ABAP Digital Signature guide for NFE

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1 Prologue

1.1 Installing the SAP Cryptographic Library

For the digital signature of NF-e data in the SAP system using Secure Store and Forward (SSF) you must install the SAP Cryptographic Library (SAPCRYPTOLIB) as described in SAP Note 662340 - SSF Encryption Using the SAPCryptolib. This is the prerequisite for the instructions in this manual. To support certificates with SHA-2 hashes the patch level should be at least on PL29.

1.2 Determine the current SAPCryptolib version and patch level

(1) Run program SSF02

(2) Execute

(3) “Determine Version”

(4) Execute

(5) Version information: “SSFLIB Version 1.555.34”

(6) The last two digits are the patch level

1.3 XML Signature Test Program

The program SECXML_DSIGNATURE provides an UI for testing both Sign and Verify a XML source and takes the configured PSE application and a local XML file name as input.

SAPCRYPTOLIB with Patch Level 30 is needed as prerequisite.

1.4 Required Notes

To prevent that the XML signature check fails if inclusive canonicalization is specified the following Notes must be applied:

1866334 CL_SEC_SXML_DSIGNATURE: Inclusive C14N

1666950 XML Signature check fails for inclusive canonicalization

1736879 XML Signature check fails for inclusive canonicalization

1333974 Central Note for WS Security on 7.20

1.5 Check and Warn About Certificates that Expire in Near Future

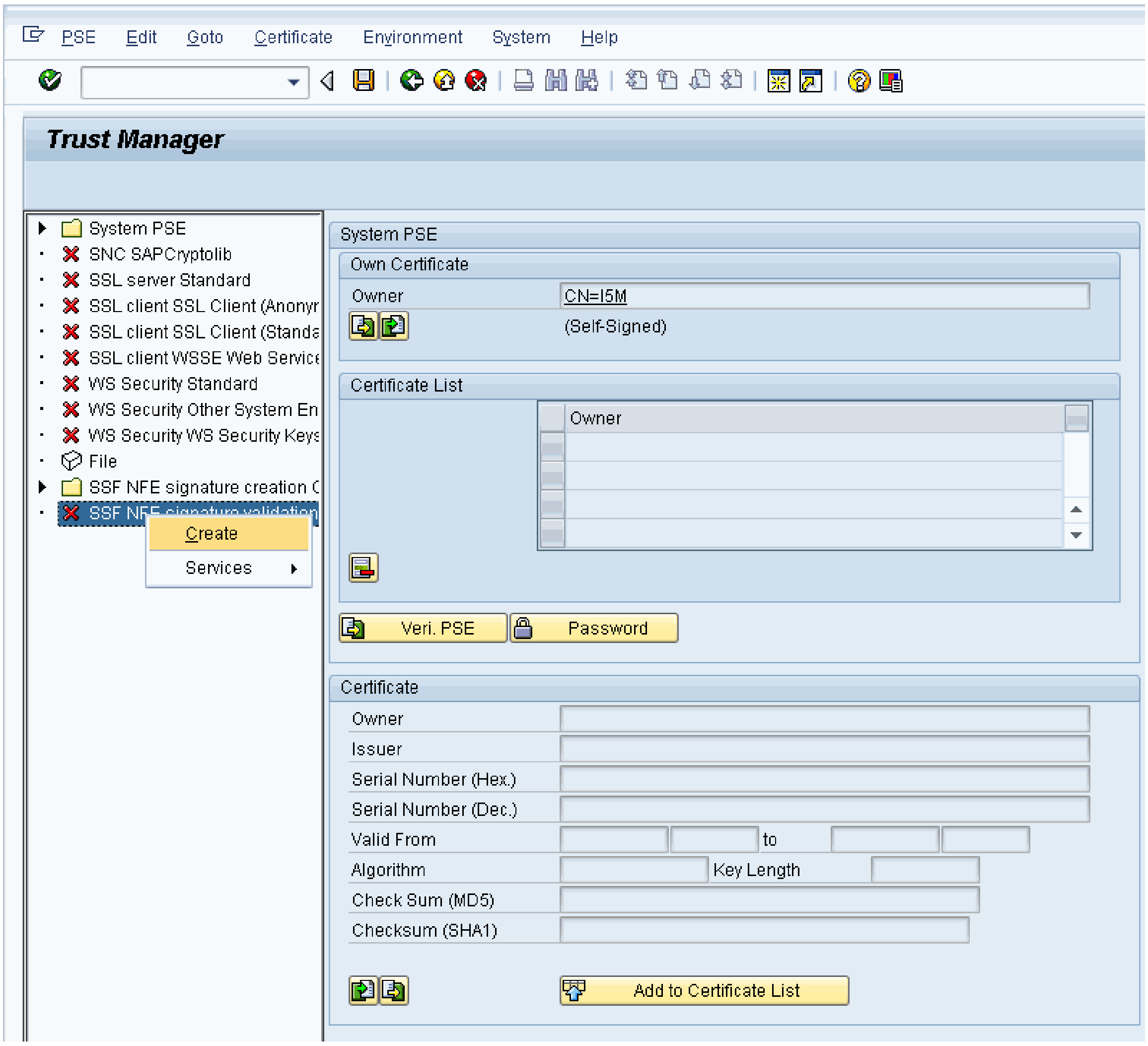
SSF_ALERT_CERTEXPIRE is a dialog report to check the validity period of certificates (SAP Note 572035). The task of this report is to provide warnings in the desired time before the expiry of the validity of installed certificates. The warnings can be provided in a variety of ways, e.g. via email. You can also schedule this report as a daily background job.

2 NFE Incoming

Importing the CA certificates for verification of the digital signature of incoming NF-e's

2.1 Creating the PSE for NFE Signature Check

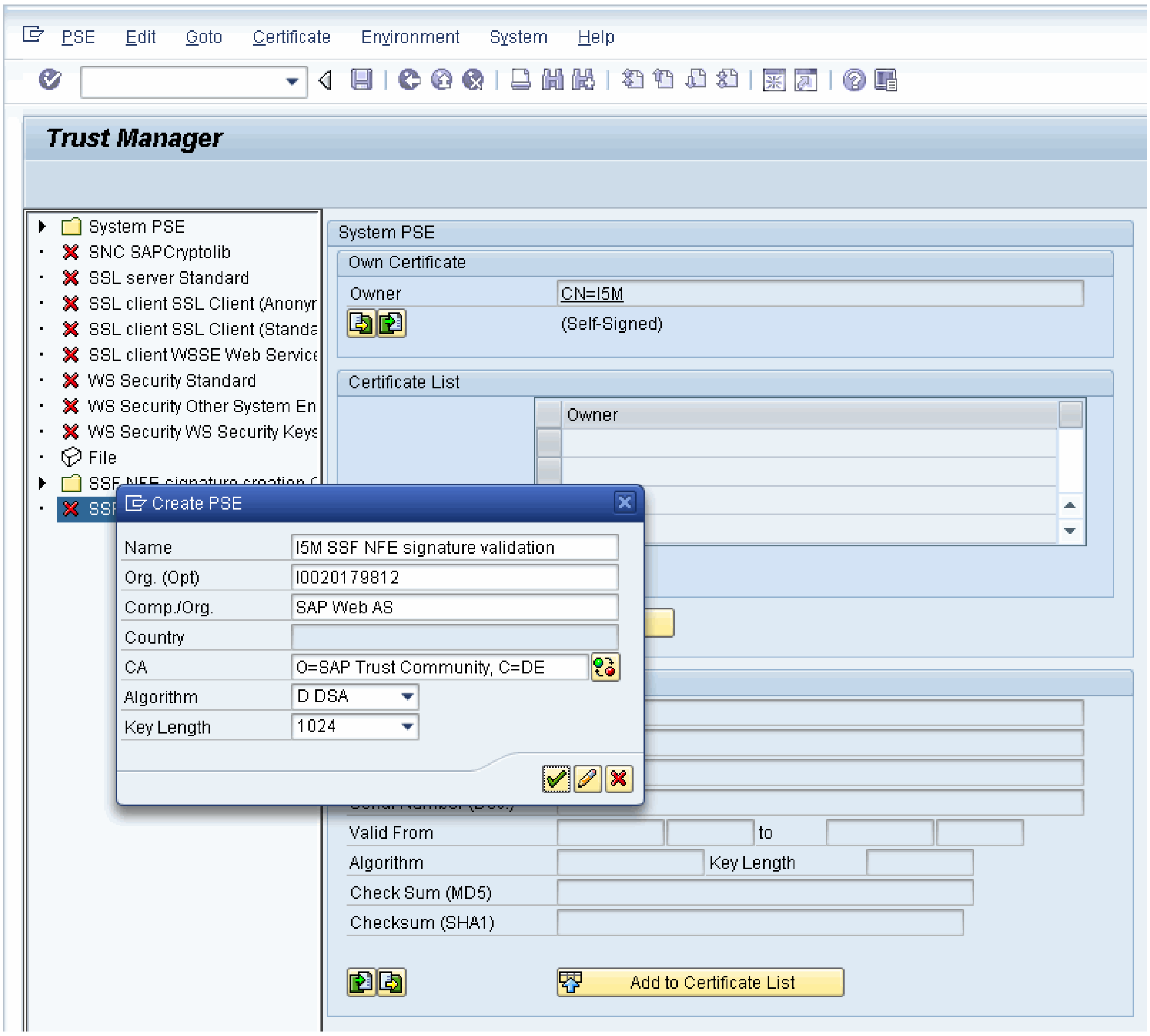
From the Administration workplace use transaction STRUST – SSF: Trust Manager and create a self-signed PSE for SSF NFE signature validation:



