THALES

www.thales-esecurity.com

Thales e-Security

Entrust Authority Security Manager 8.1 SP1

Integration Guide for Windows Server 2012 R2

Version: 1.4

Date: 11 October 2016

Contents

Chapter 1: Introduction **4**

This product 4

Product configuration 4

Supported Thales functionality 4

Requirements 5

Considerations 5

This guide 6

More information 6

Chapter 2: Procedures **7**

Installing the HSM 8

Installing the Thales Security World Software and creating the Security World 8

Installing and configuring Openwave Directory Server 6.0 8

Installing Openwave Directory Server 6.0 8

Configuring the DSA for use with your Entrust setup 9

Installing PostgreSQL Server 8.3.23 11

Using preload with a K-of-N OCS 12

Installing and configuring Entrust Authority Security Manager 8.1 SP1 13

Installing Entrust Authority Security Manager 13

Configuring the Entrust CA 13

Backup 16

Restore Entrust to a new server when using an nShield HSM 17

Procedure overview 17

Application software installation on the new server 17

Chapter 3: Troubleshooting **22**

Appendix A: Installing Entrust Authority Security Manager 8.1 Service Pack 1 (SP1) **23**

Appendix B: Initializing the CA with 1-of-N OCS **24**

Internet addresses **25**

Chapter 1: Introduction

This product

Entrust Authority Security Manager is a Public-Key Infrastructure (PKI) that manages digital certificates and can publish Certificate Revocation Lists (CRLs). The Thales Hardware Security Modules (HSMs) are used to securely store and manage:

- The key pair for the Certificate Authority (CA).
- The key pair for the CRLs.

Note: Throughout this guide, the term HSM refers to nShield Solo/Solo+, nShield Connect/Connect+, and nShield Edge products.

Product configuration

The integration between the HSM and Entrust Authority Security Manager has been successfully tested in the following configurations:

Operating system	Entrust version	nShield Security World software version	nShield Solo/Solo+ support	nShield Connect/Connect+ support	nShield Edge support
Windows Server 2012 R2	8.1 SP1 with patch 192895	12.10 (hardserver 3.21.3)	Yes	Yes	Yes

nShield Solo/Solo+ firmware version	nShield Connect/Connect+ firmware version	nShield Edge frimware version
2.61.2	2.61.2	2.61.1

Supported Thales functionality

Function	Supported
Key Generation	Yes
Key Management	Yes
Key Import	-
Key Recovery	Yes
1-of-N Operator Card Set	Yes
K-of-N Operator Card Set	Yes
Softcards	Yes
Module-only Key	-
Strict FIPS Support	Yes
Load Balancing	Yes
Fail Over	Yes

Note: Fail Over and Load Balancing are not supported with the nShield Edge.

Requirements

To integrate the HSM and Entrust Authority Security Manager, you need the server and client machines to be set up as follows:

	Hardware	Software
Server	Windows Server 2012 R2 Datacenter	Thales Security World Software 12.10 Openwave Directory Server 6.0 PostgreSQL Server 8.3.23 Entrust Authority Security Manager 8.1
Client	Windows Server 2012 R2 Datacenter	Thales Security World Software 12.10 Security Manager Administration Console 8.1

Before attempting to install the software, we recommend that you familiarize yourself with the Entrust Authority Security Manager documentation and setup process and that you have the *User Guide* for your HSM available.

You also need to consider the following aspects of HSM administration:

- The number and quorum of Administrator Cards in the Administrator Card Set (ACS), and the policy for managing these cards.
- The number and quorum of Operator Cards in the OCS, and the policy for managing these cards.
- Key attributes such as the key size, persistence, and time-out.
- Whether there is any need for auditing key usage.
- Whether the Security World should be compliant with FIPS 140-2 level 3 and whether to use with the NIST SP800-131 suite of algorithms.

Note: The nShield Edge does not support NIST SP800-131.

Considerations

When installing the Openwave Directory Server (ODS) three separate passwords will be needed that are a minimum of 8 alphanumeric upper/lower case characters.

When installing PostgreSQL Server three separate passwords will be needed that are a minimum of 8 alphanumeric upper/lower case characters.

When initialising the CA five separate passwords will be needed that are a minimum of 10 alphanumeric upper/lower case characters.

When initialising the Directory System Agent (DSA) there are a number of attributes that must be considered before hand. These include items such as the name of the DSA, the adminstrator name and assiocated passwords, see *Configuring the DSA for use with your Entrust setup* on page 9 for a full list of required parameters.

Note: The passwords lengths above are minimum password lengths and Thales recommends the minimum length should be 12 characters (alphanumeric and special characters).

This guide

This document explains how to set up and configure an Entrust PKI installation with an HSM. The instructions in this document have been thoroughly tested and provide a straightforward integration process. There may be other untested ways to achieve interoperability.

