Delinea Secret Server

nShield® HSM Integration Guide

2025-04-14

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Chapter 1. Introduction

Delinea Secret Server includes support for the Entrust nShield Connect Hardware Security Module (HSM). The nShield Connect HSM brings an additional layer of protection by controlling the Delinea Secret Server encryption key. This document describes the procedure to integrate Delinea Secret Server with the nShield Connect HSM.

1.1. Product configurations

Entrust has successfully tested nShield HSM integration with Delinea Secret Server in the following configurations:

Product	Version
Delinea Secret Server	11.6.000025 - Platinum Edition
SQL Server 2022	16.0.1000.6 Express Edition (64-bit)
SQL Server Management Studio	20.0.70.0
IIS	10.0.20348.1
Base OS	Microsoft Windows Server 2022

1.2. Supported nShield features

Entrust has successfully tested nShield HSM integration with the following features:

Feature	CNG Cryptography Provider	PKCS #11 API
Softcards	No	Yes
Module Only Key	Yes	Yes
Operator Card Set (OCS)	Yes but without a passphrase	Yes
nSaaS	Supported but not tested	Supported but not tested

Security World	Support
FIPS 140 Level 2	Yes
FIPS 140 Level 3	Yes

1.3. Supported nShield hardware and software versions

Entrust has successfully tested with the following nShield hardware and software versions:

1.3.1. Connect XC

Security World Software	Firmware	Netimage	OCS	Softcard	Module
12.80.4	12.72.1 (FIPS 140-2 certified)	12.80.5	✓		✓
12.80.4	12.50.11 (FIPS 140-2 certified)	12.80.4	✓		✓
12.80.4	12.60.15 (CC certified)	12.80.4	✓		✓
13.4.4	12.50.11 (FIPS 140-2 certified)	12.80.4	✓		✓

1.3.2. nShield 5c

Security World Software	Firmware	Netimage	OCS	Softcard	Module
13.2.2	13.2.2	13.2.2	✓		✓

1.4. Requirements

The following are needed for this integration:

- A server running Delinea Secret Server.
- An nShield Connect HSM.

Chapter 2. Deploy and configure the Entrust nShield HSM

All steps below are performed in the server running the Secret Server.

- Install the Security World software and create a Security World
- Automatically start the nShield service agent at startup
- Create the OCS

2.1. Install the Security World software and create a Security World

1. Install and configure the Security World software. For instructions, see the *Installation Guide* and the *User Guide* for the HSM.
2. Add the Security World utilities path `C:\Program Files\nCipher\nfast\bin` to the Windows system path.
3. Open port 9004 in the firewall for inbound and outbound traffic for the HSM connection.
4. Open port 9005 in the firewall for inbound and outbound traffic for remote administration using a nShield Trusted Verification Device (TVD).
5. Install the nShield Connect HSM locally, remotely, or remotely via the serial console. See the following nShield Support articles, and the *Installation Guide* for the HSM:
    - How to locally set up a new or replacement nShield Connect
    - How to remotely set up a new or replacement nShield Connect
    - How to remotely set up a new or replacement nShield Connect XC Serial Console model

    Access to the Entrust nShield Support Portal is available to customers under maintenance. To request an account, contact nshield.support@entrust.com.

6. Run `enquiry` to verify that the HSM is correctly configured:

```
C:\Users\Administrator>enquiry
Server
 enquiry reply flags    none
 enquiry reply level    Six
 serial number          <ESN-of-HSM>
 mode                   operational
...
Module #1
```

```
 enquiry reply flags    none
 enquiry reply level    Six
 serial number          <ESN-of-HSM>
 mode                   operational
...
```

7. Create your Security World if one does not exist already. Follow your organization's security policy for this. Create extra ACS cards, one for each person with access privilege, plus spares.

```
new-world -i -m <module_number> -Q <K/N>
```