Owner CN=I5M

(Self-Signed)

Confirming suggestion of PSE:



PSE Edit Goto Certificate Environment System Help
Trust Manager
System PSE
SNC SAPCryptolib
SSL server Standard
SSL client SSL Client (Anonyr
SSL client SSL Client (Standa
SSL client WSSE Web Service
WS Security Standard
WS Security Other System En
WS Security WS Security Keys
File
SSF NFE signature creation
SSF
System PSE
Own Certificate
Certificate List
Add to Certificate List

Owner CN=I5M (Self-Signed)

Create PSE

Name	I5M SSF NFE signature validation
Org. (Opt)	I0020179812
Comp./Org.	SAP Web AS
Country	
CA	O=SAP Trust Community, C=DE
Algorithm	D DSA
Key Length	1024

Valid From ... to

Algorithm · Key Length

Check Sum (MD5)

Checksum (SHA1)

2.2 Import CA certificates

After receive the message “Data saved successfully”, import the CA certificate of the issuer (the certification authority, e.g. AC CERTISIGN or SERASA) of the signing certificate (encoded in the XML tag `<X509Certificate>`). You can download the CA certificates as described here:

http://www.iti.gov.br > ICP-BRASIL > Repositório

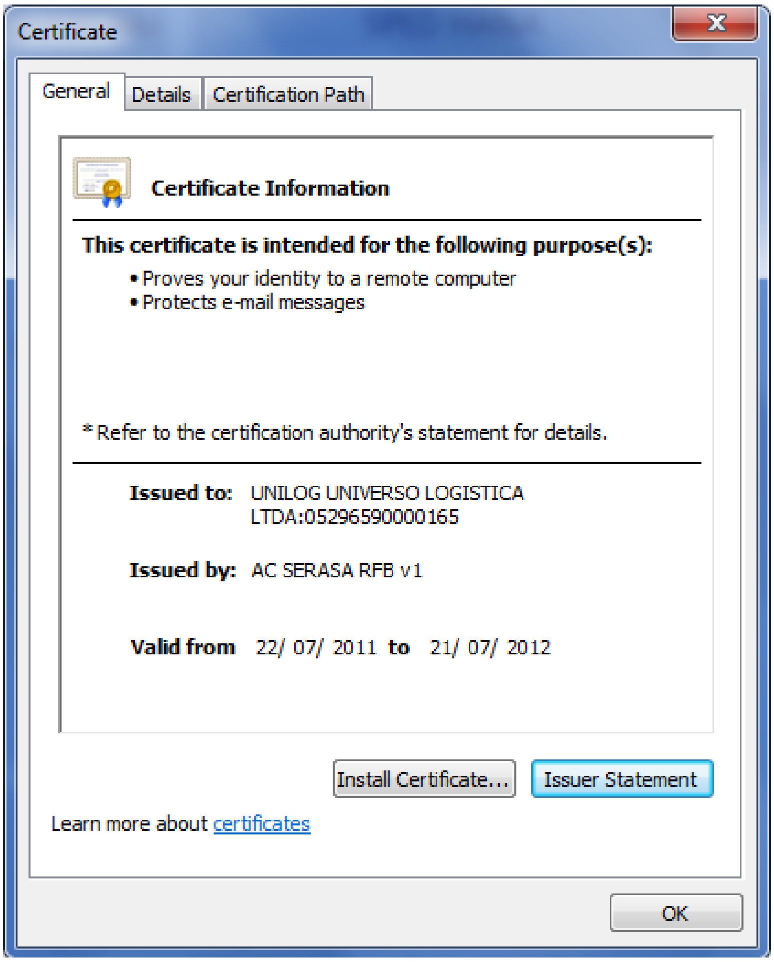
You have to import all CA certificates of the signers of the NF-e you get in your Inbound scenario, and that might be a double digit number. Still, you don’t need the whole certificate chain, only the lowest intermediate certificate from each CA.

You can restrict the number by finding out the CA’s of your partner. To speed up a particular case with a particular partner, you can ask him for the certification provider he used.

Or to find the CA in the XML of the Inbound-NF-e take the Certificate between the tags <X509Certificate> and </X509Certificate> and copy the content of X509Certificate tag to a notepad file between two fixed lines below:

```
-----BEGIN CERTIFICATE-----
MIIGWjCCBUKgAwIBAgIIe94LRpgIoVYwDQYJKoZIhvcNAQEFBQAwdTELMAkGA1UEBhMCQlIxEzARBgNVBAoTCklDUC1CcmFzaWwx
NjA0BgNVBAsTLVNlY3JldGFyaWEgZGEgUmVjZWl0YSBGZWRlcmFsIGRvIEJyYXNpbCAtIFJGQjEZMBcGA1UEAxMQQUMgU0VSQVNB
IGRvIEJyYXNpbCAtIFJGQjEWMBQGA1UECxMNUkZCIGUtQ05QSiBBMTESMBAGA1UECxMJQVIgU0VSQVNBMTYwNAYDVQQDEy1VTklM
T0cgVU5JVkVSU08gTE9HSVNUSUNBIExUREE6MDUyOTY1OTAwMDAxNjUwgZ8wDQYJKoZIhvcNAQEBBQADgY0AMIGJAoGBAKn+Ghn9
B8WMXAlE+kb9Xg87bzVmCBz312RWmP4IMpY0TGCoHe8ncVTPysiQovwMvJjrXXRZhlCSt1UBCazpYVNY/cdkBiljGg24/S0Yn4N8
xc+XJC2AhpC9dx9MvpbIA9t0WjNsgxTpXBZuYBxPj/7yQbs43T5th5tFy2tH2HzICi91fIO3D1sAdxtGKaDmii9LMIQ==
-----END CERTIFICATE-----
```

Then save it as .cer-file and double click on the file. Windows will show the certificate:



Certificate Information

This certificate is intended for the following purpose(s):

- Proves your identity to a remote computer
- Protects e-mail messages

* Refer to the certification authority's statement for details.

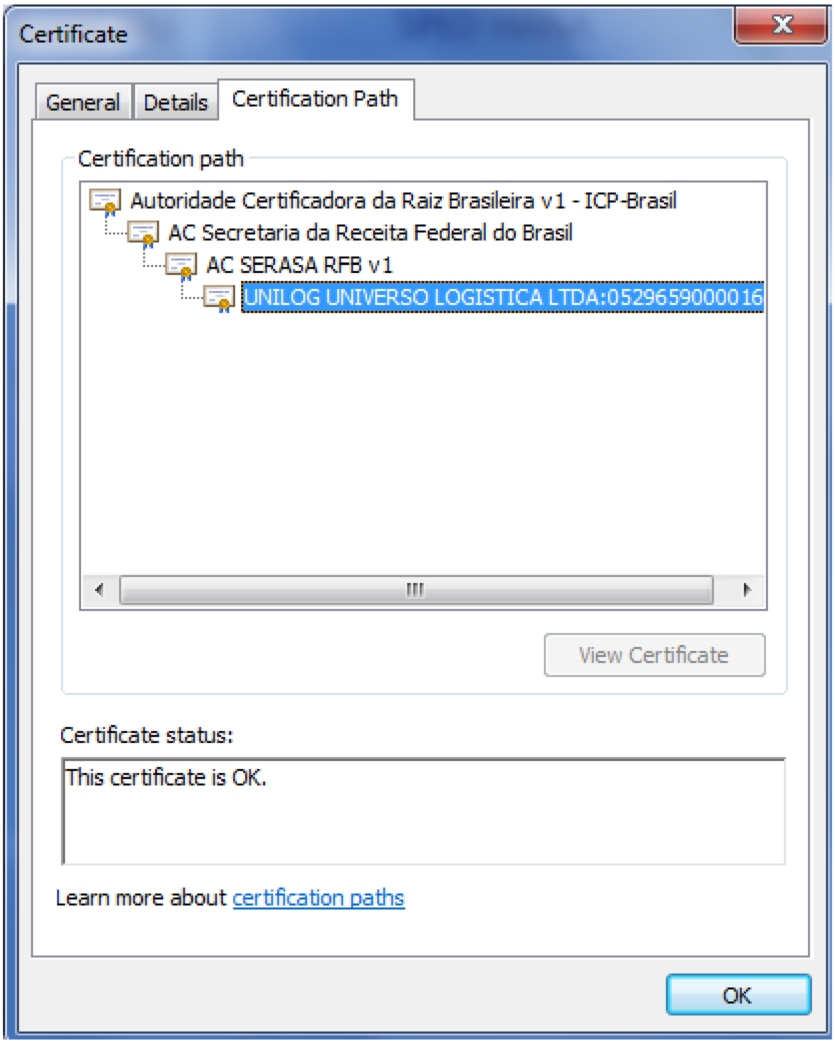
Issued to: UNILOG UNIVERSO LOGISTICA LTDA:05296590000165