This guide may not cover every step in the process of setting up all the software. For more information about installing Entrust, see the Entrust documentation.

More information

For more information about the HSM, see the *User Guide* for the HSM.

Additional documentation produced to support your Thales product is in the document directory of the CD-ROM or DVD-ROM for that product.

Chapter 2: Procedures

To integrate Entrust Authority Security Manager and HSM:

Note: If you are using an nShield Edge, install the software first and then plug in the nShield Edge. If the nShield Edge is not reported or is reported as failed, open a command window as an Administrator, and navigate to **`%nfast_home%\bin`** and run **`nc_hsc.exe`**.

1. Install the HSM.
2. Install the Thales Security World Software, and configure the Security World.
3. Edit the `cknfastrc` file located in `C:\Program Files (x86)\nCipher\nfast\cknfastrc`.
4. Install and configure Openwave Directory Server 6.0:
   a. Install Openwave Directory Server 6.0.
   b. Configure the Directory System Agent (DSA) for use with your Entrust setup.
5. Install PostgreSQL Server 8.3.23.
6. Establish a preload session.
7. Install and configure Entrust Authority Security Manager 8.1 Service Pack 1 (SP1):
   a. Install Entrust Authority Security Manager 8.1 Service Pack 1 (SP1).
   b. Configure and initialize the Entrust CA.
   c. Initialize with K of N OCS (if using 1 of N see *Appendix B: Initializing the CA with 1-of-N OCS* on page 24).

All these procedures are described in the following sections.

Installing the HSM

Install the HSM using the instructions in the *Hardware Installation Guide* for the HSM. We recommend that you install the HSM before configuring the Thales Security World Software with your Entrust setup.

Installing the Thales Security World Software and creating the Security World

Install the Thales Security World Software and create the Security World as described in the *Hardware Installation Guide* for the HSM. This document assumes that:

- You are installing an offline root Certificate Authority.
- A new root key is generated during installation.

1. After creating the Security World, configure the cknfastrc environment variables. The **cknfastrc** file can be found in `C:\Program Files (x86)\nCipher\nfast\cknfastrc`. Edit the file to include:

```
CKNFAST_NO_UNWRAP=1
CKNFAST_NO_ACCELERATOR_SLOTS=1
CKNFAST_LOADSHARING=0 <see note below>
CKNFAST_OVERRIDE_SECURITY_ASSURANCES=none
NFAST_NFKM_TOKENSFILE=C:\Preload\<filename>
```

Note: The filename is user defined and will be referenced in the preload command. For example **`%NFAST_HOME%\Bin>Preload -c <OCS Name> -f <pathname to preload file and filename>`**.

Note: When using a K-of-N cardset where K>1, set **`CKNFAST_LOADSHARING=0`**.
When using a K-of-N cardset where K=1, set **`CKNFAST_LOADSHARING=1`**.

Note: For more information about the environment variables used in **`cknfastrc`**, see the *Thales nCipher PKCS #11 library environment variables* section in the *User Guide* for the HSM.

Note: For Enhanced Database Protection (EDP) use **`CKNFAST_LOADSHARING=0`** after enabling the database hardware protection. Restart the system for load sharing to work.

Installing and configuring Openwave Directory Server 6.0

This section describes how to:

- Install Openwave Directory Server 6.0.
- Configure the DSA for use with your Entrust setup.

Installing Openwave Directory Server 6.0

Openwave Directory Server is based on X.500 recommendations and LDAPv3 standards; your Entrust setup uses it to store the user profiles that the Entrust Administrator creates.

To install Openwave Directory Server 6.0:

1. Obtain the Openwave Directory Server software and run **`setup.exe`**.
2. Accept the license agreement, select a complete installation and follow the install wizard through to completion.

Configuring the DSA for use with your Entrust setup

You should consider the DSA you are initializing, in the example below DSA1 is indicative of a primary DSA, for further information refer to the Openwave documentation.

To configure the DSA for use with your Entrust setup:

1. Right click on the command prompt and select **Run as Administrator**.
2. Run commands of the following form (which shows the example DSA created with Openwave Directory Server):

```
cd C:\
C:\>md DSADATA\DSA1
C:\>cd DSADATA\DSA1
C:\DSADATA\DSA1>odsecreate.cmd
```

This will create a DSA in the current working directory.