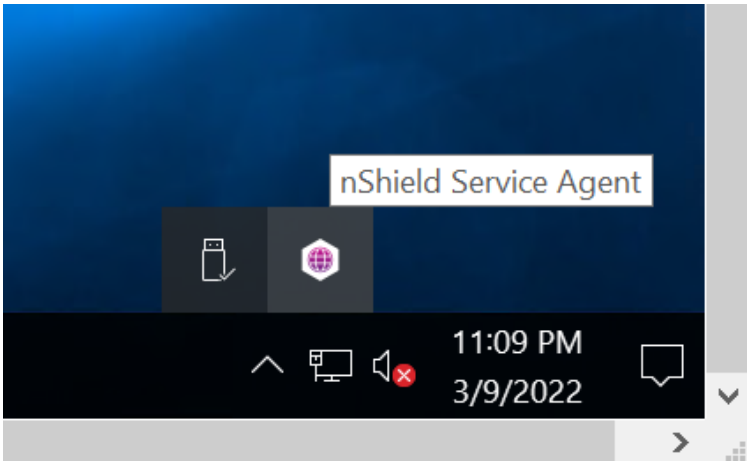
After an ACS card set has been created, the cards cannot be duplicated.

8. Run `nfkminfo` to confirm the Security World is **operational** and **usable**:

```
C:\Users\Administrator>nfkminfo
World
 generation     2
 state          0x37270008 Initialised Usable ...
...
Module #1
 generation     2
 state          0x2 Usable
...
Module #1 Slot #0 IC 0
 generation     1
 phystype       SmartCard
 ...
 error          OK
...
Module #1 Slot #1 IC 0
 generation     1
 phystype       SoftToken
 ...
 error          OK
...
```

2.2. Automatically start the nShield service agent at startup

1. Create a shortcut of `C:\Program Files\nCipher\nfast\bin\nShield_service_agent.exe` and place temporarily on the desktop.
2. Select the **Windows** key + **R**, type **shell:startup**, then select **OK**.
3. Copy and paste the shortcut to the **Startup** folder.
4. Reboot.
5. Notice the nShield service agent icon shown below.



2.3. Create the OCS

The Delinea Secret Server private keys generated by the Entrust nShield HSM can be protected with Softcard, module-only, and OCS as described in section Supported nShield features.

- OCS are smartcards that are presented to the physical smartcard reader of a HSM, or remotely via an nShield trusted verification device (TVD). The quorum K must be equal to 1 in the Secret Server application. For more information on OCS use, properties, and K-of-N values, see the *User Guide* for your HSM.
- Softcards are logical tokens protected with a passphrase.
- Module-only are logical tokens with no passphrase.

The examples shown in this integration guide use OCS protection. The following steps create the OCS.

1. Ensure file `/opt/nfast/kmdata/config/cardlist` contains the serial number of the card(s) to be presented or an asterisk wildcard the use of any card.
2. Open a command window as `administrator`.
3. Run `createocs`.

   Press **Return** when prompted to enter a blank passphrase.

   Follow your organization's security policy for the values of K/N, where K=1 as mentioned above. Use the same passphrase (left blank with CNG) for all the OCS cards in the set (one for each person with access privilege, plus spares).

   `slot 2`, remote via TVD, was used to present the card in this integration.

   The `-p` (persistent) option makes the authentication persist after you remove OCS card from the HSM front panel slot or from the TVD.

After an OCS card set has been created, the cards cannot be duplicated.

```
# createocs -m1 -s2 -N SecretServer -Q 1/1 -p

Creating Cardset:
 Module 1: 0 cards of 1 written
 Module 1 slot 0: Admin Card #1
 Module 1 slot 2: blank card
 Module 1 slot 3: empty
 Module 1 slot 2:- no passphrase specified - writing card
Card writing complete.

cardset created; hkltu = 5481cad7a4b86705678e262162e95ec9318d43e6
```

4. Verify that the OCS was created:

```
# nfkminfo -c
Cardset list - 1 cardsets:  (P)ersistent/(N)ot, (R)emoteable/(L)ocal-only
 Operator logical token hash               k/n timeout  name
 5481cad7a4b86705678e262162e95ec9318d43e6  1/1  none-PL SecretServer
```

The output of `rocs` also shows the OCS:

```
# rocs
`rocs' key recovery tool
Useful commands: `help', `help intro', `quit'.
rocs> list cardset
No. Name                    Keys (recov) Sharing
  1 SecretServer            0 (0)        1 of 1; persistent
rocs> exit
```