Issued by: AC SERASA RFB v1

Valid from 22/ 07/ 2011 to 21/ 07/ 2012

Learn more about certificates

If you have the full chain inside your computer you can also see the path and the name of the CA:



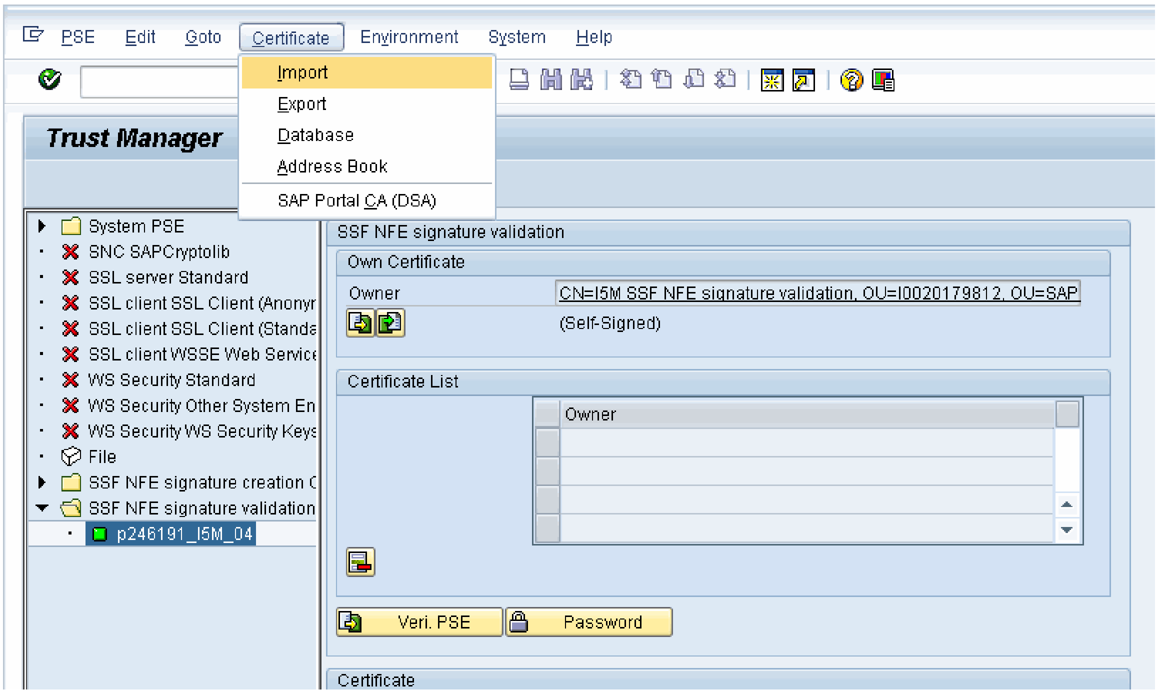
Autoridade Certificadora da Raiz Brasileira v1 - ICP-Brasil
AC Secretaria da Receita Federal do Brasil
AC SERASA RFB v1
UNILOG UNIVERSO LOGISTICA LTDA:05296590000016

Certificate status:

This certificate is OK.

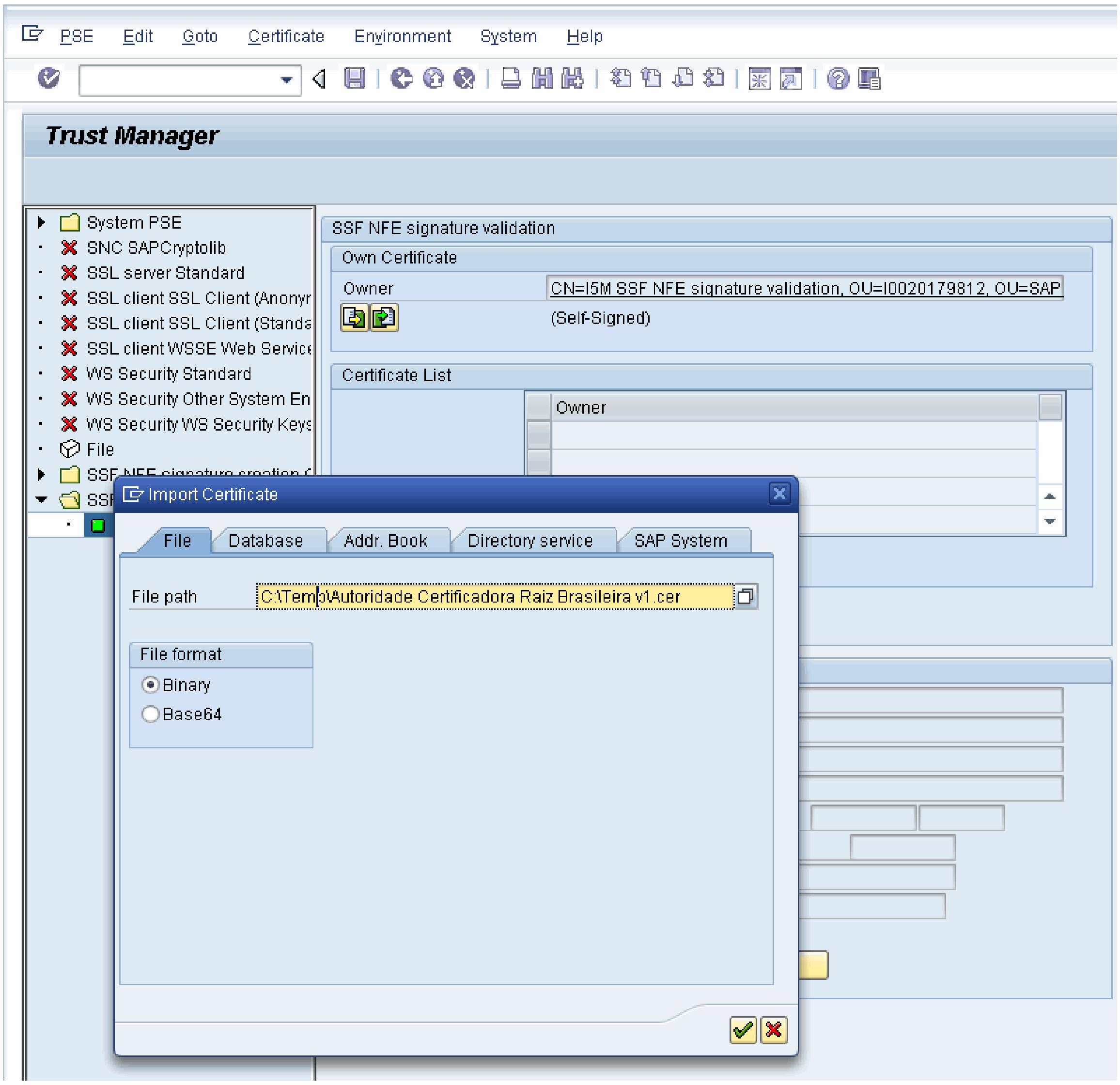
Learn more about certification paths

Import the CA certificate of the certification authority in STRUST:



Owner CN=I5M SSF NFE signature validation, OU=I0020179812, OU=SAP

(Self-Signed)



Trust Manager

- System PSE
- ☒ SNC SAPCryptolib
- ☒ SSL server Standard
- ☒ SSL client SSL Client (Anonyr
- ☒ SSL client SSL Client (Standa
- ☒ SSL client WSSE Web Servic
- ☒ WS Security Standard
- ☒ WS Security Other System En
- ☒ WS Security WS Security Keys
- File
- SSF NFE signature creation (
- SSF

SSF NFE signature validation

Own Certificate

Owner: CN=I5M SSF NFE signature validation, OU=I0020179812, OU=SAP

(Self-Signed)