3. Follow the process described in the following table to configure the DSA for use with the Entrust CA. Use nomenclature appropriate for your DSA, the table below is given as an example:

Text on screen:	You enter:
Please enter the name of the DSA	`cn=<name of DSA>`
Please enter the name of the DSA administrator	`cn=<DSA administrator name e.g. diradmin>`
Please enter the administrator's password	*<Administrator's password>*
Please enter the port number for DAP/DSP	`1001`
Please enter the port numer for shadowing. **Press return for no shadowing, this can be added later**	`2200`
Please enter the port number for LDAP. **Press return for no LDAP, this can be added later**	`389`
Please enter the license key	*<license key>*
Do you wish to include the extensibleObject defined in RFC 2252 (Y/N)?	`N`
Do you wish to include the Java(tm) Objects schema defined in RFC 2713 (Y/N)?	`N`
Do you wish to include the CORBA Objects schema defined in RFC 2714 (Y/N)?	`N`
Do you wish to include the LDAP as a NIS Schema defined in RFC 2307 (Y/N)?	`N`
Do you wish to include the UPS Common schema defined by Openwave messaging (Y/N)?	`N`
Do you wish to include the ACP133 schema defined by Openwave messaging (Y/N)?	`N`
Initializing the DSA	
Reading country codes from file iso3166 **admin>Reading country codes from file iso3166** **admin>Log file was odscreate.000**	
Please enter 'Y' to configure an empty Entrust DSA or 'N' to add the CA, Search Base (CP) and Entrust Directory Manager entries	`N`
Please enter the name of the search base in the DSA **It must be either a country, organization, organizational unit, domain or locality**	`o=CAname <enter appropriate CA name>`
Please enter the name of the CA in the DSA. It must be either a country, organization, organizational unit, domain, locality, organizational role, application processor or device. **Press return for top entry to be the CA**	`CA = o=CAname`
Please enter the CA's password	*<CA's password>*
Please enter the name of the Entrust Directory Manager	`cn=manager`
Please enter the Entrust Directory Manager's password	*<Directory Manager's password>*

Text on screen:	You enter:
Initializing the Entrust DSA	
Changing update log	
Openwave Messaging Directory Server Demo18 June 2017	
Reading country codes from file iso3166	
admin>admin>Log file was odsecreate.000	**Y**
Do you wish to start the DSA (Y/N)?	
Starting the DSA	
Creating the file 'ds.properties'	
Writing ldap/attributes.cfg	
Writing ldap/objectclasses.cfg	
Writing ldap/syntaxes.cfg	
Writing ldap/matchingrules.cfg	
Writing ldap/oidtable.at	
Writing ldap/oidtable.oc	
Writing oidslocal	
odssched<process ID> started	

Note: This command can either be minimized or closed if desired once the DSA has successfully started. If the ODS is not started, run the command **odsstart** and to stop the ODS run the command **odsstop**.

Installing PostgreSQL Server 8.3.23

To install PostgreSQL Server on the server machine:

1. Download PostgreSQL Server installer from the Entrust TrustedCare online support site for the Windows operating system (`SM_81_Win_Postgre SQL_8323_setup.exe`).
2. To start installing the PostgreSQL database for Entrust Security Manager 8.1 SP1, double-click the setup file `SM_81_Win_Postgre SQL_8323_setup.exe`.
3. Accept the license agreement for the installation.
4. Accept the default destination folder (`C:\Program Files (x86)\Entrust`) for installing the Entrust PostgreSQL Database program files, and then click **Next**.
5. In the **Select Drive for Database** window, accept the default location as drive `C:\`, and then click **Next**.
6. In the **Database Transaction Log Drive** window, select the drive that will host database logs, then click on **Next**. The default path is `C:\`.
7. In the **Possible Data Security Issue** dialog box which states:

```
For Security of your data, we recommend that the Transaction log should be stored in a
separate partition. Would you like to change your selection?
```

8. Select **No** (transaction logs can be set to a different partition on the same server, if required).
9. In the **PostgreSQL Windows Account Password** window, set the password for **easm_entrust_pg** account, and then click **Next**.
10. In the **Password for Database User** window, provide the password for the account **easm_entrust** and click on **Next**. See the Entrust password criteria for guidelines on setting the password. If the password is weak, the wizard gives a message asking to change the password.
    Press **Yes** to reset the password, otherwise press **No** to continue with the set password.
11. In the **Password for Database Backup user** window, set the password for **easm_entbackup** account. To continue, click **Next**.
12. In the **PostgreSQLDatabasePort** window, accept the default port 5432. To continue, click **Next**.
13. In the **Check Setup Information** window, verify the paths of Program files, Database, Transaction logs, and port details. To continue with the installation, click **Next**.
14. To complete the installation, click **Finish** in the **InstallShield Wizard Complete** window.

Note: Before installing Entrust Authority Security Manager, you must preload the OCS cardset being used to protect the Entrust keys.