Chapter 3. Integrate Delinea Secret Server with an Entrust nShield HSM

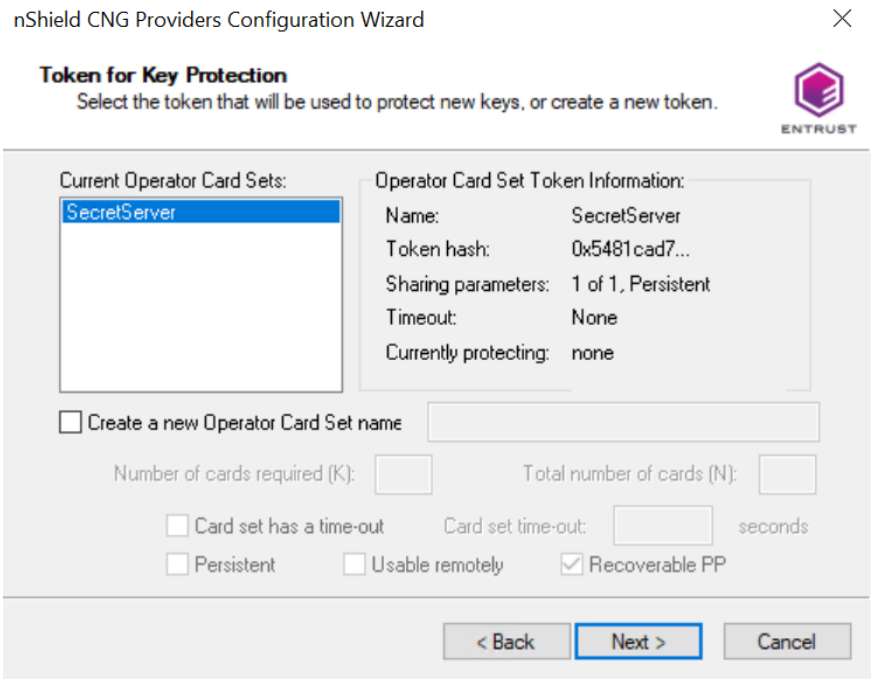
There are two options for this integration: the CNG cryptography provider, and the PKCS #11 API. Both are covered next.

3.1. Configure the Delinea Secret Server using the CNG cryptography provider

1. Select the **Windows Start > Entrust > CNG configuration** wizard.

   The **nShield CNG Providers Configuration Wizard** appears.

2. Select **Next** twice.
3. Select **Use the existing security world** if one was created in Install the Security World software and create a Security World.
4. Select **Next** twice.
5. Select the protection method. Either:
   - Select **Module Protection**, then select **Next** twice and then select **Finish**.
   - Select **OCS**, select the OCS created above, then select **Next** twice and then select **Finish**.



