Red Hat Enterprise Linux 8

Managing smart card authentication

Setting up and managing smart card authentication in RHEL

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Legal Notice

Abstract

This documentation collection provides instructions on how to manage smart card authentication in RHEL.

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MAKING OPEN SOURCE MORE INCLUSIVE

Red Hat is committed to replacing problematic language in our code, documentation, and web properties. We are beginning with these four terms: master, slave, blacklist, and whitelist. Because of the enormity of this endeavor, these changes will be implemented gradually over several upcoming releases. For more details, see our CTO Chris Wright's message .

In Identity Management, planned terminology replacements include:

- ***block list*** replaces *blacklist*
- ***allow list*** replaces *whitelist*
- ***secondary*** replaces *slave*
- The word *master* is being replaced with more precise language, depending on the context:
  - ***IdM server*** replaces *IdM master*
  - ***CA renewal server*** replaces *CA renewal master*
  - ***CRL publisher server*** replaces *CRL master*
  - ***multi-supplier*** replaces *multi-master*

PROVIDING FEEDBACK ON RED HAT DOCUMENTATION

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- For simple comments on specific passages:
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  2. Use your mouse cursor to highlight the part of text that you want to comment on.
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  4. Follow the displayed instructions.
- For submitting more complex feedback, create a Bugzilla ticket:
  1. Go to the Bugzilla website.
  2. As the Component, use **Documentation**.
  3. Fill in the **Description** field with your suggestion for improvement. Include a link to the relevant part(s) of documentation.
  4. Click **Submit Bug**.

CHAPTER 1. CONFIGURING IDENTITY MANAGEMENT FOR SMART CARD AUTHENTICATION

Authentication based on smart cards is an alternative to passwords. You can store user credentials on a smart card in the form of a private key and a certificate, and special software and hardware is used to access them. Place the smart card into a reader or a USB port and supply the PIN code for the smart card instead of providing your password.

Identity Management (IdM) supports smart card authentication with:

- User certificates issued by the IdM certificate authority
- User certificates issued by an external certificate authority

This user story shows how to set up smart card authentication in IdM for both types of certificates. In the user story, the **smartcard_ca.pem** CA certificate is the file containing the certificate of a trusted external certificate authority.

The user story contains the following modules:

- Configuring the IdM server for smart card authentication
- Configuring the IdM client for smart card authentication
- Adding a certificate to a user entry in the IdM Web UI
- Adding a certificate to a user entry in the IdM CLI
- Installing tools for managing and using smart cards
- Storing a certificate on a smart card
- Logging in to IdM with smart cards
- Configuring GDM access using smart card authentication
- Configuring su access using smart card authentication

1.1. CONFIGURING THE IDM SERVER FOR SMART CARD AUTHENTICATION

If you want to enable smart card authentication for users whose certificates have been issued by the certificate authority of the **EXAMPLE.ORG** domain, whose LDAP distinguished name (DN) is **CN=Certificate Authority,DC=EXAMPLE,DC=ORG**, then you need to obtain the certificate of the authority so that you can run it with the script configuring the IdM server. You can, for example, download the certificate from a web page whose certificate has been issued by the authority. For details, see Steps 1 - 4a in Configuring a browser to enable certificate authentication .

To enable smart card authentication for IdM users who have been issued a certificate by the IdM Certificate Authority, obtain the CA certificate from the **/etc/ipa/ca.crt** file on the IdM server on which the IdM CA is running.

This section describes how to configure an IdM server for smart card authentication. First, obtain files with the CA certificates in the PEM format, then run the in-built **ipa-advise** script. Finally, reload the system configuration.

Prerequisites

- You have root access to the IdM server.
- You have the root CA certificate and any sub CA certificates.

Procedure

1. Create a directory in which you will do the configuration:

```
[root@server]# mkdir ~/SmartCard/
```

2. Navigate to the directory:

```
[root@server]# cd ~/SmartCard/
```

3. Obtain the relevant CA certificates stored in files in PEM format. If your CA certificate is stored in a file of a different format, such as DER, convert it to PEM format. The IdM Certificate Authority certificate is located in the **/etc/ipa/ca.crt** file.
Convert a DER file to a PEM file:

```
# openssl x509 -in <filename>.der -inform DER -out <filename>.pem -outform PEM
```

4. For convenience, copy the certificates to the directory in which you want to do the configuration:

```
[root@server SmartCard]# cp /etc/ipa/ca.crt ~/SmartCard/
[root@server SmartCard]# cp /tmp/smartcard_ca.pem ~/SmartCard/
```

5. Optionally, if you use certificates of external certificate authorities, use the **openssl x509** utility to view the contents of the files in the **PEM** format to check that the **Issuer** and **Subject** values are correct:

```
[root@server SmartCard]# openssl x509 -noout -text -in smartcard_ca.pem | more
```

6. Generate a configuration script with the in-built **ipa-advise** utility, using the administrator's privileges:

```
[root@server SmartCard]# kinit admin
[root@server SmartCard]# sudo ipa-advise config-server-for-smart-card-auth > config-server-for-smart-card-auth.sh
```

The **config-server-for-smart-card-auth.sh** script performs the following actions:

- It configures the IdM Apache HTTP Server.
- It enables Public Key Cryptography for Initial Authentication in Kerberos (PKINIT) on the Key Distribution Center (KDC).
- It configures the IdM Web UI to accept smart card authorization requests.

7. Execute the script, adding the PEM files containing the root CA and sub CA certificates as arguments:

```
[root@server SmartCard]# chmod +x config-server-for-smart-card-auth.sh
[root@server SmartCard]# ./config-server-for-smart-card-auth.sh smartcard_ca.pem
ca.crt
Ticket cache:KEYRING:persistent:0:0
Default principal: admin@IDM.EXAMPLE.COM
[...]
Systemwide CA database updated.
The ipa-certupdate command was successful
```

NOTE

Ensure that you add the root CA's certificate as an argument before any sub CA certificates and that the CA or sub CA certificates have not expired.

8. Optionally, if the certificate authority that issued the user certificate does not provide any Online Certificate Status Protocol (OCSP) responder, you may need to disable OCSP check for authentication to the IdM Web UI:

   a. Set the **SSLOCSPEnable** parameter to **off** in the **/etc/httpd/conf.d/ssl.conf** file:

   ```
   SSLOCSPEnable off
   ```

   b. Restart the Apache daemon (httpd) for the changes to take effect immediately:

   ```
   [root@server SmartCard]# sudo systemctl restart httpd
   ```

WARNING

Do not disable the OCSP check if you only use user certificates issued by the IdM CA. OCSP responders are part of IdM.

For instructions on how to keep the OCSP check enabled, and yet prevent a user certificate from being rejected by the IdM server if it does not contain the information about the location at which the CA that issued the user certificate listens for OCSP service requests, see the **SSLOCSPDefaultResponder** directive in Apache mod_ssl configuration options.

The server is now configured for smart card authentication.

NOTE

To enable smart card authentication in the whole topology, run the procedure on each IdM server.

1.2. CONFIGURING THE IDM CLIENT FOR SMART CARD AUTHENTICATION

This section describes how to configure IdM clients for smart card authentication. The procedure needs

to be run on each IdM system, a client or a server, to which you want to connect while using a smart card for authentication. For example, to enable an **ssh** connection from host A to host B, the script needs to be run on host B.

As an administrator, run this procedure to enable smart card authentication using

- the **ssh** protocol
  For details see Configuring SSH access using smart card authentication .
- the console login
- the Gnome Display Manager (GDM)
- the **su** command

This procedure is not required for authenticating to the IdM Web UI. Authenticating to the IdM Web UI involves two hosts, neither of which needs to be an IdM client:

- the machine - possibly outside of the IdM domain - on which the browser is running
- the IdM server on which **httpd** is running

The following procedure assumes that you are configuring smart card authentication on an IdM client, not an IdM server. For this reason you need two computers: an IdM server to generate the configuration script, and the IdM client on which to run the script.

Prerequisites

- Your IdM server has been configured for smart card authentication, as described in Configuring the IdM server for smart card authentication.
- You have root access to the IdM server and the IdM client.
- You have access to the root CA certificate and any sub CA certificates.
- You installed the IdM client with the **--mkhomedir** option to ensure remote users can log in successfully. If you do not create a home directory, the default login location is root.

Procedure

1. On an IdM server, generate a configuration script with **ipa-advise** using the administrator's privileges:

   ```
   [root@server SmartCard]# kinit admin
   [root@server SmartCard]# ipa-advise config-client-for-smart-card-auth > config-client-for-smart-card-auth.sh
   ```

   The **config-client-for-smart-card-auth.sh** script performs the following actions:

   - It configures the smart card daemon.
   - It sets the system-wide trust store.
   - It configures the System Security Services Daemon (SSSD) to allow smart card logins to the desktop.

2. From the IdM server, copy the script to a directory of your choice on the IdM client machine:

```
[root@server SmartCard]# scp config-client-for-smart-card-auth.sh
root@client.idm.example.com:/root/SmartCard/
Password:
config-client-for-smart-card-auth.sh        100%  2419       3.5MB/s   00:00
```

3. From the IdM server, copy the CA certificate files in the PEM format for convenience to the same directory on the IdM client machine as used in the previous step:

```
[root@server SmartCard]# scp {smartcard_ca.pem,ca.crt}
root@client.idm.example.com:/root/SmartCard/
Password:
smartcard_ca.pem                100%  1237     9.6KB/s   00:00
ca.crt                        100%  2514    19.6KB/s   00:00
```

4. On the client machine, execute the script, adding the PEM files containing the CA certificates as arguments:

```
[root@client SmartCard]# kinit admin
[root@client SmartCard]# chmod +x config-client-for-smart-card-auth.sh
[root@client SmartCard]# ./config-client-for-smart-card-auth.sh smartcard_ca.pem ca.crt
Ticket cache:KEYRING:persistent:0:0
Default principal: admin@IDM.EXAMPLE.COM
[...]
Systemwide CA database updated.
The ipa-certupdate command was successful
```

NOTE

Ensure that you add the root CA's certificate as an argument before any sub CA certificates and that the CA or sub CA certificates have not expired.

The client is now configured for smart card authentication.

1.3. ADDING A CERTIFICATE TO A USER ENTRY IN THE IDM WEB UI

This procedure describes how to add an external certificate to a user entry in IdM Web UI.

