



Classic Client for Linux

User Guide



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Document Reference: D1573654A

May 9, 2022

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Preface

Welcome to Thales Classic Client for Linux.

This chapter presents an overview of Classic Client, the documentation provided with it, and additional resources available for working with Classic Client.

Classic Client

Classic Client is for individual users, who want to use a smart card/token to protect information and transactions made via computers.

Note: A token is in fact a smart card embedded in a device that can be plugged into the USB port of a PC. In this document, “connecting a device” can mean inserting a card in a reader or plugging a token in the USB port of a PC.

With Classic Client you can use a digital certificate stored on a smart card/token to:

- Sign electronic documents.
- Open and verify signed documents.
- Send and receive secure e-mail using Mozilla e-mail software.
- Connect securely with a Web server.

Classic Client also includes features for managing certificates and smart card/token security.

This guide introduces you to Classic Client and provides easy-to-follow instructions. Read the entire guide for assistance in the installation, configuration, and use of Classic Client.

Who Should Read This Book

This guide is intended for Classic Client users who are familiar with smart cards/tokens and smart card reader technology, as well as PC hardware and software.

It is assumed that the user of Classic Client has:

- an understanding of the basic operations in a Linux OS.
- administrative privileges for the PC on which Classic Client will be installed.

Documentation

Classic Client is delivered with the following documentation:

- *Classic Client for Linux* (this document).
- *End User License Agreement* (EULA)

The EULA.rtf can be found after installation in the directory `usr/share/doc/libclassicclient`.

This document is best viewed with Adobe Acrobat Reader, version 7.0 or later. You can download Adobe Acrobat Reader from Adobe's Web site at: www.adobe.com.

Conventions

The following conventions are used in this document:

Typographical Conventions

Classic Client documentation uses the following typographical conventions to assist the reader of this document.

Convention	Example	Description
Courier	transaction	Code examples.
Bold	Enter libgclib.so	Actual user input or screen output.
>	Select File > Open	Indicates a menu selection. In this example you are instructed to select the " Open " option from the " File " menu.

Note: Example screen shots of the Classic Client for Linux software are provided throughout this document to illustrate the various procedures and descriptions. These screen shots were produced with Classic Client running on Ubuntu.

Additional Resources

For further information or more detailed use of Classic Client, additional resources and documentation are available by contacting Thales technical support.

Support Contacts

If you encounter a problem while installing, registering, or operating this product, please refer to the documentation before contacting support. If you cannot resolve the issue, contact your supplier or [Thales Customer Support](#).

Thales Customer Support operates 24 hours a day, 7 days a week. Your level of access to this service is governed by the support plan arrangements made between Thales and your organization. Please consult this support plan for further information about your entitlements, including the hours when telephone support is available to you.

Customer Support Portal

The Customer Support Portal, at <https://supportportal.thalesgroup.com>, is where you can find solutions for most common problems. The Customer Support Portal is a comprehensive, fully searchable database of support resources, including software and firmware downloads, release notes listing known problems and workarounds, a knowledge base, FAQs, product documentation, technical notes, and more. You can also use the portal to create and manage support cases.

Note: You require an account to access the Customer Support Portal. To create a new account, go to the portal and click on the **REGISTER** link.

Telephone

The support portal also lists telephone numbers for voice contact ([Contact Us](#)).

If You Find an Error

Thales makes every effort to prevent errors in its documentation. However, if you discover any errors or inaccuracies in this document, please inform your Thales representative. Please quote the document reference number found at the bottom of the legal notice on the inside front cover.

Installation

This chapter discusses information related to the installation of Classic Client for Linux.

The installation requirements are outlined below.

This chapter describes:

- The hardware and software you need to use Classic Client for Linux.

System Requirements

The following sections describe the hardware, operating systems, peripherals and software you need to use for Classic Client. You must have administrator rights to the computer on which you are installing Classic Client.

Computer

The workstation must have at least 25 MB of available hard disk space and meet the normal system requirements to run the version of Linux installed.

Operating Systems

Classic Client for Linux supports the following operating systems:

The "**What's In?**" section of the Release Notes summarizes the OS that Classic Client supports.

Thales recommends that your machine has a RAM at least equal to that normally recommended for the OS. If this RAM requirement is met, Classic Client for Linux should run normally.