Using preload with a K-of-N OCS

To initialize the Entrust Authority Security Manager with a K-of-N OCS:

1. Create an empty folder called `Preload` on drive `C:`.
2. Right click on a command prompt and select **Run as Administrator** and navigate to **C:\Program Files (x86)\nCipher\nfast\bin>**.
3. Run the following command to list the OCS:

```
nfkminfo.exe -c
```

4. Preload the cardset by running the following command:

```
preload –c <cardsetname> -f <pathname>\<filename> pause
```

   The filename is user defined but must be consistent when setting the variable in cknfastrc and invoking preload. For example:
   A variable set in cknfastrc: **NFAST_NFKM_TOKENSFILE=C:\Preload\filename**
   A variable invoked with preload: **>preload.exe -c ocsname -f "C:\Preload\filename" pause**
5. Present the OCS when prompted and enter the passwords for the OCS.
   You must keep the preload command window active. You can minimize it but **do not close** it, otherwise you will shut down the session. You can confirm that the cardset has preloaded by opening another command window and running the command below. The loaded **Objects** will be reported.

```
preload.exe -c <cardsetname> -f C:\preload\<filename> nfkminfo
```

Useful information concerning Operator Card Sets (OCS):

- You must present sufficient different OCS cards to fulfil the quorum. (The passphrase (if any) can be different for each OCS card).
- If non-persistent cards are used, then the last card in the quorum must remain inserted in the card reader.
- If persistent cards are used, then the last card in the quorum can be removed from the card reader.
- The tokens file is generated by the preload utility and is valid for one continuous session only. If the session is lost then the token authorization is lost. You cannot reuse the same token file once the session is lost, even if you will use the exact same OCS cards again. To restart, you must delete the expired tokens file, and will have to go through the entire preload sequence again.
- A session, and tokens authorization may be lost if:
  - There is a temporary power failure
  - You remove the last card in the quorum if they are non-persistent OCS cards
  - You clear the module.

The tokens file represents a security risk if permissions to access it are not restricted to authorized persons only.

Installing and configuring Entrust Authority Security Manager 8.1 SP1

Installing Entrust Authority Security Manager

To install Entrust Authority Security Manager on the server computer:

1. Download Entrust Authority Security Manager 8.1 Service Pack 1 (SP1) from the Entrust TrustedCare online support site for the Windows operating system (`SM_81_Win_setup.exe`).
2. Run the installation program and accept the default installation path (`C:\Program Files (x86)\Entrust`).
3. A command prompt will appear requesting the password for **`user easm_entrust:`** enter the password and press enter to proceed with the installation. The same password for **`user easm_entrust:`** is used when installing the Postgres.
4. When the installation process is complete, select the option to run the Entrust Configuration Utility, and then click **Finish**.

Configuring the Entrust CA

To configure the Entrust CA:

1. After the installation, the **Entrust Authority Security Manager Configuration** setup screen appears. If it does not appear, select **Start > Entrust > Security Manager Configuration**.
2. In **Select the configuration type**, select **Custom configuration**, and then click **Next**.
3. When prompted, enter the Enterprise licensing information that appears on your Entrust licensing card:
   - Serial Number
   - Enterprise user limit
   - Enterprise licensing code.

4. Accept the default installation paths for the data files (`c:\authdata`) and backup files (`c:\entbackup`).
5. Select the LDAP directory. Enter the directory node name (*Server name* or IP address) and directory listen port (**389**).
6. When prompted for the CA DN and password, enter the information you provided when configuring the DSA for use with the Entrust set up (see *Installing and configuring Entrust Authority Security Manager 8.1 SP1* on page 13) and click on **Test Bind Information**. If this does not result in a **Bind Successful** response, ensure that server name or IP address are correct and that the DSA is running and rebind the information:

CA DN	**o=CA<name>**
CA Directory access password	*<password>*

7. Enter the information for the **Directory Administrator** and bind the information and test bing information:

CA DN	**cn=<manager>**
Directory access password	*<password>*

8. In the **Advanced Directory Attributes** dialogue, verify the information for the **First Officer**, and then click **Next**:

CA DN	**cn=First Officer, o=CA<name>**

9. Make sure **Verify Directory information now** is checked, then click **Next** to got to the **Verify Directory Information now** page.
10. Use the Entrust Directory Verification Tool (**EntDVT**) to verify the settings, and then click **Next**.

    At the bottom of the dialogue there should be no errors in the Summary section:

```
Summary:
       Total number of fatal errors:   0
       Total number of errors:         0
       Total number of notes:          0
```

11. When prompted, provide your Windows login credentials, and then click **Next**.
12. Select **EASM_Entrust_PostgreSQL** for database connection and leave the **Enable autologin for automatic service startup** unchecked.
13. Enter the password that was assigned to **`easm_entrust`** when you installed the PostgreSQL Server 8.3.23, see *Installing and configuring Entrust Authority Security Manager 8.1 SP1* on page 13, and then click **Next**.
14. Enter the password that was assigned to the backup user when you installed the PostgreSQL Server 8.3.23, see *Installing and configuring Entrust Authority Security Manager 8.1 SP1* on page 13, and then click **Next**.

15. When asked whether to:

```
InterOperate with Microsoft (TM) CryptoAPI-enable applications?
```

Select **No** and click **Next**.