Certificate List

Owner

Import Certificate

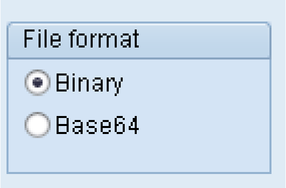
File path: C:\Temp\Autoridade Certificadora Raiz Brasileira v1.cer

File format

● Binary

○ Base64

If receive an error like “SSF kernel error: invalid parameter” try to change file format:

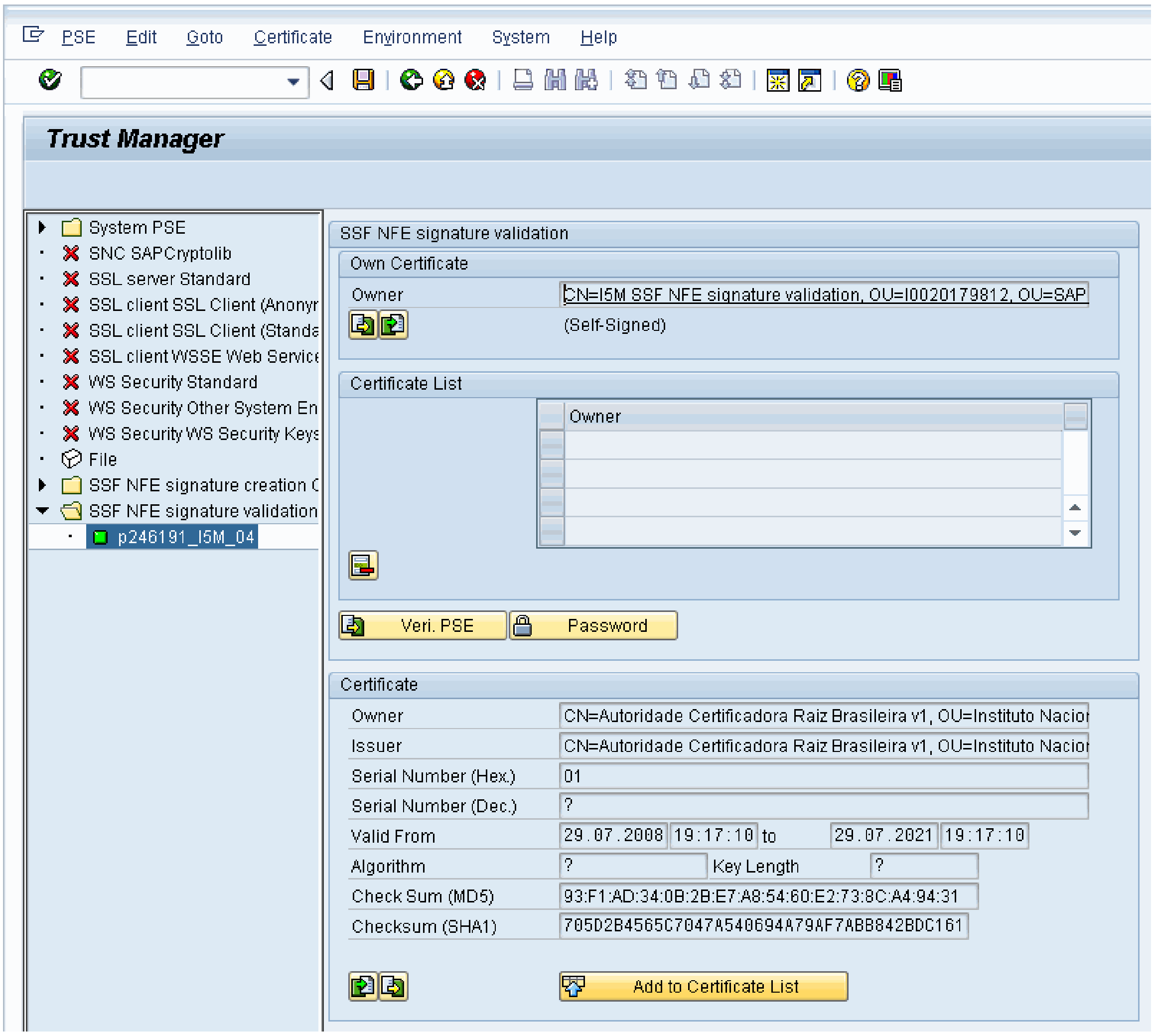


File format

● Binary

○ Base64

The certificate will be shown on Certificate box:


PSE
Edit
Goto
Certificate
Environment
System
Help
Trust Manager
System PSE
SNC SAPCryptolib
SSL server Standard
SSL client SSL Client (Anonyr
SSL client SSL Client (Standa
SSL client WSSE Web Service
WS Security Standard
WS Security Other System En
WS Security WS Security Keys
File
SSF NFE signature creation (
SSF NFE signature validation
p246191_I5M_04
Veri. PSE
Password
Add to Certificate List

SSF NFE signature validation

Own Certificate

Owner	CN=I5M SSF NFE signature validation, OU=I0020179812, OU=SAP
	(Self-Signed)

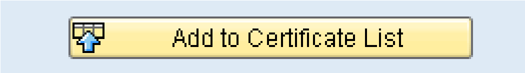
Certificate List

Owner

Certificate

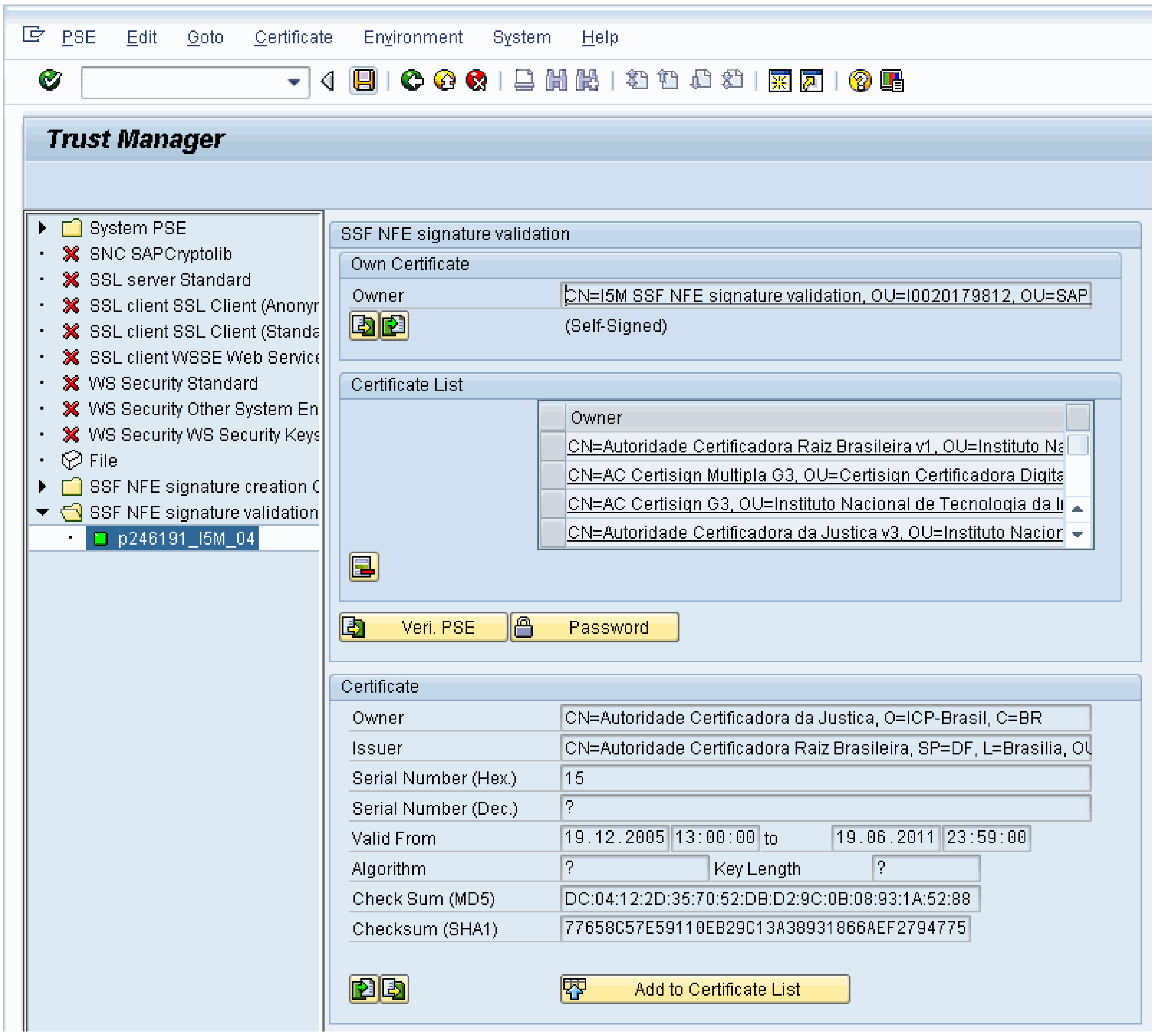
Owner	CN=Autoridade Certificadora Raiz Brasileira v1, OU=Instituto Nacior		
Issuer	CN=Autoridade Certificadora Raiz Brasileira v1, OU=Instituto Nacior		
Serial Number (Hex.)	01		
Serial Number (Dec.)	?		
Valid From	29.07.2008 19:17:10	to	29.07.2021 19:17:10
Algorithm	?	Key Length	?
Check Sum (MD5)	93:F1:AD:34:0B:2B:E7:A8:54:60:E2:73:8C:A4:94:31		
Checksum (SHA1)	705D2B4565C7047A540694A79AF7ABB842BDC161		

Click on Add to Certificate List



Repeat the same step for other CA certificates

Import one by one the CA certificates for all certification authorities of your business partners.