Applications

For a detailed list of applications supported by Classic Client for Linux, refer to the Release Notes. Here are some useful links where you can download the latest versions of some software applications free of charge:

- Mozilla Firefox and Thunderbird from www.mozilla.org.

Peripherals

Classic Client for Linux User Guide requires the following peripherals:

- Smart card reader.
- An available USB port.

For a detailed list of the smart cards and smart card readers supported by Classic Client for Linux, refer to the Release Notes.

Hardware and Software

Connecting the Smart Card Reader

To use Classic Client on your workstation, you must connect a smart card reader to your computer.

If the card reader is not recognized on your workstation, you may need to install the latest card reader drivers. You can download these from <https://supportportal.thalesgroup.com>.

Configuring Thales Cryptographic Security Modules

Security Modules are software add-ons that provide a variety of cryptographic services, such as secure browsing, and support the use of smart cards/tokens.

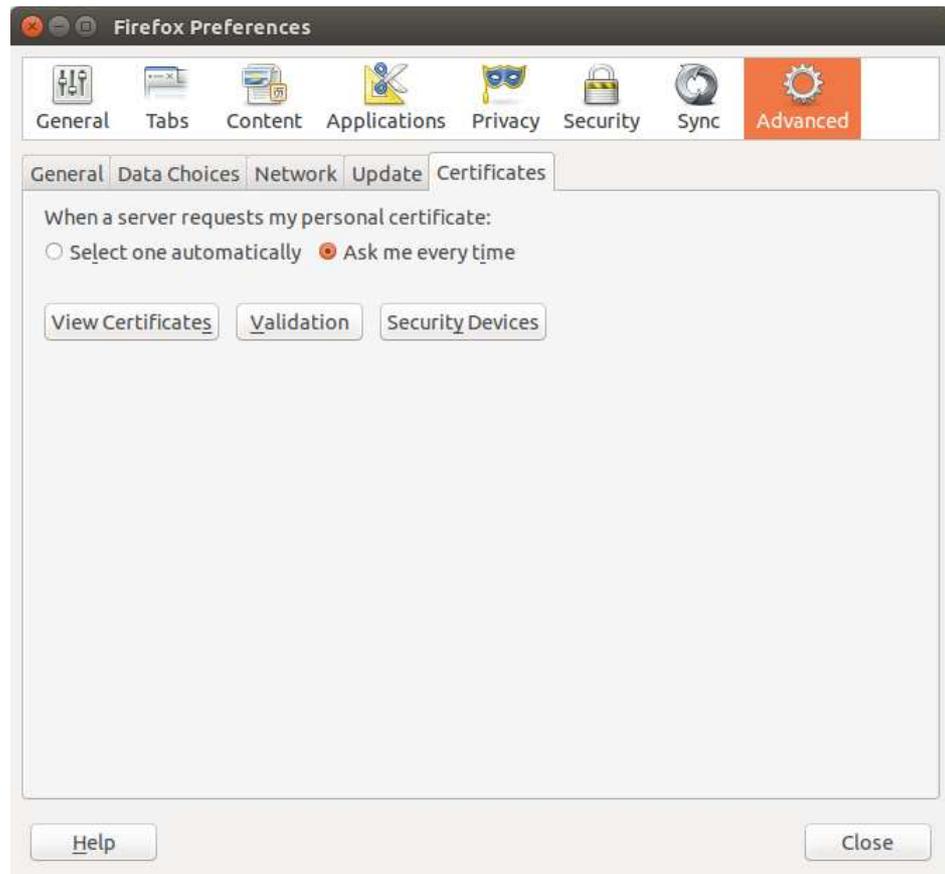
In Classic Client for Linux, the PKCS#11 security module is installed automatically as it is included with the Classic Client software.

In order to enable the Mozilla applications Firefox and Thunderbird to communicate with Classic Client, the PKCS#11 security module must be registered in the Mozilla application.

