

SafeNet ProtectServer Network HSM 5.4

INSTALLATION AND CONFIGURATION GUIDE



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PREFACE:

About the SafeNet ProtectServer Network HSM Installation and Configuration Guide

This Guide is provided as an instructional aid for the installation and configuration of a SafeNet ProtectServer Network HSM cryptographic services hardware security module (HSM). It contains the following sections:

- > "Product Overview" on page 9
- > "SafeNet ProtectServer Network HSM Hardware Installation" on page 13
- > "Testing and Configuration" on page 18
- > "Technical Specifications" on page 25
- > "Glossary" on page 26

This preface also includes the following information about this document:

- > "Customer Release Notes" below
- > "Gemalto Rebranding" below
- > "Audience" on the next page
- > "Document Conventions" on the next page
- > "Support Contacts" on page 8

For information regarding the document status and revision history, see "Document Information" on page 2.

Customer Release Notes

The customer release notes (CRN) provide important information about this release that is not included in the customer documentation. It is strongly recommended that you read the CRN to fully understand the capabilities, limitations, and known issues for this release. You can view or download the latest version of the CRN for this release at the following location:

http://www.securedbysafenet.com/releasenotes/ptk/crn_ptk_5-4.pdf

Gemalto Rebranding

In early 2015, Gemalto completed its acquisition of SafeNet, Inc. As part of the process of rationalizing the product portfolios between the two organizations, the Luna name has been removed from the SafeNet HSM product line, with the SafeNet name being retained. As a result, the product names for SafeNet HSMs have changed as follows:

Old product name	New product name
ProtectServer External 2 (PSE2)	SafeNet ProtectServer Network HSM
ProtectServer Internal Express 2 (PSI-E2)	SafeNet ProtectServer PCIe HSM
ProtectServer HSM Access Provider	SafeNet ProtectServer HSM Access Provider
ProtectToolkit C (PTK-C)	SafeNet ProtectToolkit-C
ProtectToolkit J (PTK-J)	SafeNet ProtectToolkit-J
ProtectToolkit M (PTK-M)	SafeNet ProtectToolkit-M
ProtectToolkit FM SDK	SafeNet ProtectToolkit FM SDK

NOTE These branding changes apply to the documentation only. The SafeNet HSM software and utilities continue to use the old names.

Audience

This document is intended for personnel responsible for maintaining your organization's security infrastructure. This includes SafeNet ProtectToolkit users and security officers, key manager administrators, and network administrators.

All products manufactured and distributed by Gemalto are designed to be installed, operated, and maintained by personnel who have the knowledge, training, and qualifications required to safely perform the tasks assigned to them. The information, processes, and procedures contained in this document are intended for use by trained and qualified personnel only.

It is assumed that the users of this document are proficient with security concepts.

Document Conventions

This document uses standard conventions for describing the user interface and for alerting you to important information.

Notes

Notes are used to alert you to important or helpful information. They use the following format:

NOTE Take note. Contains important or helpful information.

Cautions

Cautions are used to alert you to important information that may help prevent unexpected results or data loss. They use the following format:

CAUTION! Exercise caution. Contains important information that may help prevent unexpected results or data loss.

Warnings

Warnings are used to alert you to the potential for catastrophic data loss or personal injury. They use the following format:

****WARNING**** Be extremely careful and obey all safety and security measures. In this situation you might do something that could result in catastrophic data loss or personal injury.

Command Syntax and Typeface Conventions

Format	Convention
bold	The bold attribute is used to indicate the following: <ul style="list-style-type: none"> > Command-line commands and options (Type dir /p.) > Button names (Click Save As.) > Check box and radio button names (Select the Print Duplex check box.) > Dialog box titles (On the Protect Document dialog box, click Yes.) > Field names (User Name: Enter the name of the user.) > Menu names (On the File menu, click Save.) (Click Menu > Go To > Folders.) > User input (In the Date box, type April 1.)
<i>italics</i>	In type, the italic attribute is used for emphasis or to indicate a related document. (See the <i>Installation Guide</i> for more information.)
<variable>	In command descriptions, angle brackets represent variables. You must substitute a value for command line arguments that are enclosed in angle brackets.
[optional] [<optional>]	Represent optional keywords or <variables> in a command line description. Optionally enter the keyword or <variable> that is enclosed in square brackets, if it is necessary or desirable to complete the task.
{ a b c } {<a> <c>}	Represent required alternate keywords or <variables> in a command line description. You must choose one command line argument enclosed within the braces. Choices are separated by vertical (OR) bars.
[a b c] [<a> <c>]	Represent optional alternate keywords or variables in a command line description. Choose one command line argument enclosed within the braces, if desired. Choices are separated by vertical (OR) bars.