16. Configure the following settings as appropriate, and then click **Next**:

Security Manager node name	*<Server machine>*
Security Manager listen port	709
Administration subsystem listen port	710
PKIX-CMP subsystem server port	829
Entrust XML administration protocol port	443
Enable XAP subsystem	Checked

17. In the Cryptographic Information dialog, select settings as appropriate, for example:

Certificate Authority	
CA key generation	Hardware
CA Key Type	RSA2048*
Database	
Database Encryption Algorithm	AES-CBC-256
Entrust Users	
User Signing Key Type	RSA2048
User Encryption Key Type	RSA2048
CA Signing Algorithm	
Signature algorithm	RSA-SHA256
Policy Certificate	
Policy certificate lifetime (in days)	30

*Consult your security policy document for the recommended key sizes and algorithms to use.

Note: In order for this integration to work with EC-P and RSAPSS the nShield HSM must have ECC activation feature enabled (in `%NFAST_HOME%\bin` directory run **`FET.exe`**).

18. Click **Next**.
The system returns the following message:

```
Security Manager Configuration could not detect any hardware devices. Please select a
new cryptographic hardware library in the next dialog
```

19. Click **OK**.
20. Use the Thales nCipher PKCS11 library located at `C:\Program Files (x86)\nCipher\nfast\toolkits\pkcs11\cknfast.dll`.
    You can confirm this location by opening the `entmgr.ini` file located in the `Entrust` directory and looking for the entry: **`CryptokiV2LibraryNT = C:\Program Files (x86)\nCipher\nfast\toolkits\pkcs11\cknfast.dll`**.
21. Select the appropriate slot for the desired type of protection.
22. If you require the CA to issue and revoke certificates beyond the year 2037, select **No** and click **Next**.
23. When prompted, select **Root CA** to create a Root Certificate Authority.
24. When prompted to initialize the CA certificate, approve the initialization, and then enter the following certificate properties:

CA cert lifetime	120 months*
CA private key usage period	100%

*Consult your security policy document for CA lifetime.

25. If you want to continue to initialize the CA select the check box **Run Security Manager Control Command Shell now** and click **OK** to be taken to the first time initialization **entsh** command shell and enter passphrases when prompted, otherwise deselect the checkbox and select **OK**. You will have the option to initilize the CA later by running the **`init`** command from the **entsh** command window.

    Note: You will be prompted to enter 5 pass-phrases, these should be different and known only to the individuals concerned. When setting passwords for **Master users** (x3), **First Officer** and **CA Hardware** note the following constraints:
    - The password must be at least 10 characters in length and not based on a dictionary word.
    - The characters must be both a mix of upper and lower case and include numbers.

    Note: If you choose to protect your root CA private key with a 1-of-N OCS see *Appendix B: Initializing the CA with 1-of-N OCS* on page 24.

26. Verify the CA key is loaded into the hardware by opening an **`entsh$`** and running the command:

```
ca key show-cache
```

27. Check the hardware status:

```
hardware status: Loaded >> 'nCipher Corp. Ltd SN : XXXXXXXXXXXXX SLOT : XXXXXXXX'
```

Backup

You must ensure that the Security World `\local` directory (`C:\ProgramData\nCipher\Key Management Data\local`) is backed up after any new key generation or Security World administration activities have occurred and that the backups are stored appropriately in case a disaster recovery scenario needs to be invoked.

Restore Entrust to a new server when using an nShield HSM

In order to execute a full restore of the Entrust environment when using an HSM you must ensure that you have the backed up data from the nShield Security World `/local` directory and the Entrust Security Manager backup (`mgrbkYYYYMMDDHHMMSS`).

Procedure overview

1. Install the new Windows server, this should be the same operating system as the original including the version and patching level.
   Note: It is recommended that you use the same host name and IP address that you used on the original computer. You can change the host name or IP address, but you must change all references to the host name or IP address in the **entrust.ini** and **entmgr.ini** files. Additionally, ensure that you use the same user accounts, groups, and directories when installing PostgreSQL and Security Manager.
2. Install the HSM and Thales Security World software. You will need to have access to the Administrator Card Set (ACS) and the Operator Card Set (OCS) quorums and associated passphrases.
3. Install and configuring Openwave Directory Server 6.0.
4. Install PostgreSQL on the new server. Use the same directories, drives, passwords, and ports that you used on the original server.
5. Verify Security World condition and load Security World if necessary.
6. Edit the **`cknfastrc`** file located in **`C:\Program Files (x86)\nCipher\nfast\cknfastrc`**, see *Installing the Thales Security World Software and creating the Security World* on page 8.
7. Ensure that the `kmdata/local` directory contains the correct Security World data.
8. Run the preload command.
9. Install Security Manager. Use the same paths and drives that you used on the original server.