Instead of uploading the whole certificate, it is also possible to upload certificate mapping data to a user entry in IdM. User entries containing either full certificates or certificate mapping data can be used in conjunction with corresponding certificate mapping rules to facilitate the configuration of smart card authentication for system administrators. For details, see Certificate mapping rules for configuring authentication on smart cards.

NOTE

If the user's certificate has been issued by the IdM Certificate Authority, the certificate is already stored in the user entry, and you can skip this section.

Prerequisites

- You have the certificate that you want to add to the user entry at your disposal.

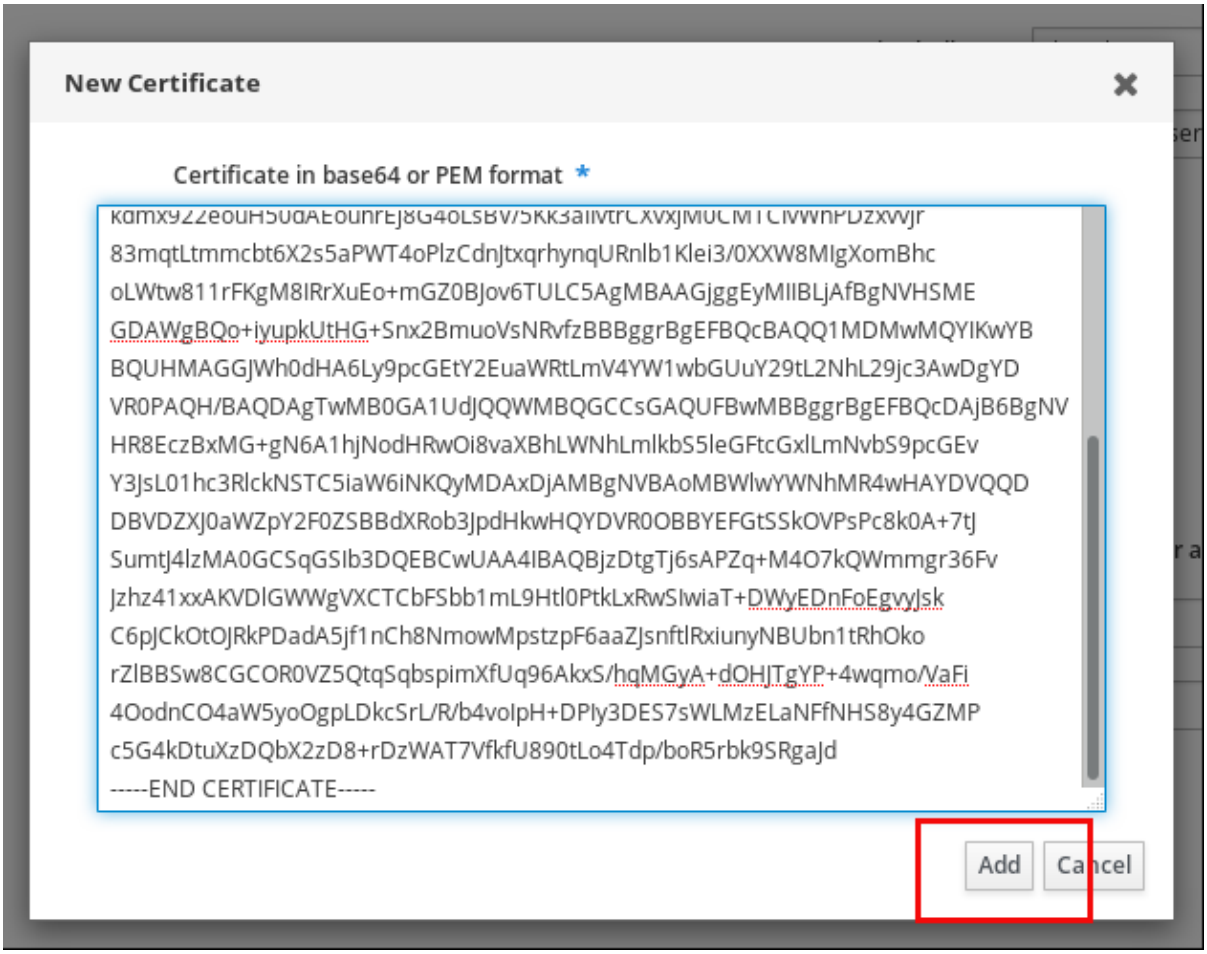
Procedure

1. Log into the IdM Web UI as an administrator if you want to add a certificate to another user. For adding a certificate to your own profile, you do not need the administrator's credentials.
2. Navigate to **Users → Active users → sc_user**.
3. Find the **Certificate** option and click **Add**.
4. In the **Command-Line Interface**, display the certificate in the **PEM** format using the **cat** utility or a text editor:

```
[user@client SmartCard]$ cat testuser.crt
```

5. Copy and paste the certificate from the CLI into the window that has opened in the Web UI.
6. Click **Add**.

Figure 1.1. Adding a new certificate in the IdM Web UI



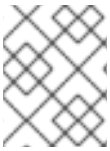
The **sc_user** entry now contains an external certificate.

1.4. ADDING A CERTIFICATE TO A USER ENTRY IN THE IDM CLI

This procedure describes how to add an external certificate to a user entry in IdM CLI.

Instead of uploading the whole certificate, it is also possible to upload certificate mapping data to a user entry in IdM. User entries containing either full certificates or certificate mapping data can be used in conjunction with corresponding certificate mapping rules to facilitate the configuration of smart card

authentication for system administrators. For details, see Certificate mapping rules for configuring authentication on smart cards.



NOTE

If the user's certificate has been issued by the IdM Certificate Authority, the certificate is already stored in the user entry, and you can skip this section.

Prerequisites

- You have the certificate that you want to add to the user entry at your disposal.

Procedure

1. Log into the IdM CLI as an administrator if you want to add a certificate to another user:

```
[user@client SmartCard]$ kinit admin
```

   For adding a certificate to your own profile, you do not need the administrator's credentials:

```
[user@client SmartCard]$ kinit sc_user
```

2. Create an environment variable containing the certificate with the header and footer removed and concatenated into a single line, which is the format expected by the **ipa user-add-cert** command:

```
[user@client SmartCard]$ export CERT=`openssl x509 -outform der -in testuser.crt | base64 -w0 -`
```

   Note that certificate in the **testuser.crt** file must be in the **PEM** format.

3. Add the certificate to the profile of sc_user using the **ipa user-add-cert** command:

```
[user@client SmartCard]$ ipa user-add-cert sc_user --certificate=$CERT
```

The **sc_user** entry now contains an external certificate.

1.5. INSTALLING TOOLS FOR MANAGING AND USING SMART CARDS

To configure your smart card, you need tools which can generate certificates and store them on a smart card.

You must:

- Install the **gnutls-utils** package which helps you to manage certificates.
- Install the **opensc** package which provides a set of libraries and utilities to work with smart cards.
- Start the **pcscd** service which communicates with the smart card reader.

Procedure

1. Install the **opensc** and **gnutls-utils** packages:

```
# dnf -y install opensc gnutls-utils
```

2. Start the **pcscd** service.

```
# systemctl start pcscd
```

Verify that the **pcscd** service is up and running.

1.6. STORING A CERTIFICATE ON A SMART CARD

This section describes smart card configuration with the **pkcs15-init** tool, which helps you to configure:

- Erasing your smart card
- Setting new PINs and optional PIN Unblocking Keys (PUKs)
- Creating a new slot on the smart card
- Storing the certificate, private key, and public key in the slot
- Locking the smart card settings (some smart cards require this type of finalization)

Prerequisites

- The **opensc** package, which includes the **pkcs15-init** tool is installed.
  For details, see Installing tools for managing and using smart cards .
- The card is inserted in the reader and connected to the computer.
- You have the private key, public key, and certificate to store on the smart card. In this procedure, **testuser.key**, **testuserpublic.key**, and **testuser.crt** are the names used for the private key, public key, and the certificate.
- Your current smart card user PIN and Security Officer PIN (SO-PIN)

Procedure

1. Erase your smart card and authenticate yourself with your PIN:

```
$ pkcs15-init --erase-card --use-default-transport-keys
Using reader with a card: Reader name
PIN [Security Officer PIN] required.
Please enter PIN [Security Officer PIN]:
```

   The card has been erased.

2. Initialize your smart card, set your user PIN and PUK, and your Security Officer PIN and PUK:

```
$ pkcs15-init --create-pkcs15 --use-default-transport-keys \
    --pin 963214 --puk 321478 --so-pin 65498714 --so-puk 784123
Using reader with a card: Reader name
```

The **pcks15-init** tool creates a new slot on the smart card.

3. Set the label and the authentication ID for the slot:

```
$ pkcs15-init --store-pin --label testuser \
   --auth-id 01 --so-pin 65498714 --pin 963214 --puk 321478
Using reader with a card: Reader name
```

The label is set to a human-readable value, in this case, **testuser**. The **auth-id** must be two hexadecimal values, in this case it is set to **01**.

4. Store and label the private key in the new slot on the smart card:

```
$ pkcs15-init --store-private-key testuser.key --label testuser_key \
   --auth-id 01 --id 01 --pin 963214
Using reader with a card: Reader name
```

NOTE

The value you specify for **--id** must be the same when storing your private key, and certificate. If you do not specify a value for **--id**, a more complicated value is calculated by the tool and it is therefore easier to define your own value.

5. Store and label the certificate in the new slot on the smart card:

```
$ pkcs15-init --store-certificate testuser.crt --label testuser_crt \
   --auth-id 01 --id 01 --format pem --pin 963214
Using reader with a card: Reader name
```

6. (Optional) Store and label the public key in the new slot on the smart card:

```
$ pkcs15-init --store-public-key testuserpublic.key
   --label testuserpublic_key --auth-id 01 --id 01 --pin 963214
Using reader with a card: Reader name
```

NOTE

If the public key corresponds to a private key and/or certificate, you should specify the same ID as that private key and/or certificate.

7. (Optional) Some smart cards require you to finalize the card by locking the settings:

```
$ pkcs15-init -F
```

At this stage, your smart card includes the certificate, private key, and public key in the newly created slot. You have also created your user PIN and PUK and the Security Officer PIN and PUK.

