Panel Indicators

Indicator	Description
Built-in Ethernet	—
100 Mbps	Lights up when the port is running in 100-Mbps mode; off when it is running in 10-Mbps mode.
Link	Lights up when the port is connected to another Ethernet port and traffic can be passed between them.
ACT	Blinks when network traffic is being received on the port.

Table 3-2 Back Panel Indicators (continued)

Indicator	Description
4FE Card	—
LINK/activity	Lights up when the port is connected to another operational Ethernet port but no traffic is being passed between them; blinks off when Ethernet packets are being received.
100 Mbps	Lights up when the port is running in 100-Mbps mode; off when the port is running in 10-Mbps mode.

Specifications

Table 3-3 lists the specifications for the IDS-4215.

Table 3-3 IDS-4215 Specifications

Dimensions and Weight	
Height	1.72 in. (4.37 cm)
Width	16.8 in. (42.72 cm)
Depth	11.8 in. (29.97 cm)
Weight	11.5 lb (4.11 kg)
Form factor	1 RU, standard 19-inch rack-mountable
Expansion	Two 32-bit/33-MHz PCI slots
Power	
Autoswitching	100V to 240V AC
Frequency	50 to 60 Hz, single phase
Operating current	1.5 A
Steady state	50W
Maximum peak	65W
Maximum heat dissipation	410 BTU/hr, full power usage (65W)

Table 3-3 IDS-4215 Specifications (continued)

Environment	
Temperature	Operating +41°F to +104°F (+5°C to +40°C) Nonoperating -13°F to +158°F (-25°C to +70°C)
Relative humidity	Operating 5% to 95% (noncondensing) Nonoperating 5% to 95% (noncondensing)
Altitude	Operating 0 to 9843 ft (3000 m) Nonoperating 0 to 15,000 ft (4750 m)
Shock	Operating 1.14 m/sec (45 in./sec) 1/2 sine input Nonoperating 30 G
Vibration	0.41 Grms2 (3-500 Hz) random input
Acoustic noise	54 dBa maximum

Note Only one PCI expansion slot can be used for the 4FE card. We recommend you install the 4FE card in the lower PCI expansion slot.

Accessories

Warning **IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030**

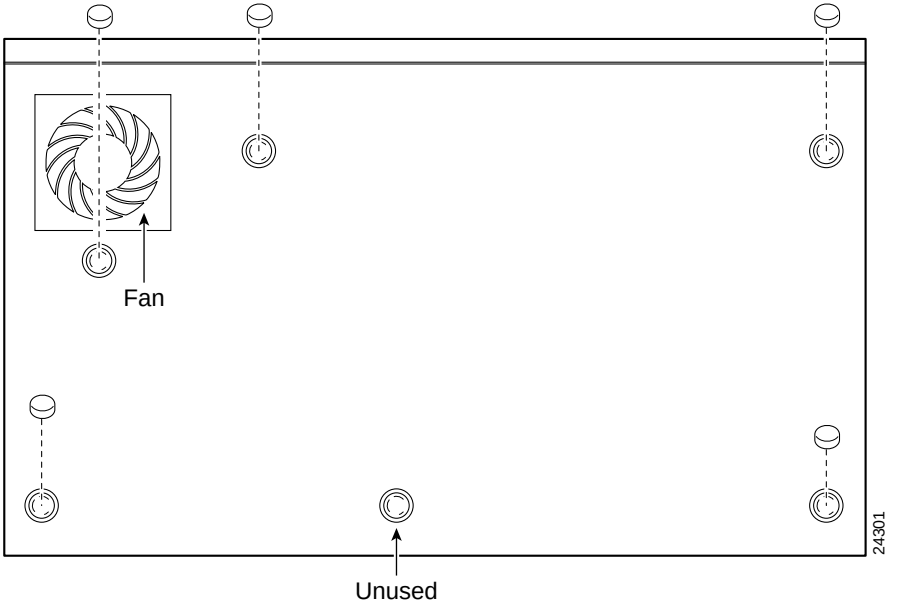
The IDS-4215 accessories kit contains the following:

- DB25 connector
- DB9 connector
- Rubber mounting feet
- Rack mounting kit—screws, washers, and metal bracket
- RJ45 console cable
- 6-ft Ethernet cable

Surface Mounting

If you are not rack mounting the IDS-4215, you must attach the rubber feet to the bottom of the IDS-4215 as shown in Figure 3-4 on page 3-7. The rubber feet are shipped in the accessories kit.

Figure 3-4 Surface Mounting the IDS-4215



Caution For proper cooling and reliability, the rubber feet must be installed on the IDS-4215 when it is on a flat surface. The rubber feet allow proper airflow around the IDS-4215 and they also absorb vibration so that the hard-disk drive is less impacted.

Rack Mounting

Warning **To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety: This unit should be mounted at the bottom of the rack if it is the only unit in the rack. When mounting this unit in a partially filled rack, load the rack from the bottom to the**

top with the heaviest component at the bottom of the rack. If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

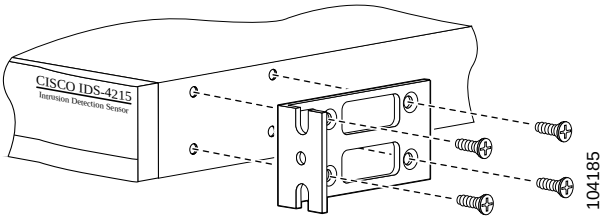
If you are installing the 4FE card in the IDS-4215, do not install the mounting brackets until after you have installed the 4FE card.

Note You must remove the chassis cover of the IDS-4215 to properly install or remove the 4FE card. See Removing and Replacing the Chassis Cover, page 3-12, for information on how to remove and replace the chassis cover. See Installing the 4FE Card, page 3-27, for information on installing the 4FE card in the IDS-4215.

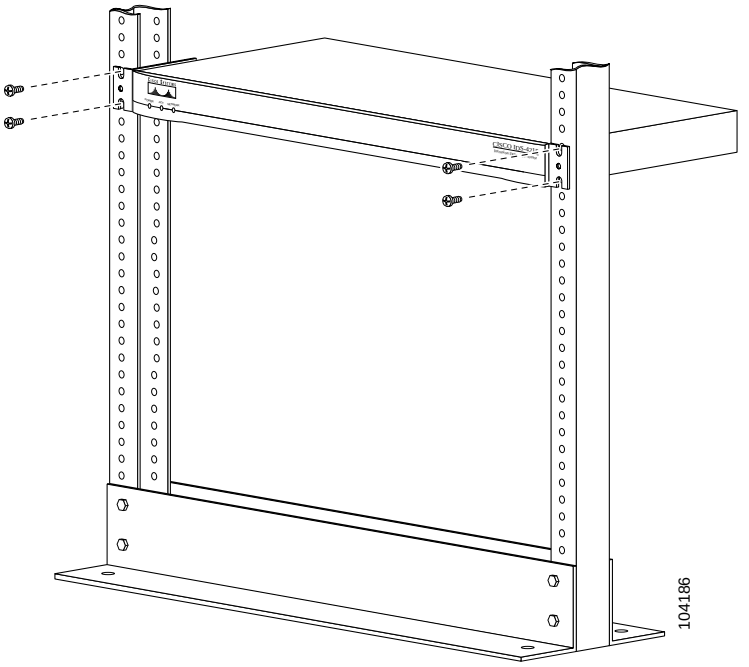
To rack mount the IDS-4215, follow these steps:

Step 1 Use the supplied screws to attach the bracket to the appliance.

You can attach the brackets to the holes near the front of the appliance.



Step 2 Attach the appliance to the equipment rack.



Installing the IDS-4215

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030**

Caution Be sure to read the safety warnings in the *Regulatory Compliance and Safety Information for the Cisco Intrusion Detection System 4200 Series Appliance Sensor* and follow proper safety procedures when performing these steps.

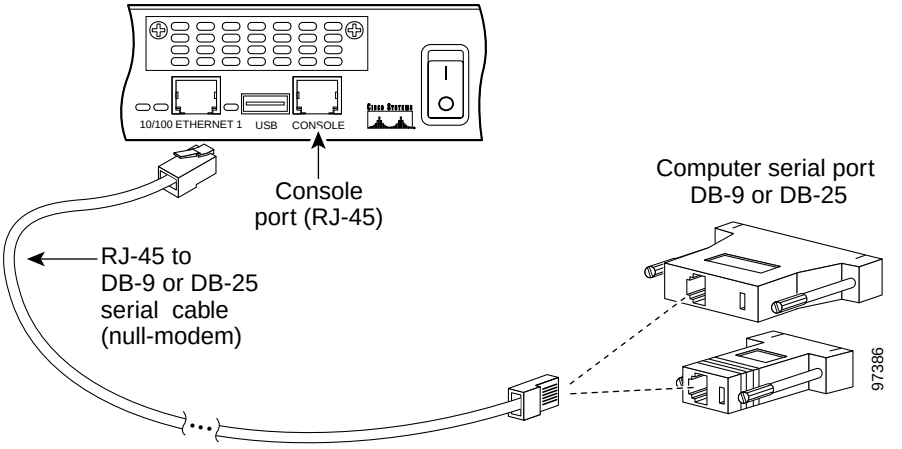
To install the IDS-4215 on your network, follow these steps:

Step 1 Position the appliance on the network.

See Placing an Appliance on Your Network, page 1-6, for information on the best places to position an appliance.

Step 2 Attach the power cord to the appliance and plug it into a power source (a UPS is recommended).

Step 3 Connect the cable so that you have either a DB-9 or DB-25 connector on one end as required by the serial port for your computer, and the other end is the RJ-45 connector.

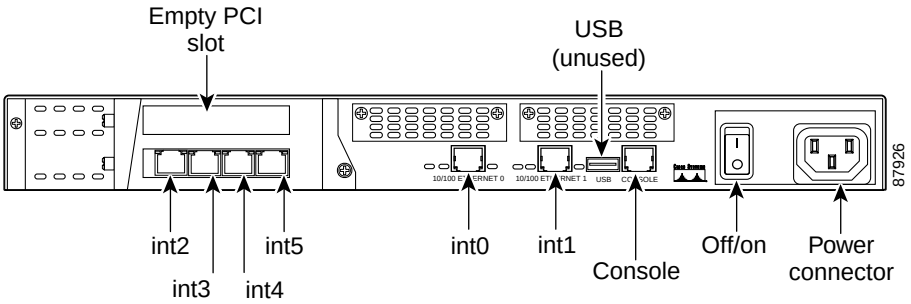


Note Use the console port to connect to a computer to enter configuration commands. Locate the serial cable from the accessory kit. The serial cable assembly consists of a 180/rollover cable with RJ-45 connectors (DB-9 connector adapter PN 74-0495-01 and DB-25 connector adapter PN 29-0810-01).

Note You can use a 180/rollover or straight-through patch cable to connect the appliance to a port on a terminal server with RJ-45 or hydra cable assembly connections. Connect the appropriate cable from the console port on the appliance to a port on the terminal server. See Setting Up a Terminal Server, page 1-9, for the instructions for setting up a terminal server.

Step 4 Connect the RJ-45 connector to the console port and connect the other end to the serial port connector on your computer.

Step 5 Attach the network cables.



- int0 is the sensing port.
- int1 is the command and control port.
- int2 through int5 are the optional sensing ports available if you have the 4FE card installed.

Step 6 Power on the appliance.

Step 7 Initialize your appliance.

See Initializing the Sensor, page 10-2, for the procedure.

Step 8 Upgrade your appliance to the most recent Cisco IDS software.

See Obtaining Cisco IDS Software, page 9-1, for the procedure.

Step 9 Assign the interfaces:

See Assigning and Enabling the Sensing Interface, page 10-9, for the procedure.

Note The interfaces are disabled by default.

You are now ready to configure intrusion detection on your appliance.

Removing and Replacing the Chassis Cover

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than 120 VAC, 20 A U.S. (240 VAC, 16-20 A International). Statement 1005**

Warning **This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 1024**

Warning **Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place. Statement 1029**

Warning **This unit might have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028**

Caution Be sure to read the safety warnings in the *Regulatory Compliance and Safety Information for the Cisco Intrusion Detection System 4200 Series Appliance Sensor* and follow proper safety procedures when removing and replacing the chassis cover.

This section describes how to remove and replace the IDS-4215 chassis cover.

This section contains the following topics:

Removing the Chassis Cover

Note Removing the appliance chassis cover does not affect your Cisco warranty. Upgrading the appliance does not require any special tools and does not create any radio frequency leaks.

To remove the chassis cover, follow these steps:

Step 1 Log in to the CLI.

Step 2 Prepare the appliance to be powered off:

```
sensor# reset powerdown
```

Wait for the power down message before continuing with Step 3.

Note You can also power down the sensor using IDM or IDS MC.

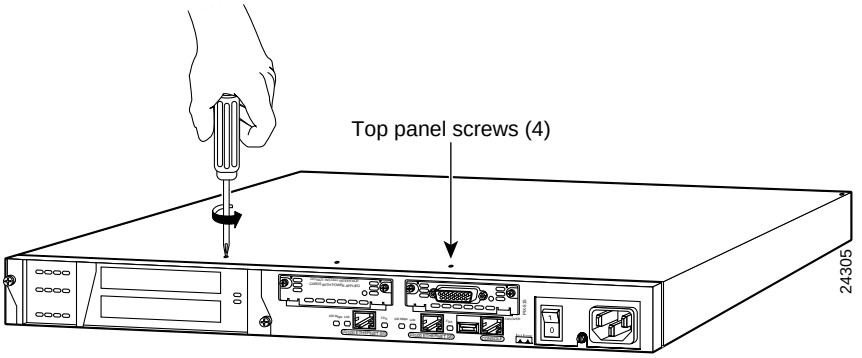
Step 3 Power off the appliance.

Step 4 Remove the power cord and other cables from the appliance.

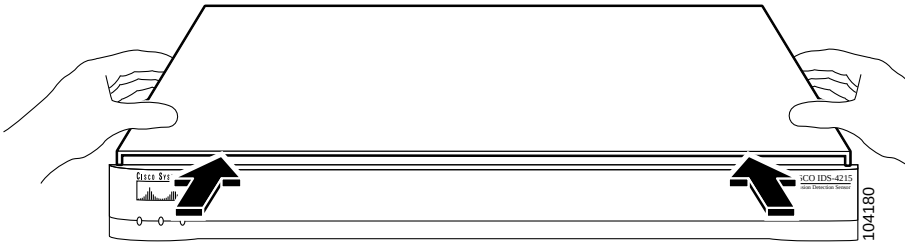
Step 5 Place the appliance in an ESD-controlled environment.

See Working in an ESD Environment, page 1-21, for more information.

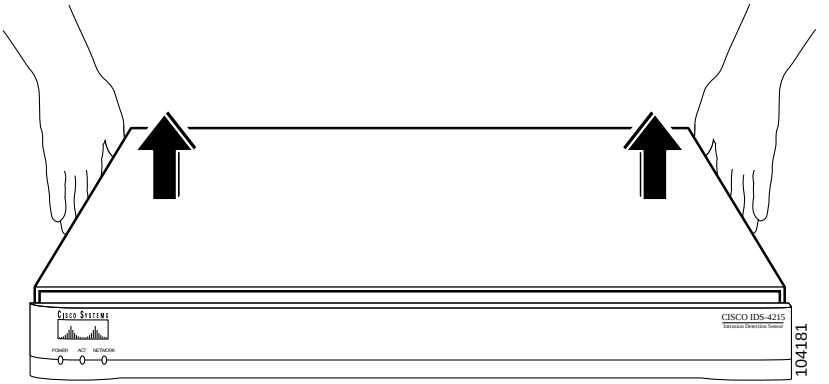
Step 6 Remove the screws from the rear of the chassis.



Step 7 With the front of the unit facing you, push the top panel back one inch.



Step 8 Pull the top panel up and put it in a safe place.



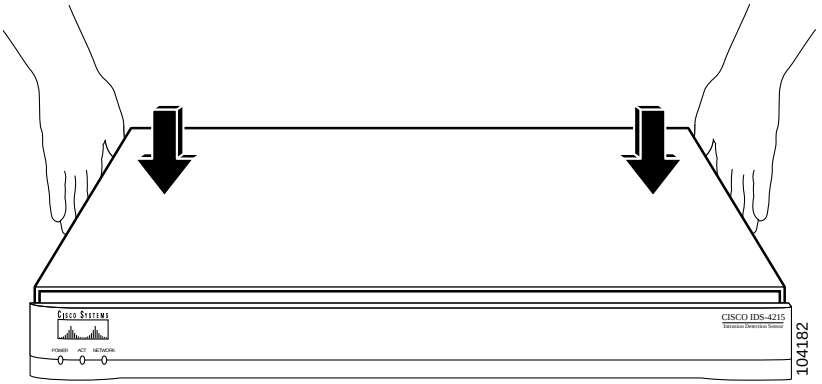
Replacing the Chassis Cover

Caution Do not operate the IDS-4215 without the chassis cover installed. The chassis cover protects the internal components, prevents electrical shorts, and provides proper air flow for cooling the electronic components.

To replace the chassis cover, follow these steps:

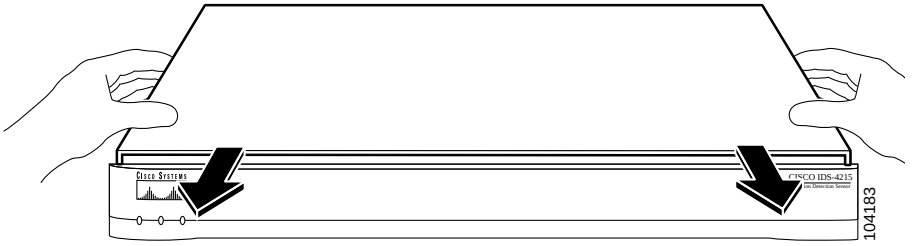
Step 1 Place the chassis on a secure surface with the front panel facing you.

Step 2 Hold the top panel so the tabs at the rear of the top panel are aligned with the chassis bottom.

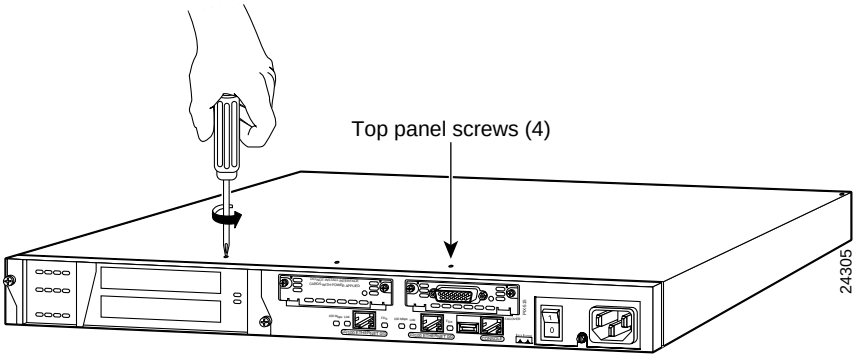


Step 3 Lower the front of the top panel onto the chassis, making sure that the top panel side tabs fit under the chassis side panels.

Step 4 Slide the top panel toward the front, making sure that the top panel tabs fit under the chassis back panel and the back panel tabs fit under the top panel.



Step 5 Fasten the top panel with the screws you set aside earlier.



Step 6 Reinstall the chassis on a rack, desktop, or table.

See Rack Mounting, page 3-7, if you are reinstalling in a rack.

Step 7 Reinstall the network interface cables.

See Installing the IDS-4215, page 3-9, for the procedure.

Removing and Replacing the IDE Hard-Disk Drive

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030**

Caution Only use the replacement IDE hard-disk drive from Cisco. We cannot guarantee that other hard-disk drives will operate properly with the IDS.

Caution Be sure to read the safety warnings in the *Regulatory Compliance and Safety Information for the Cisco Intrusion Detection System 4200 Series Appliance Sensor* and follow proper safety procedures when removing and replacing the hard-disk drive.

This section describes how to remove and replace the IDE hard-disk drive.

This section contains the following topics:

Removing the Hard-Disk Drive

To remove the hard-disk drive from the IDS-4215, follow these steps:

Step 1 Log in to the CLI.

Step 2 Prepare the appliance to be powered off:

```
sensor# reset powerdown
```

Wait for the power down message before continuing with Step 3.

Note You can also power down the sensor using IDM or IDS MC.

Step 3 Power off the appliance.

Step 4 Remove the power cord and other cables from the appliance.

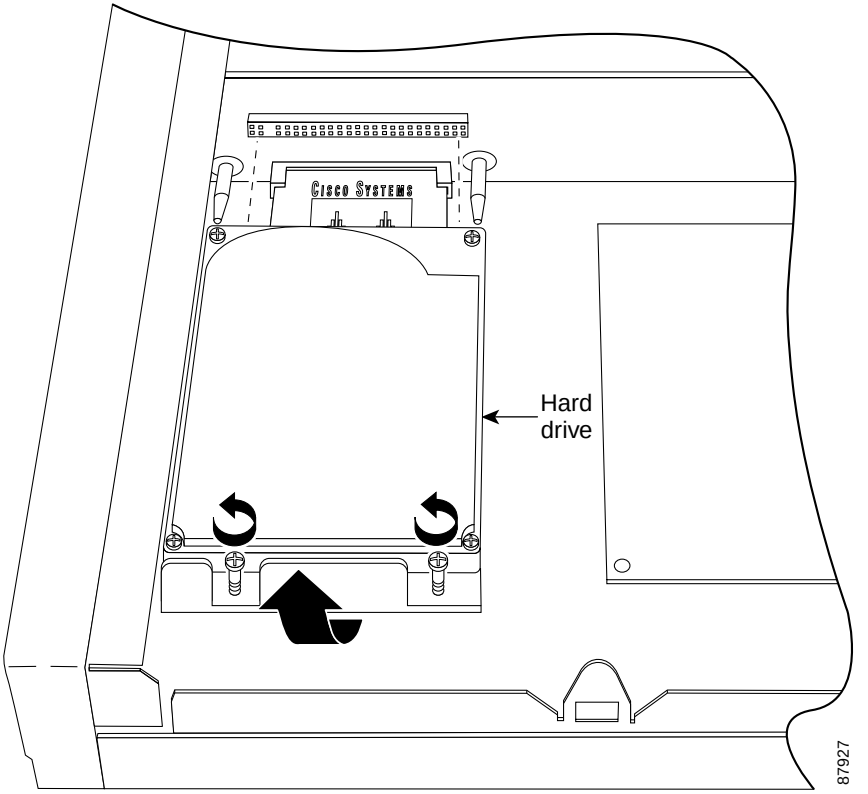
Step 5 Place the appliance in an ESD-controlled environment.

See Working in an ESD Environment, page 1-21, for more information.

Step 6 Remove the chassis cover.

See Removing the Chassis Cover, page 3-13, for the procedure.

Step 7 Loosen the two captive screws from the hard-disk drive carrier.



Step 8 Grasp the hard-disk drive and pull straight backwards until it is free of the riser card connector. Do not lift or wiggle the hard-disk drive side to side until it is completely free of the connector.

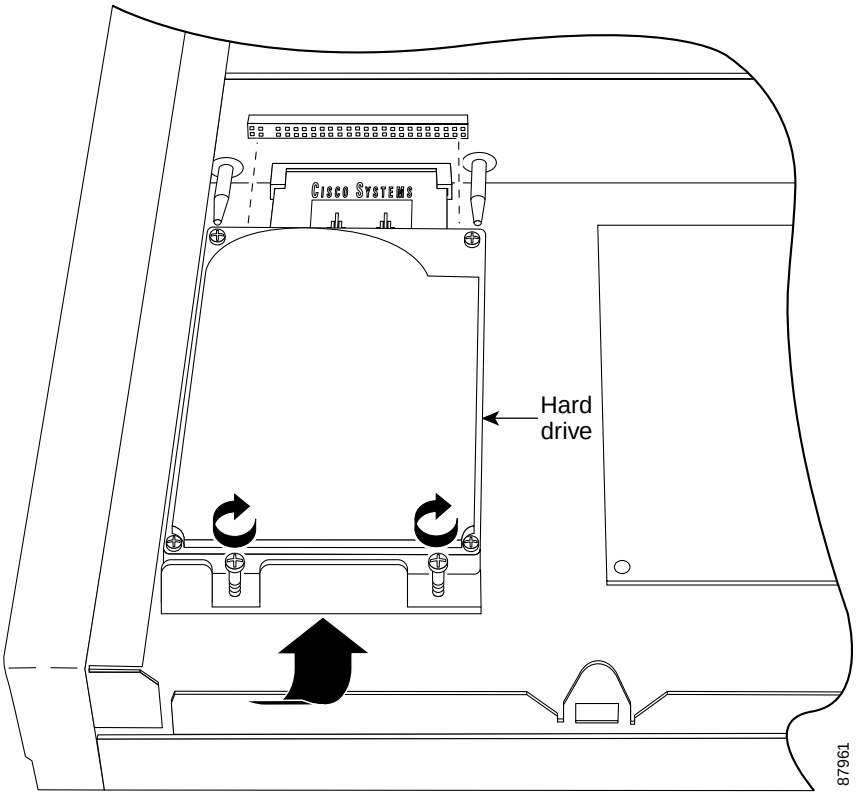
Replacing the Hard-Disk Drive

To replace the hard-disk drive in the IDS-4215, follow these steps:

Step 1 Place the appliance in an ESD-controlled environment.

See Working in an ESD Environment, page 1-21, for more information.

Step 2 Align the hard-disk drive connector with the two guide pins on the riser card.



Step 3 Push the hard-disk drive straight into the riser card connector. Do not lift or wiggle the hard-disk drive side to side. Push carefully until the hard-disk drive is seated.

Step 4 Tighten the two captive screws.

Step 5 Replace the chassis cover.

See Replacing the Chassis Cover, page 3-15, for the procedure.

Removing and Replacing the Compact Flash Device

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030**

Caution Be sure to read the safety warnings in the *Regulatory Compliance and Safety Information for the Cisco Intrusion Detection System 4200 Series Appliance Sensor* and follow proper safety procedures when removing and replacing the compact flash.

This section describes how to remove and replace the compact flash device in the IDS-4215.

This section contains the following topics:

Removing the Compact Flash Device

To remove the compact flash device from the IDS-4215, follow these steps:

Step 1 Log in to the CLI.

Step 2 Prepare the appliance to be powered off:

```
sensor# reset powerdown
```

Wait for the power down message before continuing with Step 3.

Note You can also power down the sensor using IDM or IDS MC.

Step 3 Power off the appliance.

Step 4 Remove the power cord and other cables from the appliance.

Step 5 Place the appliance in an ESD-controlled environment.

See Working in an ESD Environment, page 1-21, for more information.

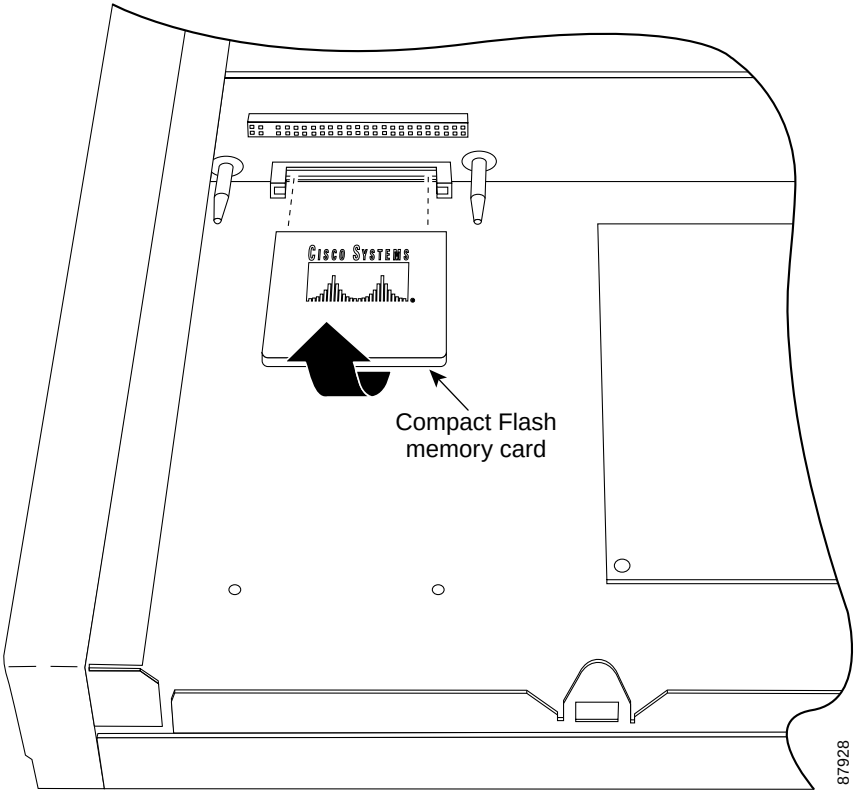
Step 6 Remove the chassis cover.

See Removing the Chassis Cover, page 3-13, for the procedure.

Step 7 Remove the hard-disk drive.

See Removing the Hard-Disk Drive, page 3-18, for the procedure.

Step 8 Grasp the compact flash device and carefully remove it from the connector on the riser card.



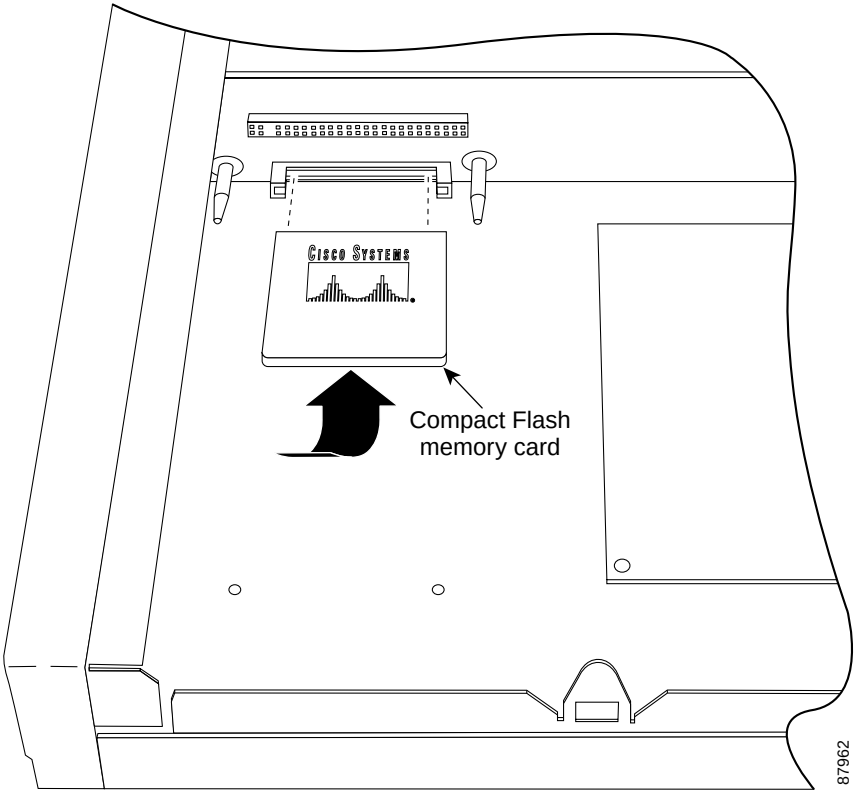
Replacing the Compact Flash Device

To replace the compact flash device in the IDS-4215, follow these steps:

Step 1 Place the appliance in an ESD-controlled environment.

See Working in an ESD Environment, page 1-21 for more information.

Step 2 Align the compact flash device with the connector on the riser card.



Step 3 Press until the compact flash device is fully seated in the connector.

Step 4 Replace the hard-disk drive.

See Replacing the Hard-Disk Drive, page 3-20, for the procedure.

Step 5 Replace the chassis cover.

See Replacing the Chassis Cover, page 3-15, for the procedure.

Removing and Installing the 4FE Card

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030**

Caution Be sure to read the safety warnings in the *Regulatory Compliance and Safety Information for the Cisco Intrusion Detection System 4200 Series Appliance Sensor* and follow proper safety procedures when installing and removing the 4FE card.

You can order the IDS-4215 with the 4FE card already installed or you can upgrade your IDS-4215 with the 4FE card to have four additional interfaces.

This section contains the following topics:

Removing the 4FE Card

To remove the 4FE card, follow these steps:

Step 1 Log in to the CLI.

Step 2 Prepare the appliance to be powered off:

```
sensor# reset powerdown
```

Wait for the power down message before continuing with Step 3.

Note You can also power down the sensor using IDM or IDS MC.

Step 3 Power off the appliance.

Step 4 Remove the power cord and other cables from the appliance.

Step 5 Place the appliance in an ESD-controlled environment.

See Working in an ESD Environment, page 1-21, for more information.

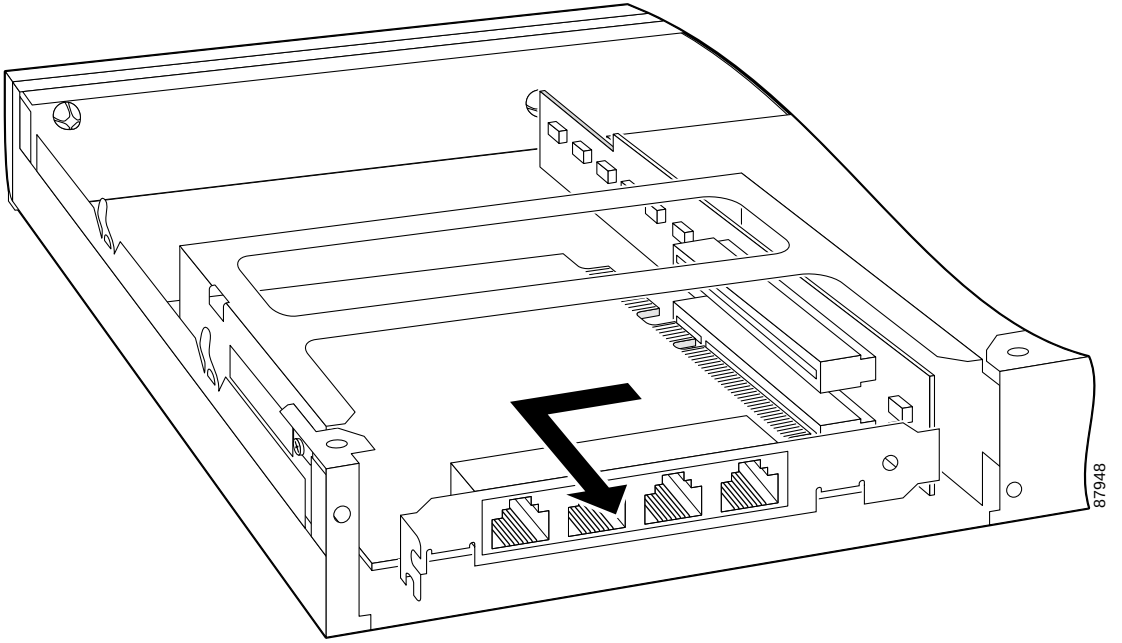
Step 6 Remove the chassis cover.

See Removing the Chassis Cover, page 3-13, for the procedure.

Step 7 Loosen the single captive screw that holds the 4FE card's connecting flange to the back cover plate.

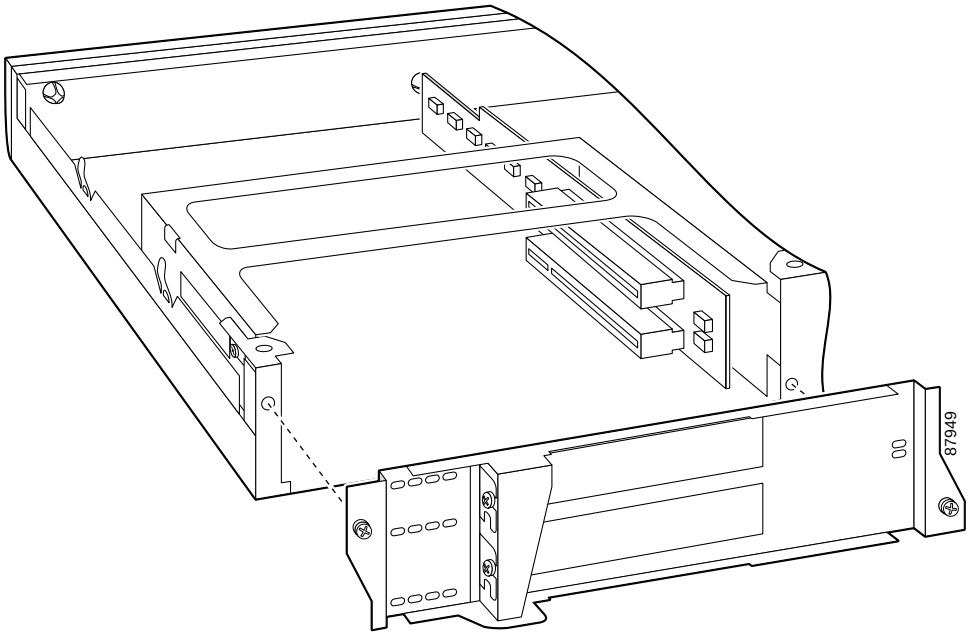
Step 8 Loosen the two captive screws from the back cover on the left and put the back cover aside.

Step 9 Grasp the 4FE card and pull it out of the slot and through the cage opening.



Step 10 Replace the lower slot cover from the back cover plate.

Step 11 Replace the back cover plate and tighten the two captive screws.



Step 12 Replace the chassis cover.

See Replacing the Chassis Cover, page 3-15, for the procedure.

Installing the 4FE Card

We recommend that you install the 4FE card in the bottom slot. We do not support installation of the 4FE card in the top slot.

Note Only one 4FE card is supported on the IDS-4215.

To install a 4FE card in the IDS-4215, follow these steps:

Step 1 Prepare the appliance to be powered off:

```
sensor# reset powerdown
```

Wait for the power down message before continuing with Step 2.

Step 2 Power off the appliance.

Step 3 Remove the power cord and other cables from the appliance.

Step 4 Place the appliance in an ESD-controlled environment.

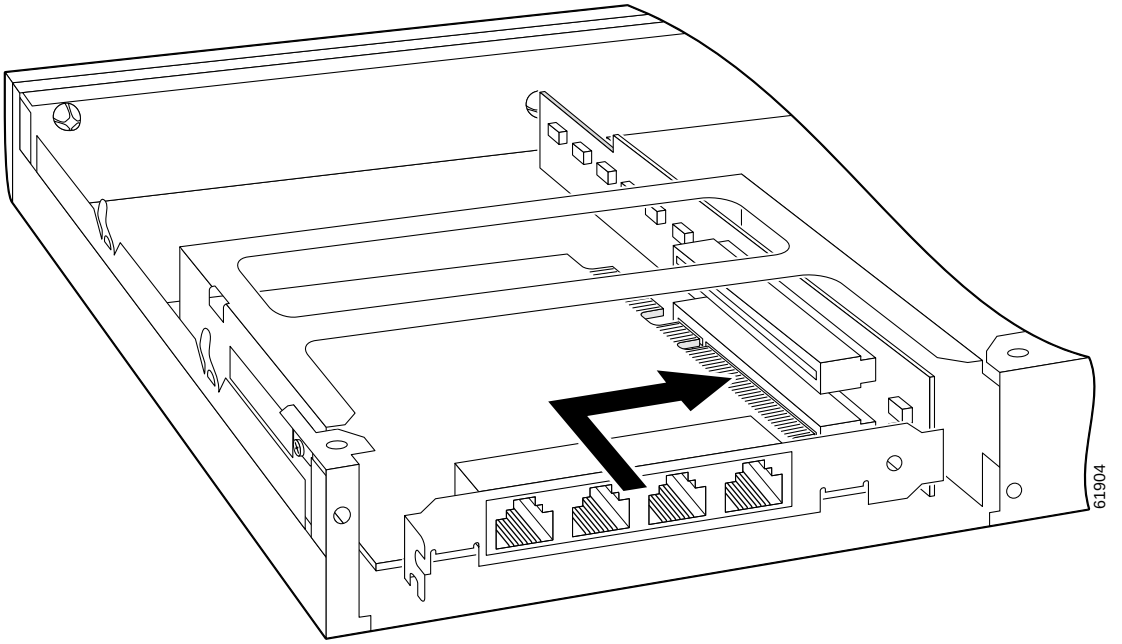
See Working in an ESD Environment, page 1-21, for more information.

Step 5 Remove the chassis cover.

See Removing the Chassis Cover, page 3-13, for the procedure.

Step 6 Loosen the two captive screws from the back cover plate on the left and put the back cover plate aside.

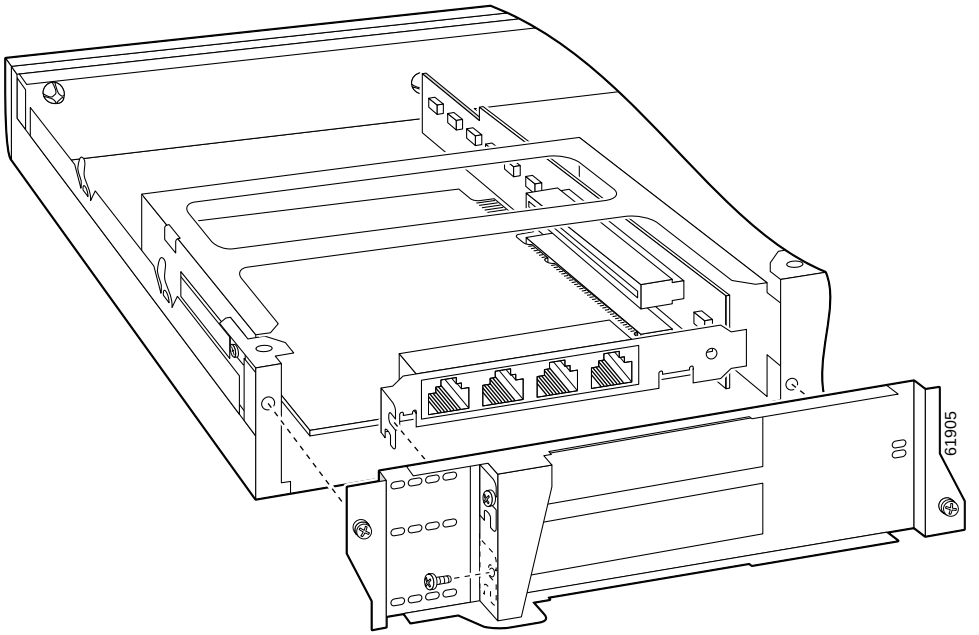
Step 7 Insert the 4FE card through the cage opening and into the lower slot.



Note When you insert a 4FE card in the slot, the end of the card's connector extends past the end of the slot. This does not affect the use or operation of the card.

Step 8 Remove the lower slot cover from the back cover plate.

Step 9 Attach the back cover plate making sure that the connecting flange on the 4FE card goes through the slot on the back cover plate.



Step 10 Tighten the single captive screw to hold the 4FE card's connecting flange to the back cover plate, and tighten the captive screws to attach the back cover plate to the appliance.

Step 11 Replace the chassis cover.

See Replacing the Chassis Cover, page 3-15, for the procedure.

You will need to assign the new interfaces (int2, int3, int4, and int5). See Assigning and Enabling the Sensing Interface, page 10-9, for the procedure.

Installing the IDS-4220 and IDS-4230

This chapter describes the IDS-4220 and IDS-4230 and how to install them. It also describes the accessories and how to install them.

Note You must upgrade the memory on the IDS-4220 to a minimum of 512 MB before you can install the most recent Cisco IDS software version. See Upgrading the Memory, page 2-3, for more information.

Note If you are upgrading an IDS-4220-E or IDS-4230-FE appliance to 4.x software, you must swap the command and control interface cable with the sensing interface cable before you upgrade the software. See Upgrading the IDS-4220-E and IDS-4230-FE to 4.x Software, page 4-5, for more information.

This chapter contains these sections:

Front and Back Panel Features

Figure 4-1 shows the front panel features of the IDS-4220 and IDS-4230.

Figure 4-1 Front Panel Features

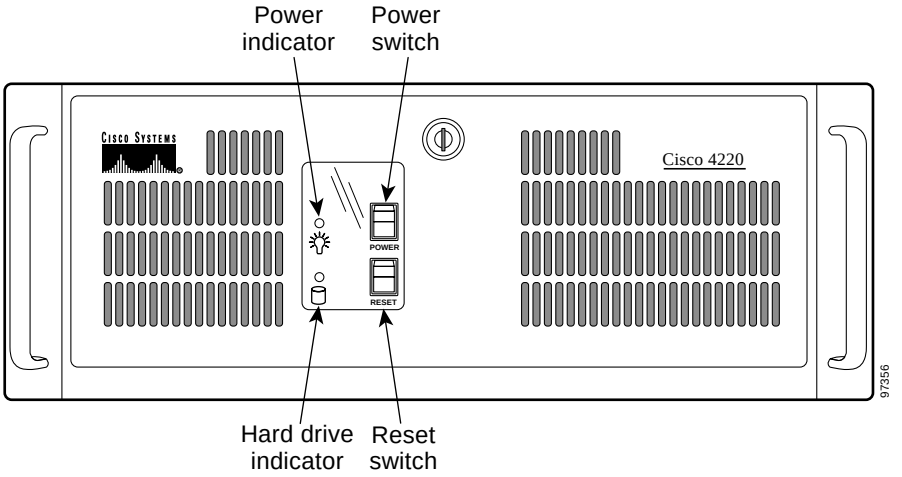


Table 4-1 describes the appearance of the front panel indicators on the IDS-4220 and IDS-4230.

Table 4-1 Front Panel Indicators

Indicator	Color	Status
Power	Green	Lights up when system is powered on; off when system is powered down.
Hard-disk drive activity	Amber	Blinks during hard-disk drive activity; off when system is idle or powered off.

Figure 4-2 on page 4-3 shows the back panel features (the onboard NIC and the SMC9432FTX network card indicators) of the IDS-4220 and IDS-4230.

Figure 4-2 Back Panel Features

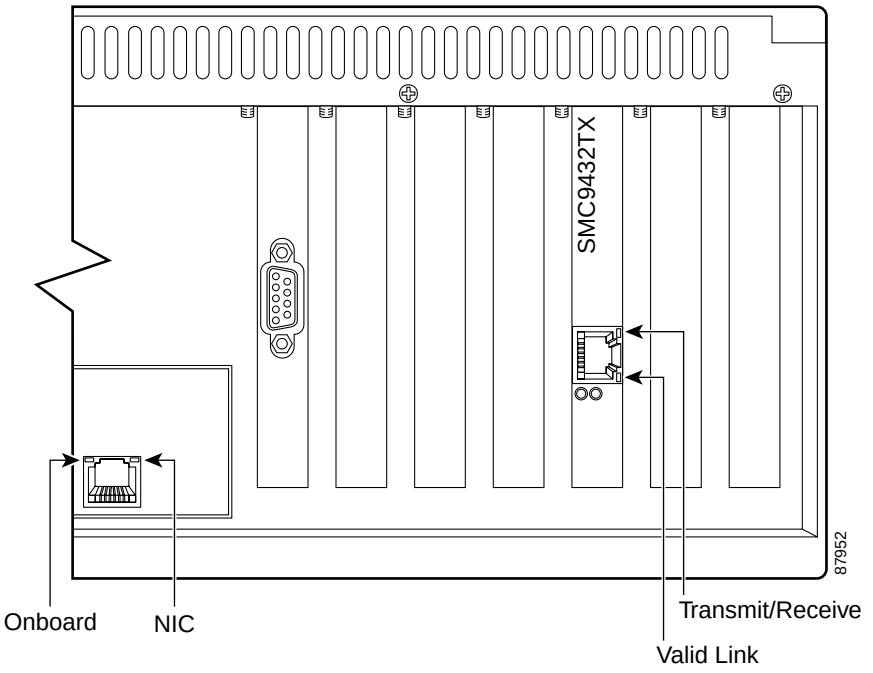


Table 4-2 describes the appearance of the onboard NIC (the monitoring port) indicators for the IDS-4220 and 4230.

Table 4-2 On-board NIC Indicators

Indicator Color	Status
Orange	Lights up when there is a 100 Mbps connection; off when there is a 10 Mbps network connection.
Green	Lights up when linked to the network and there is no network traffic; blinks when linked to the network and sending or receiving data; off when it is not linked to network.

The SMC9432FTX network card includes four status indicators.

Table 4-3 describes the appearance of the SMC NIC indicators.

Table 4-3 SMC NIC Indicators

Indicator	Color	Status
LNK	Green	Lights up to indicate a valid 10BASE-T, 100BASE-TX, or 100BASE-FX link; off when power is off or connection is not valid.
T/R	Amber	Blinks to indicate the network card is transmitting or receiving data.
100	Green	Lights up to indicate a 100 Mbps connection to the network card.
FDX	Amber	Lights up to indicate the network card is operating in full-duplex mode.

Recommended Keyboards and Monitors

Some keyboards and monitors are not compatible with the IDS-4220 and IDS-4230. This incompatibility could cause them to boot improperly.

Note You can also use a serial cable to connect to the appliance's console port.

The following keyboards and monitors have been tested with the IDS-4220 and IDS-4230:

- Keyboards
  - KeyTronic E03601QUS201-C
  - KeyTronic LT DESIGNER
- Monitors
  - MaxTech XT-7800
  - Dell D1025HT

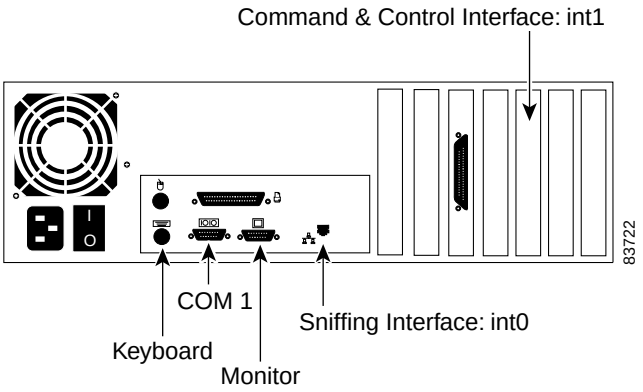
Caution The appliance does not function properly with some HP keyboards and with IBM model G50 monitors.

Note Other monitors and keyboards may be compatible with the appliance.

Upgrading the IDS-4220-E and IDS-4230-FE to 4.x Software

If you are upgrading an IDS-4220-E or IDS-4230-FE appliance to 4.x software, you must swap the command and control interface cable with the sensing interface cable before you upgrade the software. For IDS software 4.x, the former command and control interface is now the sensing interface as shown in Figure 4-3.

Figure 4-3 IDS-4220-E and IDS-4230-FE Interface Cables



Caution If the cables on the IDS-4220-E or IDS-4230-FE are not swapped, you may not be able to connect to your appliance through the network.

Note The PCI-based card that was used as the sensing interface for the IDS-4220-E and the IDS-4230-FE does not support the monitoring of dot1q trunk packets and the tracking of the 993 Dropped Packet alarm. The performance is also lower with the PCI-based card compared to the onboard NIC. For these reasons, the PCI card is now used as the command and control interface and the onboard NIC is used for sensing.

If you are upgrading from version 3.1, see Upgrading the IDS-4220-E and IDS-4230-FE to 4.x Software, page 4-5, for the procedure for upgrading your IDS-4220 and IDS-4230 to version 4.x software. If you have already swapped the cables and upgraded to 4.0, see Obtaining Cisco IDS Software, page 9-1, for the procedure for obtaining the 4.1 software.

Installing the IDS-4220 and IDS-4230

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030**

Caution Be sure to read the safety warnings in the *Regulatory Compliance and Safety Information for the Cisco Intrusion Detection System 4200 Series Appliance Sensor* and follow proper safety procedures when performing these steps.

To install the IDS-4220 and IDS-4230 on your network, follow these steps:

Step 1 Position the appliance on the network.

See Placing an Appliance on Your Network, page 1-6, for information on the best places to position an appliance.

Step 2 Attach the power cord to the appliance and plug it in to a power source (a UPS is recommended).

Step 3 Use the dual serial communication cable (PN 72-1847-01, included in the accessory kit) to attach a laptop to the COM1 port of the appliance (see Table 4-4 for a list of the terminal settings), or connect a keyboard and monitor to the appliance.

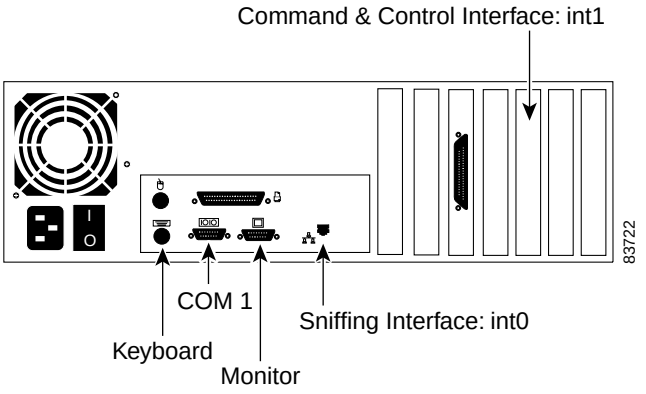
Table 4-4 Terminal Settings

Terminal	Setting
Bits per second	9600
Data bits	8
Parity	None
Stop bits	1
Flow control	Hardware or RTS/CTS

Caution We recommend that you use the dual serial communication cable (PN 72-1847-01, included in the accessory kit) rather than a keyboard and monitor, because some keyboards and monitors are incompatible with the appliance. See Recommended Keyboards and Monitors, page 4-4, for a list of compatible monitors and keyboards.

Note You can use a 180/rollover or straight-through patch cable to connect the appliance to a port on a terminal server with RJ-45 or hydra cable assembly connections. Use a M.A.S.H adapter (part number 29-4077-02) to connect the appropriate cable to a port on the terminal server. See Setting Up a Terminal Server, page 1-9, for the instructions for setting up a terminal server.

Step 4 Attach the network cables.



- int0 is the sensing port.
- int1 is the command and control port.

Step 5 Upgrade the memory on the appliance.

See Upgrading the Memory, page 2-3, for the procedure.

Caution You must upgrade the memory on the IDS-4220 to a minimum of 512 MB before you can install the most recent Cisco IDS software version.

Step 6 Power on the appliance.

Step 7 Initialize your appliance.

See Initializing the Sensor, page 10-2, for the procedure.

Step 8 Upgrade your appliance to the most recent Cisco IDS software.

See Obtaining Cisco IDS Software, page 9-1, for the procedure.

Step 9 Assign the interfaces.

See Assigning and Enabling the Sensing Interface, page 10-9, for the procedure.

You are now ready to configure intrusion detection on your appliance.

Installing the IDS-4235 and IDS-4250

You can deploy the Cisco IDS-4235 at 250 Mbps to provide protection in switched environments and on multiple T3 subnets. With the support of 10/100/1000 interfaces you can also deploy it on partially utilized gigabit links. The monitoring interface and the command and control interface are both 10/100/1000BASE-TX. You can install the 4FE card to provide an additional four sensing interfaces. See Installing Optional PCI Cards, page 5-16, for the procedure for installing optional PCI cards.

Note The 250-Mbps performance for the IDS-4235 is based on the following conditions: 2500 new TCP connections per second, 2500 HTTP transactions per second, average packet size of 445 bytes, system running Cisco IDS 4.1 sensor software.

The Cisco IDS-4250 supports a 500-Mbps speed and can be used to protect gigabit subnets and traffic traversing switches that are being used to aggregate traffic from numerous subnets. The monitoring interface and the command and control interface are both 10/100/1000BASE-TX. The optional interface is 1000BASE-SX (fiber). In addition, you can upgrade the IDS-4250 to full line-rate gigabit performance with the IDS Accelerator (XL) card. You can also install the 4FE card to provide an additional four sensing interfaces. See Installing Optional PCI Cards, page 5-16, for the procedure for installing optional PCI cards.

Note The 500-Mbps performance for the IDS-4250 is based on the following conditions: 2700 new TCP connections per second, 2700 HTTP transactions per second, average packet size of 595 bytes, system running Cisco IDS 4.1 sensor software.

Or you can order the IDS-4250-XL with the XL card already installed. At 1 Gbps, the IDS 4250-XL provides customized hardware acceleration to protect fully saturated gigabit links as well as multiple partially utilized gigabit subnets.

Note The 1000-Mbps performance for the IDS-4250-XL is based on the following conditions: 5000 new TCP connections per second, 5000 HTTP transactions per second, average packet size of 595 bytes, system running Cisco IDS 4.1 sensor software.

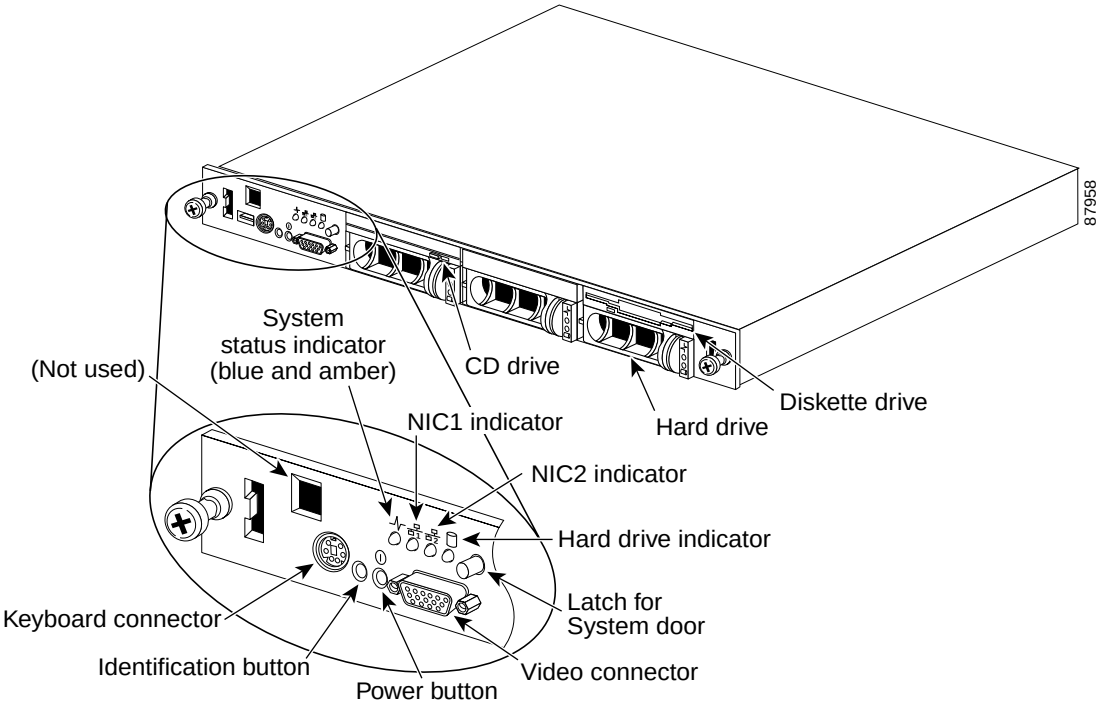
This chapter describes the IDS-4235 and IDS-4250 and how to install them. It also describes the accessories and how to install them.

This chapter contains the following sections:

Front-Panel Features and Indicators

Figure 5-1 on page 5-3 shows the controls, indicators, and connectors located behind the bezel on the front panel of the IDS-4235 and IDS-4250.

Figure 5-1 Front-Panel Features and Indicators



The power button controls the AC power input to the appliance's power supplies.

You can use the identification buttons on the front and back panels to locate a particular appliance in a rack. When you push one of these buttons, the blue system status indicator on the front and back blinks until you push one of the buttons again.

The front panel also has a video connector for connecting a monitor and a PS/2 connector for connecting a keyboard.

Table 5-1 on page 5-4 describes the appearance of the front panel indicators for the IDS-4235 and IDS-4250.

Table 5-1 Front-Panel Indicators

LED Indicator	Icon	Description
Blue and amber system status indicator		The blue system status indicator lights up during normal system operation. The amber system status indicator flashes when the system needs attention due to a problem with power supplies, fans, system temperature, or hard drives.[1]
NIC1 and NIC2 link and activity indicators		The link and activity indicators for the two integrated NICs light up when the NICs are in use.
Hard-disk drive indicator		The green hard-disk drive activity indicator flashes when the hard-disk drive is in use.
Power button		The power button lights up when the system power is on.

1. If the system is connected to AC power and an error has been detected, the amber system status indicator will flash regardless of whether the system has been powered on

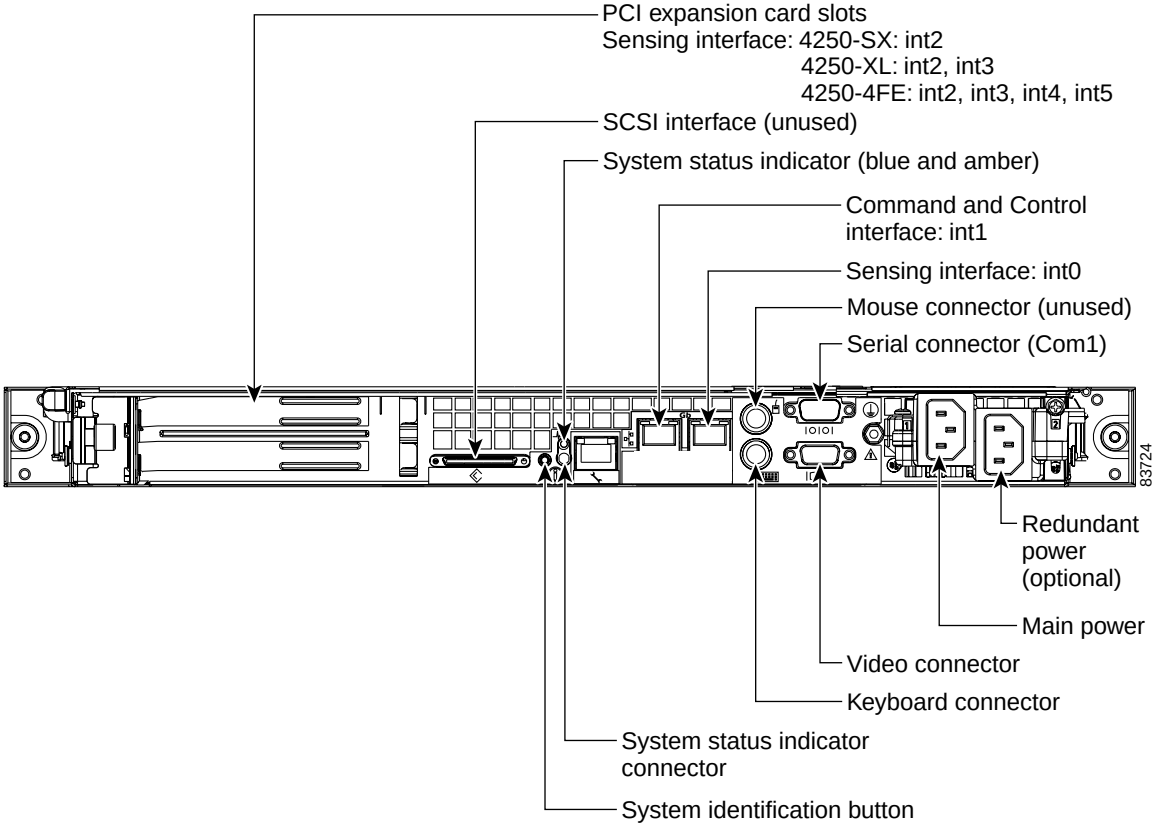
Back-Panel Features and Indicators

Figure 5-2 on page 5-5 shows the controls, indicators, and connectors located on the appliance's back panel.