6. Run `certutil -csptest` on a command window:

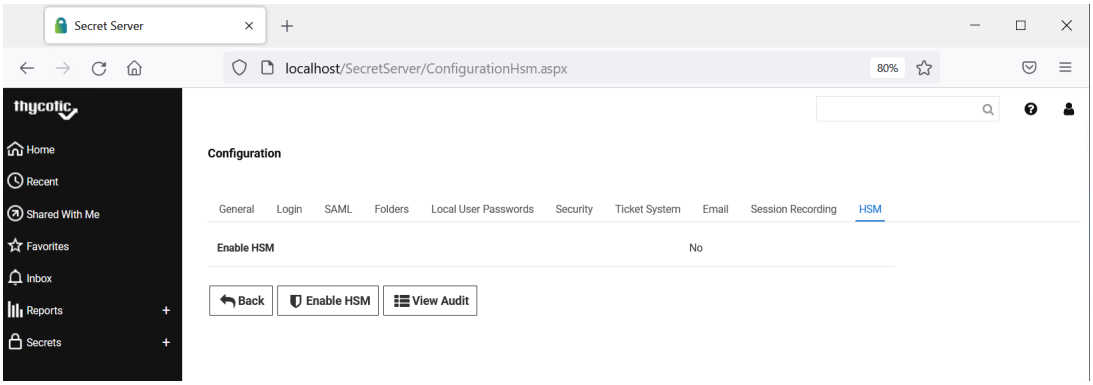
```
certutil -csptest > <filename>
```

7. Search for **Provider Name: nCipher** in the file created above, and make sure that it shows **Pass**. For example:

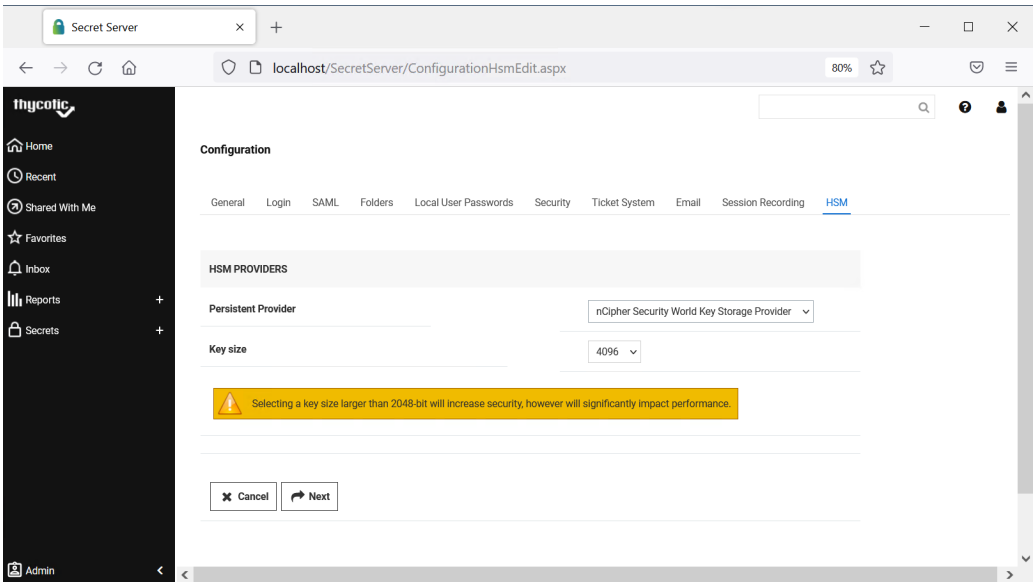
```
Provider Name: nCipher Security World Key Storage Provider
  Name: nCipher Security World Key Storage Provider
  HWND Handle:Binary:
0000    00 00 00 00 00 00 00 00                         ........
  Impl Type: 17 (0x11)
    NCRYPT_IMPL_HARDWARE_FLAG -- 1
    NCRYPT_IMPL_HARDWARE_RNG_FLAG -- 10 (16)

  Version: 786512 (0xc0050)
  Pass
  ...
```

8. Log in to Delinea Secret Server via a browser at `https://localhost/SecretServer`.
9. From the menu in the left pane, select **Administration > Actions > Configuration > HSM**.

   The **Configuration** page appears, with the **HSM** tab selected



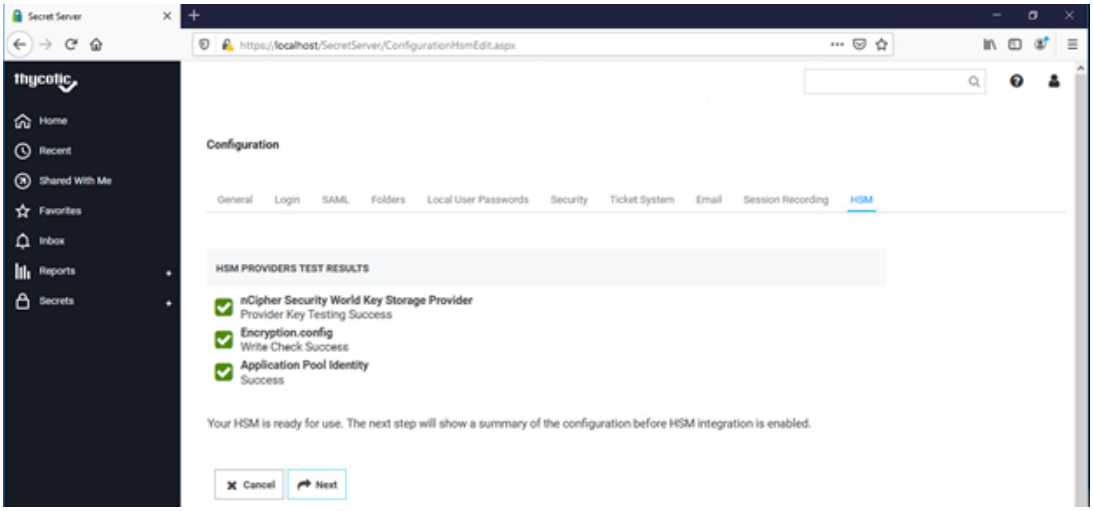
10. Select **Enable HSM** and then select **Next**.
11. Under **HSM Providers**:
    a. For **Persistent Provider**, select **nCipher Security World Key Storage Provider**.
    b. Select the required **Key size**. For example:



    c. Select **Next**.