1.7. LOGGING IN TO IDM WITH SMART CARDS

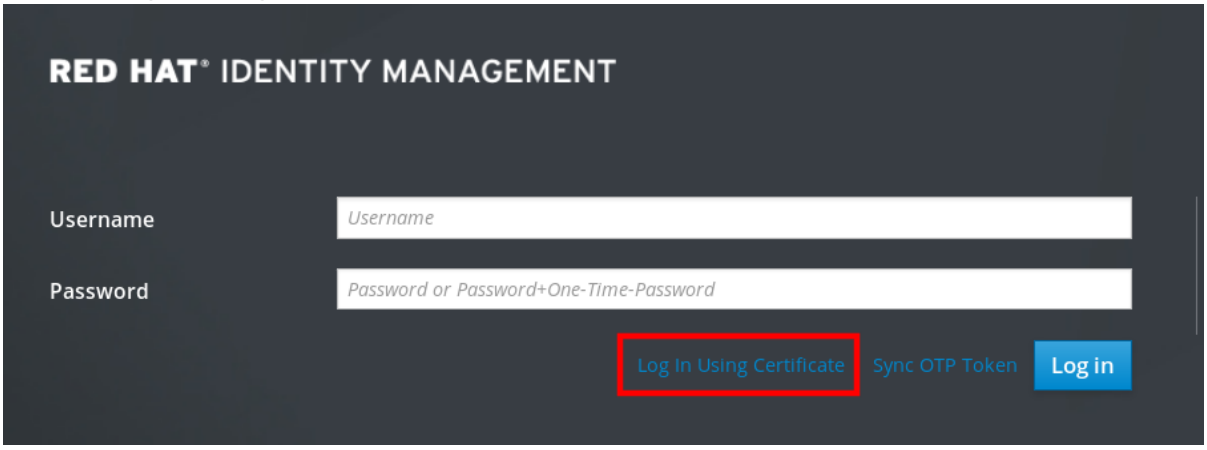
This section provides information about using smart cards for logging in to IdM Web UI.

Prerequisites

- The web browser is configured for using smart card authentication.
- The IdM server has been configured for smart card authentication.
- The certificate installed on your smart card is known to the IdM server.
- You need the PIN to unlock the smart card.
- The smart card has been plugged to the reader.

Procedure

1. Open the IdM Web UI in the browser.
2. Click on **Log In Using Certificate**

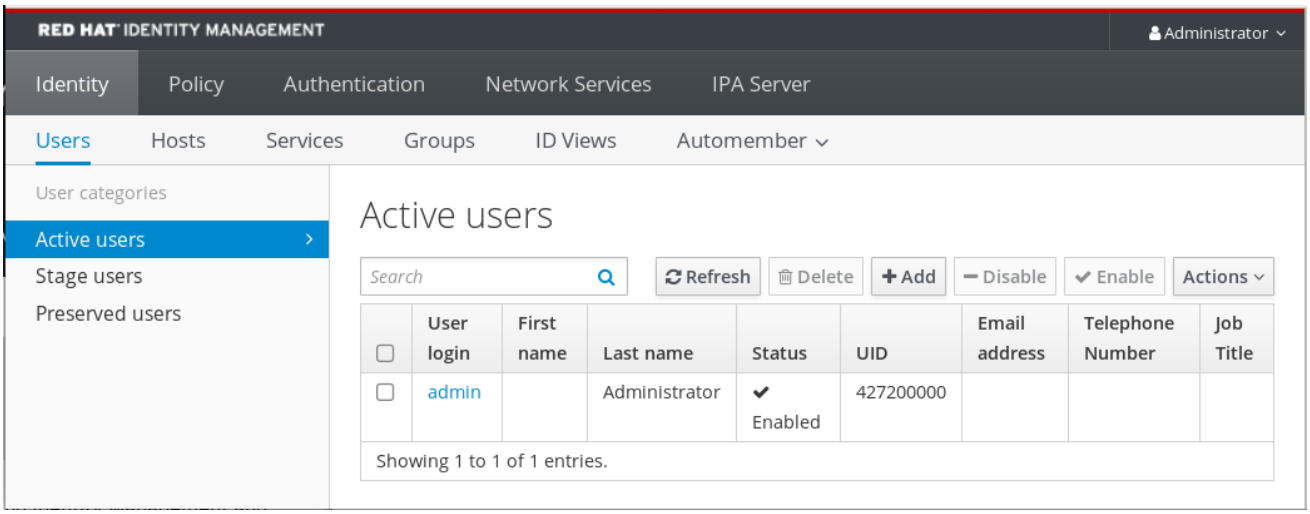


3. If the **Password Required** dialog box opens, add the PIN to unlock the smart card and click the **OK** button.
   The **User Identification Request** dialog box opens.

   If the smart card contains more than one certificate, select the certificate you want to use for authentication in the drop down list below **Choose a certificate to present as identification**

4. Click the **OK** button.

Now you are successfully logged in to the IdM Web UI.



1.8. CONFIGURING GDM ACCESS USING SMART CARD AUTHENTICATION

The Gnome Desktop Manager (GDM) requires authentication. You can use your password, however, you can also use a smart card for authentication.

This section describes smart card authentication to access GDM.

The advantage of using smart card authentication is that if the user account is part of the Identity Management domain, you also get a ticket-granting ticket (TGT).

Prerequisites

- The smart card contains your certificate and private key.
- The user account is a member of the IdM domain.
- The certificate on the smart card maps to the user entry through:
  - Assigning the certificate to a particular user entry. For details, see, Adding a certificate to a user entry in the IdM Web UI or Adding a certificate to a user entry in the IdM CLI .
  - The certificate mapping data being applied to the account. For details, see Certificate mapping rules for configuring authentication on smart cards.

Procedure

1. Insert the smart card in the reader.
2. Enter the smart card PIN.
3. Click **Sign In**.

You are successfully logged in to the RHEL system and you have a TGT provided by the IdM server.

Verification steps

- In the **Terminal** window, enter **klist** and check the result:

```
$ klist
Ticket cache: KEYRING:persistent:1358900015:krb_cache_TObtNMd
Default principal: example.user@REDHAT.COM

Valid starting       Expires              Service principal
04/20/2020 13:58:24  04/20/2020 23:58:24  krbtgt/EXAMPLE.COM@EXAMPLE.COM
 renew until 04/27/2020 08:58:15
```

1.9. CONFIGURING SU ACCESS USING SMART CARD AUTHENTICATION

Changing to a different user requires authentication. You can use a password or a certificate. This section describes using your smart card with the **su** command. It means that after entering the **su** command, you are prompted for the smart card PIN.

Prerequisites

Prerequisites

- The smart card contains your certificate and private key.
- The card is inserted in the reader and connected to the computer.

Procedure

- In a terminal window, change to a different user with the **su** command:

```
$ su - example.user
PIN for smart_card
```

If the configuration is successful, you are prompted to enter the smart card PIN.

CHAPTER 2. CONFIGURING CERTIFICATES ISSUED BY ADCS FOR SMART CARD AUTHENTICATION IN IDM

This scenario describes the following situation:

- Your deployment is based on cross-forest trust between Identity Management (IdM) and Active Directory (AD).
- You want to allow smart card authentication for users whose accounts are stored in AD.
- Certificates are created and stored in Active Directory Certificate Services (ADCS).

Configuration will be accomplished in the following steps:

- Copying CA and user certificates from Active Directory to the IdM server and client
- Configuring the IdM server and clients for smart card authentication using ADCS certificates
- Converting a PFX (PKCS#12) file to be able to store the certificate and private key into the smart card
- Configuring timeouts in the sssd.conf file
- Creating certificate mapping rules for smart card authentication

Prerequisites

- Identity Management (IdM) and Active Directory (AD) trust is installed
  For details, see Installing trust between IdM and AD .
- Active Directory Certificate Services (ADCS) is installed and certificates for users are generated

2.1. SMART CARD AUTHENTICATION

A smart card is a physical device which can provide personal authentication using certificates stored on the card. Personal authentication means that you can use smart cards in the same way as user passwords.

You can store user credentials on the smart card in the form of a private key and a certificate, and special software and hardware is used to access them. You place the smart card into a reader or a USB socket and supply the PIN code for the smart card instead of providing your password.

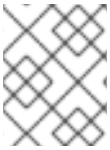
You can configure how you want smart card authentication to work in a particular IdM client:

- Users can authenticate with the user name and password or with their smart cards
- Users can authenticate with their smart cards, and passwords are not allowed
- Users can use the smart card for logout with a function lock on removal, and passwords are not allowed

Identity Management (IdM) supports smart card authentication with:

- User certificates issued by the IdM certificate authority. For details, see Configuring Identity Management for smart card authentication.

- User certificates issued by the ADCS certificate authority. For details, see Configuring certificates issued by ADCS for smart card authentication in IdM.
- User certificates issued by local certification authority generated on a RHEL system. For details, see Configuring and importing local certificates to a smart card .
- User certificates issued by an external certificate authority.



NOTE

If you want to start to use smart card authentication, see the hardware requirements: Smart Card support in RHEL8 .

2.2. WINDOWS SERVER SETTINGS REQUIRED FOR TRUST CONFIGURATION AND CERTIFICATE USAGE

This section summarizes what must be configured on Windows Server:

- Active Directory Certificate Services (ADCS) is installed
- Certificate Authority is created
- [Optional] If you are using Certificate Authority Web Enrollment, the Internet Information Services (IIS) must be configured

Export the certificate:

- Key must have **2048** bits or more
- Include a private key
- You will need a certificate in the following format: Personal Information Exchange – **PKCS #12(.PFX)**
  - Enable certificate privacy

2.3. COPYING CERTIFICATES FROM ACTIVE DIRECTORY USING SFTP

To be able to use smart card authetication, you need to copy the following certificate files:

- A root CA certificate in the **CER** format: **adcs-winserver-ca.cer** on your IdM server.
- A user certificate with a private key in the **PFX** format: **aduser1.pfx** on an IdM client.

NOTE

This procedure expects SSH access is allowed. If SSH is unavailable the user must copy the file from the AD Server to the IdM server and client.

Procedure

1. Connect from **the IdM server** and copy the **adcs-winserver-ca.cer** root certificate to the IdM server:

```
root@idmserver ~]# sftp Administrator@winserver.ad.example.com
```

```
Administrator@winserver.ad.example.com's password:
Connected to Administrator@winserver.ad.example.com.
sftp> cd <Path to certificates>
sftp> ls
adcs-winserver-ca.cer    aduser1.pfx
sftp>
sftp> get adcs-winserver-ca.cer
Fetching <Path to certificates>/adcs-winserver-ca.cer to adcs-winserver-ca.cer
<Path to certificates>/adcs-winserver-ca.cer                100%  1254    15KB/s 00:00
sftp quit
```

2. Connect from **the IdM client** and copy the **aduser1.pfx** user certificate to the client:

```
[root@client1 ~]# sftp Administrator@winserver.ad.example.com
Administrator@winserver.ad.example.com's password:
Connected to Administrator@winserver.ad.example.com.
sftp> cd /<Path to certificates>
sftp> get aduser1.pfx
Fetching <Path to certificates>/aduser1.pfx to aduser1.pfx
<Path to certificates>/aduser1.pfx                100%  1254    15KB/s 00:00
sftp quit
```

Now the CA certificate is stored in the IdM server and the user certificates is stored on the client machine.