Note Appliances with only one power supply should connect the power cable to connector PS1.

Caution You can use only one PCI slot for either the SX card, the XL card, or the 4FE card. Only one card is supported per chassis.

Figure 5-2 Back-Panel Features and Indicators



Specifications

Table 5-2 on page 5-6 lists the IDS-4235 and IDS-4250 specifications.

Table 5-2 IDS-4235 and IDS-4250 Specifications

Dimensions and Weight	
Height	1.67 in. (4.24 cm)
Width	17.6 in. (44.70 cm)
Depth	27.0 in. (68.58 cm)
Weight	35 lb (15.88 kg)
Form factor	1 RU, standard 19-inch rack-mountable
Power	
Autoswitching	110V to 220 VAC
Frequency	50 to 60 Hz, single phase
Operating current	2.7A at 115V 1.3A at 220V
Maximum heat dissipation	983 Btu/hr (maximum)
Environment	
Temperature	Operating +50° to +95°F (+10° to +35°C) Nonoperating -40° to 149°F (-40° to 65°C)
Relative humidity	Operating 8 to 80% (noncondensing) Nonoperating 5 to 95% (noncondensing)

Installing Spare Hard-Disk Drives

Do not install a second hard-disk drive in the IDS-4235 and IDS-4250. The spare hard-disk drives are meant to replace the original hard-disk drives and are not meant to be used in conjunction with the original hard-disk drive. If you install two hard-disk drives in the appliance, the appliance may not recognize the **recover** command used to reimage the appliance.

If the original hard-disk drive becomes unusable, remove the hard-disk drive and insert the replacement hard-disk drive. See Removing and Replacing the SCSI Hard-Disk Drive, page 5-20, for the procedure.

The replacement hard-disk drive is shipped blank from the factory. You must reimage it. See Reimaging the Appliance, page 10-110, for the procedure.

Upgrading the BIOS

If your BIOS version is earlier than A04, you must upgrade the BIOS on your IDS-4235 and IDS-4250 appliances before you install version 4.x software.

Caution Do not apply this BIOS upgrade to appliance models other than the IDS-4235 and IDS-4250.

Check your BIOS version before performing the following procedure. Reboot the appliance and watch for the BIOS version number. The following example shows BIOS version A03:

```
Phoenix ROM BIOS PLUS Version 1.10 A03
Cisco Systems IDS-4235/4250
www.cisco.com
Testing memory. Please wait.
```

If your version is A01, A02, or A03, you must upgrade the BIOS to version A04.

To create and boot the IDS-4235 or IDS-4250 BIOS upgrade diskette, follow these steps:

Step 1 Copy BIOS_A04.exe to a Windows system.

You can find the file in the /BIOS directory on the recovery/upgrade CD, or you can download it from Cisco.com. See Obtaining Cisco IDS Software, page 9-1, for the procedure for downloading IDS software from the Software Center on Cisco.com.

Note You must have a Cisco.com account with cryptographic access before you can download software from the Software Center. See Applying for a Cisco.com Account with Cryptographic Access, page 9-11, for the procedure.

Step 2 Insert a blank 1.44-MB diskette in the Windows system.

Step 3 Double-click the downloaded BIOS update file, BIOS_A04.exe, on the Windows system to generate the BIOS update diskette.

Step 4 Insert the newly created BIOS update diskette in your IDS-4235 or IDS-4250.

Caution Do not power off or manually reboot the appliance during Step 5.

Caution You cannot upgrade the BIOS from a console connection. You must connect a keyboard and monitor to the appliance so that you can see the output on the monitor.

Step 5 Boot the appliance and follow the on-screen instructions.

Step 6 Remove the BIOS update diskette from the appliance while the appliance is rebooting, otherwise the BIOS upgrade will be started again.

Using the TCP Reset Interface

The IDS-4250-XL has a TCP reset interface—INT0. The IDS-4250-XL has a specific TCP reset interface because it cannot send TCP resets on its monitoring ports.

If you have reset problems with the IDS-4250-XL, try the following:

- Make sure the TCP reset interface of the IDS-4250-XL (int0) is connected to the same switch as the sensing ports (int2 and int3) of the XL card.
- If the sensing ports are access ports (a single VLAN), you need to configure the reset port to be in the same VLAN.

  Note If the two XL ports are access ports for different VLANs, you can only configure the reset port for one of these VLANs. You can use dot1q trunk ports to overcome this limitation.

- If the sensing ports are dot1q trunk ports (multi-VLAN), the sensing ports and reset port all need to have the same native VLAN, and the reset port needs to trunk all the VLANs being trunked by both the sensing ports.

Installing the IDS-4235 and IDS-4250

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030**

Caution Be sure to read the safety warnings in the *Regulatory Compliance and Safety Information for the Cisco Intrusion Detection System 4200 Series Appliance Sensor* and follow proper safety procedures when performing these steps.

To install the IDS-4235 and IDS-4250 on your network, follow these steps:

Step 1 Position the appliance on the network.

See Placing an Appliance on Your Network, page 1-6, for information on the best places to position an appliance.

Step 2 Attach the power cord to the appliance and plug it in to a power source (a UPS is recommended).

Step 3 Use the dual serial communication cable (PN 72-1847-01, included in the accessory kit) to attach a laptop to the COM1 (serial) port of the appliance (see Table 5-3 for a list of the terminal settings), or connect a keyboard and monitor to the appliance.

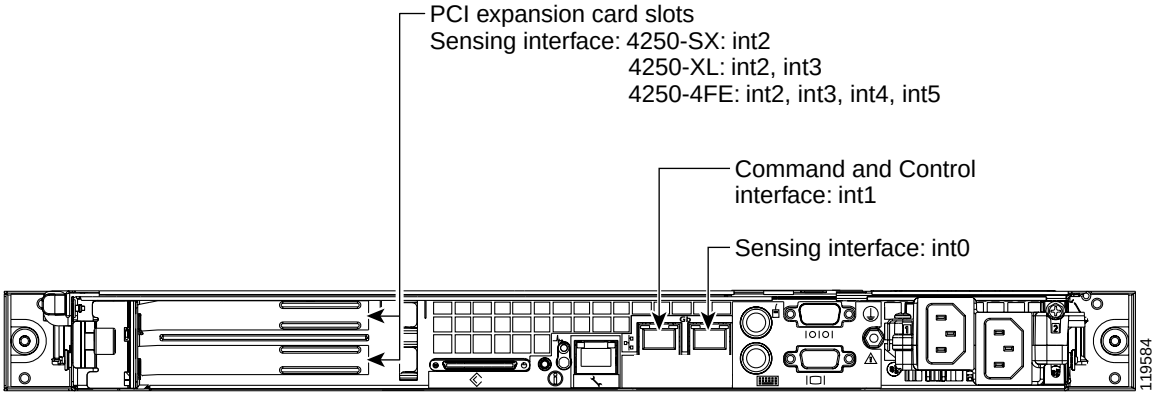
Table 5-3 Terminal Settings

Terminal	Setting
Bits per second	9600
Data bits	8
Parity	None
Stop bits	1
Flow control	Hardware or RTS/CTS

Caution We recommend that you use the dual serial communication cable included in the accessory kit, because some keyboards and monitors are incompatible with the appliance.

Note You can use a 180/rollover or straight-through patch cable to connect the appliance to a port on a terminal server with RJ-45 or hydra cable assembly connections. Use a M.A.S.H adapter (part number 29-4077-02) to connect the appropriate cable to a port on the terminal server. See Setting Up a Terminal Server, page 1-9, for the instructions for setting up a terminal server.

Step 4 Attach the network cables.



- int0 is the sensing port.
- int1 is the command and control port.
- int2 is the optional SX (fiber NIC) sensing port.
- int2 and int3 are the optional XL card sensing ports.
- int2 through int5 are the optional 4FE card sensing ports.

Step 5 Power on the appliance.

Caution If your BIOS version is earlier than A04, you must apply the BIOS upgrade before installing the version 4.x software on the IDS-4235 and IDS-4250. See Upgrading the BIOS, page 5-7.

Step 6 Initialize your appliance.

See Initializing the Sensor, page 10-2, for the procedure.

Step 7 Upgrade your appliance to the most recent Cisco IDS software.

See Obtaining Cisco IDS Software, page 9-1, for the procedure.

Step 8 Assign the interfaces.

See Assigning and Enabling the Sensing Interface, page 10-9, for the procedure.

You are now ready to configure intrusion detection on your appliance.

Installing the Accessories

This section describes the contents of the IDS-4235 and the IDS-4250 accessories package and how to install the accessories.

This section contains these topics:

Accessories Package Contents

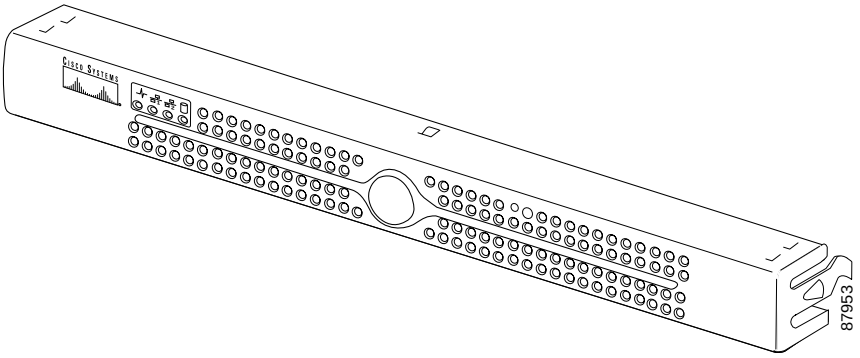
The following items are shipped in the accessories package for the IDS-4235 and IDS-4250:

- Cisco IDS-4235 or IDS-4250 bezel
- Power cable
- Network patch cable
- Dual serial communication cable
- Serial extension adapter
- M.A.S.H adapter
- Documentation and software
  - Cisco IDS recovery/upgrade CD
  - Cisco Documentation CD
  - *Cisco Intrusion Detection System (IDS) Hardware and Software Version 4.1 Documentation Guide*
  - *Regulatory Compliance and Safety Information for the Cisco Intrusion Detection System 4200 Series Appliance Sensor*

Installing and Removing the Bezel

Figure 5-3 on page 5-13 shows the Cisco bezel that you can install on your IDS-4235 or IDS-4250.

Figure 5-3 Cisco Bezel



To install and remove the bezel on the IDS-4235 or IDS-4250, follow these steps:

Step 1 To insert the bezel in the appliance, follow these steps:

a. Align the right side tab on the bezel with the slot on the appliance mounting tab.

b. Press the left side of the bezel into place on the appliance.

Step 2 To remove the bezel, press the left side tab and pull.

Installing the Power Supply

You can install a second, redundant power supply and power-supply cooling fan (part number IDS-PWR=) in your appliance.

Caution Be sure to read the safety warnings in the *Regulatory Compliance and Safety Information for the Cisco Intrusion Detection System 4200 Series Appliance Sensor* and follow proper safety procedures when performing the following steps.

To install a power supply and fan, follow these steps:

Step 1 Log in to the CLI.

Step 2 Prepare the appliance to be powered off:

```
sensor# reset powerdown
```

Wait for the power down message before continuing with Step 3.

Note You can also power down the sensor from IDM or IDS MC.

Step 3 Power off the appliance.

Step 4 Remove the power cord and other cables from the appliance.

Step 5 Place the appliance in an ESD-controlled environment.

See Working in an ESD Environment, page 1-21, for more information.

Step 6 Remove the cover.

a. Remove the single screw at the front of the chassis.

b. Press the chassis release button to release the left side of the cover.

c. Lift the left side of the cover using the tab at the back of the appliance.

d. Lift the right side of the cover using the tab at the back of the appliance.

Step 7 Place the new power supply cooling fan in the back of the power supply bay (see Figure 5-4 on page 5-15).

Note Ensure that the finger guard on the fan faces the back of the appliance and that the fan power cable is pointing toward the fan power connector on the system board (see Figure 5-4 on page 5-15).

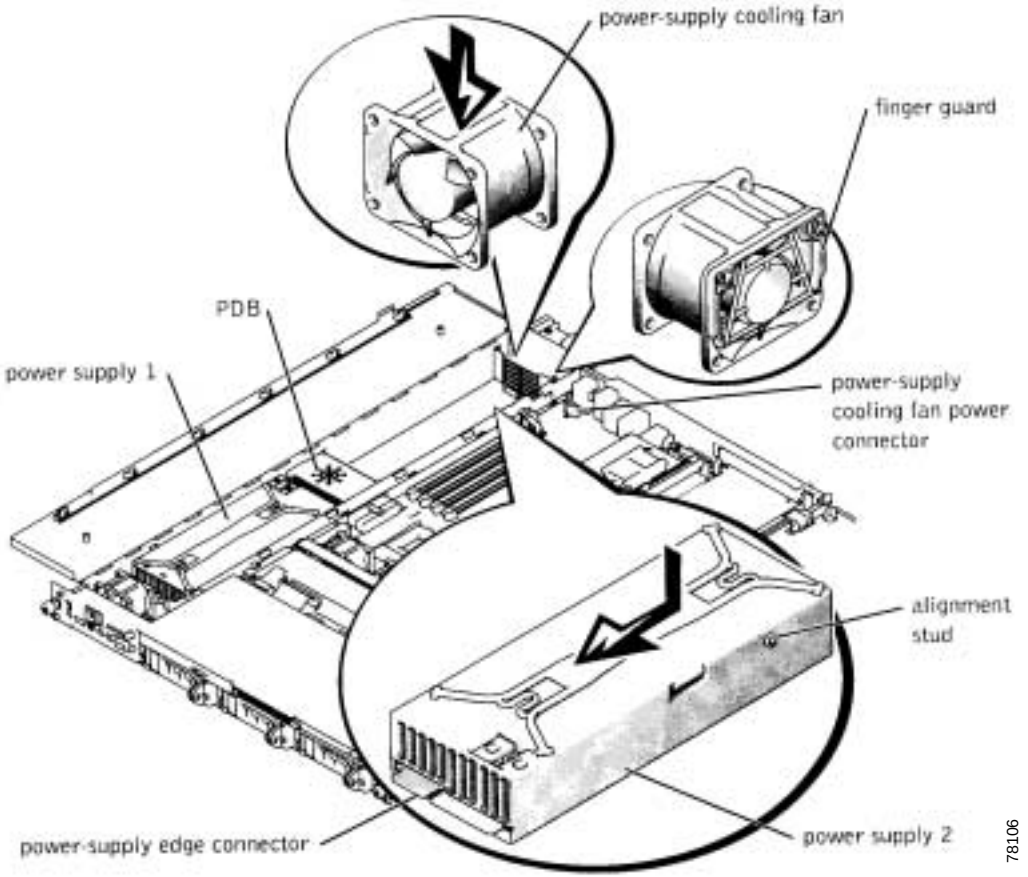
Step 8 Route the fan power cable through the rectangular opening in the power supply bay partition, and then connect the cable to the fan power connector on the system board (see Figure 5-4 on page 5-15).

Step 9 To install the new power supply, align the stud on the side of the power supply with the corresponding notch in the chassis, and then lower the power supply into the chassis (see Figure 5-4 on page 5-15).

Warning **The connectors on the Power Distribution Board (PDB) contain high voltages. Do not remove the metal cover from the PDB or touch the connectors on the PDB or power supplies.**

Step 10 Slide the power supply toward the PDB until the power-supply edge connector is fully seated in the PDB connector (see Figure 5-4).

Figure 5-4 Power Supply and Power-Supply Cooling Fan



Step 11 Close the cover.

a. Close the right side of the cover.

b. Close the left side of the cover, and press firmly along the edge to lock in place.

c. Replace the screw at the front of the chassis.

Step 12 Connect the new system power cable to the power-supply 2 cable connector (PS2) on the back panel of the appliance.

Installing Optional PCI Cards

You can install the following optional PCI cards in the IDS-4235 and IDS-4250. The optional PCI cards provide additional sensing interfaces.

- SX card (1000BASE-SX sensing interface, part number, IDS-4250-SX-INT=)

  You can install the SX card in the upper PCI slot on the IDS-4250 series appliances.

- XL card (accelerated 1000BASE-SX interface with MTRJ, part number IDS-XL-INT=)

  You can install the XL card in the upper PCI slot in the IDS-4250 series appliances. The XL card accelerates the performance of the IDS-4250 up to 1 Gbps. You can use an MTRJ cable (part number CAB-MTRJ-SC-MM-3M=) to connect the fiber port on the XL card to the switch on the network. You can order this cable when you order the XL card.

  See Disconnecting the XL Card Fiber Ports, page 5-19, for information about disconnecting the fiber ports the first time you boot the IDS-4250 after upgrading with the XL card.

- 4FE card (four-port 10/100BASE-TX fast Ethernet sensing interface, part number IDS-4FE-INT=)

  You can install the 4FE card in the lower PCI slot in the IDS-4235 and IDS-4250 series appliances.

Caution Be sure to read the safety warnings in the *Regulatory Compliance and Safety Information for the Cisco Intrusion Detection System 4200 Series Appliance Sensor* and follow proper safety procedures when performing the following steps.

Note None of the PCI cards are supported as a command and control interface.

Caution The IDS-4250 supports only one of the following cards in a PCI slot: the SX card (upper PCI slot), the XL card (upper PCI slot), or the 4FE card (lower PCI slot). The IDS-4235 supports only the 4FE card in the lower PCI slot.

To install the PCI card, follow these steps:

Step 1 Log in to the CLI.

Step 2 Prepare the appliance to be powered off:

```
sensor# reset powerdown
```

Wait for the power down message before continuing with Step 3.

Note You can also power down the sensor from IDM or IDS MC.

Step 3 Power off the appliance.

Step 4 Remove the power cord and other cables from the appliance.

Step 5 Place the appliance in an ESD-controlled environment.

See Working in an ESD Environment, page 1-21, for more information.

Step 6 Remove the cover.

a. Remove the single screw at the front of the chassis.

b. Press the chassis release button to release the left side of the cover.

c. Use the tab at the rear of the system to lift the left side of the cover.

d. Use the tab at the rear of the system to lift the right side of the cover.

Step 7 Remove the PCI slot cover.

a. Pull the slot release pin at the back of the chassis to unlock the PCI slot covers and pull the slot release toward you.

b. Remove the PCI slot cover.

Step 8 Insert the PCI card into the proper PCI slot of the riser card (according to which card you have), using enough pressure so that the card pops securely into place.

Caution Be sure to support the riser card while inserting the PCI card, otherwise, you could cause the riser card to flex and damage the riser card or main board.

Caution The IDS-4250 supports only one of the following cards in a PCI slot: the SX card (upper PCI slot), the XL card (upper PCI slot), or the 4FE card (lower PCI slot). The IDS-4235 supports only the 4FE card in the lower PCI slot.

Step 9 Check the back of the chassis to be sure the card is flush with the PCI slot, and then return the PCI slot release to its original position to lock the PCI slot card in place.

Step 10 Close the cover.

a. Close the right side of the cover.

b. Close the left side of the cover, and press firmly along the edge to lock in place.

c. Replace the screw at the front of the chassis.

Step 11 Replace the power and network connections.

Note The monitoring interface connector is now on the XL card.

Step 12 Reboot the appliance.

Caution Make sure the fiber ports are not connected the first time you boot the appliance after you have installed the XL card. For more information, see Disconnecting the XL Card Fiber Ports, page 5-19.

Step 13 Assign the new interfaces:

- SX card—int2
- XL card—int2 and int3
- 4FE card—in2 through int5

See Assigning and Enabling the Sensing Interface, page 10-9, for the procedure.

Disconnecting the XL Card Fiber Ports

When you upgrade the IDS-4250-TX and IDS-4250-SX with the XL card, the appliances may not boot up the first time if the fiber ports are connected. Disconnect the fiber ports before you boot up the appliance. After the appliance starts for the first time, the firmware version is upgraded and the problem is not seen again.

Note You will not experience this problem if you order the IDS-4250-XL—with the XL card already installed—because the appliance is rebooted at the factory.

To allow the appliance to reboot after installing the XL card, follow these steps:

Step 1 Log in to the CLI.

Step 2 Prepare the appliance to be powered off:

```
sensor# reset powerdown
```

Wait for the power down message before continuing with Step 3.

Note You can also power down the sensor from IDM or IDS MC.

Step 3 Power off the appliance.

Step 4 Remove the fiber connections from the XL card.

Step 5 Boot up the appliance.

Wait until the appliance has completed bootup and you see a login prompt.

Step 6 Plug the fiber connections back into the XL card.

Step 7 During the startup of the IDS applications, the XL card is upgraded to the latest firmware.

Removing and Replacing the SCSI Hard-Disk Drive

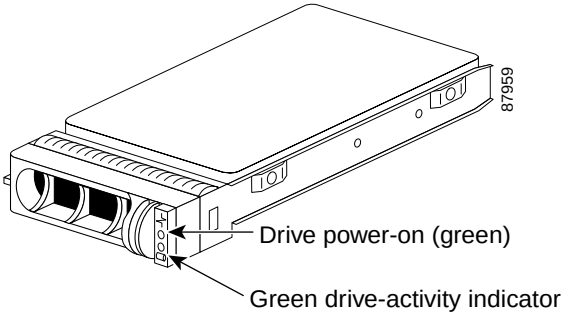
The IDS-4235 and IDS-4250 have a removable SCSI hard-disk drive. You can replace the hard-disk drive in case of drive failure. Or you can order a spare drive (part number IDS-SCSI=), apply your configuration, and ship the drive to a remote site. The administrator at the remote site can then install the configured drive.

Caution Be sure to read the safety warnings in the *Regulatory Compliance and Safety Information for the Cisco Intrusion Detection System 4200 Series Appliance Sensor* and follow proper safety procedures when removing and replacing the hard-disk drive.

Caution Do not install a second hard-disk drive in the IDS-4235 and IDS-4250. The spare hard-disk drives are meant to replace the original hard-disk drives and are not meant to be used with the original hard-disk drive. If you install two hard-disk drives in the appliance, the appliance may not recognize the **recover** command used to reimage the appliance.

Figure 5-5 on page 5-21 shows the SCSI hard-disk drive indicators.

Figure 5-5 SCSI Hard-Disk Drive



When you have installed the new hard-disk drive, you must reimage it with the recovery/upgrade CD. See Using the Recovery/Upgrade CD with the Appliance, page 9-9, for the procedure.

This section contains these topics:

- Removing the SCSI Hard-Disk Drive, page 5-21
- Replacing the SCSI Hard-Disk Drive, page 5-22

Removing the SCSI Hard-Disk Drive

To remove the SCSI hard-disk drive, follow these steps:

Step 1 Log in to the CLI.

Step 2 Prepare the appliance to be powered off:

```
sensor# reset powerdown
```

Wait for the power down message before continuing with Step 3.

Note You can also power down the sensor from IDM or IDS MC.

Step 3 Power off the appliance by pressing the power button.

Step 4 Remove the front bezel.

See Installing and Removing the Bezel, page 5-12, for the procedure.

Step 5 Open the hard-disk drive handle to release the drive.

Step 6 Slide the hard-disk drive out until it is free of the drive bay.

Replacing the SCSI Hard-Disk Drive

To replace the SCSI hard-disk drive, follow these steps:

Step 1 Log in to the CLI.

Step 2 Prepare the appliance to be powered off:

```
sensor# reset powerdown
```

Wait for the power down message before continuing with Step 3.

Note You can also power down the sensor from IDM or IDS MC.

Step 3 Power off the appliance by pressing the power button.

Step 4 Remove the front bezel.

See Installing and Removing the Bezel, page 5-12 for the procedure.

Step 5 Open the hard-disk drive handle.

Step 6 Insert the hard-disk drive into the drive bay.

Step 7 Close the hard-disk drive handle to lock the drive into place.

Step 8 Power on the appliance by pressing the power button.

Step 9 Replace the front bezel.

See Installing and Removing the Bezel, page 5-12 for the procedure.

Note Replacement drives are shipped without an image. You must reimage the hard-disk drive. See Reimaging the Appliance, page 10-110, for more information.

Four-Post Rack Installation

You can install your appliance in a four-post rack (part number IDS-RAIL-4=).

Caution Do not install rack kit components designed for another system. Use only the rack kit for your appliance. Using the rack kit for another system may damage the appliance and cause injury to yourself and others.

This section contains these topics:

Recommended Tools and Supplies

You need these tools and supplies to install the appliance in a four-post rack cabinet:

- #2 Phillips screwdriver
- Masking tape or felt-tip pen for marking the mounting holes to be used

Rack Kit Contents

The four-post rack kit includes these items:

- One pair of slide assemblies
- One cable-management arm
- One stop block
- One status-indicator cable assembly
- Ten 10-32 x 0.5-inch flange-head Phillips screws
- Releaseable tie wraps

Installing the Slide Assemblies

The rack is measured in rack units (RU). An RU is equal to 44 mm or 1.75 inches.

To install the slide assemblies, follow these steps:

Step 1 Remove the rack doors according to the documentation provided with the rack cabinet.

Step 2 Place a mark on the rack's front vertical rails where you want to locate the bottom of the appliance that you are installing in the rack cabinet.

Note The bottom of each 1-RU space is at the middle of the narrowest metal area between holes (marked with a horizontal line on some rack cabinets).

Step 3 Place a mark 44 mm (1.75 inches) above the original mark you made (or count up three holes) and mark the rack's front vertical rails to indicate where the appliance's upper edge will be located on the vertical rails.

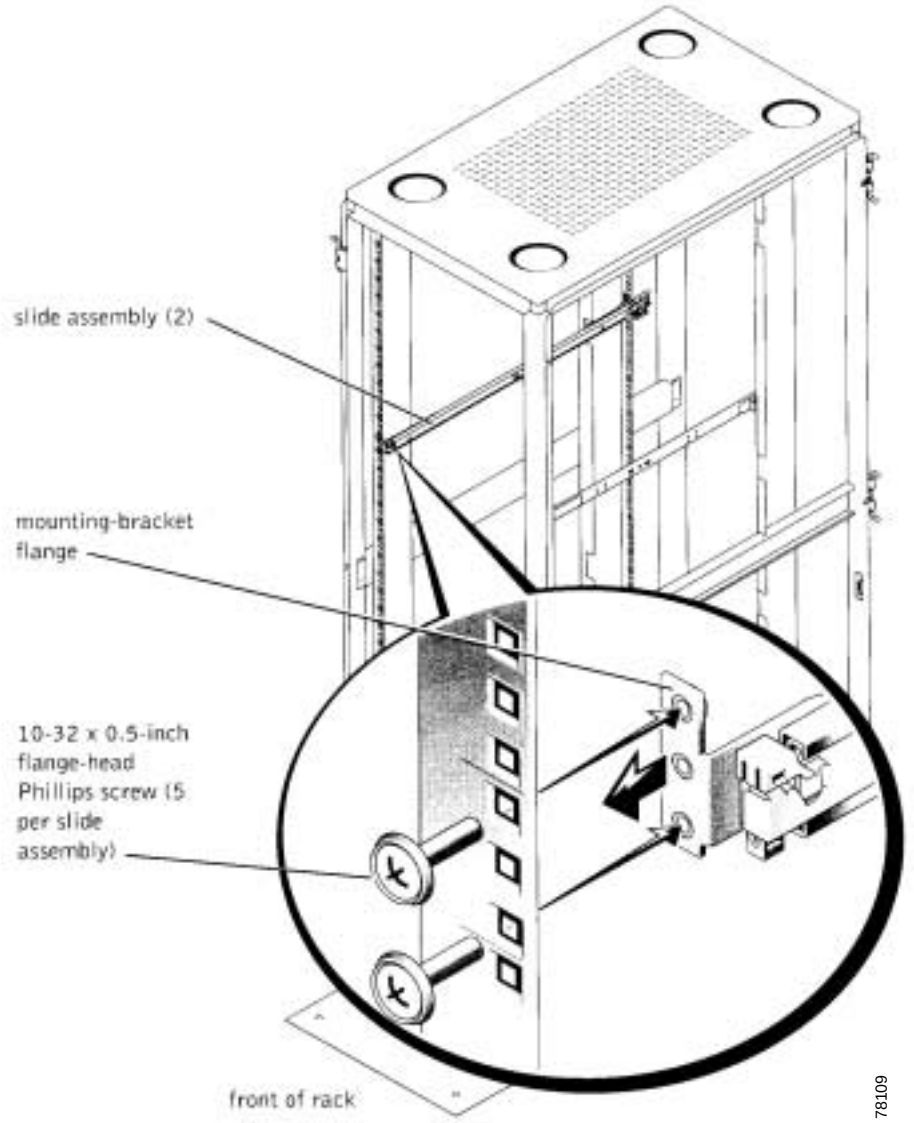
Note Mark 1 RU (44 mm or 1.75 inches) of vertical space for each appliance you install in the rack.

Step 4 At the front of the rack cabinet, position one of the slide assemblies so that its mounting-bracket flange fits between the marks you made on the rack (see Figure 5-6 on page 5-25).

Note The three holes on the front of the mounting bracket should align with the 3 holes between the marks you made on the vertical rails.

Step 5 Install two 10-32 x 0.5-inch flange-head Phillips screws in the mounting flange's top and bottom holes to secure the slide assembly to the front vertical rail (see Figure 5-6 on page 5-25).

Figure 5-6 Slide Assemblies



Step 6 At the back of the cabinet, pull back on the mounting-bracket flange until the mounting holes align with their respective holes on the back vertical rail.

Step 7 Install three 10-32 x 0.5-inch flange-head Phillips screws in the mounting flange's holes to secure the slide assembly to the back vertical rail.

Step 8 Repeat Steps 3 through 6 for the remaining slide assembly on the other side of the rack.

Step 9 Ensure that the slide assemblies are mounted at the same position on the vertical rails on each side of the rack.

Installing the Appliance in the Rack

If you are installing more than one appliance, install the first appliance in the lowest available position in the rack.

Caution Never pull more than one component out of the rack at a time.

To install the appliance in the rack, follow these steps:

Step 1 Pull the two slide assemblies out of the rack until they lock in the fully extended position.

Caution Because of the size and weight of the appliance, never attempt to install the appliance in the slide assemblies by yourself.

Step 2 Remove the appliance front bezel by pressing the left side tab and pulling.

Step 3 Lift the appliance into position in front of the extended slides.

Step 4 Place one hand on the front-bottom of the appliance and the other hand on the back-bottom of the appliance.

Step 5 Tilt the back of the appliance down while aligning the back shoulder screws on the sides of the appliance with the back slots on the slide assemblies.

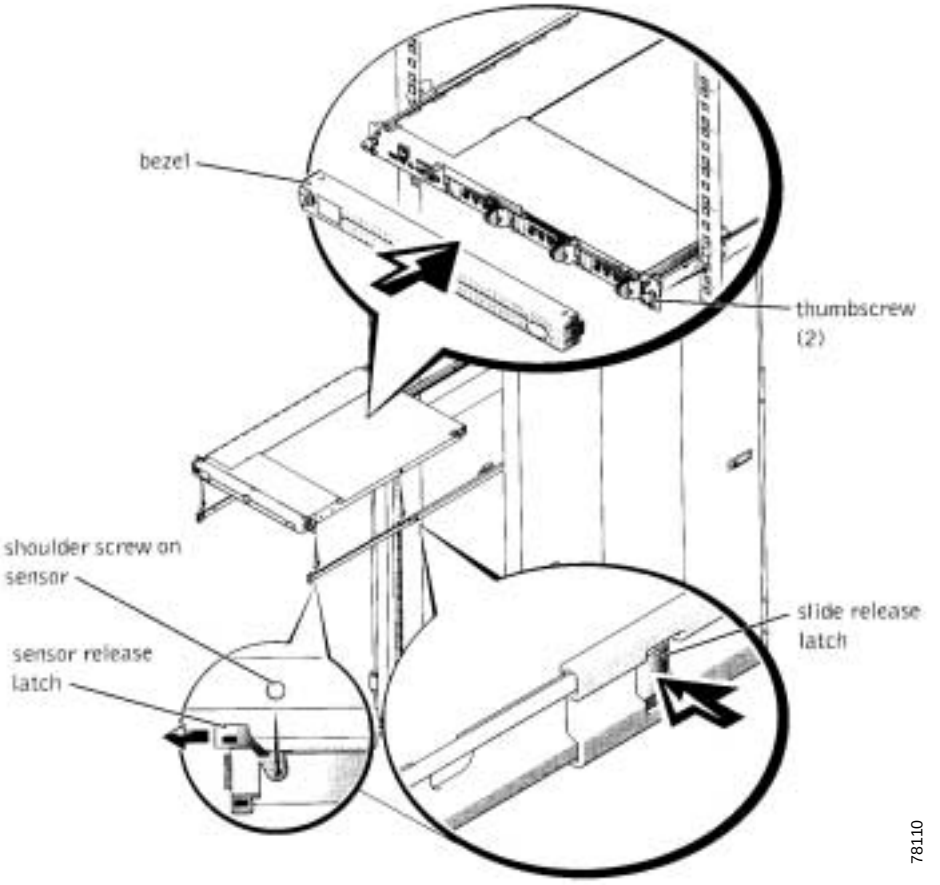
Step 6 Engage the back shoulder screws into their slots.

Step 7 Lower the front of the appliance and engage the front shoulder screws in the front slot behind the appliance release latch (see Figure 5-7 on page 5-27).

The appliance release latch moves forward and then snaps back as the shoulder screw passes into the front slot.

Note Use the appliance release latch when you want to remove the appliance from the slide assemblies.

Figure 5-7 Installing the Appliance in the Rack



Step 8 Press the slide release latch at the side of each latch to slide the appliance completely into the rack (see Figure 5-7 on page 5-27).

Step 9 Push in and turn the captive thumbscrews on each side of the front chassis panel to secure the appliance to the rack.

Installing the Cable-Management Arm

You can install the cable-management arm on the right or left of the rack cabinet. This procedure describes installing the cable-management arm in the right side of the rack cabinet, as viewed from the back.

Tip If you are installing several appliances in the rack, consider installing the cable management arms on alternating sides of the rack for ease in cable routing.

To install the cable-management arm, follow these steps:

Step 1 Facing the back of the rack cabinet, locate the latch on the end of the right slide assembly that you secured to the back vertical rail.

Step 2 Push the tab on the back end of the cable-management arm into the latch on the end of the slide assembly (see Figure 5-8 on page 5-29).

Note The latch clicks when locked.

Step 3 Push the tab on the remaining free end (the front) into a mating latch on the inner segment of the slide assembly (see Figure 5-8 on page 5-29).

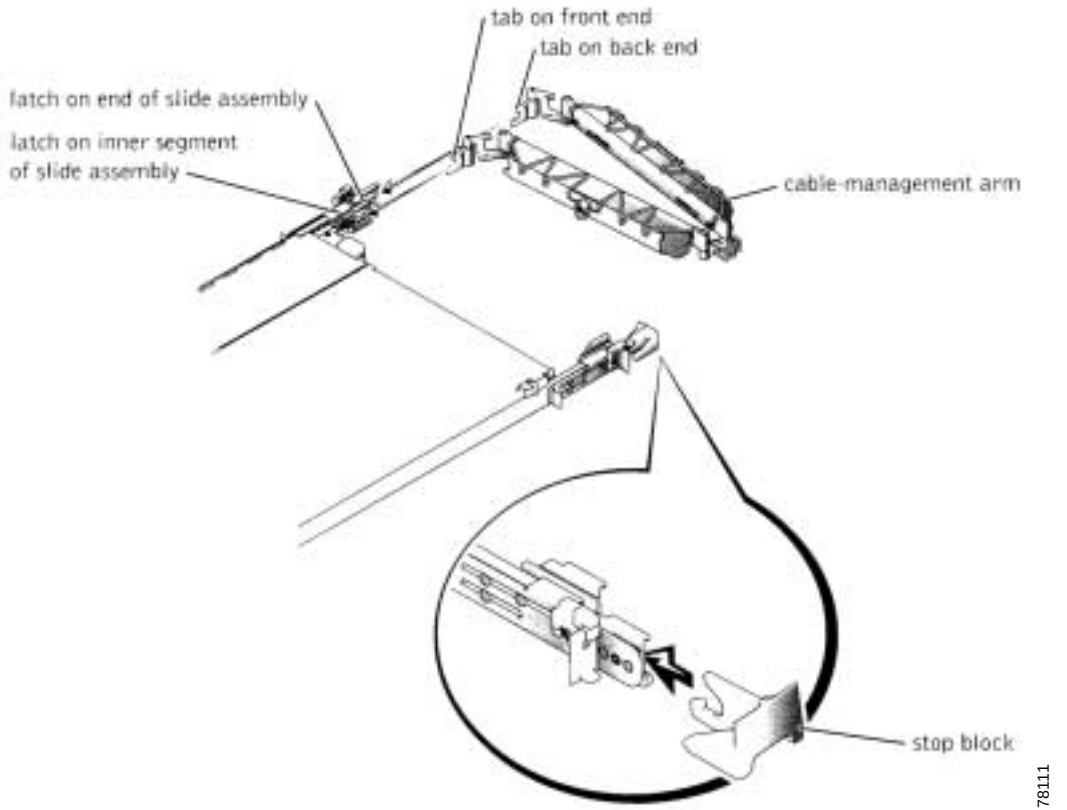
Note The latch clicks when locked.

Step 4 Install a stop block on the latch on the end of the opposite slide assembly (see Figure 5-8 on page 5-29).

Note The stop block prevents the backward travel of the cable-management arm and supports the weight of the arm with its load of installed cables.

Note The two-post rack kit has two stop blocks: one for right-side mounting, and one for left-side mounting. You can only install the proper stop block.

Figure 5-8 Cable-Management Arm



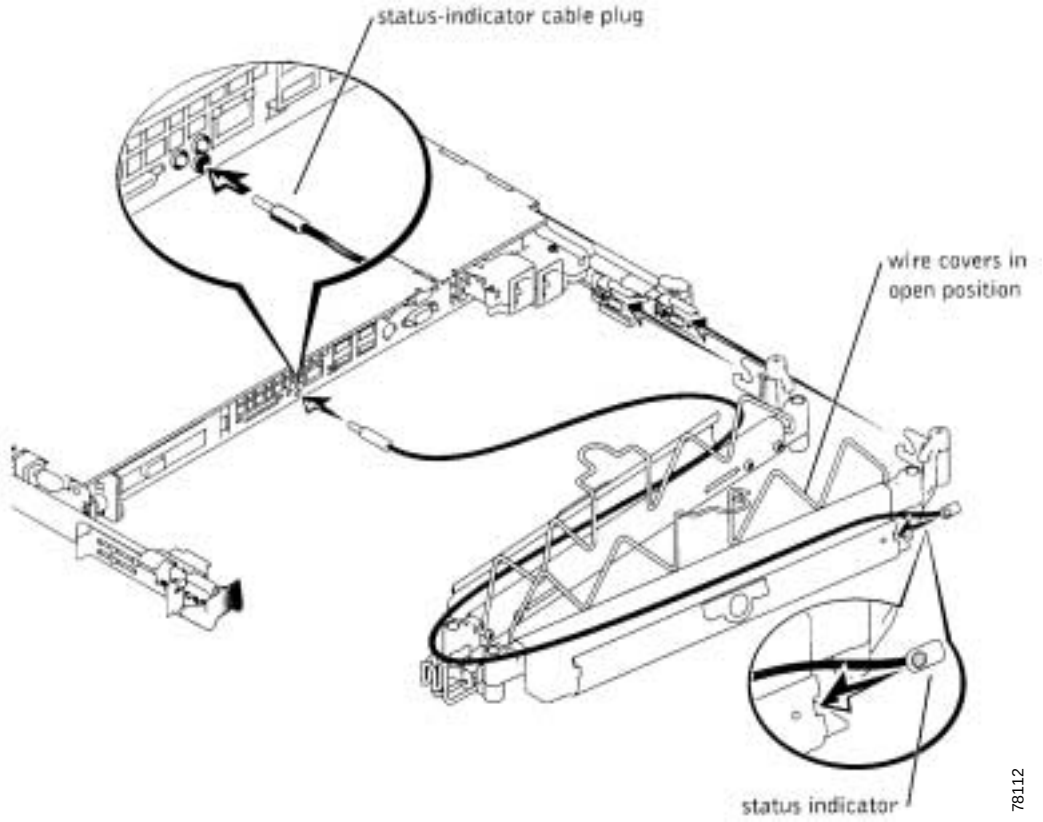
Step 5 Install the status-indicator cable plug into its connector (see Figure 5-9 on page 5-30).

Step 6 Open the wire covers on the cable-management arm by lifting the center of the wire over the top of the embossed round button on the front of the forward part of the arm, and lifting the wire over the top of a similar round button on the back part of the arm.

The wire cover swings open to enable cables to be routed within the arm.

Step 7 Route the status-indicator end of the cable assembly through the cable-management arm, and install the indicator in its slot at the back end of the cable-management arm (see Figure 5-9).

Figure 5-9 Installing the Cable-Management Arm



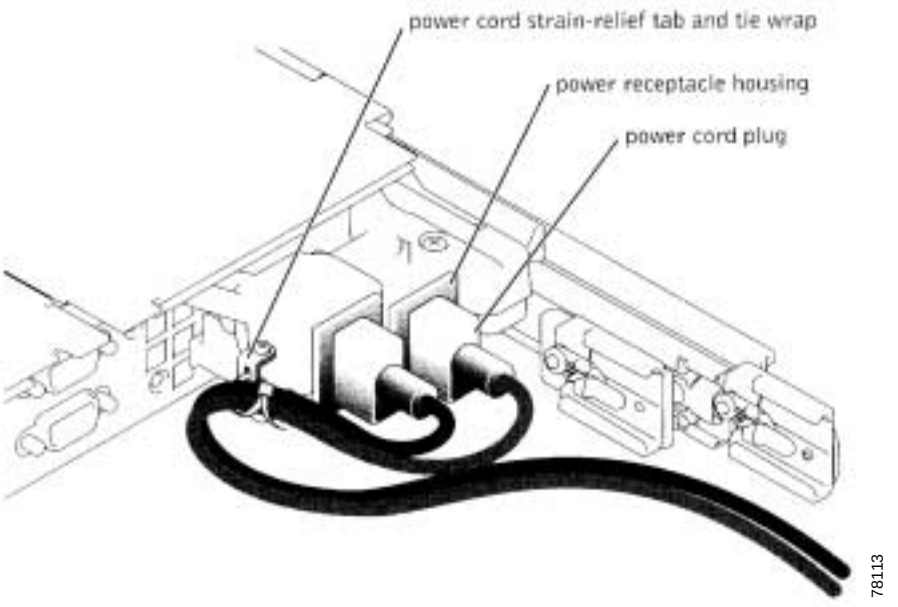
Step 8 Connect the power cords to their receptacles on the back panel.

Note Although the strain-relief can accommodate power cords with a bend radius of up to 19 millimeters (0.75 inch), use only the power cords provided with the appliance.

Step 9 Install a tie-wrap through the slot on the strain-relief tab (see Figure 5-10).

Step 10 Bend the power cords back beside the power receptacle housing and form a tight loop. Install the strain-relief tie-wrap loosely around the looped power cord (see Figure 5-10).

Figure 5-10 Power Cord Strain Relief



Routing the Cables

To route the cables, follow these steps:

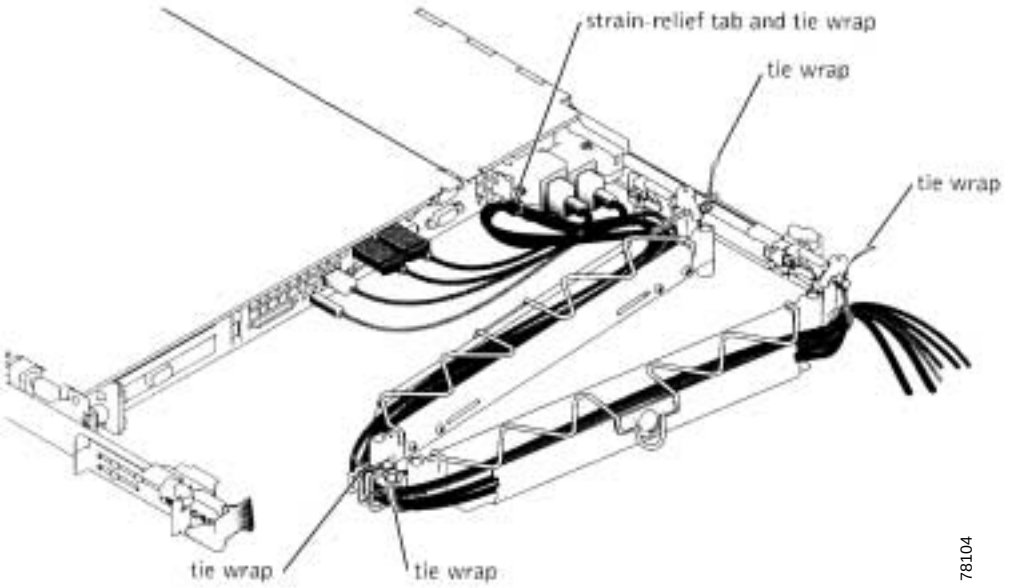
Step 1 Attach the I/O cable connectors to their respective connectors on the appliance back panel.

For details on the cable connections, see Installing the IDS-4235 and IDS-4250, page 5-9.

Step 2 Route the power and I/O cables through the cable-management arm, using four loosely secured releaseable tie-wraps (two in the middle and on each end of the cable-management arm).

Note Do not fully tighten the tie-wraps at this time (see Figure 5-11 on page 5-33). Allow some cable slack in the cable-management arm to prevent damage to the cables.

Figure 5-11 Routing Cables



Step 3 Secure the cables to the cable-management arm:

a. After connecting the cables to the appliance, unscrew the thumbscrews that secure the front of the appliance to the front vertical rail.

b. Slide the appliance forward to the fully extended position.

c. Route the cables along the cable-management arm, making any adjustments to the cable slack at the hinge positions, and secure the cables to the cable-management arm with the releaseable tie-wraps and the wire covers over the cable-management arm.

Note As you pull the appliance out to its farthest extension, the slide assemblies lock in the extended position. To push the appliance back into the rack, press the slide release latch on the side of the slide, and then slide the appliance completely into the rack.

Step 4 Slide the appliance in and out of the rack to verify that the cables are routed correctly and do not bind, stretch, or pinch with the movement of the cable-management arm.

Step 5 Make any necessary adjustments to ensure that the cable slack is neither too tight nor too loose, yet keeps the cables in place as the appliance is moved in and out of the rack.

Step 6 Replace the rack doors.

Note Refer to the procedures for replacing the rack doors in the documentation provided with your rack cabinet.

Warning **Because of the size and weight of the rack cabinet doors, never attempt to remove or install them by yourself.**

Two-Post Rack Installation

You can install the two-post rack (part number IDS-RAIL-2=) in a center-mount or flush-mount configuration. The two-post kit incorporates slide assemblies that enable the appliance to be pulled out of the rack for servicing.

You must properly secure the two-post, open frame relay rack to the floor, the ceiling or upper wall, and where applicable, to adjacent racks, using floor and wall fasteners and bracing specified or approved by the rack manufacturer.

Warning **Do not attempt to install the appliance into a two-post, open-frame relay rack that has not been securely anchored in place. Damage to the appliance and injury to yourself and to others may result.**

This section contains these topics:

Recommended Tools and Supplies

You need the following tools and supplies to install the appliance in a two-post, open-frame relay rack:

- #2 Phillips screwdriver
- 11/32-inch wrench or nut driver (if changing bracket to flush-mount configuration)
- Masking tape or felt-tip pen to mark the mounting holes

Rack Kit Contents

The two-post rack kit includes:

- One pair of slide assemblies (two-post)
- One cable-management arm
- One status-indicator cable assembly
- Two stop blocks
- Eight 12-24 x 0.5-inch pan-head Phillips screws
- Releaseable tie wraps

Marking the Rack

You must allow 1 RU (44 mm or 1.75 inches) of vertical space for each appliance you install in the two-post rack.

To mark the rack, follow these steps:

Step 1 Place a mark on the rack's front vertical rails where you want to locate the bottom of the appliance that you are installing in the two-post rack.

Note The bottom of each 1-RU space is at the middle of the narrowest metal area between holes.

Step 2 Place a mark 44 mm (1.75 inches) above the original mark you made.

Note Each 1 RU (44 mm, or 1.75 inches) of vertical space on a rack with universal-hole spacing has three holes with center-to-center spacing between the holes (beginning at the top of a 1-RU space) of 15.9 mm, 15.9 mm, and 12.7 mm (0.625 inches, 0.625 inches, and 0.5 inches).

Installing the Slide Assemblies in the Rack

You can install the slide assemblies in a two-post, open-frame relay rack having either universal-hole spacing or wide-hole spacing. You can install the 1-RU slide assemblies in either a flush-mount or center-mount configuration.

This section contains these topics:

Center-Mount Installation

The two-post rack kit is shipped with brackets configured for center-mount installation.

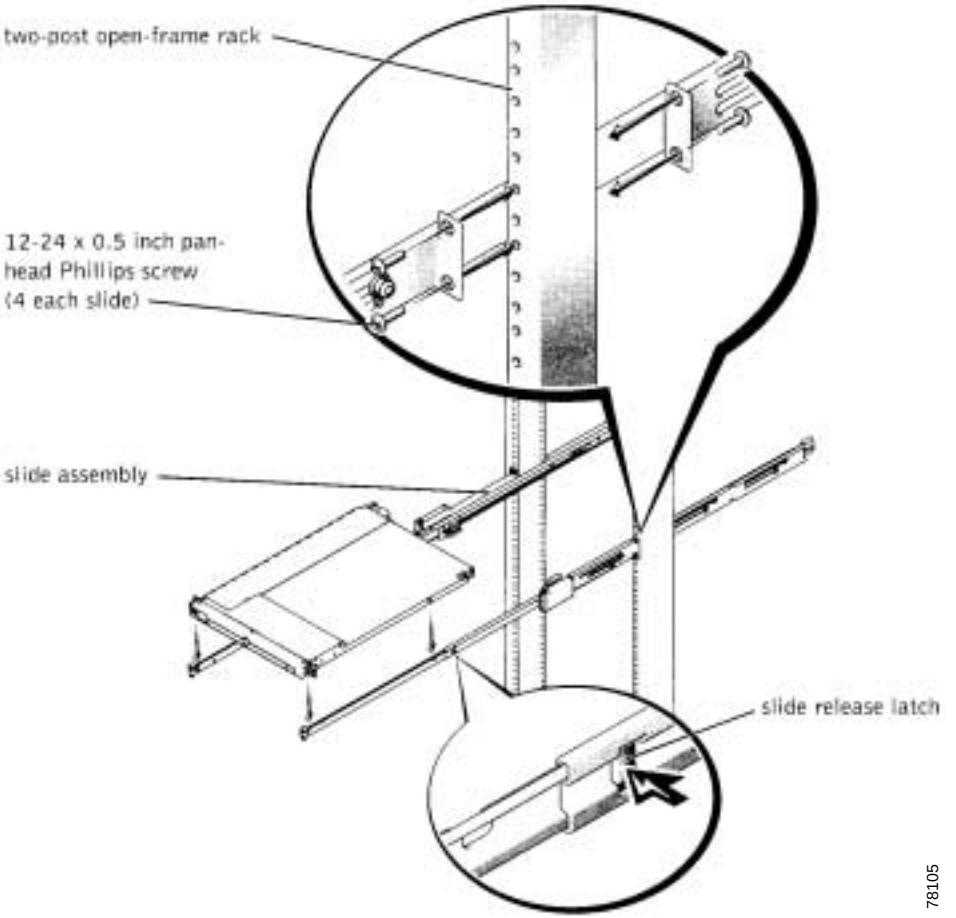
To install the center-mount brackets, follow these steps:

Step 1 Locate the right slide assembly and push the back bracket toward the back of the slide assembly (see Figure 5-12 on page 5-38).

Step 2 Position the right slide assembly in the two-post rack at the location you marked, push the back bracket forward against the vertical two-post rack, and secure the front and rear center-mounting brackets to the rack with two 12-24 x 0.5-inch pan-head Phillips screws (Figure 5-12 on page 5-38).

Step 3 Repeat Steps 1 and 2 to install the left side assembly in the rack.

Figure 5-12 Slide Assemblies for Center-Mount Configuration



Flush-Mount Installation

To install the flush-mount brackets, follow these steps:

Step 1 Locate the two slide assemblies and place them, side by side, on a smooth work surface, with the front ends of the slide assemblies toward you. Position both slide assemblies so that the center brackets are facing upward (see Figure 5-13 on page 5-40).

Note To prepare the slides for flush-mount installation, remove the front mounting bracket, rotate it 180 degrees, and reinstall it on the opposite slide assembly.

Step 2 Using a #2 Phillips screwdriver and an 11/32-inch wrench or nut driver, remove two 12-24 x 0.5-inch pan-head Phillips screws, two nuts, and two shoulder washers from each front center bracket (see Figure 5-13 on page 5-40).

Step 3 Remove the front bracket from both slide assemblies.

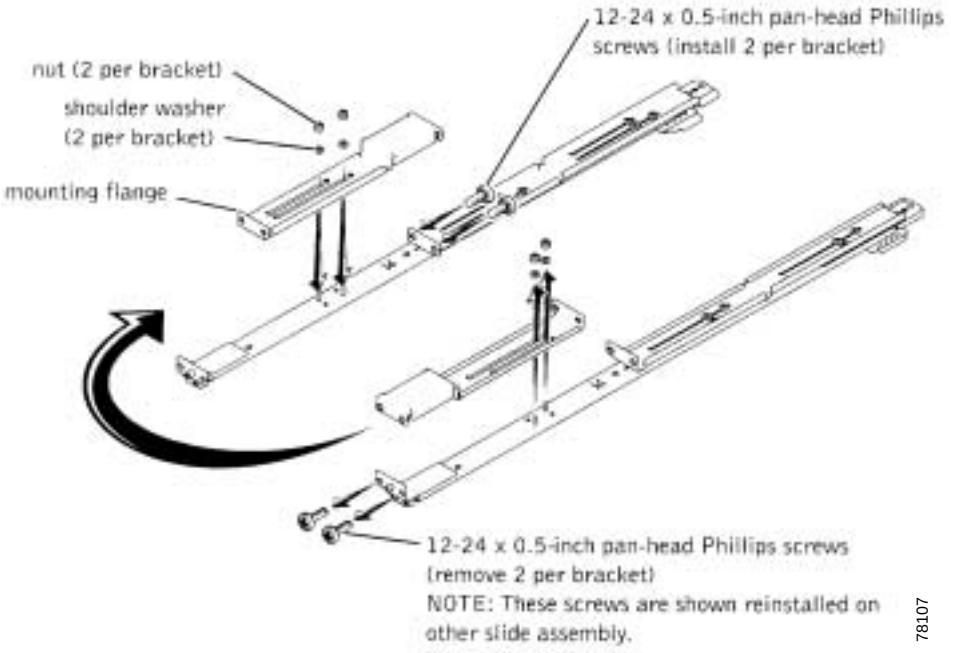
Step 4 Place the bracket from one slide assembly onto the threaded studs on the opposite slide assembly, with the bracket turned 180 degrees so that the mounting flange faces forward (see Figure 5-13 on page 5-40).

Step 5 Secure each front center mount bracket (by its nuts and shoulder washers) and tighten them by hand on their opposite slide assemblies using the two shoulder washers and two nuts you removed in Step 2 (see Figure 5-13 on page 5-40).

Step 6 Join the front brackets you just installed to the bracket on the slide assembly with the two 12-24 x 0.5-inch pan-head Phillips screws you removed in Step 2 (see Figure 5-13 on page 5-40).

The joined bracket becomes the new extended rear bracket.

Figure 5-13 Rotating the Front-Mounting Bracket for Flush-Mount Installation



Step 7 Repeat Steps 4 though 6 to configure the other slide assembly.

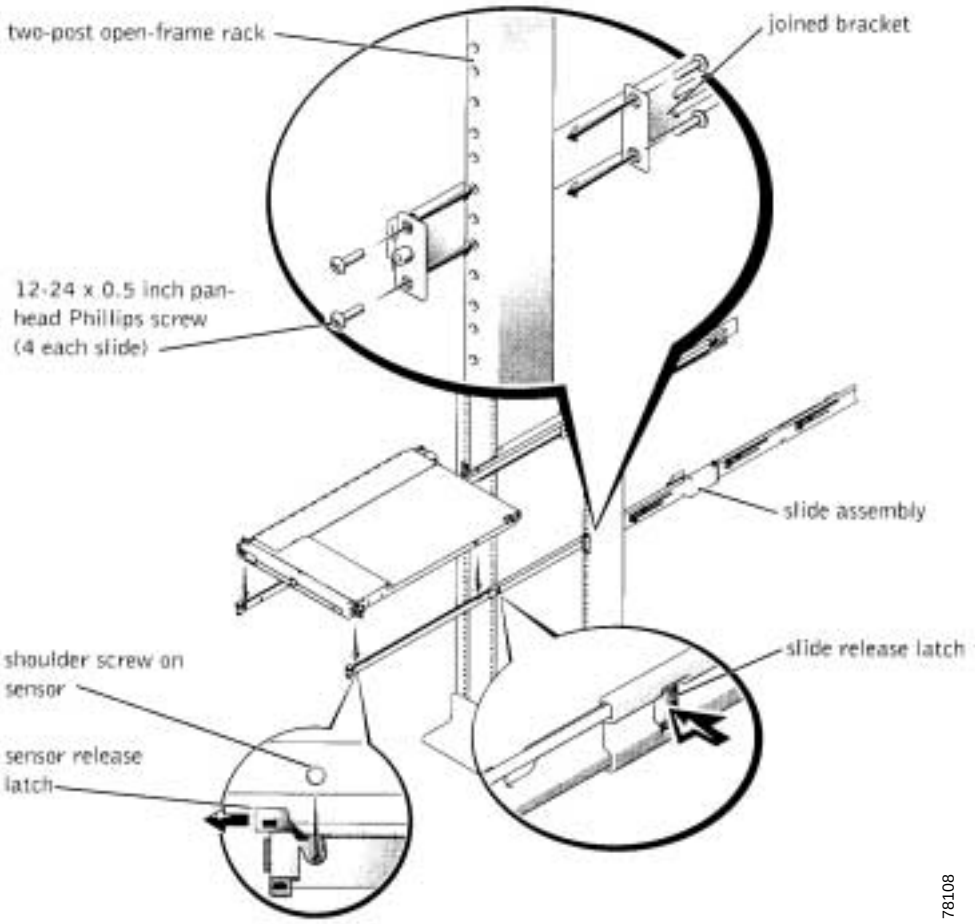
Step 8 Holding the left slide assembly into position in the two-post rack at the location you marked, adjust the extended rear bracket tightly against the back of the vertical two-post rack and secure it to the two-post rail with two 12-24 x 0.5-inch pan-head Phillips screws (see Figure 5-14 on page 5-41).

Step 9 Secure the front bracket on the slide assembly to the two-post rail with two 12-24 x 0.5-inch pan-head Phillips screws (see Figure 5-14 on page 5-41).

Step 10 Repeat Steps 8 and 9 to install the right slide assembly in the rack.

Step 11 Use and 11/32-inch wrench or nut driver to fully tighten the nuts on the mounting brackets on both slide assemblies that you tightened with your fingers.

Figure 5-14 Installing the Slide Assemblies for Flush-Mount Configuration



Installing the IPS-4240 and IPS-4255

The Cisco Intrusion Prevention System (IPS) sensors, the IPS-4240 and the IPS-4255, deliver high port density in a small form factor. They use a compact flash device for storage rather than the hard-disk drives used in other sensor models.

The IPS-4240 monitors up to 250 Mbps of aggregate network traffic on multiple sniffing interfaces and is inline ready. It replaces the IDS-4235. There are four 10/100/1000 copper sniffing interfaces.

Note The 250-Mbps performance for the IPS-4240 is based on the following conditions: 2500 new TCP connections per second, 2500 HTTP transactions per second, average packet size of 445 bytes, system running Cisco IDS 4.1 sensor software. The 250-Mbps performance is traffic combined from all four sniffing interfaces.

The IPS-4255 monitors up to 600 Mbps of aggregate network traffic on multiple sniffing interfaces and is also inline ready. It replaces the IDS-4250-TX. There are four 10/100/1000 copper sniffing interfaces.

Note The IDS-4250-SX and the IDS-4250-XL are not being replaced by the IPS-4255 at this time.

Note The 600-Mbps performance for the IPS-4255 is based on the following conditions: 6000 new TCP connections per second, 6000 HTTP transactions per second, average packet size of 445 bytes, system running Cisco IDS 4.1 sensor software. The 600-Mbps performance is traffic combined from all four sniffing interfaces.

Note The IPS-4240 and the IPS-4255 do not support redundant power supplies.

