

# **BIG-IP<sup>®</sup> Systems and SafeNet<sup>®</sup> Luna SA HSM: Implementation**

Version 11.5





# Table of Contents

<b>Legal Notices and Acknowledgments.....</b>	<b>5</b>
Legal Notices.....	5
Acknowledgments.....	6
<b>Implementing the SafeNet Luna HSM with BIG-IP Systems.....</b>	<b>23</b>
Overview: Implementing the SafeNet Luna SA HSM with BIG-IP Systems.....	23
Task summary.....	23
Prerequisites for implementing BIG-IP and SafeNet Luna SA HSM.....	23
Preparing to install the Luna SA client on the BIG-IP system.....	24
Installing and registering the Luna SA client.....	24
Generating a key/certificate using tmsh.....	25
Generating a key/certificate using the Luna SA client.....	25
Importing external HSM keys using tmsh.....	26
Adding certificates using tmsh.....	26
Creating a client SSL profile to use an external HSM key and certificate .....	26
<b>Additional Information.....</b>	<b>29</b>
fipskey.nethsm utility options.....	29
nethsm-safenet-install.sh utility options.....	30



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# Implementing the SafeNet Luna HSM with BIG-IP Systems

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## Overview: Implementing the SafeNet Luna SA HSM with BIG-IP Systems

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The SafeNet Luna SA HSM is an external HSM that is available for use with BIG-IP<sup>®</sup> systems. Because it is network-based, you can use the SafeNet solution with all BIG-IP appliances and BIG-IP Virtual Edition (VE). For interoperability information, refer to the *Interoperability Matrix for BIG-IP TMOS with SafeNet Clients and HSM* on the AskF5<sup>™</sup> web site located at [support.f5.com](http://support.f5.com).

For additional information about using the Luna SA HSM, contact SafeNet Technical Support (<http://www.safenet-inc.com/technical-support/>).

## Task summary

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The implementation process involves preparation of the SafeNet device and the BIG-IP<sup>®</sup> system, followed by key/certificate management and creation of a client SSL profile to use the key and certificate.

### Task list

*Preparing to install the Luna SA client on the BIG-IP system*

*Installing and registering the Luna SA client*

*Generating a key/certificate using tmsh*

*Generating a key/certificate using the Luna SA client*

*Importing external HSM keys using tmsh*

*Adding certificates using tmsh*

*Creating a client SSL profile to use an external HSM key and certificate*

## Prerequisites for implementing BIG-IP and SafeNet Luna SA HSM

Before you can use SafeNet Luna SA HSM with the BIG-IP<sup>®</sup> system, you must make sure that:

- The SafeNet device is installed on your network.
- The SafeNet device and the BIG-IP system can initiate connections with each other.
- The SafeNet device should have a virtual HSM (HSM Partition) defined before you install the client software on the BIG-IP system.
- The BIG-IP system is licensed for external interface and network HSM.
- The BIG-IP system has FIPS 140-2 or FIPS 140-3 compliant ciphers, depending upon your security needs. For information about FIPS compliant ciphers, see *Annex A: Approved Security Functions for FIPS PUB 140-2* (<http://csrc.nist.gov/publications/fips/fips140-2/fips1402annexa.pdf>) and SOL8802 for a complete list of supported ciphers at <http://support.f5.com>.

Additionally, before you begin the installation process, make sure that you have access to:

- The Luna SA Client software (Version 5.1)

- The Luna SA Customer Documentation

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**Note:** If you install the Luna SA HSM (external HSM) on a system with a FIPS card (internal HSM) installed, the Luna SA HSM takes precedence. You cannot use the SafeNet Luna SA HSM on a BIG-IP system that is running another external HSM.

---

### Preparing to install the Luna SA client on the BIG-IP system

Before you can set up the SafeNet Luna SA client software on a BIG-IP® system, you must obtain the software tarball from F5® and copy it to the BIG-IP system using secure copy (SCP).

To use the Luna SA HSM, you need to install the Luna SA client software onto the BIG-IP system.

1. Log in to the command-line interface of the system using the root account.
2. Create a directory under /shared named safenet\_install.  

```
mkdir /shared/safenet_install
```
3. Copy the software tarball to /shared/safenet\_install.
4. Set up the SafeNet configuration on the BIG-IP system using the password for the Luna partition.  

```
tmsh create sys crypto fips external-hsm vendor safenet password <password>
```

This example sets the vendor as SafeNet with Default1 as the password:

```
tmsh create sys crypto fips external-hsm vendor safenet password Default1!
```

5. Verify that the configuration was created.  

```
tmsh list sys crypto fips
```

The system displays information about external HSMs configured on the system, similar to this example:

```
sys crypto fips external-hsm { password Default1! vendor safenet }
```

### Installing and registering the Luna SA client

Before you can use the Luna SA device with the BIG-IP® system, you must install and register the Luna SA client. You will need to provide the passwords for your Luna SA device during the installation process.