Support Contacts

Contact method	Contact
Phone (Subject to change. An up-to-date list is maintained on the Technical Support Customer Portal)	Global +1 410-931-7520
	Australia 1800.020.183
	India 000.800.100.4290
	Netherlands 0800.022.2996
	New Zealand 0800.440.359
	Portugal 800.863.499
	Singapore 800.1302.029
	Spain 900.938.717
	Sweden 020.791.028
	Switzerland 0800.564.849
	United Kingdom 0800.056.3158
United States (800) 545-6608	
Web	https://safenet.gemalto.com
Technical Support Customer Portal	https://supportportal.gemalto.com Existing customers with a Technical Support Customer Portal account can log in to manage incidents, get the latest software upgrades, and access the Knowledge Base. To create a new account, click the Register link at the top of the page. You will need your Customer Identifier number.

CHAPTER 1:

Product Overview

The SafeNet ProtectServer Network HSM is a self-contained, security-hardened server providing hardware-based cryptographic functionality through a TCP/IP network connection. Together with high-level SafeNet application programming interface (API) software, it provides cryptographic services for a wide range of secure applications.

The SafeNet ProtectServer Network HSM is PC-based. The enclosure is a heavy-duty steel case with common PC ports and controls. Necessary software components come pre-installed on a Linux operating system. Network setting configuration is required, as described in this document.

The full range of cryptographic services required by Public Key Infrastructure (PKI) users is supported by the SafeNet ProtectServer Network HSM's dedicated hardware cryptographic accelerator. These services include encryption, decryption, signature generation and verification, and key management with a tamper resistant and battery-backed key storage.

The SafeNet ProtectServer Network HSM must be used with one of SafeNet's high-level cryptographic APIs. The following table shows the provider types and their corresponding SafeNet APIs:

Table Section Outside Table: API	Table Section Outside Table: SafeNet Product Required
PKCS #11	SafeNet ProtectToolkit-C
JCA / JCE	SafeNet ProtectToolkit-J
Microsoft IIS and CA	SafeNet ProtectToolkit-M

These APIs interface directly with the product's FIPS 140-2 Level 3 certified core using high-speed DES and RSA hardware-based cryptographic processing. Key storage is tamper-resistant and battery-backed.

A smart card reader, supplied with the HSM, allows for the secure loading and backup of keys.

Front panel view

The features on the front panel of the SafeNet ProtectServer Network HSM are illustrated below:

Figure 1: SafeNet ProtectServer Network HSM front panel



Ports

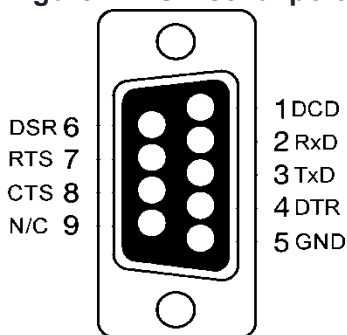
The front panel is equipped with the following ports:

VGA	Connects a VGA monitor to the appliance.
Console	Provides console access to the appliance. See "Testing and Configuration" on page 18.
USB	Connects USB devices such as a keyboard or mouse to the appliance.
eth0 eth1	Autosensing 10/100/1000 Mb/s Ethernet RJ45 ports for connecting the appliance to the network.
HSM USB	Connects a smart card reader to the appliance using the included USB-to-serial cable.

HSM serial port pin configuration

The serial port on the USB-to-serial cable, illustrated below, uses a standard RS232 male DB9 pinout:

Figure 2: HSM serial port pinout



LEDs

The front panel is equipped with the following LEDs:

Power	Illuminates green to indicate that the unit is powered on.
HDD	Flashes amber to indicate hard disk activity.
Status	Flashes green on startup.

Reset button

The reset button is located between the USB and Ethernet ports. Pressing the reset button forces an immediate restart of the appliance. Although it does not power off the appliance, it does restart the software. Pressing the reset button is service-affecting and is not recommended under normal operating conditions.

Rear panel view

The features on the rear panel of the SafeNet ProtectServer Network HSM are illustrated below:

Figure 3: SafeNet ProtectServer Network HSM rear panel



Tamper lock

The tamper lock is used during commissioning or decommissioning of the appliance to destroy any keys currently stored on the HSM.

With the key in the horizontal (Active) position, the HSM is in normal operating mode. Turning the key to the vertical (Tamper) position places the HSM in a tamper state, and any keys stored on the HSM are destroyed.