This chapter describes the IPS-4240 and the IPS-4255 and how to install them. It also describes the accessories and how to install them.

This chapter contains the following topics:

Front and Back Panel Features

This section describes the IPS-4240 and IPS-4255 front and back panel features and indicators.

Note Although the graphics show the IPS-4240, the IPS-4255 has the same front and back panel features and indicators.

Figure 6-1 shows the front view of the IPS-4240.

Figure 6-1 IPS-4240 Front Panel Features

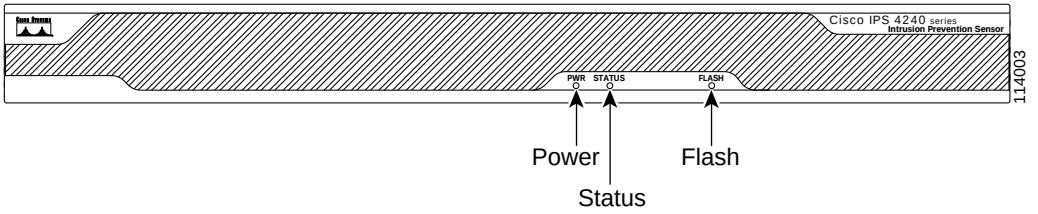


Table 6-1 describes the front panel indicators on the IPS-4240.

Table 6-1 Front Panel Indicators

Indicator	Description
Power	Off indicates no power. Green when the power supply is running.
Status	Blinks green while the power-up diagnostics are running or the system is booting. Green when the system has passed power-up diagnostics. Amber when the power-up diagnostics have failed.
Flash	Off when the compact flash device is not being accessed. Blinks green when the compact flash device is being accessed.

Figure 6-2 shows the back view of the IPS-4240.

Figure 6-2 IPS-4240 Back Panel Features

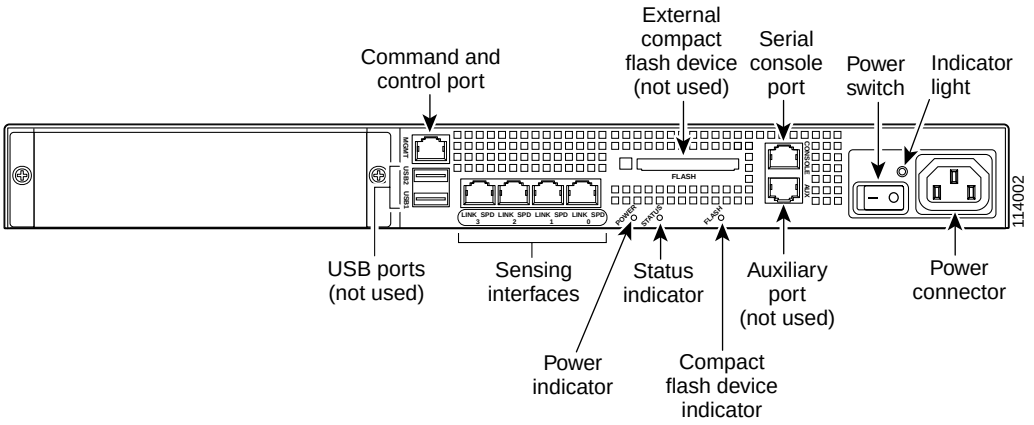


Figure 6-3 shows the four built-in Ethernet ports, which have two indicators per port.

Figure 6-3 Ethernet Port Indicators

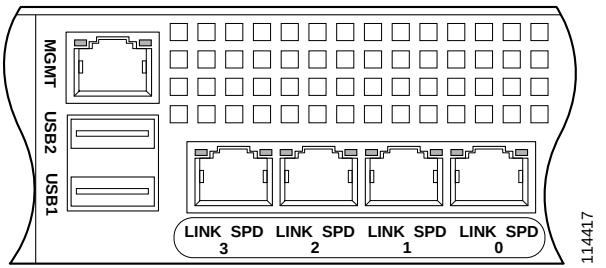


Table 6-2 lists the back panel indicators.

Table 6-2 Back Panel Indicators

Indicator	Color	Description
Left side	Green solid Green blinking	Physical link Network activity
Right side	Not lit Green Amber	10 Mbps 100 Mbps 1000 Mbps

Specifications

Table 6-3 lists the specifications for the IPS-4240 and IPS-4255.

Table 6-3 IPS-4240/IPS-4255 Specifications

Dimensions and Weight	
Height	1.72 in. (4.3688 cm)
Width	17.25 in. (43.815 cm)
Depth	14.5 in. (36.83 cm)
Weight	11.5 lb (4.11 kg)
Form factor	1 RU, standard 19-inch rack-mountable
Expansion	One chassis expansion slot (not used)
Power	
Autoswitching	100V to 240V AC
Frequency	50 to 60 Hz, single phase
Operating current	1.5 A
Steady state	50 W
Maximum peak	65 W
Maximum heat dissipation	410 BTU/hr, full power usage (65 W)

Table 6-3 IPS-4240/IPS-4255 Specifications (continued)

Environment	
Temperature	Operating +32°F to +104°F (+0°C to +40°C) Nonoperating -13°F to +158°F (-25°C to +70°C)
Relative humidity	Operating 5% to 95% (noncondensing) Nonoperating 5% to 95% (noncondensing)
Altitude	Operating 0 to 9843 ft (3000 m) Nonoperating 0 to 15,000 ft (4750 m)
Shock	Operating 1.14 m/sec (45 in./sec) ½ sine input Nonoperating 30 G
Vibration	0.41 Grms2 (3 to 500 Hz) random input
Acoustic noise	54 dBa (maximum)

Accessories

Warning **IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030**

The IPS-4240/IPS-4255 accessories kit contains the following:

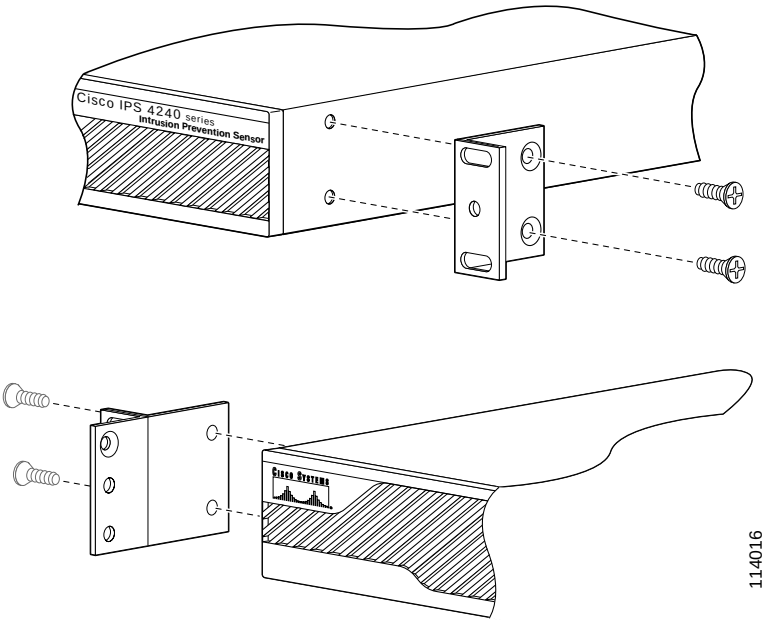
- DB25 connector
- DB9 connector
- Rack mounting kit—screws, washers, and metal bracket
- RJ45 console cable
- Two 6-ft Ethernet cables

Rack Mounting

To rack mount the IPS-4240/IPS-4255, follow these steps:

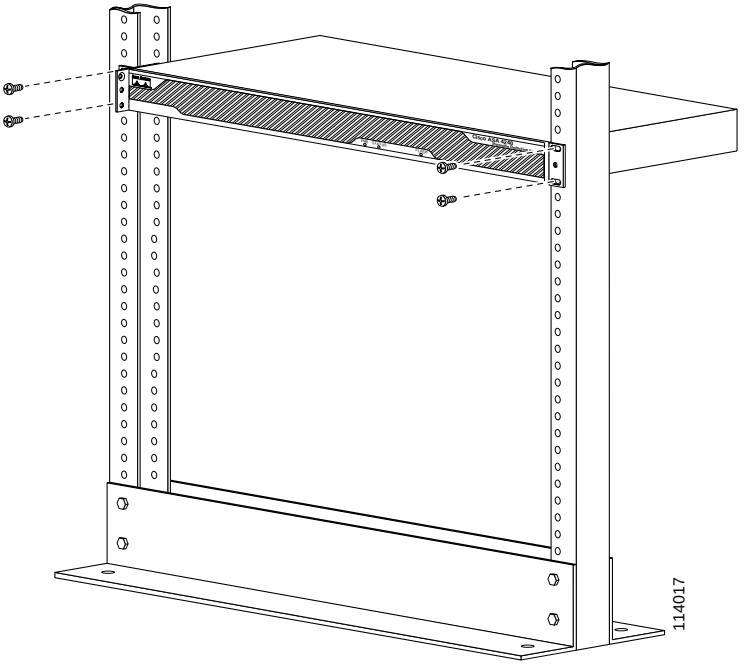
Step 1 Attach the bracket to the appliance using the supplied screws.

You can attach the brackets to the holes near the front of the appliance.



Note The bottom hole in the bracket is a banana jack you can use for ESD grounding purposes when you are servicing the system. You can use the two threaded holes to mount a ground lug to ground the chassis.

Step 2 Use the supplied screws to attach the appliance to the equipment rack.



Step 3 To remove the appliance from the rack, remove the screws that attach the appliance to the rack, and then remove the appliance.

Installing the IPS-4240 and IPS-4255

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030**

Caution Be sure to read the safety warnings in the *Regulatory Compliance and Safety Information for the Cisco Intrusion Detection System 4200 Series Appliance Sensor* and follow proper safety procedures when performing these steps.

To install the IPS-4240 and IPS-4255 on your network, follow these steps:

Step 1 Position the appliance on the network.

See Placing an Appliance on Your Network, page 1-6, for information on the best places to position an appliance.

Step 2 Place the appliance in a rack, if you are rack mounting it.

See Rack Mounting, page 6-7, for the procedure.

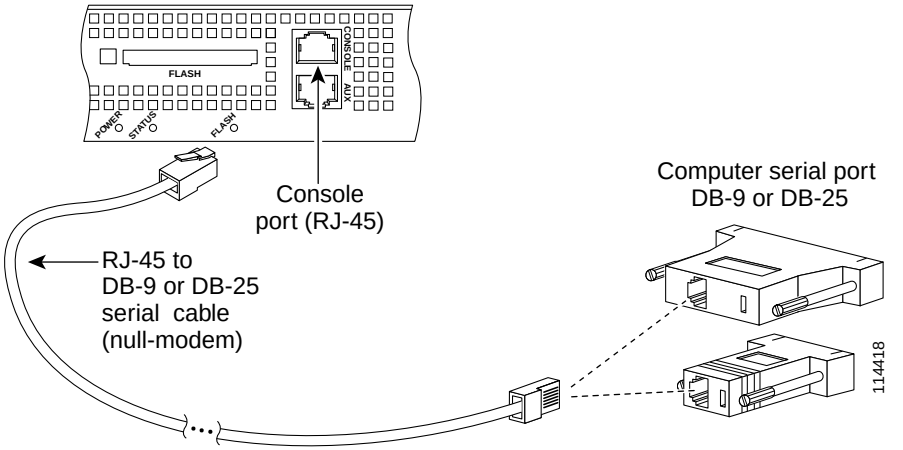
Step 3 Attach the power cord to the appliance and plug it in to a power source (a UPS is recommended).

Step 4 Connect the cable as shown in so that you have either a DB-9 or DB-25 connector on one end as required by the serial port for your computer, and the other end is the RJ-45 connector.

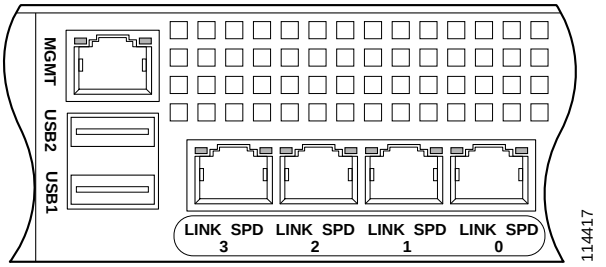
Note Use the console port to connect to a computer to enter configuration commands. Locate the serial cable from the accessory kit. The serial cable assembly consists of a 180/rollover cable with RJ-45 connectors (DB-9 connector adapter PN 74-0495-01 and DB-25 connector adapter PN 29-0810-01).

Note You can use a 180/rollover or straight-through patch cable to connect the appliance to a port on a terminal server with RJ-45 or hydra cable assembly connections. Connect the appropriate cable from the console port on the appliance to a port on the terminal server. See Setting Up a Terminal Server, page 1-9, for the instructions for setting up a terminal server.

Step 5 Connect the RJ-45 connector to the console port and connect the other end to the DB-9 or DB-25 connector on your computer.



Step 6 Attach the network cables.



- INT0 through INT3 are sensing ports.
- MGMT is the command and control port.

Step 7 Power on the appliance.

Step 8 Initialize your appliance.

See Initializing the Sensor, page 10-2, for the procedure.

Step 9 Upgrade your appliance with the most recent Cisco IDS software.

See Obtaining Cisco IDS Software, page 9-1, for the procedure.

Step 10 Assign the interfaces:

See Assigning and Enabling the Sensing Interface, page 10-9, for the procedure.

Note The interfaces are disabled by default.

You are now ready to configure intrusion detection on your appliance.

Installing the NM-CIDS

This chapter lists the software and hardware requirements of the NM-CIDS, and describes how to install and remove it.

Note In Cisco IOS documentation, the NM-CIDS is referred to as the Cisco IDS network module.

This chapter contains the following sections:

Specifications

Table 7-1 lists the specifications for the NM-CIDS.

Table 7-1 NM-CIDS Specifications

Specification	Description
Dimensions (H x W x D)	1.55 x 7.10 x 7.2 in. (3.9 x 18.0 x 19.3 cm)
Weight	1.5 lb (0.7 kg) (maximum)
Operating temperature	32° to 104°F (0° to 40°C)

Table 7-1 NM-CIDS Specifications (continued)

Specification	Description
Nonoperating temperature	–40° to 185°F (–40° to 85°C)
Humidity	5% to 95% noncondensing
Operating altitude	0 to 10,000 ft (0 to 3,000 m)

Software and Hardware Requirements

The NM-CIDS has the following software and hardware requirements.

The NM-CIDS supports the following software:

- Cisco IOS software 12.2(15)ZJ or later
- Cisco IOS software 12.3(4)T or later
- Cisco IDS software 4.1 or later

Caution Do not confuse Cisco IOS IDS (a software-based intrusion-detection application that runs in the Cisco IOS) with the IDS that runs on the NM-CIDS. The NM-CIDS runs Cisco IDS version 4.1. Because performance can be reduced and duplicate alarms can be generated, we recommend that you do not run Cisco IOS IDS and Cisco IDS 4.1 simultaneously.

The NM-CIDS supports the following feature sets:

- IOS IP/FW/IDS
- IOS IP/FW/IDS PLUS IPSEC 56
- IOS IP/FW/IDS PLUS IPSEC 3DES
- IOS IP/IPX/AT/DEC/FW/IDS PLUS
- IOS ENTERPRISE/FW/IDS PLUS IPSEC 56
- IOS ENTERPRISE/FW/IDS PLUS IPSEC 3DES
- IOS Advanced Security
- IOS Advanced IP
- IOS Advanced Enterprise

Table 7-2 lists supported and unsupported platforms for the NM-CIDS.

Table 7-2 Supported and Unsupported Platforms

Router	NM-CIDS
Cisco 2600 series	No
Cisco 2600XM series	Yes
Cisco 2691	Yes
Cisco 3620	No
Cisco 3631	No
Cisco 3640, Cisco 3640A	No
Cisco 3660	Yes
Cisco 3725	Yes
Cisco 3745	Yes

Note The supported Cisco series routers only support one NM-CIDS per chassis.

Table 7-3 lists the hardware specifications for the NM-CIDS.

Table 7-3 Hardware Requirements

Feature	Description
Processor	500 Mhz Intel Mobile Pentium III
Default SDRAM	512 MB
Maximum DSRAM	512 MB
Internal disk storage	NM-CIDS 20-GB IDE

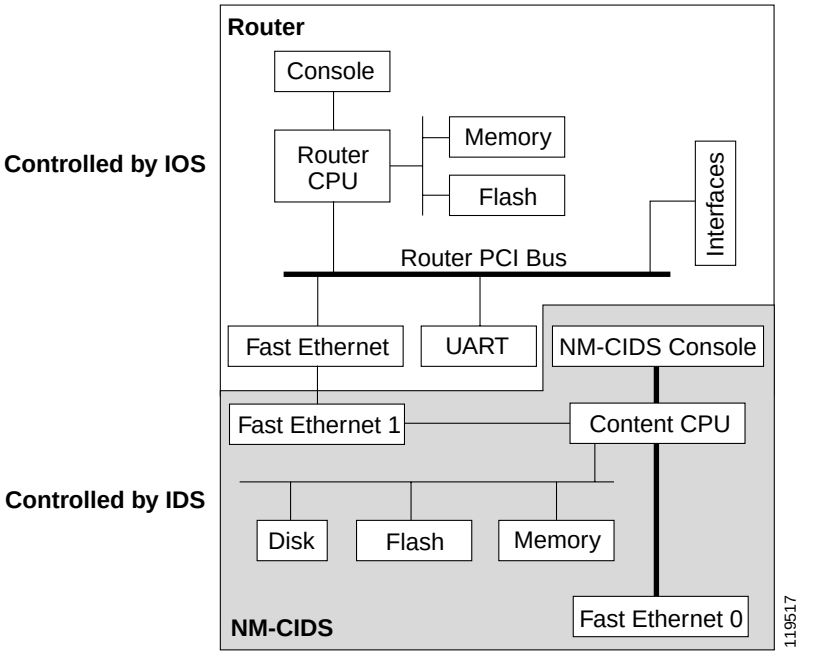
Hardware Architecture

The NM-CIDS has the following hardware architecture:

- Back-to-back Ethernet, which provides interface-level connectivity to the router.
- 100-Mbps full-duplex interface between the router and the module.
- Back-to-back UART, which provides console access from router side.
- Console access to the module from the router.
- External FE interface, which provides a command and control interface.

Figure 7-1 shows the hardware architecture of the NM-CIDS.

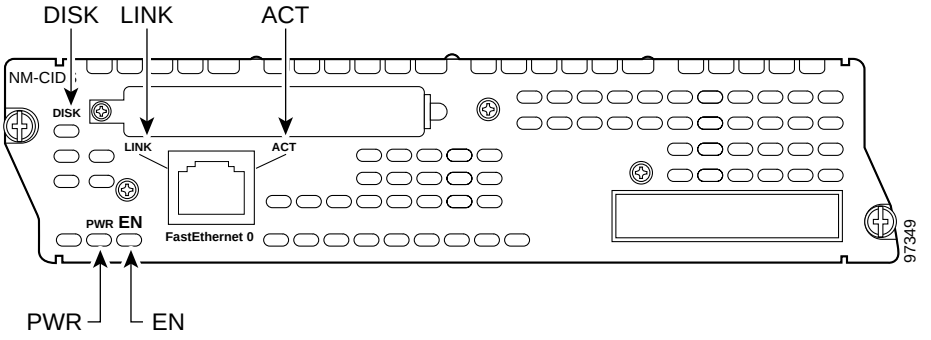
Figure 7-1 NM-CIDS Hardware Architecture



Front Panel Features

Figure 7-2 shows the front panel features of the NM-CIDS.

Figure 7-2 Front Panel Features



Status Indicators

Table 7-4 describes the NM-CIDS states as indicated by the status indicators.

Table 7-4 Status Indicators

Indicator	Description
ACT	Activity on the fast ethernet connection.
DISK	Activity on the IDS hard-disk drive.
EN	NM-CIDS has passed self-test and is available to the router.
LINK	Fast Ethernet connection is available to the NM-CIDS.
PWR	Power is available to the NM-CIDS.

Interfaces

The router-side fast ethernet interface is known as `interface IDS-Sensor`. This interface name appears in the **show interface** and **show controller** commands. You must assign the IP address to the interface to get console access to the IDS.

Caution We recommend that you assign a loopback address on the monitoring interface, otherwise if the IP address is advertised through routing updates, the monitoring interface can become vulnerable to attacks.

See Configuring Cisco IDS Interfaces on the Router, page 10-78 for the procedure for assigning the IP address to gain access to the console and for setting up a loopback address.

Installation and Removal Instructions

You must install the NM-CIDS offline in Cisco 2650XM, 2651XM, and 2961 series routers.

Caution To avoid damaging the NM-CIDS, you must turn OFF electrical power and disconnect network cables before you insert the NM-CIDS into a chassis slot or remove the NM-CIDS from a chassis slot.

Cisco 3660 and Cisco 3700 series routers allow you to replace network modules without switching off the router or affecting the operation of other interfaces. Online insertion and removal (OIR) provides uninterrupted operation to network users, maintains routing information, and ensures session preservation.

Note Cisco 2600, 3600, and 3700 series routers support only one NM-CIDS per chassis.

Caution Unlike other network modules, the NM-CIDS uses a hard-disk drive. Online removal of hard-disk drives without proper shutdown can result in file system corruption and might render the hard-disk drive unusable. The operating system on the NM-CIDS must be shut down in an orderly fashion before it is removed.

This section contains the following topics:

Required Tools

You need the following tools and equipment to install an NM-CIDS in a Cisco modular router chassis slot:

- #1 Phillips screwdriver or small flat-blade screwdriver
- ESD-preventive wrist strap
- Tape for DC circuit breaker handle

Installing the NM-CIDS

This section contains the following topics:

Installing the NM-CIDS Offline

You can install the NM-CIDS in the chassis either before or after mounting the router, whichever is more convenient.

Warning **Only trained and qualified personnel should be allowed to install or replace this equipment. To see translations of the warnings that appear in this publication, refer to the Regulatory Compliance and Safety Information document that accompanied this device.**

Caution ESD can damage equipment and impair electrical circuitry. Always follow ESD prevention procedures when removing and replacing cards. See Working in an ESD Environment, page 1-21, for more information.

To install the NM-CIDS, follow these steps:

Step 1 Turn OFF electrical power to the router.

To channel ESD voltages to ground, do not unplug the power cable.

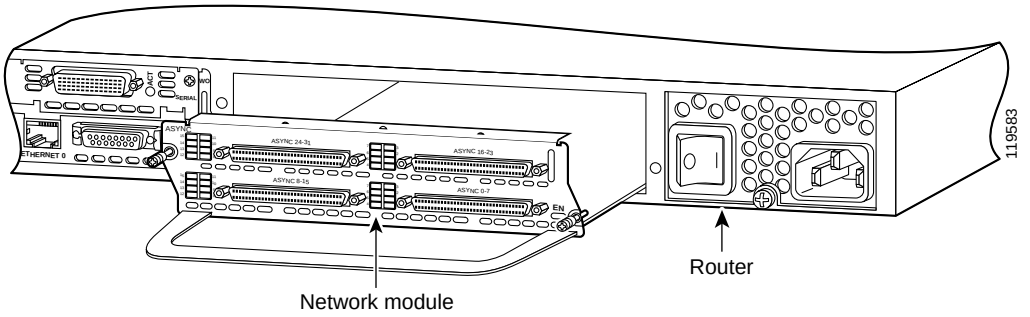
Step 2 Remove all network interface cables, including telephone cables, from the back panel. The following warning applies to routers that use a DC power supply:

Warning **Before performing any of the following procedures, ensure that power is removed from the DC circuit. To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position.**

Step 3 Using either a #1 Phillips screwdriver or a small flat-blade screwdriver, remove the blank filler panel from the chassis slot where you plan to install the NM-CIDS.

Save the blank panel for future use.

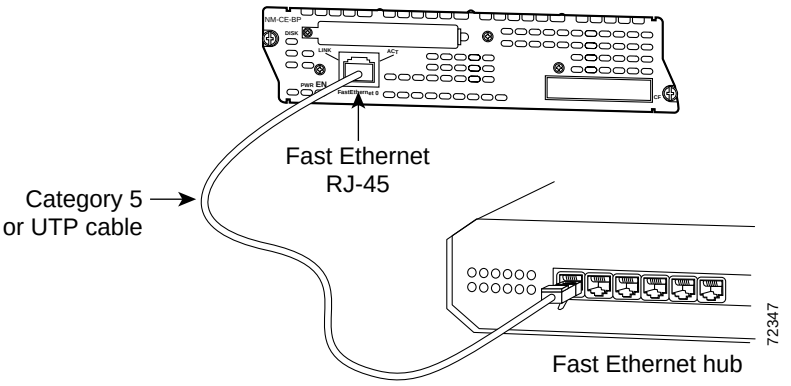
Step 4 Align the NM-CIDS with the guides in the chassis and slide it gently into the slot.



Step 5 Push the NM-CIDS into place until you feel its edge connector mate securely with the connector on the motherboard.

Step 6 Fasten the captive mounting screws of the NM-CIDS into the holes in the chassis, using a Phillips or flat-blade screwdriver.

Step 7 If the router was previously running, reinstall the network interface cables and turn ON power to the router.



The following warning applies to routers that use a DC power supply:

Warning **After wiring the DC power supply, remove the tape from the circuit breaker switch handle and reinstate power by moving the handle of the circuit breaker to the ON position.**

Step 8 Connect the command and control port to a hub or switch.

Step 9 Check that the NM-CIDS indicators light up, and that the Active/Ready indicators on the front panel also light up.

Step 10 Initialize the NM-CIDS.

See Initializing the Sensor, page 10-2, for the procedure.

Step 11 Upgrade your NM-CIDS to the latest Cisco IDS software.

See Obtaining Cisco IDS Software, page 9-1, for the procedure.

Step 12 Assign the interfaces.

See Assigning and Enabling the Sensing Interface, page 10-9, for the procedure.

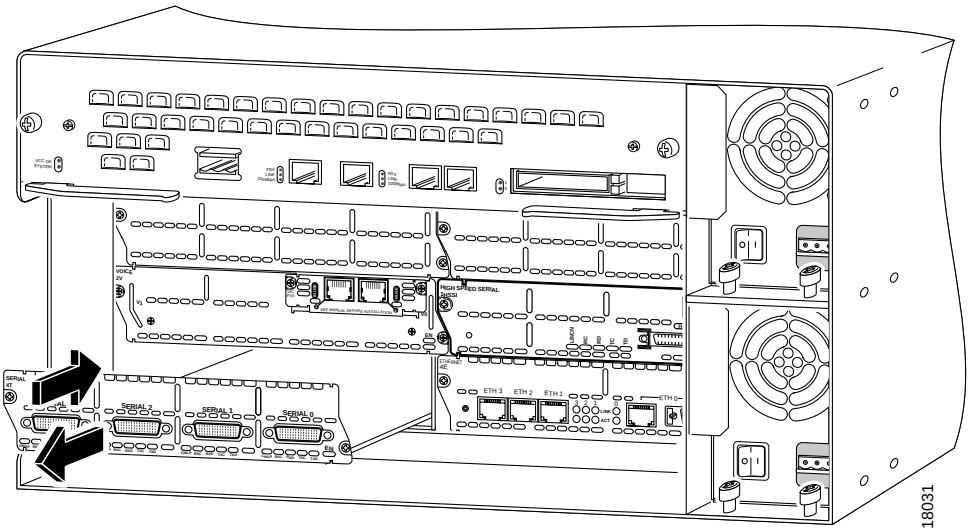
You are now ready to configure intrusion detection on your NM-CIDS.

Installing an NM-CIDS Using OIR Support

To install the NM-CIDS using OIR support, follow these steps:

Step 1 Align the NM-CIDS with the guides in the chassis slot and slide it gently into the slot (see Figure 7-3).

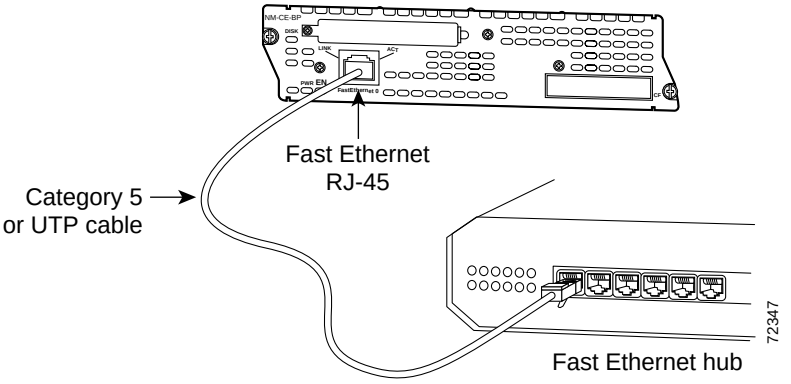
Figure 7-3 Online Insertion of the NM-CIDS



Step 2 Push the NM-CIDS into place until you feel its edge connector mate securely with the connector on the backplane.

Step 3 Tighten the two captive screws on the faceplate.

Step 4 Connect the command and control port to a hub or switch.



Step 5 Verify that the NM-CIDS indicators light up, and that the Active/Ready indicators on the front panel also light up.

Step 6 Initialize the NM-CIDS.

See Initializing the Sensor, page 10-2, for the procedure.

Step 7 Upgrade your NM-CIDS to the latest Cisco IDS software.

See Obtaining Cisco IDS Software, page 9-1, for the procedure.

Step 8 Assign the interfaces.

See Assigning and Enabling the Sensing Interface, page 10-9, for the procedure.

You are now ready to configure intrusion detection on your NM-CIDS.

Removing the NM-CIDS

This section contains the following topics:

- Removing the NM-CIDS Offline, page 7-12
- Removing the NM-CIDS Using OIR Support, page 7-13

Removing the NM-CIDS Offline

You must turn off all power to the router before removing the NM-CIDS.

To remove the NM-CIDS from the router chassis, follow these steps:

Step 1 Prepare the NM-CIDS to be powered off by entering:

```
Router# service-module IDS-Sensor slot_number/0 shutdown
Trying 10.10.10.1, 2129 ... Open
```

Wait for the shutdown message before continuing with Step 2:

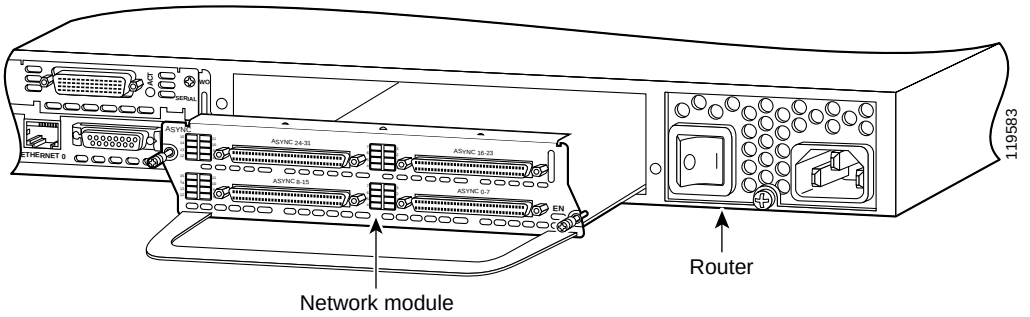
```
%SERVICEMODULE-5-SHUTDOWN2:Service module IDS-Sensor1/0 shutdown
complete
```

Step 2 Turn OFF electrical power to the router.

To channel ESD voltages to ground, do not unplug the power cable.

Step 3 Unplug the command and control network interface cable from the NM-CIDS.

Step 4 Loosen the two captive screws holding the NM-CIDS in the chassis slot.



Step 5 Slide the NM-CIDS out of the slot.

Note Either install a replacement NM-CIDS (see Installing the NM-CIDS Offline, page 7-7, for the procedure) or install a blank panel (see Blank Network Module Panels, page 7-14, for the procedure).

Removing the NM-CIDS Using OIR Support

Caution Cisco 3660 and Cisco 3700 series routers support OIR with similar modules only. If you remove an NM-CIDS, install another NM-CIDS in its place.

To remove an NM-CIDS with OIR support, follow these steps:

Step 1 Prepare the NM-CIDS to be powered off by entering:

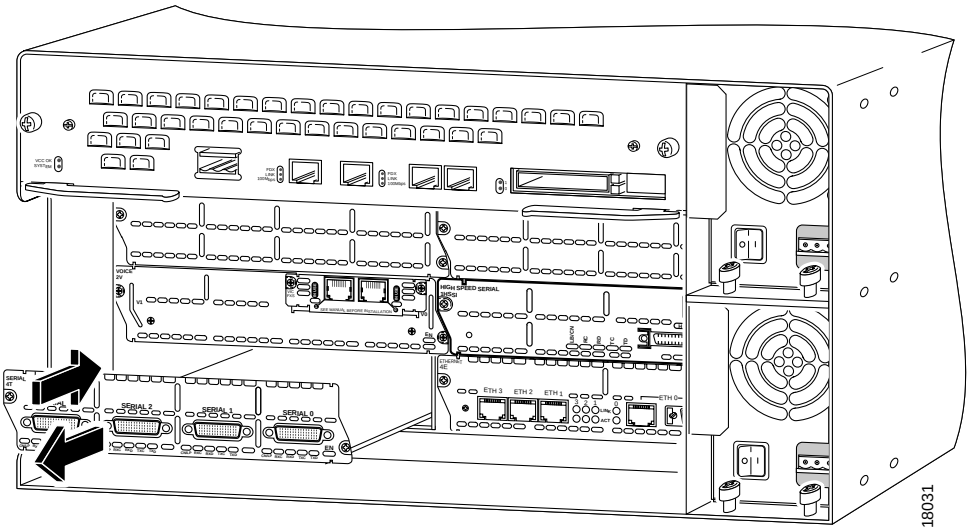
```
Router# service-module IDS-Sensor slot_number/0 shutdown
Trying 10.10.10.1, 2129 ... Open
```

Wait for the shutdown message before continuing with Step 2:

```
%SERVICEMODULE-5-SHUTDOWN2:Service module IDS-Sensor1/0 shutdown
complete
```

Step 2 Unplug the command and control network interface cable from the NM-CIDS.

Step 3 Loosen the two captive screws holding the NM-CIDS in the chassis slot.



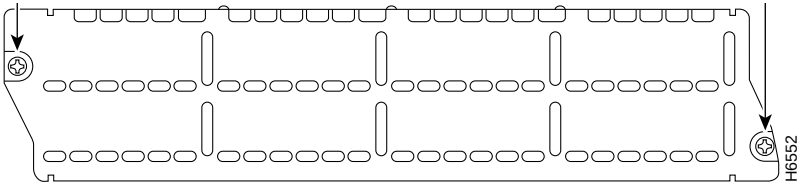
Step 4 Slide the NM-CIDS out of the slot.

Note Either install a replacement NM-CIDS (see Installing an NM-CIDS Using OIR Support, page 7-10, for the procedure), or install a blank panel (see Blank Network Module Panels, page 7-14, for the procedure).

Blank Network Module Panels

If the router is not fully configured with network modules, make sure that blank panels fill the unoccupied chassis slots to provide proper airflow as shown in Figure 7-4:

Figure 7-4 Blank Network Module Panel



Installing the IDSM-2

This chapter lists the software and hardware requirements of the IDSM-2, and describes how to remove and install it.

This chapter contains the following sections:

Specifications

Table 8-1 lists the specifications for the IDSM-2.

Table 8-1 IDSM-2 Specifications

Specification	Description
Dimensions (H x W x D)	1.18 x 15.51 x 16.34 in (30 x 394 x 415 mm)
Weight	Minimum: 3 lb (1.36 kg) Maximum: 5 lb (2.27 kg)
Operating temperature	32° to 104°F (0° to 40°C)

Table 8-1 IDSM-2 Specifications (continued)

Specification	Description
Nonoperating temperature	–40° to 167°F (–40° to 75°C)
Humidity	10% to 90%, noncondensing

Software and Hardware Requirements

The following are the IDSM-2 software and hardware requirements:

- Catalyst software release 7.5(1) or later with supervisor engine 1a with MSFC2
- Catalyst software release 7.5(1) or later with supervisor engine 2 with MSFC2 or PFC2
- Cisco IOS software release 12.2(14)SY with supervisor engine 2 with MSFC2
- Cisco IOS software release 12.1(19)E or later with supervisor engine 2 with MSFC2
- Cisco IOS software release 12.1(19)E1 or later with supervisor engine 1a with MSFC2
- Cisco IOS software release 12.2(14)SX1 with supervisor engine 720
- Cisco IDS software release 4.0 or later
- Any Catalyst 6500 series switch chassis or 7600 router

Supported IDSM-2 Configurations

Table 8-2 lists the supported configurations for the IDSM-2.

Table 8-2 Supported Configurations

Supervisor	SPAN/ RSPAN	VACL Capture	VACL Blocking	RACL Blocking	Catalyst Software	Cisco IOS Software
Supervisor 1A	X				7.5(1)	
Supervisor 1A with PFC1	X	X	X		7.5(1)	
Supervisor 1A with PFC1 or MSFC1	X	X	X[1]	X	7.5(1)	[2]
Supervisor 1A-PFC2 or MSFC2	X	X	X[3]	X	7.5(1)	12.1(19)E1
Supervisor 2 with PFC2	X	X	X		7.5(1)	
Supervisor 2 with PFC2 or MSFC2	X	X	X[4]	X	7.5(1)	12.1(19)E, 12.2(14)SY
Supervisor 720 (integrated PFC3 and MSFC3)	X	X	[5]	X		12.2(14)SX1

1. VACL blocking by the IDSM-2 is supported on Catalyst software and not on Cisco IOS for this configuration.
2. Cisco IOS is supported on Supervisor 1A with PFC1 or MSFC1; however, the IDSM-2 is not supported on this configuration.
3. VACL blocking by the IDSM-2 is supported on Catalyst software and not on Cisco IOS for this configuration.
4. VACL blocking by the IDSM-2 is supported on Catalyst software and not on Cisco IOS for this configuration.
5. Supervisor 720 with Cisco IOS supports VACL deny statements; however, the IDSM-2 cannot block with Cisco IOS-style VACLs

Caution The Supervisor 1A with PFC2 combination is not supported. Supervisor 2 alone (without PFC2 or MSFC2) is not supported by Catalyst software or Cisco IOS software.

Using the TCP Reset Interface

The IDSM-2 has a TCP reset interface—port 1. The IDSM-2 has a specific TCP reset interface because it cannot send TCP resets on its sensing ports.

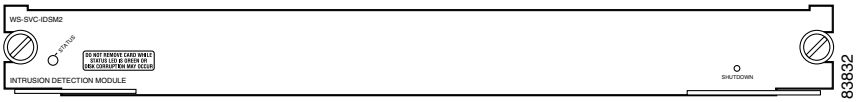
If you have reset problems with the IDSM-2, try the following:

- If the sensing ports are access ports (a single VLAN), you need to configure the reset port to be in the same VLAN.
- If the sensing ports are dot1q trunk ports (multi-VLAN), the sensing ports and reset port all must have the same native VLAN, and the reset port must trunk all the VLANs being trunked by both the sensing ports.

Front Panel Description

The IDSM-2 (see Figure 8-1) has a status indicator and a Shutdown button.

Figure 8-1 IDSM-2 Front Panel



Status Indicator

Table 8-3 describes the IDSM-2 states as indicated by the status indicator.

Table 8-3 Status Indicator

Color	Description
Green	All diagnostics tests pass—IDSM-2 is operational.
Red	A diagnostics test other than an individual port test failed.
Amber	The IDSM-2 is running through its boot and self-test diagnostics sequence, or the IDSM-2 is disabled, or the IDSM-2 is in the shutdown state.
Off	The IDSM-2 power is off.

Shutdown Button

To prevent corruption of the IDSM-2, you must use the **shutdown** command to shut it down properly. See Step 1 of Removing the IDSM-2, page 8-13, for instructions on properly shutting down the IDSM-2. If the IDSM-2 does not respond, firmly press the Shutdown button on the faceplate and wait for the Status indicator to turn amber. The shutdown procedure may take several minutes.

Caution Do not remove the IDSM-2 from the switch until the module shuts down completely. Removing the module without going through a shutdown procedure can corrupt the application partition on your module and result in data loss.

Installation and Removal Instructions

All Catalyst 6500 series switches support hot swapping, which lets you install, remove, replace, and rearrange modules without turning off the system power to the switch. When the system detects that a module has been installed or removed, it runs diagnostic and discovery routines, acknowledges the presence or absence of the module, and resumes system operation with no operator intervention.

Caution You must first shut down the IDSM-2 before removing it from a Catalyst 6500 series switch. See Removing the IDSM-2, page 8-13, for the procedure for removing an IDSM-2 from a Catalyst 6500 series switch.

This section contains the following topics:

Required Tools

Note You must have at least one supervisor engine running in the Catalyst 6500 series switch with the IDSM-2. Refer to the *Catalyst 6500 Series Switch Installation Guide* for more information.

You need the following tools to install the IDSM-2 in the Catalyst 6500 series switches:

- Flat-blade screwdriver
- Wrist strap or other grounding device
- Antistatic mat or antistatic foam

  Whenever you handle the IDSM-2, always use a wrist strap or other grounding device to prevent serious damage from electrostatic discharge (ESD). See Working in an ESD Environment, page 1-21, for more information.

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030**

Slot Assignments

The Catalyst 6006 and 6506 switch chassis each have six slots. The Catalyst 6009 and 6509 switch chassis each have nine slots. The Catalyst 6513 switch chassis has 13 slots.

Note The Catalyst 6509-NEB switch has vertical slots numbered 1 to 9 from right to left. Install the IDSM-2 with the component side facing to the right.

- You can install the IDSM-2 in any slot that is not used by the supervisor engine.
- You can install up to eight IDSM-2s in a single chassis.

Caution Install module filler plates (blank module carriers) in the empty slots to maintain consistent airflow through the switch chassis.

Note The IDSM-2 works with any supervisor engine using SPAN, but the copy capture feature with security VACLs requires that the supervisor engine has the Policy Feature Card (PFC) or the Multi-Layer Switch Feature Card (MSFC) option.

Installing the IDSM-2

To install the IDSM-2 in the Catalyst 6500 series switch, follow these steps:

Step 1 Make sure that you take necessary ESD precautions.

Warning **During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not touch the backplane with your hand or any metal tool, or you could shock yourself.**

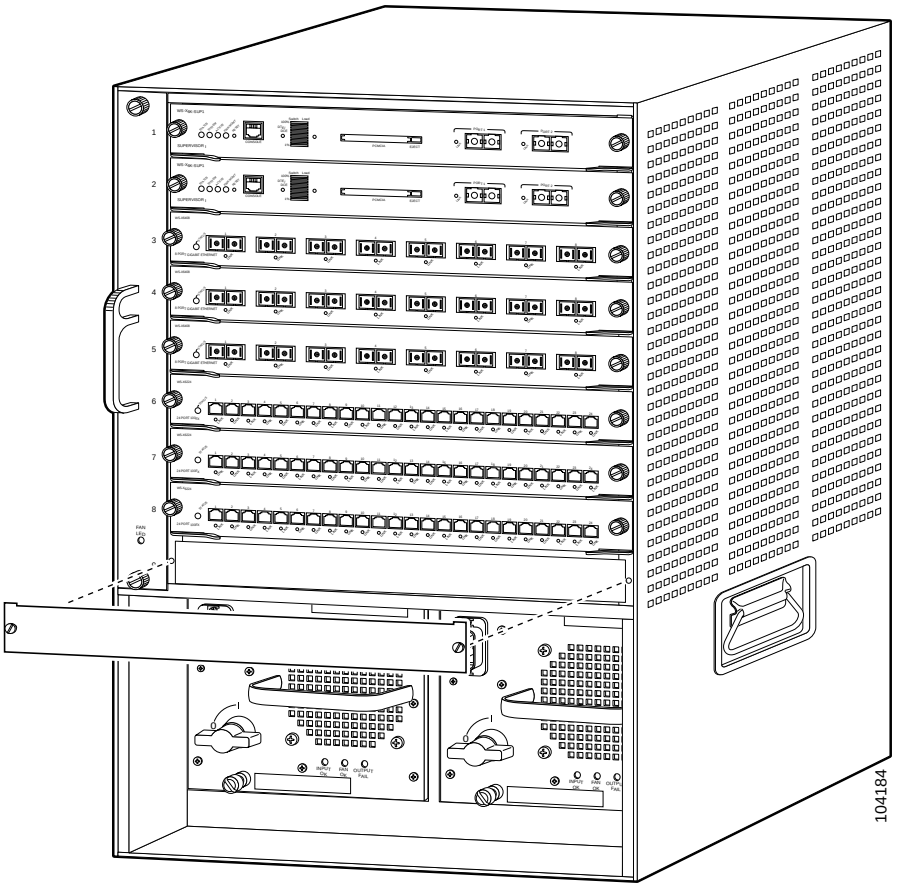
See Working in an ESD Environment, page 1-21, for more information.

Step 2 Choose a slot for the IDSM-2.

Note You can install the IDSM-2 in any slot that is not reserved for a supervisor engine or other module. Refer to your switch documentation for information about which slots are reserved for the supervisor engine or other modules.

Step 3 Remove the installation screws (use a screwdriver, if necessary) that secure the filler plate to the desired slot.

Step 4 Remove the filler plate by prying it out carefully.

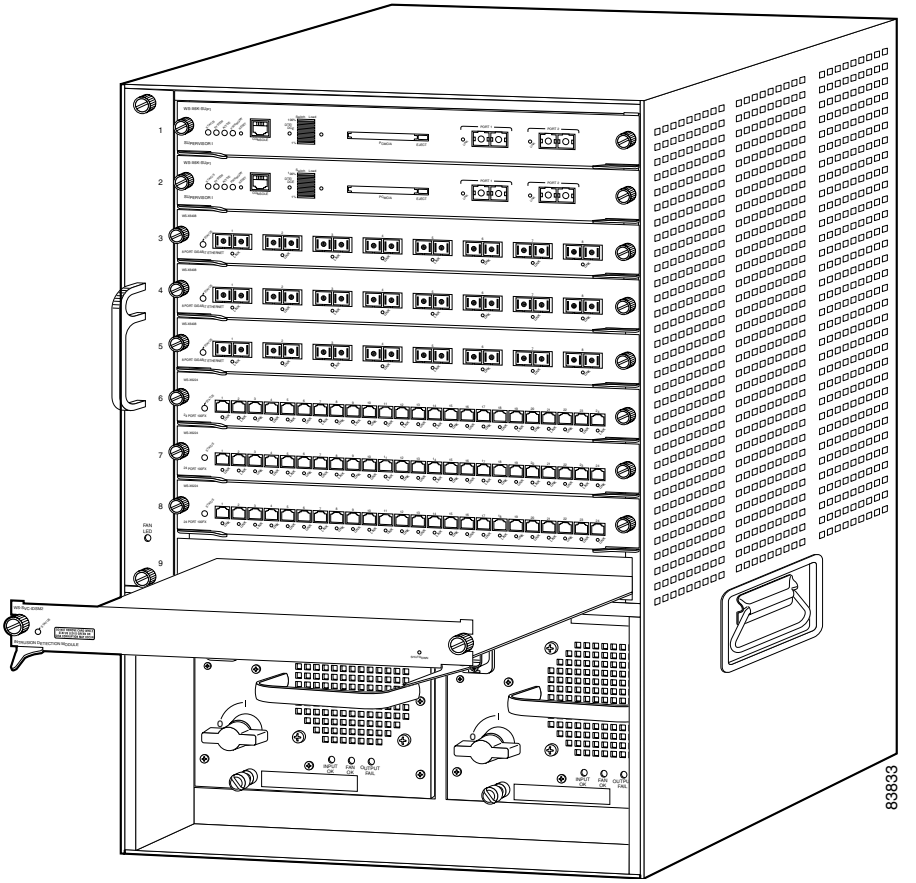


Warning **Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place. Statement 1029**

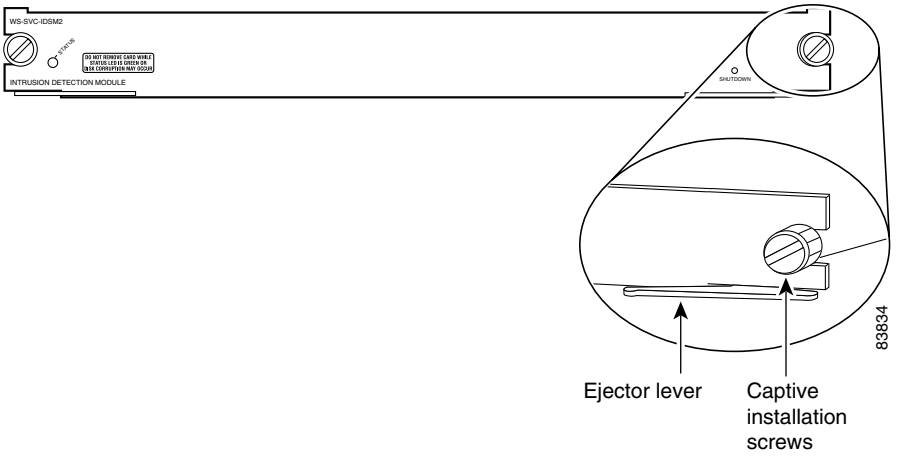
Step 5 Hold the IDSM-2 with one hand, and place your other hand under the IDSM-2 carrier to support it.

Caution Do not touch the printed circuit boards or connector pins on the IDSM-2.

Step 6 Place the IDSM-2 in the slot by aligning the notch on the sides of the IDSM-2 carrier with the groove in the slot.



Step 7 Keeping the IDSM-2 at a 90-degree orientation to the backplane, carefully push it into the slot until the notches on both ejector levers engage the chassis sides.



Step 8 Using the thumb and forefinger of each hand, simultaneously pivot in both ejector levers to fully seat the IDSM-2 in the backplane connector.

Caution Always use the ejector levers when installing or removing the IDSM-2. A module that is partially seated in the backplane causes the system to halt and subsequently crash.

Note If you perform a hot swap, the console displays the message "Module *x* has been inserted." This message does not appear, however, if you are connected to the Catalyst 6500 series switch through a Telnet session.

Step 9 Use a screwdriver to tighten the installation screws on the left and right ends of the IDSM-2.

Step 10 Verify that you have correctly installed the IDSM-2 and can bring it online. See Verifying the IDSM-2 Installation, page 8-11, for the procedure.

Step 11 Initialize the IDSM-2.

See Initializing the Sensor, page 10-2, for the procedure.

Step 12 Configure the switch for command and control access to the IDSM-2.

See Configuring the Catalyst 6500 Series Switch for Command and Control Access to the IDSM-2, page 10-88.

Step 13 Upgrade your IDSM-2 to the most recent Cisco IDS software.

See Obtaining Cisco IDS Software, page 9-1, for the procedure.

Step 14 Assign the interfaces.

See Assigning and Enabling the Sensing Interface, page 10-9, for the procedure.
See Using the TCP Reset Interface, page 8-4, for information on the TCP reset interface.

Step 15 Set up the IDSM-2 to capture IDS traffic.

See Copying IDS Traffic, page 10-90, for the procedure.

You are now ready to configure the IDSM-2 for intrusion detection.

Verifying the IDSM-2 Installation

Verify that the switch acknowledges the new IDSM-2 and has brought it online.

To verify the installation, follow these steps:

Step 1 Log in to the console.

Step 2 For Catalyst software, verify that the IDSM-2 is online by typing the following:

```
cat6k> enable
console> (enable) show module
Mod Slot Ports Module-Type             Model             Sub Status
--- ---- ----- ----------------------- ----------------- --- -----
1   1    2     1000BaseX Supervisor    WS-X6K-SUP2-2GE   yes ok
15  1    1     Multilayer Switch Featu WS-F6K-MSFC2      no  ok
2   2    48    10/100BaseTX Ethernet   WS-X6548-RJ-45    no  ok
3   3    2     Intrusion Detection Sys WS-X6381-IDS      no  faulty
4   4    8     1000BaseX Ethernet      WS-X6408-GBIC     no  ok
5   5    2     Intrusion Detection Sys WS-X6381-IDS      no  ok
6   6    0     FlexWAN Module          WS-X6182-2PA      no  ok
7   7    2     Intrusion Detection Sys WS-x6381-IDS      no  ok
9   9    8     Intrusion Detection Sys WS-SVC-IDSM2      yes ok

Mod Module-Name          Serial-Num
```

```
--- -------------------- -----------
1                        SAD044409HJ
15                       SAD044509KZ
2                        SAD060304VG
3                        SAD04130DZ4
4                        JAB04040859
5                        SAD044508PH
6                        SAD06450316
7                        SAD04130DZ9
9                        SAD063803KK

Mod MAC-Address(es)                         Hw     Fw          Sw
--- --------------------------------------- ------ ----------- ------------
1   00-01-63-d0-73-20 to 00-01-63-d0-73-21 1.1    6.1(3)      8.2(2)
    00-01-63-d0-73-1e to 00-01-63-d0-73-1f
    00-04-de-43-ec-00 to 00-04-de-43-ef-ff
15  00-04-9a-12-3b-40 to 00-04-9a-12-3b-7f 1.1    12.1(22)E1  12.1(22)E1
2   00-01-63-d4-a0-aa to 00-01-63-d4-a0-d9 4.0    6.3(1)      8.2(2)
3   00-d0-97-38-74-71 to 00-d0-97-38-74-72 0.301  5.3(1)      8.2(2)
4   00-30-a3-38-9a-30 to 00-30-a3-38-9a-37 2.3    4.2(0.24)V  8.2(2)
5   00-30-f2-70-d8-5e to 00-30-f2-70-d8-5f 1.2    4B4LZ0XA    3.0(7)S82
6   00-09-7c-be-37-80 to 00-09-7c-be-37-bf 1.5    12.1(22)E1  12.1(22)E1
7   00-50-3e-7e-70-62 to 00-50-3e-7e-70-63 0.301  4B4LZ0XA    3.0(7)S82
9   00-03-fe-aa-c0-d8 to 00-03-fe-aa-c0-df 0.102  7.2(1)      4.1(4)S91

Mod Sub-Type               Sub-Model          Sub-Serial  Sub-Hw Sub-Sw
--- ---------------------- ------------------ ----------- ------ ------
1   L3 Switching Engine II  WS-F6K-PFC2        SAD044302BP 1.0
9   IDS 2 accelerator board WS-SVC-IDSUPG      .           2.0
console> (enable)
```

Step 3 For Cisco IOS software, verify that the IDSM-2 is online by typing the following:

```
Router# show module
Mod Ports Card Type                                  Model              Serial No.
--- ----- -------------------------------------- ------------------ -----------
  1    2  Catalyst 6000 supervisor 2 (Active)    WS-X6K-SUP2-2GE    SAD060300AR
  2   48  SFM-capable 48 port 10/100/1000mb RJ45 WS-X6548-GE-TX     SAD074806XS
  5    8  8 port 1000mb ethernet                 WS-X6408-GBIC      SAD03380401
  6    2  Intrusion Detection System             WS-X6381-IDS       SAD052106AX
  7    0  2 port adapter FlexWAN                  WS-X6182-2PA       SAD064502WY
  9    8  Intrusion Detection System             WS-SVC-IDSM2       SAD060301T4

Mod MAC addresses                       Hw    Fw           Sw           Status
--- ----------------------------------- ----- ------------ ------------ -------
  1  0002.7e38.7630 to 0002.7e38.7631   3.2   7.1(1)       12.1(19)E1   Ok
  2  000e.8336.d730 to 000e.8336.d75f   6.0   7.2(1)       7.6(1.6)T195 Ok
  5  0030.961a.b194 to 0030.961a.b19b   2.6   5.4(2)       7.6(1.6)T195 Ok
  6  0002.7ef9.9c80 to 0002.7ef9.9c81   1.1   4B4LZ0XA     3.0(6)S42    Ok
  7  0008.7cd5.2340 to 0008.7cd5.237f   1.5   12.1(19)E1   12.1(19)E1   Ok
  9  0001.0002.0003 to 0001.0002.000a   0.102 7.2(1)       4.1(4)S91    Ok

Mod Sub-Module                  Model           Serial           Hw     Status
--- --------------------------- --------------- ---------------- ------- -------
  1 Policy Feature Card 2       WS-F6K-PFC2     SAD060300XG      3.0    Ok
  1 Cat6k MSFC 2 daughterboard  WS-F6K-MSFC2    SAD060102D7      1.3    Ok
  9 IDS 2 accelerator board     WS-SVC-IDSUPG   .                2.0    Ok
```

```
Mod Online Diag Status
--- -------------------
  1 Pass
  2 Pass
  5 Pass
  6 Not Supported
  7 Not Supported
  9 Pass
router#
```

Note It is normal for the status to read “other” when the IDSM-2 is first installed. After the IDSM-2 completes the diagnostics routines and comes online, the status reads “ok.” Allow up to 5 minutes for the IDSM-2 to come online.

See Enabling a Full Memory Test, page 10-99, for information on enabling a full memory test after verifying the IDSM-2 installation.

Removing the IDSM-2

This procedure describes how to remove the IDSM-2 from the Catalyst 6500 series switch.

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030**

Caution Before removing the IDSM-2, be sure to perform the shutdown procedure. If the IDSM-2 is not shut down correctly, you could corrupt the software.

Warning **During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not touch the backplane with your hand or any metal tool, or you could shock yourself.**

See Working in an ESD Environment, page 1-21, for more information.

To remove the IDSM-2, follow these steps:

Step 1 Shut down the IDSM-2 by one of these methods:

- Log in to the IDSM-2 CLI and type **reset powerdown**.
- Log in to the switch CLI and type one of the following commands:
  - For Catalyst software, type:

    `set module shutdown` *module_number*

  - For Cisco IOS software, type:

    `hw-module module` *module_number* **`shutdown`**
- Shut down the IDSM-2 through IDM or IDS MC.
- Press the Shutdown button.

Note Shutdown may take several minutes.

Caution If the IDSM-2 is removed from the switch chassis without first being shut down, or the chassis loses power, you may need to reset the IDSM-2 more than once. See Resetting the IDSM-2, page 10-101, for the procedure. If the module fails to respond after three reset attempts, boot the maintenance partition, and perform the instructions for restoring the application partition. See Reimaging the IDSM-2, page 10-124, for the procedure.

Step 2 Verify that the IDSM-2 shuts down. Do not remove the IDSM-2 until the status indicator is amber or off.

Step 3 Use a screwdriver to loosen the installation screws at the left and right sides of the IDSM-2.

Step 4 Grasp the left and right ejector levers and simultaneously pull the left lever to the left and the right lever to the right to release the IDSM-2 from the backplane connector.

Step 5 As you pull the IDSM-2 out of the slot, place one hand under the carrier to support it.

Caution Do not touch the printed circuit boards or connector pins.

Step 6 Carefully pull the IDSM-2 straight out of the slot, keeping your other hand under the carrier to guide it.

Note Keep the IDSM-2 at a 90-degree orientation to the backplane (horizontal to the floor).

Step 7 Place the IDSM-2 on an antistatic mat or antistatic foam.

Step 8 If the slot is to remain empty, install a filler plate (part number 800-00292-01) to keep dust out of the chassis and to maintain proper airflow through the module compartment.

Warning **Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place. Statement 1029**

Obtaining Software

This chapter provides information on obtaining Cisco IDS software for the sensors.

This chapter contains the following sections:

Obtaining Cisco IDS Software

You can find IDS Event Viewer, signature updates, service pack updates, BIOS upgrades, Readmes, and other software updates at Downloads on Cisco.com.

Note You must be logged into Cisco.com to access Downloads.

Periodic signature updates, which also contain Network Security Database (NSDB) updates, are posted to Cisco.com approximately every two weeks. Service packs are posted to Cisco.com as needed. Major and minor feature releases are also posted periodically.

You must have an active IDS maintenance contract and a Cisco.com password to download updates. See Applying for a Cisco.com Account with Cryptographic Access, page 9-11, for information on obtaining a Cisco.com account with cryptographic access.

Check Cisco.com regularly for the latest IDS software updates.

To access Downloads on Cisco.com, follow these steps:

Step 1 Go to Cisco.com.

Step 2 Log in to Cisco.com.

Step 3 Select **Technical Support > Downloads**.

Step 4 Under Software Products & Downloads, click **Cisco Secure Software**.

Step 5 Under Cisco Secure Software, click **Cisco Intrusion Detection System (IDS)**.

Step 6 On the Software Center (Downloads) page, locate your sensor, and then under Version 4.x, click the applicable software link, for example, **Latest Service Pack, Minor, and Major Updates**.

For BIOS upgrades, click **Firmware**.

Step 7 On the Software Download page, click the file you need.

To sort by Filename, Release, Date, or Size, select the option in the menu and click **Go**.

Note See IDS Software Image Naming Conventions, page 9-3, for an explanation of the IDS file versioning scheme.

Step 8 You must type your Cisco.com username and password again.

Note The first time you download a file from Cisco.com, you must fill in the Encryption Software Export Distribution Authorization form before you can download the software and click Submit.

Step 9 Click the file you are downloading.

Step 10 Follow the instructions in the Readme to install the update.

If the software upgrade fails for any reason, and leaves the sensor in an unusable condition, you may need to recover the system. See Reimaging Appliances and Modules, page 10-110, for more information.

Note Major version upgrades, minor version upgrades, service packs, and signature updates are the same for all sensors. System image files, recovery files, and application files are unique per platform.

IDS Software Versioning

This section describes how to interpret IDS software versioning.

This section contains the following topics:

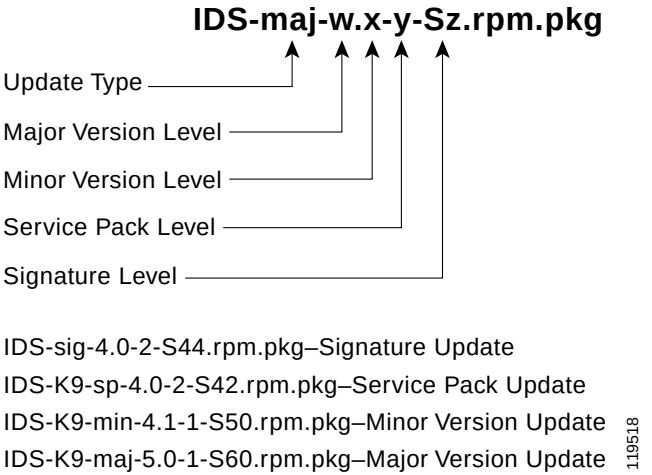
IDS Software Image Naming Conventions

When you download IDS software images from Cisco.com, you should understand the versioning scheme so that you know which files are base files, which are cumulative, and which are incremental.