1. Log in to the command-line interface of the system using the root account.
2. Install and register the Luna SA client.  

```
nethsm-safenet-install.sh --hsm_ip_addr=<luna_sa_device_IP_address>  
--image=Luna_x.x_Client_Software.tar
```

This example sets up the version 5.1 client where the Luna SA device has an IP address of 172.27.13.59:

```
nethsm-safenet-install.sh --hsm_ip_addr=172.27.13.59  
--image=Luna_5.1_Client_Software.tar
```

Install all components when prompted. During the installation, you register your client IP address with the SafeNet device, and assign the Luna SA client to one previously-defined HSM partition. The BIG-IP system supports using keys only within the first HSM partition/slot assigned to the Luna SA client. Note that HSM partitions are not the same as BIG-IP partitions.



## Generating a key/certificate using tmsh

You can use the Traffic Management Shell (tmsh) to generate a key and certificate.

1. Log in to the command-line interface of the system using the root account.
2. Open the Traffic Management Shell (tmsh).

```
tmsh
```

3. Generate a key.

```
tmsh create sys crypto key <key_name> gen-certificate common-name <cert_name>
security-type nethsm
```

This example generates an external HSM key named test\_key and a certificate named test\_safenet.com with the security type of nethsm:

```
tmsh create sys crypto key test_key gen-certificate common-name
test_safenet.com security-type nethsm
```

## Generating a key/certificate using the Luna SA client

Before you generate a key/certificate, make sure that the SafeNet Luna SA client is running on the BIG-IP® system.

You can use the fipskey.nethsm utility to generate private keys and self-signed certificates on the BIG-IP system.

1. Set the external HSM to SafeNet.

```
fipskey.nethsm --hsm=safenet
```

2. Generate a key.

```
fipskey.nethsm --genkey -o <output_file>
```

This example generates three files: /config/ssl/ssl.key/www.siterequest.com.key, /config/ssl/ssl.csr/www.siterequest.com.csr, and /config/ssl/ssl.crt/www.siterequest.com.crt:

```
fipskey.nethsm --genkey -o www.siterequest.com
```

The key is saved in /config/ssl/ssl.key/<output\_file>.key. The certificate request is saved in /config/ssl/ssl.csr/<output\_file>.csr. The self-signed certificate is saved in /config/ssl/ssl.crt/<output\_file>.crt.

3. Verify that the key was created.

```
tmsh list sys crypto key www.siterequest.com.key
```

Information about the key displays:

```
sys crypto key www.siterequest.com.key {
  key-size 2048
  key-type rsa-private
  security-type normal
}
```

After you generate a key and certificates, you need to import them into the BIG-IP configuration using tmsh.

## Importing external HSM keys using tmsh

You can use the Traffic Management Shell (tmsh) to import existing external HSM (FIPS) keys into the BIG-IP® system.

1. Log in to the command-line interface of the system using the root account.
2. Open the Traffic Management Shell (tmsh).
3. Import a key.

```
install sys crypto key <key_object_name> from-local-file <keyname>
```

This example imports an external HSM key named my\_key.key from a local key file stored in the /config/ssl/ssl.key/ directory: install sys crypto key my\_key.key from-local-file /config/ssl/ssl.key/my\_key.key

After you have imported the key into the BIG-IP system, you must import the certificate.

## Adding certificates using tmsh

You can use the Traffic Management Shell (tmsh) to add existing certificates to the BIG-IP® system configuration.

1. Log in to the command-line interface of the BIG-IP system using an account with administrator privileges.
2. Open the Traffic Management Shell (tmsh).
3. Add the certificate.

```
install sys crypto cert <cert_object_name> from-local-file <path_to_cert_file>
```

This example loads the certificate named my\_key.crt from a local certificate file stored in the /config/ssl/ssl.crt/ directory:

```
install sys crypto cert my_key.crt from-local-file /config/ssl/ssl.crt/my_key.crt
```

## Creating a client SSL profile to use an external HSM key and certificate

After you have installed the external HSM key and certificate to the BIG-IP® system, you can use the key and certificate as part of a client SSL profile.