CAUTION! Turning the tamper key from the Active position to the Tamper position deletes any keys currently stored on the HSM. Deleted keys are not recoverable. Ensure that you always back up your keys. To avoid accidentally deleting the keys on an operational SafeNet ProtectServer Network HSM, remove the tamper key after commission and store it in a safe place.

Cryptographic architecture

A hardware-based cryptographic system consists of three general components:

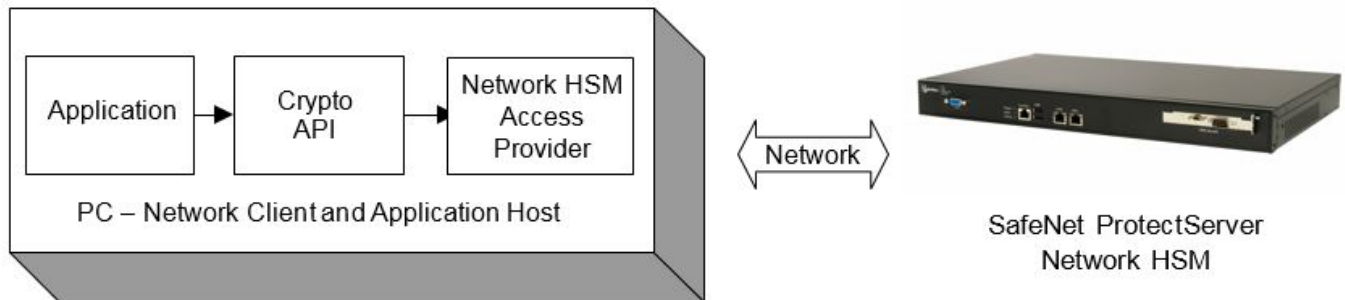
- > One or more hardware security modules (HSMs) for key processing and storage.
- > High-level cryptographic API software. This software uses the HSM's cryptographic capabilities to provide security services to applications.
- > Access provider software to allow communication between the API software and the HSMs.

Operating in network mode, a standalone SafeNet ProtectServer Network HSM can provide key processing and storage.

In network mode, access provider software is installed on the machine hosting the cryptographic API software. The access provider allows communication between the API and the SafeNet ProtectServer Network HSM over a TCP/IP connection. The HSM can therefore be located remotely, improving the security of cryptographic key data

The figure below depicts a cryptographic service provider using the SafeNet ProtectServer Network HSM in network mode.

Figure 4: SafeNet ProtectServer Network HSM implementation



Summary of Cryptographic Service Provider setup

These steps summarize the overall procedure of setting up a cryptographic service provider using a SafeNet ProtectServer Network HSM in network mode. Relevant links to more detailed documentation are provided at each step.

1. **Install the SafeNet ProtectServer Network HSM** (See ["Installing the SafeNet ProtectServer Network HSM Hardware"](#) on page 15).
2. **Check that the SafeNet ProtectServer Network HSM is operating correctly** (see ["Testing and Configuration"](#) on page 18).
3. **Configure the SafeNet ProtectServer Network HSM network settings** (see ["Testing and Configuration"](#) on page 18).
4. **Install and configure the Network HSM Access Provider software** (see the *SafeNet HSM Access Provider Installation Guide*).
5. **Install the high-level cryptographic API software.**
Please refer to the relevant installation guide supplied with the product:
 - *SafeNet ProtectToolkit-C Administration Guide*
 - *SafeNet ProtectToolkit-J Installation Guide*
 - *SafeNet ProtectToolkit-M User Guide*
6. **Configure the high-level cryptographic API to allow preferred operating modes.** Some of these tasks may include:
 - establishing a trusted channel or secure messaging system (SMS) between the API and the Safenet ProtectServer Network HSM.
 - establishing communication between the network client and the Safenet ProtectServer Network HSM.

Please refer to the relevant high-level cryptographic API documentation:

- *SafeNet ProtectToolkit-C Administration Guide*
- *SafeNet ProtectToolkit-J Administration Guide*
- *SafeNet ProtectToolkit-M User Guide*

CHAPTER 2:

SafeNet ProtectServer Network HSM Hardware Installation

This chapter describes how to install and connect a SafeNet Protect Server Network HSM. To ensure a successful installation, perform the following tasks in the order indicated:




1. Ensure that you have all of the required components, as listed in ["SafeNet ProtectServer Network HSM Required Items" on the next page](#)
2. Install and connect the hardware, as described in ["Installing the SafeNet ProtectServer Network HSM Hardware" on page 15](#)



SafeNet ProtectServer Network HSM Required Items

This section provides a list of components that you should have received with your SafeNet ProtectServer Network HSM order.