- System PSE
- SNC SAPCryptolib
- SSL server Standard
- SSL client SSL Client (Anonyr
- SSL client SSL Client (Standa
- SSL client WSSE Web Service
- WS Security Standard
- WS Security Other System En
- WS Security WS Security Keys
- File
- SSF NFE signature creation (
- SSF NFE signature validation
  - p246191_I5M_04

SSF NFE signature validation

Own Certificate

Owner: CN=I5M SSF NFE signature validation, OU=I0020179812, OU=SAP

(Self-Signed)

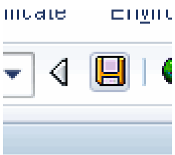
Certificate List

Owner
CN=Autoridade Certificadora Raiz Brasileira v1, OU=Instituto Na
CN=AC Certisign Multipla G3, OU=Certisign Certificadora Digita
CN=AC Certisign G3, OU=Instituto Nacional de Tecnologia da I
CN=Autoridade Certificadora da Justica v3, OU=Instituto Nacior

Certificate

Owner	CN=Autoridade Certificadora da Justica, O=ICP-Brasil, C=BR
Issuer	CN=Autoridade Certificadora Raiz Brasileira, SP=DF, L=Brasilia, OU
Serial Number (Hex.)	15
Serial Number (Dec.)	?
Valid From	19.12.2005 13:00:00 to 19.06.2011 23:59:00
Algorithm	? Key Length ?
Check Sum (MD5)	DC:04:12:2D:35:70:52:DB:D2:9C:0B:08:93:1A:52:88
Checksum (SHA1)	77658C57E59110EB29C13A38931866AEF2794775

After import and add all certificates to list, save it to persist the changes



3 NFE Outgoing

In the following the customizing of the private certificate for digital signature of outgoing NF-es is described.

3.1 Obtain the private certificate

In order to issue electronic invoices the xml must be signed using a digital certificate compliant with ICP-Brasil standards securing the access between the NFE system and the government's servers.

To obtain the digital certificate you must interact with a Certification Authority. You can find a completed and updated list of Certificating Authorities on the National Information Technology Institute (ITI Brazil) website http://www.iti.gov.br. The main Certification Authorities are: Caixa, Serasa, Certisign, Valid, Digitalsign, Boa Vista.

The Certificating Authorities can issue both certificates as well as certificates in the form of a physical token; so make sure you request the digital certificate that can be used for e-commerce transactions in PKSC#12 format with the file ending .pfx.

Hints:

- The certificate can also be used for the client authentication using https in PI.
- For signing you can also use the physical token and connect it via PI using enhancement spot /XNFE/CORE_SIGNATURE_CREATE_EN

3.2 Create PSE

Use tool SAPGENPSE to create PSE on the Command Prompt from existing private certificate as described in Importing a PKCS#12 File:

```
sapgenpse import_p12 -p <path>file.pse bras.pfx
```

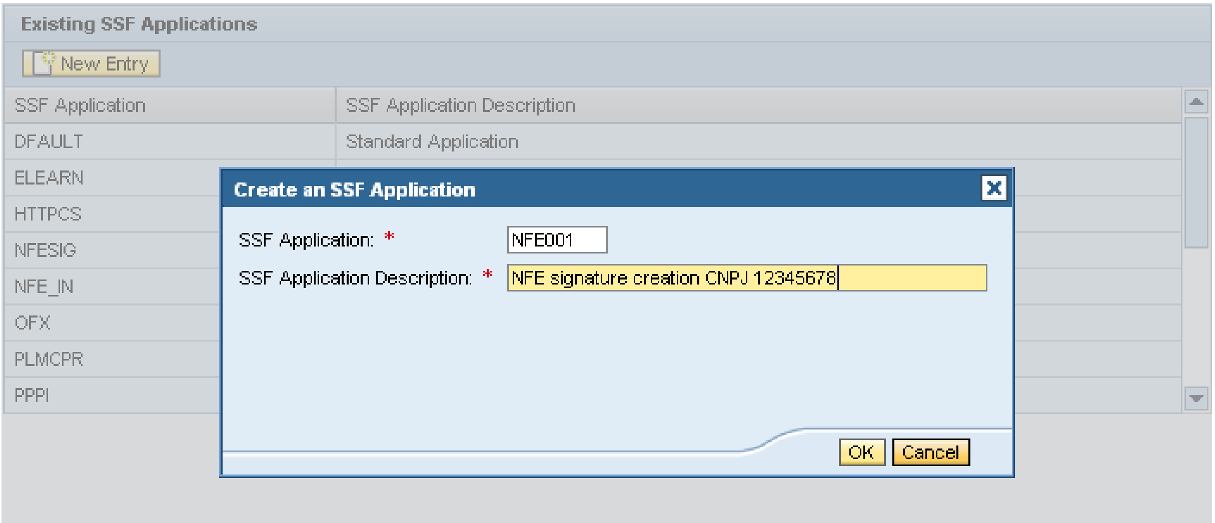
Hints:

- In case of an error that the pfx is missing the certification chain you can complete the chain by adding the missing certificates with option '-r'. Then the command line should look like this:

  ```
  sapgenpse import_p12 -r SerasaACPv2.cer -r ICPBrasilv2.cer -p <path>file.pse bras.pfx
  ```
- Inform the full path for the PSE to be created.
- If asked for a PSE PIN enter one or click Return.

3.3 Create SSF application

From the Administration workplace use application *SSF: Define Application.* With this administration UI SSF applications are created and also all attributes are set correctly in the SSFAPPLIC table. You need a separate SSF application for each private certificate that you use for signing the NF-e (e.g. for each own tax number). This step has to be done in all three the dev, test and production systems (no transport).



Existing SSF Applications

SSF Application	SSF Application Description
DFAULT	Standard Application
ELEARN	
HTTPCS	
NFESIG	
NFE_IN	
OFX	
PLMCPR	
PPPI	

Create an SSF Application

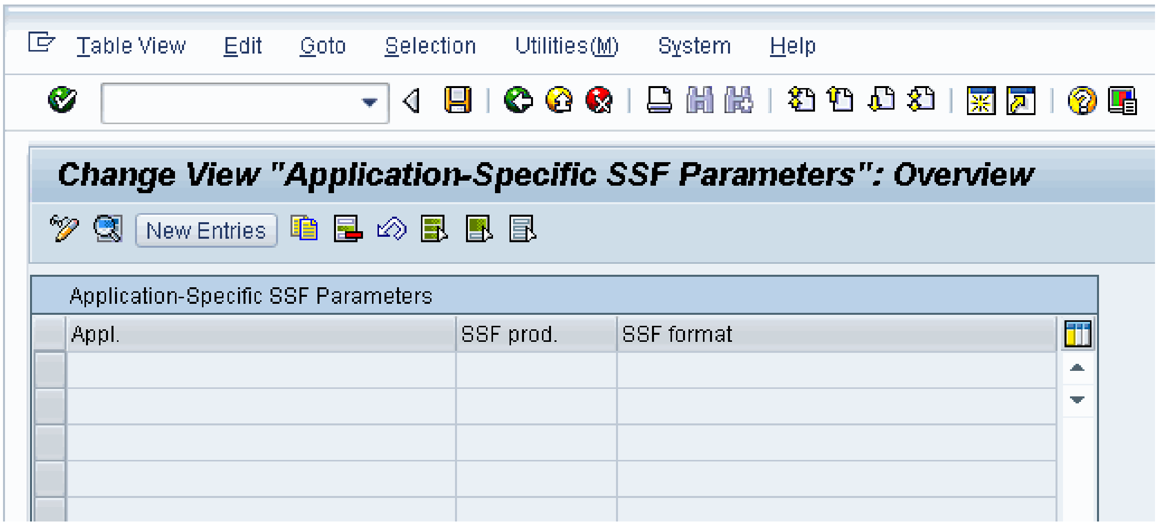
SSF Application: * NFE001

SSF Application Description: * NFE signature creation CNPJ 12345678

The SSF applications have also to be customized in IMG activity Outbound > "Maintain System Response for Own Tax Numbers".