1. On the Main tab, click **Local Traffic > Profiles > SSL > Client**.  
The Client screen opens.
2. Click **Create**.  
The New Client SSL Profile screen opens.
3. In the **Name** field, type a name for the profile.
4. Select clientssl in the Parent Profile list.
5. From the **Configuration** list, select **Advanced**.  
This selection makes it possible for you to modify additional default settings.
6. Select the **Custom** check box for **Configuration**.  
The settings in the Configuration area become available for configuring.

7. Using the **Certificate Key Chain** setting, specify one or more certificate key chains:
  - a) From the **Certificate** list, select the name of a certificate that you imported.
  - b) From the **Key** list, select the name of the key that you imported.
  - c) From the **Chain** list, select the chain that you want to include in the certificate key chain.
  - d) Click **Add**.
  
8. Click **Finished**.

After you have created the client SSL profile, you must assign the profile to a virtual server, so that the virtual server can process SSL traffic according to the specified profile settings.



# Additional Information

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## fipskey.nethsm utility options

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The `fipskey.nethsm` utility includes these options:

Option	Description
-o	Name applied to <code>.key</code> , <code>.csr</code> , and <code>.crt</code> output files <hr/> <b>Important:</b> <i>This parameter is required.</i> <hr/>
-c [token   module   softcard]	Type of protection (default value is token)
-e [hex]	Public exponent to use when generating RSA keys only. <hr/> <b>Note:</b> <i>Do not provide a value for this option, unless advised to do so by F5<sup>®</sup> Technical Support.</i> <hr/>
-g [sha1]	Digest used to sign key and certificate
-k [name]	Key name
-m [yes   no]	Store key in non-volatile RAM
-n [integer]	Slot number to read cards from <hr/> <b>Note:</b> <i>Not designed to work with the Thales HSM devices.</i> <hr/>
-r [yes   no]	Key recovery available
-s [integer]	Size of key/certificate pair (in bits)
-t [RSA]	Key type
-v [yes   no]	Verification available
-C	Country identifier
-D	Domain name
-E	Email address for key contact
-L	Locality identifier
-N	Substitute alternative name <hr/> <b>Note:</b> <i>Applies only to SafeNet Luna HSM.</i> <hr/>
-O	Organization identifier
-P	Province identifier
-U	Organization unit identifier

## nethsm-safenet-install.sh utility options

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The `nethsm-safenet-install.sh` utility includes these options:

Option	Description
<code>-h</code>	Display help
<code>-v</code>	Verbose output
<code>--hsm_ip_addr=&lt;ip_addr&gt;</code>	SafeNet Luna SA HSM IP address
<code>--hsm_username=&lt;user_name&gt;</code>	SafeNet Luna SA HSM user name. Default is admin.
<code>--interface=&lt;interface_name&gt;</code>	BIG-IP system interface used to communicate with the SafeNet Luna SA HSM. Default is the management interface.
<code>--client_ip_addr=&lt;client_ip_addr&gt;</code>	IP address of the BIG-IP system, as seen by the SafeNet Luna SA HSM
<code>--hsm_password=&lt;password&gt;</code>	SafeNet Luna SA HSM partition password
<code>--image=&lt;image_name&gt;</code>	SafeNet Luna SA tarball to be installed (for example, <code>Luna_5.1_Client_Software.tar</code> ). This file must be stored on the BIG-IP system in <code>/shared/safenet_install</code> .

# Index

## A

AWS CloudHSM 23

## C

certificate

adding using tmsh 26

generating for use with BIG-IP 25

generating using tmsh 25

client SSL profile

using with external HSM key and certificate 26

## E

external HSM

about 23

implementation overview 23

use with BIG-IP Virtual Edition (VE) 23

using key and certificate with client SSL profile 26

external HSM key

importing using tmsh 26

## F

FIPS card

use with external HSM 23

FIPS key, See external HSM key.

fipskey.nethsm utility

generating certificates 25

generating keys 25

options 29

## H

hardware security module (HSM)

external 23

HSM Partition

assigning client to 24

defining 23

## I

implementation

task summary 23

installation

for the Luna SA client 24

internal HSM, See FIPS card.

## K

key

generating for use with BIG-IP 25

generating using tmsh 25

## L

Luna SA client

generating certificates 25

generating keys 25

installing 24

preparing for installation 24

registering 24

## N

nethsm-safenet-install.sh utility

installing the Luna SA client 24

options 30

registering the Luna SA client 24

## P

preparing for Luna SA client installation 24

prerequisites 23

## R

registration

for the Luna SA client 24

## S

SafeNet HSM

implementing with BIG-IP Systems 23

## T

tmsh commands

adding certificates 26

generating certificates 25

generating keys 25

importing external HSM keys 26

## V

virtual HSM, See HSM Partition.