2.4. CONFIGURING THE IDM SERVER AND CLIENTS FOR SMART CARD AUTHENTICATION USING ADCS CERTIFICATES

You must configure the IdM (Identity Management) server and clients to be able to use smart card authentication in the IdM environment. IdM includes the **ipa-advise** scripts which makes all necessary changes:

- install necessary packages
- it configures IdM server and clients
- copy the CA certificates into expected locations

You can run **ipa-advise** on your IdM server.

This procedure describes:

- On an IdM server: Preparing the **ipa-advise** script to configure your IdM server for smart card authentication.
- On an IdM server: Preparing the **ipa-advise** script to configure your IdM client for smart card authentication.
- On an IdM server: Applying the the **ipa-advise** server script on the IdM server using the AD certificate.
- Moving the client script to the IdM client machine.
- On an IdM client: Applying the the **ipa-advise** client script on the IdM client using the AD certificate.

Prerequisites

- The certificate has been copied to the IdM server.
- Obtain the Kerberos ticket.
- Log in as a user with administration rights.

Procedure

1. On the IdM server, use the **ipa-advise** script for configuring a client:

```
[root@idmserver ~]# ipa-advise config-client-for-smart-card-auth > sc_client.sh
```

2. On the IdM server, use the **ipa-advise** script for configuring a server:

```
[root@idmserver ~]# ipa-advise config-server-for-smart-card-auth > sc_server.sh
```

3. On the IdM server, execute the script:

```
[root@idmserver ~]# sh -x sc_server.sh adcs-winserver-ca.cer
```

   - It configures the IdM Apache HTTP Server.
   - It enables Public Key Cryptography for Initial Authentication in Kerberos (PKINIT) on the Key Distribution Center (KDC).
   - It configures the IdM Web UI to accept smart card authorization requests.

4. Copy the **sc_client.sh** script to the client system:

```
[root@idmserver ~]# scp sc_client.sh root@client1.idm.example.com:/root
Password:
sc_client.sh                  100%  2857   1.6MB/s   00:00
```

5. Copy the Windows certificate to the client system:

```
[root@idmserver ~]# scp adcs-winserver-ca.cer root@client1.idm.example.com:/root
Password:
adcs-winserver-ca.cer                 100%  1254   952.0KB/s   00:00
```

6. On the client system, run the client script:

```
[root@idmclient1 ~]# sh -x sc_client.sh adcs-winserver-ca.cer
```

The CA certificate is installed in the correct format on the IdM server and client systems and next step is to copy the user certificates onto the smart card itself.

2.5. CONVERTING THE PFX FILE

Before you store the PFX (PKCS#12) file into the smart card, you must:

- convert the file to the PEM format

- extract the private key and the certificate to two different files

Prerequisites

- The PFX file is copied into the IdM client machine.

Procedure

1. On the IdM client, into the PEM format:

```
[root@idmclient1 ~]# openssl pkcs12 -in aduser1.pfx -out aduser1_cert_only.pem -clcerts -
nodes
Enter Import Password:
```

2. Extract the key into the separate file:

```
[root@idmclient1 ~]# openssl pkcs12 -in adduser1.pfx -nocerts -out adduser1.pem >
aduser1.key
```

3. Extract the public certificate into the separate file:

```
[root@idmclient1 ~]# openssl pkcs12 -in adduser1.pfx -clcerts -nokeys -out
aduser1_cert_only.pem > aduser1.crt
```

At this point, you can store the **aduser1.key** and **aduser1.crt** into the smart card.

2.6. INSTALLING TOOLS FOR MANAGING AND USING SMART CARDS

To configure your smart card, you need tools which can generate certificates and store them on a smart card.

You must:

- Install the **gnutls-utils** package which helps you to manage certificates.
- Install the **opensc** package which provides a set of libraries and utilities to work with smart cards.
- Start the **pcscd** service which communicates with the smart card reader.

Procedure

1. Install the **opensc** and **gnutls-utils** packages:

```
# dnf -y install opensc gnutls-utils
```

2. Start the **pcscd** service.

```
# systemctl start pcscd
```

Verify that the **pcscd** service is up and running.

2.7. STORING A CERTIFICATE ON A SMART CARD

This section describes smart card configuration with the **pkcs15-init** tool, which helps you to configure:

- Erasing your smart card
- Setting new PINs and optional PIN Unblocking Keys (PUKs)
- Creating a new slot on the smart card
- Storing the certificate, private key, and public key in the slot
- Locking the smart card settings (some smart cards require this type of finalization)

Prerequisites

- The **opensc** package, which includes the **pkcs15-init** tool is installed.
  For details, see Installing tools for managing and using smart cards .
- The card is inserted in the reader and connected to the computer.
- You have the private key, public key, and certificate to store on the smart card. In this procedure, **testuser.key**, **testuserpublic.key**, and **testuser.crt** are the names used for the private key, public key, and the certificate.
- Your current smart card user PIN and Security Officer PIN (SO-PIN)

Procedure

1. Erase your smart card and authenticate yourself with your PIN:

```
$ pkcs15-init --erase-card --use-default-transport-keys
Using reader with a card: Reader name
PIN [Security Officer PIN] required.
Please enter PIN [Security Officer PIN]:
```

   The card has been erased.

2. Initialize your smart card, set your user PIN and PUK, and your Security Officer PIN and PUK:

```
$ pkcs15-init --create-pkcs15 --use-default-transport-keys \
   --pin 963214 --puk 321478 --so-pin 65498714 --so-puk 784123
Using reader with a card: Reader name
```

   The **pcks15-init** tool creates a new slot on the smart card.

3. Set the label and the authentication ID for the slot:

```
$ pkcs15-init --store-pin --label testuser \
   --auth-id 01 --so-pin 65498714 --pin 963214 --puk 321478
Using reader with a card: Reader name
```

   The label is set to a human-readable value, in this case, **testuser**. The **auth-id** must be two hexadecimal values, in this case it is set to **01**.

4. Store and label the private key in the new slot on the smart card:

```
$ pkcs15-init --store-private-key testuser.key --label testuser_key \
   --auth-id 01 --id 01 --pin 963214
Using reader with a card: Reader name
```

NOTE

The value you specify for **--id** must be the same when storing your private key, and certificate. If you do not specify a value for **--id**, a more complicated value is calculated by the tool and it is therefore easier to define your own value.

5. Store and label the certificate in the new slot on the smart card:

```
$ pkcs15-init --store-certificate testuser.crt --label testuser_crt \
   --auth-id 01 --id 01 --format pem --pin 963214
Using reader with a card: Reader name
```

6. (Optional) Store and label the public key in the new slot on the smart card:

```
$ pkcs15-init --store-public-key testuserpublic.key
   --label testuserpublic_key --auth-id 01 --id 01 --pin 963214
Using reader with a card: Reader name
```

NOTE

If the public key corresponds to a private key and/or certificate, you should specify the same ID as that private key and/or certificate.

7. (Optional) Some smart cards require you to finalize the card by locking the settings:

```
$ pkcs15-init -F
```

At this stage, your smart card includes the certificate, private key, and public key in the newly created slot. You have also created your user PIN and PUK and the Security Officer PIN and PUK.

2.8. CONFIGURING TIMEOUTS IN SSSD.CONF

Authentication with a smart card certificate might take longer than the default timeouts used by SSSD. Time out expiration can be caused by:

- slow reader
- a forwarding form a physical device into a virtual environment
- too many certificates stored on the smart card
- slow response from the OCSP (Online Certificate Status Protocol) responder if OCSP is used to verify the certificates

In this case you can prolong the following timeouts in the **sssd.conf** file, for example, to 60 seconds:

- **p11_child_timeout**
- **krb5_auth_timeout**

Prerequisites

- You must be logged in as root.

Procedure

1. Open the **sssd.conf** file:

```
[root@idmclient1 ~]# vim /etc/sssd/sssd.conf
```

2. Change the value of **p11_child_timeout**:

```
[pam]
p11_child_timeout = 60
```

3. Change the value of **krb5_auth_timeout**:

```
[domain/IDM.EXAMPLE.COM]
krb5_auth_timeout = 60
```

4. Save the settings.

Now, the interaction with the smart card is allowed to run for 1 minute (60 seconds) before authentication will fail with a timeout.

2.9. CREATING CERTIFICATE MAPPING RULES FOR SMART CARD AUTHENTICATION

If you want to use one certificate for a user who has accounts in AD (Active Directory) and in IdM (Identity Management), you can create a certificate mapping rule on the IdM server.

After creating such a rule, the user is able to authenticate with their smart card in both domains.

For details about certificate mapping rules, see Certificate mapping rules for configuring authentication on smart cards.

CHAPTER 3. CERTIFICATE MAPPING RULES FOR CONFIGURING AUTHENTICATION ON SMART CARDS

Certificate mapping rules are a convenient way of allowing users to authenticate using certificates in scenarios when the Identity Management (IdM) administrator does not have access to certain users' certificates. This lack of access is typically caused by the fact that the certificates have been issued by an external certificate authority. A special use case is represented by certificates issued by the Certificate System of an Active Directory (AD) with which the IdM domain is in a trust relationship.

Certificate mapping rules are also convenient if the IdM environment is large with a lot of users using smart cards. In this situation, adding full certificates can be complicated. The subject and issuer are predictable in most scenarios and thus easier to add ahead of time than the full certificate. As a system administrator, you can create a certificate mapping rule and add certificate mapping data to a user entry even before a certificate is issued to a particular user. Once the certificate is issued, the user can log in using the certificate even though the full certificate has not yet been uploaded to the user entry.

In addition, as certificates have to be renewed at regular intervals, certificate mapping rules reduce administrative overhead. When a user's certificate gets renewed, the administrator does not have to update the user entry. For example, if the mapping is based on the **Subject** and **Issuer** values, and if the new certificate has the same subject and issuer as the old one, the mapping still applies. If, in contrast, the full certificate was used, then the administrator would have to upload the new certificate to the user entry to replace the old one.