To configure Firefox to recognize the security module:

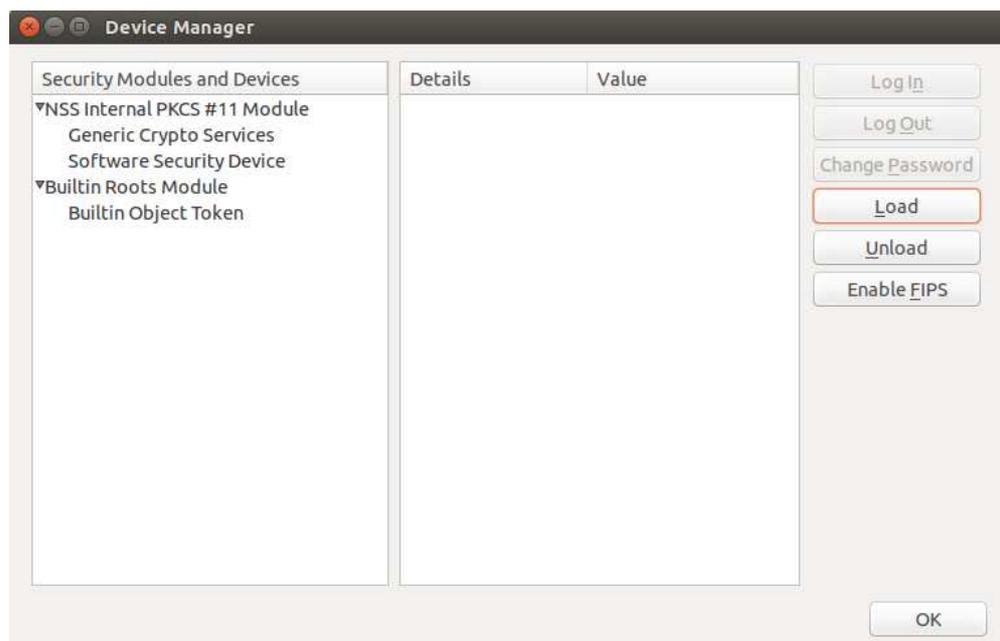
- 1 Open **Firefox** and from the **Edit** menu choose **Preferences**.
- 2 In the dialog box that opens, click the **Advanced** icon, then the **Certificates** tab to display the settings as shown in “Figure 1”.

Figure 1 - Encryption Tab in Advanced Dialog



- 3 Click **Security Devices** to display the **Device Manager** window. This displays the modules currently available as shown in "Figure 2" on page 3.

Figure 2 - Device Manager



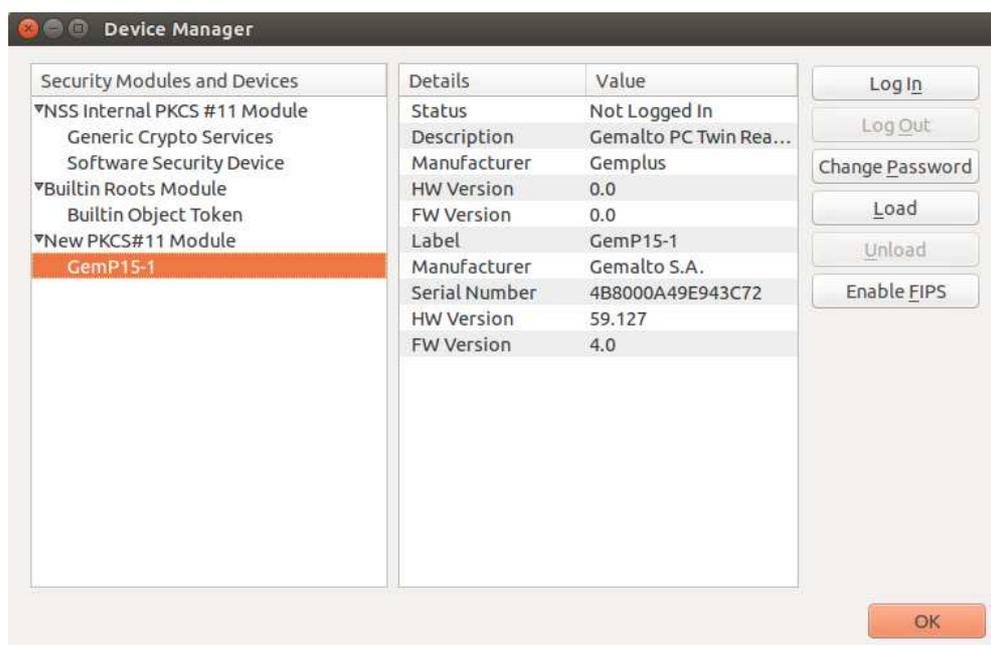
- Click the **Load** button to the right in the dialog. This displays the **Load PKCS#11 Device** window, as shown in “Figure 3”.