Contents Received

The following table contains the standard items you received with your order:

Qty	Item
1	 <p>SafeNet ProtectServer Network HSM standalone appliance.</p>
1	Power cable(*)
1	 <p>Smart card reader</p>
2	 <p>Smart cards (in a single media case)</p>

Qty	Item
1	 <p data-bbox="212 590 823 617">SafeNet ProtectToolkit Software DVD (in DVD case)</p>
1	 <p data-bbox="212 978 624 1005">Documentation DVD (in DVD case)</p>

(*) Power cables are no longer included with the shipment from our factory. Please source your power cables locally for the intended deployment destination.

NOTE To configure your SafeNet ProtectServer Network HSM you will need to supply and connect a keyboard, mouse, and display monitor. After the appliance is placed into service, the keyboard, mouse and monitor can be disconnected from the appliance.

Installing the SafeNet ProtectServer Network HSM Hardware

Since the SafeNet ProtectServer Network HSM is delivered with the necessary software pre-installed, no software installation is necessary on the unit itself.

After installation, confirm that the unit is operating correctly and configure the network settings. These steps are covered in ["Testing and Configuration" on page 18](#).

Installation procedure

To install the hardware:

1. Choose a suitable location to site the equipment. You can mount the SafeNet ProtectServer Network HSM in a standard 19-inch rack.

NOTE The power supply cord acts as the unit's disconnect device. The main outlet socket to which the unit is connected must be easily accessible.

2. Connect the SafeNet ProtectServer Network HSM to the network by inserting standard Ethernet cables into the LAN connectors located on the unit's front face (labelled *eth0* and *eth1*). The client machine(s) with SafeNet cryptographic API software installed should be hosted on the same network.

NOTE The SafeNet ProtectServer Network HSM is equipped with two NICs (*eth0* and *eth1*) incorporating an IPv4/IPv6 dual stack, allowing you to configure both an IPv4 and IPv6 address on each interface. If you intend to use both NICs, connect Ethernet cables to both LAN connectors.

3. Connect the power cable to the unit and a suitable power source. The SafeNet ProtectServer Network HSM is equipped with an autosensing power supply that can accept 100-240V at 50-60Hz.

Smart Card Reader Installation

The unit supports the use of smart cards with a SafeNet-supplied smart card reader. Other smart card readers are not supported.

The SafeNet ProtectServer Network HSM supports two different card readers:

- > the new USB card reader (introduced in 5.2)
- > the legacy card reader, which provides a serial interface for data (via a USB-to-serial cable) and a PS/2 interface for power (direct or via a PS/2 to USB adapter)

Installing the USB smart card reader

To install the USB card reader, simply plug the card reader into the HSM USB port, as illustrated below.



Installing the legacy card reader

To install the smart card reader, connect it to the HSM USB port with the included USB-to-serial cable.

The legacy card reader must also be connected to a PS/2 port for its power. Many newer servers have USB ports, but do not provide a PS/2 connection.

If there is no available PS/2 connection, there are two options:

- > Connect a PS/2-to-USB adapter (pink in the image below) between the card reader and a USB port on the SafeNet ProtectServer Network HSM.
- > If, for security reasons, you prefer to not expose USB ports on your crypto server, connect a PS/2-to-USB adapter cable between the card reader and a standalone powered USB hub. It should be noted that the USB connection is for power only. No data transfer occurs.



Next, see ["Testing and Configuration" on page 18.](#)

CHAPTER 3:

Testing and Configuration

This chapter provides a step-by-step overview of how to confirm correct operation of the Safenet ProtectServer Network HSM, and configure its network settings. These instructions assume that the installation process covered in ["Installing the SafeNet ProtectServer Network HSM Hardware" on page 15](#) is complete.

This chapter contains the following sections:

- > ["First Login and System Test" below](#)
- > ["Network Configuration" on page 20](#)
- > ["Powering off the SafeNet ProtectServer Network HSM" on page 24](#)
- > ["Troubleshooting" on page 24](#)

First Login and System Test

When starting up your SafeNet ProtectServer Network HSM for the first time, follow these steps:

- > ["Access the Console" below](#)
- > ["Power on and Login" on the next page](#)
- > ["Run System Test" on page 20](#)

Access the Console

To test the system and configure the network, you must first access the SafeNet ProtectServer Network HSM console. There are two options:

- > *Direct access.* Connect a keyboard and monitor (not included) to the USB (keyboard) and VGA (monitor) ports located on the unit's front panel.
- > *Console access.* Connect the RJ45 console port to a terminal emulation device, such as a laptop or terminal server.