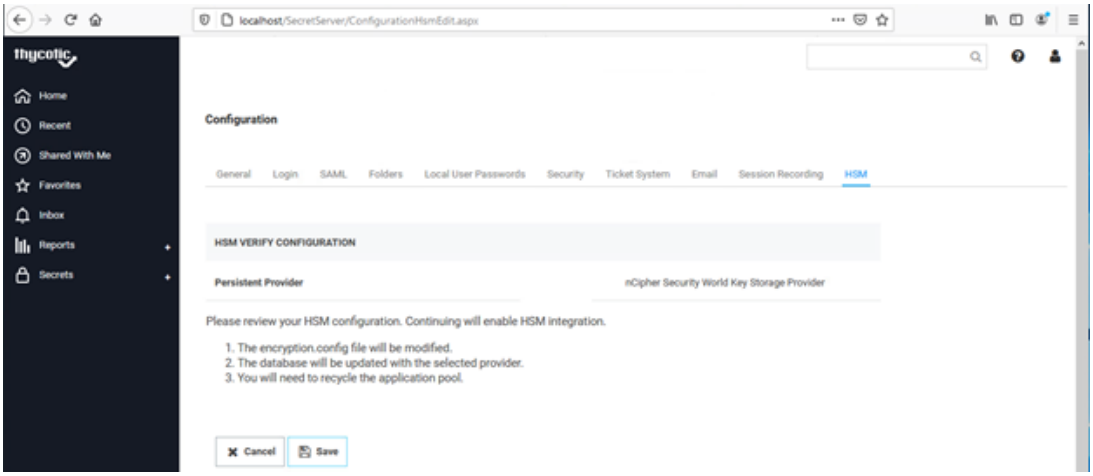
    The HSM provider is tested, and results displayed.

12. Check the **HSM Provider Test Results**. For example:



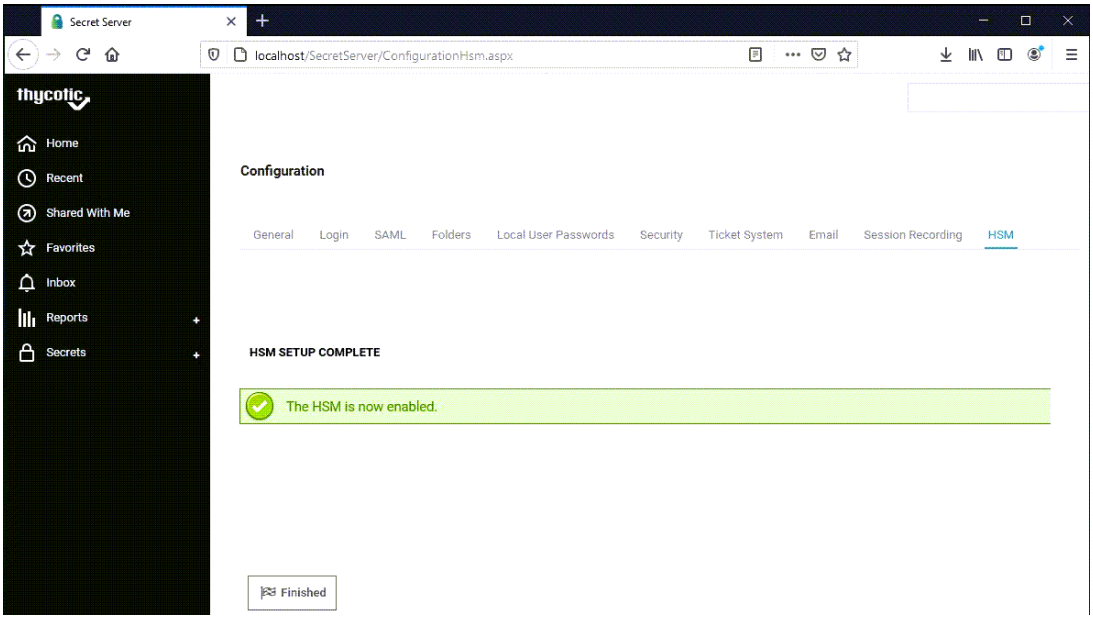
13. Select **Next**.