Figure 3 - The Load PKCS#11 Device Dialog Box



- Enter a **Module Name**.
- In **Module filename**, enter the full path and filename for the libgclib.so file:
By default, this is
/usr/lib/ClassicClient/libgclib.so
- Click **OK**.
The **Device Manager** indicates the presence of the new module as shown in “Figure 4”.

Figure 4 - Cryptographic Modules Available



PIN Management

This chapter discusses the Classic Client PIN Management tool, the dedicated tool for managing PINs and the tasks it can be used to perform.

About PINs

PIN Types

Classic Client recognizes two types of PIN that may be in a smart card/token:

- Admin PIN – the PIN that is necessary to unblock the smart card/token (for example after too many consecutive incorrect presentations of the User PIN).
- User PIN – the standard PIN used by a user to access the smart card/token.

Administrator PIN

This is the PIN used to unblock a User PIN. Normally only administrators know the value of this PIN.

The administrator PIN is an extremely important part of the security of the smart card/token. Knowledge of this PIN means you can change the value of all the user PINs on the smart card/token and unblock it if the user PIN is blocked.

It is extremely important for smart card/token administrators to keep the value of the Admin PIN secure and secret. The administrator must know the Admin PIN value for all smart cards/tokens he or she has deployed. The Admin PIN value of a smart card/token should never be shared with anyone else, and it is strongly recommended not to give this value to the smart card/token user, unless your security policy requests it.

Caution: Once an administration PIN has been entered incorrectly the requisite number of times, it becomes blocked and the smart card/token can never be used again.

The original Admin PIN value of a smart card/token is included in the packaging of the smart card/token. If you are an administrator you may want to change the Admin PIN value of the smart cards/tokens you deploy so that only you, the administrator, knows it.

User PIN

A PIN (*Personal Identification Number*) is a private code. It can be a sequence of numeric or alphanumeric characters or a mix of the two and is used as a type of password. Your User PIN must be verified before you can perform security tasks with the smart card/token, such as logging on to a workstation, or creating a digital signature.

The user PIN of a smart card/token may be the original PIN value set at the time of manufacture *or* it may be a PIN value assigned by the administrator.

The user PIN should be unique to your smart card/token and known only to you. It is standard practice, upon reception of a smart card/token, to change the user PIN value so that only you, the user, knows it. Your administrator can even force you to change the PIN value upon first use in the software.

To perform a security operation, you must prove that you know the User PIN. Software that performs a security operation usually displays a window requesting you to enter the PIN before performing the security operation.

- When creating a digital signature, successful PIN validation proves that you are the real smart card/token holder and enables you to sign with the selected key.
- By using the PIN to log on a network, you prove both that your smart card/token is valid in the system and that you smart card/token holder, is physically there.

Caution: Do not allow the User PIN for your smart card/token to be blocked. If, for example, you forget the user PIN and enter a predetermined number of failed validation attempts (the PIN is entered incorrectly), the smart card/token becomes blocked and you cannot perform any further security operations with it. If you know the Admin PIN you can unblock your smart card/token as described in “How to Unblock a PIN” on page 8. However most companies’ security policy does not allow this, in which case you must ask your Classic Client system administrator to unblock the smart card/token using the Administrator PIN. Sometimes smart card/token technology or software on-board the smart card/token limits the absolute number of these unblocking operations. For more information, see your smart card/token technology documentation.

PIN Security Policies

PIN policies are established according to a company’s security policy, but they are also established in relation to the particular type of smart card/token you use and the on-board software the smart card/token features. For example, some cards/tokens allow a user PIN to be a minimum of 4 characters, and other smart cards/tokens allow a minimum of 6 characters. Please see your smart card/token documentation for more information.

Classic Client PIN Management Tool

The Classic Client PIN Management tool allows you to make changes to the PINs associated with a particular smart card/token.