NOTE To access the appliance through the console port, you will need the appropriate cable. If your terminal device is equipped with a DB9 serial port, you require a cable with an RJ45 connector on one end and a DB9 serial port on the other end (see ["Serial cable: RJ45 to DB9" on the next page](#)). If your terminal device is equipped with an RJ45 serial port, you can use a standard Ethernet cable. Serial cables are not included.

Figure 5: Serial cable: RJ45 to DB9

If you are using a serial connection, configure your local VT100 or terminal emulator settings as follows:

Speed (bits per second)	115200
Word length (data bits)	8
Parity	No
Stop bit	1

Power on and Login

Power on the SafeNet ProtectServer Network HSM and the (optional) monitor. A green LED on the front of the device will illuminate and the startup messages will be displayed on the monitor.

Power-up is complete when the SafeNet ProtectServer Network HSM login prompt appears:

```
Protect Server External 5.4.0
PSE+ login:
```

You can login as **admin** or **pseoperator** to access the PSE shell (PSESH), which provides a CLI for configuring and managing the appliance. See the *PSESH Command Reference Guide* for command syntax.

The default passwords for the **admin** and **pseoperator** users are:

User name	Default password
admin	password
pseoperator	password

After logging in, you will be prompted to change the password for the account. Please remember your password. To change the account password at any time, login to the account and use the command **user password**.

The **admin** user can reset all account passwords to their factory defaults at any time with the PSESH command **sysconf appliance factory**. This command will also reset the SNMP and network settings to their factory defaults.

CAUTION! Executing **sysconf appliance factory** over an SSH connection may cause you to lose connection with the appliance when the IP address is reset. To avoid this, use a serial connection instead when using this command.

Run System Test

Before field testing and deployment, run the diagnostic utility. Use **hsm state** to display the current status:

```
psesh:>hsm state
```

```
HSM device 0:   HSM in NORMAL MODE. RESPONDING to requests. Usage Level=0%
State = (0x8000, 0xffffffff)
Host Interface  = PSIE2
```

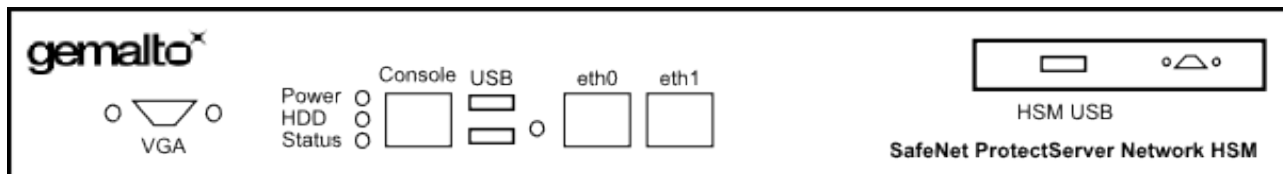
```
Command Result : 0 (Success)
```

You can also use the PSESH command **status** to check each of the HSM's processes. See the *PSESH Command Reference Guide* for command syntax.

Network Configuration

The SafeNet ProtectServer Network HSM is intended to be installed in a data center and accessed remotely over a network. Network access is provided by two Ethernet LAN ports. The SafeNet ProtectServer Network HSM is also equipped with an RJ-45 console port, used to provide serial access to the appliance for initial network configuration.

The network device interfaces (eth0 and eth1) and console port are located on the front of the appliance, as illustrated below:



Serial port

Connect a serial device to the SafeNet ProtectServer Network HSM to perform initial network configuration via PSESH. Use the console port to configure at least one of the network interfaces. Once you have configured an interface, you can connect the appliance to the network and access PSESH to complete the network configuration.

Appliance configuration

The following network parameters are configured at the appliance level:

- > Appliance hostname. A hostname is optional, unless you are using DNS.

Ethernet LAN device configuration

The SafeNet ProtectServer Network HSM is equipped with two individually-configurable Ethernet LAN network devices. You can configure the following network settings for each device:

- > IPv4 or IPv6 address. You can configure the addresses using static or DHCP addressing.

- > Network gateway. Devices must use a gateway appropriate for the network (IPv4 or IPv6).
- > Network mask. IPv4 devices must use dotted-quad format (for example, 255.255.255.0). IPv6 devices can use full or shorthand syntax.
- > Static network route.
- > DNS configuration. Although you configure DNS at the device level, the settings you configure for a device are available to all devices on the appliance if the configured device is connected to the network. To ensure DNS access, it is recommended that you configure each device. You can configure the following settings:
 - DNS nameservers
 - DNS search domains

These settings apply to static network configurations only. If you are using DHCP, the DNS search domains and DNS nameservers configured on the DHCP server are used.