To set up certificate mapping:

1. An administrator has to load the certificate mapping data (typically the issuer and subject) or the full certificate into a user account.

2. An administrator has to create a certificate mapping rule to allow successful logging into IdM for a user

    a. whose account contains a certificate mapping data entry

    b. whose certificate mapping data entry matches the information on the certificate

    For details on the individual components that make up a mapping rule and how to obtain and use them, see Components of an identity mapping rule in IdM and Obtaining the issuer from a certificate for use in a matching rule .

Afterwards, when the end-user presents the certificate, stored either in the filesystem or on a smart card, authentication is successful.

3.1. CERTIFICATE MAPPING RULES FOR TRUSTS WITH ACTIVE DIRECTORY DOMAINS

This section outlines the different certificate mapping use cases that are possible if an IdM deployment is in a trust relationship with an Active Directory (AD) domain.

Certificate mapping rules are a convenient way to enable access to IdM resources for users who have smart card certificates that were issued by the trusted AD Certificate System. Depending on the AD configuration, the following scenarios are possible:

- If the certificate is issued by AD but the user and the certificate are stored in IdM, the mapping and the whole processing of the authentication request takes place on the IdM side. For details of configuring this scenario, see Configuring certificate mapping for users stored in IdM

- If the user is stored in AD, the processing of the authentication request takes place in AD. There are three different subcases:
  - The AD user entry contains the whole certificate. For details how to configure IdM in this scenario, see Configuring certificate mapping for users whose AD user entry contains the whole certificate.
  - AD is configured to map user certificates to user accounts. In this case, the AD user entry does not contain the whole certificate but instead contains an attribute called **altSecurityIdentities**. For details how to configure IdM in this scenario, see Configuring certificate mapping if AD is configured to map user certificates to user accounts.
  - The AD user entry contains neither the whole certificate nor the mapping data. In this case, the only solution is to use the **ipa idoverrideuser-add** command to add the whole certificate to the AD user's ID override in IdM. For details, see Configuring certificate mapping if AD user entry contains no certificate or mapping data .

3.2. COMPONENTS OF AN IDENTITY MAPPING RULE IN IDM

This section describes the components of an *identity mapping rule* in IdM and how to configure them. Each component has a default value that you can override. You can define the components in either the web UI or the CLI. In the CLI, the identity mapping rule is created using the **ipa certmaprule-add** command.

Mapping rule

The mapping rule component associates (or *maps*) a certificate with one or more user accounts. The rule defines an LDAP search filter that associates a certificate with the intended user account. Certificates issued by different certificate authorities (CAs) might have different properties and might be used in different domains. Therefore, IdM does not apply mapping rules unconditionally, but only to the appropriate certificates. The appropriate certificates are defined using *matching rules*.

Note that if you leave the mapping rule option empty, the certificates are searched in the **userCertificate** attribute as a DER encoded binary file.

Define the mapping rule in the CLI using the **--maprule** option.

Matching rule

The matching rule component selects a certificate to which you want to apply the mapping rule. The default matching rule matches certificates with the **digitalSignature key** usage and **clientAuth extended key** usage.
Define the matching rule in the CLI using the **--matchrule** option.

Domain list

The domain list specifies the identity domains in which you want IdM to search the users when processing identity mapping rules. If you leave the option unspecified, IdM searches the users only in the local domain to which the IdM client belongs.
Define the domain in the CLI using the **--domain** option.

Priority

When multiple rules are applicable to a certificate, the rule with the highest priority takes precedence. All other rules are ignored.

- The lower the numerical value, the higher the priority of the identity mapping rule. For example, a rule with a priority 1 has higher priority than a rule with a priority 2.

- If a rule has no priority value defined, it has the lowest priority.

Define the mapping rule priority in the CLI using the **--priority** option.

Certificate mapping rule example

To define, using the CLI, a certificate mapping rule called **simple_rule** that allows authentication for a certificate issued by the **Smart Card CA** of the **EXAMPLE.ORG** organisation as long as the **Subject** on that certificate matches a **certmapdata** entry in a user account in IdM:

```
# ipa certmaprule-add simple_rule --matchrule '<ISSUER>CN=Smart Card
CA,O=EXAMPLE.ORG' --maprule '(ipacertmapdata=X509:<I>{issuer_dn!nss_x500}<S>
{subject_dn!nss_x500})'
```

3.3. OBTAINING THE ISSUER FROM A CERTIFICATE FOR USE IN A MATCHING RULE

This procedure describes how to obtain the issuer information from a certificate so that you can copy and paste it into the matching rule of a certificate mapping rule. To get the issuer format required by a matching rule, use the **openssl x509** utility.

Prerequisites

- You have the user certificate in a **.pem** or **.crt** format

Procedure

1. Obtain the user information from the certificate. Use the **openssl x509** certificate display and signing utility with:
   - the **-noout** option to prevent the output of an encoded version of the request
   - the **-issuer** option to output the issuer name
   - the **-in** option to specify the input file name to read the certificate from
   - the **-nameopt** option with the **RFC2253** value to display the output with the most specific relative distinguished name (RDN) first
     If the input file contains an Identity Management certificate, the output of the command shows that the Issuer is defined using the **Organisation** information:

     ```
     # openssl x509 -noout -issuer -in idm_user.crt -nameopt RFC2253
     issuer=CN=Certificate Authority,O=REALM.EXAMPLE.COM
     ```

     If the input file contains an Active Directory certificate, the output of the command shows that the Issuer is defined using the **Domain Component** information:

     ```
     # openssl x509 -noout -issuer -in ad_user.crt -nameopt RFC2253
     issuer=CN=AD-WIN2012R2-CA,DC=AD,DC=EXAMPLE,DC=COM
     ```

2. Optionally, to create a new mapping rule in the CLI based on a matching rule which specifies that the certificate issuer must be the extracted **AD-WIN2012R2-CA** of the **ad.example.com** domain and the subject on the certificate must match the **certmapdata** entry in a user account

in IdM:

```
# ipa certmaprule-add simple_rule --matchrule '<ISSUER>CN=AD-WIN2012R2-
CA,DC=AD,DC=EXAMPLE,DC=COM' --maprule '(ipacertmapdata=X509:<I>
{issuer_dn!nss_x500}<S>{subject_dn!nss_x500})'
```

3.4. ADDITIONAL RESOURCES

- See the **sss-certmap(5)** man page.

CHAPTER 4. CONFIGURING AND IMPORTING LOCAL CERTIFICATES TO A SMART CARD

This chapter describes a scenario where:

- The host is not connected to a domain.
- You want to authenticate with a smart card on this host.
- You want to configure SSH access using smart card authentication.
- You want to configure the smart card with **authselect**.

Use the following configuration to accomplish this scenario:

- Obtain a user certificate for the user who wants to authenticate with a smart card. The certificate should be generated by a trustworthy Certification Authority used in the domain.
  If you cannot get the certificate, you can generate a user certificate signed by a local certificate authority for testing purposes,
- Store the certificate and private key in a smart card.
- Configure the smart card authentication for SSH access.

IMPORTANT

If a host can be part of the domain, add the host to the domain and use certificates generated by Active Directory or Identity Management Certification Authority.

For details about how to create IdM certificates for a smart card, see Configuring Identity Management for smart card authentication.

Prerequisites

- Authselect installed
  The authselect tool configures user authentication on Linux hosts and you can use it to configure smart card authentication parameters. For details about authselect, see Explaining authselect.
- Smart Card or USB devices supported by RHEL 8
  For details, see Smart Card support in RHEL8 .

4.1. CREATING LOCAL CERTIFICATES

This section describes how to perform these tasks:

- Generate the OpenSSL certificate authority
- Create a certificate signing request

WARNING

The following steps are intended for testing purpose only. Certificates generated by a local self-signed Certificate Authority are not as secure as using AD, IdM, or RHCS Certification Authority. You should use a certificate generated by your enterprise Certification Authority even if the host is not part of the domain.

Procedure

1. Create a directory where you can generate the certificate, for example:

```
# mkdir /tmp/ca
# cd /tmp/ca
```

2. Set up the certificate (copy this text to your command line in the **ca** directory):

```
cat > ca.cnf <<EOF
[ ca ]
default_ca = CA_default

[ CA_default ]
dir             = .
database        = \$dir/index.txt
new_certs_dir   = \$dir/newcerts

certificate     = \$dir/rootCA.crt
serial          = \$dir/serial
private_key     = \$dir/rootCA.key
RANDFILE        = \$dir/rand

default_days    = 365
default_crl_days = 30
default_md      = sha256

policy          = policy_any
email_in_dn     = no

name_opt        = ca_default
cert_opt        = ca_default
copy_extensions  = copy

[ usr_cert ]
authorityKeyIdentifier = keyid, issuer

[ v3_ca ]
subjectKeyIdentifier   = hash
authorityKeyIdentifier = keyid:always,issuer:always
basicConstraints       = CA:true
keyUsage               = critical, digitalSignature, cRLSign, keyCertSign

[ policy_any ]
```

```
organizationName       = supplied
organizationalUnitName = supplied
commonName             = supplied
emailAddress           = optional

[ req ]
distinguished_name = req_distinguished_name
prompt             = no

[ req_distinguished_name ]
O  = Example
OU = Example Test
CN = Example Test CA
EOF
```

3. Create the following directories:

```
# mkdir certs crl newcerts
```

4. Create the following files:

```
# touch index.txt crlnumber index.txt.attr
```

5. Write the number 01 in the serial file:

```
# echo 01 > serial
```

This command writes a number 01 in the serial file. It is a serial number of the certificate. With each new certificate released by this CA the number increases by one.

6. Create an OpenSSL root CA key:

```
# openssl genrsa -out rootCA.key 2048
```

7. Create a self-signed root Certification Authority certificate:

```
# openssl req -batch -config ca.cnf \
    -x509 -new -nodes -key rootCA.key -sha256 -days 10000 \
    -set_serial 0 -extensions v3_ca -out rootCA.crt
```

8. Create the key for your username:

```
# openssl genrsa -out example.user.key 2048
```

This key is generated in the local system which is not secure, therefore, remove the key from the system when the key is stored in the card.

You can create a key directly in the smart card as well. For doing this, follow instructions created by the manufacturer of your smart card.