3.4 Set Application Parameters

From the Administration workplace use transaction *SSFA – SSF: Set Application Parameters*

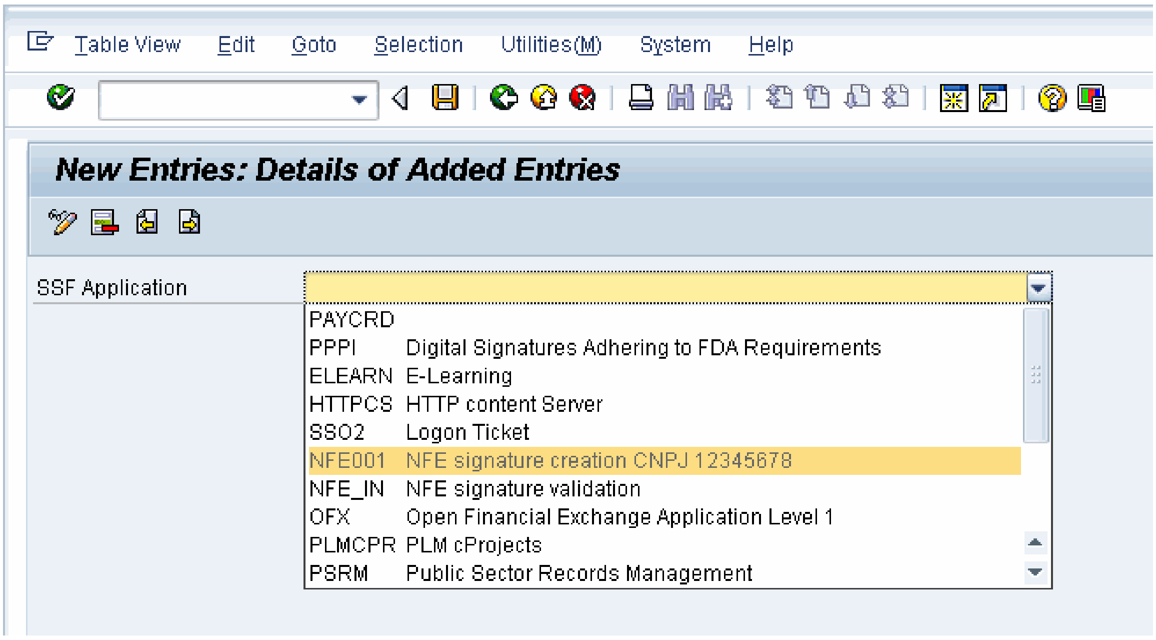


Change View "Application-Specific SSF Parameters": Overview

Application-Specific SSF Parameters

Appl.	SSF prod.	SSF format

Create the configuration for ZNFE01 (for sign NF-es)

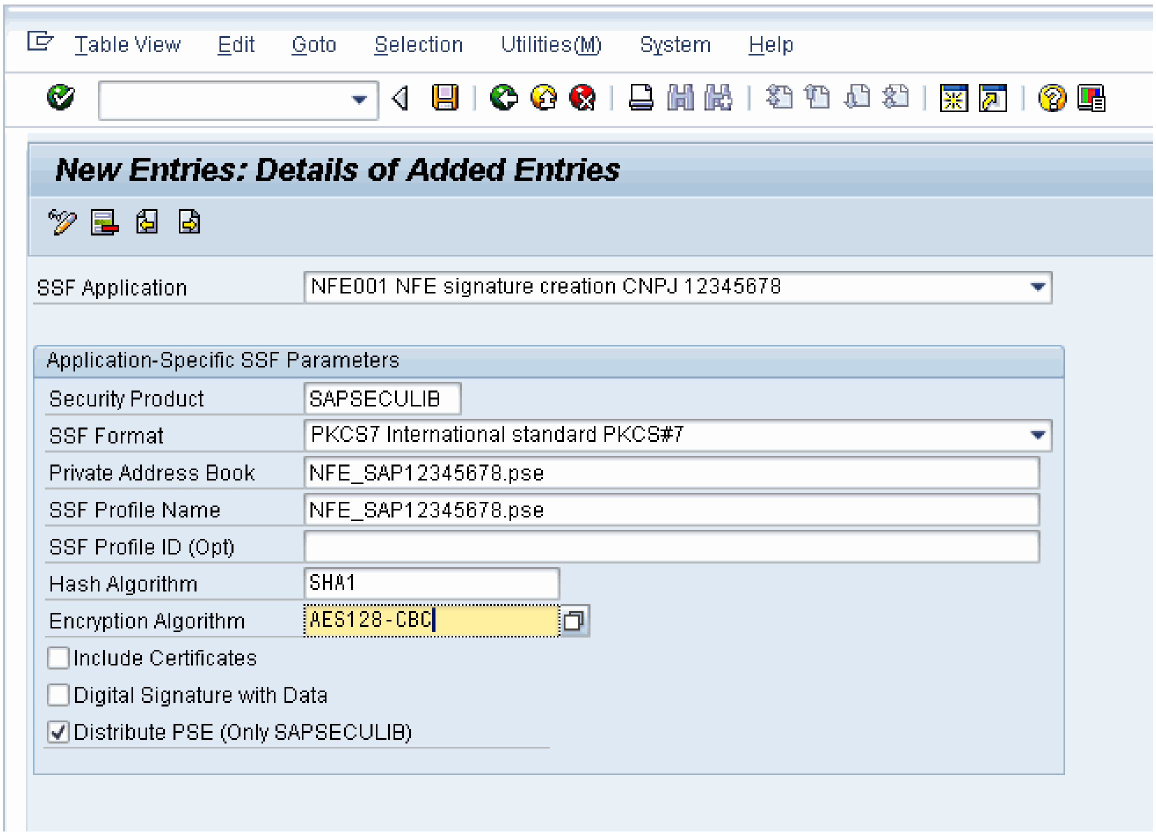


New Entries: Details of Added Entries

SSF Application

PAYCRD	
PPPI	Digital Signatures Adhering to FDA Requirements
ELEARN	E-Learning
HTTPCS	HTTP content Server
SSO2	Logon Ticket
NFE001	NFE signature creation CNPJ 12345678
NFE_IN	NFE signature validation
OFX	Open Financial Exchange Application Level 1
PLMCPR	PLM cProjects
PSRM	Public Sector Records Management

Filling data:



New Entries: Details of Added Entries

SSF Application	NFE001 NFE signature creation CNPJ 12345678

Application-Specific SSF Parameters

Security Product	SAPSECULIB
SSF Format	PKCS7 International standard PKCS#7
Private Address Book	NFE_SAP12345678.pse
SSF Profile Name	NFE_SAP12345678.pse
SSF Profile ID (Opt)	
Hash Algorithm	SHA1
Encryption Algorithm	AES128-CBC