Gathering Appliance Network Information

Before you begin, obtain the following information (see your network administrator for most of these items):

HSM Appliance Network Parameters

- > IP address and subnet mask for each LAN port you want to use (if you are using static IP addressing)
- > Hostname for the HSM appliance (registered with network DNS)
- > Domain name (per port)
- > Default gateway IP address (per port)
- > DNS Name Server IP address(es) (per port)
- > Search Domain name(s) (per port)
- > Device subnet mask (per port)

DNS Entries

- > Ensure that you have configured your DNS Server(s) with the correct entries for the appliance and the client.
- > If you are using DHCP, then all references to the Client and the HSM appliance (as in Certificates) should use hostnames.

Configuring the Network Parameters

You can use the serial connection to configure all of your network parameters, or configure a single port and use it to access the appliance over the network and complete the configuration.

NOTE Use a locally-connected serial terminal when changing the appliance IP address, to avoid SSH admin console disconnection.

To configure the appliance and port network parameters:

It is recommended that you configure and test each device. You need to know the IP address of at least one network interface to establish an SSH connection to the appliance.

1. Login to the appliance as **admin** or **pseoperator**.
2. Configure the IP address, network mask, and gateway (optional) on at least one of the Ethernet LAN ports (eth0 or eth1). You can specify a static address, or retrieve one from a DHCP server. You can configure each port to use an IPv4 or IPv6 address.

Static	psesh:> network interface static -device <netdevice> -ip <IP_address> -netmask <netmask> [-gateway <IP_address>]
DHCP	psesh:> network interface dhcp -device <netdevice>

Either of these commands will prompt you to restart the network service.

3. [Optional] Set the appliance hostname and domain name.

```
psesh:> network hostname <hostname>
```

```
psesh:> network domain <netdomain>
```

You must configure your DNS server to resolve the hostname to the IP address configured on the Ethernet port of the appliance. Do this for each Ethernet port connected to a network. See your network administrator for assistance.

4. [Optional] Add a domain name server to the network configuration for the appliance. The name server is added to the appliance DNS table. There is one DNS table that applies to all network devices (ports) on the appliance.

```
psesh:> network dns add nameserver <IP_address> -device <net_device>
```

NOTE The domain name settings apply to static network configurations only. If you are using DHCP, the DNS name servers configured on the DHCP server are used.

When you add a DNS server to a specific network device, it is added to the DNS table for the appliance and becomes available to both devices, provided the device you added it to is connected to the network. For example, if you add a DNS server to eth0, eth1 will be able to access the DNS server if eth0 is connected to the network. If eth0 is disconnected from the network, eth1 also loses DNS server access. To ensure that any DNS server you add is available in the event of a network or port failure, it is recommended that you add it to both network-connected devices.

5. [Optional] Add a search domain to the network configuration. These are automatically appended to an internet address you specify in PSESH. For example, if you add the search domain **mycompany.com**, entering the command **network ping hsm1** would search for the domain **hsm1.mycompany.com**. If the domain resolves, it pings the device with that hostname.

```
lunash:> network dns add searchdomain <domain> -device <net_device>
```

The search domain is added to the appliance DNS table.

NOTE The search domain settings apply to static network configurations only. If you are using DHCP, the DNS search domains configured on the DHCP server are used.

When you add a DNS search domain to a specific network device, it is added to the DNS table for the appliance and becomes available to both devices, provided the device you added it to is connected to the network. For example, if you add a DNS server to eth0, eth1 will be able to access the DNS server if eth0 is connected to the network. If eth0 is disconnected from the network, eth1 also loses DNS server access. To ensure that any DNS server you add is available in the event of a network or port failure, it is recommended that you add it to both network-connected devices.

If you have chosen to perform setup via SSH, you will likely lose your network connection as you confirm the change of IP address from the default setting.

6. [Optional] Add iptables ACCEPT and DROP rules to manage network access to the appliance.

By default, the SafeNet ProtectServer Network HSM allows access to all networks and hosts. The default policy for the INPUT and OUTPUT chain is set to ACCEPT. The default policy for the FORWARD chain is set to DROP, since the SafeNet ProtectServer Network HSM is not used to forward packets, as in a router or proxy.

CAUTION! If you are configuring iptables via SSH, a malformed rule can cause a lockout.

a. To add an ACCEPT rule, specify a host or network:

```
psesh:> network iptables addrule accept host -ip <IP_address>
```

```
psesh:> network iptables addrule accept network -net <IP_address> -mask <netmask>
```

b. To add a DROP rule, specify a host or network:

```
psesh:> network iptables addrule drop host -ip <IP_address>
```

```
psesh:> network iptables addrule drop network -net <IP_address> -mask <netmask>
```

c. To see the current list of rules:

```
psesh:> network iptables show
```

d. To delete a rule, specify the rule's position on the list:

```
psesh:> network iptables delrule -rulenum <number>
```

A rule's number is based on its current list position, so executing **network iptables delrule -rulenum 1** multiple times will eventually delete the entire list.

e. Save your iptables changes:

```
psesh:> network iptables save
```

You must execute this command, or any changes will be lost on the next appliance reboot.