Note You can determine which software version is installed on your sensor by using the **show version** command.

Figure 9-1 on page 9-4 illustrates what each part of the IDS software file represents:

Figure 9-1 IDS Software File Name



A major version upgrade contains new functionality or an architectural change in the product. For example, beginning with the IDS 4.0 base version release, future major version upgrades (5.0, 6.0, and so forth) include everything since the previous major release (the minor version features, service pack fixes, and signature updates) plus any new changes.

A minor version upgrade is incremental to the major version. Minor version upgrades are also base versions for service packs. The first minor version upgrade for 4.0 is 4.1(1)Sx. Minor version upgrades are released for minor enhancements to the product. Minor version upgrades contain all previous minor features, service pack fixes, and signature updates since the last major version, and the new minor features being released.

Service packs are cumulative following a base version release (minor or major). Service packs are used for the release of defect fixes with no new enhancements. Service packs contain all service pack fixes and signature updates since the last base version (minor or major) and the new defect fixes being released.

Signature updates are cumulative and increment by one with each new release (for example, S45, S46, S47). Signature updates include every signature since the initial signature release (S1) in addition to the new signatures being released.

A signature update is the most dependent software file. To install the most recent signature update, you must have the most recent service pack. Service packs are dependent on the most recent minor version, which is dependent on the most recent major version.

Note See 4.x Software Release Examples, page 9-6, for a table listing the types of files with examples of filenames and corresponding software releases.

In addition there are system image files for the IDS-4215, IPS-4240, and IPS-4255, a recovery partition file for the appliances, application partition files for the IDSM-2 and NM-CIDS, a maintenance partition file for the IDSM-2, and a helper image for the NM-CIDS:

- System image files (IDS-4215, IPS-4240, IPS-4255 only)—Full IDS application and recovery image used for reimaging an entire sensor.
- Recovery partition image file (appliances only)—A recovery partition image file is a hard-disk drive partition on appliances that contains a full IDS application image to be used for recovery.
- Application partition image file (IDSM-2 and NM-CIDS)—An application partition image file is a full IDS application image that can be used to reimage the application partition of the IDSM-2 and the NM-CIDS. Application partition image files are released when new major or minor version upgrades are released. Application partition image files are usually not released for service pack or signature updates. A service pack may be released to address defects identified in existing application partition images, but new application partition images will not be produced for subsequently released service packs.
- Maintenance partition image file (IDSM-2 only)—A maintenance partition image file is used to reimage the maintenance partition of the IDSM-2. Maintenance partition files are released when new major or minor versions of the maintenance partition are released. Maintenance partition image files are not released for service packs to the maintenance partition. A service pack may be released to address defects identified in existing maintenance partition images, but new maintenance partition images are not produced for subsequently released service packs.

Note The maintenance partition image file does not contain a signature designator.

- Helper image and bootloader—The helper image is used to reimage the NM-CIDS hard-disk drive. You boot the helper image from the NM-CIDS firmware, which includes the BIOS and the bootloader. The bootloader supports booting from a TFTP server and booting an image from the hard-disk drive. After this image is booted, it provides support for TFTP and SSH. You can use either protocol to load the application image and write it to the hard-disk drive. Helper image and bootloader files are released as needed.

4.x Software Release Examples

Table 9-1 lists platform-independent IDS 4.x software release examples. Refer to Readmes that accompany the software files for detailed instructions on how to install the files. See Obtaining Cisco IDS Software, page 9-1, for instructions on how to access these files on Cisco.com.

Table 9-1 Platform-Independent Release Examples

Release	Target Frequency	Identifier	Supported Platform	Example File Name
Signature update[1]	Bi-weekly	sig	All	IDS-sig-4.0-1-S30.rpm.pkg
Service pack[2]	Semi-annually or as needed	sp	All	IDS-K9-sp-4.0-2-S29.rpm.pkg
Minor version[3]	Annually	min	All	IDS-K9-min-4.1-1-S29.rpm.pkg
Major version[4]	Annually	maj	All	IDS-K9-maj-4.0-1-S29.rpm.pkg

1. Signature updates include the latest cumulative IDS signatures and the NSDB.
2. Service packs include defect fixes.
3. Minor versions include new features and/or functionality (for example, signature engines).
4. Major versions include new functionality or new architecture.

Table 9-2 describes the platform-dependent release examples.

Table 9-2 Platform-Dependent Release Examples

Release	Target Frequency	Identifier	Supported Platform	Example File Name
System image[1]	Semi-annually	sys	IDS-4215 IPS-4240 IPS-4255	IPS-4240-K9-sys-1.1-a-4.0-1-S29.img
Application partition image[2]	Semi-annually	a	IDSM-2 NM-CIDS	WS-SVC-IDSM2-K9-a-4.0-1-S29.bin.gz NM-CIDS-K9-a-4.1-1-S29.bin.gz
Maintenance partition image[3]	Annually	mp	IDSM-2 only	mp-2-1-1.bin.gz
Full image for recovery partition (IDS/IPS appliances only)[4]	Semi-annually	r	IDS-4210 IDS-4220 IDS-4230 IDS-4235 IDS-4250 IDS-4215 IPS-4240 IPS-4255	IDS-42XX-K9-r-1.1-a-4.0-1-S29.tar.pkg IDS-4215-K9-r-1.1-a-4.1-1-S29.tar.pkg IPS-4240-K9-r-1.1-a-4.1.1-S29.tar.pkg
Boot loader[5]	As needed	bl	NM-CIDS	servicesengine-bl-1.0-4.bin
Helper image[6]	As needed	helper	NM-CIDS	NM-CIDS-K9-helper-1.0-1.bin
Recovery and upgrade CD[7]	Annually	cd	IDS-4210 IDS-4220 IDS-4230 IDS-4235 IDS-4250	IDS-42XX-K9-cd-1.1-a-4.0-1-S29.iso

1. The system image includes the combined recovery and application image used to reimage an entire sensor.
2. The application partition image includes the full image for the application partition.

3. The maintenance partition image includes the full image for the maintenance partition. The file is platform specific. If you have to recover the IDSM-2 from the maintenance partition, the application partition reflects the applicable 4.0 version after the recovery operation has been completed.
4. The r 1.1 can be revised to r 1.2 if it is necessary to release a new recovery image that contains the same underlying application image. If there are defect fixes for the installer, for example, the underlying application version may still be 4.0(1)S29, but the recovery partition image will be r 1.2.
5. Bootloader is used for reimaging the NM-CIDS.
6. The helper image reimages the NM-CIDS hard-disk drive.
7. This CD is used for recovery or upgrade of an IDS appliance. The cd 1.1 can be revised to cd 1.2 if it is necessary to release a new CD that contains the same underlying application image. If there is a defect fix for the installer, for example, the underlying application version may still be 4.0(1)S29, but the recovery partition image will be cd 1.2.

Upgrading Cisco IDS Software from Version 4.0 to 4.1

Note The newest IDS platforms, the IDS-4215 and the NM-CIDS, ship with Cisco IDS 4.1 installed. The new IPS platforms, the IPS-4240 and the IPS-4255, ship with Cisco IDS 4.1 installed.

Note You cannot upgrade the IDSM (WS-X6381) to Cisco IDS 4.1. You must replace your IDSM (WS-X6381) with the IDSM-2 (WS-SVC-IDSM2-K9), which supports version 4.x.

The upgrade from Cisco IDS software version 4.0 to 4.1 is available as a download from Cisco.com. See Obtaining Cisco IDS Software, page 9-1, for the procedure for accessing the Software Center on Cisco.com.

After downloading the 4.1 upgrade file, refer to the accompanying Readme for the procedure for installing the 4.1 upgrade file using the **upgrade** command.

If you configured Auto Update for your sensor, copy the 4.1 upgrade file to the directory on the server that your sensor polls for updates. Refer to *Installing and Using the Cisco Intrusion Detection System Device Manager and Event Viewer Version 4.1* for the procedure for configuring Auto Update through IDS Device Manager.

If you install an upgrade on your sensor and the sensor is unusable after it reboots, you must recover the system image of your sensor. Upgrading a sensor from any Cisco IDS version before 4.0 also requires you to use the **recover** command or the recovery/upgrade CD.

You can recover the system image of your sensor in the following ways:

- For IDS appliances with a CD-ROM drive, use the recovery/upgrade CD.

  See Using the Recovery/Upgrade CD with the Appliance, page 9-9, for the procedure.

- For the IDS/IPS appliance, use the **recover** command.

  See Recovering the Application Partition Image, page 10-111, for the procedure.

- For the IPS appliances, use the ROMMON to restore the system image.

  See Installing the IDS-4215 System Image, page 10-113, and Installing the IPS-4240 and IPS-4255 System Image, page 10-116, for the procedures.

- For NM-CIDS, use the bootloader.

  See Reimaging the NM-CIDS Application Partition, page 10-119, for the procedure.

- For IDSM-2, use the **recover** command.

  See Reimaging the IDSM-2, page 10-124, for the procedure.

Caution When you recover the system image for your sensor, all accounts are removed and the default account and password are reset to cisco.

Using the Recovery/Upgrade CD with the Appliance

Caution You are installing a new software image. All configuration data is overwritten.

After you recover the system image with the recovery/upgrade CD, you must use the **setup** command to initialize the appliance. You will need your configuration information. You can obtain this information by generating a diagnostics report through IDM.

Signature updates, which include the Network Security Database (NSDB), occur approximately every two weeks. The most recent signature update will not be on the recovery/upgrade CD that shipped with your appliance. Download the most recent signature update and apply it after you have recovered the system image.

To recover the system image with the recovery/upgrade CD, follow these steps:

Step 1 Obtain your configuration information from IDM:

a. To access IDM, point your browser to the appliance you are upgrading.

b. Select **Administration** > **Diagnostics**.

The Diagnostics panel appears.

c. Click **Run Diagnostics**.

Running the diagnostics may take a while.

d. Click **View Results**.

The results are displayed in a report.

e. To save the diagnostics report, select **Menu** > **Save As** in your browser.

Step 2 Insert the recovery/upgrade CD into the CD-ROM drive.

Step 3 Power off the appliance and then power it back on.

The boot menu appears, which lists important notices and boot options.

```
IDS-4220/4230 customers:
Sniffing and Command-and-Control interfaces have been swapped in CIDS
4.0. Reference the 4.0 software documentation before proceeding.
IDS-4235/4250 customers: BIOS version "A04" or later is required to
run CIDS 4.0 on your appliance. Reference the 4.0 software
documentation before proceeding.

- To recover the Cisco IDS 4.0 Application using a local
keyboard/monitor, type: k <ENTER>. (WARNING: ALL DATA ON DISK 1 WILL
BE LOST)
- To recover the Cisco IDS 4.0 Application using a serial connection,
type: s <ENTER>, or just press <ENTER> (WARNING: ALL DATA ON DISK 1
WILL BE LOST)
```

Step 4 Type **k** if you are installing from a keyboard, or type **s** if you are installing from a serial connection.

Note A blue screen is displayed for several minutes without any status messages while the files are being copied from the CD to your appliance.

Step 5 Log in to the appliance by using a serial connection or with a monitor and keyboard.

Note The default username and password are both cisco.

Step 6 You are prompted to change the default password.

Note Passwords must be at least eight characters long and be strong, that is, not be a dictionary word.

After you change the password, the `sensor#` prompt appears.

Step 7 Type the **setup** command to initialize the appliance.

See Initializing the Sensor, page 10-2, for the procedure.

Step 8 Install the most recent service pack and signature update.

See Obtaining Cisco IDS Software, page 9-1, for the procedure.

Applying for a Cisco.com Account with Cryptographic Access

To download software updates, you must have a Cisco.com account with cryptographic access.

To apply for cryptographic access, follow these steps:

Step 1 If you have a Cisco.com account, skip to Step 2. If you do not have a Cisco.com account, register for one by going to the following URL: http://tools.cisco.com/RPF/register/register.do

Step 2 Go to the following URL: http://www.cisco.com/pcgi-bin/Software/Crypto/crypto_main.pl

The Enter Network Password dialog box appears.

Step 3 Log in with your Cisco.com account.

The Encryption Software Export Distribution Authorization Form page appears.

Step 4 Select your software from the list box and click **Submit**.

The Encryption Software Export Distribution Authorization Form appears.

Step 5 Review and complete the Encryption Software Export Distribution Authorization form and click **Submit**.

The "Cisco Encryption Software: Crypto Access Granted" message appears.

Note It takes approximately 4 hours to process your application. You cannot download the software until the entitlement process is complete. You will not receive notification.

IDS Bulletin

You can subscribe to Cisco IDS Active Update Bulletin on Cisco.com to receive e-mails when signature updates and service pack updates occur.

To receive notification about updates, follow these steps:

Step 1 Go to the following URL: http://www.cisco.com/offer/newsletter/123668_4/

Step 2 Fill out the required information, as follows:

- **a.** Would you like to receive IDS Active Update Bulletin? Select Yes or No from menu.
- **b.** Type your first name in the First Name box.
- **c.** Type your middle name or initial in the Middle Name/Initial box.
- **d.** Type your last name in the Last Name/Surname box.
- **e.** Type the name of your organization in the Organization box.
- **f.** Select your country from the menu.
- **g.** Type your e-mail address in the E-mail box.

Step 3 Select the check box if you would like to receive further information about Cisco products and offerings by e-mail.

Step 4 Select the e-mail format you prefer from the menu.

Step 5 Fill in the optional information if desired.

- **a.** Select your job function from the menu.
- **b.** Select your job level from the menu.
- **c.** Select your industry or business type from the menu.
- **d.** Select how many people your organization employs worldwide from the menu.
- **e.** Select your company or organization type from the menu.

Step 6 Click **Submit Form**.

You will receive e-mail notifications of updates when they occur and instructions on how to obtain them.

CHAPTER 10

Configuring the Sensor Using the CLI

The command line interface (CLI) for IDS version 4.1 is the user interface that enables you to access the sensor through Telnet, SSH, and serial interface connections.

This chapter provides basic configuration procedures using the CLI. You can also use an IDS manager to configure your sensor. For information on using IDS Device Manager or Management Center for IDS Sensors to configure your sensor, refer to the documentation on Cisco.com. Refer to the *Cisco Intrusion Detection System (IDS) Hardware and Software Version 4.1 Documentation Guide* that shipped with your sensor for information on how to access IDS documentation.

Note When procedures apply to all IDS sensors, the term "sensor" is used. When a procedure applies to a specific appliance or module, it is indicated in the procedures.

This chapter contains the following sections:

Sensor Initial Configuration Tasks

This section describes the configuration tasks you need to perform before configuring intrusion detection on your sensor.

This section contains the following topics:

Initializing the Sensor

After you have installed the sensors on your network, you must initialize them using the **setup** command.

Note If you have an IDS-4235 or IDS-4250, check to see what version BIOS you have. If it is earlier than A04, you must apply the BIOS upgrade before installing version 4.1 software. See Upgrading the BIOS, page 5-7, for the procedure.

Note For support reasons, you should set up the service account after initializing the sensor. See Creating the Service Account, page 10-12, for the procedure.

Note After you have initialized your sensor, you must assign the interfaces. See Assigning and Enabling the Sensing Interface, page 10-9, for the procedure.

To initialize the sensor, follow these steps:

Step 1 Log in to the CLI.

The default username and password are both **cisco**.

a. Session in to the IDSM-2:

- For Catalyst software, type the following:

```
Console> enable
Console> (enable) session module_number
```

- For Cisco IOS software, type the following:

```
Router# session slot slot_number processor 1
```

b. Session in to the NM-CIDS by typing the following:

```
Router# service-module IDS-Sensor slot_number/port_number session
```

c. Log in to the appliance by using a serial connection or with a monitor and keyboard.

Note You cannot use a monitor and keyboard with the IDS-4215, the IPS-4240, or the IPS-4255.

Step 2 You are prompted to change the default password.

Passwords must be at least eight characters long and be strong, that is, not be a dictionary word.

Caution If you forget your password, you may have to reimage your sensor (see Reimaging Appliances and Modules, page 10-110), unless there is another user with administrator privileges. The other administrator can log in and assign a new password to the user who forgot the password. Or, if you have created the service account, you can have TAC create a password. See Creating the Service Account, page 10-12, for more information.

After you change the password, the `sensor#` prompt appears.

Step 3 Type **`setup`** to initialize the sensor.

The System Configuration Dialog is displayed.

Note The System Configuration Dialog is an interactive dialog. The default settings are displayed.

```
--- System Configuration Dialog ---

At any point you may enter a question mark '?' for help.
User ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.


Current Configuration:


networkParams
ipAddress 10.89.146.110
netmask 255.255.255.0
defaultGateway 10.89.146.254
hostname sensor
telnetOption disabled
accessList ipAddress 10.0.0.0 netmask 255.0.0.0
exit
timeParams
summerTimeParams
active-selection none
exit
exit
service webServer
general
ports 443
exit
exit


Current time: Sat May 15 02:52:09 1993
```

Step 4 Press the spacebar to get to the following question:

```
Continue with configuration dialog?[yes]:
```

Press the spacebar to show one page at a time. Press **Enter** to show one line at a time.

Step 5 Type **yes** to continue.

Step 6 Specify the hostname.

The hostname is a case-sensitive character string up to 256 characters. Numbers, "_" and "-" are valid, but spaces are not acceptable. The default is sensor.

Step 7 Specify the IP address.

An IP address is a 32-bit address written as four octets separated by periods, X.X.X.X, where X=0-255. The default is 10.1.9.201.

Step 8 Specify the netmask.

The netmask is a 32-bit address written as four octets separated by periods, X.X.X.X, where X=0-255. The default for a Class C address is 255.255.255.0.

Step 9 Specify the default gateway.

The default gateway is the default router IP address for the sensor. The default is 10.1.9.1.

Step 10 Specify the Telnet server status.

You can disable or enable Telnet services. The default is disabled.

Step 11 Specify the web server port.

The web server port is the TCP port used by the web server (1 to 65535). The default is 443.

Note If you change the web server port, you must specify the port in the URL address of your browser when you connect to IDS Device Manager in the format `https://`*sensor ip address*`:port` (for example, `https://10.1.9.201:1040`).

Step 12 Type **yes** to modify the network access list.

a. Press **Enter** to get to the Permit line.

b. Specify the IP address and netmask of the network you want to add to the access list.

Specify the netmask if the IP address is a network address (as opposed to a host address).

c. Repeat Step b until you have entered all networks that you want to add to the access list.

Step 13 Type **yes** to modify the system clock settings.

a. Type **yes** if you want to use NTP.

You will need the NTP server IP address, the NTP key ID, and the NTP key value. If you do not have those at this time, you can configure NTP later. See Configuring the Sensor to Use an NTP Server as its Time Source, page 10-21, for the procedure.

b. Type **yes** to modify summertime settings.

Note Summertime is also known as Daylight Savings Time (DST). If your location does not use Summertime, go to Step h.

c. Type recurring, date, or disable to specify how you want to configure summertime settings.

The default is recurring.

d. If you typed recurring, type the month you want to start summertime settings.

The default is apr.

Valid entries are jan, feb, mar, apr, may, jun, jul, aug, sep, oct, nov, and dec.

e. Specify the week you want to start summertime settings.

The default is first.

Valid entries are first, second, third, fourth, fifth, and last.

f. Specify the day you want to start summertime settings.

The default is sun.

Valid entries are sun, mon, tue, wed, thu, fri, and sat.

g. Specify the time you want to start summertime settings.

The default is 02:00:00.

Note The default recurring summertime parameters are correct for time zones in the United States. The default values specify a start time of 2 a.m. on the first Sunday in April, and a stop time of 2 a.m. on the fourth Sunday in October. The default summertime offset is 60 minutes.

h. Specify the month you want summertime settings to end.

The default is oct.

Valid entries are jan, feb, mar, apr, may, jun, jul, aug, sep, oct, nov, and dec.

i. Specify the week you want the summertime settings to end.

The default is last.

Valid entries are first, second, third, fourth, fifth, and last.

j. Specify the day you want the summertime settings to end.

The default is sun.

Valid entries are sun, mon, tue, wed, thu, fri, and sat.

k. Specify the time you want summertime settings to end.

The default is 02:00:00.

l. Specify the DST zone.

The zone name is a character string up to 128 characters long.

m. Specify the summertime offset.

The default is 60.

Specify the summertime offset from UTC in minutes (negative numbers represent time zones west of the Prime Meridian).

n. Type **yes** to modify the system time zone.

o. Specify the standard time zone name.

The zone name is a character string up to 128 characters long.

p. Specify the standard time offset.

The default is 60.

Your configuration appears with the following options:

```
[0] Go to the command prompt without saving this config.
[1] Return back to the setup without saving this config.
[2] Save this configuration and exit setup.
```

Step 14 Type **2** to save the configuration.

```
Enter your selection[2]: 2
Configuration Saved.
```

Step 15 Modify the current system date and time.

Note This option is not available on modules. The modules get their time from the router or switch in which they are installed.

a. Type **yes** to modify the system date and time.

b. Specify the local date.

c. Specify the local time.

Step 16 Type **2** to save the configuration.

```
Enter your selection[2]: 2
Configuration Saved.
Warning: The node must be rebooted for the changes to go into effect.
Continue with reboot? [yes]:
```

Step 17 Type **yes** to reboot the sensor.

Step 18 Display the self-signed X.509 certificate (needed by TLS) by typing the following command:

```
sensor# show tls fingerprint
MD5: C1:9F:DE:2A:7D:D9:9A:EE:C9:19:76:D8:0F:96:8D:EC SHA1:
DC:06:71:57:90:C7:2A:E4:6E:FE:22:78:B0:33:0F:5A:F2:4A:13:59
```

Step 19 Write down the certificate fingerprints.

You will need these to check the authenticity of the certificate when connecting to this sensor with a web browser.

Step 20 Apply the most recent signature update.

See Obtaining Cisco IDS Software, page 9-1, for information on how to obtain the most recent software. The Readme explains how to apply the most recent software update.

Step 21 Assign the interfaces.

See Assigning and Enabling the Sensing Interface, page 10-9, for the procedure.

You are now ready to configure your sensor for intrusion detection.

Assigning and Enabling the Sensing Interface

An interface group provides a way to group sensing interfaces into one logical virtual sensor. Only one interface group, 0, is supported. Depending on the configuration of your sensor, you may need to assign the sensing interface to interface group 0 and enable the interface.

Review the following guidelines:

- If you purchased a new sensor that shipped with Cisco IDS version 4.1:
  - The sensor detects the available sensing (monitoring) interfaces during the bootup process and adds those interfaces to interface group 0.

    Note If the XL card is present, only the XL interfaces are added to interface group 0. If the XL card is not present, all Ethernet 100/1000 interfaces (except the command and control interface) are added to interface group 0.

  - By default, all interfaces the sensor detects and adds to interface group 0 are disabled. You need to use the IDS CLI or other IDS manager to enable the appropriate interfaces.

    Note When you enable an interface the change takes effect immediately. The sensor does not need to reboot.

- If you upgrade an existing sensor to Cisco IDS version 4.1:
  - The sensor detects the available interfaces during startup but does not modify the existing interface group 0.
  - You must use the IDS CLI or other IDS manager to add the unassigned interfaces to interface group 0.

    Note If you add or remove interfaces of different types (such as adding an XL interface and removing an Ethernet 100/1000 interface) the sensor reboots.

Warning **If you are using the command and control interface as the sensing interface, you receive an error the first time Cisco IDS 4.1 boots. The sensor detects that the command and control interface is an invalid interface for interface group 0. You must use the IDS CLI or other IDS manager to remove the command and control interface from interface group 0 and add a valid sensing interface.**

To assign and enable sensing interfaces, follow these steps:

Step 1 Log in to the CLI using an account with administrator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 To add an interface to or remove an interface from interface group 0, follow these steps:

a. Enter interface group configuration mode for interface group 0:

```
sensor(config)# interface group 0
```

b. Remove an interface:

```
sensor(config-ifg)# no sensing-interface name
```

Where *name* is the logical name of the sensing interface, such as int0.

See Sensing Interfaces, page 10-11, for a list of interface names per platform.

c. Add an interface:

```
sensor(config-ifg)# sensing-interface name
```

For example, to add int0 and int3 to interface group 0, type the following command:

```
sensor(config-ifg)# sensing-interface int0,int3
```

Note There is no space after the comma in the previous example. When typing more than one interface, you do not need to add a space between the comma and the next interface name.

d. Exit interface group configuration mode:

```
sensor(config-ifg)# exit
```

Step 4 To enable or disable an interface, follow these steps:

a. Enter sensing interface configuration mode for the interface:

```
sensor(config)# interface sensing name
```

Where *name* is the logical name of the sensing interface, such as int0.

b. Enable the interface:

```
sensor(config-ifs)# no shutdown
```

c. Verify the interface is enabled:

```
sensor(config-ifs)# exit
sensor(config)# exit
sensor# show interface
```

d. Disable the interface:

```
sensor# configure terminal
sensor(config)# interface sensing name
sensor(config-ifs)# shutdown
```

e. Exit sensing interface configuration mode:

```
sensor(config-ifs)# exit
sensor(config)# exit
sensor#
```

Note Enabling or disabling the interface group enables or disables all sensing interfaces contained in the group.

Sensing Interfaces

Table 10-1 on page 10-12 lists the sensing interfaces for each IDS platform.

Table 10-1 Sensing Interfaces

IDS Platform	Sensing Interface
IDS-4210	int0
IDS-4215	int0
IDS-4215-4FE	int0, int2, int3, int4, int5
IDS-4220 and IDS-4230	int0
IDS-4235	int0
IDS-4235-4FE	int0, int2, int3, int4, int5
IDS-4250	int0
IDS-4250-SX	int0, int2
IDS-4250-XL	int0, int2, int3
IDS-4250-4FE	int0, int2, int3, int4, int5
IDSM-2	int7 and int8
IPS-4240	int0, int1, int2, int3
IPS-4255	int0, int1, int2, int3
NM-CIDS	int1

Creating the Service Account

You can create a service account for TAC to use during troubleshooting. Although more than one user can have access to the sensor, only one user can have service privileges on a sensor. The service account is for support purposes only.

Caution Do not make modifications to the sensor through the service account except under the direction of TAC. If you use the service account to configure the sensor, your configuration is not supported by TAC. Adding services to the operating system through the service account affects proper performance and functioning of the other IDS services. TAC does not support a sensor on which additional services have been added.

To create the service account, follow these steps:

Step 1 Log in to the CLI using an account with administrator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Specify the parameters for the service account:

```
sensor(config)# privilege service
```

A valid *username* contains 1-32 alphanumeric characters. You can also use an underscore (_) or dash (-) in the username.

Step 4 Specify a password when prompted.

If a service account already exists for this sensor, the following error is displayed and no service account is created:

```
Error: Only one service account allowed in UserAccount document
```

Step 5 Exit configuration mode:

```
sensor(config)# exit
sensor#
```

When you use the service account to log in to the CLI, you receive the following warning:

```
********************** WARNING ********************************
UNAUTHORIZED ACCESS TO THIS NETWORK DEVICE IS PROHIBITED. This account
is intended to be used for support and troubleshooting purposes only.
Unauthorized modifications are not supported and will require this
device to be reimaged to guarantee proper operation.
***************************************************************
```

Logging in to the Sensor

To log in to the sensor, follow these steps:

Step 1 Do one of the following:

a. SSH or Telnet to the appliance:

ssh *user@ip_address*

telnet *ip_address*

b. SSH, Telnet, or console log in to the IDSM-2:

– For Catalyst Software:

ssh *ip_address*
session *slot_number*

telnet *ip_address*
session *slot_number*

`Console>(enable)` **session** *slot_number*

– For Cisco IOS software:

ssh *ip_address*
session *slot_number* **processor 1**

telnet *ip_address*
session *slot_number* **processor 1**

`Router#` **session slot** *slot_number* **processor** *processor_number*

c. SSH or Telnet to the NM-CIDS:

ssh *ip_address*
service-module IDS-Sensor *slot_number*/**0 session**

telnet *ip_address*
service-module IDS-Sensor *slot_number*/**0 session**

Step 2 Type your username and password at the login prompt:

Note The default is cisco.

```
login: cisco
Password: cisco
```

If you are logging in for the first time, you are prompted to change your password.

Changing a Password

The **password** command updates the password on the local sensor. You can also use this command to change the password for an existing user or to reset the password for a locked account.

To change the password, follow these steps:

Step 1 To change the password for another user or reset the password for a locked account, follow these steps:

a. Log in to the CLI using an account with administrator privileges.

b. Enter configuration mode:

```
sensor# configure terminal
```

c. Change the password for a specific user:

```
sensor(config)# password tester
Enter New Login Password: ******
Re-enter New Login Password: ******
```

Note This example modifies the password for the user “tester.”

Step 2 To change your password, follow these steps:

a. Log in to the CLI.

b. Enter configuration mode:

```
sensor# configure terminal
```

c. Change your password:

```
sensor(config)# password
Enter Old Login Password:************
Enter New Login Password: ************
Re-enter New Login Password: ************
```

Adding a User

You can add a new user, set the privilege level—administrator, operator, viewer—and set the password for the new user. Use the **username** command to create users on the local system. Use the **no** form of this command to remove a user from the system.

The **username** command provides username and password authentication for login purposes only. You cannot use this command to remove a user who is logged into the system. If you do not specify a password, the system prompts you for one. Use the **password** command to change the password for existing users. Use the **privilege** command to change the privilege for existing users.

Note You cannot use the **privilege** command to give a user service privileges. If you want to give an existing user service privileges, you must remove that user and then use the **username** command to create the service account. See "Creating the Service Account" section on page 10-12.

To add a user, follow these steps:

Step 1 Log in to the CLI using an account with administrator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Specify the parameters for the user:

```
sensor(config)# username username password password privilege
administrator/operator/viewer
```

A valid *username* contains 1-32 alphanumeric characters. You can also use an underscore (_) or dash (-) in the username.

For example, to add the user "tester" with a privilege level of administrator and the password "testpassword," type the following command:

```
sensor(config)# username tester privilege administrator
Enter Login Password: *****
Re-enter Login Password: *****
```

Note If you do not specify a privilege level for the user, the user is assigned the default *viewer* privilege.

Step 4 Verify that the user has been added:

a. Exit configuration mode:

```
sensor(config)# exit
```

b. View a list of all users:

```
sensor# show users all
```

A list of users is displayed.

Removing a User

You can delete a user and thus prevent access to the sensor.

To remove a user, follow these steps:

Step 1 Log in to the CLI using an account with administrator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Remove the user:

```
sensor(config)# no username name
```

The username is now removed from the sensor.

Step 4 Verify that the user has been removed.

a. Exit configuration mode:

```
sensor(config)# exit
```

b. View a list of all users:

```
sensor# show users all
```

A list of all user accounts is displayed. The user you removed no longer appears in the list.

Adding Trusted Hosts

You can identify hosts (trusted hosts) that are allowed to connect to the sensor.

To add a trusted host, follow these steps:

Step 1 Log in to the CLI using an account with administrator or operator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enter Service host mode:

```
sensor(config)# service host
```

Step 4 Enter configuration mode for network parameters:

```
sensor(config-Host)# networkParams
```

Step 5 Specify the allowed host:

```
sensor(config-Host-net)# accessList ipAddress ip_address
```

The IP address is now in the list of trusted hosts.

Step 6 You can type an optional netmask to specify allowed networks.

```
sensor(config-Host-net)# accessList ipAddress ip_address netmask
netmask
```

Step 7 Exit configuration mode for network parameters:

```
sensor(config-Host-net)# exit
sensor(config-Host)# exit
```

You are prompted to apply the changes:

```
Apply Changes?:[yes]:
```

Step 8 Type **yes** to apply the changes.

After the sensor has finished processing the configuration changes, the `sensor(config)#` prompt is displayed.

Adding Known Hosts to the SSH Known Hosts List

You must add hosts to the SSH known hosts list so that the sensor can recognize the hosts that it can communicate with through SSH. These hosts are SSH servers that the sensor needs to connect to for upgrades and file copying, and other hosts, such as Cisco routers, PIX Firewalls, and Catalyst switches.

To add a host to the SSH known hosts list, follow these steps:

Step 1 Log in to the CLI using an account with administrator or operator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Specify an SSH known host:

```
sensor(config)# ssh host-key ip_address
```

For example, to add the remote host 10.16.0.0 to the SSH known hosts list, type the following command:

```
sensor(config)# ssh host-key 10.16.0.0
```

The MD5 fingerprint appears. You are prompted to add it to the known hosts table:

```
Would you like to add this to the known hosts table for this
host?[yes]
```

Step 4 Type **yes** to have the fingerprint added to the known hosts list.

Step 5 To view the list of SSH known hosts, type the following command:

```
sensor# show ssh host-keys ip-address
```

The SSH known hosts information (similar to the following) appears:

```
1024 35
139306213541835240385332922253968814685684523520064131997839905113640120217816869696708721704631322844292073851730565044879082670677555415793705848520399557211463129660455216130971260106861481274996959351374059833139315488498830230218292235333515265386058916365194499784287458362788327746013850608404341586192 7
MD5: 49:3F:FD:62:26:58:94:A3:E9:88:EF:92:5F:52:6E:7B

Bubble Babble:
xebiz-vykyk-fekuh-rukuh-cabaz-paret-gosym-serum-korus-fypop-huxyx
```

Step 6 To remove an entry, type the following command:

```
sensor(config)# no ssh host-key ip_address
```

For example, to remove host 10.16.0.0 from the list of SSH known hosts, type the following command:

```
sensor(config-SshKnownHosts)# no ssh host-key 10.16.0.0
```

The host is removed from the SSH known hosts list. You can verify the removal by typing the following command:

```
sensor(config-SshKnownHosts)# show settings
```

The SSH known hosts information (similar to the following) appears:

```
rsa1Keys (min: 0, max: 500, current: 0)
```

Step 7 Exit service mode for SSH known hosts:

```
sensor(config-SshKnownHosts)# exit
```

You are prompted to apply the changes:

```
Apply Changes:?[yes]:
```

Step 8 Type **yes** to apply the changes.

Step 9 Exit configuration mode:

```
sensor(config)# exit
sensor#
```

Configuring the Sensor to Use an NTP Server as its Time Source

The sensor requires a consistent time source. We recommend that you use an NTP server. Use the following procedure to configure the sensor to use the NTP server as its time source.

Note You must obtain the NTP server IP address, NTP server key ID, and the key value from the NTP server. See Configuring a Cisco Router to be an NTP Server, page 10-22, for more information.

To configure the sensor to use an NTP server as its time source, follow these steps:

Step 1 Log in to the CLI using an account with administrator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enter service host mode:

```
sensor(config)# service host
```

Step 4 Enter time configuration parameters mode:

```
sensor(config-Host)# timeParams
```

Step 5 Type the NTP server's IP address:

```
sensor(config-Host-tim)# ntp ipAddress ip_address
```

For example:

```
sensor(config-Host-tim)# ntp ipAddress 10.16.0.0
```

Step 6 Type the NTP server's key ID:

```
sensor(config-Host-tim-ntp)# keyId key_ID
```

The key ID is a number between 1 and 65535. This is the key ID that you already set up on the NTP server. See Step 3 of Configuring a Cisco Router to be an NTP Server, page 10-22.

For example:

```
sensor(config-Host-tim-ntp)# keyId 100
```

Step 7 Type the NTP server's key value:

```
sensor(config-Host-tim-ntp)# md5 key-value
```

The key value is text (numeric or character). This is the key value that you already set up on the NTP server. See Step 3 of Configuring a Cisco Router to be an NTP Server, page 10-22.

For example:

```
sensor(config-Host-tim-ntp)# keyValue attack
```

Step 8 Exit NTP configuration mode:

```
sensor(config-Host-tim-ntp)# exit
sensor(config-Host-tim)# exit
sensor(config-Host)# exit
```

Step 9 Save the changes by typing yes:

```
Apply Changes:?[yes]
```

Configuring a Cisco Router to be an NTP Server

The sensor requires an authenticated connection with an NTP server if it is going to use the NTP server as its time source. The sensor supports only the MD5 hash algorithm for key encryption. Use the following procedure to activate a Cisco router to act as an NTP server and use its internal clock as the time source.

Note Remember the NTP server's key ID and key values. You will need them along with the NTP server's IP address when you configure the sensor to use the NTP server as its time source. See Configuring the Sensor to Use an NTP Server as its Time Source, page 10-21, for this procedure.

To set up a Cisco router to act as an NTP server, follow these steps:

Step 1 Log in to the router.

Step 2 Enter configuration mode:

```
router# configure terminal
```

Step 3 Create the key ID and key value:

```
router(config)# ntp authentication-key key-ID md5 key-value
```

The key ID can be a number between 1 and 65535. The key value is text (numeric or character). It is later encrypted.

For example:

```
router(config)# ntp authentication-key 100 attack
```

Note The sensor only supports MD5 keys.

Note Keys may already exist on the router. Use the **show running configuration** command to check for other keys. You can use those values for the trusted key in Step 4.

Step 4 Designate the key you just created in Step 3 as the trusted key (or use an existing key):

```
router(config)# ntp trusted-key key-ID
```

The trusted key ID is the same number as the key ID in Step 3. For example:

```
router(config)# ntp trusted-key 100
```

Step 5 Type the interface on the router that the sensor will communicate with:

```
router(config)# ntp source interface-name
```

For example:

```
router(config)# ntp source FastEthernet 1/0
```

Step 6 Type the NTP master stratum number to be assigned to the sensor:

```
router(config)# ntp master stratum-number
```

For example:

```
router(config)# ntp master 6
```

The NTP master stratum number identifies the server's relative position in the NTP hierarchy. You can choose a number between 1 and 15. It is not important to the sensor which number you choose.

Sensor Administrative Tasks

This section describes the administrative tasks for the sensor.

This section contains the following topics:

Displaying the Current Version and Configuration Information

You can display the IDS software version and sensor configuration. Use the **show version** command to display version information for all installed operating system (OS) packages, signature packages, and IDS processes running on the system. To view the configuration for the entire system, use the **more current-config** command.

To display the version and configuration, follow these steps:

Step 1 Log in to the CLI.

Step 2 View version information:

```
sensor# show version
```

The following examples show sample version output for the appliance and the NM-CIDS.

Sample version output for the appliance:

```
sensor# show version
Application Partition:

Cisco Systems Intrusion Detection Sensor, Version 4.1(3)S61

OS Version 2.4.18-5smpbigphys
Platform: IDS-4235
Sensor up-time is 20 days.
Using 214319104 out of 921522176 bytes of available memory (23% usage)
Using 596M out of 15G bytes of available disk space (5% usage)


MainApp           2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
AnalysisEngine    2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
Authentication    2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
Logger            2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
NetworkAccess     2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
TransactionSource 2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
WebServer         2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
CLI               2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500


Upgrade History:

* IDS-K9-min-4.1-1-S47          12:00:00 UTC Thu Jun 30 2005
  IDS-K9-sp-4.1-3-S61.rpm.pkg   14:14:55 UTC Fri Feb 20 2004

Recovery Partition Version 1.2 - 4.1(1)S47
```

Note If the –MORE– prompt is displayed, press the spacebar to see more information or **Ctrl-C** to cancel the output and get back to the CLI prompt.

Sample version output for the NM-CIDS:

```
Router# show version
Application Partition:

Cisco Systems Intrusion Detection Sensor, Version 4.1(0.3)S42(0.3)

OS Version 2.4.18-5
Platform: NM-CIDS
Sensor up-time is 3 days.
Using 256172032 out of 260788224 bytes of available memory (98% usage)
Using 530M out of 17G bytes of available disk space (4% usage)


MainApp           2003_May_09_06.00  (Release)  2003-05-09T06:09:22-0500 Running
AnalysisEngine    2003_May_09_06.00  (Release)  2003-05-09T06:09:22-0500 Running
Authentication    2003_May_09_06.00  (Release)  2003-05-09T06:09:22-0500 Running
Logger            2003_May_09_06.00  (Release)  2003-05-09T06:09:22-0500 Running
NetworkAccess     2003_May_09_06.00  (Release)  2003-05-09T06:09:22-0500 Running
TransactionSource 2003_May_09_06.00  (Release)  2003-05-09T06:09:22-0500 Running
WebServer         2003_May_09_06.00  (Release)  2003-05-09T06:09:22-0500 Running
CLI               2003_May_09_06.00  (Release)  2003-05-09T06:09:22-0500


Upgrade History:

No upgrades installed
```

Step 3 View configuration information:

Note You can use the **more current-config** or **show configuration** commands.

```
sensor# more current-config
```

Configuration information (similar to the following) appears:

```
sensor# more current-config
! ------------------------------
service Authentication
general
methods method Local
exit
exit
exit
! ------------------------------
service Host
networkParams
```

```
ipAddress 10.89.146.110
defaultGateway 10.89.146.254
hostname firesafe
telnetOption enabled
accessList ipAddress 10.0.0.0 netmask 255.0.0.0
accessList ipAddress 10.89.0.0 netmask 255.255.0.0
accessList ipAddress 10.16.0.0 netmask 255.255.0.0
accessList ipAddress 10.89.149.31 netmask 255.255.255.255
exit
optionalAutoUpgrade
active-selection none
exit
timeParams
timeParams
summerTimeParams
active-selection recurringParams
recurringParams
summerTimeZoneName CST
exit
exit
ntpServers ipAddress 10.89.147.99
keyId 2
keyValue test
exit
exit
exit
! ------------------------------
service Logger
masterControl
enable-debug false
exit
zoneControl zoneName Cid
severity debug
exit
zoneControl zoneName AuthenticationApp
severity warning
exit
zoneControl zoneName Cli
--MORE--
```

Creating and Using a Backup Configuration File

To protect your configuration, you can back up the current configuration and then display it to confirm that is the configuration you want to save. If you need to restore this configuration, you can merge the backup configuration file with the current configuration or overwrite the current configuration file with the backup configuration file.

To back up your current configuration, follow these steps:

Step 1 Log in to the CLI using an account with administrator privileges.

Step 2 Save the current configuration:

```
sensor# copy current-config backup-config
```

The current configuration is saved in a backup file.

Step 3 Display the backup configuration file:

```
sensor# more backup-config
```

The backup configuration file is displayed.

Step 4 You can either merge the backup configuration with the current configuration, or you can overwrite the current configuration.

- To merge the backup configuration into the current configuration:

  ```
  sensor# copy backup-config current-config
  ```

- To overwrite the current configuration with the backup configuration:

  ```
  sensor# copy/erase backup-config current-config
  ```

Displaying and Clearing Events

Use the **show events** command to display the local event log. You can display new events or events from a specific time or of a specific severity, and you can delete all events.

The **show events** command displays the requested event types beginning at the requested start time. If no start time is entered, the selected events are displayed beginning at the current time. If no event types are entered, all events are displayed. Events are displayed as a live feed. You can cancel the live feed by pressing Ctrl-C.

Note The **show events** command waits until a specified event is available. It continues to wait and display events until you exit by pressing the **Ctrl-C**.

To display and clear events, follow these steps:

Step 1 Log in to the CLI.

Step 2 Display new events:

```
sensor# show events
```

Use the regular expression **| include shunInfo** to view the shun information, including source address, for the event.

New events are displayed as they occur.

Step 3 Display events from a specific time:

```
sensor# show events hh:mm month day year
```

For example, **show events 14:00 September 2 2002** displays all events since 2:00 p.m. September 2, 2002.

Note Time is specified in 24-hour format. You can use single digit numbers for the date.

Events from the specified time are displayed.

Step 4 Display events since a specified time for a specified alert level:

```
sensor# show events alert level hh:mm month day year
```

For example, **show events alert high 10:00 September 22 2002** displays all high severity events since 10:00 a.m. September 22, 2002.

Events from the specified time are displayed.

Step 5 Show events that began in the past:

```
sensor# show events past hh:mm:ss
```

The following example displays all events beginning 30 seconds in the past.

```
sensor# show events past 00:00:30
```

Step 6 Delete events from the event store:

```
sensor# clear events
Warning: Executing this command will remove all events currently
stored in the event store.
Continue with clear? :
```

Step 7 Type **yes** to clear all events from the EventStore.

Rebooting or Powering Down the Appliance

The **reset** command stops the applications running on the appliance and reboots it. If the powerdown option is included, the appliance is powered off if possible or left in a state where the power can be turned off after the applications are stopped.

Shutdown (stopping the applications) begins immediately after the command is executed. Because shutdown may take a little time, you can continue to access CLI commands (access is not denied) but access can be terminated without warning.

See Rebooting the NM-CIDS, page 10-83, and Resetting the IDSM-2, page 10-101, for the procedure for the modules.

To reboot or power down the appliance, follow these steps:

Step 1 Log into the CLI using an account with administrator privileges.

Step 2 To stop all applications and reboot the appliance, follow these steps:, otherwise, to power down the appliance, skip to Step 3.

a. Reset the appliance:

```
sensor# reset
```

A warning appears:

```
Warning: Executing this command will stop all applications and
reboot the node. Continue with reset?:
```

b. Type **yes** to continue the reset.

The appliance reboots.

Step 3 To stop all applications and power down the appliance, follow these steps:

a. Power down the appliance:

```
sensor# reset powerdown
```

A warning appears:

```
Warning: Executing this command will stop all applications and
reboot the node if possible. If the node cannot be powered off, it
will be left in a state that is safe to manually power down.
Continue with reset?:
```

b. Type **yes** to continue the reset.

```
Broadcast message from root (Sat May 15 05:25:09 1993):

A system reboot has been requested. The reboot may not start for
90 seconds.
Request Succeeded.
sensor#
Broadcast message from root (Sat May 15 05:25:12 1993):

The system is going down for reboot NOW!
```

You are prompted to turn off the power switch on the appliance.

Displaying Tech Support Information

You can display system information on the screen or have it sent to a specific URL to use as a troubleshooting tool with TAC.

To display tech support information, follow these steps:

Step 1 Log in to the CLI using an account with administrator privileges.

Step 2 View the optional parameters for the **show tech-support** command:

```
sensor# show tech-support ?
```

The following parameters are optional:

- page—Displays the output, one page of information at a time.
- password—Leaves passwords and other security information in the output.
- destination—Indicates the information should be formatted as HTML and sent to the destination that follows this command. If you do not specify this parameter, the output appears on the screen.
- destination-url—Indicates the information should be formatted as HTML. The URL specifies where the information should be sent.

Step 3 View the output on the screen:

```
sensor# show tech-support page
```

The system information appears on the screen, one page at a time. Press the space bar to view the next page or press **Ctrl-C** to return to the prompt.

Step 4 To send the output (in HTML format) to a file, follow these steps:

a. Type the following command, followed by a valid destination:

```
sensor# show tech-support destination-url
```

You can specify the following destination types:

- **ftp:**—Destination URL for File Transfer Protocol (FTP) network server. The syntax for this prefix is `ftp:[[//username@location]/relativeDirectory]/filename` or `ftp:[[//username@location]//absoluteDirectory]/filename`.
- **scp:**—Destination URL for the Secure Copy Protocol (SCP) network server. The syntax for this prefix is `scp:[[//username@]location]/relativeDirectory]/filename` or `scp:[[//username@]location]//absoluteDirectory]/filename`.

For example, to send the tech support output to the file `/absolute/reports/sensor1Report.html`, type the following command:

```
sensor# show tech support dest
ftp://csidsuser@10.2.1.2//absolute/reports/sensor1Report.html
```

The `password:` prompt appears.

b. Type the password for this user account.

The `Generating report:` message is displayed.

Displaying and Clearing Statistics

You can use the **show statistics** command to display the statistics of the service you are interested in. You can use the clear option to clear the statistics.

To display and clear the statistics of the service you are interested in, follow these steps:

Step 1 Log in to the CLI.

Step 2 View the optional parameters of the **show statistics** command:

```
sensor# show statistics
Authentication        Display authentication statistics
EventServer           Display event server statistics
EventStore            Display event store statistics
Host                  Display host statistics
Logger                Display logger statistics
NetworkAccess         Display network access controller statistics
TransactionServer     Display transaction server statistics
TransactionSource     Display transaction source statistics
WebServer             Display web server statistics
```

Note The clear option is not available for Host or NetworkAccess statistics.

Step 3 Show the statistics of the service you are interested in:

`sensor# show statistics` {*Authentication* | *EventServer* | *EventStore* | *Host* | *Logger* | *NetworkAccess* | *TransactionServer* | *TransactionSource* | *WebServer* } *[clear]*

For example, here are the statistics for the EventStore:

```
sensor# show statistics EventStore
Event store statistics
   General information about the event store
      The current number of open subscriptions = 0
      The number of events lost by subscriptions and queries = 0
```

```
      The number of queries issued = 0
      The number of times the circular buffer has wrapped = 0
   Number of events of each type currently stored
      Debug events = 0
      Status events = 7
      Log transaction events = 118
      Shun request events = 0
      Error events, warning = 44
      Error events, error = 0
      Error events, fatal = 0
      Alert events, informational = 0
      Alert events, low = 0
      Alert events, medium = 0
      Alert events, high = 0
```

Step 4 Clear the statistics:

Note The clear option is not available for Host or NetworkAccess statistics.

```
sensor# show statistics EventStore clear
Event store statistics
   General information about the event store
      The current number of open subscriptions = 0
      The number of events lost by subscriptions and queries = 0
      The number of queries issued = 0
      The number of times the circular buffer has wrapped = 0
   Number of events of each type currently stored
      Debug events = 0
      Status events = 7
      Log transaction events = 119
      Shun request events = 0
      Error events, warning = 44
      Error events, error = 0
      Error events, fatal = 0
      Alert events, informational = 0
      Alert events, low = 0
      Alert events, medium = 0
      Alert events, high = 0
```

The next time you want to see the statistics for EventStore, the counters are reset.

Sensor Configuration Tasks

This section describes the main configuration tasks for the sensor.

This section contains the following topics:

Configuring Signatures

This section describes how to configure signatures on the sensor.

This section contains the following topics:

Configuring Alarm Channel System Variables

The **tune-alarm-channel** command enables you to configure system variables for the alarm aggregation process. The items and menus in this configuration depend on the contents of the configuration file and are built dynamically based on the configuration retrieved when the command is executed. The modifications made in this mode and any submodes contained within it are applied when you exit tune-alarm-channel mode.

You can change the value of an alarm channel system variable, but you cannot add variables or delete variables. You also cannot change the name, type, or constraints of a variable. If you use a variable in a filter, you must use a dollar sign (for example, $SIG1) in front of the variable to indicate that the string you have entered represents a variable.

You use system variables when configuring alarm channel event filters. When you want to use the same value within multiple filters, use a variable. When you change the value of a variable, the variables in all the filters are updated. This prevents you from having to change the variable repeatedly as you configure alarm filters. See Configuring Alarm Channel Event Filters, page 10-37, for more information.

For example, if you had an IP address space that applied to your engineering group and there were no Windows systems in that group, and you were not worried about any Windows-based attacks, you could set up a USER-ADDR1 to be the engineering group's IP address space. You could then use this variable on the Event Filters page to set up the filter to ignore all Windows-based attacks for USER-ADDR1.

To configure alarm channel system variables, follow these steps:

Step 1 Log in to the CLI using an account with administrator or operator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enter alarm channel configuration mode:

```
sensor(config)# service alarm-channel-configuration virtualAlarm
```

Step 4 Enter tune alarm channel submode:

```
sensor(config-acc)# tune-alarm-channel
```

Step 5 Enter system variable submode:

```
sensor(config-acc-virtualAlarm)# systemVariables
```

Step 6 View the current system variable settings:

```
sensor(config-acc-virtualAlarm-sys)# show settings
```

A list of alarm channel system variables is displayed.

Step 7 Type the name of the system variable you want to configure, followed by a valid value for that variable.

For example, to set the value of system variable SIG1 to 2001-2006, type the following command:

```
sensor(config-acc-virtualAlarm-sys)# SIG1 2001-2006
```

To type more than one signature range, use a comma (no space) between the ranges.

Step 8 View your changes:

```
sensor(config-acc-virtualAlarm-sys)# show settings
```

The settings for the system variables are displayed. In the example above, the settings for the SIG1 variable would appear as `SIG1: 2001-2006`.

Step 9 Exit system variable submode:

```
sensor(config-acc-virtualAlarm-sys)# exit
sensor(config-acc-virtualAlarm)# exit
Apply Changes?:[yes]:
```

Step 10 Type **yes** to apply the changes.

The `Processing config:` message is displayed.

Step 11 Exit alarm channel configuration mode:

```
sensor(config-acc)# exit
sensor(config)#
```

Configuring Alarm Channel Event Filters

The **tune-alarm-channel** command allows you to configure event filters for the aggregation process. The items and menus in this configuration depend on the contents of the configuration file and are built dynamically based on the configuration retrieved when the command is executed. The modifications made in this mode and any submodes contained within it are applied when you exit tune-alarm-channel mode.

You can configure event filters that are based on source and destination addresses for specified signatures. You can use the alarm channel system variables that you have defined to group addresses for your filters. See Configuring Alarm Channel System Variables, page 10-35, for more information. If you use a variable in a filter, you must use a dollar sign ($) in front of the variable (for example, $SIG1) to indicate that the string you have entered represents a variable.

To configure alarm channel event filters, follow these steps:

Step 1 Log in to the CLI using an account with administrator or operator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enter alarm channel configuration mode:

```
sensor(config)# service alarm-channel-configuration virtualAlarm
```

Step 4 Enter tune alarm channel submode:

```
sensor(config-acc)# tune-alarm-channel
```

Step 5 Enter event filter submode:

```
sensor(config-acc-virtualAlarm)# eventFilter
```

Step 6 Type the following command to configure a filter:

```
sensor(config-acc-virtualAlarm-Eve)# Filters SIGID signature-id SubSig
sub-id SourceAddrs ipaddress DestAddrs ipaddress Exception true | false
```

The following options apply to the command:

- SIGID—Signature IDs of events to which this filter should be applied. You can use a list (2001,2004), or a range (2001–2004), an asterisk (*) for all signatures, or one of the SIG variables if you defined them. If you use a variable, you must use a dollar sign ($SIG1) in front of the variable. See Configuring Alarm Channel System Variables, page 10-35, for more information.
- SubSig—SubSignature IDs of events to which this filter should be applied.
- Exception—Specifies if this filter identifies an exception to an existing filter. By default, the exception value is False to indicate that this filter does not identify an exception to another filter.
- SourceAddrs—Source addresses of events to which this filter should be applied. You can use one of the DMZ or USER-ADDR variables if you defined them. If you use a variable, you must use a dollar sign ($USER-ADDRS1) in front of the variable. See Configuring Alarm Channel System Variables, page 10-35, for more information.

- DestAddrs—Destination addresses of events to which this filter should be applied. You can use one of the DMZ or USER-ADDR variables if you defined them. If you use a variable, you must use a dollar sign ($USER-ADDRS1) in front of the variable. See Configuring Alarm Channel System Variables, page 10-35, for more information.

Step 7 View your changes:

```
sensor(config-acc-virtualAlarm-eve)# show settings
```

The settings for the filters are displayed.

Step 8 Exit event filter submode:

```
sensor(config-acc-virtualAlarm-eve)# exit
sensor(config-acc-virtualAlarm)# exit
Apply Changes?:[yes]:
```

Step 9 Type **yes** to apply the changes.

The `Processing config:` message is displayed.

Step 10 Exit the alarm channel configuration mode:

```
sensor(config-acc)# exit
sensor(cofig)#
```

Viewing Signature Engine Parameters

You can display settings for individual signature engines.

To view signature engine settings, follow these steps:

Step 1 Log in to the CLI using an account with administrator or operator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enter service virtual sensor configuration mode:

```
sensor(config)# service virtual-sensor-configuration virtualSensor
```

Step 4 Enter tune micro-engines mode:

```
sensor(config-vsc)# tune-micro-engines
```

Step 5 Display the list of signature engines:

```
sensor(config-vsc-virtualSensor)# ?
```

A list of all signature engine names and a description of each is displayed.

```
sensor(config-vsc-virtualSensor)# ?
ATOMIC.ARP                    Layer 2 ARP signatures.
ATOMIC.ICMP                   Simple ICMP alarms based on Type, Code,
                              Seq, Id
ATOMIC.IPOPTIONS              Simple L3 Alarms based on Ip Options
ATOMIC.L3.IP                  Simple L3 IP Alarms.
ATOMIC.TCP                    Simple TCP packet alarms based on TCP
                              Flags, ports (both sides), and single
                              packet regex. Use SummaryKey to define
                              the address view for MinHits and
                              Summarize counting. For best
                              performance, use a StorageKey of xxxx.
ATOMIC.UDP                    Simple UDP packet alarms based on Port,
                              Direction and DataLength.
exit                          Exit service configuration mode
FLOOD.HOST.ICMP               Icmp Floods directed at a single host
FLOOD.HOST.UDP                UDP Floods directed at a single host
FLOOD.NET                     Multi-protocol floods directed at a
                              network segment. Ip Addresses are
                              wildcarded for this inspection.
FragmentReassembly            Fragment Reassembly configuration tokens
IPLog                         Virtual Sensor IP log configuration
                              tokens
OTHER                         This engine is used to group generic
                              signatures so common parameters may be
                              changed. It defines an interface into
                              common signature parameters.
SERVICE.DNS                   DNS SERVICE Analysis Engine
SERVICE.FTP                   FTP service special decode alarms
SERVICE.GENERIC               Custom service/payload decode and
                              analysis based on our quartet tuple
                              programming language. EXPERT use only.
SERVICE.HTTP                  HTTP protocol decode based string search
                              Engine. Includes anti-evasive URL
                              deobfuscation
SERVICE.IDENT                 Ident service (client and server)
                              alarms.
SERVICE.MSSQL                 Microsoft (R) SQL service inspection
                              engine
SERVICE.NTP                   Network Time Protocol based signature
                              engine
SERVICE.RPC                   RPC SERVICE analysis engine
```

```
SERVICE.SMB                   SMB Service decode inspection.
SERVICE.SMTP                  SMTP Protocol Inspection Engine
SERVICE.SNMP                  Inspects SNMP traffic
SERVICE.SSH                   SSH header decode signatures.
SERVICE.SYSLOG                Engine to process syslogs,
show                          Display system settings and/or history
                              information
ShunEvent                     Shun Event configuration tokens
STATE.STRING.CISCOLOGIN       Telnet based Cisco Login Inspection
                              Engine
STATE.STRING.LPRFORMATSTRING  LPR Protocol Inspection Engine
StreamReassembly              Stream Reassembly configuration tokens
STRING.ICMP                   Generic ICMP based string search Engine
STRING.TCP                    Generic TCP based string search Engine.
STRING.UDP                    Generic UDP based string search Engine
SWEEP.HOST.ICMP               ICMP host sweeps from a single attacker
                              to many victims.
SWEEP.HOST.TCP                TCP-based Host Sweeps from a single
                              attacker to multiple victims.
SWEEP.MULTI                   UDP and TCP combined port sweeps.
SWEEP.OTHER.TCP               Odd sweeps/scans such as nmap
                              fingerprint scans.
SWEEP.PORT.TCP                Detects port sweeps between two nodes.
SWEEP.PORT.UDP                Detects UDP connections to multiple
                              destination ports between two nodes.
systemVariables               User modifiable system variables
TRAFFIC.ICMP                  Identifies ICMP traffic irregularities.
TROJAN.BO2K                   BackOrifice BO2K trojan traffic
TROJAN.TFN2K                  TFN2K trojan/ddos traffic
TROJAN.UDP                    Detects BO/BO2K UDP trojan traffic.
```

Step 6 Type the name of engine you want to see.

For example, to see the settings for the engine that inspects the Network Time Protocol (NTP):

```
sensor(config-vsc-virtualSensor)# service.ntp
```

The prompt changes to indicate which signature engine you are in. In the example above, the prompt would be: `sensor(config-vsc-virtualSensor-SER)#`.

Step 7 View the parameters for that specific signature engine:

```
sensor(config-vsc-virtualSensor-SER)# show settings
   SERVICE.NTP
   -----------------------------------------------
      version: 4.0 <protected>
      signatures (min: 0, max: 1000, current: 1)
      -----------------------------------------------
```

```
        SIGID: 4056 <protected>
        SubSig: 0 <protected>
        AlarmDelayTimer:
        AlarmInterval:
        AlarmSeverity: high <defaulted>
        AlarmThrottle: FireOnce <defaulted>
        AlarmTraits:
        CapturePacket: False <defaulted>
        ChokeThreshold:
        ControlOpCode: 2 <defaulted>
        Enabled: True <defaulted>
        EventAction:
        FlipAddr:
        MaxInspectLength:
        MaxSizeOfControlData: 468 <defaulted>
        MaxTTL:
        MinHits:
        Mode: 6 <defaulted>
        Protocol: UDP <defaulted>
        ResetAfterIdle: 15 <defaulted>
        SigComment:
        SigName: NTPd readvar overflow <protected>
        SigStringInfo:
        SigVersion: S37 <defaulted>
        StorageKey: AaBb <defaulted>
        SummaryKey: AaBb <defaulted>
        ThrottleInterval: 15 <defaulted>
        WantFrag:
        isInvalidDataPacket:
        isNonNtpTraffic:
        ------------------------------------------------
      ------------------------------------------------
    ------------------------------------------------
```

Step 8 Press the spacebar to page through all the settings. Press **Ctrl-C** to return to the prompt.

Configuring Virtual Sensor System Variables

You can change the value of a system variable but you cannot add or delete variables. You cannot change the name or type of a variable. Only one virtual sensor is supported; therefore, you cannot select the virtual sensor.

The virtual sensor system variables establish the default values that are referenced when you tune signatures. See Tuning Signature Engines, page 10-45, for more information.