    A verification page appears.



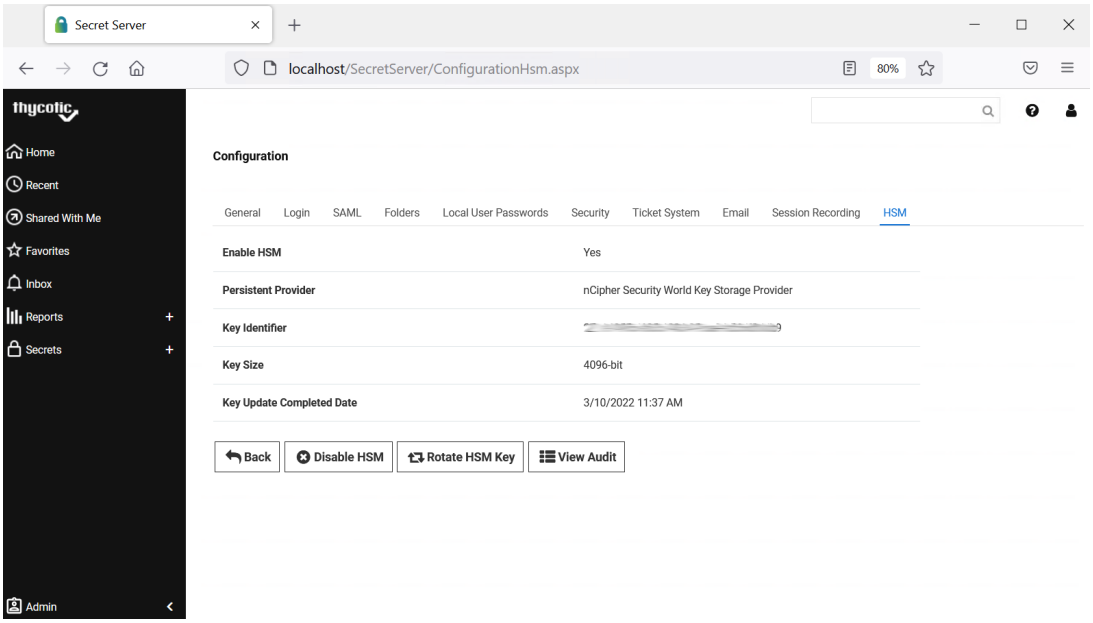
14. Select **Save** to update the HSM configuration.

    A confirmation page appears.



15. Select **Finish**.

    The nShield Connect HSM is now enabled, and the Delinea Secret Server encryption key is stored on it. The nShield Connect HSM configuration details appear on the Delinea Secret Server **HSM** tab.