7. After making any change to the network configuration, reboot the appliance:

```
psesh:> sysconf appliance reboot
```

8. View the new network settings:

```
psesh:> network show
```

SSH Network Access

After you have completed the network configuration, you can access the SafeNet ProtectServer Network HSM over the network using the SSH protocol. You need an SSH client such as puTTY (available for free from www.putty.org).

Powering off the SafeNet ProtectServer Network HSM

Use PSESH to power off the appliance before toggling the power switch.

To power off the SafeNet ProtectServer Network HSM:

1. While logged in to PSESH as **admin** or **pseoperator**, issue the command:

```
psesh:> sysconf appliance poweroff
```

Wait for the appliance to perform shutdown procedures. The fan and LEDs will remain operational.
2. Toggle the power switch, located on the rear of the SafeNet ProtectServer Network HSM, to the off position. The fan and LEDs will turn off.

Troubleshooting

Each SafeNet ProtectServer Network HSM is tested during manufacture to ensure a high level of quality. In the unlikely event the unit is not functioning correctly please re-check the installation procedure, paying particular attention to the power source and network cable connection. Running the diagnostic command **hsm state**, as described in "[First Login and System Test](#)" on page 18, is the only method available to test the unit.

NOTE The unit has no user serviceable parts. Please do not disassemble the unit to resolve problems unless directed by a SafeNet support engineer.

NOTE If it ever becomes necessary to get into the BIOS, press **<Delete>** as the SafeNet ProtectServer Network HSM boots.

For further assistance contact your supplier or SafeNet support with the following details at hand:

- > The product serial number (at the back of the unit)
- > A detailed description of the current system configuration
- > Details of any error messages pertaining to the problem

For contact numbers in your home country, see "[Support Contacts](#)" on page 8.

APPENDIX A:

Technical Specifications

The SafeNet ProtectServer Network HSM specifications are as follows:

Hardware

- > One smart card reader secure USB port (requires the included USB-to-serial cable)
- > Protective, heavy duty steel, industrial PC case
- > ATOM D425 CPU
- > 1 Gb RAM
- > 2 Gb solid state flash memory hard disk (DOM)
- > 10/100/1000 Mbps autosensing Network Interface with RJ45 LAN connector

Pre-installed Software

- > Linux operating system
- > SafeNet PCI HSM Access Provider software
- > SafeNet HSM Net Server software

Power Supply

- > Nominal power consumption: 43 W
- > Input AC voltage range: 100-240 V
- > Input frequency range: 50-60 Hz

Physical properties

- > 437 mm (W) x 270 mm (D) x 44 mm (H) (1U)
- > 19" rack mounting brackets included
- > Weight 5 kg (11 lb)

Operating Environment

- > Temperature: 0 to 40 °C (32 to 104 °F)
- > Relative Humidity: 5 to 85%

APPENDIX B:

Glossary

A

Adapter

The printed circuit board responsible for cryptographic processing in a HSM

AES

Advanced Encryption Standard

API

Application Programming Interface

ASO

Administration Security Officer

Asymmetric Cipher

An encryption algorithm that uses different keys for encryption and decryption. These ciphers are usually also known as public-key ciphers as one of the keys is generally public and the other is private. RSA and ElGamal are two asymmetric algorithms

B

Block Cipher

A cipher that processes input in a fixed block size greater than 8 bits. A common block size is 64 bits

Bus

One of the sets of conductors (wires, PCB tracks or connections) in an IC

C

CA

Certification Authority

CAST

Encryption algorithm developed by Carlisle Adams and Stafford Tavares

Certificate

A binding of an identity (individual, group, etc.) to a public key which is generally signed by another identity. A certificate chain is a list of certificates that indicates a chain of trust, i.e. the second certificate has signed the first, the third has signed the second and so on

CMOS

Complementary Metal-Oxide Semiconductor. A common data storage component

Cprov

ProtectToolkit C - SafeNet's PKCS #11 Cryptoki Provider

Cryptoki

Cryptographic Token Interface Standard. (aka PKCS#11)

CSA

Cryptographic Services Adapter

CSPs

Microsoft Cryptographic Service Providers

D

Decryption

The process of recovering the plaintext from the ciphertext

DES

Cryptographic algorithm named as the Data Encryption Standard

Digital Signature

A mechanism that allows a recipient or third party to verify the originator of a document and to ensure that the document has not be altered in transit