To configure virtual sensor system variables, follow these steps:

Step 1 Log in to the CLI using an account with administrator or operator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enter virtual sensor configuration mode:

```
sensor(config)# service virtual-sensor-configuration virtualSensor
```

Step 4 Enter tune micro-engines submode:

```
sensor(config-vsc)# tune-micro-engines
```

Step 5 Enter system variable submode:

```
sensor(config-vsc-virtualSensor)# systemVariables
```

Step 6 View the current system variable settings:

```
sensor(config-vsc-virtualSensor-sys)# show settings
   systemVariables
   -----------------------------------------------
      WEBPORTS: 80,3128,8000,8010,8080,8888,24326 <defaulted>
      Ports1:
      Ports2:
      Ports3:
      Ports4:
      Ports5:
      Ports6:
      Ports7:
      Ports8:
      Ports9:
      IPReassembleMaxFrags: 10000 <defaulted>
   -----------------------------------------------
```

Step 7 Type the name of the system variable you want to configure, followed by a valid value for that variable.

For example, to change the maximum number of fragments the system will queue from the default value (10000) to 5000, type the following command:

```
sensor(config-vsc-virtualSensor-sys)# IPReassembleMaxFrags 5000
```

Note You can view a list of all system variables by typing a question mark (?) at the `sensor(config-vsc-virtualSensor-sys)#` prompt.

- WEBPORTS—WEBPORTS is a predefined set of ports where web servers are running. The default value for this variable includes the following ports: 80, 3128, 8000, 8010, 8080, 8888, 24326. This variable is referenced by all web server signatures.
- Ports1, Ports2, Ports3, Ports4—You can set up a list of ports to apply to particular signatures.
- ADDRS1, ADDRS2, ADDRS3, ADDRS4—You can set up this variable with a list of addresses to use anywhere you can use IP addresses.
- IPReassembleMaxFrags—You can define the total number of fragments you want the system to queue. You can define a number between 1000 and 50,000. The default is 10,000.

Step 8 View your changes:

```
sensor(config-vsc-virtualSensor-sys)# show settings
```

The settings for the system variables are displayed. In the example above, the settings for the IPReassembleMaxFrags variable appear as `IPReassembleMaxFrags: 5000 default: 10000`.

Step 9 To return any value to the default setting, type the keyword **default** before the variable name.

For example, to return the IPReassembleMaxFrags to 10000 (the default value), type the following command:

```
sensor(config-vsc-virtualSensor)# default IPReassembleMaxFrags
```

The IPReassembleMaxFrags value is returned to the default value and settings for the IPReassembleMaxFrags appear as `IPReassembleMaxFrags: 10000 <defaulted>`.

Step 10 Exit system variable mode:

```
sensor(config-vsc-virtualSensor-sys)# exit
sensor(config-vsc-virtualSensor)# exit
Apply Changes?:[yes]:
```

Step 11 Type **yes** to apply the changes.

The `Processing config:` message is displayed.

Step 12 Exit virtual sensor configuration mode:

```
sensor(config-vsc)# exit
sensor(config)#
```

Tuning Signature Engines

To tune parameters in a signature engine, follow the procedure for viewing signature engines (see Viewing Signature Engine Parameters, page 10-39). When you have chosen a signature engine to tune and are in its mode, you can choose the parameters you want to change. For example, if you want to capture the Base64-encoded trigger packet for an alert, you must set the **capturePacket** parameter to **true** for that signature.

Note Refer to the IDS Event Viewer documentation for more information on viewing the captured packet.

The **tune-micro-engines** command enables you to configure standard signatures and create custom signatures for the sensor micro-engines. The items and menus in this configuration depend upon the contents of the configuration file and are built dynamically based on the configuration retrieved when the command is executed. The modifications made in this mode and any submodes contained within it are applied to the system when you exit tune-micro-engines mode.

To tune parameters in signature engines, follow these steps:

Step 1 Log in to the CLI using an account with administrator or operator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enter virtual sensor configuration mode:

```
sensor(config)# service virtual-sensor-configuration virtualSensor
```

Step 4 Enter tune micro-engines submode:

```
sensor(config-vsc)# tune-micro-engines
```

Step 5 Type the name of the signature engine that you want to tune.

Note You can view a list of all signature engines by typing a question mark (?) at the `sensor(config-vsc-virtualSensor)#` prompt.

For example, to tune a simple UDP packet alarm, type the following command:

```
sensor(config-vsc-virtualSensor)# ATOMIC.UDP
```

Step 6 View the signature settings:

```
sensor(config-vsc-virtualSensor-ATO)# show settings
```

A summary of the signatures and settings is displayed.

```
sensor(config-vsc-virtualSensor-ATO)# show settings
   ATOMIC.UDP
   -----------------------------------------------
      version: 4.0 <protected>
      signatures (min: 0, max: 1000, current: 13)
      -----------------------------------------------
         SIGID: 9019 <protected>
         SubSig: 0 <protected>
         AlarmDelayTimer:
         AlarmInterval:
         AlarmSeverity: informational <defaulted>
         AlarmThrottle: FireOnce <defaulted>
         AlarmTraits:
         CapturePacket: False <defaulted>
         ChokeThreshold: 100 <defaulted>
         DstIpAddr:
         DstIpMask:
         DstPort: 2140 <defaulted>
         Enabled: False <defaulted>
         EventAction:
         FlipAddr:
         MaxInspectLength:
         MaxTTL:
         MinHits:
         MinUDPLength:
         Protocol: UDP <defaulted>
         ResetAfterIdle: 15 <defaulted>
         ShortUDPLength:
```

```
SigComment:
SigName: Back Door (UDP 2140) <protected>
SigStringInfo: UDP 2140 (backdoor) <defaulted>
SigVersion: S37 <defaulted>
SrcIpAddr:
SrcIpMask:
SrcPort:
StorageKey: xxxx <defaulted>
SummaryKey: AxBx <defaulted>
ThrottleInterval: 30 <defaulted>
WantFrag:
-----------------------------------------------
SIGID: 9020 <protected>
SubSig: 0 <protected>
AlarmDelayTimer:
AlarmInterval:
AlarmSeverity: informational <defaulted>
AlarmThrottle: FireOnce <defaulted>
AlarmTraits:
CapturePacket: False <defaulted>
ChokeThreshold: 100 <defaulted>
DstIpAddr:
DstIpMask:
DstPort: 47262 <defaulted>
Enabled: False <defaulted>
EventAction:
FlipAddr:
MaxInspectLength:
MaxTTL:
MinHits:
MinUDPLength:
Protocol: UDP <defaulted>
ResetAfterIdle: 15 <defaulted>
ShortUDPLength:
SigComment:
SigName: Back Door (UDP 47262) <protected>
SigStringInfo: UDP 47262 (backdoor) <defaulted>
SigVersion: S37 <defaulted>
SrcIpAddr:
SrcIpMask:
SrcPort:
StorageKey: xxxx <defaulted>
SummaryKey: AxBx <defaulted>
ThrottleInterval: 30 <defaulted>
WantFrag:
-----------------------------------------------
```

Step 7 Look through the list of settings for this signature engine and chose the signature ID that you want to tune. Type the following command to configure the parameters for a specific signature:

```
sensor(config-vsc-virtualSensor-ATO)# signature SIGID signature ID
```

For example, to tune signature ID 9019, type the following command:

```
sensor(config-vsc-virtualSensor-ATO)# signature sigID 9019
```

Step 8 Type **?** at the prompt to see a list of configurable parameters.

```
sensor (config-vsc-virtualSensor-ATO-sig)# ?
AlarmDelayTimer     Number of seconds to delay further signature
                    inspection after an alarm.
AlarmInterval       Special Handling for timed events. Use
                    AlarmInterval Y with MinHits X for X alarms
                    in Y second interval.
AlarmSeverity       The severity of this alert reported in the
                    alarm.
AlarmThrottle       Technique used to limit alarm firings. FireAll
                    sends all alarms. FireOnce sends the firstalarm
                    then deletes the inspector. Summarize sends an
                    IntervalSummary alarm. GlobalSummarize sends
                    a GlobalSummary alarm.
AlarmTraits         User-defined traits further describing this
                    signature.
CapturePacket       Set to True to include the offending packet in
                    the alarm.
ChokeThreshold      Threshold value of alarms-per-interval to
                    auto-switch Alarm
Throttle modes      If ChokeThreshold is defined the sensor will
                    automatically switch AlarmThrottle modes when
                    a large volume of alarms is seen in the
                    ThrottleInterval.
default             Set the value back to the system default
                    setting
DstIpAddr           IP address (or network) to match on the
                    IP packet's destination address. Must be used
                    with DstIpMask.
DstIpMask           IP netmask used with DstIpAddr to match on the
                    IP packet's destination address. Must be used
                    with DstIpAddr.
DstPort             A single Destination Port to match.
Enabled             True to Enable the Sig. False to Disable
                    the Sig.
EventAction         What action(s) to perform when the alarm is
                    fired.
exit                Exit signatures configuration submode
```

```
FlipAddr            True if address (and ports) Source and
                    Destination are swapped in the alarm message.
                    False for no swap (normal).
MaxInspectLength    Maximum number of bytes to inspect.
MaxTTL              Maximum number of seconds to inspect a
                    logical stream. The inspector is deleted after X
                    seconds of being active.
MinHits             Minimum number of signature hits before the
                    alarm message is sent. This a limiter for
                    firing the alarm only after X times of seeing
                    the signature on the address key.
MinUDPLength        Fire alarm when packet UDP LENGTH is less
                    than this.
Protocol            Protocol of interest for this inspector.
ResetAfterIdle      Number of seconds to wait to reset signature
                    counters after the host(s) were idle.
ShortUDPLength      Fire alarm when IP Data length is less than
                    UDP Header Length
show                Display system settings and/or history
                    information
SigComment          USER NOTES - miscellaneous information about
                    this signature
SigStringInfo       Extra information included in the alarm message.
SigVersion          Signature update version of signature
SrcIpAddr           IP address (or network) to match on the IP
                    packet's source address. Must be used with
                    SrcIpMask.
SrcIpMask           IP netmask used with SrcIpAddr to match on
                    the IP packet's destination address. Must be
                    used with SrcIpAddr.
SrcPort             A single Source Port to match.
StorageKey          Type of Address Key used to store persistent
                    data.
SummaryKey          The Storage Type on which to summarize this
                    signature.
ThrottleInterval    Number of seconds defining an Alarm Throttle
                    interval. This is used with the AlarmThrottle
                    parameter to tune special alarm limiters.
WantFrag            True if a fragment is desired. False if a
                    fragment is not desired. Any for either.
```

Step 9 Type the name of the parameter that you want to configure and add or change the values.

For example, to change the destination port for signature ID 9019 from the default 2140 to 2139, type the following command:

```
sensor(config-vsc-virtualSensor-ATO-sig)# dstport 2139
```

Step 10 View your changes:

```
sensor(config-vsc-virtualSensor-ATO-sig)# show settings
```

The settings for this signature are displayed. In the example above, the settings for the destination port parameter would appear as `DstPort: 2139 default: 2140`.

Step 11 To return any value to the default setting, type the keyword **default** before the parameter name.

For example, to return the destination port to 2140 (the default value), type the following command:

```
sensor(config-vsc-virtualSensor-ATO-sig)# default dstport
```

The port value is returned to the default value and settings for the destination port parameter appear as `DstPort: 2140 <defaulted>`.

Step 12 Exit tuning mode for this signature:

```
sensor(config-vsc-virtualSensor-ATO-sig)# exit
sensor(config-vsc-virtualSensor-ATO)# exit
sensor(config-vsc-virtualSensor)# exit
Apply Changes?:[yes]:
```

Step 13 Type **yes** to apply the changes.

The `Processing config:` message is displayed.

Step 14 Exit virtual sensor configuration mode:

```
sensor(config-vsc)# exit
sensor(config)#
```

IP Logging

You can manually configure the sensor to capture all IP traffic associated with a host you specify by IP address. You can specify in minutes how long you want the IP traffic to be logged at the IP address, and/or how many packets you want logged, and/or how many bytes you want logged. The sensor stops logging IP traffic at the first parameter you specify.

You can also have the sensor automatically log IP packets every time a particular signature is fired. You can specify how long you want the sensor to log IP traffic (the default is 30 seconds), and/or now many packets and bytes you want logged.

Note Turning on IP logging affects system performance.

Note You cannot delete or manage IP log files. The **no iplog** command does not delete IP logs, it only stops more packets from being recorded for that IP log. The IP logs are stored in a circular buffer that is never filled because new IP logs overwrite the old ones.

This section contains the following topics:

Manual IP Logging for a Specific IP Address

You can log IP packets manually for a specific IP address. To stop logging IP packets for a specific IP address, see Disabling IP Logging, page 10-55. To automatically log IP packets as an event associated with a signature, see Automatic IP Logging for a Specific Signature, page 10-53. To copy and view an IP log file, see Copying IP Log Files to Be Viewed, page 10-56.

To manually log packets for a specific IP address, follow these steps:

Step 1 Log in to the CLI using an account with administrator or operator privileges.

Step 2 Start IP logging for a specific IP address:

```
sensor# iplog group-id ip-address [duration minutes] [packets numPackets] [bytes numBytes]
```

Note There is only one interface group, 0.

- minutes—Duration the logging should be active, in minutes (0-60). The default is 10 minutes.
- numPackets—Maximum number of packets to log (0-4294967295). The default is 1000 packets.
- numBytes—Maximum number of bytes to log (0-4294967295).

Note These parameters are optional, you do not have to specify all three. However, if you include more than one parameter, the sensor continues logging only until the first threshold is reached. For example, if you set the duration to 5 minutes and the number of packets to 1000, the sensor stops logging after the 1000th packet is captured, even if only 2 minutes have passed.

Example:

```
sensor# iplog 0 10.16.0.0 duration 5
Logging started for group 0, IP address 10.16.0.0, Log ID 137857506
Warning: IP Logging will affect system performance.
```

The example shows the sensor logging all IP packets for 5 minutes to and from the IP address 10.16.0.0.

Note Make note of the Log ID for future reference.

Step 3 Monitor the IP log status by executing the **iplog-status** command:

```
sensor# iplog-status
Log ID:             137857506
IP Address:         10.16.0.0
Group:              0
Status:             added
Bytes Captured:     0
Packets Captured:   0
Log ID:             137857512
IP Address:         10.16.0.0
Group:              0
Status:             completed
Start Time:         1070363599443768000
End Time:           1070363892909384000
Bytes Captured:     30650
Packets Captured:   263
Log ID:             137857513
```

```
IP Address:          10.16.0.0
Group:               0
Status:              completed
Start Time:          1070438601052865000
End Time:            1070439201267043000
Bytes Captured:      5104
Packets Captured:    46
```

Automatic IP Logging for a Specific Signature

You can assign IP logging as an event for the EventAction of a signature so that every time the signature fires, IP packets are captured for that signature. To turn off automatic IP logging for a signature, use the default keyword (see Step 8). To copy and view an IP log file, see Copying IP Log Files to Be Viewed, page 10-56.

To automatically log IP packets for a specific signature, follow these steps:

Step 1 Log in to the CLI using an account with administrator or operator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enter virtual sensor configuration mode:

```
sensor(config)# service virtual-sensor-configuration virtualSensor
```

Step 4 Enter tune micro-engines submode:

```
sensor(config-vsc)# tune-micro-engines
```

Step 5 Type the name of the signature engine that you want to tune.

Note You can view a list of all signature engines by typing a question mark (?) at the `sensor(config-vsc-virtualSensor)#` prompt.

For example, to tune a simple UDP packet alarm, type the following command:

```
sensor(config-vsc-virtualSensor)# ATOMIC.UDP
```

Step 6 Type the following command to configure the parameters for a specific signature and subsignature:

```
sensor(config-vsc-virtualSensor-ATO)# signature SIGID signature ID
SubSig SubSig ID
```

For example, to tune signature ID 9019, type the following command:

```
sensor(config-vsc-virtualSensor-ATO)# signature sigID 9019 SubSig 0
```

Step 7 View the signature settings:

```
sensor(config-vsc-virtualSensor-ATO)# show settings
```

A summary of the signatures and settings is displayed.

Step 8 Set the EventAction parameter to log.

```
sensor(config-vsc-virtualSensor-ATO-sig)# EventAction log
```

Note If in Step 7 you saw other actions set for EventAction, you can combine these with the log action by placing the | between the actions, for example log|shunHost. Do not use spaces between | and the actions.

Note To return any value to the default setting, type the keyword **default** before the parameter name. For example, to remove IP logging from this signature, type the following command: **default EventAction**.

Step 9 View your changes:

```
sensor(config-vsc-virtualSensor-ATO-sig)# show settings
```

The settings for this signature are displayed. In the example above, the settings for the EventAction parameter would appear as `EventAction: log`.

Step 10 Exit tuning mode for this signature:

```
sensor(config-vsc-virtualSensor-ATO-sig)# exit
sensor(config-vsc-virtualSensor-ATO)# exit
sensor(config-vsc-virtualSensor)# exit
Apply Changes?:[yes]:
```

Step 11 Type **yes** to apply the changes.

The `Processing config:` message is displayed.

Step 12 Exit Virtual Sensor Configuration mode:

```
sensor(config-vsc)# exit
sensor(config)#
```

Step 13 Look for the alerts generated by the signature and look for the IP Log ID associated with the alert.

Step 14 Repeat Steps 1 through 15 for other signatures and subsignatures.

Disabling IP Logging

You can disable one or all IP logging sessions.

To disable one or all IP logging sessions, follow these steps:

Step 1 Log in to the CLI using an account with administrator or operator privileges.

Step 2 To disable a particular IP logging session:

a. Find the log ID of the session you want to disable by using the **iplog-status** command:

```
sensor# iplog-status
Log ID:             137857512
IP Address:         10.16.0.0
Group:              0
Status:             started
Start Time:         1070363599443768000
Bytes Captured:     30650
Packets Captured:   263
```

b. Disable the IP log session:

```
sensor# no iplog 137857512
```

Step 3 To disable all IP logging sessions:

```
sensor# no iplog
sensor#
```

Copying IP Log Files to Be Viewed

You can copy IP log files to an FTP or SCP server so that you can view them with a sniffing tool such as Ethereal or TCP Dump.

To copy IP log files to an FTP or SCP server, follow these steps:

Step 1 Log in to the CLI using an account with administrator or operator privileges.

Step 2 Monitor the IP log status by executing the **iplog-status** command until you see that the status reads completed for the log ID of the log file that you want to copy:

```
sensor# iplog-status
Log ID:              137857506
IP Address:          10.16.0.0
Group:               0
Status:              completed
Start Time:          1070363599443768000
End Time:            1070363892909384000
Bytes Captured:      30650
Packets Captured:    263
```

Step 3 Copy the IP log to your FTP or SCP server:

```
sensor# copy iplog 137857506 ftp://root@10.16.0.0/user/iplog1
Password: ******** Connected to 10.16.0.0 (10.16.0.0). 220
linux.machine.com FTP server (Version wu-2.6.0(1) Mon Feb 28 10:30 :36
EST 2000) ready. ftp> user (username) root 331 Password required for
root. Password:230 User root logged in. ftp> 200 Type set to I. ftp>
put iplog.8518.tmp iplog1 local: iplog.8518.tmp remote: iplog1 227
Entering Passive Mode (2,4,6,8,179,125) 150 Opening BINARY mode data
connection for iplog1. 226 Transfer complete. 30650 bytes sent in
0.00246 secs (1.2e+04 Kbytes/sec) ftp>
```

Step 4 Open the IP log using a sniffer program such as Ethereal or TCPDUMP.

For more information on Ethereal go to http://www.ethereal.com. For more information on TCPDUMP, go to http://www.tcpdump.org/.

Configuring Blocking

This section describes how to set up blocking using the CLI.

This section contains the following topics:

Understanding Blocking

NAC, the blocking application on the sensor, starts and stops blocks on routers, switches, and PIX firewalls. NAC blocks the IP address on the devices it is managing. It sends the same block to all the devices it is managing, including any other master blocking sensors. NAC monitors the time for the block and removes the block after the time has expired.

For a more detailed discussion of blocking, see NAC, page A-16.

There are two types of blocks:

- Host block—Blocks all traffic from a given IP address
- Connection block—Blocks traffic from a given source IP address to a given destination IP address and destination port

Note Multiple connection blocks from the same source IP address to either a different destination IP address or destination port automatically switch the block from a connection block to a host block.

On Cisco routers and Catalyst 6500 series switches NAC creates blocks by applying ACLs or VACLs. ACLs and VACLs permit or deny passage of data packets through interface ports. Each ACL or VACL contains permit and deny conditions that apply to IP addresses. The PIX Firewall does not use ACLs or VACLs. The built-in **shun**/**no shun** command is used.

You need the following information for NAC to manage a device:

- Login user ID
- Login password
- Enable password (not needed if the user has enable privileges)
- Interfaces to be managed (for example, ethernet0, vlan100)
- Any existing ACL information you want applied at the beginning (Pre-ACL) or end (Post-ACL) of the ACL that will be created

Note This does not apply to a PIX Firewall because the PIX Firewall does not use ACLs to block.

- Whether you are using Telnet or SSH to communicate with the device
- IP addresses (host or range of hosts) you never want blocked
- How long you want the blocks to last

Tip To check the status of NAC, type **show statistics networkAccess** at the `sensor#`. The output shows the devices you are managing, any active blocks, and the status for all the devices.

Before Configuring Blocking

To sum up, before you configure blocking, make sure you understand the following:

- You need to analyze your network topology to understand which devices should be blocked by which sensor, and which addresses should never be blocked.

Caution Two sensors cannot control blocking on the same device.

- You need to gather the usernames, device passwords, modal passwords, and connections types (Telnet or SSH) needed to log in to each device.
- You need to know the interface names on the devices.
- You need to know the names of the pre-ACL and post-ACLs if needed.
- You need to understand which interfaces should and should not be blocked. You do not want to accidentally shut down an entire network.

Supported Blocking Devices

The NAC service supports up to 250 devices in any combination. The following devices are supported by NAC:

- Cisco series routers using Cisco IOS 11.2 or later (ACLs):
  - Cisco 1600 series router
  - Cisco 1700 series router
  - Cisco 2500 series router
  - Cisco 2600 series router
  - Cisco 3600 series router
  - Cisco 7200 series router
  - Cisco 7500 series router
- Catalyst 5000 switches with RSM/RSFC with IOS 11.2(9)P or later (ACLs)
- Catalyst 6000 switches with IOS 12.1(13)E or later (ACLs)

- Catalyst 6000 switches with Catalyst software version 7.5(1) or later (VACLs)
  - Sup1A
  - Sup1A/PFC
  - Sup1A/MSFC1
  - Sup1A/MFSC2
  - Sup2/MSFC2 required
- PIX Firewall with version 6.0 or later (**shun** command)
  - 501
  - 506E
  - 515E
  - 525
  - 535 required

You configure blocking using either ACLs, VACLS, or the **shun** command. All PIX Firewall models support the **shun** command.

Configuring Blocking Properties

You can change the default blocking properties through the CLI. It is best to use the default properties, but if you need to change them, use these procedures.

This section contains the following topics:

Allowing the Sensor to Block Itself

Caution We recommend that you do not permit the sensor to block itself, because it may stop communicating with the blocking device. You can configure this option if you can ensure that if the sensor creates a rule to block its own IP address, it will not prevent the sensor from accessing the blocking device.

To allow the sensor to block itself, follow these steps:

Step 1 Log in to the CLI using an account with administrator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enter network access mode:

```
sensor(config)# service networkAccess
```

Step 4 Enter general submode:

```
sensor(config-NetworkAccess)# general
```

Step 5 Configure the sensor to block itself:

```
sensor(config-NetworkAccess-gen)# allow-sensor-shun true
```

By default, this value is false.

Step 6 Exit general submode:

```
sensor(config-NetworkAccess-gen)# exit
sensor(config-NetworkAccess)# exit
Apply Changes:?[yes]:
```

Step 7 Type **yes** to apply changes.

Note To reverse this procedure, follow the steps but change the value in Step 5 from true to false.

Disabling Blocking

By default, blocking is enabled on the sensor. If NAC is managing a device and you need to manually configure something on that device, you should disable blocking first. You want to avoid a situation in which both you and NAC could be making a change at the same time on the same device. This could cause the device and/or NAC to crash.

To disable blocking, follow these steps:

Step 1 Log in to the CLI using an account with administrator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enter network access mode:

```
sensor(config)# service networkAccess
```

Step 4 Enter general submode:

```
sensor(config-NetworkAccess)# general
```

Step 5 Disable blocking on the sensor:

```
sensor(config-NetworkAccess-gen)# shun-enable false
```

By default, this value is true.

Step 6 Exit general submode:

```
sensor(config-NetworkAccess-gen)# exit
sensor(config-NetworkAccess)# exit
Apply Changes:?[yes]:
```

Step 7 Type **yes** to apply changes.

Note To enable blocking, follow the steps but change the value in Step 5 from false to true.

Setting Maximum Block Entries

You can set how many blocks are to be maintained simultaneously (0 to 65,535). The default value is 250.

Caution We do not recommend nor support setting the maximum block entries higher than 250.

Note The number of blocks will not exceed the maximum block entries. If the maximum is reached, new blocks will not occur until existing blocks time out and are removed.

To change the maximum block entries, follow these steps:

Step 1 Log in to the CLI using an account with administrator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enter network access mode:

```
sensor(config)# service networkAccess
```

Step 4 Enter general submode:

```
sensor(config-NetworkAccess)# general
```

Step 5 Change the maximum number of block entries:

```
sensor(config-NetworkAccess-gen)# shun-max-entries value
```

Step 6 Exit general submode:

```
sensor(config-NetworkAccess-gen)# exit
sensor(config-NetworkAccess)# exit
Apply Changes:?[yes]:
```

Step 7 Type **yes** to apply changes.

Setting the Block Time

You can change the amount of time the block lasts. The default is 30 minutes.

Note If you change the default block time, you are changing a signature parameter, which affects all signatures. Because it affects all signatures, saving the change can take a while.

To change the default block time, follow these steps:

Step 1 Log in to the CLI using an account with administrator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enter virtual sensor configuration mode:

```
sensor(config)# service virtual-sensor-configuration virtualSensor
```

Step 4 Enter tuning submode:

```
sensor(config-vsc)# tune
```

Step 5 Enter the shun event submode:

```
sensor(config-vsc-VirtualSensor)# shunevent
```

Step 6 Configure the shun time:

```
sensor(config-vsc-VirtualSensor-Shu)# shuntime value
```

The value is the time duration of the shun event in minutes (0-4294967295).

Step 7 Exit shun event submode:

```
sensor(config-vsc-VirtualSensor-Shu)# exit
sensor(config-vsc-VirtualSensor)# exit
Apply Changes:?[yes]:
```

Step 8 Type **yes** to apply changes.

Note There is a time delay while the signatures are updated.

Configuring Addresses Never to Block

You must tune your sensor to identify hosts and networks that should never be blocked, not even manually, because you may have a trusted network device whose normal, expected behavior appears to be an attack. Such a device should never be blocked, and trusted, internal networks should never be blocked.

You can specify a single host or an entire network.

If you specify a netmask, this is the netmask of the network that should never be blocked. If no netmask is specified, only the IP address you specify will never be blocked.

To set up addresses never to be blocked by blocking devices, follow these steps:

Step 1 Log in to the CLI using an account with administrator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enter network access mode:

```
sensor(config)# service networkAccess
```

Step 4 Enter general submode:

```
sensor(config-NetworkAccess)# general
```

Step 5 Define the address that should never be blocked:

- For a single host:

  ```
  sensor(config-NetworkAccess-gen)# never-shun-hosts ip-address ip_address
  ```

- For an entire network:

  ```
  sensor(config-NetworkAccess-gen)# never-shun-networks ip-address ip_address netmask netmask
  ```

Step 6 Exit general submode:

```
sensor(config-NetworkAccess-gen)# exit
sensor(config-NetworkAccess)# exit
Apply Changes:?[yes]:
```

Step 7 Type **yes** to apply changes.

Configuring Logical Devices

You must set up logical devices for the other hardware that the senor will manage. The logical devices contain userid, password and enable password information. For example, routers that all share the same passwords and usernames can be under one logical device name.

Caution You MUST have a logical device created before configuring the blocking device.

To set up logical devices, follow these steps:

Step 1 Log in to the CLI using an account with administrator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enter Network Access mode:

```
sensor(config)# service networkAccess
```

Step 4 Create the logical device name:

```
sensor(config-NetworkAccess)# shun-device-cfg name logical_device_name
```

Step 5 Type the username for that logical device:

```
sensor(config-NetworkAccess-shu)# username username
```

Type **none** if there is no username.

Step 6 Specify the password for the user:

```
sensor(config-NetworkAccess-shu)# password
Enter password[]: ****
Re-enter password
```

Type **none** if there is no password.

Step 7 Specify the enable password for the user:

```
sensor(config-NetworkAccess-shu)# enable-password
Enter enable-password[]: ****
Re-enter enable-password
```

Type **none** if there is no enable password.

Step 8 Exit shun device configuration submode:

```
sensor(config-NetworkAccess-shu)# exit
sensor(config-NetworkAccess)# exit
Apply Changes:?[yes]:
```

Step 9 Type **yes** to apply changes.

Configuring Blocking Devices

NAC uses ACLs on Cisco routers and switches to manage those devices. These ACLs are built as follows:

1. A `permit` line with the sensor's IP address, or if specified, the NAT address

Note If you permit the sensor to be blocked, this line does not appear in the ACL.

2. PreShun ACL (if specified)

   This ACL must already exist on the device.

3. Any active blocks

4. Either:

   – PostShun ACL (if specified)

     This ACL must already exist on the device.

     Note Make sure the last line in the ACL is `permit ip any any`.

   – `permit ip any any` (not used if a PostShun ACL is specified)

NAC uses two ACLs to manage devices. Only one is active at any one time. It uses the offline ACL name to build the new ACL, then applies it to the interface. NAC then reverses the process on the next cycle.

Caution A single sensor can manage multiple devices, but you cannot use multiple sensors to control a single device. In this case, use a master blocking sensor. See Configuring the Sensor to be a Master Blocking Sensor, page 10-73, for more information.

This section contains the following topics:

Configuring the Sensor to Manage a Cisco Router

To configure a sensor to manager a Cisco router, follow these steps:

Step 1 Log in to the CLI using an account with administrator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enter network access mode:

```
sensor(config)# service networkAccess
```

Step 4 Set the IP address for the router controlled by NAC:

```
sensor(config-NetworkAccess)# router-devices ip-address ip_address
```

Step 5 Type the logical device name that you created in Configuring Logical Devices, page 10-66.

```
sensor(config-NetworkAccess-rou)# shun-device-cfg logical_device_name
```

NAC accepts anything you type. It does not check to see if the logical device exists.

Step 6 Designate the method used to access the sensor:

```
sensor(config-NetworkAccess-rou)# communication telnet/ssh-des/ssh-3des
```

If unspecified, SSH 3DES is used.

Note If you are using DES or 3DES, you must use the command **ssh host-key** *ip_address* to accept the key or NAC cannot connect to the device.

Step 7 Specify the sensor's NAT address:

```
sensor(config-NetworkAccess-rou)# nat-address nat_address
```

Note This changes the IP address in the first line of the ACL from the sensor's address to the NAT address.

Step 8 Set the interface direction:

```
sensor(config-NetworkAccess-rou-shu)# shun-interfaces direction in or
out interface-name interface name you want ACL attached to
```

Step 9 Add the preShun ACL name (optional):

```
sensor(config-NetworkAccess-rou-shu)# pre-acl-name pre_shun_acl_name
```

Step 10 Add the postShun ACL name (optional):

```
sensor(config-NetworkAccess-rou-shu)# post-acl-name post_shun_acl_name
```

Step 11 Exit shun interfaces submode:

```
sensor(config-NetworkAccess-rou-shu)# exit
sensor(config-NetworkAccess-rou)# exit
sensor(config-NetworkAccess)# exit
sensor(config)# exit
Apply Changes:?[yes]:
```

Note You receive an error if the logical device name does not exist.

Step 12 Type **yes** to apply changes.

Configuring the Sensor to Manager a Catalyst 6500 Series Switch

To configure the sensor to manage a Catalyst 6500 series switch, follow these steps:

Step 1 Log in to the CLI using an account with administrator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enter network access mode:

```
sensor(config)# service networkAccess

Set the IP address for the router controlled by NAC:
sensor(config-NetworkAccess)# cat6k-devices ip-address ip_address
```

Step 4 Type the logical device name that you created in Configuring Logical Devices, page 10-66.

```
sensor(config-NetworkAccess-cat)# shun-device-cfg logical_device_name
```

NAC accepts anything you type. It does not check to see if the logical device exists.

Step 5 Designate the method used to access the sensor:

```
sensor(config-NetworkAccess-cat)# communication telnet/ssh-des/ssh-3des
```

If unspecified, SSH 3DES is used.

Note If you are using DES or 3DES, you must use the command **ssh host-key** *ip_address* to accept the key or NAC cannot connect to the device.

Step 6 Specify the sensor's NAT address:

```
sensor(config-NetworkAccess-cat)# nat-address nat_address
```

Note This changes the IP address in the first line of the ACL from the sensor's address to the NAT address.

Step 7 Specify the VLAN number:

```
sensor(config-NetworkAccess-cat)# shun-interfaces vlan vlan_number
```

Step 8 Add the preShun ACL name (optional):

```
sensor(config-NetworkAccess-cat-shu)# pre-acl-name pre_shun_acl_name
```

Step 9 Add the postShun ACL name (optional):

```
sensor(config-NetworkAccess-cat-shu)# post-acl-name post_shun_acl_name
```

Step 10 Exit shun device configuration submode:

```
sensor(config-NetworkAccess-cat-shu)# exit
sensor(config-NetworkAccess-cat)# exit
sensor(config-NetworkAccess)# exit
sensor(config)# exit
Apply Changes:?[yes]:
```

Note You receive an error if the logical device name does not exist.

Step 11 Type **yes** to apply changes.

Configuring the Sensor to Manage a Cisco PIX Firewall

To configure the sensor to manage a Cisco PIX Firewall, follow these steps:

Step 1 Log in to the CLI using an account with administrator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enter network access mode:

```
sensor(config)# service networkAccess
```

Step 4 Set the IP address for the router controlled by NAC:

```
sensor(config-NetworkAccess)# pix-devices ip-address ip_address
```

Step 5 Type the logical device name that you created in Configuring Logical Devices, page 10-66.

```
sensor(config-NetworkAccess-pix)# shun-device-cfg logical_device_name
```

NAC accepts anything you type. It does not check to see if the logical device exists.

Step 6 Designate the method used to access the sensor:

```
sensor(config-NetworkAccess-pix)# communication telnet/ssh-des/ssh-3des
```

If unspecified, SSH 3DES is used.

Note If you are using DES or 3DES, you must use the command **ssh host-key** *ip_address* to accept the key or NAC cannot connect to the device.

Step 7 Specify the sensor's NAT address:

```
sensor(config-NetworkAccess-pix)# nat-address nat_address
```

Note This changes the IP address in the first line of the ACL from the sensor's address to the NAT address.

Step 8 Exit shun device configuration submode:

```
sensor(config-NetworkAccess-pix)# exit
sensor(config-NetworkAccess)# exit
sensor(config)# exit
Apply Changes:?[yes]:
```

Note You receive an error if the logical device name does not exist.

Step 9 Type **yes** to apply changes.

Configuring the Sensor to be a Master Blocking Sensor

Multiple sensors (blocking forwarding sensors) can forward blocking requests to a specified master blocking sensor (MBS), which controls one or more devices. The MBS is the NAC running on a sensor that controls blocking on one or more devices on behalf of one or more other sensors. The NAC on an MBS controls blocking on devices at the request of the NACs running on other sensors.

On the blocking forwarding sensor, identify which remote host serves as the MBS; on the MBS you must add the blocking forwarding sensors to its allowed host configuration.

Note Typically the MBS is configured to manage the network devices. Blocking forwarding sensors are not normally configured to manage network devices, although doing so is permissible.

Caution Only one sensor should control all blocking interfaces on a device.

To configure the NAC on a sensor to forward blocks to an MBS, follow these steps:

Step 1 Log in to the CLI using an account with administrator privileges.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Configure the NAC of the blocking forwarding sensor to accept the TLS/SSL X.509 certificate of the MBS remote host (in configuration mode):

```
sensor(config)# tls trusted-host ip-address MBS_ip_address
```

Note You are prompted to accept the certificate based on the certificate's fingerprint. Sensors provide only self-signed certificates (instead of certificates signed by a recognized certificate authority). You can verify the MBS host sensor's certificate by logging in to the host sensor and typing the **show tls fingerprint** command to see that the host certificate's fingerprints match.

Step 4 Accept the certificates for all MBS hosts that the NAC will connect with.

Step 5 Enter network access mode:

```
sensor(config)# service networkAccess
```

Step 6 Enter general submode:

```
sensor(config-NetworkAccess)# general
```

Step 7 Add an MBS entry:

```
sensor(config-networkAccess-gen)# master-blocking-sensors
mbs-ipaddress mbs_host_ip_address
```

Step 8 Specify the username for an administrative account on the MBS host:

```
sensor(config-networkAccess-gen-mas)# mbs-username username
```

Step 9 Specify the password for the user:

```
sensor(config-networkAccess-gen-mas)# mbs-password
Enter mbs-password []: *****
Re-enter mbs-password []: *****
```

Step 10 Specify the port number for the host's HTTP communications.

```
sensor(config-networkAccess-gen-mas)# mbs-port port_number
```

The default is 80/443 if not specified.

Step 11 Set the status of whether or not the host uses TLS/SSL:

```
sensor(config-networkAccess-gen-mas)# mbs-tls true/false
```

Note If you set the value to true, you need to use the command **tls trusted-host ip-address** *mbs_ip_address*.

Step 12 Exit master blocking sensor submode:

```
sensor(config-NetworkAccess-gen-mas)# exit
sensor(config-NetworkAccess-gen)# exit
sensor(config-NetworkAccess)# exit
sensor(config)# exit
Apply Changes:?[yes]:
```

Step 13 Type **yes** to apply changes.

Obtaining a List of Blocked Hosts and Connections

You can obtain a list of blocked hosts and blocked connections by using the **show statistics command** for NetworkAccess.

To obtain a list of blocked hosts and connections, follow these steps:

Step 1 Log in to the CLI.

Step 2 Check the statistics for NAC:

```
sensor# show statistics networkAccess
Current Configuration
   AllowSensorShun = false
   ShunMaxEntries = 250
   NetDevice
      Type = Cisco
      IP = 10.89.150.160
      NATAddr = 0.0.0.0
      Communications = telnet
```

```
      ShunInterface
         InterfaceName = ethernet1
         InterfaceDirection = in
State
   ShunEnable = true
   NetDevice
      IP = 10.89.150.160
      AclSupport = uses Named ACLs
      State = Active
   ShunnedAddr
      Host
         IP = 10.16.0.0
         ShunMinutes = 15
         MinutesRemaining = 15
      Host
         IP = 192.168.16.0
         ShunMinutes = 10
         MinutesRemaining = 10
```

The last two `Host` entries indicate which hosts are being blocked and how long the blocks are.

How to Set up Manual Blocking and How to Unblock

If you have blocking configured, you can manually block a host. You can also view a list of hosts that are being blocked.

Note Manual blocks in the CLI are actually changes to the configuration, so they are permanent. You cannot do a timed manual block. You cannot use the IDSM or IDS MC to delete blocks created by the CLI. Manual blocks have to be removed in the CLI.

Caution We recommend that you use manual blocking on a very limited basis, if at all.

To manually block a host, follow these steps:

Step 1 Log in to the CLI using an account with administrator privileges.

Step 2 Enter configuration mode:

```
sensor# configuration terminal
```

Step 3 Enter network access mode:

```
sensor(config)# service networkAccess
```

Step 4 Enter general mode:

```
sensor (config-NetworkAccess)# general
```

Step 5 Start the manual block for a host IP address:

```
sensor (config-NetworkAccess-gen)# shun-hosts ip-address ip_address
```

Note You must end the manual block in the CLI or it is permanent.

Step 6 To end the manual block:

```
sensor (config-NetworkAccess-gen)# no shun-hosts ip-address ip_address
```

Step 7 Exit general submode:

```
sensor (config-NetworkAccess-gen)# exit
sensor (config-NetworkAccess)# exit
sensor(config)# exit
sensor#
```

NM-CIDS Configuration Tasks

This section describes the tasks you need to perform to set up the NM-CIDS and get it ready to receive traffic. After that you are ready to configure intrusion detection.

This section contains the following topics:

Configuring Cisco IDS Interfaces on the Router

The NM-CIDS differs from a standalone appliance because it does not have an external console port. Console access to the NM-CIDS is enabled when you issue the command **service-module ids-module** *slot_number*/0 session on the router, or when you initiate a Telnet connection into the router with the port number corresponding to the NM-CIDS slot. The lack of an external console port means that the initial bootup configuration is possible only through the router.

When you issue the command **service-module ids-sensor** *slot_number*/**0 session**, you create a console session with the NM-CIDS, in which you can issue any IDS configuration commands. After completing work in the session and exiting the IDS CLI, you are returned to Cisco IOS CLI.

The **session** command starts a reverse Telnet connection using the IP address of the ids-sensor interface. The ids-sensor interface is an interface between the NM-CIDS and the router. You must assign an IP address to the ids-sensor interface before invoking the **session** command. Assigning a routable IP address can make the IDS interface itself vulnerable to attacks. To counter that vulnerability, a loopback IP address is assigned to the ids-sensor interface.

To set up the NM-CIDS interfaces, follow these steps:

Step 1 Confirm the NM-CIDS slot number in your router:

```
Router # show interfaces ids-sensor slot_number/0
```

Note You can also use the **show run** command. Look for “IDS-Sensor” and the slot number.

Note Cisco IOS gives the NM-CIDS the name "IDS-Sensor." In this example, 1 is the slot number and 0 is the port number, because there is only one port.

Step 2 Enable the CEF switching path:

```
Router# configuration terminal
Router(config)# ip cef
Router(config)# exit
```

Step 3 Create a loopback interface:

```
Router# configure terminal
Router(config)# interface loopback 0
```

Step 4 Assign an IP address and netmask to the loopback interface:

```
Router(config-if)# ip address 10.16.0.0 255.255.0.0
```

Note You must assign an IP address to the NM-CIDS's internal interface to session into the NM-CIDS. Choose a network that does not overlap with any networks assigned to the other interfaces in the router. It does not have to be a "real" IP address, because you will not be using this address to access the NM-CIDS.

Step 5 Assign an unnumbered loopback interface to the ids-sensor interface. Use slot 1 for this example.

```
Router(config)# interface ids-sensor 1/0
Router(config-if)# ip unnumbered loopback 0
```

Step 6 Activate the port:

```
Router(config-if)# no shutdown
```

Step 7 Exit configuration mode:

```
Router(config-if)# end
```

Step 8 Write the configuration to NVRAM:

```
Router# write memory
Building configuration
[OK]
```

Establishing Cisco IDS Console Sessions

You can establish and disconnect sessions between the router and the NM-CIDS using one of the following:

- The **session** command
- CTRL-Shift-6 x and the **disconnect** command
- Telnet

This section contains the following topics:

Using the Session Command

Use the **session** command to establish a session in the NM-CIDS (in slot 1 in this example):

```
Router# service-module ids-sensor 1/0 session
```

A Telnet session is initiated:

```
Trying 10.16.0.0, 2033 ... Open
```

Suspending a Session and Returning to the Router

When you are finished with a session, you need to return to the router to establish the association between a session (the IDS application) and the router interfaces you want to monitor.

To toggle between connections in a Telnet session, follow these steps:

Step 1 Hold **CTRL-Shift** simultaneously, and then press **6**. Release all keys, and then press **x**.

This command takes you from a session prompt to a router prompt, and vice versa.

Step 2 Type the following at the prompt:

```
Router# disconnect
```

Step 3 Press **Enter** when prompted as follows:

```
Closing connection to 10.16.0.0 [confirm] <Enter>
```

Note Telnet clients vary. In some cases, you may have to press CTRL-6 + x. The control character is specified as ^^, CTRL-^, or ASCII value 30 (hex 1E).

Caution Failing to close a session properly makes it possible for others to exploit a connection that is still in place. Remember to type **exit** at the `Router#` prompt to close the Cisco IOS session completely. See Closing an Open Session, page 10-81, for the procedure.

Closing an Open Session

If you use the Telnet **disconnect** command to leave the session, the session remains running. The open session can be exploited by someone wanting to take advantage of a connection that is still in place.

To close on open session to the NM-CIDS, follow these steps:

Step 1 Exit the session:

```
sensor# exit
```

Step 2 Suspend and close the session to the NM-CIDS by holding **CTRL-Shift** and pressing **6**. Release all keys, and then press **x**.

Step 3 Disconnect from the router:

```
Router# disconnect
```

Step 4 Press **Enter** to confirm the disconnection:

```
Router# Closing connection to 10.16.0.0 [confirm] <Enter>
```

Step 5 Exit the session:

```
Router# exit
```

Using Telnet

You can also telnet directly into the router with the port number corresponding to the NM-CIDS slot. Use the address you established when configuring the loopback 0 interface in Configuring Cisco IDS Interfaces on the Router, page 10-78.

The port number is determined by the following formula: 2001 + 32 x slot number.

For example, for slot 1, the port number is 2033, for slot 2, it is 2065, and so forth.

To use Telnet to invoke a session to port 2033:

```
Router# telnet 10.16.0.0 2033
```

Rebooting the NM-CIDS

The Cisco IOS provides the following commands to control the NM-CIDS: **shutdown**, **reload**, and **reset**:

- shutdown—Brings the operating system down gracefully:

  ```
  Router# service-module ids-sensor slot_number/0 shutdown
  ```

Caution Make sure you execute a **shutdown** command before you remove the hard-disk drive from the NM-CIDS. Failing to do so can lead to the loss of data or the corruption of the hard-disk drive.

- reload—Performs a graceful halt and reboot of the operating system on an NM-CIDS:

  ```
  Router# service-module ids-sensor slot_number/0 reload
  ```

- reset—Resets the hardware on the NM-CIDS. Typically this command is used to recover from a shutdown.

  ```
  Router# service-module ids-sensor slot_number/0 reset
  ```

  The following warning appears:

  ```
  Router# service-module ids-sensor 1/0 reset
  Use reset only to recover from shutdown or failed state
  Warning: May lose data on the hard disc!
  Do you want to reset?[confirm]
  ```

Caution Hard-disk drive data loss only occurs if you issue the **reset** command without first shutting down the NM-CIDS. You can use the **reset** command safely in other situations.

Setting Up Packet Capture

You will need to enable the desired interfaces (including subinterfaces) on the router for packet monitoring. You can select any number of interfaces or subinterfaces to be monitored. The packets sent and received on these interfaces are forwarded to the NM-CIDS for inspection. The enabling and disabling of the interfaces is configured through the router CLI (Cisco IOS).

To set up packet capture on the NM-CIDS, follow these steps:

Step 1 View your interface configuration:

```
Router# show run
```

Step 2 Identify the interfaces or subinterfaces that you want to monitor, for example, FastEthernet0/0.

Note You can choose more than one interface or subinterface to monitor, but you can only edit one interface at a time.

Step 3 Enter configuration mode:

```
Router# configure terminal
```

Step 4 Specify the interface:

```
Router(config)# interface FastEthernet0/0
```

Note The traffic comes from one of the router's interfaces.

Step 5 Configure the interface to copy network traffic to the NM-CIDS:

```
Router(config-if)# ids-service-module monitoring
```

Note Use the command **no ids-service-module monitoring** to turn off monitoring.

Step 6 Exit interface mode:

```
Router(config-if)# exit
```

Step 7 Repeat Steps 3 though 6 for each interface or subinterface that you want to monitor.

Step 8 Exit configuration mode:

```
Router(config)# exit
```

Step 9 Verify that the NM-CIDS is analyzing network traffic.

a. Open a TFTP or SSH session to the external interface on the NM-CIDS.

Note SSH requires known hosts. See Adding Known Hosts to the SSH Known Hosts List, page 10-19, for the procedure.

b. Log in as **cisco**.

c. View the interface group:

```
Router# show interface group 0
```

d. If the output shows the sensing interface is down, repeat Steps 3 through 6.

e. Repeat Step c to see the counters gradually increasing. This indicates that the NM-CIDS is receiving network traffic.

Checking the Status of the Cisco IDS Software

To check the status of the Cisco IDS software running on the router:

```
Router# service-module ids-sensor slot_number/0 status
```

Something similar to the following output appears:

```
Router# service-module ids-sensor1/0 status
Service Module is Cisco IDS-Sensor1/0
Service Module supports session via TTY line 33
Service Module is in Steady state
Getting status from the Service Module, please wait..
Service Module Version information received,
Major ver = 1, Minor ver= 1
```

```
Cisco Systems Intrusion Detection System Network Module
Software version: 4.1(1)S42(0.3)
Model: NM-CIDS
Memory: 254676 KB
```

Supported Cisco IOS Commands

The following Cisco IOS command is new to support the NM-CIDS:

service-module ids-sensor *slot_number*/**0**

The slot number can vary, but the port is always 0. These options are available:

- **reload**
- **reset**
- **session**
- **shutdown**
- **status**

The following Cisco IOS commands are supported on the NM-CIDS:

- Privileged mode EXEC
  - `Router#` **service-module ids-sensor** *slot_number*/**0 reload**

    Reloads the operating system on the NM-CIDS.
  - `Router#` **service-module ids-sensor** *slot_number*/**0 reset**

    Provides a hardware reset to the NM-CIDS.
  - `Router#` **service-module ids-sensor** *slot_number*/**0 session**
    `Entering Console for IDS sensor Module in slot slot_number.`

    The **session** command allows you access to the IDS console.

– `Router#` **service-module ids-sensor** *slot_number*/**0 shutdown**

Shuts down the IDS applications running on the NM-CIDS.

Caution Removing the NM-CIDS without proper shutdown can result in the hard-disk drive being corrupted. After successful shutdown of the NM-CIDS applications, Cisco IOS prints a message indicating that you can now remove the NM-CIDS.

– `Router#` **service-module ids-sensor** *slot_number*/**0 status**

Provides information on the status of the Cisco IDS software.

- Configure interfaces mode

```
Router(config-if)# ids-service-module monitoring
```

You can enable IDS monitoring on a specified interface (or subinterface). Both inbound and outbound packets on the specified interface are forwarded for monitoring.

IDSM-2 Configuration Tasks

Perform the following tasks to configure the IDSM-2:

1. Initialize the IDSM-2.

   Run the **setup** command to initialize the IDSM-2.

   See Initializing the Sensor, page 10-2, for more information.

2. Configure the Catalyst 6500 series switch for command and control access to the IDSM-2.

   See Configuring the Catalyst 6500 Series Switch for Command and Control Access to the IDSM-2, page 10-88, for the procedure.

3. Assign the interfaces.

   See Assigning and Enabling the Sensing Interface, page 10-9, for the procedure. See Using the TCP Reset Interface, page 8-4, for information on the TCP reset interface.

4. Configure the IDSM-2 to capture traffic for intrusion detection analysis.

   See Capturing IDS Traffic, page 10-90, for the procedures.

5. Perform the other initial tasks, such as adding users, trusted hosts, configuring the sensor to use an NTP server as a time source, and so forth.

   See Sensor Initial Configuration Tasks, page 10-2, for more information.

6. Configure intrusion detection.

   See Sensor Configuration Tasks, page 10-35, and IDS manager documentation. See the *Cisco Intrusion Detection System (IDS) Hardware and Software Version 4.1 Documentation Guide* that shipped with your IDSM-2 for instructions on how to locate these documents.

7. Perform miscellaneous tasks to keep your IDSM-2 running smoothly.

   See Sensor Administrative Tasks, page 10-24, and Miscellaneous Tasks, page 10-98, for more information.

8. Upgrade the IDS software with new signature updates and service packs.

   See Obtaining Cisco IDS Software, page 9-1, for more information.

9. Reimage the application partition and the maintenance partition when needed.

   See Reimaging the IDSM-2, page 10-124.

This section contains the following topics:

Configuring the Catalyst 6500 Series Switch for Command and Control Access to the IDSM-2

After you initialize the IDSM-2, you must configure the Catalyst 6500 series switch to have command and control access to the IDSM-2.

This section contains the following topics:

Catalyst Software

To configure the Catalyst 6500 series switch to have command and control access to the IDSM-2, follow these steps:

Step 1 Log in to the console.

Step 2 Enter privileged mode:

```
Console> enable
```

Step 3 Put the command and control port into the correct VLAN:

```
Console> (enable) set vlan command_and_control_vlan_number
module_slot_number/command_and_control_port_number
```

Example:

```
Console> (enable) set vlan 147 8/2
```

Step 4 Verify that you have connectivity by sessioning into the IDSM-2:

```
Console> session slot module_number
ping network_ip_address
```

Cisco IOS Software

To configure the Catalyst 6500 series switch to have command and control access to the IDSM-2, follow these steps:

Step 1 Log in to the console.

Step 2 Enter configuration mode:

```
Router# configure terminal
```

Step 3 Put the command and control port into the correct VLAN:

```
Router (config)# intrusion-detection-module module_number
management-port access-vlan vlan_number
```

Example:

```
Router (config)# intrusion-detection-module 5 management-port
access-vlan 146
```

Step 4 Verify that you have connectivity by sessioning into the IDSM-2:

```
Router# session slot module_number processor 1
ping network_ip_address
```

Capturing IDS Traffic

Traffic is captured for intrusion detection analysis on the IDSM-2 through SPAN, VACL capture, or by using the **mls ip ids** command. Port 1 is used as the TCP reset port, port 2 is the command and control port, and ports 7 and 8 are the monitoring ports. You can configure one of the monitoring ports as a SPAN or VACL monitoring port.

This section contains the following topics:

Using SPAN for Capturing IDS Traffic

The IDSM-2 can analyze Ethernet VLAN traffic from Ethernet or Fast Ethernet SPAN source ports, or you can specify an Ethernet VLAN as the SPAN source. This section describes how to use SPAN to capture IDS traffic.

The section contains the following topics:

Catalyst Software

To enable SPAN on the IDSM-2, follow these steps:

Step 1 Log in to the console.

Step 2 Enter privileged mode:

```
Console> enable
```

Step 3 Enable SPAN to the IDSM-2 from a source port:

```
Console> (enable) set span [source_module/source_port]
idsm_module/port_number [rx | tx | both] [filter vlans...]
```

Note Use the filter keyword and variable to monitor traffic on specific VLANs on source trunk ports.

Step 4 Enable SPAN to the IDSM-2 from a VLAN:

```
Console> (enable) set span [vlan] idsm_module/port_number [rx | tx | both]
```

Step 5 Disable all SPAN traffic to the IDSM-2:

```
Console> (enable) set span disable idsm_module/port_number
```

Note Refer to *Catalyst 6500 Series Switch Command Reference* for more information on SPAN.

Cisco IOS Software

To enable SPAN on the IDSM-2, follow these steps:

Step 1 Log in to the console.

Step 2 Enter configuration mode:

```
Router# configure terminal
```

Step 3 Set the source interfaces/VLANs for the monitor session:

```
Router (config)# monitor session {session_number} {source {interface
type slot_number/port_number} | {vlan vlan_ID}} [, | - | rx | tx |
both]
```

Step 4 Enable an IDSM-2 data port as a SPAN destination:

```
Router (config)# monitor session {session_number} {destination
intrusion-detection-module module_number data-port data_port_number
```

Step 5 If you want to disable the monitor session:

```
Router (config)# no monitor session session_number
```

Step 6 To filter the SPAN session so that only certain VLANs are seen from switch port trunks (optional):

```
Router (config)# monitor session {session_number} {filter {vlan_ID} [,
| - ]}
```

Step 7 Exit configuration mode:

```
Router (config)# exit
```

Step 8 To show current monitor sessions:

```
Router # show monitor session session_number
```

Note Refer to the *Catalyst 6500 Series Cisco IOS Command Reference* for more information on SPAN.

Configuring VACLS to Capture IDS Traffic

You can set VACLs to capture traffic for IDS from a single VLAN or from multiple VLANs. This section describes how to configure VACLs to capture IDS traffic.

This section contains the following topics:

Catalyst Software

Port 1 is set as the TCP reset port. Ports 7 and 8 are the sensing ports and can be configured as security ACL capture ports. By default, ports 7 and 8 are configured as trunk ports and trunk all VLANs on which a security ACL has been applied with the capture feature. If you want to monitor traffic from specific VLANs only, you need to clear the VLANs that you do not want to monitor so that they are not trunked to ports 7 and 8.

To set VACLs to capture IDS traffic on VLANs, follow these steps:

Step 1 Log in to the console.

Step 2 Enter privileged mode.

```
console> enable
```

Step 3 Set the VACL to capture traffic:

```
console> (enable) set security acl ip acl name permit (...) capture
```

Step 4 Commit the VACL:

```
console> (enable) commit security acl
```

Step 5 Map the VACL to the VLANs:

```
console> (enable) set security acl map acl name [vlans]
```

Step 6 Add the IDSM-2 monitoring port (port 7 or 8) to the VACL capture list:

```
console> (enable) set security acl capture module_number/port_number
```

This example shows how to capture IDS traffic on VLANs:

```
Console> (enable) show security acl info all
set security acl ip webacl2
————————————————————-
permit tcp any host 10.1.6.1 eq 21 capture
permit tcp host 10.1.6.1 eq 21 any capture
permit tcp any host 10.1.6.1 eq 80 capture
permit tcp any host 10.1.6.2 eq 80 capture
deny ip any host 10.1.6.1
deny ip any host 10.1.6.2
permit ip any any
```

Note Refer to *Catalyst 6500 Series Switch Command Reference* for more information on trunk ports and ACLs.

Cisco IOS Software

To set VACLs to capture IDS traffic on VLANs, follow these steps:

Step 1 Log in to the console.

Step 2 Enter privileged mode.

```
Router# configure terminal
```

Step 3 Define the ACL:

```
Router (config)# ip access-list {standard | extended} acl_name

Create ACL entries through the permit and/or deny statements:
Router(config-ext-nacl)# ?
Ext Access List configuration commands:

default     Set a command to its defaults
deny        Specify packets to reject
dynamic     Specify a DYNAMIC list of PERMITs or DENYs
evaluate    Evaluate an access list
exit        Exit from access-list configuration mode
no          Negate a command or set its defaults
permit      Specify packets to forward
remark      Access list entry comment
Router(config-ext-nacl)# exit
```

Step 4 Define the VLAN access map:

```
Router(config)# vlan access-map map_name [0-65535]
```

Step 5 Configure a match clause in a VLAN access map sequence:

```
Router (config-access-map)# match {ip address {1-199 | 1300-2699 |
acl_name}
```

Step 6 Configure an action clause in the VLAN access map sequence to accompany the preceding match clause:

```
Router(config-access-map)# action forward capture
```

Step 7 Apply the VLAN access-map to the specified VLANs:

```
Router (config)# vlan filter map_name vlan-list vlan_list
```

Step 8 Configure the IDSM-2 data ports to capture the captured-flagged traffic:

```
Router (config)# intrusion-detection module module_number data-port
data_port_number capture allowed-vlan capture_vlans
```

Step 9 Enable the capture function on the IDSM-2:

```
Router (config)# intrusion-detection module module_number data-port
data_port_number capture
```

Caution You should not configure an IDSM-2 data port as both a SPAN destination port and a capture port.

This example shows the output from the **show run** command:

```
Router# show run
intrusion-detection module 4 data-port 1 capture allowed-vlan
450,1002-1005
intrusion-detection module 4 data-port 1 capture
.
.
.
vlan access-map CAPTUREALL 10
match ip address MATCHALL
action forward capture
.
.
.
ip access-list extended MATCHALL
permit ip any any
```

Using the mls ip ids Command for Capturing IDS Traffic

This section describes how to use the **mls ip ids** command to capture IDS traffic.

This section contains the following topics:

Catalyst Software

When you are running the Cisco IOS Firewall on the Multilayer Switch Feature Card (MSFC), you cannot use VACLs to capture traffic for the IDSM-2, because you cannot apply VACLs to a VLAN in which you have applied an IP inspect rule for the Cisco IOS Firewall. However, you can use the **mls ip ids** command to designate which packets are captured. Packets that are permitted by the ACL are captured. Those denied by the ACL are not captured. The permit/deny parameter does not affect whether a packet is forwarded to destination ports. Packets coming into that router interface are checked against the IDS ACL to determine if they should be captured. The **mls ip ids** command is applied as part of the MSFC configuration instead of the supervisor configuration. The **mls ip ids** command only captures incoming traffic. You will need to use the **mls ip ids** command on both the client side router interface and server side router interface, so that both directions of the connection will be captured.

To use the mls ip ids command to capture IDS traffic, follow these steps:

Step 1 Log in to the MSFC.

Step 2 Enter privileged mode:

```
Router> enable
```

Step 3 Enter configuration mode:

```
Router# configure terminal
```

Step 4 Configure an ACL to designate which packets will be captured:

```
Router(config)# ip access-list extended word
```

Step 5 Select the interface that carries the packets to be captured:

```
Router(config)# interface interface_name
```

Step 6 Apply the ACL created in Step 4 to the interface selected in Step 5:

```
Router(config-if)# mls ip ids word
```

Step 7 Log in to the supervisor engine.

Step 8 Enter privileged mode.

```
Console> enable
```

Step 9 On the supervisor engine, add the IDSM-2 monitoring port (port 7 or 8) to the VACL capture list:

```
Console> (enable) set security acl capture idsm_module/port_number
```

Caution For the IDSM-2 to capture all packets marked by the **mls ip ids** command, port 7 or 8 of the IDSM-2 must be a member of all VLANs to which those packets are routed.

Cisco IOS Software

When you are using ports as router interfaces rather than switch ports, there is no VLAN on which to apply a VACL.

You can use the **mls ip ids** command to designate which packets will be captured. Packets that are permitted by the ACL will be captured. Those denied by the ACL will not be captured. The permit/deny parameter does not affect whether a packet is forwarded to destination ports. Packets coming into that router interface are checked against the IDS ACL to determine if they should be captured.

To use the **mls ip ids** command to capture IDS traffic, follow these steps:

Step 1 Log in to the console.