Application software installation on the new server

To recover your Entrust installation to a new server when using an nShield HSM:

1. Install the new Windows server. When installing the new server, ensure that it is identical to the old server (same operating system, including versions and patches).
   It is recommended that you use the same host name and IP address that you used on the original computer. You can change the host name or IP address, but you must change all references to the host name or IP address in the entrust.ini and entmgr.ini files. Additionally, ensure that you use the same user accounts, groups, and directories when installing PostgreSQL and Security Manager.
2. Install the HSM and the Security World software on the new host server. For details on installing and configuring Security World and nShield HSMs refer to the user guides which can be found on the Security World release software DVD.
3. Install Openwave Directory services on the new server.
   Initialise the DSA with the same settings as on the original server.
4. Install PostgreSQL on the new server.
   Use the same directories, drives, passwords, and ports that you used on the original server.
5. Confirm that the HSM is correctly installed by running the enquiry command The HSM will usually be reported as Module #1(unless you are using multiple HSMs) the Module # mode should be reported as operational:

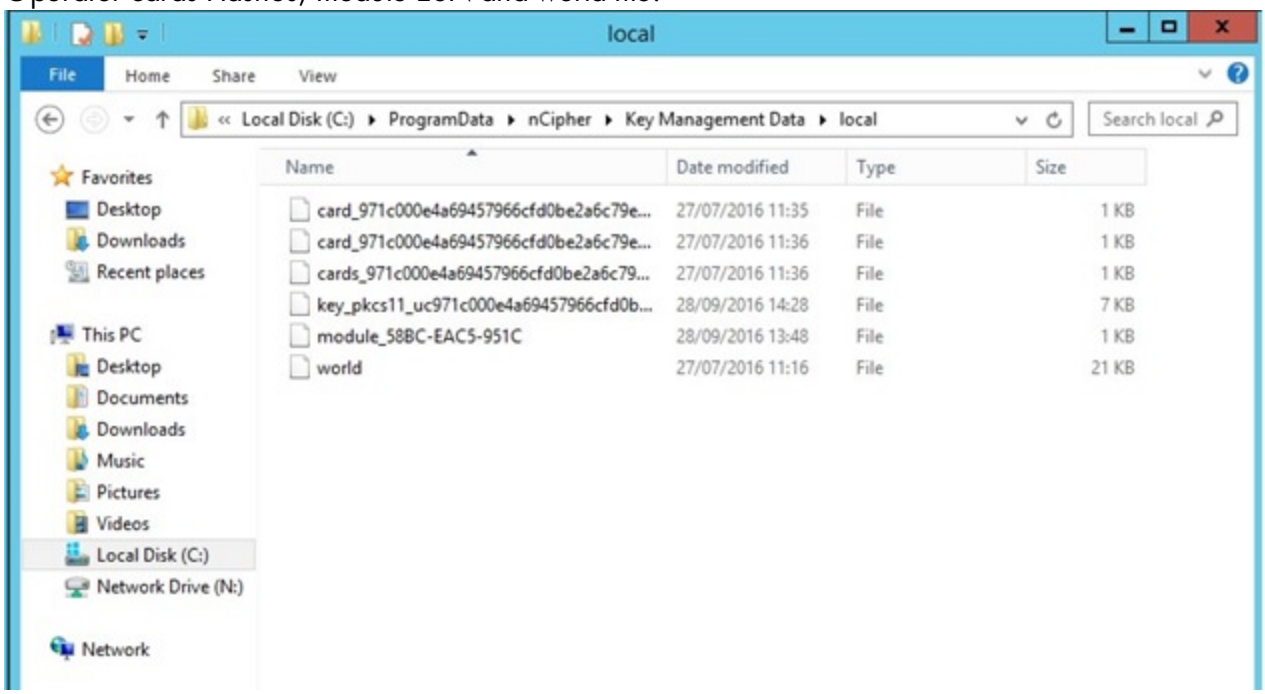
```
C:\Program Files (x86)\nCipher\nfast\bin>enquiry.exe
Server:
 enquiry reply flags  none
 enquiry reply level  Six
 serial number        2958-B193-14D7
 mode                 operational

Module #1:
 enquiry reply flags  none
 enquiry reply level  Six
 serial number        2958-B193-14D7
 mode                 operational
```

6. From the backed up **`\local directory`**, copy and paste the contents into the new **`\local directory`**:

```
C:\ProgramData\nCipher\Key Management Data\local
```

Ensure that the HSM Electronic Serial Number (ESN) module **xxxx-xxxx-xxxx** matches that reported in the enquiry output. Below is an example of *\local* directory contents showing Operator cards Hashes, module ESN and world file:



7. Confirm that the Security World is running correctly by running the **`nfkminfo`** command.

```
C:\Program Files (x86)\nCipher\nfast\bin>nfkminfo.exe
```