DLL

Dynamically Linked Library. A library which is linked to application programs when they are loaded or run rather than as the final phase of compilation

DSA

Digital Signature Algorithm

E

Encryption

The process of converting the plaintext data into the ciphertext so that the content of the data is no longer obvious. Some algorithms perform this function in such a way that there is no known mechanism, other than decryption with the appropriate key, to recover the plaintext. With other algorithms there are known flaws which reduce the difficulty in recovering the plaintext

F

FIPS

Federal Information Protection Standards

FM

Functionality Module. A segment of custom program code operating inside the CSA800 HSM to provide additional or changed functionality of the hardware

FMSW

Functionality Module Dispatch Switcher

H

HA

High Availability

HIFACE

Host Interface. It is used to communicate with the host system

HSM

Hardware Security Module

I

IDEA

International Data Encryption Algorithm

IIS

Microsoft Internet Information Services

IP

Internet Protocol

J

JCA

Java Cryptography Architecture

JCE

Java Cryptography Extension

K

Keyset

A keyset is the definition given to an allocated memory space on the HSM. It contains the key information for a specific user

KWRAP

Key Wrapping Key

M

MAC

Message authentication code. A mechanism that allows a recipient of a message to determine if a message has been tampered with. Broadly there are two types of MAC algorithms, one is based on symmetric encryption algorithms and the second is based on Message Digest algorithms. This second class of MAC algorithms are known as HMAC algorithms. A DES based MAC is defined in FIPS PUB 113, see <http://www.itl.nist.gov/div897/pubs/fip113.htm>. For information on HMAC algorithms see RFC-2104 at <http://www.ietf.org/rfc/rfc2104.txt>

Message Digest

A condensed representation of a data stream. A message digest will convert an arbitrary data stream into a fixed size output. This output will always be the same for the same input stream however the input cannot be reconstructed from the digest

MSCAPI

Microsoft Cryptographic API

MSDN

Microsoft Developer Network

P

Padding

A mechanism for extending the input data so that it is of the required size for a block cipher. The PKCS documents contain details on the most common padding mechanisms of PKCS#1 and PKCS#5

PCI

Peripheral Component Interconnect

PEM

Privacy Enhanced Mail

PIN

Personal Identification Number

PKCS

Public Key Cryptographic Standard. A set of standards developed by RSA Laboratories for Public Key Cryptographic processing

PKCS #11

Cryptographic Token Interface Standard developed by RSA Laboratories

PKI

Public Key Infrastructure

ProtectServer

SafeNet HSM

ProtectToolkit C

SafeNet's implementation of PKCS#11. Protecttoolkit C represents a suite of products including various PKCS#11 runtimes including software only, hardware adapter, and host security module based variants. A Remote client and server are also available

ProtectToolkit J

SafeNet's implementation of JCE. Runs on top of ProtectToolkit C

R

RC2/RC4

Ciphers designed by RSA Data Security, Inc.

RFC

Request for Comments, proposed specifications for various protocols and algorithms archived by the Internet Engineering Task Force (IETF), see <http://www.ietf.org>

RNG

Random Number Generator

RSA

Cryptographic algorithm by Ron Rivest, Adi Shamir and Leonard Adelman

RTC

Real Time Clock

S

SDK

Software Development Kits Other documentation may refer to the SafeNet Cprov and Protect Toolkit J SDKs. These SDKs have been renamed ProtectToolkit C and ProtectToolkit J respectively. ⌚ The names Cprov and ProtectToolkit C refer to the same device in the context of this or previous manuals. ⌚ The names Protect Toolkit J and ProtectToolkit J refer to the same device in the context of this or previous manuals.

Slot

PKCS#11 slot which is capable of holding a token

SlotPKCS#11

Slot which is capable of holding a token

SO

Security Officer

Symmetric Cipher

An encryption algorithm that uses the same key for encryption and decryption. DES, RC4 and IDEA are all symmetric algorithms

T

TC

Trusted Channel

TCP/IP

Transmission Control Protocol / Internet Protocol

Token

PKCS#11 token that provides cryptographic services and access controlled secure key storage

TokenPKCS#11

Token that provides cryptographic services and access controlled secure key storage

U

URI

Universal Resource Identifier

V

VA

Validation Authority

X

X.509

Digital Certificate Standard

X.509 Certificate

Section 3.3.3 of X.509v3 defines a certificate as: "user certificate; public key certificate; certificate: The public keys of a user, together with some other information, rendered unforgeable by encipherment with the private key of the certification authority which issued it"