Step 2 Enter privileged mode:

```
Router> enable
```

Step 3 Enter configuration mode:

```
Router# configure terminal
```

Step 4 Configure an ACL to designate which packets will be captured:

```
Router(config)# ip access-list extended word
```

Step 5 Select the interface that carries the packets to be captured:

```
Router(config)# interface interface_name
```

Step 6 Apply the ACL created in Step 4 to the interface selected in Step 5:

```
Router(config-if)# mls ip ids word
```

```
Enable the capture function on the IDSM-2 data ports so that packets
with the capture bit set are received by the interface:
Router(config)# intrusion-detection module 4 data-port 1 capture
Router(config)# intrusion-detection module 4 data-port 2 capture
```

Caution For the IDSM-2 to capture all packets marked by the **mls ip ids** command, data port 1 or data port 2 of the IDSM-2 must be a member of all VLANs to which those packets are routed.

Miscellaneous Tasks

This section contains procedures such as resetting the IDSM-2 and lists of Catalyst and Cisco IOS software commands.

Note For more detailed information on Catalyst and Cisco IOS software commands, refer to the command references found on Cisco.com. See the *Cisco Intrusion Detection System (IDS) Hardware and Software Version 4.1 Documentation Guide* that shipped with your IDSM-2 for instructions on how to locate these documents.

This section contains the following topics:

- Cisco IOS Software Commands, page 10-106
- Cisco IOS Software Commands, page 10-106

Enabling a Full Memory Test

When the IDSM-2 initially boots, by default it runs a partial memory test. You can enable a full memory test in Catalyst software and Cisco IOS software.

This section contains the following topics:

- Memory and Boot Time, page 10-99
- Catalyst Software, page 10-99
- Cisco IOS Software, page 10-100

Memory and Boot Time

Table 10-2 lists the memory and approximate boot time for a long memory test.

Table 10-2 Memory and Boot Time

Memory Size	Boot Time
256 MB	1.5 minutes
512 MB	3 minutes
1 GB	6 minutes
1.5 GB	9 minutes
2 GB	12 minutes

Catalyst Software

You can enable a full memory test when you use the **set boot device bootseq** *module_number* **mem-test-full** command. The long memory test takes about 12 minutes.

To enable a full memory test, follow these steps:

Step 1 Log in to the console.

Step 2 Type the following commands:

```
Console> set boot device cf:1 4
mem-test-full
Console> show boot device 4
```

The **set boot device** command can either contain **cf:1** or **hdd:1**.

The following output appears:

```
Device BOOT variable = cf:1
FAST BOOT Enabled
```

Step 3 Reset the IDSM-2.

See Resetting the IDSM-2, page 10-101, for the procedure.

The full memory test runs.

Note A full memory test takes more time to complete than a partial memory test.

Cisco IOS Software

You can enable a full memory test when you use the **set boot device bootseq** *module_number* **mem-test-full** command. The long memory test takes about 12 minutes.

To enable a full memory test, follow these steps:

Step 1 Log in to the console.

Step 2 Type the following commands:

```
Router# set boot device cf:1 4 mem-test-full
Router# show boot device 4
```

The **set boot device** command can either contain **cf:1** or **hdd:1**.

Step 3 The following output appears:

```
Device BOOT variable = cf:1
FAST BOOT Enabled
```

Step 4 Reset the IDSM-2.

See Resetting the IDSM-2, page 10-101, for the procedure.

The full memory test runs.

Note A full memory test takes more time to complete than a partial memory test.

Resetting the IDSM-2

If for some reason you cannot communicate with the IDSM-2 through SSH, Telnet, or the switch **session** command, you must reset the IDSM-2 from the switch console. The reset process requires several minutes. This section describes how to reset the IDSM-2.

The section contains the following topics:

Catalyst Software

To reset the IDSM-2 from the CLI, follow these steps:

Step 1 Log in to the console.

Step 2 Enter privileged mode:

```
Console> enable
```

Step 3 Reset the IDSM-2 to the application partition or the maintenance partition:

```
Console> (enable) reset module_number [hdd:1/cf:1]
```

Note If you do not specify either the application partition (hdd:1 the default) or the maintenance partition (cf:1), the IDSM-2 uses the boot device variable.

The following example shows the output of the **reset** command:

```
Console> (enable) reset 3
2003 Feb 01 00:18:23 %SYS-5-MOD_RESET: Module 3 reset from console//
Resetting module 3... This may take several minutes.
2003 Feb 01 00:20:03 %SYS-5-MOD_OK: Module 3 is online.
Console> (enable)
```

Caution If the IDSM-2 is removed from the switch chassis without first being shut down, or the chassis loses power, you may need to reset the IDSM-2 more than once. If the IDSM-2 fails to respond after three reset attempts, boot the maintenance partition, and perform the instructions for restoring the application partition. See Reimaging the IDSM-2, page 10-124, for the procedure.

Cisco IOS Software

Note The reset process requires several minutes.

To reset the IDSM-2 from the CLI, follow these steps:

Step 1 Log in to the console.

Step 2 Enter privileged mode:

```
Router# configure terminal
```

Step 3 Reset the IDSM-2:

```
Router# hw-module module module_number reset [hdd:1/cf:1]
```

This example shows the output of the **reset** command:

```
Router# hw-module module 8 reset
```

```
Device BOOT variable for reset =
Warning: Device list is not verified.
Proceed with reload of module? [confirm]
% reset issued for module 8
```

Catalyst Software Commands

This section lists supported and unsupported Catalyst Software Commands. For more information, refer to the Catalyst 6500 Series Command References found on Cisco.com.

This section contains the following topics:

Supported Supervisor Engine Commands

The IDSM-2 also supports the following supervisor engine CLI commands, which are described in more detail in the Catalyst 6500 Series Command References.

- **clear config** *module_number*

  Clears the configuration on the supervisor engine that is associated with the specified IDSM-2.

- **clear log** *module_number*

  Deletes all entries in the error log for the specified IDSM-2.

- **session** *slot_number*

  Logs in to the console of the IDSM-2 from the switch console.

- **set module** commands (all other **set module** commands return an error message):

  – **set module name** *module_number*

  Sets the name of the module.

  – **set module power** *module_number* **up | down**

  Enables or disables power to the specified IDSM-2.

- **set port name** *module_number*

  Configures the name for the specified IDSM-2 port.

- **set span**

  Configures port 1 as a SPAN destination port. You cannot use port 1 on the IDSM-2 as a SPAN source port.

- **set trunk**

  Configures trunk ports.

- **set vlan**

  Configures VLAN capture ports.

- **show config**

  Displays the supervisor engine NVRAM configurations.

- **show log**

  Displays the error logs for the specified IDSM-2.

- **show mac** *module_number*

  Displays the MAC counters for the specified IDSM-2.

- **show module** *module_number*

  With an IDSM-2 installed, displays “Intrusion Detection System Module” under Module-Type.

- **show port** *module_number*

  Displays the port status for the specified IDSM-2.

- **show port capabilities** *[module | module_number]*

  Displays the capabilities of the module and ports.

- **show test**

  Displays the errors reported from the diagnostic tests for both the SPAN port (port 1) and the management port (port 2) and the BIOS and CMOS boot results.

Unsupported Supervisor Engine Commands

The following supervisor engine CLI commands are not supported by the IDSM-2:

- **set module {enable|disable}** *module_number*
- **set port broadcast**
- **set port channel**
- **set port cops**
- **set port disable**
- **set port enable**
- **set port flowcontrol**
- **set port gmrp**
- **set port gvrp**
- **set port host**
- **set port inlinepower**
- **set port jumbo**
- **set port membership**
- **set port negotiation**
- **set port protocol**
- **set port qos**
- **set port rsvp**
- **set port security**
- **set port speed**
- **set port trap**
- **set protocolfilter**
- **set rgmp**
- **set snmp**
- **set spantree**
- **set udld**
- **set vtp**

Cisco IOS Software Commands

This section lists the Cisco IOS software commands that the IDSM-2 supports. These commands are grouped according to mode.

For more detailed information on Cisco IOS software commands, refer to the command references found on Cisco.com. See the *Cisco Intrusion Detection System (IDS) Hardware and Software Version 4.1 Documentation Guide* that shipped with your sensor for instructions on how to locate these documents.

This section contains the following topics:

EXEC Commands

The following commands are all performed in EXEC mode:

- **clock read-calendar**

  Updates the clock time to the calendar time.

- **clock set** *time date*

  Sets the current time and date.

- **clock update-calendar**

  Updates the calendar time to the clock time.

- **hw-module module** *slot_number* **reset**

  Resets the IDSM-2 into the partition specified by the boot device variable; if the boot device variable has not been set, the IDSM-2 is reset to the application partition by default. Use the command **show boot device module** *module_number* to view the current setting of the boot device variable.

- **hw-module module** *slot_number* **reset cf:1**

  Resets the module into the maintenance partition.

- **hw-module module** *slot_number* **shutdown**

  Shuts down the module so that it can be safely removed from the chassis.

- **reload**

  Reloads the entire switch.

- **session slot** *slot_number* **processor** *processor_number*

  Logs in to the console of the IDSM-2 from the switch console.

- **show intrusion-detection module** *module_number* **data-port** *data_port_number* **state**

  Displays the state of the specified IDSM-2 data port.

- **show intrusion-detection module** *module_number* **data-port** *data_port_number* **traffic**

  Displays traffic statistics for the IDSM-2 data port traffic.

- **show intrusion-detection module** *module_number* **management-port state**

  Displays the state of the IDSM-2 management port.

- **show intrusion-detection module** *module_number* **management-port traffic**

  Displays traffic statistics for the IDSM-2 management port.

- **show ip access-lists**

  Displays the current access lists.

- **show module**

  Displays the installed modules, versions, and states.

- **show running-config**

  Displays the configuration that is currently running.

- **show startup-config**

  Displays the saved configuration.

- **show vlan access-map**

  Displays all current VLAN access maps.

Configuration Commands

The following configuration commands are all performed in either global configuration mode, interface configuration mode, or VACL configuration submode:

- Global configuration mode
  - **clock calendar valid**

    Sets the current calendar time as the switch time on bootup.
  - **clock summer-time** *zone* **recurring**

    Sets the switch to use the summertime settings.
  - **clock timezone** *zone offset*

    Sets the timezone for the switch/IDSM-2.
  - **intrusion-detection module** *module_number* **management-port access-vlan** *access_vlan_number*

    Configures the access vlan for the IDSM-2 command and control port.
  - **intrusion-detection module** *module_number* **data-port** *data_port_number* **capture allowed-vlan** *allowed_capture_vlan(s)*

    Configures the VLAN(s) for VACL capture.
  - **intrusion-detection module** *module_number* **data-port** *data_port_number* **capture**

    Enables VACL capture for the specified IDSM-2 data port.
  - **ip access-list extended** *word*

    Creates access lists for use in the VACL maps.
  - **monitor session** *session* {**destination** {**interface** *interface interface-number*} [, | -] {**vlan** *vlan-id*}}

    Sets the destination for a SPAN session.
  - **monitor session** *session* {**source** {**interface** *interface interface-number*} | {**vlan** *vlan-id*}} [, | - | **rx** | **tx** | **both**]

    Sets the sources for a SPAN session.
  - **no power enable module** *slot_number*

    Shuts down the IDSM-2 and removes power.

  - **power enable module** *slot_number*

    Turns on the power for the IDSM-2 if it is not already on.
  - **vlan access-map** *map_name_sequence*

    Creates the VACL maps.
  - **vlan filter** *map_name* **vlan-list** *vlans*

    Maps the VACL maps to VLANs.
- Interface configuration mode
  - **switchport**

    Sets the interface as a switch port.
  - **switchport access vlan** *vlan*

    Sets the access VLAN for the interface.
  - **switchport capture**

    Sets the interface as a capture port.
  - **switchport mode access**

    Sets the interface as an access port.
  - **switchport mode trunk**

    Sets the interface as a trunk port.
  - **switchport trunk allowed vlan** *vlans*

    Sets the allowed VLANs for trunk.
  - **switchport trunk encapsulation dot1q**

    Sets dot1q as the encapsulation type.
  - **switchport trunk native vlan** *vlan*

    Sets the native VLAN for the trunk port.
- VACL configuration submode
  - **action forward capture**

    Designates that matched packets should be captured.
  - **match ip address** {*1-199* | *1300-2699* | *acl_name*}

    Specifies filtering in the VACL.

Reimaging Appliances and Modules

This section provides procedures for reimaging the sensor image. When you reimage the sensor, all accounts are removed and the default cisco account is reset to use the default password “cisco”. After reimage, you must initialize the sensor again. See Initializing the Sensor, page 10-2, for the procedure.

After you initialize your sensor, upgrade your sensor with the most recent signature updates and service packs. See Obtaining Cisco IDS Software, page 9-1, for the procedure.

You must also reassign the interfaces. See Assigning and Enabling the Sensing Interface, page 10-9, for the procedure.

This section contains the following topics:

Reimaging the Appliance

When you use the **recover** command, you are booting to the recovery partition, which automatically reimages the application partition on your appliance. You can use the **upgrade** command to download and install a recovery partition image, which reimages the recovery partition. You can also install the system image on the IDS-4215, IPS-4240, or IPS-4255 by using the ROMMON to TFTP the system image onto the compact flash device. Installing the system image reimages both the recovery partition and application partition.

This section contains the following topics:

Recovering the Application Partition Image

You can recover the application partition image for the appliance if it becomes unusable. Using the **recover application-partition** command, you can reinstall the original factory image that resides on the recovery partition.

Note If you have upgraded your recovery partition to the most recent version before you recover the application partition image, you can install the most up-to-date software image. See Upgrading the Recovery Partition Image, page 10-112, for the procedure for upgrading the recovery partition to the most recent version.

Note You can also use the recovery/upgrade CD to reinstall both the recovery and application partitions. See Using the Recovery/Upgrade CD with the Appliance, page 9-9, for the procedure.

To recover the application partition image, follow these steps:

Step 1 Log in to the sensor CLI.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Recover the application partition image:

```
sensor(config)# recover application-partition
```

You are asked whether you want to proceed.

```
All configuration changes except for the network settings will be
reset to default. Continue with recovery?
```

Step 4 Type **yes** to continue.

The application partition is reimaged with the original factory image from the recovery partition. You must now initialize the appliance with the **setup** command. See Initializing the Sensor, page 10-2, for the procedure.

Note The IP address, netmask, access lists, time zone, and offset are saved and applied to the reimaged application partition. If you executed the **recover application-partition** command remotely, you can SSH to the sensor with the default username and password (cisco/cisco) and then initialize the sensor again with the **setup** command.

Note If you cannot access the CLI to execute the **recover application-partition** command, you can reboot the sensor and select the option during the bootup process. This enables you to boot to the recovery partition and reimage the application partition.

Upgrading the Recovery Partition Image

You can upgrade the image on the recovery partition with the most recent version so that it is ready if you need to recover the application partition on your appliance.

To upgrade the recovery partition image, follow these steps:

Step 1 Obtain the recovery partition image file from Software Center on Cisco.com and copy it to an SCP or FTP server.

See Obtaining Cisco IDS Software, page 9-1, for instructions on how to access the Software Center on Cisco.com.

Step 2 Log in to the sensor CLI.

Step 3 Enter configuration mode:

```
sensor# configure terminal
```

Step 4 Upgrade the recovery partition:

```
sensor(config)# upgrade
scp://user@server_ipaddress//upgrade_path/recovery_partition_file
```

The recovery partition image filename looks similar to this:

```
IDS-42XX-K9-r-1.1-a-4.0-1-S37.tar.pkg
```

Step 5 Type the SCP or FTP server's password.

After the recovery partition image file has been downloaded, you are asked if you want to proceed with the upgrade:

```
Warning: Executing this command will reimage the recovery partition.
The system may be rebooted to complete the upgrade.
Continue with upgrade?
```

Step 6 Type **yes** to continue with the reimaging.

The recovery partition has been upgraded with the new image.

Installing the IDS-4215 System Image

You can install the IDS-4215 system image by using the ROMMON on the appliance to TFTP the system image onto the compact flash device.

Note Other IDS appliances use the recovery/upgrade CD rather than the system image.

Caution Before installing the system image, you must first upgrade the IDS-4215 BIOS to version 5.1.7 and the ROMMON to version 1.4 using the upgrade utility file IDS-4215-bios-5.1.7-rom-1.4.bin available for download at the following URL: http://www.cisco.com/cgi-bin/tablebuild.pl/ids-firmware

We recommend the following TFTP servers:

- For Windows:

  Tftpd32 version 2.0, available at:

  http://membres.lycos.fr/phjounin/P_tftpd32.htm

- For UNIX:

  Tftp-hpa series, available at:

  http://www.kernel.org/pub/software/network/tftp/

To install the system image, follow the steps:

Note You lose all user configuration settings when you install the system image. Before trying to recover the sensor by installing the system image, try to recover by using the **recover application-partition** command or by selecting the Recovery Partition during sensor bootup. See Recovering the Application Partition Image, page 10-111, for the procedure.

To install the IDS-4215 system image, follow these steps:

Step 1 Download the IDS-4215-K9-sys-4.1-4-S91a.img file to the TFTP root directory of a TFTP server that is accessible from your IDS-4215.

The file is available for download at the following URL:

http://www.cisco.com/cgi-bin/tablebuild.pl/ids4-app-recovr

Make sure you can access the TFTP server location from the network connected to your IDS-4215 Ethernet port.

Step 2 Boot the appliance.

Step 3 Press **CTRL-R** at the following prompt while the system is booting:

```
Evaluating Run Options...
```

Note You have five seconds to press CTRL-R.

The console displays information such as the following:

```
CISCO SYSTEMS IDS-4215
Embedded BIOS Version 5.1.7 05/12/03 10:18:14.84
Compiled by ciscouser
Evaluating Run Options ...
Cisco ROMMON (1.4) #0: Mon May 12 10:21:46 MDT 2003
Platform IDS-4215
0: i8255X @ PCI(bus:0 dev:13 irq:11)
1: i8255X @ PCI(bus:0 dev:14 irq:11)

Using 1: i82557 @ PCI(bus:0 dev:14 irq:11), MAC: 0000.c0ff.ee01
Use ? for help.
rommon>
```

Step 4 Verify that the sensor is running BIOS version 5.1.7 or later and ROMMON version 1.4 or later.

The current versions are shown in the console display information identified in Step 3.

Step 5 Select the interface port number to be used for the TFTP download:

Note The port in use is listed just before the rommon prompt. In the example, port 1 is being used as noted by the text, `Using 1: i82557 @ PCI(bus:0 dev:14 irq:11), MAC: 0000.c0ff.ee01`.

```
rommon> interface <port_number>
```

Note Ports 0 and 1 are labeled on the back of the chassis.

Step 6 Set an IP address for the local port on the IDS-4125:

```
rommon> ip_address <ip_address>
```

Note Select an unused IP address on the sensor's local network that can access the TFTP server.

Step 7 Set the TFTP server IP address:

```
rommon> server <ip_address>
```

Step 8 Set the gateway IP address:

```
rommon> gateway <ip_address>
```

Step 9 Verify that you have access to the TFTP server by pinging it from your local defined Ethernet port using one of the following commands:

```
rommon> ping <ip_address>
rommon> ping server
```

Step 10 Define the path and filename on the TFTP file server from which you are downloading the image:

```
rommon> file <path/filename>
```

For example, for UNIX:

```
rommon> file /tftpboot/IDS-4215-K9-sys-4.1-4-S91a.img
```

For example, for Windows:

```
rommon> file C:\<tftpboot_directory>\IDS-4215-K9-sys-4.1-4-S91a.img
```

Step 11 Download and install the system image:

```
rommon> tftp
```

Note The sensor reboots several times during the reimaging process. Do not remove power from the sensor during the update process or the upgrade can become corrupted.

Installing the IPS-4240 and IPS-4255 System Image

You can install the IPS-4240 and IPS-4255 system image by using the ROMMON on the appliance to TFTP the system image onto the compact flash device.

Note Other IDS appliances use the recovery/upgrade CD rather than the system image.

We recommend the following TFTP servers:

- For Windows:

  Tftpd32 version 2.0, available at:

  http://membres.lycos.fr/phjounin/P_tftpd32.htm

- For UNIX:

  Tftp-hpa series, available at:

  http://www.kernel.org/pub/software/network/tftp/

To install the system image, follow these steps:

Step 1 Download the IPS-4240-K9-sys-4.1-4-S91a.img file to the TFTP root directory of a TFTP server that is accessible from your IDS-4240.

The file is available for download at the following URL:

http://www.cisco.com/cgi-bin/tablebuild.pl/ids4-app-recovr

Make sure you can access the TFTP server location from the network connected to your IDS-4240 Ethernet port.

Step 2 Boot the appliance.

Step 3 Press **Break** or **ESC** at the following prompt while the system is booting:

```
Evaluating Run Options...
```

Note You have ten seconds to press **Break** or **ESC**.

The system enters ROMMON mode. The `rommon>` prompt appears.

The console displays information such as the following:

```
ROMMON Variable Settings:
  ADDRESS=10.1.9.201
  SERVER=10.1.8.1
  GATEWAY=10.1.9.254
  PORT=Management0/0
  VLAN=untagged
  IMAGE=IPS-4240-K9-sys-4.1-4-S91.img
  CONFIG=
```

Note Not all values are required to establish network connectivity. The address, server, gateway, and image values are required. If you are not sure of the settings needed for your local environment, contact your system administrator.

The variables have the following definitions:

- Address—Local IP address of the sensor
- Server—TFTP server IP address where the application image is stored
- Gateway—Gateway IP address used by the sensor

- Port—Ethernet interface port used for sensor management
- VLAN—VLAN ID number (leave as 0)
- Image—System image file path/name

Step 4 Select the interface port number to be used for the TFTP download:

```
rommon> interface <port_number>
```

Step 5 Set an IP address for the local port on the IDS-4240:

```
rommon> ip_address <ip_address>
```

Note Select an unused IP address on the sensor's local network that can access the TFTP server.

Step 6 Set the TFTP server IP address:

```
rommon> server <ip_address>
```

Step 7 Set the gateway IP address:

```
rommon> gateway <ip_address>
```

Step 8 Type **set** and press **Enter** to verify the network settings.

Step 9 Verify that you have access to the TFTP server by pinging it from your local defined Ethernet port using one of the following commands:

```
rommon> ping <ip_address>
rommon> ping server
```

Note You can type the **sync** command to store these settings in NVRAM so they are maintained across boots. Otherwise, this information must be typed each time you want to boot an image from ROMMON.

Step 10 Download and install the system image:

```
rommon> tftp
```

Note The sensor reboots several times during the reimaging process. Do not remove power from the sensor during the update process or the upgrade can become corrupted.

If the network settings are correct, the system downloads and boots the specified IMAGE on the sensor. Be sure to use a valid sensor image.

Reimaging the NM-CIDS Application Partition

You use the helper image file to replace the application partition on the NM-CIDS. The helper image is booted over the network using a TFTP server.

To reimage the NM-CIDS application partition, follow these steps:

Step 1 Obtain the helper image file on Cisco.com.

See Obtaining Cisco IDS Software, page 9-1, for the procedure for accessing the Software Center on Cisco.com.

a. Locate a TFTP server on your network.

Remember the IP address of your TFTP server. You will need it later to copy the software files.

b. Put the IDS helper image file on the TFTP server.

c. Locate an SSH or TFTP server on your network.

Remember the IP address of your SSH or TFTP server. You will need it later to copy the software files.

d. Copy the helper image file to the /tftpboot directory on your TFTP server:

```
# scp user@host:/path/NM-CIDS-K9-helper-1.0-1.bin /tftpboot
```

The following example shows what a helper image file looks like:

```
NM-CIDS-K9-helper-1.0-1.bin
```

Note Most TFTP servers offer the directory /tftpboot to TFTP clients.

Step 2 Session in to the NM-CIDS:

```
Router# service-module IDS-Sensor slot_number/0 session
```

Step 3 Suspend the session by pressing **Shift-CTRL-6 x**.

You will see the `router#` prompt. If you do not see this prompt, try **Ctrl-6 x**.

Step 4 Reset the NM-CIDS:

```
Router# service-module IDS-Sensor slot_number/0 reset
```

You are prompted to confirm the **reset** command.

Step 5 Press **Enter** to confirm.

Step 6 Resume the suspended session by pressing **Enter**.

After displaying its version, the bootloader displays the following prompt for 15 seconds:

```
Please enter '***' to change boot configuration:
```

If you type *** during the 15-second delay or there is no default boot device configured, you enter the bootloader CLI.

Step 7 Session in to the NM-CIDS:

```
ServicesEngine boot-loader>
```

Step 8 Set up the bootloader network parameters:

Note You only have to configure the bootloader once.

```
ServicesEngine boot-loader> config
TFTP server [10.1.2.5] > Gateway [10.1.2.254] > Default Helper-file []
>NM-CIDS-K9-helper-1.0-1.bin Ethernet interface [external] > Default
Boot [none] >disk
```

You are prompted for each value line by line.

a. Specify the IP address.

The IP address applies to the external fast Ethernet port on the NM-CIDS. This must be a real IP address on your network.

b. Specify the subnet mask.

The netmask applies to the external fast Ethernet port on the NM-CIDS. This must be a real IP address on your network.

c. Specify the TFTP server IP address.

d. Specify the gateway IP address.

e. Specify the default helper file.

f. Specify the Ethernet interface.

The Ethernet interface is **external**.

g. Specify the default boot device.

The default boot device is **disk**.

Step 9 Boot the helper file:

```
ServicesEngine boot-loader> boot helper
Probing...EEPRO100Found Intel EtherExpressPro100 at x00000000 ROM
address 0x 00000000
Ethernet addr: 01:23:45:67:89:AB
Me: 10.1.2.3, Server: 10.1.2.5, Gateway: 10.1.2.254
Loading NM-CIDS-K9-helper-1.0-1.bin
```

Note If you want to boot a helper image different from the one you configured as your default helper, you can type its name here. For example: **boot helper** *some_other_helper*

Note The bootloader brings up the external interface and locates the TFTP server host, which may take a while. You can press keys during the TFTP load process to affect the bootloader's behavior. Press **p** to see a printout of the ARP table. You should see three entries: the Me address from the example above, the Server address, and the Gateway address. If this process seems to take too long and nothing changes for a long time, you may have network configuration or connectivity problems.

When the TFTP load actually begins, a spinning character is displayed to indicate packets arriving from the TFTP server.

Note After the helper image is loaded, the bootloader checks that it downloaded correctly. The bootloader will not run a helper if it was received incorrectly or it was not signed by Cisco. The following message indicates the helper is valid: `Image signature verified successfully.`

The Helper utility is launched:

```
Cisco Systems, Inc.
Services engine helper utility for NM-CIDS
Version 1.0(1) [200305011547]
——-
Main menu
1 - Download application image and write to HDD
2 - Download bootloader and write to flash
3 - Display software version on HDD
4 - Display total RAM size
5 - Change file transfer method (currently secure shell)
Change file transfer method (currently secure shell)
r - Exit and reset Services Engine
h - Exit and shutdown Services Engine
Selection [1234rh]:
```

Step 10 Chose the transfer method:

- **a.** For SSH, go to Steps 11 and 12.
- **b.** For TFTP, go to Steps 13 and 14.

Step 11 Set SSH as the transfer method:

- **a.** Type **5**.
- **b.** Type **1** to change to secure shell.
- **c.** Type **r** to return to the Main menu.

Step 12 Reimage the hard-disk drive:

- **a.** Type **1**.
- **b.** Type the secure shell server username.
- **c.** Type the secure shell server IP address.
- **d.** Type the full pathname of recovery image:

```
full pathname of recovery image: /path /NM-CIDS-K9-a-4.1-1-S42.bin
```

e. Type **y** to continue:

```
Ready to begin
Are you sure? y/n
```

You receive the following message:

```
The authenticity of host 10.1.2.10 (10.1.2.10) can't be
established. RSA key fingerprint is
7b:90:3b:16:5f:a1:34:92:ff:94:54:19:82:dc:73:ba. Are you sure you
want to continue connecting (yes/no)?
```

f. Type **yes**.

g. Specify the server password:

```
user@ip_address password

./
./ptable
.....
Disk restore was successful
The operation was successful.
Writing kernel signature to boot flash device
Read 174 bytes from vmlinuz-2.4.18-5-module.u64md5
bflash-write: After bfwrite The operation was successful
```

You are returned to the main menu with the `Selection [1234rh]:` prompt. Continue with Step 15.

Step 13 Set TFTP as the transfer method:

a. Type **5**.

b. Type **2** to change to TFTP.

c. Type **r** to return to the Main menu.

Step 14 Reimage the hard-disk drive:

a. Type **1**.

b. Type the TFTP server IP address.

c. Type the full pathname of recovery image:

```
full pathname of recovery image: /path /NM-CIDS-K9-a-4.1-1-S42.bin
```

d. Type **y** to continue.

```
Ready to begin
Are you sure? y/n
```

You receive the following message:

```
The authenticity of host 10.1.2.10 (10.1.2.10) can't be
established.
RSA key fingerprint is
7b:90:3b:16:5f:a1:34:92:ff:94:54:19:82:dc:73:ba.
Are you sure you want to continue connecting (yes/no)?
```

e. Type **yes**.

Step 15 Reboot the NM-CIDS:

```
Selection [1234rh]: r
About to exit and reset Services Engine.
Are you sure? [y/N]
```

Step 16 Type **y** to reboot.

You must initialize your NM-CIDS with the **setup** command. See Initializing the Sensor, page 10-2.

Reimaging the IDSM-2

If your application partition becomes unusable, you can reimage it from the maintenance partition. After you reimage the application partition of the IDSM-2, you must initialize the IDSM-2 using the **setup** command.

See Initializing the Sensor, page 10-2, for the procedure.

When there is a new maintenance partition image file, you can reimage the maintenance partition from the application partition.

This section describes how to reimage the application partition and maintenance partition for Catalyst software and Cisco IOS software.

This section contains the following topics:

Reimaging the IDSM-2

This section contains the following topics:

Catalyst Software

To reimage the application partition, follow these steps:

Step 1 Obtain the application partition file from Software Center on Cisco.com and copy it to an FTP server.

See Obtaining Cisco IDS Software, page 9-1, for instructions on how to access the Software Center on Cisco.com.

Step 2 Log in to the switch CLI.

Step 3 Boot the IDSM-2 to the maintenance partition:

```
cat6k> (enable) reset module_number cf:1
```

Step 4 Log in to the maintenance partition CLI:

```
login: guest
Password: cisco
```

Step 5 Reimage the application partition:

```
guest@hostname.localdomain# upgrade ftp://user@ftp server IP/directory path/image file
```

Step 6 Specify the FTP server password.

After the application partition file has been downloaded, you are asked if you want to proceed:

```
Upgrading will wipe out the contents on the hard disk. Do you want to
proceed installing it [y|n]:
```

Step 7 Type **y** to continue.

When the application partition file has been installed, you are returned to the maintenance partition CLI.

Step 8 Exit the maintenance partition CLI and return to the switch CLI.

Step 9 Reboot the IDSM-2 to the application partition:

```
cat6k> (enable) reset module_number hdd:1
```

Step 10 When the IDSM-2 has rebooted, check the software version.

Step 11 Log in to the application partition CLI and initialize the IDSM-2.

See Initializing the Sensor, page 10-2, for the procedure.

Cisco IOS Software

To reimage the application partition, follow these steps:

Step 1 Obtain the application partition file from Software Center on Cisco.com and copy it to an FTP server.

See Obtaining Cisco IDS Software, page 9-1, for instructions on how to access the Software Center on Cisco.com.

Step 2 Log in to the switch CLI.

Step 3 Boot the IDSM-2 to the maintenance partition:

```
cat6k# hw-module module module_number reset cf:1
```

Step 4 Session in to the maintenance partition CLI:

```
cat6k# session slot slot_number processor 1
```

Step 5 Log in to the maintenance partition CLI:

```
login: guest
Password: cisco
```

Step 6 Reimage the application partition:

```
guest@hostname.localdomain# upgrade
ftp://user@ftp_server_IP_address/directory_path/image_file
–install
```

Step 7 Specify the FTP server password.

After the application partition file has been downloaded, you are asked if you want to proceed:

```
Upgrading will wipe out the contents on the hard disk.
Do you want to proceed installing it [y|n]:
```

Step 8 Type **y** to continue.

When the application partition file has been installed, you are returned to the maintenance partition CLI.

Step 9 Exit the maintenance partition CLI and return to the switch CLI.

Step 10 Reboot the IDSM-2 to the application partition:

```
cat6k# hw-module module module_number reset hdd:1
```

Step 11 Verify that the IDSM-2 is online and that the software version is correct and that the status is `ok`:

```
cat6k# show module module_number

Session in to the IDSM-2 application partition CLI:
cat6k# session slot slot_number processor 1
```

Step 12 Initialize the IDSM-2.

See Initializing the Sensor, page 10-2, for the procedure.

Reimaging the Maintenance Partition

This section contains the following topics:

Catalyst Software

To reimage the maintenance partition, follow these steps:

Step 1 Obtain the maintenance partition file from Software Center on Cisco.com and copy it to an SCP or FTP server.

See Obtaining Cisco IDS Software, page 9-1, for instructions on how to access the Software Center on Cisco.com.

Step 2 Log in to the IDSM-2 CLI.

Step 3 Enter configuration mode:

```
sensor# configure terminal
```

Step 4 Reimage the maintenance partition:

```
sensor# upgrade
ftp://user@ftp_server_IP_address/directory_path/image_file
```

You are asked whether you want continue.

Step 5 Type **y** to continue.

The maintenance partition file is upgraded.

Cisco IOS Software

To reimage the maintenance partition, follow these steps:

Step 1 Obtain the maintenance partition file from Software Center on Cisco.com and copy it to an SCP or FTP server.

See Obtaining Cisco IDS Software, page 9-1, for instructions on how to access the Software Center on Cisco.com.

Step 2 Log in to the switch CLI.

Step 3 Session in to the application partition CLI:

```
cat6k# session slot slot_number processor 1
```

Step 4 Enter configuration mode:

```
cat6k# configure terminal
```

Step 5 Reimage the maintenance partition:

```
cat6k(config)# upgrade
ftp://user@ftp_server_IP_address/directory_path/image_file
```

Step 6 Specify the FTP server password:

```
Password: ********
```

You are prompted to continue:

```
Continue with upgrade? :
```

Step 7 Type **yes** to continue.

Intrusion Detection System Architecture

This appendix describes the IDS 4.x system architecture and contains the following sections:

System Overview

You can install Cisco IDS software on two platforms: the appliances and the modules (see Supported Sensors, page 1-16, for a list of current appliances and modules).

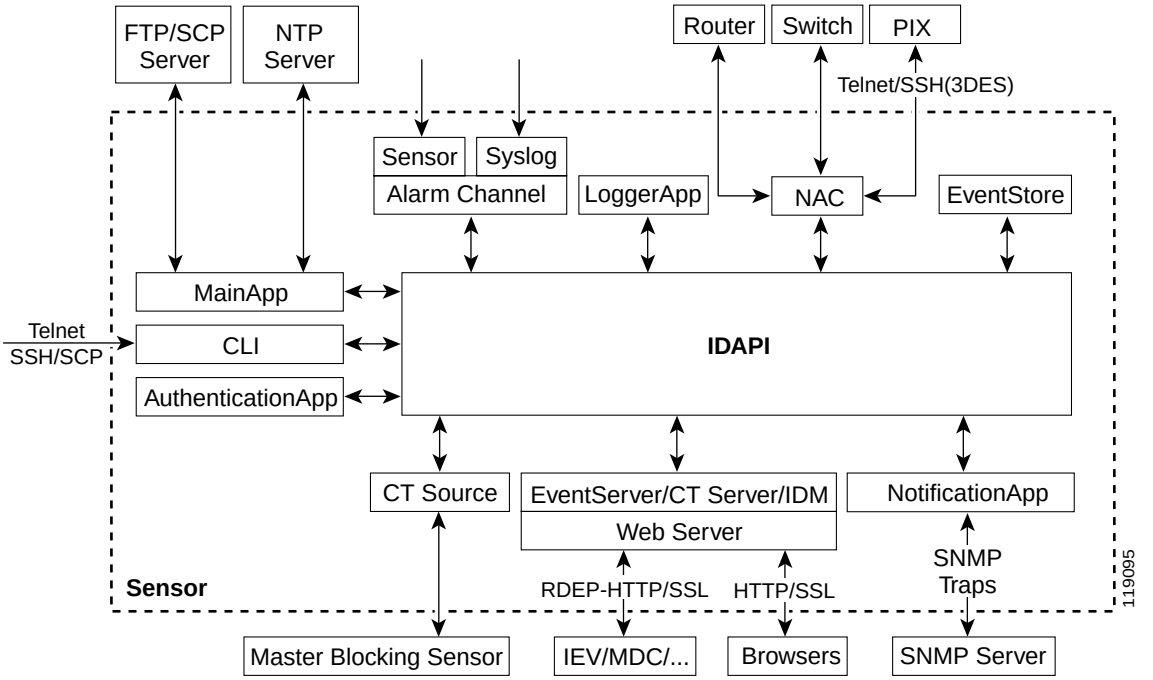
This section contains the following topics:

Software Architecture Overview

IDS software runs on the Linux operating system. We have hardened the Linux OS by removing unnecessary packages from the OS, disabling unused services, restricting network access, and removing access to the shell.

Figure A-1 illustrates the software architecture:

Figure A-1 System Design



IDS software includes the following IDS applications:

Note Each application has its own configuration file in XML format.

- MainApp—Initializes the system, starts and stops the other applications, configures the OS, and performs updates.
- SensorApp (Analysis Engine)—Performs packet capture and analysis.
- Authentication (AuthenticationApp)—Verifies that users are authorized to perform CLI, IDM, or Remote Data Exchange Protocol (RDEP) actions.
- LogApp (Logger)—Writes all the application's log messages to the log file and the application's error messages to the EventStore.
- NAC (NetworkAccess)—Manages remote network devices (PIX Firewall, routers, and switches) to provide blocking capabilities when an alert event has occurred. NAC (Network Access Controller) creates and applies Access Control Lists (ACLs) on the controlled network device, or uses the **shun** command (PIX Firewall) to another RDEP server.
- ctlTransSource (TransactionSource)—Allows sensors to send control transactions. This is used to enable the NAC's master blocking sensor (MBS) capability.
- cidwebserver (WebServer)—Provides a web interface and communication with other IDS devices through RDEP using several servlets to provide IDS services. These servlets are shared libraries that are loaded into the cidWebserver process at run-time:
  - IDM—Provides the IDM web-based management interface.
  - Event server—Used to serve events to external management applications such as Security Monitor.
  - Transaction server—Allows external management applications such as the IDS MC to send control transactions to the sensor.
  - IP log server—Used to serve IP logs to external systems.

- cidcli (CLI)—The interface that is run when you successfully log in to the sensor through Telnet or SSH. All accounts created through the CLI will use the CLI as their shell (except the service account—only one service account is allowed). Allowed CLI commands depend on what the privilege of the user is.
- EventStore—An indexed store used to store IDS events (error, status, and alert system messages) that is accessible through the CLI, IDM, or RDEP.

See Show Version Command Output, page A-4, for an example of the output from the **show version** command, which lists the sensor applications and shows their status.

All IDS applications communicate with each other through a common API (IDAPI). Remote applications (other sensors, management applications, and third-party software) communicate with sensors through the RDEP and Intrusion Detection Interchange and Operations Messages (IDIOM) protocols.

The sensor has the following partitions:

- Application partition—A full IDS system image.
- Maintenance partition—A special purpose IDS image used to reimage the application partition of the IDSM-2. All configuration is lost.
- Recovery partition—A special purpose image used for recovery of the appliance. Booting into the recovery partition enables you to completely reimage the application partition. Network settings are preserved, but all other configuration is lost.

Note IDSM-2 and NM-CIDS do not have recovery partitions.

Show Version Command Output

The following is a sample output from the **show version** command. All the sensor's applications are displayed with their current status.

```
sensor# show version
Application Partition:

Cisco Systems Intrusion Detection Sensor, Version 4.1(3)S61

OS Version 2.4.18-5smpbigphys
Platform: IDS-4235
```

```
Sensor up-time is 20 days.
Using 214319104 out of 921522176 bytes of available memory (23% usage)
Using 596M out of 15G bytes of available disk space (5% usage)


MainApp            2003_Oct_10_11.16 (Release)  2003-10-10T11:01:13-0500 Running
AnalysisEngine     2003_Oct_10_11.16 (Release)  2003-10-10T11:01:13-0500 Running
Authentication     2003_Oct_10_11.16 (Release)  2003-10-10T11:01:13-0500 Running
Logger             2003_Oct_10_11.16 (Release)  2003-10-10T11:01:13-0500 Running
NetworkAccess      2003_Oct_10_11.16 (Release)  2003-10-10T11:01:13-0500 Running
TransactionSource  2003_Oct_10_11.16 (Release)  2003-10-10T11:01:13-0500 Running
WebServer          2003_Oct_10_11.16 (Release)  2003-10-10T11:01:13-0500 Running
CLI                2003_Oct_10_11.16 (Release)  2003-10-10T11:01:13-0500


Upgrade History:

* IDS-K9-min-4.1-1-S47          12:00:00 UTC Thu Jun 30 2005
  IDS-K9-sp-4.1-3-S61.rpm.pkg   14:14:55 UTC Fri Feb 20 2004

Recovery Partition Version 1.2 - 4.1(1)S47
```

User Interaction

You can configure IDS through the CLI, the IDM, the IDS MC, or another application using RDEP.

You can interact with IDS software in the following ways:

- Configure sensor parameters.

  You generate the initial configuration for the IDS—setting network parameters, time, and allowed hosts—by using the **setup** command in the CLI. You usually have to do this only once with a new sensor.

- Configure blocking and interfaces.
- Tune the configuration.

  You will want to make modifications to the default configuration, primarily the sensing engine (SensorApp), which is the portion of the application that monitors network traffic. After initially installing the IDS on the network, you can tune it until it is operating efficiently and only producing information you think is useful.

- Update IDS.

  You can schedule automatic updates or request that updates be applied immediately to the applications and signature data files.

- Retrieve information.

  You can retrieve data (status, error, and alert messages) and iplogs from the system. You can also retrieve statistics and diagnostic information.

New Features in Version 4.x

The following new features appear in the IDS 4.x system architecture:

- XML documents replace tokens and configuration files.

  Sensor configuration, control, log, and event information are communicated and stored in XML documents as directed by the IDIOM specification.

- RDEP replaces postoffice protocol.

  RDEP uses HTTP/HTTPS protocol to deliver XML documents between the sensor and external systems. postoffice operated by pushing alarms and queuing up to 1000 on each sensor. The RDEP client pulls alerts from the sensor and there is less of a chance of missing alerts.

- Version 4.x is now an open system.

  Note "Open" refers to the fact that we provide specifications so that you can write applications to configure the sensor and/or monitor the events generated by the sensor.

  Alarms and configuration are communicated using RDEP and IDIOM, which are based on the HTTP/HTTPS and XML open standards. Providing a secure, open system that uses standard communication protocols allows greater internal and third party integration.

- Version 4.x offers the following scalability enhancements:
  - Provides gigabit sensing
  - Addresses the scaling and performance limitations that are inherent in the postoffice architecture

  - Changes from a push to a pull model that enables management consoles to support more sensors
  - Provides better support for large scale sensor deployment and management
- Version 4.x has the following security enhancements:
  - The CLI replaces the OS shell access.
  - Multi-user support with multi-level permissions (administrator, operator, viewer, service) replaces the former single netrangr account.
- The hardened Linux OS replaces the Solaris OS.
- A memory-mapped circular buffer EventStore replaces log files and log file maintenance (no more sapd).
- Supported Cisco management options are the CLI, the IDM or IDS MC, which replace CSPM and the UNIX Director.
- The following reliability enhancements:
  - Alarms are not lost because of communication failures.
  - CLI configuration instead of native shell configuration decreases the possibility of misconfiguration. The sensor has become a true appliance rather than a group of applications running on a workstation.
- Version 4.x builds an infrastructure to support the future IDS roadmap, which includes:
  - Multiple interfaces and VLANs per sensor
  - AAA authentication
  - False positive reduction
  - Inline intrusion prevention

System Components

This section describes IDS components in more detail.

This section contains the following topics:

MainApp

MainApp has the following responsibilities:

- Initialize and start all IDS components and applications.

  MainApp is started by the operating system. It starts the applications in the following sequence:

  1. Read and validate contents of dynamic and static configurations.
  2. Write dynamic configuration data to system files to make sure the two representations of data are in sync (for example, the IP address in the dynamic configuration must match the system network files).
  3. Create the shared system components—EventStore and IDAPI.
  4. Open status event subscription.
  5. Start the IDS applications (the order is specified in the static configuration).
  6. Wait for an initialization status event from each application.

     If after waiting 60 seconds all status events have not been received, MainApp generates an error event identifying all applications that did not start.
  7. Close status event subscription.
  8. Start the upgrade scheduler.
  9. Register for control transaction requests, and service them as received.

- Schedule, download, and install software upgrades.

  Note The legacy application is *idsupdate*.

- Configure the communications network interface.

  MainApp sets the hostname, IP address, netmask, and default gateway for the sensor's command and control interface. It also configures the network access list.

  Note The legacy application is *sysconfig-sensor*.

- Manage the system clock.

  There are three clock management modes:

  – NTP—Uses an NTP server to synchronize the sensor's clock.

  – Manual—Used only on the appliance, this mode relies on the sensor's system clock.

  – Switch/Router—Used only on the IDSM-2 and the NM-CIDS.

    The IDSM-2 uses switch control protocol to synchronize its clock with the switch supervisor's clock. The NM-CIDS uses router/blade control protocol to synchronize its clock to the parent router's clock.

    Note We recommend that you use NTP time because it is more reliable. See Setting the Time on Sensors, page 1-18. for more information.

- Shut itself down and cleanly shut down all IDS components and applications.

  MainApp shuts itself and all IDS components and applications down in the following sequence:

  1. Deregister control transaction requests.
  2. Stop the update scheduler.
  3. Open evStatus event subscription.

4. Stop IDS applications in the reverse order specified in static configuration.

   An interrupt signal is sent to each application telling it to shut down.

5. Wait for an exit evStatus event from each application.

   If after waiting 60 seconds all status events have not been received, mainApp generates an error message and continues.

6. Close evStatus event subscription.
7. Start the utility that waits for MainApp to exit before triggering the OS to shut down.
8. Destruct shared system components—EventStore and IDAPI.
9. Exit MainApp.
10. Reboot the operating system.

Note A system reboot is functionally the same as a system shutdown except the OS is triggered to reboot.

MainApp responds to the **show version** command by displaying the following information:

- Sensor build version
- MainApp version
- Version of each running application
- Version and timestamp of each installed upgrade
- Next downgrade version of each installed upgrade
- Platform version (for example, IDS-4240, WS-SVC-IDSM2)
- Version of sensor build on the other partition

MainApp also gathers the host statistics.

SensorApp

SensorApp, the sensing engine, is made up of two major components, the VirtualSensor and the VirtualAlarm, which in turn are made up of nine major functional units:

Note Although VirtualSensor allows you to run multiple virtual sensors on the same appliance and to configure each with different signature behavior and traffic feeds, at this time IDS 4.x only supports one virtual sensor.

Note The legacy application is *packetd*.

- Kernel memory management module (KMMM)—Maintains ring and data integrity by mediating access to the ring buffer.
- Packet capture module (PCM)—Captures packets and places them in a kernel/user shared memory ring buffer for further processing.
- L2/L3/L4 parser (L2/L3/L4P)—Parses the L2/3/4 packet information and puts the required information into the IDS header. If needed, the IDS header of the packet is marked for reassembly by the fragment reassembly unit.
- Fragment reassembly unit (FRU)—Processes packets that are marked for it. The FRU has a separate ring buffer for the reassembly process.
- TCP stream reassembly unit (SRU)—Determines if a packet belongs to a known stream or if it is the first packet in a new stream. The SRU follows predefined stream reassembly constraints to determine if the packet should be queued for processing downstream or dropped.
- Regular expression string search engine (RSSE)—Used for analysis of stream and packet payloads for the existence of certain patterns that when combined with other data may indicate the presence of an attack underway.
- Signature micro-engines (SME)—Supports many signatures in a certain category. An engine is composed of a parser and an inspector. Each engine has a set of legal parameters that have allowable ranges or sets of values.

- Alert generation module (AGM)—Processes all requests for alert event generation. The AGM then generates the appropriate alert messages and presents them to the IDAPI interface. The AGM also issues TCP resets, routing of packets to be logged for IP session logins, and notification to the Network Access Controller (NAC) for blocks.
- Configuration management module (CMM)—Maintains the sensor's configuration.

AuthenticationApp

AuthenticationApp has the following responsibilities:

- To authenticate a user's identity
- To administrate the user's accounts, privileges, keys, and certificates
- To configure which authentication methods are used by AuthenticationApp and other access services on the sensor

This section contains the following topics:

Authenticating Users

When a user tries to access the sensor through a service such as the WebServer or the CLI, the user's identity must be authenticated and the user's privileges must be established. The service that is providing access to the user initiates an execAuthenticateUser control transaction request to AuthenticationApp to authenticate the user's identity. The control transaction request typically includes the username and a password, or the user's identity can be authenticated using an SSH authorized key.

AuthenticationApp responds to the execAuthenticateUser control transaction request by attempting to authenticate the user's identity. AuthenticationApp returns a control transaction response that contains the user's authentication status and privileges. If the user's identity cannot be authenticated, AuthenticationApp returns an unauthenticated status and anonymous user privileges in the control transaction response. The control transaction response also indicates if the

account's password has expired. User interface applications that authenticate users by initiating an execAuthenticateUser control transaction prompt the user to change the password.

AuthenticationApp uses the underlying operating system to confirm a user's identity. All the IDS applications send control transactions to AuthenticationApp, which then uses the operating system to form its responses.

Remote shell services, Telnet and SSH, are not IDS applications. They call the operating system directly. If the user is authenticated, it launches the IDS CLI. In this case, CLI send a special form of the execAuthenticateUser control transaction to determine the privilege level of the logged-in user. The CLI then tailors the commands it makes available based on this privilege level.

Configuring Authentication on the Sensor

You must configure authentication on the sensor to establish appropriate security for user access. When you install a sensor, an initial cisco account with an expired password is created. A user with administrative access to the sensor accesses the sensor through the CLI or an IDS manager by logging in to the sensor using the default administrative account (cisco). In the CLI, the administrator is prompted to change the password. IDS managers initiate a setEnableAuthenticationTokenStatus control transaction to change the account's password.

Through the CLI or an IDS manager, the administrator configures which authentication method is used, such as username and password or an SSH authorized key. The application servicing the administrator initiates a setAuthenticationConfig control transaction to establish the authentication configuration.

The authentication configuration includes a login attempt limit value that is used to specify how account locking is handled. Account locking is invoked when the number of consecutive failed login attempts for a given account exceeds the login attempt limit value. After an account is locked, all further attempts to log in to that account are rejected. The account is unlocked by resetting the account's authentication token using the setEnableAuthenticationTokenStatus control transaction. The account locking feature is disabled when the login attempt limit value is set to zero.

The administrator can add additional user accounts either through the CLI or an IDS manager. See User Account Roles, page A-30, for more information.

Managing TLS and SSH Trust Relationships

Encrypted communications over IP networks provide data privacy by making it impossible for a passive attacker to discover from the packets exchanged alone the secret key needed to decrypt the data in the packets.

However, an equally dangerous attack vector is for an imposter to pretend to be the server end of the connection. All encryption protocols provide a means for clients to defend themselves from these attacks. IDS supports two encryption protocols, SSH and TLS, and AuthenticationApp helps manage trust when the sensor plays either the client or server role in encrypted communications.

The IDS WebServer and SSH server are server endpoints of encrypted communications. They protect their identities with a private key and offer a public key to clients that connect to them. For TLS this public key is included inside an X.509 certificate, which includes other information. Remote systems that connect to the sensor should verify that the public key received during connection establishment is the one it expects.

Clients must maintain a list of trusted public keys to protect themselves from man-in-the-middle attacks. The exact procedure by which this trust is established varies depending on the protocol and client software. In general, the client displays a fingerprint of 16 or 20 bytes. The human operator who is configuring the client to establish trust should use an out-of-band method to learn the server`s key fingerprints before attempting to establish trust. If the fingerprints match, the trust relationship is established and henceforth the client can automatically connect with that server and be confident that the remote server is not an imposter.

You can use the **show ssh server-key** and **show tls fingerprint** to display the sensor's key fingerprints. By recording the output of these commands when directly connected to the sensor console, you can reliably use this information to confirm the sensor's identity over the network later when establishing trust relationships.

For example, when initially connecting to an sensor through the Microsoft Internet Explorer (MSIE) web browser, a security warning dialog box is displayed that indicates that the certificate is not trusted. Using MSIE's user interface, you can inspect the certificate thumbprint, a value that should exactly match the SHA1 fingerprint displayed by the **show tls fingerprint** command. After verifying this, add this certificate to the browser's list of trusted Certificate Authorities (CAs) to establish permanent trust.

Each TLS client (IEV, IDS Security Monitor, and so forth) has different procedures for establishing this trust. The sensor itself includes a TLS client that is used to send control transactions to other sensors and download upgrades and configuration files from other TLS web servers. Use the **tls trusted-host** command to establish trust of the TLS servers with which the sensor communicates.

Similarly, the sensor includes an SSH client that is used to communicate with managed network devices, download upgrades, and copy configurations and support files to remote hosts. Use the **ssh host-key** command to establish trust relationships with the SSH servers the sensor will contact.

You can manage the list of TLS trusted certificates and SSH known hosts through the commands **service TrustedCertificates** and **service SshKnownHosts**.

X.509 certificates include additional information that can increase the security of the trust relationship; however, these can lead to confusion. For example, an X.509 certificate includes a validity period during which the certificate can be trusted. Typically this is a period of a number of years starting at the moment the certificate is created. To ensure that an X.509 certificate is valid at the moment it is being used requires that the client system maintain an accurate clock.

X.509 certificates are also tied to a particular network address. Sensors fill this field with the IP address of the sensor's command and control interface. Consequently, if you change the command and control IP address of the sensor, the server's X.509 certificate is regenerated. You must reconfigure all clients on the network that trusted the old certificate to locate the sensor at its new IP address and trust the new certificate.

By using the SSH known hosts and TLS trusted certificates services in AuthenticationApp, you can operate sensors at a high level of security.

LogApp

The sensor logs all events (alert, error, status, and debug messages) in a persistent, circular buffer. The sensor also generates IP logs. The messages and IP logs are accessible through the CLI, IDM, and RDEP clients.

Note The legacy applications are *loggerd* and *sapd*.

The IDS applications use LogApp to log messages. LogApp sends log messages at any of five levels of severity: debug, timing, warning, error, and fatal. LogApp writes the log messages to /usr/cids/idsRoot/log/main.log, which is a circular text file. New messages overwrite older messages when the file reaches its maximum size, therefore the last message written may not appear at the end of the main.log. Search for the string "= END OF FILE =" to locate the last line written to the main.log.

The main.log is included in the **show tech support** command output. If the message is logged at warning level or above (error or fatal), LogApp converts the message to an evError event (with the corresponding error severity) and inserts it in the EventStore.

Note See Displaying Tech Support Information, page 10-31, for the procedure for displaying tech support information. See Displaying and Clearing Events, page 10-28, for the procedure for displaying events.

LogApp receives all syslog messages, except cron messages, that are at the level of informational and above (*.info;cron.none), and inserts them into the EventStore as evErrors with the error severity set to Warning. LogApp and application logging are controlled through the service logger commands.

LogApp can control what log messages are generated by each application by controlling the logging severity for different logging zones. You would only access the individual-zone-control of the logger service at the request and supervision of a TAC engineer or developer. For troubleshooting purposes, TAC might request that you turn on debug logging. See Enabling Debug Logging, page B-28, for more information.

NAC

This section describes NAC, which is the IDS application that starts and stops blocks on routers, switches, and PIX Firewalls. A *block* is an entry in a device's configuration or ACL to block incoming/outgoing traffic for a specific host IP address or network address.

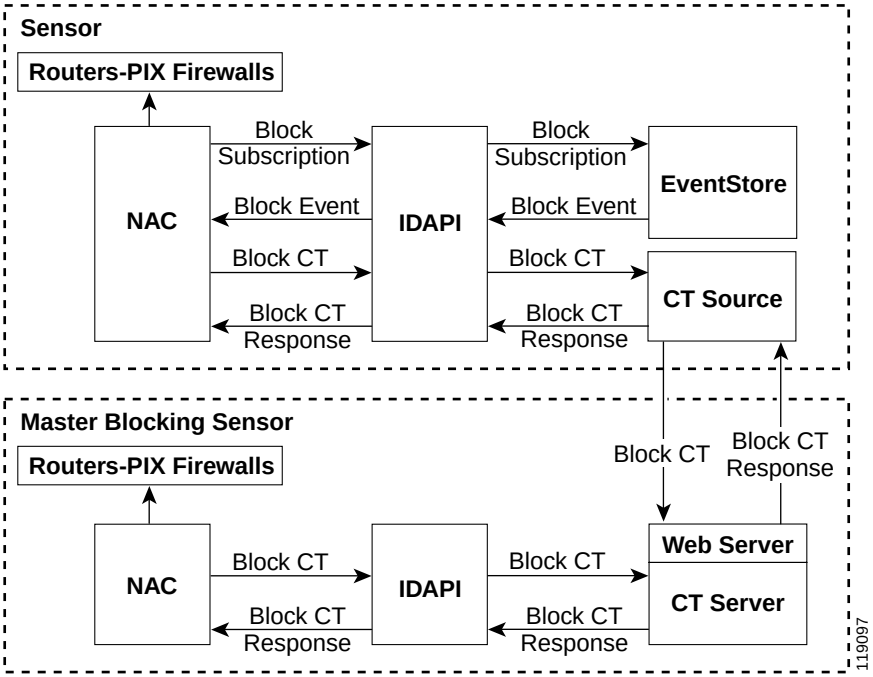
Note The legacy application is *managed*.

This section contains the following topics:

About NAC

The NAC application's main responsibility is to block events. When it responds to a block, it either interacts with the devices it is managing directly to enable the block or it sends a block request through the Control Transaction Server to a master blocking sensor. The WebServer on the master blocking sensor receives the control transaction and passes it to the Control Transaction Server, which passes it to the NAC application. The NAC application on the master blocking sensor then interacts with the devices it is managing to enable the block. Figure A-2 illustrates the NAC application.

Figure A-2 NAC Application



Note A NAC application instance can control 0, 1, or many network devices. NAC does not share control of any network device with other NAC applications, IDS management software, other network management software, or system administrators. Only one NAC application instance is allowed to run on a given sensor.

NAC initiates a block in response to one of the following:

- An alert event generated from a signature that is configured with a block action
- A block configured manually through the CLI, IDM, or the IDS MC
- A block configured permanently against a host or network address

When you configure NAC to block a device, NAC initiates either a Telnet or SSH connection with the device. The NAC maintains the connection with each device. After the block is initiated, the NAC pushes a new set of configurations or ACLs (one for each interface direction) to each controlled device. When a block is completed, all configurations or ACLs are updated to remove the block.

NAC-Controlled Devices

NAC can control the following devices:

- Cisco routers running Cisco IOS 11.2 or later
- Catalyst 5000 with Supervisor Engine software 5.3(1) or later running on the supervisor engine, and IOS 11.2(9)P or later running on the RSM.

  Note You must have the RSM because blocking is performed on the RSM.

- Catalyst 6000 with PFC installed running Catalyst software 5.3 or later
- Catalyst 6000 MSFC2 with Catalyst software 5.4(3) or later and Cisco IOS 12.1(2)E or later on the MSFC2

NAC Features

NAC has the following features:

- Communication through Telnet and SSH 1.5 with 3DES (the default) or DES encryption

  Only the protocol specified in the NAC configuration for that device is attempted. If the connection fails for any reason, NAC attempts to reestablish it.

- Preexisting ACLs on routers and VACLs on switches

  If a preexisting ACL exists on a router interface/direction that is controlled by NAC, you can specify that this ACL be merged into the NAC-generated configuration, either before any blocks by specifying a preblock ACL or after any blocks by specifying a postblock ACL. The Catalyst 6000 VACL device types can have a preblock and postblock VACL specified for each interface

that NAC controls. The PIX Firewall device type uses a different API to perform blocks and the NAC does not have any effect on preexisting ACLs on the PIX Firewall.

Note Catalyst 5000 RSM and Catalyst 6000 MSFC2 network devices are supported in the same way as Cisco routers.

See ACLs and VACLs, page A-22, for more information.

- Forwarding blocks to a list of remote sensors

  NAC can forward blocks to a list of remote sensors, so that multiple sensors can in effect collectively control a single network device. Such remote sensors are referred to as master blocking sensors. See Configuring the Sensor to be a Master Blocking Sensor, page 10-73, for more information on master blocking sensors.

- Specifying blocking interfaces on a network device

  You can specify the interface/directions where blocking is performed in the NAC configuration for routers. You can specify the interface where blocking is performed in the VACL configuration.

  Note The PIX Firewall does not block based on interface or direction, so this configuration is never specified for the PIX Firewall.

  NAC can simultaneously control up to 250 interfaces.

- Blocking hosts or networks for a specified time

  NAC can block a host or network for a specified number of minutes or indefinitely. NAC determines when a block has expired and unblocks the host or network at that time.

- Logging important events

  NAC writes a confirmation event when block or unblock actions are completed successfully or if any errors occur. NAC also logs important events such as loss and recovery of a network device communication session, configuration errors, and errors reported by the network device.

  See NAC Events, page A-42, for more information.

- Maintaining the blocking state across NAC restarts

  NAC reapplies blocks that have not expired when a shutdown/restart occurs. NAC removes blocks that have expired while it was shut down.

  Note NAC can only maintain the blocking state successfully if no one changes the system time while the application is shut down.

  See Maintaining State Across Restarts, page A-23, for more information.

- Maintaining blocking state across network device restarts

  NAC reapplies blocks and removes expired blocks as needed whenever a network device is shut down and restarted. NAC is not affected by simultaneous or overlapping shutdowns and restarts of NAC.