9. Create the certificate signing request configuration file (copy this text to your command line in the ca directory):

```
cat > req.cnf <<EOF
```

```
[ req ]
distinguished_name = req_distinguished_name
prompt = no

[ req_distinguished_name ]
O = Example
OU = Example Test
CN = testuser

[ req_exts ]
basicConstraints = CA:FALSE
nsCertType = client, email
nsComment = "testuser"
subjectKeyIdentifier = hash
keyUsage = critical, nonRepudiation, digitalSignature, keyEncipherment
extendedKeyUsage = clientAuth, emailProtection, msSmartcardLogin
subjectAltName = otherName:msUPN;UTF8:testuser@EXAMPLE.COM,
email:testuser@example.com
EOF
```

10. Create a certificate signing request for your example.user certificate:

```
# openssl req -new -nodes -key example.user.key \
    -reqexts req_exts -config req.cnf -out example.user.csr
```

11. Configure the new certificate. Expiration period is set to 1 year:

```
# openssl ca -config ca.cnf -batch -notext \
    -keyfile rootCA.key -in example.user.csr -days 365 \
    -extensions usr_cert -out example.user.crt
```

At this point, the certification authority and certificates are successfully generated and prepared for import into a smart card.

4.2. COPYING CERTIFICATES TO THE SSSD DIRECTORY

Gnome Desktop Manager (GDM) requires SSSD. If you use GDM, you need to copy the PEM certificate to the **/etc/sssd/pki** directory.

Prerequisites

- The local CA authority and certificates have been generated

Procedure

1. Ensure that you have SSSD installed on the system.

```
# rpm -q sssd
sssd-2.0.0.43.el8_0.3.x86_64
```

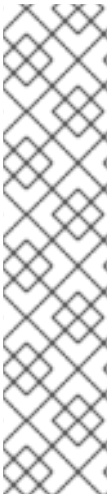
2. Create a **/etc/sssd/pki** directory:

```
# file /etc/sssd/pki
/etc/sssd/pki/: directory
```

3. Copy the **rootCA.crt** as a PEM file in the **/etc/sssd/pki/** directory:

```
# cp /tmp/ca/rootCA.crt /etc/sssd/pki/sssd_auth_ca_db.pem
```

Now you have successfully generated the certificate authority and certificates, and you have saved them in the **/etc/sssd/pki** directory.



NOTE

If you want to share the Certificate Authority certificates with another application, you can change a location in sssd.conf:

- SSSD PAM responder: **pam_cert_db_path** in the **[pam]** section
- SSSD ssh responder: **ca_db** in the **[ssh]** section

For details, see man page for **sssd.conf**.

Red Hat recommends to keep the default path and use a dedicated Certificate Authority certificate file for SSSD to make sure that only Certificate Authorities trusted for authentication are listed here.

4.3. INSTALLING TOOLS FOR MANAGING AND USING SMART CARDS

To configure your smart card, you need tools which can generate certificates and store them on a smart card.

You must:

- Install the **gnutls-utils** package which helps you to manage certificates.
- Install the **opensc** package which provides a set of libraries and utilities to work with smart cards.
- Start the **pcscd** service which communicates with the smart card reader.

Procedure

1. Install the **opensc** and **gnutls-utils** packages:

```
# dnf -y install opensc gnutls-utils
```

2. Start the **pcscd** service.

```
# systemctl start pcscd
```

Verify that the **pcscd** service is up and running.

4.4. STORING A CERTIFICATE ON A SMART CARD

This section describes smart card configuration with the **pkcs15-init** tool, which helps you to configure:

- Erasing your smart card
- Setting new PINs and optional PIN Unblocking Keys (PUKs)
- Creating a new slot on the smart card
- Storing the certificate, private key, and public key in the slot
- Locking the smart card settings (some smart cards require this type of finalization)

Prerequisites

- The **opensc** package, which includes the **pkcs15-init** tool is installed.
  For details, see Installing tools for managing and using smart cards .
- The card is inserted in the reader and connected to the computer.
- You have the private key, public key, and certificate to store on the smart card. In this procedure, **testuser.key**, **testuserpublic.key**, and **testuser.crt** are the names used for the private key, public key, and the certificate.
- Your current smart card user PIN and Security Officer PIN (SO-PIN)

Procedure

1. Erase your smart card and authenticate yourself with your PIN:

```
$ pkcs15-init --erase-card --use-default-transport-keys
Using reader with a card: Reader name
PIN [Security Officer PIN] required.
Please enter PIN [Security Officer PIN]:
```

   The card has been erased.

2. Initialize your smart card, set your user PIN and PUK, and your Security Officer PIN and PUK:

```
$ pkcs15-init --create-pkcs15 --use-default-transport-keys \
    --pin 963214 --puk 321478 --so-pin 65498714 --so-puk 784123
Using reader with a card: Reader name
```

   The **pcks15-init** tool creates a new slot on the smart card.

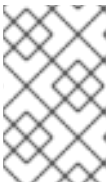
3. Set the label and the authentication ID for the slot:

```
$ pkcs15-init --store-pin --label testuser \
    --auth-id 01 --so-pin 65498714 --pin 963214 --puk 321478
Using reader with a card: Reader name
```

   The label is set to a human-readable value, in this case, **testuser**. The **auth-id** must be two hexadecimal values, in this case it is set to **01**.

4. Store and label the private key in the new slot on the smart card:

```
$ pkcs15-init --store-private-key testuser.key --label testuser_key \
   --auth-id 01 --id 01 --pin 963214
Using reader with a card: Reader name
```



NOTE

The value you specify for **--id** must be the same when storing your private key, and certificate. If you do not specify a value for **--id**, a more complicated value is calculated by the tool and it is therefore easier to define your own value.

5. Store and label the certificate in the new slot on the smart card:

```
$ pkcs15-init --store-certificate testuser.crt --label testuser_crt \
   --auth-id 01 --id 01 --format pem --pin 963214
Using reader with a card: Reader name
```

6. (Optional) Store and label the public key in the new slot on the smart card:

```
$ pkcs15-init --store-public-key testuserpublic.key
   --label testuserpublic_key --auth-id 01 --id 01 --pin 963214
Using reader with a card: Reader name
```

NOTE

If the public key corresponds to a private key and/or certificate, you should specify the same ID as that private key and/or certificate.

7. (Optional) Some smart cards require you to finalize the card by locking the settings:

```
$ pkcs15-init -F
```

At this stage, your smart card includes the certificate, private key, and public key in the newly created slot. You have also created your user PIN and PUK and the Security Officer PIN and PUK.

4.5. CONFIGURING SSH ACCESS USING SMART CARD AUTHENTICATION

SSH connections require authentication. You can use a password or a certificate. This section describes:

- the configuration necessary for enabling authentication using a certificate stored on a smart card
- the lock on removal configuration using the **authselect** tool

The lock on removal configuration enforces log out after the smart card removal.

For details about configuring smart cards with **authselect**, see Configuring smart cards using authselect.

Prerequisites

- The smart card contains your certificate and private key.

- The card is inserted in the reader and connected to the computer.
- SSSD is installed and configured.
- Your username matches the Common Name (CN) or User ID (UID) in the certificate's SUBJECT.
- The **pcscd** service is running on your local machine.
  For details, see Installing tools for managing and using smart cards .

Procedure

1. Create a new directory for SSH keys in the home directory of the user who uses smart card authentication:

```
# mkdir /home/example.user/.ssh
```

2. Run the **ssh-keygen -D** command with the **opensc** library to retrieve the existing public key paired with the private key on the smart card, and add it to the **authorized_keys** list of the user's SSH keys directory to enable SSH access with smart card authentication.

```
# ssh-keygen -D /usr/lib64/pkcs11/opensc-pkcs11.so >>
~example.user/.ssh/authorized_keys
```

3. SSH requires access right configuration for the **/.ssh** directory and the **authorized_keys** file. To set or change the access rights, enter:

```
# chown -R example.user:example.user ~example.user/.ssh/
# chmod 700 ~example.user/.ssh/
# chmod 600 ~example.user/.ssh/authorized_keys
```

4. Optionally, display the keys:

```
# cat ~example.user/.ssh/authorized_keys
```

   The terminal displays the keys.

5. Verify that the smart card authentication is enabled in the **/etc/sssd/sssd.conf** file:
   In the **[pam]** section, enable the pam certificate authentication module: **pam_cert_auth = True**

   If the **sssd.conf** file has not been created yet, you can create the minimal functional configuration by copying the following script to the command line:

```
# cat > /etc/sssd/sssd.conf <<EOF
[sssd]
services = nss, pam
domains = shadowutils

[nss]

[pam]
pam_cert_auth = True
```

```
[domain/shadowutils]
id_provider = files
EOF
```

6. To use the SSH keys, configure the authentication with the **authselect** command:

```
# authselect select sssd with-smartcard with-smartcard-lock-on-removal --force
```

Now, you can verify the SSH access with the following command:

```
# ssh -I /usr/lib64/opensc-pkcs11.so -l example.user localhost hostname
```

If the configuration is successful, you are prompted to enter the smart card PIN.

The configuration works now locally. Now you can copy the public key and distribute it to **authorized_keys** files located on all servers on which you want to use SSH.

CHAPTER 5. CONFIGURING SMART CARDS USING AUTHSELECT

This section describes how to configure your smart card to achieve one of the following aims:

- Enable both password and smart card authentication
- Disable password and enable smart card authentication
- Enable lock on removal

Prerequisites

- Authselect installed
  The authselect tool configures user authentication on Linux hosts and you can use it to configure smart card authentication parameters. For details about authselect, see Configuring user authentication using authselect.
- Smart Card or USB devices supported by RHEL 8
  For details, see Smart Card support in RHEL8 .

5.1. CERTIFICATES ELIGIBLE FOR SMART CARDS

Before you can configure a smart card with **authselect**, you must import a certificate into your card. You can use the following tools to generate the certificate:

- Active Directory (AD)
- Identity Management (IdM)
  For details about how to create IdM certificates, see Requesting a new user certificate and exporting it to the client.
- Red Hat Certificate System (RHCS)
  For details, see Managing Smart Cards with the Enterprise Security Client .
- Local Certification Authority. You can use a certificate generated by the Local Certification Authority if the user is not part of a domain or for testing purposes.
  For details about how to create and import local certificates into a smart card, Configuring and importing local certificates to a smart card.

5.2. ENABLING USER PASSWORD AUTHENTICATION TO CONFIGURE SMART CARD AUTHENTICATION

This section describes how to enable both smart card and password authentication on your system.

Prerequisites

- The Smart card contains your certificate and private key.
- The card is inserted into the reader and connected to the computer.
- The **authselect** tool is installed on your system.

Procedure

- Enter the following command to allow smart card and password authentication:

```
# authselect select sssd with-smartcard --force
```

At this point, smart card authentication is enabled, however, password authentication will work if you forget your smart card at home.