3.2. Configure the Delinea Secret Server using the PKCS #11 API

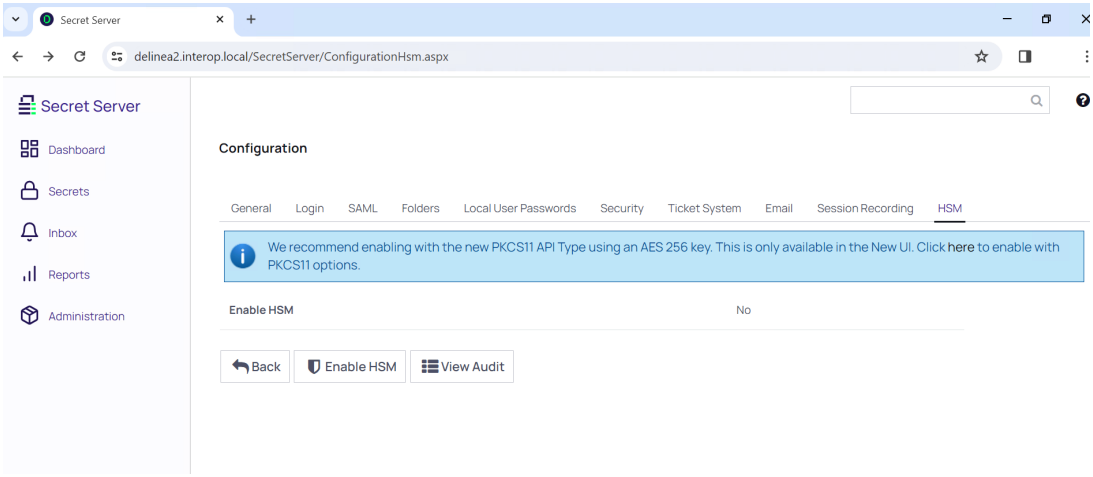
1. Copy the `cryptoki` library file

   located at `C:\Program Files\nCipher\nfast\toolkits\pkcs11\cknfast.dll`

to `C:\inetpub\wwwroot\SecretServer\pkcs11`

so that Delinea Secret Server can see it.

2. Insert your OCS card into the proper slot.
3. Select **here** in the pop up dialogue



4. For API Type, select **PKCS#11**.

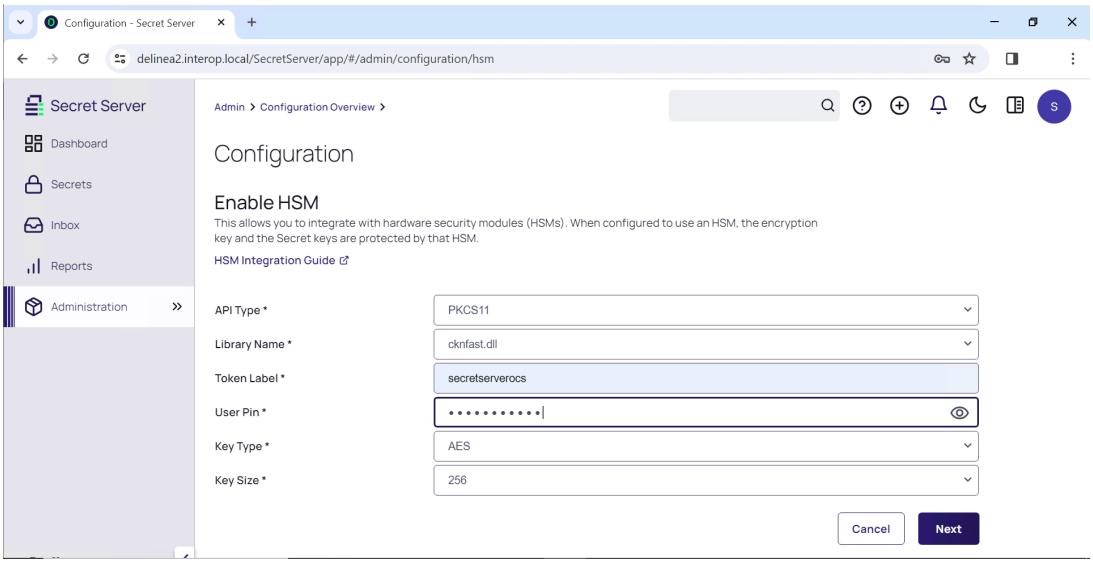
   For **Library Name** select **cknfast.dll**.

   For **Token Label** enter your OCS name.

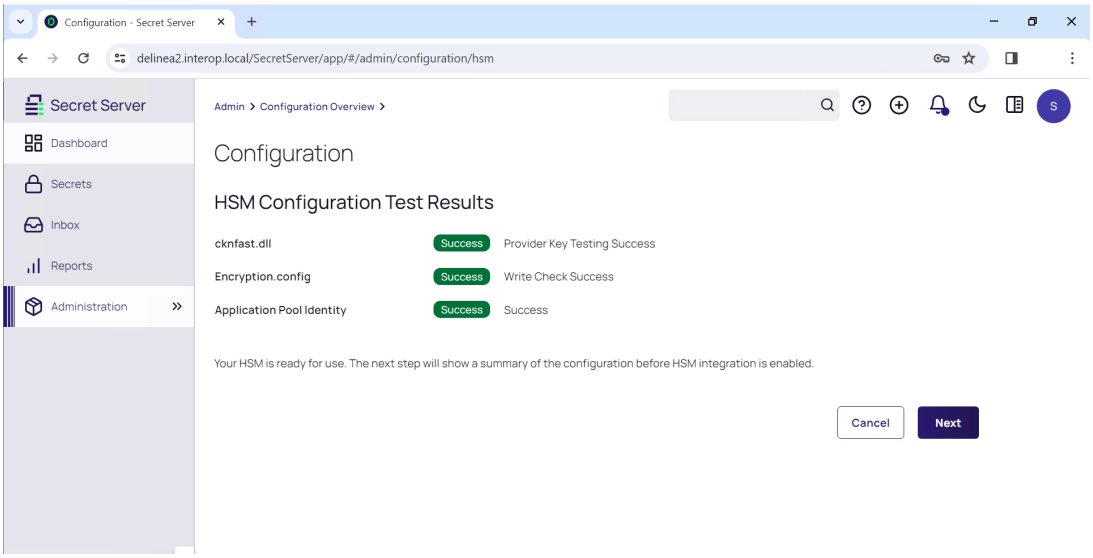
   For **User Pin** enter your OCS passphrase.