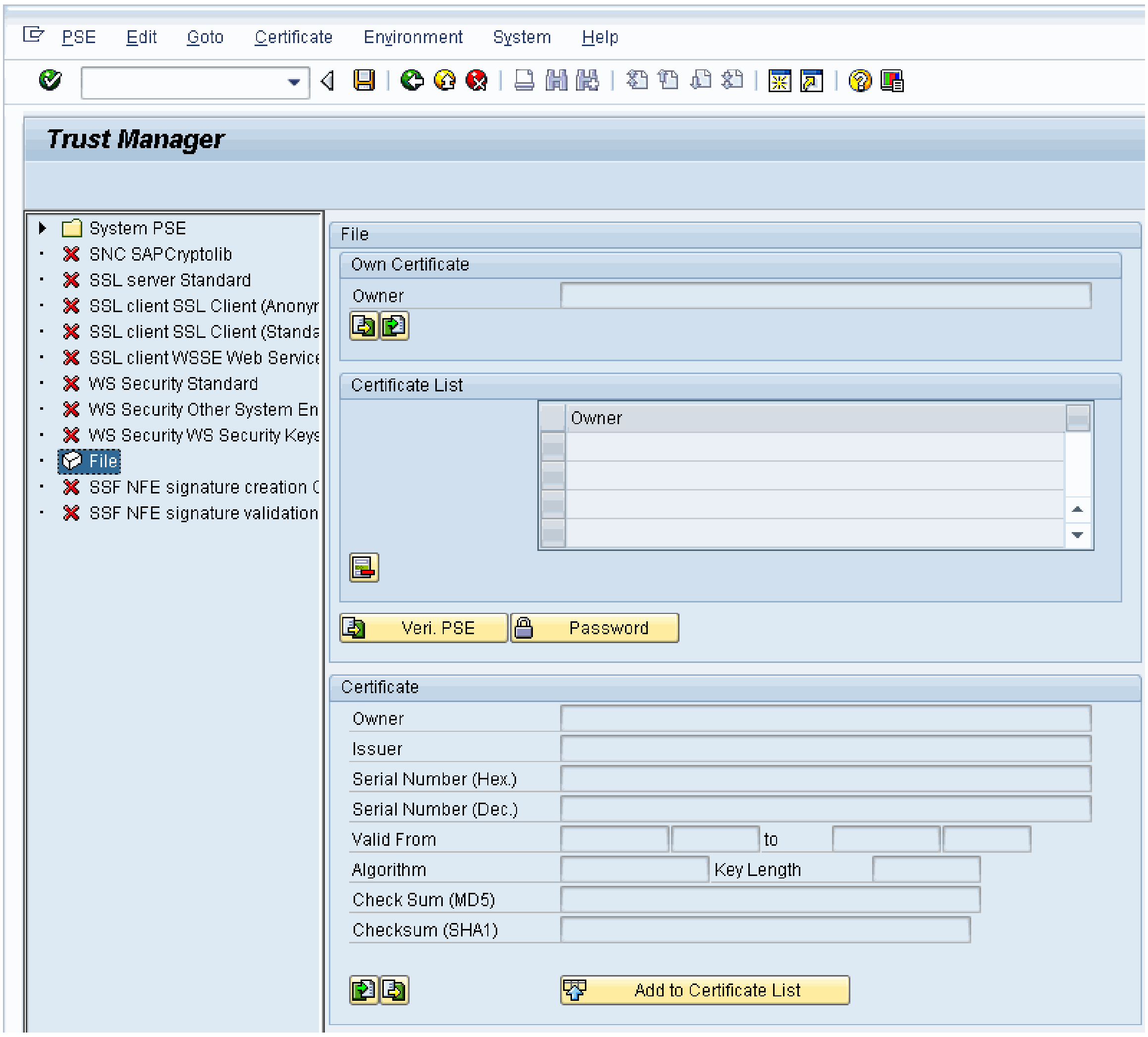
□ Include Certificates

□ Digital Signature with Data

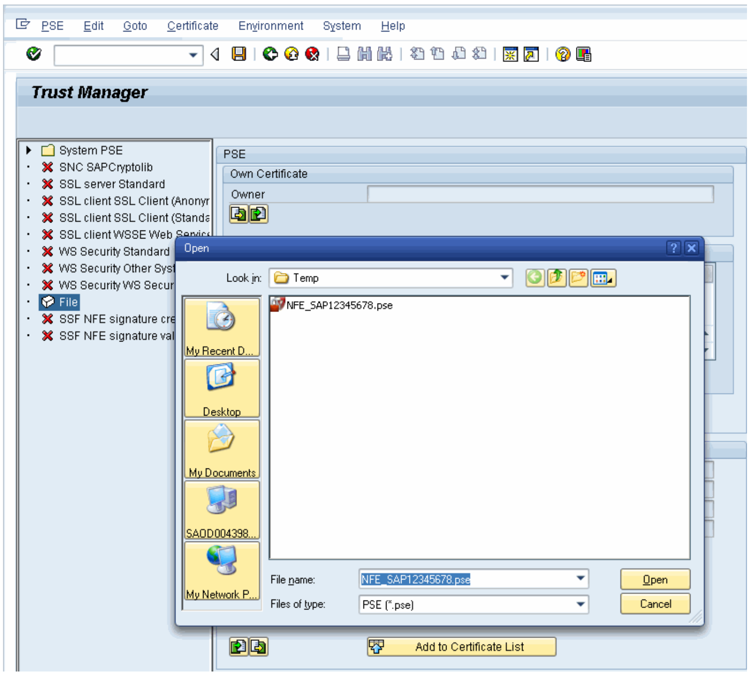
☑ Distribute PSE (Only SAPSECULIB)

3.5 Load the PSE

From the Administration workplace use transaction STRUST – SSF: Trust Manager and load the PSE: Double click on *File*:



Informing the .pse which is copied from server to local machine



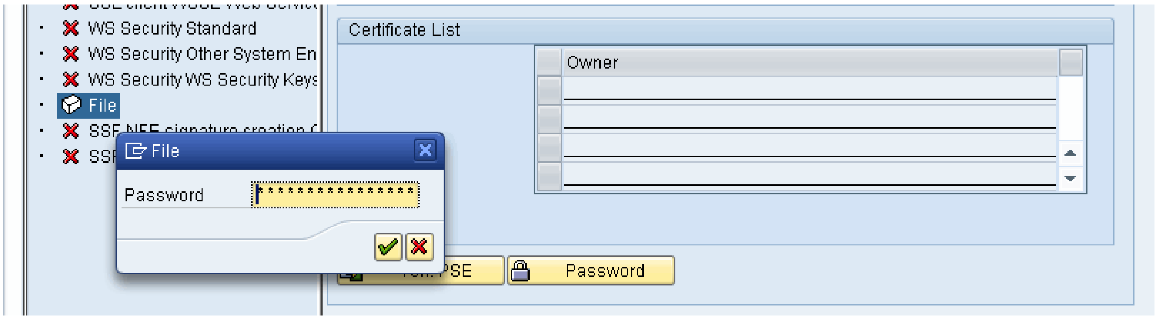
Look in: Temp

NFE_SAP12345678.pse

File name: NFE_SAP12345678.pse

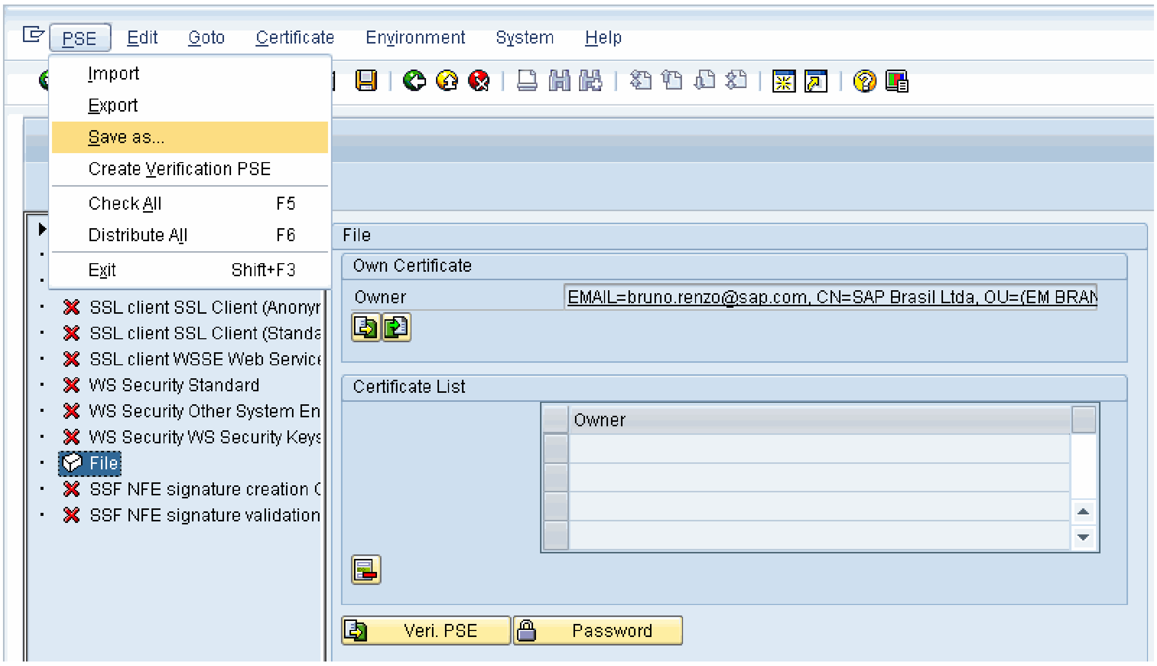
Files of type: PSE (*.pse)

Inform the password of PSE


WS Security Standard
WS Security Other System En
WS Security WS Security Keys
File
SSF NFE signature creation
SSF
Certificate List
Owner
File
PSE
Password