5.3. CONFIGURING AUTHSELECT TO ENFORCE SMART CARD AUTHENTICATION

The **authselect** tool enables you to configure smart card authentication on your system and to disable the default password authentication. The **authselect** command includes the following options:

- **with-smartcard** – enables smart card authentication in addition to password authentication
- **with-smartcard-required** – enables smart card authentication and disables password authentication

NOTE

The **with-smartcard-required** option only enforces exclusive smart card authentication for login services, such as **login**, **gdm**, **xdm**, **kdm**, **xscreensaver**, **gnome-screensaver**, and **kscreensaver**. Other services, such as **su** or **sudo** for switching users, do not use smart card authentication by default and will continue to prompt you for a password.

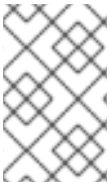
Prerequisites

- Smart card contains your certificate and private key.
- The card is inserted into the reader and connected to the computer.
- The **authselect** tool is installed on your local system.

Procedure

- Enter the following command to enforce smart card authentication:

```
# authselect select sssd with-smartcard  with-smartcard-required --force
```



NOTE

Once you run this command, password authentication will no longer work and you can only log in with a smart card. Ensure smart card authentication is working before running this command or you may be locked out of your system.

5.4. CONFIGURING SMART CARD AUTHENTICATION WITH LOCK ON REMOVAL

The **authselect** service enables you to configure your smart card authentication to lock your screen instantly after removing the smart card from the reader. The **authselect** command must include the following variables:

- **with-smartcard** – enabling smart card authentication
- **with-smartcard-required** – enabling exclusive smart card authentication (authentication with a password is disabled)
- **with-smartcard-lock-on-removal** – enforcing log out after the smart card removal

Prerequisites

- Smart card contains your certificate and private key.
- The card is inserted into the reader and connected to the computer.
- The **authselect** tool is installed on your local system.

Procedure

- Enter the following command to enable smart card authentication, disable password authentication, and enforce lock on removal:

```
# authselect select sssd  with-smartcard  with-smartcard-required with-smartcard-lock-on-removal --force
```

Now, when you remove the card, the screen locks. You must re-insert your smart card to unlock it.

CHAPTER 6. AUTHENTICATING TO SUDO REMOTELY USING SMART CARDS

This section describes how to authenticate to sudo remotely using smart cards. After the **ssh-agent** service is running locally and can forward the **ssh-agent** socket to a remote machine, you can use the SSH authentication protocol in the sudo PAM module to authenticate users remotely.

After logging in locally using a smart card, you can log in through SSH to the remote machine and run the **sudo** command without being prompted for a password by using SSH forwarding of the smart card authentication.

For the purposes of this example, a client is connecting to the IPA server through SSH and running the sudo command on the IPA server with credentials stored on a smart card.

- Creating sudo rules in IdM
- Setting up the PAM module for sudo
- Connecting to sudo remotely using a smart card

6.1. CREATING SUDO RULES IN IDM

This procedure describes how to create sudo rules in IdM in order to give **ipauser1** permission to run sudo on the remote host.

For the purposes of this example, the **less** and **whoami** commands are added as sudo commands to test the procedure.

Prerequisites

- The IdM user has been created. For the purpose of this example, the user is **ipauser1**.
- You have the hostname of the system where you are running sudo remotely. For the purpose of this example, the host is **server.ipa.test**.

Procedure

1. Create a **sudo** rule named **adminrule** to allow a user to run commands.

```
ipa sudorule-add adminrule
```

2. Add **less** and **whoami** as **sudo** commands:

```
ipa sudocmd-add /usr/bin/less
ipa sudocmd-add /usr/bin/whoami
```

3. Add the **less** and **whoami** commands to the **adminrule**:

```
ipa sudorule-add-allow-command adminrule --sudocmds /usr/bin/less
ipa sudorule-add-allow-command adminrule --sudocmds /usr/bin/whoami
```

4. Add the **ipauser1** user to the **adminrule**:

```
ipa sudorule-add-user adminrule --users ipauser1
```

5. Add the host on which you are running **sudo** to the **adminrule**:

```
ipa sudorule-add-host adminrule --hosts server.ipa.test
```

Additional resources

- See **ipa sudorule-add --help**.
- See **ipa sudocmd-add --help**.

6.2. SETTING UP THE PAM MODULE FOR SUDO

This procedure describes how to install and set up the **pam_ssh_agent_auth.so** PAM module for sudo authentication with a smart card on any host where you are running sudo.

Procedure

1. Install the PAM SSH agent:

```
dnf -y install pam_ssh_agent_auth
```

2. Add the **authorized_keys_command** for **pam_ssh_agent_auth.so** to the **/etc/pam.d/sudo** file before any other **auth** entry:

```
#%PAM-1.0
auth sufficient pam_ssh_agent_auth.so
authorized_keys_command=/usr/bin/sss_ssh_authorizedkeys
auth       include      system-auth
account    include      system-auth
password   include      system-auth
session    include      system-auth
```

3. To enable the SSH agent forwarding to work when you run sudo commands, add the following to the **/etc/sudoers** file:

```
Defaults env_keep += "SSH_AUTH_SOCK"
```

This allows users who have their public keys from smart cards stored in IPA/SSSD to authenticate to sudo without entering a password.

4. Restart the **sssd** service:

```
systemctl restart sssd
```

Additional resources

- See the **pam** man page.

6.3. CONNECTING TO SUDO REMOTELY USING A SMART CARD

This procedure describes how to configure the SSH agent and client in order to connect to sudo remotely using a smart card.

Prerequisites

- You have created sudo rules in IdM.
- You have installed and set up the **pam_ssh_agent_auth** PAM module for sudo authentication on the remote system where you are going to run sudo.

Procedure

1. Start the SSH agent (if not already running).

```
eval `ssh-agent`
```

2. Add your smart card to the SSH agent. Enter your PIN when prompted:

```
ssh-add -s /usr/lib64/opensc-pkcs11.so
```

3. Connect via SSH with ssh-agent forwarding enabled (using the **-A** option) to the system where you are going to run **sudo** remotely:

```
ssh -A ipauser1@server.ipa.test
```

Verification steps

- Run the **whoami** command with **sudo**:

```
sudo /usr/bin/whoami
```

You should not be prompted for a PIN or password.

CHAPTER 7. TROUBLESHOOTING AUTHENTICATION WITH SMART CARDS

The following sections describe how to resolve some of the issues you might encounter when setting up smart card authentication.

- Testing smart card authentication
- Troubleshooting smart card authentication with SSSD
- Verifying that IdM Kerberos KDC can use PKINIT and that the CA certificates are correctly located
- Increasing SSSD timeouts

7.1. TESTING SMART CARD ACCESS ON THE SYSTEM

This procedure describes how to test whether you can access your smart card.

Prerequisites

- You have installed and configured your IdM Server and client for use with smart cards.
- You have installed the **certutil** tool from the **nss-tools** package.
- You have the PIN or password for your smart card.

Procedure

1. Using the **lsusb** command, verify that the smart card reader is visible to the operating system:

```
$ lsusb
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 003: ID 072f:b100 Advanced Card Systems, Ltd ACR39U
Bus 001 Device 002: ID 0627:0001 Adomax Technology Co., Ltd
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
```

   For more information on the smart cards and readers tested and supported in RHEL, see Smart Card support in RHEL8.

2. Ensure that the **pcscd** service and socket are enabled and running:

```
$ systemctl status pcscd.service pcscd.socket

● pcscd.service - PC/SC Smart Card Daemon
     Loaded: loaded (/usr/lib/systemd/system/pcscd.service; indirect;
vendor preset: disabled)
     Active: active (running) since Fri 2021-09-24 11:05:04 CEST; 2
weeks 6 days ago
TriggeredBy: ● pcscd.socket
       Docs: man:pcscd(8)
   Main PID: 3772184 (pcscd)
      Tasks: 12 (limit: 38201)
     Memory: 8.2M
```

```
        CPU: 1min 8.067s
     CGroup: /system.slice/pcscd.service
             └─3772184 /usr/sbin/pcscd --foreground --auto-exit

● pcscd.socket - PC/SC Smart Card Daemon Activation Socket
   Loaded: loaded (/usr/lib/systemd/system/pcscd.socket; enabled;
vendor preset: enabled)
   Active: active (running) since Fri 2021-09-24 11:05:04 CEST; 2
weeks 6 days ago
 Triggers: ● pcscd.service
   Listen: /run/pcscd/pcscd.comm (Stream)
   CGroup: /system.slice/pcscd.socket
```

3. Using the **p11-kit list-modules** command, display information about the configured smart card and the tokens present on the smart card:

```
$ p11-kit list-modules
p11-kit-trust: p11-kit-trust.so
[...]
opensc: opensc-pkcs11.so
    library-description: OpenSC smartcard framework
    library-manufacturer: OpenSC Project
    library-version: 0.20
    token: MyEID (sctest)
        manufacturer: Aventra Ltd.
        model: PKCS#15
        serial-number: 8185043840990797
        firmware-version: 40.1
        flags:
                rng
                login-required
                user-pin-initialized
                token-initialized
```

4. Verify you can access the contents of your smart card:

```
$ pkcs11-tool --list-objects --login
Using slot 0 with a present token (0x0)
Logging in to "MyEID (sctest)".
Please enter User PIN:
Private Key Object; RSA
  label:      Certificate
  ID:         01
  Usage:      sign
  Access:     sensitive
Public Key Object; RSA 2048 bits
  label:      Public Key
  ID:         01
  Usage:      verify
  Access:     none
Certificate Object; type = X.509 cert
  label:      Certificate
  subject:    DN: O=IDM.EXAMPLE.COM, CN=idmuser1
  ID:         01
```

5. Display the contents of the certificate on your smart card using the **certutil** command:

   a. Run the following command to determine the correct name of your certificate:

```
$ certutil -d /etc/pki/nssdb -L -h all

Certificate Nickname                                         Trust Attributes
                                                             SSL,S/MIME,JAR/XPI

Enter Password or Pin for "MyEID (sctest)":
Smart Card CA 0f5019a8-7e65-46a1-afe5-8e17c256ae00           CT,C,C
MyEID (sctest):Certificate                                   u,u,u
```

   b. Display the contents of the certificate on your smart card:

NOTE

Ensure the name of the certificate is an exact match for the output displayed in the previous step, in this example **MyEID (sctest):Certificate**.

```
$ certutil -d /etc/pki/nssdb -L -n "MyEID (sctest):Certificate"

Enter Password or Pin for "MyEID (sctest)":
Certificate:
    Data:
        Version: 3 (0x2)
        Serial Number: 15 (0xf)
        Signature Algorithm: PKCS #1 SHA-256 With RSA Encryption
        Issuer: "CN=Certificate Authority,O=IDM.EXAMPLE.COM"
        Validity:
            Not Before: Thu Sep 30 14:01:41 2021
            Not After : Sun Oct 01 14:01:41 2023
        Subject: "CN=idmuser1,O=IDM.EXAMPLE.COM"
        Subject Public Key Info:
            Public Key Algorithm: PKCS #1 RSA Encryption
            RSA Public Key:
                Modulus:
                    [...]
                Exponent: 65537 (0x10001)
        Signed Extensions:
            Name: Certificate Authority Key Identifier
            Key ID:
                e2:27:56:0d:2f:f5:f2:72:ce:de:37:20:44:8f:18:7f:
                2f:56:f9:1a

            Name: Authority Information Access
            Method: PKIX Online Certificate Status Protocol
            Location:
                URI: "http://ipa-ca.idm.example.com/ca/ocsp"

            Name: Certificate Key Usage
            Critical: True
            Usages: Digital Signature
                    Non-Repudiation
                    Key Encipherment
```

```
                Data Encipherment

            Name: Extended Key Usage
                TLS Web Server Authentication Certificate
                TLS Web Client Authentication Certificate

            Name: CRL Distribution Points
            Distribution point:
                URI: "http://ipa-ca.idm.example.com/ipa/crl/MasterCRL.bin"
                CRL issuer:
                    Directory Name: "CN=Certificate Authority,O=ipaca"

            Name: Certificate Subject Key ID
            Data:
                43:23:9f:c1:cf:b1:9f:51:18:be:05:b5:44:dc:e6:ab:
                be:07:1f:36

    Signature Algorithm: PKCS #1 SHA-256 With RSA Encryption
    Signature:
        [...]
    Fingerprint (SHA-256):

6A:F9:64:F7:F2:A2:B5:04:88:27:6E:B8:53:3E:44:3E:F5:75:85:91:34:ED:48:A8:0D:F0:31:5
D:7B:C9:E0:EC
    Fingerprint (SHA1):
        B4:9A:59:9F:1C:A8:5D:0E:C1:A2:41:EC:FD:43:E0:80:5F:63:DF:29

    Mozilla-CA-Policy: false (attribute missing)
    Certificate Trust Flags:
        SSL Flags:
            User
        Email Flags:
            User
        Object Signing Flags:
            User
```

Additional resources

- See **certutil(1)** man page.

7.2. TROUBLESHOOTING SMART CARD AUTHENTICATION WITH SSSD

This procedure describes how to troubleshoot authentication with SSSD using smart cards.

Prerequisites

- You have installed and configured your IdM Server and client for use with smart cards.
- You have installed the **sssd-tools** package.
- You are able to detect your smart card reader and display the contents of your smart card. See Testing smart card access on the system .

Procedure

1. Verify you can authenticate with your smart card using **su**:

```
$ su - idmuser1 -c 'su - idmuser1 -c whoami'
PIN for MyEID (sctest):
idmuser1
```

If you are not prompted for the smart card PIN, and either a password prompt or an authorization error are returned, check the SSSD logs. See Troubleshooting authentication with SSSD in IdM for information on logging in SSSD. The following is an example of an authentication failure:

```
$ su - idmuser1 -c 'su - idmuser1 -c whoami'
PIN for MyEID (sctest):
su: Authentication failure
```

If the SSSD logs indicate an issue from the **krb5_child**, similar to the following, you may have an issue with your CA certificates. To troubleshoot issues with certificates, see Verifying that IdM Kerberos KDC can use Pkinit and that the CA certificates are correctly located.

```
[Pre-authentication failed: Failed to verify own certificate (depth 0): unable to get local issuer certificate: could not load the shared library]
```

If the SSSD logs indicate a timeout either from **p11_child** or **krb5_child**, you may need to increase the SSSD timeouts and try authenticating again with your smart card. See Increasing SSSD timeouts for details on how to increase the timeouts.

2. Verify your GDM smart card authentication configuration is correct. A success message for PAM authentication should be returned as shown below:

```
# sssctl user-checks -s gdm-smartcard "idmuser1" -a auth
user: idmuser1
action: auth
service: gdm-smartcard

SSSD nss user lookup result:
 - user name: idmuser1
 - user id: 603200210
 - group id: 603200210
 - gecos: idm user1
 - home directory: /home/idmuser1
 - shell: /bin/sh

SSSD InfoPipe user lookup result:
 - name: idmuser1
 - uidNumber: 603200210
 - gidNumber: 603200210
 - gecos: idm user1
 - homeDirectory: /home/idmuser1
 - loginShell: /bin/sh

testing pam_authenticate

PIN for MyEID (sctest)
pam_authenticate for user [idmuser1]: Success
```

```
PAM Environment:
 - PKCS11_LOGIN_TOKEN_NAME=MyEID (sctest)
 - KRB5CCNAME=KCM:
```

If an authentication error, similar to the following, is returned, check the SSSD logs to try and determine what is causing the issue. See Troubleshooting authentication with SSSD in IdM for information on logging in SSSD.

```
pam_authenticate for user [idmuser1]: Authentication failure

PAM Environment:
 - no env -
```

If PAM authentication continues to fail, clear your cache and run the command again.

```
# sssctl cache-remove
SSSD must not be running. Stop SSSD now? (yes/no) [yes] yes
Creating backup of local data…
Removing cache files…
SSSD needs to be running. Start SSSD now? (yes/no) [yes] yes
```

7.3. VERIFYING THAT IDM KERBEROS KDC CAN USE PKINIT AND THAT THE CA CERTIFICATES ARE CORRECTLY LOCATED

This procedure describes how to verify that IdM Kerberos KDC can use PKINIT and also describes how to verify your CA certificates are correctly located.

Prerequisites

- You have installed and configured your IdM Server and client for use with smart cards.
- You are able to detect your smart card reader and display the contents of your smart card. See Testing smart card access on the system .

Procedure

1. Run the **kinit** utility to authenticate as the **idmuser1** with the certificate stored on your smart card:

```
$ kinit -X X509_user_identity=PKCS11: idmuser1
MyEID (sctest)                PIN:
```

2. Enter your smart card PIN. If you are not prompted for your PIN, check that you can detect your smart card reader and display the contents of your smart card. See Testing smart card authentication.

3. If your PIN is accepted and you are then prompted for your password, you might be missing your CA signing certificate.

   a. Verify the CA chain is listed in the default certificate bundle file using **openssl** commands:

```
$ openssl crl2pkcs7 -nocrl -certfile /var/lib/ipa-client/pki/ca-bundle.pem | openssl pkcs7 -
print_certs -noout
```

```
subject=O = IDM.EXAMPLE.COM, CN = Certificate Authority

issuer=O = IDM.EXAMPLE.COM, CN = Certificate Authority
```

b. Verify the validity of your certificates:

i. Find the user authentication certificate ID for **idmuser1**:

```
$ pkcs11-tool --list-objects --login
[...]
Certificate Object; type = X.509 cert
  label:      Certificate
  subject:    DN: O=IDM.EXAMPLE.COM, CN=idmuser1
 ID: 01
```

ii. Read the user certificate information from the smart card in DER format:

```
$ pkcs11-tool --read-object --id 01 --type cert --output-file cert.der
Using slot 0 with a present token (0x0)
```

iii. Convert the DER certificate to PEM format:

```
$ openssl x509 -in cert.der -inform DER -out cert.pem -outform PEM
```

iv. Verify the certificate has valid issuer signatures up to the CA:

```
$ openssl verify -CAfile /var/lib/ipa-client/pki/ca-bundle.pem <path>/cert.pem
cert.pem: OK
```

4. If your smart card contains several certificates, **kinit** might fail to choose the correct certificate for authentication. In this case, you need to specify the certificate ID as an argument to the **kinit** command using the **certid=<ID>** option.

a. Check how many certificates are stored on the smart card and get the certificate ID for the one you are using:

```
$ pkcs11-tool --list-objects --type cert --login
Using slot 0 with a present token (0x0)
Logging in to "MyEID (sctest)".
Please enter User PIN:
Certificate Object; type = X.509 cert
  label:      Certificate
  subject:    DN: O=IDM.EXAMPLE.COM, CN=idmuser1
  ID:         01
Certificate Object; type = X.509 cert
  label:      Second certificate
  subject:    DN: O=IDM.EXAMPLE.COM, CN=ipauser1
  ID:         02
```

b. Run **kinit** with certificate ID 01:

```
$ kinit -X kinit -X X509_user_identity=PKCS11:certid=01 idmuser1
MyEID (sctest)                  PIN:
```

5. Run **klist** to view the contents of the Kerberos credentials cache:

```
$ klist
Ticket cache: KCM:0:11485
Default principal: idmuser1@EXAMPLE.COM

Valid starting       Expires              Service principal
10/04/2021 10:50:04  10/05/2021 10:49:55  krbtgt/EXAMPLE.COM@EXAMPLE.COM
```

6. Destroy your active Kerberos tickets once you have finished:

```
$ kdestroy -A
```

Additional resources

- See **kinit** man page.
- See **kdestroy** man page.

7.4. INCREASING SSSD TIMEOUTS

If you are having issues authenticating with a smart card, check the **krb5_child.log** and the **p11_child.log** file for timeout entries similar to the following:

krb5_child: Timeout for child [9607] reached…..consider increasing value of krb5_auth_timeout.

If there is a timeout entry in the log file, try increasing the SSSD timeouts as outlined in this procedure.

Prerequisites

- You have configured your IdM Server and client for smart card authentication.

Procedure

1. Open the **sssd.conf** file on the IdM client:

```
# vim /etc/sssd/sssd.conf
```

2. In your domain section, for example **[domain/idm.example.com]**, add the following option:

```
krb5_auth_timeout = 60
```

3. In the **[pam]** section, add the following:

```
p11_child_timeout = 60
```

4. Clear the SSSD cache:

```
# sssctl cache-remove
SSSD must not be running. Stop SSSD now? (yes/no) [yes] yes
Creating backup of local data…
Removing cache files…
SSSD needs to be running. Start SSSD now? (yes/no) [yes] yes
```

-

Once you have increased the timeouts, try authenticating again using your smart card. See Testing smart card authentication for more details.