   Keep the default **Key Type** and **Key Size**.

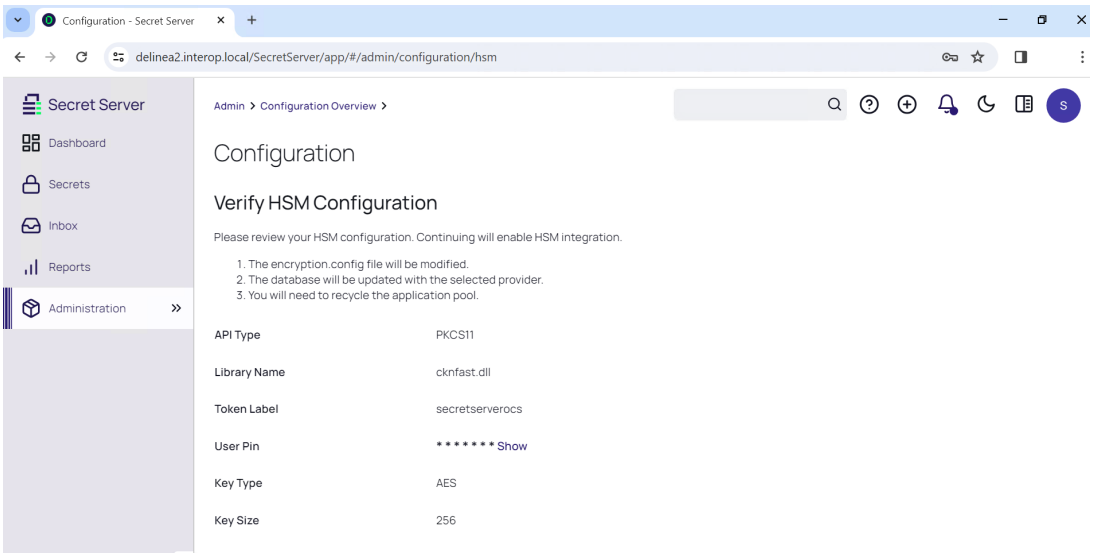
   Select **Next**



5. Check the HSM Configuration Test Results, then select **Next**:



6. Verify the HSM configuration, then select **Next**



3.3. Verify integration

Verify the keys generated by the Delinea Secret Server are stored in the nShield HSM.

Run the `nfkmverify` utility.

```
C:\Users\Administrator>nfkmverify

** [Security world] **
    Ciphersuite: DLf3072s256mAEScSP800131Ar1
    128-bit security level
    1 Administrator Card(s)
     (Currently in Module #1 Slot #0: Card #1)
    HKNSO 78b1cbd1814e6f711cc64fe84dae2fe3bd32584a
    Cardset recovery ENABLED
```

```
    Passphrase recovery ENABLED
    Common Criteria CMTS 419221-5 disabled
    Strict FIPS 140-2 level 3 (does not improve security) disabled
    SEE application non-volatile storage ENABLED
    real time clock setting ENABLED
    SEE debugging ENABLED
    SEE debugging restricted
    Foreign Token Open authorization ENABLED
    Generating module ESN <ESN-of-HSM> currently #1 (in same incarnation)

Verification successful, confirm details above.  0 keys verified.
```

This completes the integration of Delinea Secret Server with the nShield Connect HSM. Secrets created in Delinea Secret Server will use encryption keys that are stored in the nShield Connect HSM.

Chapter 4. Additional resources and related products

4.1. nShield Connect

4.2. nShield as a Service

4.3. Entrust products

4.4. nShield product documentation