If there is an exclamation mark **!** immediately before **Usable**, then check under Module for reported condition.

```
C:\Program Files (x86)\nCipher\nfast\bin>nfkminfo.exe
World
  generation  2
  state       0x37b50000 Initialised !Usable Recovery PINRecovery
 !ExistingClient RTC NVRAM FTO AlwaysUseStrongPrimes
 !DisablePKCS1Padding !PpStrengthCheck SEEDebug StrictFIPS140
```

The error condition is reported via the module **state**. If **unchecked** is reported as **state** then you should re-load the Security World onto the HSM.

```
Module #1
 generation 2
 state      0x9 Unchecked
 flags      0x0 !ShareTarget
 n_slots    2
 esn        5964-C7A0-6AA8
```

8. To load the Security World onto the module, place the HSM into **Initialisation** mode and run the new-world command; **`new-world -l -m#`** (where # is the reported module number e.g. module #1.

```
C:\Program Files (x86)\nCipher\nfast\bin>new-world -l -m1
```

Once the world has been loaded onto the HSM, put the HSM back into **Operational** mode and confirm that the Security World is available and usable by running **`nfkminfo`**, again; the exclamation mark should no longer be visible.

Note: If state is reported as **Foreign**, this is indicative of a mismatch of the world file, i.e. the world file in the \local directory is incongruous to the Security World loaded onto the HSM. Ensure that you are using the correct back up if you are utilising multiple Security Worlds in your environment (if in doubt contact Thales support.

9. Open a text editor and add the below to the **`cknfastrc`** file in `C:\Program Files (x86)\nCipher\nfast\cknfastrc`:

```
CKNFAST_NO_UNWRAP=1
CKNFAST_NO_ACCELERATOR_SLOTS=1
CKNFAST_LOADSHARING=0
CKNFAST_OVERRIDE_SECURITY_ASSURANCES=none
NFAST_NFKM_TOKENSFILE=C:\Preload\<preload_filename>
```

Note: `NFAST_NFKM_TOKENSFILE=C:\Preload\<filename>` the `<filename>` must be the same as on the original server. This will be named in step 5 when the **`preload`** command is run. Once the above edits have been made save the file and close the editor. Details can be found in *Installing the Thales Security World Software and creating the Security World* on page 8.

10. Ensure that all expected keys are present by running **`nfkminfo.exe -k`**, this will report all keys available to the Security World there should be at least **1** key reported:

```
C:\Program Files (x86)\nCipher\nfast\bin>nfkminfo.exe -k
```

11. Run the nShield preload session. Open a command window, right click and select **Run as Administrator**, navigate to the *%NFAST_HOME%\bin* directory and run the preload command:

```
C:\Windows\system32>cd %nfast_home%\bin

C:\Program Files (x86)\nCipher\nfast\bin>preload.exe -c OCS_name -f C:\path_to_preload_
file\preload_filename pause
```

    Present the quorum of Operator Cards and enter the passphrase when prompted to do so. Do not close the command window, as this will terminate the preload session.
12. Install the same version of Security Manager that you used on the old server. Use the same paths and drives that you used on the original server. For further details refer to the document **SM_81SP1_Operations_issue16**.
    Note: Do not configure or initialize Security Manager.

Continue to recover the environment as per the detailed description in the Entrust Operation document **SM_81SP1_Operations_issue16** in the section **Restoring data to a new server from a backup**. See notes below.

Notes on the SM_81SP1_Operations document:

Step #9 - Where you are advised to:

Copy the Security Manager backup (`mgrbkYYYYMMDDHHMMSS`) from the original server to the new server. It is recommended that you copy the backup into the entbackup folder on the new server.

You will need to manually create a folder called entbackup to copy the `mgrbkYYYYMMDDHHMMSS` folder to as this does not exist at this stage.

Step #12 Subsection b and c

set the database password in the dbloginpw= setting and *set the database backup password in the dbBackupPw= setting*

Be aware that **`dbloginpw`** and **`dbBackupPw`** do not exist in the login section, enter these in full together with the actual passwords for these two roles, i.e.

```
C[login]
maxProcs=256
..
..

dbloginpw=Password
dbBackupPw=Password
```

Save the file and exit.

Step #12 Subsection f and g

Remove the encrypted dbloginpw setting and *Remove the encrypted dbBackupPw setting*.