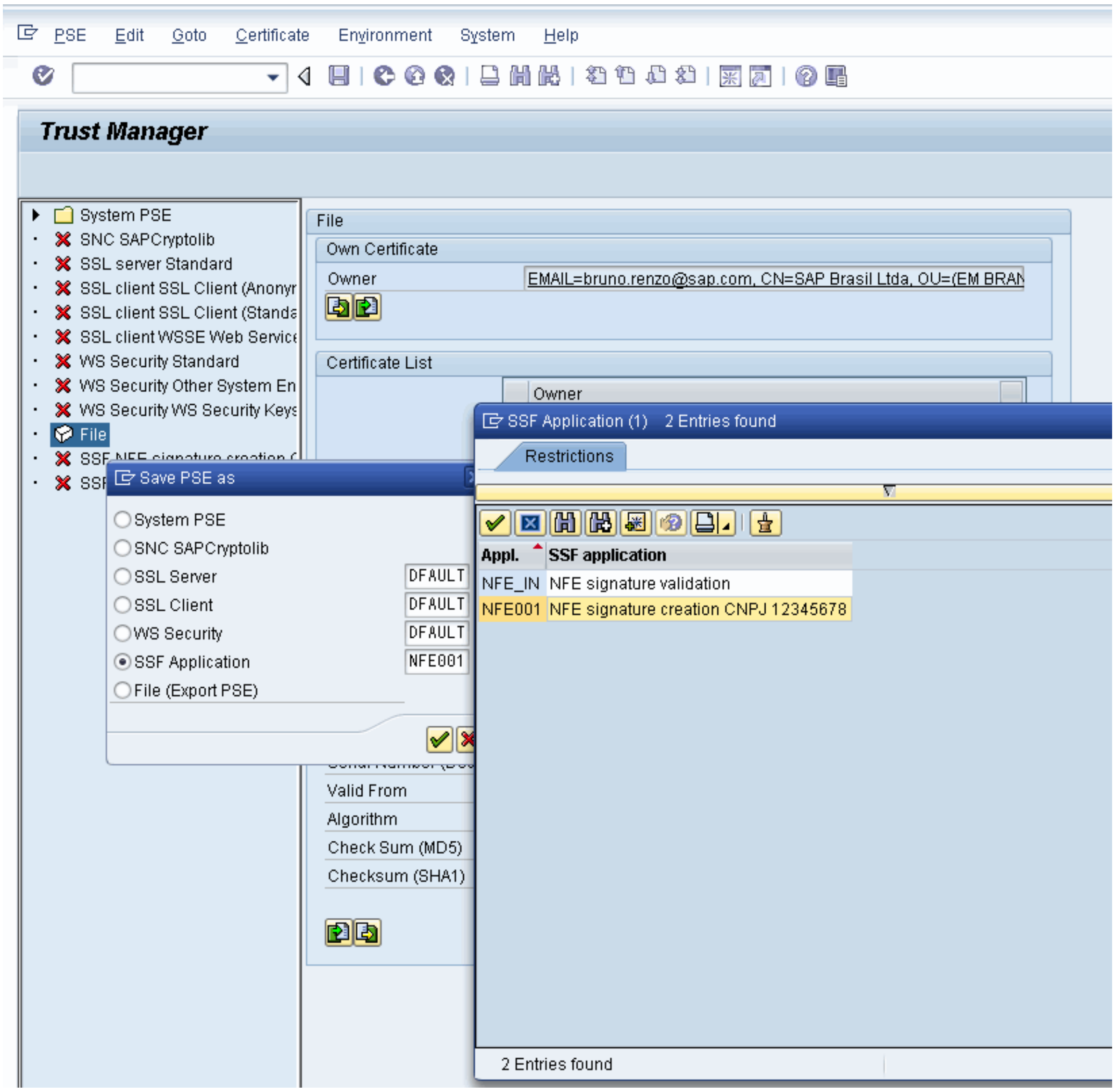
Password: ****************

Choosing PSE -> Save as…



Owner EMAIL=bruno.renzo@sap.com, CN=SAP Brasil Ltda, OU=(EM BRAN

Select SSF application on Save PSE as box, and select and confirm the proper SSF for signature which are being created:



- System PSE
- SNC SAPCryptolib
- SSL server Standard
- SSL client SSL Client (Anonyr
- SSL client SSL Client (Standa
- SSL client WSSE Web Servic
- WS Security Standard
- WS Security Other System En
- WS Security WS Security Keys
- File
- SSF NFE signature creation (
- SSF

File

Own Certificate

Owner EMAIL=bruno.renzo@sap.com, CN=SAP Brasil Ltda, OU=(EM BRAN

Certificate List

Owner

Valid From

Algorithm

Check Sum (MD5)

Checksum (SHA1)

Save PSE as

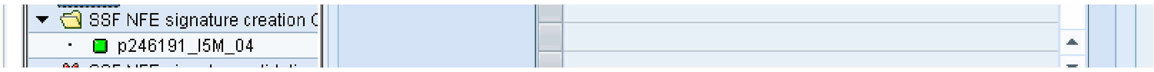
○ System PSE	
○ SNC SAPCryptolib	
○ SSL Server	DFAULT
○ SSL Client	DFAULT
○ WS Security	DFAULT
● SSF Application	NFE001
○ File (Export PSE)	

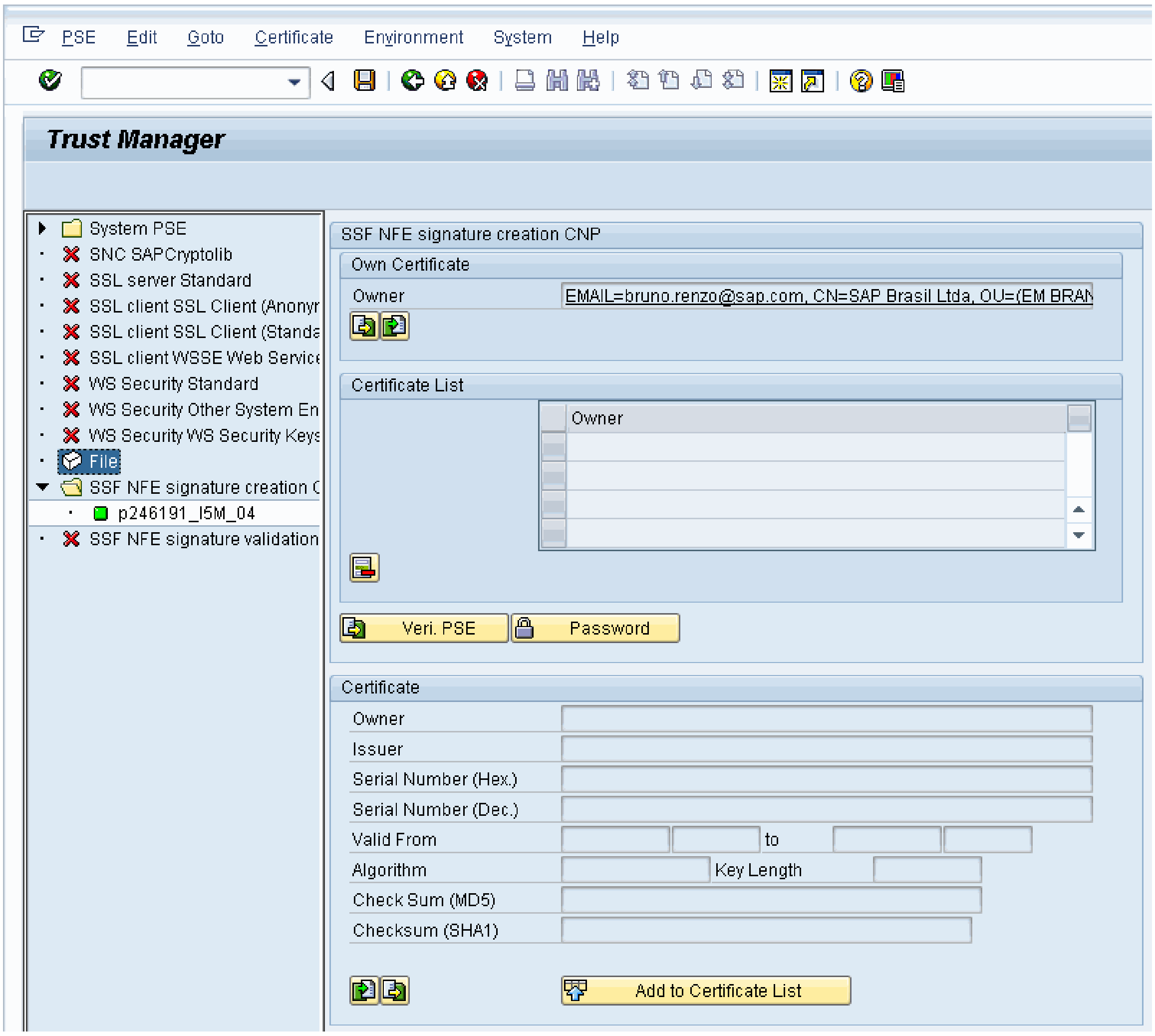
SSF Application (1) 2 Entries found

Appl.	SSF application
NFE_IN	NFE signature validation
NFE001	NFE signature creation CNPJ 12345678

2 Entries found

Data saved successfully…





Owner: EMAIL=bruno.renzo@sap.com, CN=SAP Brasil Ltda, OU=(EM BRAN