- Authentication and authorization

  NAC can establish a communications session with a network device that uses AAA authentication and authorization including the use of remote TACACS+ servers.

- Two types of blocking

  NAC supports host blocks and network blocks. Host blocks are connection based or unconditional. Network blocks are always unconditional.

  See Connection-Based and Unconditional Blocking, page A-24, for more information.

- NAT addressing

  NAC can control network devices that use a Native Address Translation (NAT) address for the sensor. If you specify a NAT address when you configure a network device, that address is used instead of the local IP address when the sensor address is filtered from blocks on that device.

- Single point of control

  NAC does not share control of network devices with administrators or other software. If you must update a configuration, shut down NAC until the change is complete. You can enable/disable NAC through the IDS CLI or any IDS manager. When NAC is reenabled, it completely reinitializes itself, including rereading the current configuration for each controlled network device.

Note We recommend that you disable NAC from blocking when you are configuring any network device, including the PIX Firewall.

- Up to 250 active blocks at any given time

  NAC can maintain up to 250 active blocks at a time. Although NAC can support up to 65535 blocks, we recommend that you configure no more than 250 at a time.

Note The number of blocks is not the same as the number of interface/directions.

ACLs and VACLs

If you want to filter packets on an interface/direction that NAC controls, you can configure NAC to apply an ACL before any blocks (preblock ACL) and to apply an ACL after any blocks (postblock ACL). These ACLs are configured on the network device as inactive ACLs. You can define preblock and postblock ACLs for each interface and direction. NAC retrieves and caches the lists and merges them with the blocking Access Control Entries (ACE) whenever it updates the active ACL on the network device. In most cases, you will want to specify a preexisting ACL as the postblock ACL so that it does not prevent any blocks from taking effect. ACLs work by matching a packet to the first ACE entry found. If this first ACE entry permits the packet, a subsequent deny statement will not be found.

You can specify different preblock and postblock ACLs for each interface/direction, or you can reuse the same ACLs for multiple interface/directions. If you do not want to maintain a preblock list, you can use the never block option and always block hosts and networks by using existing configuration statements. A forever block is a normal block with a timeout value of -1.

NAC only modifies ACLs that it owns. NAC does not modify ACLs that you have defined. The ACLs maintained by NAC have a specific format that should not be used by user-defined ACLs. The naming convention is **IDS_<ifname>_[in|out]_[0|1]**. <ifname> corresponds to the name of the blocking interface as given in the NAC configuration.

For Catalyst switches it is a blocking interface VLAN number. Do not use these names for preblock and postblock ACLs.

For Catalyst 6000 VACLs, you can specify a preblock and postblock VACL and only the interface is specified (direction is not used in VLANs).

For PIX Firewalls, you cannot use preblock or postblock ACLS because the PIX Firewall uses a different API for blocking. Instead you must create ACLs directly on the PIX Firewall. See Blocking with the PIX Firewall, page A-25, for more information.

Maintaining State Across Restarts

When the blocked host list or blocked network list changes, the new lists (with starting timestamps) are written to a local file (nac.shun.txt) that is maintained by NAC. When NAC starts, this file is used to determine if any block updates should occur at the controlled network devices. Any unexpired blocks found in the file are applied to the network devices at startup. When NAC shuts down, no special actions on the ACLs are taken even if outstanding blocks are in effect. The nac.shun.txt file is accurate only if the system time is not changed while NAC is not running.

Caution Do not make manual changes to the nac.shun.txt file.

The following scenarios demonstrate how NAC maintains state across restarts.

Scenario 1

There are two blocks in effect when NAC stops and one of them expires before NAC restarts. When NAC restarts, it first reads the nac.shun.txt file. It then reads the preblock and postblock ACLs or VACLs. The active ACL or VACL is built in the following order:

1. The **allow** *sensor_ ip_address* command (unless the **allow sensor shun** command has been configured)
2. Preblock ACL
3. The **always block** command entries from the configuration
4. Unexpired blocks from nac.shun.txt
5. Postblock ACL

When a host is specified as never block in the NAC configuration, it does not get translated into permit statements in the ACL. Instead, it is cached by NAC and used to filter incoming addShunEvent events and addShunEntry control transactions.

Scenario 2

There are no preblock or postblock ACLs specified, but there is an existing active ACL. The new ACL is built in the following order:

1. The **allow** *sensor_ ip_address* command (unless the **allow sensor shun** command has been configured)
2. The **always block** command entries from the configuration
3. Unexpired blocks from nac.shun.txt
4. The **permit IP any any** command

Connection-Based and Unconditional Blocking

NAC supports two types of blocking for hosts and one type of blocking for networks. Host blocks are connection based or unconditional. Network blocks are always unconditional.

When a host block is received, NAC checks for the connectionShun attribute on the host block. If connectionShun is set to true, NAC performs connection blocking. Any host block can contain optional parameters, such as destination IP address, source port, destination port, and protocol. For a connection block to take place, at least the source IP address must be present.

Under the following conditions, NAC forces the block to be unconditional converting the block from connection type if necessary:

- A block of any type is active for a specified source IP address
- A new block of any type is received for that source IP address
- The new block differs in any of its optional parameters (except the source port) from the old block

When a block is updated (for example, when a new block arrives while an existing block for that source IP address or network is already in effect), the remaining minutes of the existing block is determined. If the time for the new block is less than or equal to the remaining minutes, no action is taken. Otherwise, the new block timeout replaces the existing block timeout.

Caution The PIX Firewall does not support connection blocking of hosts. When a connection block is applied, the PIX Firewall treats it like an unconditional block. The PIX Firewall also does not support network blocking. NAC never tries to apply a network block to a PIX Firewall.

Blocking with the PIX Firewall

This sections describes the PIX Firewall and blocking.

This section contains the following topics:

The shun Command

NAC performs blocks on the PIX Firewall using the **shun** command. The **shun** command has the following formats:

- To block an IP address:

  shun srcip [*destip sport dport* [*port*]]

- To unblock an IP address:

  no shun ip

- To clear all blocks:

  clear shun

- To show active blocks or to show the global address that was actually blocked:

  show shun [*ip_address*]

NAC uses the response to the **show shun** command to determine whether the block was performed.

The **shun** command does not replace existing ACLs, conduits, or outbound commands, so there is no need to cache the existing PIX Firewall configuration, nor to merge blocks into the PIX configuration.

Caution Do not perform manual blocks or modify the existing PIX Firewall configuration while NAC is running.

If the **block** command specifies only the source IP address, existing active TCP connections are not broken, but all incoming packets from the blocked host are dropped.

When NAC first starts up, the active blocks in the PIX Firewall are compared to an internal blocking list. Any blocks that do not have a corresponding internal list entry are removed.

See Configuring Blocking Devices, page 10-67, for more information.

The PIX Firewall and AAA

NAC supports authentication on the PIX Firewall using local usernames or a TACACS+ server. If you configure the PIX Firewall to authenticate using AAA but without the TACACS+ server, NAC uses the reserved username *pix* for communications with the PIX Firewall.

If the PIX Firewall uses a TACACS+ server for authentication, you use a TACACS+ username. In some PIX Firewall configurations that use AAA logins, you are presented with 3 password prompts: the initial PIX Firewall password, the AAA password, and the enable password. NAC requires that the initial PIX Firewall password and the AAA password be the same.

Address Translation and Blocking

If you configure a PIX Firewall to use NAT or PAT and the sensor is checking packets on the PIX Firewall outside network, if you detect a host attack that originates on the PIX Firewall inside network, the sensor tries to block the translated address provided by the PIX Firewall. If you are using dynamic NAT addressing, the block can be ineffective or cause innocent hosts to be blocked. If you are using PAT addressing, the PIX Firewall could block the entire inside network. To avoid these situations, position your sensor on the inside interface or do not configure the sensor to block.

Blocking with the Catalyst 6000

A Catalyst 6000 switch with a PFC card filters packets using VACLs. VACLs filter all packets between VLANs and within a VLAN.

MSFC router ACLs are supported when WAN cards are installed and you want the sensor to control the interfaces through the MSFC2.

Note An MSFC2 card is not a required part of a Catalyst 6000 configuration for blocking with VACLs.

Caution When you configure NAC for the Catalyst 6000, do not specify a direction with the controlled interface. The interface name is a VLAN number. Preblock and postblock lists should be VACLs.

The following commands apply to the Catalyst 6000 VACLs:

- To view an existing VACL:

  `show security acl info` {*aclname*}

- To block an address (address spec is the same as used by router ACLs):

  `set security acl ip` {*aclname*} **`deny`** {*address spec*}

- To activate VACLs after building the lists:

  `commit security acl all`

- To clear a single VACL:

  `clear security acl map` {*aclname*}

- To clear all VACLs:

  `clear security acl map all`

- To map a VACL to a VLAN:

  `set sec acl` {*aclname*} {*vlans*}

See Configuring Blocking Devices, page 10-67, for more information.

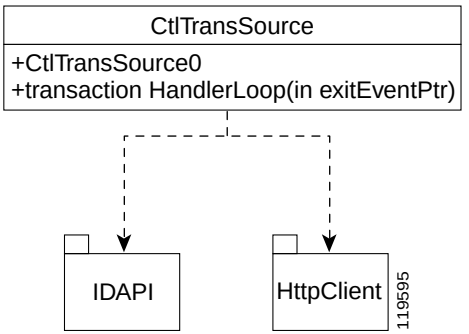
TransactionSource

TransactionSource is an application that forwards locally initiated remote control transactions to their remote destinations using the RDEP and HTTP protocols. TransactionSource initiates either TLS or non-TLS connections and communicates remote control transactions to HTTP servers over these connections.

TransactionSource must establish sufficient credentials on the remote HTTP server to execute a remote control transaction. TransactionSource establishes its credentials by presenting an identity to the HTTP server on the remote node in the form of a username/password (basic authentication). Once authenticated, the requestor is assigned a cookie containing a user authentication that must be presented with each request on that connection.

The transactionHandlerLoop method in the CtlTransSource serves as a proxy for remote control transaction. When a local application initiates a remote control transaction, IDAPI initially directs the transaction to TransactionSource. The transactionHandlerLoop method is a loop that waits on remote control transactions that are directed to TransactionSource. Figure A-3 shows the transactionHandlerLoop method in the CtlTransSource.

Figure A-3 CtlTransSource



When the transactionHandlerLoop receives a remotely addressed transaction, it tries to forward the remote control transaction to its remote destination. The transactionHandlerLoop formats the transaction into an RDEP control transaction message. The transactionHandlerLoop uses the HttpClient classes to issue the RDEP control transaction request to the HTTP server on the remote node. The remote HTTP server handles the remote control transaction and returns the

appropriate RDEP response message in an HTTP response. If the remote HTTP server is a CIDS WebServer, the WebServer uses the Transaction Server servlet to process the remote control transactions.

The transactionHandlerLoop returns either the RDEP response or a failure response as the control transaction's response to the remote control transaction's initiator. If the HTTP server returns an unauthorized status response (indicating the HTTP client has insufficient credentials on the HTTP server), the transactionHandlerLoop reissues the transaction request using TransactionSource's designated username and password to authenticate the requestor's identity. The transactionHandlerLoop continues to loop until it receives a control transaction that directs it to exit or until its exit event is signaled.

WebServer

The WebServer provides configuration support for IDM. It also provides IDS RDEP, which enables the sensor to report security events, receive IDIOM transactions, and serve IP logs.

The WebServer supports HTTP 1.0 and 1.1. The communications with the WebServer often include sensitive information, such as passwords, that would severely compromise the security of the system if an attacker were able to eavesdrop. For this reason, sensors ship with TLS enabled. The TLS protocol is an encryption protocol that is compatible with SSL.

CLI

The CLI provides the sensor user interface for all direct node access such as Telnet, SSH, and serial interface. You configure the sensor applications with the CLI. Direct access to the underlying OS is allowed through the service role.

This section contains the following topics:

User Account Roles

User accounts have roles that are associated with them and determine which operations the user is allowed to perform. There are four roles that can be assigned to an account:

- Administrator—This user role has the highest level of privileges.

  Administrators can perform all functions on the sensor including the following:

  - Add users and assign passwords
  - Enable and disable control of physical interfaces and interface groups
  - Assign physical sensing interfaces to interface groups
  - Modify the list of hosts allowed to connect to the sensor as configuring or viewing agents
  - Modify sensor address configuration
  - Tune signatures
  - Assign virtual sensor configuration to interface groups
  - Manage routers

- Operator—This user role has the second highest level of privileges.

  Operators can perform all viewing and some administrative operations on a sensor including the following:

  - Modify their passwords
  - Tune signatures
  - Manage routers

- Viewer—This user role has the lowest level of privileges.

  Viewers can perform all viewing operations such as viewing events and viewing some configuration files. Their only available administrative operation is changing their passwords.

Tip Monitoring applications only require viewer access to the sensor. You can use the CLI to set up a user account with viewer privileges and then configure the monitoring application to use this account to connect to the sensor.

- Service—This user role does not have direct access to the CLI. Service account users are logged directly into a bash shell rather than the CLI shell. See Service Account, page A-31, for more information.

Service Account

The service account is a support and troubleshooting tool that enables TAC to log in to a native operating system shell rather than the CLI shell. It does not exist on the sensor by default. You must create it so that it available for TAC to use for troubleshooting your sensor. See Creating the Service Account, page 10-12, for the procedure to create the service account.

Only one service account is allowed per sensor and only one account is allowed a service role. When the service account's password is set or reset, the root account's password is set to the same password. This allows the service account user to su to root using the same password. When the service account is removed, the root account's password is locked.

The service account is not intended to be used for configuration purposes. Only modifications made to the sensor through the service account under the direction of TAC are supported. Cisco Systems does not support the addition and/or running of an additional service to the operating system through the service account, because it affects proper performance and proper functioning of the other IDS services. TAC does not support a sensor on which additional services have been added.

You can track logins to the service account by checking the log file /var/log/.tac, which is updated with a record of service account logins.

CLI Behavior

The IDS CLI has the following behavior:

Prompts

- You cannot change the prompt displayed for the CLI commands.
- User interactive prompts occur when the system displays a question and waits for user input. The default input is displayed inside brackets [ ]. To accept the default input, press **Enter**.

Help

- To display the help for a command, type **?** after the command. You can also type **?** after an incomplete token to view the valid tokens that complete the command. Refer to the following examples to compare the two outputs.

```
sensor# configure ?
terminal Configure from the terminal
sensor# configure
sensor (config)# ip n?
name-server nat
sensor (config)# ip n
```

Note If you type a space between the incomplete token and the ?, as in **ip n ?**, the system returns the error `% Ambiguous command: ip n`.

- Only commands available in the current mode are displayed by help.

Tab Completion

- If you are unsure of the complete syntax for a command, you can type a portion of the command and press Tab to complete the command.
- If multiple commands match for tab completion, nothing is displayed, the terminal repeats the current line you typed.
- Only commands available in the current mode are displayed by tab complete and help.

Recall

- To recall the commands entered in a mode, use the Up Arrow or Down Arrow keys or press the Control key (Ctrl) simultaneously with the p key (Ctrl-p) or n (Ctrl-n) key.

Note Help and tab complete requests are not reported in the recall list.

- A blank prompt indicates the end of the recall list.

Case Sensitivity

- The CLI is not case sensitive, but it does echo back the text in the same case you typed it. For example, if you type:

  `sensor#` **CONF** and press Tab, the sensor displays:

  ```
  sensor# CONFigure
  ```

Display Options

- `–More–` is an interactive prompt that indicates that the terminal output exceeds the allotted display space. To display the remaining output, press the Spacebar to display the next page of output or press **Enter** to display the output one line at a time.
- To clear the current line contents and return to a blank command line, press the Control key (Ctrl) simultaneously with the c key (Ctrl-c) or press the q key.

Keywords

- In general, use the **no** form of a command to disable a feature or function. Use the command without the keyword **no** to enable a disabled feature or function. For example, the command **shutdown** disables an interface, the command **no shutdown** enables the interface. Refer to the *Cisco Intrusion Detection System Command Reference Version 4.1*for a list of individual commands and a complete description of what the **no** form of that command does for each.
- Configuration commands that specify a default value in the configuration files, such as service and tune-micro-engines, can have a **default** form. The **default** form of a command returns the command setting to the default value.

Regular Expression Syntax

Regular expressions are text patterns that are used for string matching. Regular expressions are strings that contains a mix of plain text and special characters to indicate what kind of matching to do. For example, if you are looking for a numeric digit, the regular expression to search for is "[0-9]". The brackets indicate that the character being compared should match any one of the characters enclosed within the bracket. The dash (-) between 0 and 9 indicates that it is a range from 0 to 9. Therefore, this regular expression matches any character between 0 and 9, that is, any digit. To search for a specific special character, you must use a backslash before the special character. For example, the single character regular expression "*" matches a single asterisk.

The regular expressions defined in this section are similar to a subset of the POSIX Extended Regular Expression definitions. In particular, "[..]", "[==]", and "[::]" expressions are not supported. Also, escaped expressions representing single characters are supported.

- ^ Beginning of the string—The expression "^A" matches an "A" only at the beginning of the string.
- ^ Immediately following the left-bracket ([)—Excludes the remaining characters within brackets from matching the target string. The expression "[^0-9]" indicates that the target character should not be a digit.
- $—The dollar sign ($) matches the end of the string. The expression "abc$" matches the sub-string "abc" only if it is at the end of the string.
- |—The alternation character (|) allows the expression on either side to match the target string. The expression "a|b" matches "a" as well as "b".
- .—The dot (.) matches any character.
- *—The asterisk (*) indicates that the character to the left of the asterisk in the expression should match 0 or more times.

  The following example matches any number of occurrences of the letter a, including none:

  a*

- +—The plus (+) is similar to asterisk but there should be at least one match of the character to the left of the + sign in the expression.

The following pattern requires that at least one letter a be in the string to be matched:

```
a+
```

- ?—The question mark (?) matches the character to its left 0 or 1 times.

  The following pattern matches the string bb or bab:

  ```
  ba?b
  ```

- ()—The parenthesis affects the order of pattern evaluation and also serves as a tagged expression that can be used when replacing the matched substring with another expression.
- []—Brackets ([and]) enclosing a set of characters indicates that any the enclosed characters can match the target character.
- \—The escape character specifies a character that would otherwise be interpreted as special. \xHH represents the character whose value is the same as the value represented by (HH) hexadecimal digits [0-9A-Fa-f]. The value must be non-zero. BEL is the same as \x07, BS is \x08, FF is \x0C, LF is \x0A, CR is \x0D, TAB is \x09, and VT is \x0B. For any other character ‘c’, ‘\c’ is the same a ‘c.’

The following string matches any number of asterisks (*):

```
\**
```

To use multipliers with multiple-character patterns, you enclose the pattern in parentheses. In the following example, the pattern matches any number of the multiple-character string ab:

```
(ab)*
```

The following pattern matches one or more instances of alphanumeric pairs, but not none (that is, an empty string is not a match):

```
([A-Za-z][0-9])+
```

The order for matches using multipliers (*, +, or ?) is to put the longest construct first. Nested constructs are matched from outside to inside. Concatenated constructs are matched beginning at the left side of the construct. Thus, the regular expression matches A9b3, but not 9Ab3 because the letters are specified before the numbers.

You can also use parentheses around a single- or multiple-character pattern to instruct the software to remember a pattern for use elsewhere in the regular expression. To create a regular expression that recalls a previous pattern, you use parentheses to indicate memory of a specific pattern and a backslash (\) followed by a digit to reuse the remembered pattern. The digit specifies the occurrence of a parentheses in the regular expression pattern. If you have more than one remembered pattern in your regular expression, \1 indicates the first remembered pattern, and \2 indicates the second remembered pattern, and so on. The following regular expression uses parentheses for recall:

```
a(.)bc(.)\1\2
```

This regular expression matches an *a* followed by any character, followed by *bc* followed by any character, followed by the first *any* character again, followed by the second *any* character again. For example, the regular expression can match aZbcTZT. The software remembers that the first character is Z and the second character is T and then uses Z and T again later in the regular expression.

EventStore

This section describes the EventStore and its responsibilities.

This section contains the following topics:

About the EventStore

Each IDS event is stored in EventStore with a time stamp and a unique, monotonic, ascending ID. This time stamp is the primary key used to index the event into the fixed-size, indexed EventStore. When the circular EventStore has reached its configured size, the oldest event or events are overwritten by the new event being stored. SensorApp is the only application that writes alert events into the EventStore. All applications write log, status, and error events into the EventStore.

The fixed-sized, indexed EventStore allows simple event queries based on the time, type, priority, and a limited number of user-defined attributes. If each intrusion event is assigned a priority of low, medium, or high, a single event query can specify a list of desired event types, intrusion event priorities, and a time range.

Table A-1 shows some examples:

Table A-1 IDS Event Examples

IDS Event Types	Intrusion Event Priorities	Start Time Stamp Value	Stop Time Stamp Value	Meaning
status	—	0	Maximum value	Get all status events that are stored.
error, status	—	0	65743	Get all error and status events that were stored before time 65743.
status	—	65743	Maximum value	Get status events that were stored at or after time 65743.
intrusion, network access	low	0	Maximum value	Get all intrusion and network access events with low priority that are stored.
network access, error, status, intrusion	medium, high	4123000000	4123987256	Get network access, error, status, and intrusion events with medium or high priority that were stored between time 4123000000 and 4123987256.

The size of the EventStore allows sufficient buffering of the IDS events when the sensor is not connected to an IDS event consumer. Sufficient buffering depends on your requirements and the capabilities of the nodes in use. The oldest events in the circular buffer are replaced by the newest events.

Major Data Structures

The various functional units communicate the following seven types of data:

- Intrusion events—Produced by SensorApp. The sensor detects intrusion events.
- Error events—Caused by hardware or software malfunctions.
- Status events—Reports of a change in the application's status, for example, that its configuration has been updated.
- Control transaction log events—The sensor logs the result of a control transaction.
- Network access events—Actions for the NAC, for example, a block request.
- Debug events—Highly detailed reports of a change in the application's status used for debugging.
- Control transaction data—Data associated with control transactions, for example, diagnostic data from an application, session logs, and configuration data to or from an application.

All seven types of data are referred to collectively as *IDS data*. The six event types—intrusion, error, status, control transaction log, network access, and debug—have similar characteristics and are referred to collectively as *IDS events*. IDS events are produced by the several different applications that make up the IDS and are subscribed to by other IDS applications. IDS events have the following characteristics:

- They are spontaneously generated by the application instances configured to do so. There is no request from another application instance to generate a particular event.
- They have no specific destination. They are stored and then retrieved by one or more application instances.

Control transactions involve the following types of requests:

- Request to update an application instance's configuration data
- Request for an application instance's diagnostic data
- Request to reset an application instance's diagnostic data
- Request to restart an application instance
- Request for the NAC, such as a block request

Control transactions have the following characteristics:

- They always consist of a request followed by a response. The request and response may have an arbitrary amount of data associated with them. The response always includes at least a positive or negative acknowledgment.
- They are point-to-point transactions. They are sent by one application instance (the initiator) to another application instance (the responder).

IDS data is represented in XML format as an XML document. The system stores user configurable parameters in several XML files.

IDS Events

IDS applications generate IDS events to report the occurrence of some stimulus. The events are the data, such as the alerts generated by sensorApp or errors generated by any application. Events are stored in a local database known as the EventStore.

There are five types of events:

- evAlert—Alert event messages that report when a signature is triggered by network activity.
- evStatus—Status event messages that report the status and actions of the IDS applications.
- evError— Error event messages that report errors that occurred while attempting response actions.
- evLogTransaction—Log transaction messages that report the control transactions processed by each sensor application.
- evShunRqst—Shun request messages that report when NAC issues a shun request.

You can view the status and error messages using the CLI, IDM, and the IEV.

SensorApp and NAC log response actions (TCP resets, IP logging start and stop, blocking start and stop, trigger packet) as status messages.

This section contains the following topics:

- Alert Events, page A-40
- Status Events, page A-40
- Error Events, page A-41

Alert Events

Alert events provide notification of some suspicious activity that may indicate an intrusion attack is in process or has been attempted. Alert events are generated by the SensorApp application whenever an IDS signature is triggered by network activity.

The following is an example of an alert event:

```
evAlert: eventId=1066276939791336085 severity=informational
originator:
hostId: sensor
appName: sensorApp
appInstanceId: 3627
time: 2003/10/16 16:50:11 2003/10/16 11:50:11 CDT
interfaceGroup: 0
vlan: 0
signature: sigId=1001 sigName=Record Packet Rte subSigId=0 version=S37
participants:
attack:
attacker: proxy=false
addr: locality=OUT 4.1.1.2
victim:
addr: locality=OUT 10.2.1.2
alertDetails: Traffic Source: int0 ;
```

Note The alertDetails field shows the specific interface that the alert is coming from.

Status Events

Status events are generated by IDS applications whenever certain application state changes occur. The content of evStatus is an element that defines what aspect of the application's state changed and the new state value. The state information that may be reported varies by application, and many of the state elements are specific to a single application.

Note Errors and warnings are not considered state information and are reported using evError rather than evStatus.

The following elements are contained in an evStatus event message:

- applicationStarted—The originating application has started running and has completed its initialization. This event message provides the application's version and confirms that the application successfully started.
- applicationStopped—The specified application has been intentionally shut down. This event message is sent by a management application that is responsible for shutting down the application, rather than by the application that is shutting down.
- certificatesChanged—Indicates that the host's X.509v3 certificates were changed.
- configChanged—Indicates that a configuration file has been modified by a setConfig control transaction request.
- ipLogAdded—A new IP logging session has been requested. This event message also contains the address being logged, the time that it was initiated, and the identifier for the newly created logging session.
- ipLogCompleted—An IP logging session has ended (because of packet count or timeout exceeded). The event message contains the log session's identifier.
- ipLogRemoved—An IP logging document is no longer available for retrieval. For reference purposes the event message contains the original logging session's identifier, although this identifier is no longer valid because the document was deleted.
- ipLogStarted—An IP logging session has been started and at least one packet has been logged. The event document contains the address being logged, the time that it was initiated, and the log session's identifier.
- loginAction—A login action, such as a user logging in or logging out, has occurred.

Error Events

Error events are generated by an IDS application when the application detects an error or warning condition. The evError event contains error code and a textual description of the error.

Caution Do not confuse evError with the <error> element. evError is a type of event that is part of the events document that is returned upon successful completion of an event retrieval operation. The <error> element is a document root element that is returned in the response to a failed operation (such as a control transaction).

The following is an example of an error event:

```
evError: eventId=1077226078696330133 severity=warning
originator:
hostId: firesafe
appName: login(pam_unix)
appInstanceId: 7475
time: 2004/03/03 17:05:56 2004/03/03 17:05:56 UTC
errorMessage: name=errSyslog session opened for user cisco by (uid=0)
```

Log Events

Log events provide notification anytime control transactions are processed by sensor applications.

The following is an example of a log event:

```
evLogTransaction: command=getVersion eventId=1077226078696330135
successful=true
originator:
hostId: sensor
appName: mainApp
appInstanceId: 1048
time: 2004/03/03 17:05:56 2004/03/03 17:05:56 UTC
requestor:
user: cids
application:
hostId: CONSOLE
appName: -cidcli
appInstanceId: 7476
```

NAC Events

NAC communicates with other IDS applications through IDIOM control transactions and events. NAC generates evStatus events when the internal state changes and evError events when errors are detected.

The following is an example of an evShunRqst NAC event:

```
evShunRqst: eventId=1094239199791041344
  originator:
    deviceName: Sensor1
    appName: NetworkAccessControllerApp
    appInstance: 654
  time: 2004/09/21 18:43:10 1988/05/20 22:21:38
  shunEntry:
    shunInfo:
      host: connectionShun=false
        srcAddr: 1.1.1.1
        destAddr: 0
        srcPort: 0
        destPort: 0
        protocol: numericType=0 other
      timeoutMinutes: 70
  evAlertRef: hostId=esendHost 123456789012345678
```

Event Actions

The following actions can be triggered by an alert event:

Note You can configure these actions through the CLI, IDM, or IDS MC.

- IP logging—Provides the ability to capture raw unaltered packets related to the participants of an event. Information from the logs are used for confirmation, damage assessment, and forensic evidence.

  The IP logging system allocates all of its storage at startup time. This data store is then split into equal size pages. When logs are written, they are stored in the pages. When all available pages are filled, the oldest page is overwritten. A master list of pages and the page contents is maintained by the system. As old pages are used by new logs, the master list is updated to show a new start time for the log that was overwritten.

- TCP reset—Provides the ability to reset an ongoing TCP connection in response to an alert event detected in that connection.

  TCP resetting is performed by SensorApp. 100 reset packets are sent in each direction as a result of an event that is configured to perform resetting. Alerts that have been configured for resetting that do not use TCP protocol are ignored.

- Blocking—Provides the ability to modify ACLs on routers and other devices to dynamically affect the access policy on a network as the result of an event.

  A block request is sent to the NAC. To avoid the performance impact and delay of a control transaction, the request is in the form of a event.

- CapturePacket—Provides the ability to capture the alert trigger packet. The offending packet is included in the evAlert. You configure the signature to perform this action by setting the master engine parameter CapturePacket to True. If set to True, and the alert is not a SummaryAlarm, the current packet is appended to the evAlert message.

  You will not be able to query the IP log system and get only packets from a specific time inside the log. If you supply a time range, you receive a single file made up of all internal blocks that contain the time range requested. Further refinement of the log file must be done on a separate platform, because filtering the packets puts an undue burden on the sensor platform. There are many tools available that allow you to filter and otherwise manipulate the IP log files.

  An interface must be active to activate a log from that interface. There is no provision for erasing IP logs or sanitizing the sensor. You must reimage the sensor if you want to remove all log files.

Note The IDS management systems cannot display IP log information, but through the CLI you can print the HEX and ASCII Base64 decoded version of the CapturePacket field.

System Architectural Details

This section provides information about other system architecture details.

This section contains the following topics:

Communications

IDS applications use an interprocess communication API called Intrusion Detection Application Program Interface (IDAPI) to handle internal communications. IDAPI reads and writes event data and provides a mechanism for control transactions. See IDAPI, page A-46, for an illustration of how IDAPI operates.

External communications use RDEP. RDEP is an application-level communications protocol used to exchange IDS event, IP log, configuration, and control messages between IDS clients and IDS servers. RDEP communications consist of request and response messages. RDEP clients initiate request messages to RDEP servers. RDEP servers respond to request messages with response messages. See RDEP, page A-47, for an illustration of how RDEP operates.

RDEP defines three classes of request/response messages: event, IP log, and transaction messages. Event messages include IDS alert, status, and error messages. Clients use IP log requests to retrieve IP log data from servers. Transaction messages are used to configure and control IDS servers.

RDEP utilizes the industry standards HTTP, TLS/SSL and XML to provide a standardized interface between RDEP agents. The RDEP protocol is a subset of the HTTP/1.1 protocol. All RDEP messages are legal HTTP/1.1 messages. RDEP uses HTTP's message formats and message exchange protocol to exchange messages between RDEP agents.

You use the IDS manager to specify which hosts are allowed to access the sensor through the network. Sensors accept connections from 1 to 10 RDEP clients simultaneously. Clients selectively retrieve data by time range, type of event (alert, error, or status message) and level (alert = high, medium, low, or informational; error = high, medium, low). Events are retrieved by a query (a single bulk get) or subscription (a real-time persistent connection) or both. Communications are secured by TLS or SSL.

Note The following legacy applications have been replaced by RDEP: *postofficed*, *fileXferd*, and IPSec.

IDIOM is a data format standard that defines the event messages that are reported by the IDS as well as the operational messages that are used to configure and control intrusion detection systems. These messages consist of XML documents that conform to the IDIOM XML schema.

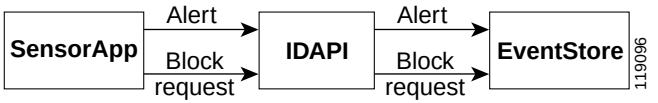
IDIOM supports two types of interactions: event and control transaction. Event interactions are used to exchange IDS events such as alerts. IDIOM uses two types of messages for event interactions: event and error messages. Control transactions provide a means for one host to initiate an action in, change the state of, or read the state of another host. Control transactions utilize four types of IDIOM messages: request, response, configuration, and error messages. Events and control transactions that are communicated between application instances within a host are known as local events or local control transactions, or collectively, local IDIOM messages. Events and control transactions that are communicated between different hosts using the RDEP protocol are known as remote events and remote control transactions, or collectively, remote IDIOM messages.

IDAPI

IDAPI is the interface through which all the applications communicate.

SensorApp captures and analyzes the network traffic on its interfaces. When a signature is matched, SensorApp generates an alert, which is stored in the EventStore. If the signature is configured to perform the blocking response action, SensorApp generates a block event, which is also stored in the EventStore. Figure A-4 on page A-46 illustrates the IDAPI interface.

Figure A-4 IDAPI



Each application registers to the IDAPI to send and receive events and control transactions. IDAPI provides the following services:

- Control transactions
  - Initiates the control transaction.
  - Waits for the inbound control transaction.
  - Responds to the control transaction.

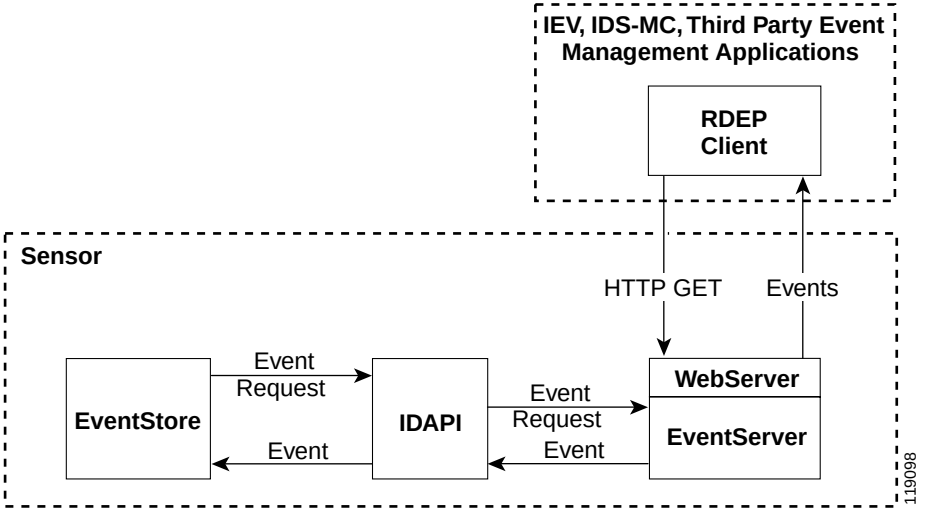
- IDS events
  - Subscribes to remote IDS events, which are stored in the local EventStore when received.
  - Reads IDS events from the local EventStore.
  - Writes IDS events to the local EventStore.

IDAPI provides the necessary synchronization mechanisms to guarantee atomic data accesses.

RDEP

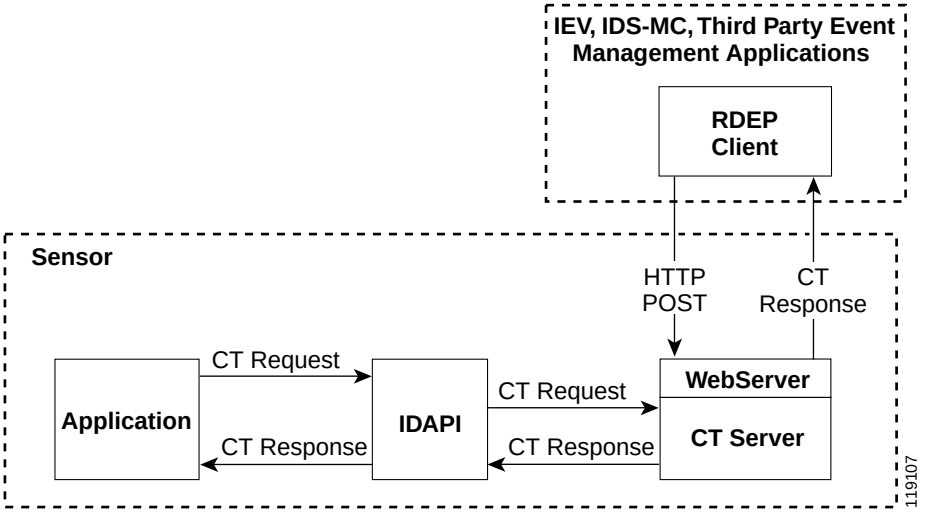
Remote applications can retrieve events from the sensor through RDEP. The remote client sends an RDEP event request to the sensor's WebServer, which passes it to the EventServer. The EventServer queries the EventStore through IDAPI and then returns the result. Figure A-5 on page A-47 shows remote applications retrieving events from the sensor through RDEP.

Figure A-5 Retrieving Events Through RDEP



Remote applications can send commands to the sensor through RDEP. The remote client sends an RDEP control transaction to the sensor's WebServer, which passes it to the Control Transaction Server. The Control Transaction Server passes the control transaction through IDAPI to the appropriate application, waits for the application's response, and then returns the result. Figure A-6 shows remote applications sending commands to the sensor through RDEP.

Figure A-6 Sending Commands Through RDEP



Sensor Directory Structure

IDS 4.x has the following directory structure:

- /usr/cids/idsRoot—Main installation directory.
- /usr/cids/idsRoot/shared—Stores files used during system recovery.
- /usr/cids/idsRoot/var—Stores files created dynamically while the sensor is running.
- /usr/cids/idsRoot/var/updates—Stores files and logs for update installations.
- /usr/cids/idsRoot/var/virtualSensor—Stores files used by SensorApp to analyze regular expressions.

- /usr/cids/idsRoot/var/eventStore—Contains the EventStore application.
- /usr/cids/idsRoot/var/core—Stores core files that are created during system crashes.
- /usr/cids/idsRoot/var/iplogs—Stores iplog file data.
- /usr/cids/idsRoot/bin—Contains the binary executables.
- /usr/cids/idsRoot/bin/authentication—Contains the authentication application.
- /usr/cids/idsRoot/bin/cidDump—Contains the script that gathers data for tech support.
- /usr/cids/idsRoot/bin/cidwebserver—Contains the WebServer application.
- /usr/cids/idsRoot/bin/cidcli—Contains the CLI application.
- /usr/cids/idsRoot/bin/nac—Contains the NAC application.
- /usr/cids/idsRoot/bin/logApp—Contains the logger application.
- /usr/cids/idsRoot/bin/mainApp—Contains the main application.
- /usr/cids/idsRoot/bin/sensorApp—Contains the sensor application.
- /usr/cids/idsRoot/bin/falcondump—Contains the application for getting packet dumps on the sensing ports of the IDS-4250-XL and IDSM-2.
- /usr/cids/idsRoot/etc—Stores sensor configuration files.
- /usr/cids/idsRoot/htdocs—Contains the IDM and NSDB files for the WebServer.
- /usr/cids/idsRoot/lib—Contains the library files for the sensor applications.
- /usr/cids/idsRoot/log—Contains the log files for debugging.
- /usr/cids/idsRoot/tmp—Stores the temporary files created during run time of the sensor.

Summary of Applications

Table A-2 gives a summary of the applications that make up IDS.

Table A-2 Summary of Applications

Application	Description
AuthenticationApp	Authorizes and authenticates users based on IP address, password, and/or digital certificates.
CLI	Accepts command line input and modifies the local configuration using IDAPI.
IDS Event Viewer (IEV)[1]	Subscribes to intrusion, network access, status, and error events and displays the event information in a GUI.
EventServer[2]	Accepts RDEP request for events from remote clients.
MainApp	Reads the configuration and starts applications, handles starting and stopping of applications and node reboots, handles software upgrades.
NetworkAccessControllerApp (NAC)[3]	A NAC is run on every sensor. Each NAC subscribes to network access events from its local EventStore. The NAC configuration contains a list of sensors and the network access devices that its local NAC controls. If a NAC is configured to send network access events to a master blocking sensor, it initiates a network access control transaction to the remote NAC that controls the device. These network access action control transactions are also used by IDS managers to issue occasional network access actions.
SensorApp[4]	Captures and analyzes traffic on the monitored network and generates intrusion and network access events. Responds to IP logging control transactions that turn logging on and off and that send and delete IP log files.

Table A-2 Summary of Applications (continued)

Application	Description
Control Transaction Server (CT Server)[5]	Accepts control transactions from a remote RDEP client, initiates a local control transaction, and returns the response to the remote client.
Control Transaction Source (CT Source)[6]	Waits for control transactions directed to remote applications, forwards the control transactions to the remote node using RDEP, and returns the response to the initiator.
IDS Device Manager (IDM)	The WebServer servlet that provides an HTML IDS management interface.
WebServer	Waits for remote HTTP client requests and calls the appropriate servlet application.
Syslog Monitoring Application	Captures and analyzes syslog and SNMP events generating intrusion and network access events.
Alarm Channel Application	Filters and correlates the alerts before sending them to the EventStore.

1. This is a remote application.
2. This is a WebServer servlet.
3. NAC is formerly known as *managed* in the legacy IDS.
4. SensorApp is formerly known as *packetd* in the legacy IDS.
5. This is a WebServer servlet.
6. This is a remote control transaction proxy.

Troubleshooting

This appendix contains troubleshooting tips and procedures for sensors and software.

This appendix contains the following sections:

Preventive Maintenance

The following actions will help you maintain your sensor:

- Create a service account.

  You can use the service account when you need to work with the TAC to troubleshoot your sensor.

  See Creating the Service Account, page 10-12, for the procedure.

- You should back up a good configuration. If your current configuration becomes unusable, you can replace it with the backup version.

  See Creating and Using a Backup Configuration File, page 10-28, for the procedure.

- Save your backup configuration to a remote system.
- Always back up your configuration before you do a manual upgrade. If you have auto upgrades configured, make sure you do periodic backups.

Disaster Recovery

The following section provides recommendations and steps to take if you need to to recover your sensor after a disaster.

Follow these recommendations so that you are ready in case of a disaster:

- If you are using the CLI or IDM for configuration, copy the current configuration from the sensor to an FTP or SCP server any time a change has been made.

  See Creating and Using a Backup Configuration File, page 10-28, for the procedure.

  Note You should note the specific software version for that configuration. You can apply the copied configuration only to a sensor of the same version.

  Note You also need the list of user IDs that have been used on that sensor. The list of user IDs and passwords are not saved in the configuration.

- If you are using IDS MC, the current configuration is saved in the IDS MC database and a separate copy is not needed.

  Note The list of user IDs is not saved in the IDS MC database. You must make a note of the user IDs.

  Note You should note the specific software version for that configuration. You can push the copied configuration only to a sensor of the same version.

When a disaster happens and you need to recover the sensor, try the following:

1. Reimage the sensor.

   See Reimaging Appliances and Modules, page 10-110, for the procedures for appliances and modules.

2. Log in to the sensor with the default user ID and password—cisco.

   Note You are be prompted to change the cisco password.

3. Run the **setup** command.

   See Initializing the Sensor, page 10-2, for the procedure.

4. Upgrade the sensor to the IDS software version it had when the configuration was last saved and copied.

   See Obtaining Cisco IDS Software, page 9-1, for more information on obtaining IDS software versions and how to install them.

Warning **Trying to copy the saved configuration without getting the sensor back to the same IDS software version it had before the disaster can cause configuration errors.**

5. Copy the last saved configuration to the sensor.

   See Creating and Using a Backup Configuration File, page 10-28, for the procedure.

6. Update clients to use the new key/certificate of the sensor.

   Reimaging changes the sensor's SSH keys and HTTPS certificate. See Adding Known Hosts to the SSH Known Hosts List, page 10-19, for the procedure.

7. Create previous users.

   See Adding a User, page 10-16, for the procedure.

Troubleshooting the 4200 Series Appliance

This section pertains to troubleshooting the 4200 series appliance.

Tip Before troubleshooting the appliance, check the Caveats section of the Readme for the software version you have installed on your sensor to see if you are dealing with a known issue.

This section contains the following topics:

Communication

This section helps you troubleshoot communication problems with the 4200 series sensor.

This section contains the following topics:

Cannot Access the Sensor Through the IDM or Telnet and/or SSH

If you cannot access the sensor through the IDM or through Telnet and/or SSH, follow these steps:

Step 1 Ping the sensor's IP address:

- The ping fails. Go to Step 2.

```
sensor# ping 10.89.149.81
PING 10.89.149.81 (10.89.149.81) from 10.89.149.56 : 56(84) bytes
of data.
From 10.89.149.56 icmp_seq=1 Destination Host Unreachable
From 10.89.149.56 icmp_seq=2 Destination Host Unreachable
From 10.89.149.56 icmp_seq=3 Destination Host Unreachable

—- 10.89.149.81 ping statistics —-
3 packets transmitted, 0 received, +3 errors, 100% loss, time
2013ms , pipe 3
```

- The ping succeeds. Go to Step 4.

```
sensor# ping 10.89.149.81
PING 10.89.149.81 (10.89.149.81) from 10.89.149.110 : 56(84) bytes
of data.
64 bytes from 10.89.149.81: icmp_seq=1 ttl=254 time=0.273 ms
64 bytes from 10.89.149.81: icmp_seq=2 ttl=254 time=0.176 ms
64 bytes from 10.89.149.81: icmp_seq=3 ttl=254 time=0.178 ms
64 bytes from 10.89.149.81: icmp_seq=4 ttl=254 time=0.187 ms

—- 10.89.149.81 ping statistics —-
4 packets transmitted, 4 received, 0% loss, time 3001ms rtt
min/avg/max/mdev = 0.176/0.203/0.273/0.042 ms
```

Step 2 Run a trace route to the sensor to find out where the route is broken.

```
sensor# traceroute to 172.21.172.24 (172.21.172.24), 30 hops max, 40
byte packets 1 171.69.162.2 (171.69.162.2) 1.25 ms 1.37 ms 1.58 ms 2
172.21.172.24 (172.21.172.24) 0.77 ms 0.66 ms 0.68 ms
sensor#
```

Step 3 Make sure the sensor's IP address and default gateway are set correctly. Make sure the router, switch, and/or the firewall are configured to interface with the sensor.

```
sensor# setup

—- System Configuration Dialog —-
At any point you may enter a question mark '?' for help.
```

```
User ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.
Current Configuration:

networkParams
ipAddress 10.89.146.110
netmask 255.255.255.0
defaultGateway 10.89.146.254
hostname firesafe
telnetOption enabled
accessList ipAddress 10.0.0.0 netmask 255.0.0.0
accessList ipAddress 10.89.0.0 netmask 255.255.0.0
accessList ipAddress 64.101.0.0 netmask 255.255.0.0
accessList ipAddress 10.89.149.31 netmask 255.255.255.255
accessList ipAddress 64.102.0.0 netmask 255.255.0.0
exit
timeParams
summerTimeParams
active-selection none
exit
ntpServers ipAddress 10.89.147.99
keyId 2
keyValue test
exit
exit
service webServer
general
ports 443
exit
exit
```

The network configuration is correct.

Step 4 Verify that the sensor does not have an IP address conflict with another host on the network.

Note Linux prevents the command and control Ethernet port from activating if it detects an address conflict with another host.

```
sensor# show interfaces
command-control is up
  Internet address is 10.89.146.110, subnet mask is 255.255.255.0,
telnet is enabled.
  Hardware is eth1, tx
```

Note If the output says `command-control is down`, there is a hardware issue or an IP address conflict.

Step 5 SSH fails to connect or the connection is refused:

a. Make sure the sensor's access list is configured to accept your IP address.

```
sensor# show configuration | include accessList
accessList ipAddress 10.0.0.0 netmask 255.0.0.0
accessList ipAddress 10.89.0.0 netmask 255.255.0.0
accessList ipAddress 64.101.0.0 netmask 255.255.0.0
accessList ipAddress 10.89.149.31 netmask 255.255.255.255
accessList ipAddress 64.102.0.0 netmask 255.255.0.0
```

b. If the sensor's access list is correct, make sure the sensor's SSH and/or Telnet and web server ports are open in the firewall.

```
sensor# configure terminal
sensor(config)# service WebServer
sensor(config-WebServer)# show settings
   general
   -----------------------------------------------
      enable-tls: true <defaulted>
      ports: 443 <defaulted>
      server-id: HTTP/1.1 compliant <defaulted>
   -----------------------------------------------
```

Step 6 Verify that the network cabling for the appliances is correct and operational, and that the routers and switches are operational for the modules.

IDM Cannot Access the Sensor

If the IDM cannot access the sensor, follow these steps:

Step 1 If you can access the sensor through SSH, verify that you are accessing the correct port on the sensor and that you are making the correct HTTP versus HTTPs selection.

You are correctly addressing the sensor.

Step 2 Verify that the Web server is still running:

a. Use the **show version** command to check the status of the WebServer:

```
sensor# show version
Application Partition:

Cisco Systems Intrusion Detection Sensor, Version 4.1(3)S61

OS Version 2.4.18-5smpbigphys
Platform: IDS-4235
Sensor up-time is 20 days.
Using 214319104 out of 921522176 bytes of available memory (23% usage)
Using 596M out of 15G bytes of available disk space (5% usage)


MainApp           2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
AnalysisEngine    2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500  Running
Authentication    2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500  Running
Logger            2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500  Running
NetworkAccess     2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500  Running
TransactionSource 2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500  Running
WebServer         2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500  Running
CLI               2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500

WebServer         2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500  Running
CLI               2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500


Upgrade History:

* IDS-K9-min-4.1-1-S47          12:00:00 UTC Thu Jun 30 2005
  IDS-K9-sp-4.1-3-S61.rpm.pkg   14:14:55 UTC Fri Feb 20 2004

Recovery Partition Version 1.2 - 4.1(1)S47
```

The Web server is still running. Go to Step 4

b. The web server is still not running:

```
sensor# show version
Application Partition:

Cisco Systems Intrusion Detection Sensor, Version 4.1(3)S61

OS Version 2.4.18-5smpbigphys
Platform: IDS-4235
Sensor up-time is 20 days.
Using 214319104 out of 921522176 bytes of available memory (23% usage)
Using 596M out of 15G bytes of available disk space (5% usage)
```

```
MainApp           2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500  Running
AnalysisEngine    2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500  Running
Authentication    2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500  Running
Logger            2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500  Running
NetworkAccess     2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500  Running
TransactionSource 2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500  Running
WebServer         2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500  Not Running
CLI               2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500


Upgrade History:

* IDS-K9-min-4.1-1-S47          12:00:00 UTC Thu Jun 30 2005
  IDS-K9-sp-4.1-3-S61.rpm.pkg   14:14:55 UTC Fri Feb 20 2004

Recovery Partition Version 1.2 - 4.1(1)S47
```

Step 3 If the Web server is not running, follow these steps:

a. Run diagnostics, save the output, and send the output file to the TAC.

See Displaying Tech Support Information, page 10-31, for the procedure.

b. Restart the Web server:

```
sensor# reset
Warning: Executing this command will stop all applications and
reboot the node.
Continue with reset?:yes
Request Succeeded.
sensor#
```

Note The **reset** command shuts down the applications running on the sensor, reboots the appliance, and restarts all the applications.

Step 4 If the Web server is still running, verify that the firewall has an open port for the sensor.

Access List Misconfiguration

To correct a misconfigured access list, follow these steps:

Step 1 Log in to the CLI.

Step 2 View your configuration to see the access list:

```
sensor# show configuration | include accessList
accessList ipAddress 10.0.0.0 netmask 255.0.0.0
accessList ipAddress 10.89.0.0 netmask 255.255.0.0
accessList ipAddress 64.101.0.0 netmask 255.255.0.0
accessList ipAddress 10.89.149.31 netmask 255.255.255.255
accessList ipAddress 64.102.0.0 netmask 255.255.0.0
```

Step 3 Verify that the client IP address is listed in the allowed networks. If it is not, add it:

```
sensor# configure terminal
sensor(config)# service Host
sensor(config-Host)# networkParams
sensor(config-Host-net)# accessList ipAddress value netmask value
```

Duplicate IP Address Shuts Interface Down

If you have two newly imaged sensors with the same IP address that come up on the same network at the same time, the interface shuts down. Linux prevents the command and control interface Ethernet port from activating if it detects an address conflict with another host.

To verify that the sensor in question does not have an IP address conflict with another host on the network, follow these steps:

Step 1 Log in to the CLI.

Step 2 Determine whether the interface is up:

```
sensor# show interfaces
command-control is up
```

If the output says `command-control is down`, there is a hardware issue or an IP address conflict. Go to Step 3.

Step 3 Make sure the sensor's cabling is correct.

Refer to the chapter for your sensor in this hardware guide.

Step 4 Run the **setup** command to make sure the IP address is correct.

See Initializing the Sensor, page 10-2, for the procedure.

SensorApp and Alerting

This section helps you troubleshoot issues with SensorApp and alerting.

This section contains the following topics:

Sensing Process Not Running

The sensing process (SensorApp) should always be running. If it is not, you do not receive any alerts.

To make sure the sensing process is running, follow these steps:

Step 1 Log in to the CLI.

Step 2 Determine the status of the AnalysisEngine service:

```
sensor# show version
AnalysisEngine 2003_Oct_10_11.16 (Release) 2003-10-10T11:01:13-0500
Not Running
```

Step 3 If the SensorApp is not running, look for any errors connected to it:

```
sensor# show events error | sensorApp | hh:mm:ss month day year
evError: eventId=1077219258696330005 severity=warning

originator:
hostId: sensor
appName: sensorApp
appInstanceId: 1045
time: 2004/02/19 19:34:20 2004/02/19 19:34:20 UTC
errorMessage: name=errUnclassified Generating new Analysis Engine
configuration file.
```

Note hh:mm:ss month day year is the date and time of the last restart.

Step 4 Make sure you have the latest software updates:

```
sensor# show version
Upgrade History:
* IDS-K9-min-4.1-1-S47 12:00:00 UTC Thu Jun 30 2005
IDS-K9-sp-4.1-3-S61.rpm.pkg 14:14:55 UTC Fri Feb 20 2004
Recovery Partition Version 1.2 - 4.1(1)S47
```

If you do not have the latest software updates, download them from Cisco.com. See Obtaining Cisco IDS Software, page 9-1, for the procedure.

Step 5 Read the Readme that accompanies the software upgrade for any known DDTS for SensorApp or AnalysisEngine.

Physical Connectivity, SPAN, or VACL Port Issue

If the sensor is not connected properly, you do not receive any alerts.

To make sure the sensor is connected properly, follow these steps:

Note If you have an IDS-4230 or IDS-4220, make sure you have swapped the interfaces. See Upgrading the IDS-4220-E and IDS-4230-FE to 4.x Software, page 4-5, for the procedure.

Step 1 Log in to the CLI.

Step 2 Make sure the interfaces are up and that the packet count is increasing:

```
sensor# show interface sensing
Sensing int0 is down
  Hardware is eth0, TX
  Reset port
```

Step 3 If the interface is down, make sure the sensing port is connected properly:

a. Make sure the sensing port is connected properly on the appliance.

See the chapter on your appliance in the *Cisco Intrusion Detection System Appliance and Module Installation and Configuration Guide Version 4.1*.

b. Make sure the sensing port is connected to the correct SPAN or VACL capture port on the IDSM-2.

See the chapter on the IDSM-2 in the *Cisco Intrusion Detection System Appliance and Module Installation and Configuration Guide Version 4.1*.

Step 4 Verify the interface configuration:

a. Make sure you have the interfaces configured properly.

Refer to Assigning and Enabling the Sensing Interface, page 10-9, for the procedure.

b. Verify the SPAN and VACL capture port configuration on the Cisco switch.

Refer to your switch documentation for the procedure.

Step 5 Verify again that the interfaces are up and that the packet count is increasing.

```
sensor# show interface sensing
Sensing int0 is up
  Hardware is eth0, TX
  Reset port
```

Unable to See Alerts

If you cannot see alerts, the following:

- Make sure the signature is enabled.
- Make sure the sensor is seeing packets.
- Make sure that alerts are being generated.
- Make sure Event Viewer can communicate with the sensor.

To make sure you can see alerts, follow these steps:

Step 1 Log in to the CLI.

Step 2 Make sure the signature is enabled:

a. Enter configuration mode:

```
sensor# configure terminal
```

b. Enter virtual sensor mode:

```
sensor(config)# service virtual-sensor-configuration virtualSensor
```

c. Make sure the signature is enabled:

```
sensor(config-vsc)# tune-micro-engines
sensor(config-vsc-virtualSensor# atomic.icmp
sensor(config-vsc-virtualSensor-ATO)# sig sigid 2000
sensor(config-vsc-virtualSensor-ATO-sig)# show settings
SIGID: 2000 <protected>
SubSig: 0 <protected>
AlarmDelayTimer:
AlarmInterval:
AlarmSeverity: informational <defaulted>
AlarmThrottle: Summarize <defaulted>
AlarmTraits:
CapturePacket: False <defaulted>
ChokeThreshold: 100 <defaulted>
DstIpAddr:
DstIpMask: Enabled: False <defaulted>
```

Step 3 Make sure the sensor is seeing packets:

```
sensor# show interface sensing
Sensing int0 is up
  Hardware is eth0, TX
  Reset port
```

Step 4 Check for alerts:

```
sensor# show events alert

evAlert: eventId=1080048367680474106 severity=informational
originator:
hostId: sensor
appName: sensorApp
appInstanceId: 1102
time: 2004/06/24 13:21:33 2004/06/24 13:21:33 EST
interfaceGroup: 0
vlan: 0
signature: sigId=7102 sigName=Reply-to-Broadcast subSigId=0
version=S37
participants:
attack:
attacker: proxy=false
addr: locality=OUT 10.89.146.24
victim:
addr: locality=OUT 10.89.146.24
alertDetails: Traffic Source: int0 ;
```

Sensor Not Seeing Packets

If your sensor is not seeing any packets on the network, you could have the interfaces set up incorrectly.

If your sensor is not seeing packets, follow these steps:

Step 1 Log in to the CLI.

Step 2 Make sure the interfaces are up and receiving packets:

```
sensor# show interfaces sensing
Sensing int0 is down
  Hardware is eth0, TX
  Reset port
```

Step 3 If the interfaces are not up, do the following:

a. Check the cabling.

See the chapter that pertains to your sensor for information on installing the sensor properly.

b. Bring the interface up.

```
sensor# configure terminal
sensor(config)# interface sensing int0
sensor(config-ifs)# no shutdown
sensor(config-ifs)# e100: eth0 NIC Link is Up 100 Mbps Half duplex
sensor(config)# exit
sensor(config)# exit
sensor# show interfaces sensing
Sensing int0 is up
  Hardware is eth0, TX
  Reset port

   MAC statistics from the Fast Ethernet Interface int0
      Missed Packet Percentage = 0
      Link Status = Up
      Total Packets Received = 75077
      Total Bytes Received = 398
      Total Receive Errors = 0
      ...
```

Cleaning Up a Corrupted SensorApp Configuration

If your SensorApp configuration has become corrupted and SensorApp cannot run, you must delete it entirely and restart SensorApp.

To delete SensorApp, follow these steps:

Step 1 Log in to the service account.

Step 2 Su to root.

Step 3 Stop the IDS applications:

```
/etc/init.d/cids stop
```

Step 4 Replace the virtual sensor file:

```
cp /usr/cids/idsRoot/etc/defVirtualSensorConfig.xml
/usr/cids/idsRoot/etc/VS-Config/virtualSensor.xml
```

Step 5 Remove the cache files:

```
rm /usr/cids/idsRoot/var/virtualSensor/*.pmz
```

Step 6 Exit the service account.

Step 7 Log in to an account with administrator privileges.

Step 8 Reboot the sensor:

```
sensor# reset
Warning: Executing this command will stop all applications and reboot
the node.
Continue with reset? [yes]:yes
Request Succeeded.
sensor#
```

Running SensorApp in Single CPU Mode

SensorApp can crash or consume the CPU when running on a dual CPU sensor with IP logging turned on for the stream-based signatures. You should change to single processor mode or turn off IP logging for the stream-based signatures. See CSCed32093 for the more information.

To change the sensor to single processor mode, follow these steps:

Step 1 Change to single processor mode:

a. `vi ~cids/idsRoot/etc/mainApp.conf`

b. Add the following lines at the end of AnalysisEngine section:

```
Arg01=-t
Arg02=single
```

This forces the sensorApp to run in single processor mode.

Note Running SensorApp in single processor mode can cause a drop in packet-processing performance.

Note Running the SensorApp in single processor mode is the preferred workaround. You should use this workaround unless you see Signature 993 missed packet alarms after you apply the workaround. If you do, go to Step 2.

Step 2 Turn off EventAction log and use CapturePacket True instead in the stream-based signatures.

Bad Memory on the IDS-4250-XL

Some IDS-4250-XLs were shipped with faulty DIMMs on the XL cards. The faulty DIMMs cause the sensor to hang or SensorApp to stop functioning and generate a core file.

See the Partner Field 52563 for the procedure for checking the IDS-4250-XL for faulty memory.

Step 3 Display events since a specified time for a specified alert level:

`sensor# show events alert` *level hh:mm month day year*

For example, **show events alert high 10:00 September 22 2002** displays all high severity events since 10:00 a.m. September 22, 2002.

Events from the specified time are displayed.

Blocking

After you have configured NAC, you can verify if NAC is running properly by using the **show version** command. To verify that NAC is connecting to the network devices, use the **show statistics networkAccess** command.

To troubleshoot NAC, follow these steps:

1. Verify that NAC is running.

   See Verifying NAC is Running, page B-19, for the procedure.

2. Verify that NAC is connecting to the network devices.

   See Verifying NAC is Connecting, page B-20, for the procedure.

3. Verify that the EventAction is set to shunHost for specific signatures.

   See Blocking Not Occurring for a Signature, page B-25, for the procedure.

4. Verify that the MBS is properly configured.

   See Verifying the Master Blocking Sensor Configuration, page B-26.

Note See NAC, page A-16, for a discussion of NAC architecture.

This section provides troubleshooting help for blocking and the NAC service.

This section contains the following topics.

Verifying NAC is Running

To verify that NAC is running, use the **show version** command.

Step 1 Log in to the CLI.