Only delete the data , you should not delete the headings themselves, example of the **authauto.ini** file after **dbloginpw** and **dbBackupPw** credentials removed:

```
[dbloginpw Credentials]

[Hardware Info]
CAKey=6E43697068657220436F72702E204C74642020534E203A2039373163303030653 4
_continue_=61363934353739
DbProt=2020534E203A20
HwList=6E43697068657220436F72702E204C74642020534E203A203937316330303065 3
_continue_=461363934353739X

[dbBackupPw CredentialsC[login]
```

12. Verify the restore process by logging in to **entsh** and running:

```
entsh$ login
Master User Name: Master1
Password:
You are logged in to Security Manager Control Command Shell.
o=Thales.Master1 $ ca key show-cahw -type all

EAC is not enabled. There is no associated cryptographic hardware for EAC.[dbloginpw
Credentials].

**** Hardware Information ****

-------------------------------------------------

Name:
nCipher Corp. Ltd  SN : 971c000e4a694579 SLOT : 492971158

Has current X.509 CA key: Y
Load Status:              hardware loaded ok
Uses Password:            Y
DB protection HW:         N
In use for X.509 CA keys: Y
In use for EAC keys:      N

-------------------------------------------------
**** End of Hardware Information ****

o=Thales.Master1 $
-------------------------------------------------
```

The HSM name/serial number (SN :) should be displayed and **hardware loaded ok** should be reported.

Chapter 3: Troubleshooting

The following table lists error messages that might be displayed during the procedures described in this guide.

Problem	Cause	Resolution
(-8973) Could not connect to the Entrust Authority Security Manager service. Security Manager service may not be running.	The Entrust service is not running in the Entrust Authority Master Control shell (**entsh$**).	Open the Master Control shell (**entsh$**): 1. Login with **Master1**. 2. Run **Service Start**.
(-2229) An error occurred. Check the service status and manager logs for details.	Timeout issue.	Login to **entsh** and run service status, if the service is shown as down start the service with **service start**.

Appendix A: Installing Entrust Authority Security Manager 8.1 Service Pack 1 (SP1)

The following steps detail how to install Entrust Authority Security Manager 8.1 Service Pack 1 (SP1) on older versions of Windows Server (i.e Windows Server 2008 R2, installing Entrust Authority Security Manager 8.1 Service Pack 1 (SP1) on older versions is not supported).

To install the Entrust Authority Security Manager 8.1 Service Pack 1:

1. Close all open applications to prevent conflicts from open applications that use shared files during the upgrade.
2. Ensure that your Security Manager database and LDAP-compliant directory are running.
3. Download the upgrade installer (`SM_81SP1_Win_upgrade.exe`) from **Entrust TrustedCare** (https://secure.entrust.com/trustedcare).
4. Run the upgrade installer (`SM_81SP1_Win_upgrade.exe`) to start the upgrade. The **InstallShield Wizard** appears. Follow the Wizard to begin the upgrade.
5. A **Security Manager Control Command Shell** window appears. When prompted, enter the password for **`easm_entrust`**.
6. When prompted, enter your **Master User** name and password.
7. Press **Enter** to close the **Security Manager Control Command Shell** window. The **InstallShield Wizard Complete** page appears.
8. Click **Finish**.

Appendix B: Initializing the CA with 1-of-N OCS

To initialize the Entrust Authority Security Manager with a 1-of-N OCS:

1. Open a command prompt and navigate to `C:\Program Files (x86)\Entrust\Security Manager\Bin` and run the command:

```
entsh.exe" -e "source \"C:/Program Files (x86)/Entrust/Security
Manager/etc/FirstTimeInit.tcl\""
```

2. When prompted for the password for the CA hardware, provide the operator card password.
3. When the initialization process is complete, the **Entrust Master Control Command Shell** informs you that the Entrust infrastructure has been set up.

Internet addresses

Web site:	http://www.thales-esecurity.com/
Support:	http://www.thales-esecurity.com/support-landing-page
Online documentation:	http://www.thales-esecurity.com/knowledge-base
International sales offices:	http://www.thales-esecurity.com/contact

Addresses and contact information for the main Thales e-Security sales offices are provided at the bottom of the following page.

THALES

www.thales-esecurity.com

About Thales e-Security

Thales e-Security is a leading global provider of data encryption and cyber security solutions to the financial services, high technology manufacturing, government and technology sectors. With a 40-year track record of protecting corporate and government information, Thales solutions are used by four of the five largest energy and aerospace companies, 22 NATO countries, and they secure more than 80 percent of worldwide payment transactions. Thales e-Security has offices in Australia, France, Hong Kong, Norway, United Kingdom and United States. For more information, visit www.thales-esecurity.com

Follow us on:

Americas – Thales e-Security Inc. 900 South Pine Island Road, Suite 710, Plantation, FL 33324 USA • Tel: +1 888 744 4976 or +1 954 888 6200 • Fax: +1 954 888 6211 • E-mail: sales@thalesesec.com
Asia Pacific – Unit 4101 41/F 248, Queen's Road East, Wanchai, Hong Kong, PRC • Tel: +852 2815 8633 • Fax: +852 2815 8141 • E-mail: asia.sales@thales-esecurity.com
Europe, Middle East, Africa – Meadow View House, Long Crendon, Aylesbury, Buckinghamshire HP18 9EQ • Tel: +44 (0)1844 201800 • Fax: +44 (0)1844 208550 • E-mail: emea.sales@thales-esecurity.com