Step 2 Verify that NAC is running:

```
sensor# show version
Application Partition:

Cisco Systems Intrusion Detection Sensor, Version 4.1(3)S61

OS Version 2.4.18-5smpbigphys
Platform: IDS-4235
Sensor up-time is 20 days.
Using 214319104 out of 921522176 bytes of available memory (23% usage)
Using 596M out of 15G bytes of available disk space (5% usage)
```

```
MainApp           2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
AnalysisEngine    2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
Authentication    2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
Logger            2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
NetworkAccess     2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
TransactionSource 2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
WebServer         2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
CLI               2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500


Upgrade History:

* IDS-K9-min-4.1-1-S47          12:00:00 UTC Thu Jun 30 2005
  IDS-K9-sp-4.1-3-S61.rpm.pkg   14:14:55 UTC Fri Feb 20 2004

Recovery Partition Version 1.2 - 4.1(1)S47
```

Step 3 If NetworkAccess display `Not Running`, NAC has failed. You must contact TAC.

Verifying NAC is Connecting

Step 1 Log in to the CLI.

Step 2 Verify that NAC is connecting:

Check the State section of the output to verify that all devices are connecting.

```
sensor# show statistics networkAccess
Current Configuration
   AllowSensorShun = false
   ShunMaxEntries = 100
   NetDevice
      Type = PIX
      IP = 7.7.7.7
      NATAddr = 0.0.0.0
      Communications = telnet
   NetDevice
      Type = Cisco
      IP = 5.5.5.5
      NATAddr = 0.0.0.0
      Communications = ssh-des
      ShunInterface
         InterfaceName = fa0/0
         InterfaceDirection = in
         InterfacePreShun = preAcl
```

```
   NeverShun
      IP = 3.3.3.1
      IP = 3.3.3.2
      IP = 3.3.3.3
      IP = 11.0.0.0
   MasterBlockingSensor
      SensorIp = 1.2.3.4
      SensorPort = 8080
      UseTls = 1
State
   ShunEnable = true
   NetDevice
      IP = 7.7.7.7
      AclSupport = Does not use ACLs
      State = Connecting
   NetDevice
      IP = 5.5.5.5
      AclSupport = uses Named ACLs
      State = Connecting
sensor#
```

Step 3 If NAC is not connecting, look for recurring errors:

```
sensor# show events error NAC hh:mm:ss month day year
```

Step 4 Make sure you have the latest software updates:

```
sensor# show version
Upgrade History:

* IDS-K9-min-4.1-1-S47          12:00:00 UTC Thu Jun 30 2005
  IDS-K9-sp-4.1-3-S61.rpm.pkg   14:14:55 UTC Fri Feb 20 2004
Recovery Partition Version 1.2 - 4.1(1)S47
```

If you do not have the latest software updates, download them from Cisco.com. See Obtaining Cisco IDS Software, page 9-1, for the procedure.

Step 5 Read the Readme that accompanies the software upgrade for any known DDTS for NetworkAccess.

Step 6 Make sure the configuration settings for each device are correct (the username, password, and IP address).

See Device Access Issues, page B-22, for the procedure.

Step 7 Make sure the interface/directions for each network device are correct.

See Verifying the Interfaces/Directions on the Network Device, page B-23, for the procedure.

Step 8 If the network device is using SSH-DES or SSH-3DES, make sure the you have enabled SSH connections to the device.

See Enabling SSH Connections to the Network Device, page B-24, for the procedure.

Step 9 Verify that each interface/direction on each controlled device is correct.

See Verifying the Interfaces/Directions on the Network Device, page B-23, for the procedure.

Device Access Issues

NAC may not be able to access the devices it is managing. Make sure the you have the correct IP address and username and password for the managed devices and the correct interface/direction configured.

To troubleshoot device access issues, follow these steps:

Step 1 Log in to the CLI.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enter service configuration mode for NetworkAccess:

```
sensor (config)# service NetworkAccess
```

Step 4 Verify the IP address for the managed devices:

```
sensor(config-NetworkAccess)# show settings
cat6k-devices (min: 0, max: 100, current: 1)
communication:
ip-address: 172.21.172.151
nat-address:
shun-device-cfg: groupa shun-interfaces (min: 0, max: 100, current: 2)
post-vacl-name: testPostACL
pre-vacl-name: testPreACL vlan: 1 units: none post-vacl-name:
pre-vacl-name:
lan: 5 units: none
general
---------------
allow-sensor-shun: false
enable-acl-logging: false
```

```
master-blocking-sensors (min: 0, max: 100, current: 0)
never-shun-hosts (min: 0, max: 100, current: 0)
```

Step 5 Manually connect to the device to make sure you have used the correct username, password, and enable password, and to ensure that the device is reachable from the sensor.

- **a.** Log in to the service account.
- **b.** Telnet or SSH to the network device to verify the configuration.
- **c.** Make sure you can reach the device.
- **d.** Verify the username and password.

Step 6 Verify that each interface/direction on each network device is correct.

See Verifying the Interfaces/Directions on the Network Device, page B-23, for the procedure.

Step 7 Look for the ACL on the router:

```
sensor# interface Ethernet0
ip address 172.16.171.28 255.255.255.192
ip access-group IDS_ethernet0_in_0 in!
ip access-list extended IDS_ethernet0_in_0d
deny ip host 172.16.171.14 any
permit ip any any
```

Verifying the Interfaces/Directions on the Network Device

To verify that each interface/direction on each controlled device is correct, you can send a manual block to a bogus host and then check to see if deny entries exist for the blocked addresses in the router's ACL.

Note You can also perform a manual block from the IDM by selecting **Administration > Manual Blocking > Host Manual Blocks**.

To initiate a manual block to a bogus host, follow these steps:

Step 1 Enter configuration mode:

```
sensor# configure terminal
```

Step 2 Enter the NAC's service configuration mode:

```
sensor(config)# service NetworkAccess
```

Step 3 Enter general NAC configuration mode:

```
sensor(config-NetworkAccess)# general
```

Step 4 Start the manual block of the bogus host IP address:

```
sensor(config-NetworkAccess-gen)# shun-hosts ip-address 10.16.0.0
```

Step 5 Exit and accept changes:

```
sensor(config-NetworkAccess-gen-shu)# exit
sensor(config-NetworkAccess-gen)# exit
sensor(config-NetworkAccess)# exit
Apply Changes:? [yes]: yes
```

Step 6 Telnet to the router and verify that a deny entry for the blocked address exists in the router's ACL.

Refer to the router documentation for the procedure.

Step 7 Remove the manual block by repeating Steps 1-5 except in Step 4 place **no** in front of the command:

```
sensor(config-NetworkAccess-gen)# no shun-hosts ip-address 10.16.0.0
```

Enabling SSH Connections to the Network Device

If you are using SSH-DES or SSH-3DES as the communication protocol for the network device, you must make sure you have enabled it on the device.

To enable SSH connections to the network device, follow these steps:

Step 1 Log in to the CLI.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enable SSH:

```
sensor(config)# ssh host blocking_device_ip_ address
```

Step 4 Type **yes** when prompted to accept the device.

Blocking Not Occurring for a Signature

If blocking is not occurring for a specific signature, check that the EventAction is set to shunHost.

To make sure blocking is occurring for a specific signature, follow these steps:

Step 1 Log in to the CLI.

Step 2 Enter configuration mode:

```
sensor# configure terminal
```

Step 3 Enter virtual sensor mode:

```
sensor(config)# service virtual-sensor-configuration virtualSensor
```

Step 4 Make sure the EventAction is set to shunHost:

```
sensor(config-vsc)# tune-micro-engines
sensor(config-vsc-virtualSensor)# atomic.icmp
sensor(config-vsc-virtualSensor-ATO)# sig sigid 2000
sensor(config-vsc-virtualSensor-ATO-sig)# show settings
SIGID: 2000 <protected>
SubSig: 0 <protected>
AlarmDelayTimer:
AlarmInterval:
AlarmSeverity: informational <defaulted>
AlarmThrottle: Summarize <defaulted>
AlarmTraits:
CapturePacket: False <defaulted>
ChokeThreshold: 100 <defaulted>
DstIpAddr:
DstIpMask:
Enabled: False <defaulted>
EventAction: shunHost
```

Verifying the Master Blocking Sensor Configuration

To verify that a master blocking sensor (MBS) is set up properly or to troubleshoot an MBS that is not set up properly, you can use the **show statistics networkAccess** command. Make sure that the forwarding sensor is set up as TLS trusted host if the remote MBS is using TLS for web access.

To verify a sensor's NAC MBS configuration, follow these steps:

Step 1 View the NAC's statistics and verify that the MBS entries are in the statistics:

```
sensor# show statistics networkAccess
Current Configuration
   AllowSensorShun = false
   ShunMaxEntries = 250
   MasterBlockingSensor
      SensorIp = 10.89.149.46
      SensorPort = 443
      UseTls = 1
State
   ShunEnable = true
   ShunnedAddr
      Host
         IP = 122.122.122.44
         ShunMinutes = 60
         MinutesRemaining = 59
```

Step 2 If the MBS does not show up in the statistics, you need to add it.

See Configuring the Sensor to be a Master Blocking Sensor, page 10-73, for the procedure.

Step 3 Initiate a manual block to a bogus host IP address to make sure the MBS is initialing blocks:

a. Enter configuration mode:

```
sensor# configure terminal
```

b. Enter the NAC's service configuration mode:

```
sensor(config)# service NetworkAccess
```

c. Enter general NAC configuration mode:

```
sensor(config-NetworkAccess)# general
```

d. Start the manual block for a bogus host IP address:

```
sensor(config-NetworkAccess-gen)# shun-hosts ip-address 10.16.0.0
```

e. Exit and accept changes:

```
sensor(config-NetworkAccess-gen-shu)# exit
sensor(config-NetworkAccess-gen)# exit
sensor(config-NetworkAccess)# exit
Apply Changes:? [yes]: yes
sensor(config)# exit
sensor#
```

Step 4 Verify that the block shows up in the NAC's statistics:

```
sensor# show statistics networkAccess
Current Configuration
   AllowSensorShun = false
   ShunMaxEntries = 100
State
   ShunEnable = true
   ShunnedAddr
      Host
         IP = 10.16.0.0
         ShunMinutes =
```

Step 5 Log in to the MBS host's CLI and, using the **show statistics networkAccess** command, verify that the block also shows up in the MBS NAC's statistics.

```
sensor# show statistics networkAccess
Current Configuration
   AllowSensorShun = false
   ShunMaxEntries = 250
   MasterBlockingSensor
      SensorIp = 10.89.149.46
      SensorPort = 443
      UseTls = 1
State
   ShunEnable = true
   ShunnedAddr
      Host
         IP = 10.16.0.0
         ShunMinutes = 60
         MinutesRemaining = 59
```

Step 6 If the remote MBS sensor is using TLS for web access, make sure the forwarding sensor is configured as a TLS host:

a. Enter configuration mode:

```
sensor# configure terminal
```

b. Make the forwarding sensor a TLS host:

```
sensor(config)# tls trust ip master_blocking_sensor_ip_address
```

Logging

TAC may suggest that you turn on debug logging for troubleshooting purposes. LogApp controls what log messages are generated by each application by controlling the logging severity for different logging zones. By default, debug logging is not turned on.

If you enable individual zone control, each zone uses the level of logging that it is configured for. Otherwise, the same logging level is used for all zones.

This section contains the following topics:

Enabling Debug Logging

Caution Enabling debug logging seriously affects performance and should only be done when instructed by TAC.

To enable debug logging, follow these steps:

Step 1 Log in to the service account.

Step 2 Edit the log.conf file to increase the size of the log to accommodate the additional log statements:

```
vi /usr/cids/idsRoot/etc/log.conf
```

Step 3 Change the `fileMaxSizeInK=500` to `fileMaxSizeInK=5000`.

Step 4 Locate the zone/CID section of the file and set the severity to debug:

```
severity=debug
```

Step 5 Save the file, exit the vi editor, and exit the service account.

Step 6 Log in to the CLI as administrator.

Step 7 Enter configuration mode:

```
sensor# configure terminal
```

Step 8 Enter service logger mode:

```
sensor(config)# service logger
```

Step 9 Enter master-control submode:

```
sensor(config-Logger)# masterControl
```

Step 10 Turn individual zone control on:

```
sensor(config-Logger-mas)# individual-zone-control true
```

Step 11 Exit master zone control:

```
sensor(config-Logger-mas)# exit
```

Step 12 View the zone names:

```
sensor(config-Logger)# show settings
   masterControl
   -----------------------------------------------
      enable-debug: false default: false
      individual-zone-control: true default: false
   -----------------------------------------------
   zoneControl (min: 0, max: 999999999, current: 8)
   -----------------------------------------------
      zoneName: Cid default: Cid
      severity: debug default: debug
```

```
      ------------------------------------------------
      zoneName: AuthenticationApp default: Cid
      severity: warning default: debug
      ------------------------------------------------
      zoneName: Cli default: Cid
      severity: warning default: debug
      ------------------------------------------------
      zoneName: ctlTransSource default: Cid
      severity: warning default: debug
      ------------------------------------------------
      zoneName: IdapiCtlTrans default: Cid
      severity: warning default: debug
      ------------------------------------------------
      zoneName: IdsEventStore default: Cid
      severity: warning default: debug
      ------------------------------------------------
      zoneName: MpInstaller default: Cid
      severity: warning default: debug
      ------------------------------------------------
      zoneName: tls default: Cid
      severity: warning default: debug
      ------------------------------------------------
   ---------------------------------------------
```

See Zone Names, page B-31, for a list of what each zone name refers to.

Step 13 To adjust the logging level for a particular zone:

```
sensor(config-Logger)# zoneControl zoneName csi
sensor(config-Logger-zon)#
```

csi now appears as a zone name.

```
sensor(config-Logger)# show setttings IdsEventStore
-----------------------------------------------
      zoneName: csi default: Cid
      severity: warning default: debug
      ------------------------------------------------
   ---------------------------------------------
```

Step 14 Enter the submode for a specific zone, for example, the EventStore:

```
sensor(config-Logger)# zoneControl zoneName IdsEventStore
```

Step 15 Turn on debugging for the EventStore:

```
sensor(config-Logger-zon)# severity debug
```

Step 16 Exit the submode for the individual zone:

```
sensor(config-Logger-zon)# exit
sensor(config-Logger)# exit
```

Step 17 Type **yes** to apply the changes:

```
Apply Changes:?[yes]: yes
sensor(config)#
```

Zone Names

Table B-1 lists the debug logger zone names:

Table B-1 Debug Logger Zone Names

Zone Name	Description
AuthenticationApp	Authentication zone
Cid	General logging zone
Cli	CLI zone
IdapiCtlTrans	All control transactions zone
IdsEventStore	EventStore zone
MpInstaller	IDSM-2 master partition installer zone
ctlTransSource	Outbound control transactions zone
tls	SSL/TLS zone

Directing cidLog Messages to SysLog

It might be useful to direct cidLog messages to syslog.

To direct cidLog messages to syslog, follow these steps:

Step 1 Go to the idsRoot/etc/log.conf file.

Step 2 Make the following changes:

a. Set [logApp] `enabled=false`

Comment out the `enabled=true` because `enabled=false` is the default.

b. Set [drain/main] `type=syslog`

The following example shows the logging configuration file:

```
timemode=local
;timemode=utc

[logApp]
;enabled=true
;-------- FIFO parameters --------
fifoName=logAppFifo
fifoSizeInK=240
;-------- logApp zone and drain parameters --------
zoneAndDrainName=logApp
fileName=main.log
fileMaxSizeInK=500

[zone/Cid]
severity=warning
drain=main

[zone/IdsEventStore]
severity=debug
drain=main

[drain/main]
type=syslog
```

The syslog output is sent to the syslog facility local6 with the following correspondence to syslog message priorities:

LOG_DEBUG, // debug

LOG_INFO, // timing

LOG_WARNING, // warning

LOG_ERR, // error

LOG_CRIT // fatal

Note Make sure that your /etc/syslog.conf has that facility enabled at the proper priority.

Caution The syslog is much slower than logApp (on the order of 50 messages per second as opposed to 1000 or so). We recommend that you enable debug severity on one zone at a time.

NTP

When you configure an NTP server to provide the time for the sensor, the sensor runs the ntpdate utility to synchronize with the NTP server. A defect exists that lets the sensor do this without authenticating. If you have not correctly typed the NTP authentication key ID and values, the sensor NTP updates still appear to be working. However, the long term updates from the NTP server will not occur if the authentication key ID and values are not correctly configured.

Also, if you are trying to configure NTP on the sensor and receive the following error, there are two possible causes:

```
Error: Could not run ntpdate utility. Fatal Error has occurred. Node
MUST be rebooted to enable alarming.
```

Either there is a connectivity problem or you have encountered an NTP reconfiguration defect.

This section contains the following topics:

Verifying that the Sensor is Synchronized with the NTP Server

To verify that the sensor is synchronized with the NTP server, follow these steps:

Step 1 Log in to the service account.

Step 2 Check to see if the sensor can communicate with the NTP server by running /usr/sbin/ntpg -p:

```
sensor# /usr/sbin/ntpq -p
remote       refid        st t when poll reach delay offset jitter
10.89.147.99 CHU_AUDIO(1) 6  u 47   64   0     0.410 19.457 0.740
LOCAL(0)     LOCAL(0)     5  l 59   64   0     0.000 0.000  0.004
```

In the servers's IP address line, if the value in the reach column is 0, the sensor either cannot communicate with the NTP server or the keys do not match.

Step 3 Make sure the sensor can contact the NTP server by running /usr/sbin/ntptrace:

```
sensor# /usr/sbin/ntptrace server_ip_address
```

Step 4 If this is the output, the sensor can contact the NTP server but the key ID or value is most likely incorrect:

```
10.89.147.99: stratum 6, offset 0.025372, synch distance 0.00003
```

Step 5 If this is the output, there is most likely a network connectivity or access problem:

```
10.89.147.99: 'Timeout'
```

Step 6 If you can contact the NTP server, make sure the sensor can authenticate the NTP server:

```
sensor# /usr/sbin/ntpq -c assoc
```

Step 7 In this output, the auth column has `ok`, indicating that the sensor was able to authenticate the NTP server. If the auth column has `bad` most likely the key ID or key value configured on the sensor does not match the value configured on the server.

```
ind assID status conf reach auth condition  last_event cnt
1   1052  f614   yes  yes   ok   sys.peer   reachable  1
2   1053  9014   yes  yes   none reject     reachable  1
```

NTP Server Connectivity Problem

If you are receiving the `Could not run ntpdate utility. Fatal Error has occurred. Node MUST be rebooted to enable alarming`, you may have a problem with connectivity and the NTP server.

To look for problems with connectivity to the NTP server, follow these steps:

Step 1 Log in to the sensor service account.

Step 2 Su to root using the service account password:

```
bash-2.05a$ su root
Password:
```

Step 3 Type the following command to shut down the NTP daemon:

```
[root@sensor]# killall -INT ntpd
```

Step 4 To synchronize the sensor's time with the NTP server's (if the NTP configuration is correct), type the following command:

```
[root@sensor]# ntpdate -u ntp_server_ip_address
```

Step 5 Look for errors in the output.

If there are no errors, you have encountered the NTP Reconfiguration defect. See NTP Reconfiguration Defect, page B-35, for more information.

If the error is `cannot reach server` or `server is not running`, see your server documentation for information on how to correctly connect the NTP server.

NTP Reconfiguration Defect

If you are receiving the `Could not run ntpdate utility. Fatal Error has occurred. Node MUST be rebooted to enable alarming`, and you do not have NTP server connectivity problem, you have encountered the NTP reconfiguration defect (CSCed84480).

Note The error occurs when ntpdate is running while ntpd is running. The defect is that MainApp should shut ntpd down every time the NTP configuration is changed so that ntpdate can be run to immediately synchronize with the NTP server.

To correct the NTP reconfiguration defect, follow these steps:

Step 1 Log in to the sensor service account.

Step 2 Su to root using the service account password.

```
bash-2.05a$ su root
Password:
```

Step 3 Type the following command:

```
[root@sensor]# killall -INT ntpd
```

Step 4 Log out of the service account.

Step 5 Log in to the sensor CLI.

Step 6 Enter configuration mode:

```
sensor# configure terminal
```

Step 7 Enter service Host mode:

```
sensor(config)# service Host
```

Step 8 Enter time parameters submode:

```
sensor(config-Host)# timeParams
```

Step 9 Set up NTP (NTP server IP address, key ID, and key value):

```
sensor(config-Host-tim)# ntpServers ipAddress ntp_server_ip_address
sensor(config-Host-tim-ntp)# keyid number
sensor(config-Host-tim-ntp)# keyvalue name
```

Here is an example of an NTP configuration:

```
sensor(config-Host-tim)# ntpServers ipAddress 10.87.126.52
sensor(config-Host-tim-ntp)# keyid 10
sensor(config-Host-tim-ntp)# keyvalue cisco
```

Step 10 Exit NTP submode:

```
sensor(config-Host-tim-ntp)# exit
sensor(config-Host-tim)# exit
sensor(config-Host)# exit
Apply Changes:?[yes]:
```

Step 11 Type **yes** to apply the changes.

TCP Reset

This section helps you troubleshoot issues with TCP reset.

This section contains the following topics:

Reset Not Occurring for a Signature

If you do not have the EventAction set to reset, the TCP reset does not occur for a specific signature.

To troubleshoot a reset not occurring for a specific signature, follow these steps:

Step 1 Log in to the CLI.

Step 2 Make sure the EventAction is set to reset:

a. Enter configuration mode:

```
sensor# configure terminal
```

b. Enter virtual sensor mode:

```
sensor(config)# service virtual-sensor-configuration virtualSensor
```

c. Check the EventAction parameter:

```
sensor(config-vsc)# tune-micro-engines
sensor(config-vsc-virtualSensor# string.tcp
sensor(config-vsc-virtualSensor-/STR)# sig sigid 20000
sensor(config-vsc-virtualSensor-STR-sig)# show settings
```

```
SIGID: 20000 <protected>
SubSig: 0 <defaulted>
AlarmDelayTimer:
AlarmInterval:
AlarmSeverity: medium <defaulted>
AlarmThrottle: Summarize <defaulted>
AlarmTraits:
CapturePacket: False <defaulted>
ChokeThreshold:
Direction: toService <defaulted>
Enabled: True <defaulted>
EventAction: reset
```

Step 3 Make sure the correct alarms are being generated:

```
sensor# show events
evAlert: eventId=1047575239898467370 severity=medium
originator:
hostId: sj_4250_40
appName: sensorApp
appInstanceId: 1004
signature: sigId=20000 sigName=STRING.TCP subSigId=0 version=Unknown
addr: locality=OUT 172.16.171.19
port: 32771
victim:
addr: locality=OUT 172.16.171.13 port: 23
actions:
tcpResetSent: true
```

Step 4 Make sure the switch is allowing incoming TCP reset packet from the sensor.

Refer to your switch documentation for the procedure.

Step 5 Make sure the resets are being sent:

```
root# ./tcpdump -i eth0 src host 172.16.171.19
tcpdump: WARNING: eth0: no IPv4 address assigned
tcpdump: listening on eth0
13:58:03.823929 172.16.171.19.32770 > 172.16.171.13.telnet: R 79:79(0)
ack 62 win 0
13:58:03.823930 172.16.171.19.32770 > 172.16.171.13.telnet: R 80:80(0)
ack 62 win 0
13:58:03.823930 172.16.171.19.32770 > 172.16.171.13.telnet: R 80:80(0)
ack 62 win 0
13:58:03.823930 172.16.171.19.32770 > 172.16.171.13.telnet: R 80:80(0)
ack 62 win 0
```

Using the TCP Reset Interface

The IDS-4250-XL has a TCP reset interface—INT0. The IDS-4250-XL has a specific TCP reset interface because it cannot send TCP resets on its monitoring ports.

If you have reset problems with the IDS-4250-XL, try the following:

- Make sure the TCP reset interface of the IDS-4250-XL (int0) is connected to the same switch as the sensing ports (int2 and int3) of the XL card.
- If the sensing ports are access ports (a single VLAN), you must configure the reset port to be in the same VLAN.

Note If the two XL ports are access ports for different VLANs, you can only configure the reset port for one of these VLANs. You can use dot1q trunk ports to overcome this limitation.

- If the sensing ports are dot1q trunk ports (multi-VLAN), the sensing ports and reset port all need to have the same native VLAN, and the reset port needs to trunk all the VLANs being trunked by both the sensing ports.

Software Upgrade

This section helps in troubleshooting software upgrades.

This section contains the following topics:

IDS-4235 and IDS-4250 Hang During A Software Upgrade

If the BIOS of the IDS-4235 and IDS-4250 is at A03, you must upgrade it to A04 before applying the latest IDS software, otherwise, the appliances will hang during the software upgrade process. Refer to Upgrading the BIOS, page 5-7, for the procedure for upgrading the BIOS. Refer to Obtaining Cisco IDS Software, page 9-1, for the procedure for applying the latest IDS software.

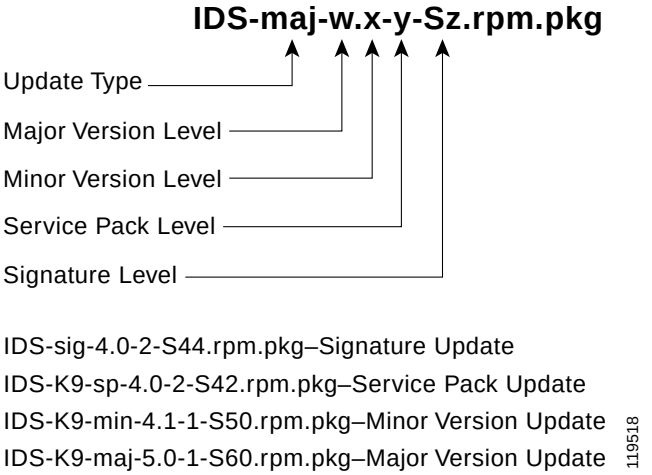
Which Updates to Apply and in Which Order

You must have the correct service pack and minor/major version of the software. If you are having trouble with applying new software, make sure that you are applying the proper updates in the proper order:

- Signature updates require correct service packs.
- Service packs require the correct minor version.
- Minor versions require the correct major version.
- Major versions require the previous major version.

Figure B-1 demonstrates how to interpret the IDS software filenames.

Figure B-1 IDS Software File Name



For example, the software updates are dependent on one another:

- To install IDS-maj-5.0-1-S90.rpm.pkg requires that the sensor be at version 4.x(y)Sz
- To install IDS-min-4.2-1-S90.rpm.pkg requires that the sensor be at version 4.0(y)Sz or 4.1(y)Sz
- To install IDS-sp-4.0-3-S90.rpm.pkg requires that the sensor be at version 4.0(1)Sz or 4.0(2)Sz
- To install IDS-sig-4.0-3-S81.rpm.pkg requires that the sensor be at version 4.0(3)Sz where the z is smaller than 81

Issues With Automatic Update

The following list provides suggestions for troubleshooting automatic update:

- Run tcpDump
  - Create a service account. Su to root and run tcpDump on the command and control interface to capture packets between the sensor and the FTP server.

    See Creating the Service Account, page 10-12, for the procedure.
  - Use the **upgrade** command to manually upgrade the sensor.

    See Reimaging Appliances and Modules, page 10-110, for the procedure.
  - Look at the tcpDump output for errors coming back from the FTP server.
- Make sure the sensor is in the correct directory.

  The directory must be specified correctly. This has caused issues with Windows FTP servers. Sometimes an extra “/” or even two “/” are needed in front of the directory name.

  To verify this, use the same FTP commands you see in the tcpDump output through your own FTP connection.
- Make sure you have not modified the FTP server to use custom prompts.

  If you modify the FTP prompts to give security warnings, for example, this causes a problem, because the sensor is expecting a hard-coded list of responses.

Note Not modifying the prompt only applies to versions before 4.1(4).

- You must use the Windows FTP server setup option to emulate UNIX file structure and not MS-DOS file structure.
- If you are using SCP, make sure you have added the SSH host key to the known hosts list.

  See Adding Known Hosts to the SSH Known Hosts List, page 10-19, for the procedure.

Try the manual **upgrade** command before attempting the automatic update. If it works with the **upgrade** command and does not work with the automatic update, try the following:

- Determine which IDS software version your sensor has (see Displaying the Current Version, page B-57, for the procedure).

  Version 4.0(1) has a known problem with automatic update. Upgrade manually to 4.1(1) before trying to configure and use automatic update.
- Make sure the passwords configured for automatic update. Make sure they match the same passwords used for manual update.
- Make sure that the filenames in the FTP server are exactly what you see on Downloads on Cisco.com. This includes capitalization.

  Some Windows FTP servers allow access to the file with the incorrect capitalization but the sensor ultimately rejects the file because the name has changed.
- If necessary, run tcpDump on automatic update. You can compare the successful manual update with the unsuccessful automatic update and troubleshoot from there.

Verifying the Version of the IDSM-2 and NM-CIDS 4.1(4) Images

The 4.1(4) application partition files for the IDSM-2 and the NM-CIDS have been repackaged. The following new files exist:

- IDSM-2—WS-SVC-IDSM2-K9-a-4.1-4-S91a.bin.gz
- NM-CIDS—NM-CIDS-K9-a-4.1-4-S91a.bin

After you install the new files, you cannot see the "a" in the filename when you use the **show version** command.

To verify that you have applied the repackaged application partition file for the IDSM-2, log in to the service account and verify that the /sbin/hdparm file exists.

To verify that you have applied the repackaged application partition file for the NM-CIDS, run the **show version** command and verify that the recovery partition is 2.4. The version of the recovery partition in the original 4.1 (4) image file was 2.3.

Updating a Sensor with the Update Stored on the Sensor

You can store the update package in the /var directory on the sensor and update the sensor from there if you need to.

To update the sensor with an update stored on the sensor, follow these steps:

Step 1 Log in to the service account.

Step 2 Obtain the update package file from Cisco.com.

Refer to Obtaining Cisco IDS Software, page 9-1, for the procedure.

Step 3 FTP or SCP the update file to the sensor's /usr/cids/idsRoot/var directory.

Step 4 Set the file permissions:

```
chmod 644 IDS_package_file_name
```

Step 5 Exit the service account.

Step 6 Log in to the sensor using an account with administrator privileges.

Step 7 Store the sensor's host key:

```
sensor# configure terminal
sensor(config)# ssh host-key sensor_ip_address
```

Step 8 Upgrade the sensor:

```
sensor(config)# upgrade
scp://service@sensor_ip_address/upgrade/IDS_package_file_name
Enter password: *****
Re-enter password: *****
```

Troubleshooting the IDSM-2

The IDSM-2 has the same software architecture as the 4200 series sensors. You can use the same troubleshooting tools as outlined in Troubleshooting the 4200 Series Appliance, page B-4.

This section pertains specifically to troubleshooting the IDSM-2.

This section contains the following topics:

Diagnosing IDSM-2 Problems

Use the following list to diagnose IDSM-2 problems:

- The ribbon cable between the IDSM-2 and the motherboard is loose.

  During physical handling of the module, the connector can come loose from the base card, and cause the daughter card and the base card to lose contact with each other. A loose ribbon cable connector causes an on-line diagnostic error on ports 7 and 8. The module cannot operate when this condition exists.

  See Partner Field Notice 52816 for more information.

- Some IDSM-2s were shipped with faulty DIMMs.

  See the Partner Field 52563 for the procedure for checking the IDSM-2 for faulty memory.

- The hard-disk drive fails to read or write.

  When the hard-disk drive has been in constant use for extended periods of time (for more than 2 weeks), multiple symptoms, such as the following, can occur:

  – An inability to log in

  – I/O errors to the console when doing read/write operations (the **ls** command)

  – Commands do not execute properly (cannot find the path to the executable)

  The switch reports that the module is ok, but if you log in to the service account and try to execute commands, you see that the problem exists. The 4.1(4) service pack alleviates this problem, but if you reimage the IDSM-2 with the 4.1(4) application partition image, you must apply the 4.1(4b) patch. See CSCef12198 for more information.

- SensorApp either crashes or takes 99% of the CPU when IP logging is enabled for stream-based signatures (1300 series). See CSCed32093 for the workaround.

- The IDSM-2 appears to lock up and remote access is prohibited (SSH. Telnet, IDM, event server, control transaction server, IP log server).

  This defect is related to using SWAP. The IDSM-2 responds to pings. Apply the 4.1(4) service pack to resolve this issue. See CSCed54146 for more information.

- Shortly after you upgrade the IDSM-2 or you tune a signature with VMS, the IDSM-2 becomes unresponsive and often produces a sensorApp core file. Apply the 4.1(4b) patch to fix this issue.

- Confirm that your IDSM-2 has the supported configurations.

  See Supported IDSM-2 Configurations, page 8-3.

- If you have confirmed that the IDSM-2 does not suffer from any of the problems listed above and yet it appears unresponsive, for example, you cannot log in to the modules via SSH or Telnet, nor can you session to the switch. Determine if the IDSM-2 responds to pings and if you can log in through the service account. If you can log in, obtain a cidDump and any core files and contact TAC.

Switch Commands for Troubleshooting

The following switch commands help you troubleshoot the IDSM-2:

- **show module** (Cisco Catalyst Software and Cisco IOS Software)
- **show version** (Cisco Catalyst Software and Cisco IOS Software)
- **show port (**Cisco Catalyst Software)
- **show trunk (**Cisco Catalyst Software)
- **show span (**Cisco Catalyst Software)
- **show security acl (**Cisco Catalyst Software)
- **show intrusion-detection module** (Cisco IOS Software)
- **show monitor** (Cisco IOS Software)
- **show vlan access-map** (Cisco IOS Software)
- **show vlan filter** (Cisco IOS Software)

Status LED Off

If the status LED is off on the IDSM-2, you need to turn power on to the module.

To determine status of the module, follow these steps:

Step 1 Log in to the console.

Step 2 Verify that the IDSM-2 is online:

For Catalyst Software (in enable mode):

```
console> (enable) show module
Mod Slot Ports Module-Type             Model              Sub Status
--- ---- ----- ---------------------- ------------------ --- -----
1   1    2     1000BaseX Supervisor    WS-X6K-SUP2-2GE    yes ok
15  1    1     Multilayer Switch Featu WS-F6K-MSFC2       no  ok
2   2    48    10/100BaseTX Ethernet   WS-X6548-RJ-45     no  ok
4   4    8     1000BaseX Ethernet      WS-X6408-GBIC      no  ok
5   5    2     Intrusion Detection Sys WS-X6381-IDS       no  ok
6   6    0     FlexWAN Module          WS-X6182-2PA       no  ok
7   7    2     Intrusion Detection Sys WS-x6381-IDS       no  ok
9   9    8     Intrusion Detection Sys WS-SVC-IDSM2       yes ok
```

```
Mod Module-Name          Serial-Num
--- -------------------- -----------
1                        SAD044409HJ
15                       SAD044509KZ
2                        SAD060304VG
4                        JAB04040859
5                        SAD044508PH
6                        SAD06450316
7                        SAD04130DZ9
9                        SAD063803KK

Mod MAC-Address(es)                         Hw     Fw          Sw
--- --------------------------------------- ------ ----------- ------------
1   00-01-63-d0-73-20 to 00-01-63-d0-73-21 1.1    6.1(3)      8.2(2)
    00-01-63-d0-73-1e to 00-01-63-d0-73-1f
    00-04-de-43-ec-00 to 00-04-de-43-ef-ff
15  00-04-9a-12-3b-40 to 00-04-9a-12-3b-7f 1.1    12.1(22)E1 12.1(22)E1
2   00-01-63-d4-a0-aa to 00-01-63-d4-a0-d9 4.0    6.3(1)      8.2(2)
4   00-30-a3-38-9a-30 to 00-30-a3-38-9a-37 2.3    4.2(0.24)V 8.2(2)
5   00-30-f2-70-d8-5e to 00-30-f2-70-d8-5f 1.2    4B4LZ0XA    3.0(7)S82
6   00-09-7c-be-37-80 to 00-09-7c-be-37-bf 1.5    12.1(22)E1 12.1(22)E1
7   00-50-3e-7e-70-62 to 00-50-3e-7e-70-63 0.301  4B4LZ0XA    3.0(7)S82
9   00-03-fe-aa-c0-d8 to 00-03-fe-aa-c0-df 0.102  7.2(1)      4.1(4)S91

Mod Sub-Type               Sub-Model           Sub-Serial  Sub-Hw Sub-Sw
--- ---------------------- ------------------- ----------- ------ ------
1   L3 Switching Engine II  WS-F6K-PFC2         SAD044302BP 1.0
9   IDS 2 accelerator board WS-SVC-IDSUPG       .           2.0
console> (enable)

For Cisco IOS software:
router# show module
Mod Ports Card Type                                Model              Serial No.
--- ----- ---------------------------------------- ------------------ -----------
  1    2  Catalyst 6000 supervisor 2 (Active)    WS-X6K-SUP2-2GE    SAD060300AR
  2   48  SFM-capable 48 port 10/100/1000mb RJ45 WS-X6548-GE-TX     SAD074806XS
  5    8  8 port 1000mb ethernet                 WS-X6408-GBIC      SAD03380401
  6    2  Intrusion Detection System             WS-X6381-IDS       SAD052106AX
  7    0  2 port adapter FlexWAN                  WS-X6182-2PA       SAD064502WY
  9    8  Intrusion Detection System             WS-SVC-IDSM2       SAD060301T4

Mod MAC addresses                       Hw    Fw           Sw           Status
--- ----------------------------------- ------ ------------ ------------ -------
  1  0002.7e38.7630 to 0002.7e38.7631   3.2   7.1(1)       12.1(19)E1   Ok
  2  000e.8336.d730 to 000e.8336.d75f   6.0   7.2(1)       7.6(1.6)T195 Ok
  5  0030.961a.b194 to 0030.961a.b19b   2.6   5.4(2)       7.6(1.6)T195 Ok
  6  0002.7ef9.9c80 to 0002.7ef9.9c81   1.1   4B4LZ0XA     3.0(6)S42    Ok
  7  0008.7cd5.2340 to 0008.7cd5.237f   1.5   12.1(19)E1   12.1(19)E1   Ok
```

```
  9  0001.0002.0003 to 0001.0002.000a   0.102 7.2(1)       4.1(4)S91    Ok

Mod Sub-Module                  Model           Serial           Hw     Status
--- --------------------------- --------------- ---------------- ------- -------
  1 Policy Feature Card 2       WS-F6K-PFC2     SAD060300XG      3.0    Ok
  1 Cat6k MSFC 2 daughterboard  WS-F6K-MSFC2    SAD060102D7      1.3    Ok
  9 IDS 2 accelerator board     WS-SVC-IDSUPG   .                2.0    Ok

Mod Online Diag Status
--- -------------------
  1 Pass
  2 Pass
  5 Pass
  6 Not Supported
  7 Not Supported
  9 Pass
router#
```

Note It is normal for the status to read "other" when the IDSM-2 is first installed. After the IDSM-2 completes the diagnostics routines and comes online, the status reads "ok." Allow up to 5 minutes for the IDSM-2 to come online.

Step 3 If the status does not read `ok`, turn the module on:

`router# **set module power up** *module_number*`

Status LED On But IDSM-2 Does Not Come Online

If the status LED is on, but the module does not come online, try the following troubleshooting tips:

- Reset the module.
- Make sure the module is installed properly in the switch.
- If the hard-disk drive status has failed, reimage the application partition.

To enable the module, follow these steps:

Step 1 Log in to the console.

Step 2 Make sure the module is enabled:

```
router# show module
```

Step 3 If the status does not read `ok`, enable the module:

```
router# set module enable module_number
```

Step 4 If the module still does not come online, reset the module:

```
router# reset module_number
```

Wait for about 5 minutes for the module to come online.

Step 5 If the module still does not come online, make sure the hardware and operating system are ok:

```
router# show test module_number
```

Step 6 If the `port` status reads `fail`, make sure the module is firmly connected in the switch.

Step 7 If the `hdd` status reads `fail`, you must reimage the application partition.

See Reimaging Appliances and Modules, page 10-110, for the procedure.

Cannot Communicate With IDSM-2 Command and Control Port

If you cannot communicate with the IDSM-2 command and control port, the command and control port may not be in the correct VLAN.

To communicate with the command and control port of the IDSM-2, follow these steps:

Step 1 Log in to the console.

Step 2 Make sure you can ping the command port from any other system.

Step 3 Make sure the IP address, mask, and gateway settings are correct:

```
router# show configuration
```

Step 4 Make sure the command and control port is in the correct VLAN:

For Catalyst software:

```
console> (enable) show port 9/2
* = Configured MAC Address

Port  Name         Status     Vlan    Duplex  Speed    Type
----- ------------ ---------- ------- ------ --------- ------------
 9/2               connected  146     full    1000     Intrusion De



Port  Broadcast-Limit Multicast Unicast Total-Drop     Action
----- --------------- --------- ------- -------------- ------------
 9/2        -              -       -     0              drop-packets

Port  Status      ErrDisable Reason   Port ErrDisableTimeout  Action on Timeout
----  ----------  ------------------  ----------------------  -----------------
 9/2  connected           -           Enable                  No Change

Port  Align-Err  FCS-Err    Xmit-Err   Rcv-Err    UnderSize
----- ---------- ---------- ---------- ---------- ---------
 9/2  0          0          0          0          0

Port  Single-Col Multi-Coll Late-Coll  Excess-Col Carri-Sen Runts     Giants
----- ---------- ---------- ---------- ---------- --------- --------- ---------
 9/2  0          0          0          0         0          0         0

Port  Last-Time-Cleared
----- --------------------------
 9/2  Mon Jul 19 2004, 09:58:55

Idle Detection
--------------
   --
console> (enable)
```

For Cisco IOS software:

```
router# show intrusion-detection module 6 management-port state
Intrusion-detection module 6 management-port:

Switchport: Enabled
Administrative Mode: dynamic desirable
Operational Mode: static access
Administrative Trunking Encapsulation: negotiate
Operational Trunking Encapsulation: native
Negotiation of Trunking: On
```

```
Access Mode VLAN: 146 (10.89.149.0/25_QA_Sensors)
Trunking Native Mode VLAN: 1 (default)
Trunking VLANs Enabled: ALL
Pruning VLANs Enabled: 2-1001
Vlans allowed on trunk:146
Vlans allowed and active in management domain: 146
Vlans in spanning tree forwarding state and not pruned:
   146
      Access Vlan = 146
```

Using the TCP Reset Interface

The IDSM-2 has a TCP reset interface—port 1. The IDSM-2 has a specific TCP reset interface because it cannot send TCP resets on its sensing ports.

If you have reset problems with the IDSM-2, try the following:

- If the sensing ports are access ports (a single VLAN), you must configure the reset port to be in the same VLAN.
- If the sensing ports are dot1q trunk ports (multi-VLAN), the sensing ports and reset port all must have the same native VLAN, and the reset port must trunk all the VLANs being trunked by both the sensing ports.

Connecting a Serial Cable to the IDSM-2

You can connect a serial cable directly to the serial console port on the IDSM-2. This lets you bypass the switch and module network interfaces.

To connect a serial cable to the IDSM-2, follow these steps:

Step 1 Locate the two RJ-45 ports on the IDSM-2.

You can find them approximately in the center of the mother board. If you are facing the module faceplate, the RJ-45 port on the right is the serial console port.

Step 2 Connect a straight-through cable to the right port on the IDSM-2, and then connect the other end of the cable to a terminal server port.

Step 3 Configure the terminal server port to be 19200 baud, 8 bits, no parity.

You can now log directly in to the IDSM-2.

Note Connecting a serial cable to the IDSM-2 works only if there is no module located about the IDSM-2 in the switch chassis, because the cable has to come out through the front of the chassis.

Gathering Information

You can use the following CLI commands and scripts to gather information and diagnose the state of the sensor when problems occur. You can use the **show tech-support** command to gather all the sensor's information, or you can use the other individual commands listed in this section for specific information.

This section contains the following topics:

show tech-support Command

The **show tech-support** command is useful for capturing all the sensor's status and configuration information.

This section contains the following topics:

- show tech-support Command Output, page B-55

show tech-support Command

The **show tech-support** command captures all status and configuration information on the sensor and includes the current configuration, version information, and cidDump information. The output can be large, over 1 MB. You can transfer the output to a remote system. See Displaying Tech Support Information, page B-53, for the procedure for copying the output to a remote system.

Note You can get the same information from IDS Device Manager by selecting **Administration** > **Support** > **System Information**.

Note Always run the **show tech-support** command before contacting TAC.

Displaying Tech Support Information

You can display system information on the screen or have it sent to a specific URL to use as a troubleshooting tool with TAC.

To display tech support information, follow these steps:

Step 1 Log in to the CLI using an account with administrator privileges.

Step 2 View the optional parameters for the **show tech support** command:

```
sensor# show tech-support ?
```

The following parameters are optional:

- page—Displays the output, one page of information at a time.
- password—Leaves passwords and other security information in the output.

- destination—Indicates the information should be formatted as HTML and sent to the destination that follows this command. If you do not specify this parameter, the output appears on the screen.
- destination-url—Indicates the information should be formatted as HTML. The URL specifies where the information should be sent.

Step 3 View the output on the screen:

```
sensor# show tech-support page
```

The system information appears on the screen, one page at a time. Press the space bar to view the next page or press **Ctrl-C** to return to the prompt.

Step 4 To send the output (in HTML format) to a file, follow these steps:

a. Type the following command, followed by a valid destination:

```
sensor# show tech-support destination-url
```

You can specify the following destination types:

- **ftp:**—Destination URL for File Transfer Protocol (FTP) network server. The syntax for this prefix is `ftp:[[//username@location]/relativeDirectory]/filename` or `ftp:[[//username@location]//absoluteDirectory]/filename`.
- **scp:**—Destination URL for the Secure Copy Protocol (SCP) network server. The syntax for this prefix is `scp:[[//username@]location]/relativeDirectory]/filename` or `scp:[[//username@]location]//absoluteDirectory]/filename`.

For example, to send the tech support output to the file `/absolute/reports/sensor1Report.html`, type the following command:

```
sensor# show tech support dest
ftp://csidsuser@10.2.1.2//absolute/reports/sensor1Report.html
```

The `password:` prompt appears.

b. Type the password for this user account.

The `Generating report:` message is displayed.

show tech-support Command Output

The following is an example of the **show tech-support** command output:

Note This output example shows the first part of the command and lists the information for the Authentication, Host, and Logger services.

```
sensor# show tech-support page
IDS 4.1 System Status Report
!! Warning output may contain Passwords !!
This Report was generated on Tues June 23 01:00:11 1994.
Output from more current-config
! ------------------
service Authentication
general
methods method Local
exit
exit
exit
! ------------------
service Host
networkParams
ipAddress 1.1.1.1
netmask 255.255.255.0
defaultGateway 10.89.146.254
hostname sensor
telnetOption enabled
accessList ipAddress 10.0.0.0 netmask 255.0.0.0
accessList ipAddress 1.2.3.4 netmask 255.255.0.0
accessList ipAddress 64.101.0.0 netmask 255.255.0.0
accessList ipAddress 5.6.7.8 netmask 255.255.255.255
accessList ipAddress 9.10.11.12 netmask 255.255.0.0
exit
optionalAutoUpgrade
active-selection none
exit
timeParams
summerTimeParams
active-selection none
exit
ntpServers ipAddress 10.10.10.10
keyId 2
keyValue none
exit
exit
exit
```

```
! ——————————————
service Logger
masterControl
enable-debug false
exit
zoneControl zoneName Cid severity debug exit zoneControl zoneName
AuthenticationApp
severity warning
exit
zoneControl zoneName Cli
severity warning
exit
zoneControl zoneName ctlTransSource
severity warning
exit
zoneControl zoneName IdapiCtlTrans
severity warning
exit
zoneControl zoneName IdsEventStore
severity warning
exit
zoneControl zoneName MpInstaller
severity warning
exit
zoneControl zoneName tls
severity warning
exit
exit
! ——————————————
```

show version Command

The **show version** command is useful for establishing the general health of the sensor.

This section contains the following topics:

show version Command

The **show version** command shows the general health of the sensor and can indicate where a failure is occurring. It gives the following information:

- Which applications are running
- Versions of the applications
- Disk and memory usage
- Upgrade history of the applications

Note You can get the same information from IDS Device Manager by selecting **Administration** > **Support** > **Diagnostics**.

Displaying the Current Version

You can display the IDS software version. Use the **show version** command to display version information for the OS, signature packages, and IDS processes running on the system.

To display the version and configuration, follow these steps:

Step 1 Log in to the CLI.

Step 2 View version information:

```
sensor# show version
```

The following examples show sample version output for the appliance and the NM-CIDS.

Sample version output for the appliance:

```
sensor# show version
Application Partition:

Cisco Systems Intrusion Detection Sensor, Version 4.1(3)S61

OS Version 2.4.18-5smpbigphys
Platform: IDS-4235
Sensor up-time is 20 days.
Using 214319104 out of 921522176 bytes of available memory (23% usage)
Using 596M out of 15G bytes of available disk space (5% usage)
```

```
MainApp           2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
AnalysisEngine    2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
Authentication    2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
Logger            2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
NetworkAccess     2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
TransactionSource 2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
WebServer         2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500 Running
CLI               2003_Oct_10_11.16  (Release)  2003-10-10T11:01:13-0500


Upgrade History:

* IDS-K9-min-4.1-1-S47          12:00:00 UTC Thu Jun 30 2005
  IDS-K9-sp-4.1-3-S61.rpm.pkg   14:14:55 UTC Fri Feb 20 2004

Recovery Partition Version 1.2 - 4.1(1)S47
```

Note If the –MORE– prompt is displayed, press the spacebar to see more information or **Ctrl-C** to cancel the output and get back to the CLI prompt. You can also disable the more prompt (so that output is continuous) by using the **terminal length 0** command.

Sample version output for the NM-CIDS:

```
Router# show version
Application Partition:

Cisco Systems Intrusion Detection Sensor, Version 4.1(0.3)S42(0.3)

OS Version 2.4.18-5
Platform: NM-CIDS
Sensor up-time is 3 days.
Using 256172032 out of 260788224 bytes of available memory (98% usage)
Using 530M out of 17G bytes of available disk space (4% usage)


MainApp           2003_May_09_06.00  (Release)  2003-05-09T06:09:22-0500 Running
AnalysisEngine    2003_May_09_06.00  (Release)  2003-05-09T06:09:22-0500 Running
Authentication    2003_May_09_06.00  (Release)  2003-05-09T06:09:22-0500 Running
Logger            2003_May_09_06.00  (Release)  2003-05-09T06:09:22-0500 Running
NetworkAccess     2003_May_09_06.00  (Release)  2003-05-09T06:09:22-0500 Running
TransactionSource 2003_May_09_06.00  (Release)  2003-05-09T06:09:22-0500 Running
WebServer         2003_May_09_06.00  (Release)  2003-05-09T06:09:22-0500 Running
CLI               2003_May_09_06.00  (Release)  2003-05-09T06:09:22-0500
```

```
Upgrade History:

No upgrades installed
```

show configuration/more current-config Command

To view the configuration for the entire system, use the **show configuration** or **more current-config** command.

Step 1 Log in to the CLI.

Step 2 View configuration information:

Note You can use the **more current-config** or **show configuration** commands.

```
sensor# more current-config
```

Configuration information (similar to the following) appears:

```
! ------------------
service Authentication
general
attemptLimit 0
methods method Local
exit
exit
exit
! ------------------
service Host
networkParams
ipAddress 10.89.147.31
netmask 255.255.255.128
defaultGateway 10.89.147.126
hostname sensor31
telnetOption disabled

accessList ipAddress 10.0.0.0 netmask 255.0.0.0
accessList ipAddress 10.16.0.0 netmask 255.255.0.0
exit
optionalAutoUpgrade
active-selection
autoUpgradeParams autoUpgradeParams
schedule
active-selection calendarUpgrade
calendarUpgrade
timesOfDay time 14:40:00
daysOfWeek day wed
exit
exit
```

```
ipAddress 10.89.149.10
directory var/relupdates
username netrangr
password 12345
fileCopyProtocol ftp
exit
exit
timeParams
offset -360
standardTimeZoneName CST
summerTimeParams
active-selection none
exit
exit
exit
```

show statistics Command

The **show statistics** command is useful for examining the state of the sensor's services.

This section contains the following topics:

show statistics Command

The **show statistics** command provides a snapshot of the current state of the sensor's services. Use the **show statistics ?**command to list the following services that provide the statistics:

- Authentication
- EventServer
- EventStore
- Host
- Logger

- NetworkAccess
- TransactionSource
- TransactionServer
- WebServer

Note You can get the same information from IDS Device Manager by selecting **Monitoring** > **Statistics**.

Displaying Statistics

You can use the **show statistics** command to display the statistics of the service you are interested in.

To display the statistics of the service you are interested in, follow these steps:

Step 1 Log in to the CLI.

Step 2 View the services that you can display statistics on:

```
sensor# show statistics ?
Authentication        Display authentication statistics
EventServer           Display event server statistics
EventStore            Display event store statistics
Host                  Display host statistics
Logger                Display logger statistics
NetworkAccess         Display network access controller statistics
TransactionServer     Display transaction server statistics
TransactionSource     Display transaction source statistics
WebServer             Display web server statistics
```

Step 3 Show the statistics of the service you are interested in:

`sensor# **show statistics** {`*Authentication* | *EventServer* | *EventStore* | *Host* | *Logger* | *NetworkAccess* | *TransactionServer* | *TransactionSource* | *WebServer* `}`
[clear]

For example, here are statistics for the EventStore:

```
sensor# show statistics EventStore
Event store statistics
   General information about the event store
      The current number of open subscriptions = 0
```

```
      The number of events lost by subscriptions and queries = 0
      The number of queries issued = 0
      The number of times the event store circular buffer wrapped = 0
   Number of events of each type currently stored
      Debug events = 0
      Status events = 0
      Log transaction events = 4
      Shun request events = 0
      Error events, warning = 3
      Error events, error = 0
      Error events, fatal = 0
      Alert events, informational = 0
      Alert events, low = 0
      Alert events, medium = 0
      Alert events, high = 0
```

show statistics Command Output

The following is an example of the **show statistics** command output for the EventStore service:

```
sensor# show statistics EventStore
Event store statistics
   General information about the event store
      The current number of open subscriptions = 1
      The number of events lost by subscriptions and queries = 0
      The number of queries issued = 0
      The number of times the event store circular buffer has
      wrapped = 0
   Number of events of each type currently stored
      Debug events = 0
      Status events = 21
      Log transaction events = 226
      Shun request events = 0
      Error events, warning = 414
      Error events, error = 10
      Error events, fatal = 1
      Alert events, informational = 0
      Alert events, low = 0
      Alert events, medium = 0
      Alert events, high = 0
```

The following is an example of the **show statistics** command output for the Logger service:

```
sensor# show statistics Logger
The number of Log interprocessor FIFO overruns = 0
The number of syslog messages received = 120
The number of <evError> events written to the event store by severity
   Fatal Severity = 0
   Error Severity = 0
   Warning Severity = 120
   TOTAL = 120
The number of log messages written to the message log by severity
   Fatal Severity = 0
   Error Severity = 0
   Warning Severity = 0
   Timing Severity = 0
   Debug Severity = 3
   Unknown Severity = 189
   TOTAL = 192
```

show interfaces Command

The **show interfaces** command is useful for gathering information on the sensing and command and control interfaces.

This section contains the following topics:

show interfaces Command

You can learn the following information from the **show interfaces** command:

- Whether the interface is up or down
- Whether or not packets are being seen, and on which interfaces
- Whether or not packets are being dropped by SensorApp
- Whether or not there are errors being reported by the interfaces that can result in packet drops

The **show interfaces** command displays statistics for all system interfaces. Or you can use the individual commands to display statistics for the command and control interface (**show interfaces command-control**), the sensing interface (**show interfaces sensing**) and all interfaces in an interface group (**show interfaces group**).

show interfaces Command Output

The following examples show the output from the **show interfaces** commands.

```
sensor# show interfaces sensing
Sensing int0 is down
  Hardware is eth0, TX
  Reset port
```

If the sensing interface is down, the sensor does not receive traffic. Use the **no shutdown** command to enable the interface.

```
sensor# configure terminal
sensor(config)# interface sensing int0
sensor(config-ifs)# no shutdown
sensor(config-ifd)# exit
sensor(config)# exit
sensor# show interfaces command-control
command-control is up
  Internet address is 10.89.146.110, subnet mask is 255.255.255.0,
   telnet is enabled.
  Hardware is eth1, tx

Network Statistics
   eth1  Link encap:Ethernet  HWaddr 00:06:5B:EC:69:A0
         inet addr:10.89.146.110  Bcast:10.89.146.255
         Mask:255.255.255.0
         UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
         RX packets:1536664 errors:37 dropped:0 overruns:0 frame:37
         TX packets:12606 errors:0 dropped:0 overruns:0 carrier:0
         collisions:88 txqueuelen:100
         RX bytes:143231073 (136.5 Mb)  TX bytes:1783147 (1.7 Mb)
         Interrupt:16 Base address:0xdcc0 Memory:feb20000-feb40000
```

The command and control port is up. You are receiving packets and none are being dropped.

show events Command

You can use the **show events** command to view the alerts generated by SensorApp and errors generated by an application.

This section contains these topics:

Sensor Events

There are five types of events:

- evAlert—Intrusion detection alerts
- evError—Application errors
- evStatus—Status changes, such as an IP log being created
- evLogTransaction—Record of control transactions processed by each sensor application
- evShunRqst—Block requests

Events remain in the EventStore until they are overwritten by newer events.

show events Command

The **show events** command is useful for troubleshooting event capture issues in which you are not seeing events in IDS Event Viewer or Security Monitor. You can use the **show events** command to determine which events are being generated on the sensor to make sure events are being generated and that the fault lies with the monitoring side.

You can clear all events from EventStore by using the **clear events** command.

Here are the parameters for the **show events** command:

```
sensor# show events
<cr>
alert          Display local system alerts
error          Display error events
hh:mm[:ss]     Display start time
log            Display log events
```

```
nac             Display NAC shun events
past            Display events starting in the past specified time
status          Display status events
|               Output modifiers
```

Displaying and Clearing Events

Use the **show events** command to display the local event log. You can display new events or events from a specific time or of a specific severity, and you can delete all events.

The **show events** command displays the requested event types beginning at the requested start time. If no start time is entered, the selected events are displayed beginning at the current time. If no event types are entered, all events are displayed. Events are displayed as a live feed. You can cancel the live feed by pressing Ctrl-C.

Note The **show events** command waits until a specified event is available. It continues to wait and display events until you exit by pressing Ctrl-C.

To display and clear events, follow these steps:

Step 1 Log in to the CLI.

Step 2 Display new events:

```
sensor# show events
```

Use the regular expression **| include shunInfo** to view the shun information, including source address, for the event.

New events are displayed as they occur.

Step 3 Display events from a specific time:

```
sensor# show events hh:mm month day year
```

For example, **show events 14:00 September 2 2002** displays all events since 2:00 p.m. September 2, 2002.

Note Time is specified in 24-hour format. You can use single digit numbers for the date.

Events from the specified time are displayed.

Step 4 Show events that began in the past:

```
sensor# show events past hh:mm:ss
```

The following example displays all events beginning 30 seconds in the past.

```
sensor# show events past 00:00:30
```

Step 5 Delete events from the event store:

```
sensor# clear events
Warning: Executing this command will remove all events currently
stored in the event store.
Continue with clear? :
```

Step 6 Type **yes** to clear all events from the EventStore.

show events Command Output

The following is an example of the **show events** command output:

```
sensor# show events

evAlert: eventId=1080048367680474106 severity=informational
 originator:
   hostId: sensor
   appName: sensorApp
   appInstanceId: 1102
 time: 2004/06/24 13:21:33 2004/06/24 13:21:33 EST
 interfaceGroup: 0
 vlan: 0
 signature: sigId=7102 sigName=Reply-to-Broadcast subSigId=0
version=S37
 participants:
   attack:
     attacker: proxy=false
       addr: locality=OUT 10.89.146.24
     victim:
       addr: locality=OUT 10.89.146.24
```

```
 alertDetails: Traffic Source: int0 ;

evAlert: eventId=1080048367680474107 severity=informational
 originator:
   hostId: sensor
   appName: sensorApp
   appInstanceId: 1102
 time: 2004/06/24 13:21:33 2004/06/24 13:21:33 EST
 interfaceGroup: 0
 vlan: 0
 signature: sigId=7102 sigName=Reply-to-Broadcast subSigId=0
version=S37
 participants:
   attack:
     attacker: proxy=false
       addr: locality=OUT 10.89.146.24
     victim:
       addr: locality=OUT 10.89.146.24
 alertDetails: Traffic Source: int5 ;
```

cidDump Script

If you do not have access to IDM or the CLI, you can run the underlying script cidDump from the service account by logging in as root and running /usr/cids/idsRoot/bin/cidDump. The cidDump file's path is /usr/cids/idsRoot/htdocs/private/cidDump.html.

cidDump is a script that captures a large amount of information including the IDS processes list, log files, OS information, directory listings, package information, and configuration files.

To run the cidDump script, follow these steps:

Step 1 Log in to the sensor service account.

Step 2 Su to root using the service account password.

Step 3 Type cidDump /usr/cids/idsRoot/bin/cidDump.

Step 4 Compress the resulting /usr/cids/idsRoot/log/cidDump.html file:

```
gzip /usr/cids/idsRoot/log/cidDump.html
```

Step 5 Send the resulting HTML file to TAC or the IDS developers in case of a problem.

See Uploading a File to the Cisco FTP Site for the procedure.

Uploading and Accessing Files on the Cisco FTP Site

You can upload large files, for example, cidDump.html, the show tech-support command output, and cores, to the ftp-sj server.

To upload and access files on the Cisco FTP site, follow these steps:

Step 1 Log in to ftp-sj.cisco.com as anonymous.

Step 2 Change to the /incoming directory.

Step 3 Use the **put** command to upload the files.

Make sure to use the binary transfer type.

Step 4 To access uploaded files, log in to an ECS-supported host.

Step 5 Change to the /auto/ftp/incoming directory.