PIN Pad Readers

You can use the PIN Pad, “PC Pinpad” with the PIN Tool. PC Pinpad behaves like a normal reader in transparent mode.

PIN Management Tasks

This section describes the tasks that you can perform with the PIN Management Tool.

How to Access the Classic Client PIN Management Tool

To access the PIN Tool:

- 1 Make sure that your smart card/token is connected to your computer.
- 2 Either browse to `/usr/bin/` and double-click **CCChangePinTool** or open a terminal, and type `./CCChangePinTool`.
- 3 When the window shown in “Figure 5” appears, select a smart card reader from the list and click **Apply**.

Figure 5 - Selecting a Smart Card Reader for the PIN Management Tool



This opens the **Classic Client PIN Management** Window as shown in “Figure 6”.

Figure 6 - Classic Client PIN Management - Change PIN Function



How to Change a PIN

To change the Admin PIN, you will need to know its current value. This means that normally you will not be able to change an Admin PIN unless you are an administrator.

To change a PIN

- 1 Connect the smart card/token whose Admin PIN/User PIN/Signature PIN you want to change to the PC.
- 2 Open the PIN Management window as described in “How to Access the Classic Client PIN Management Tool” on page 7.
- 3 If it is not already selected, click **Change PIN** at the top of the window (see “Figure 6” on page 7).

- 4 Select the PIN whose value you want to change from the list, **Admin PIN**, **User PIN** or **Signature PIN**.
- 5 Enter the current value of the PIN in **Current PIN Code**, and the new value in **New PIN Code** and again in **Confirm New PIN Code**.
- 6 Click the **Change PIN** button at the bottom of the window. A pop-up window appears to confirm a successful PIN change or to display an error message if unsuccessful.

How to Unblock a PIN

Note: This section is applicable only for User PIN. It is not possible to unblock an Admin PIN. If the Admin PIN becomes blocked, the smart card/token can no longer be used.

If you know the Admin PIN for your smart card/token, you can unblock your User PIN by using the Classic Client PIN Management tool.

In most cases, if you are not an administrator you will not know the Admin PIN – it depends on your company's security policy. In such cases, there are two possibilities:

- The administrator must unblock the smart card/token for you.
- You must return the smart card/token to the administrator so he or she can unblock it on his or her PC.

To unblock a PIN as an administrator:

- 1 Connect the blocked smart card/token to your administrator PC.
- 2 Open the Classic Client PIN Management window as described in “How to Access the Classic Client PIN Management Tool” on page 7.
- 3 If it is not already selected, click **Unblock PIN** at the top of the window as shown in “Figure 7” on page 8.

Figure 7 - Classic Client PIN Management - Unblock PIN Function



- 4 Enter the Admin PIN in **Admin PIN**, and the new value for the PIN in **New PIN** and again in **Confirm New PIN**.
- 5 For security reasons, Thales recommends that you check the box **Force user to change PIN**. This is particularly useful if the user whose PIN is being unblocked is not the administrator (as in most cases). For details on **Force user to change PIN**, refer to “Force Change PIN” on page 15.

- 6 Click the **Unlock PIN** button at the bottom of the window. A pop-up window appears to confirm a successful **Unlock PIN** operation or to display an error message if unsuccessful.

Fingerprint Authentication

This chapter provides information on fingerprint authentication in the Classic Client. Fingerprint authentication can be used as an alternative to PIN authentication. Fingerprint authentication is supported in the tasks mentioned in “Chapter 5 - Tasks”.

About Fingerprints

For cards that contain the IAS Classic Applet V3 or the IAS Classic Applet V4 and the Match On Card (MoC) applet, fingerprints can be used as an alternative to presenting a PIN. For fingerprint authentication, you must have a fingerprint scanner connected to the computer. (Please refer to the Classic Client Release Note to know which fingerprint scanners are supported.) To authenticate, place a finger on the sensor of the reader. Classic Client compares the digital fingerprint of the finger with the corresponding fingerprint stored in the MoC applet.

Caution: As with PINs, the number of attempts to perform a fingerprint authentication is limited. After a pre-defined number of failed attempts, you can no longer perform operations that require fingerprint authentication. **YOU CANNOT UNBLOCK FINGERPRINT AUTHENTICATION USING CLASSIC CLIENT.**

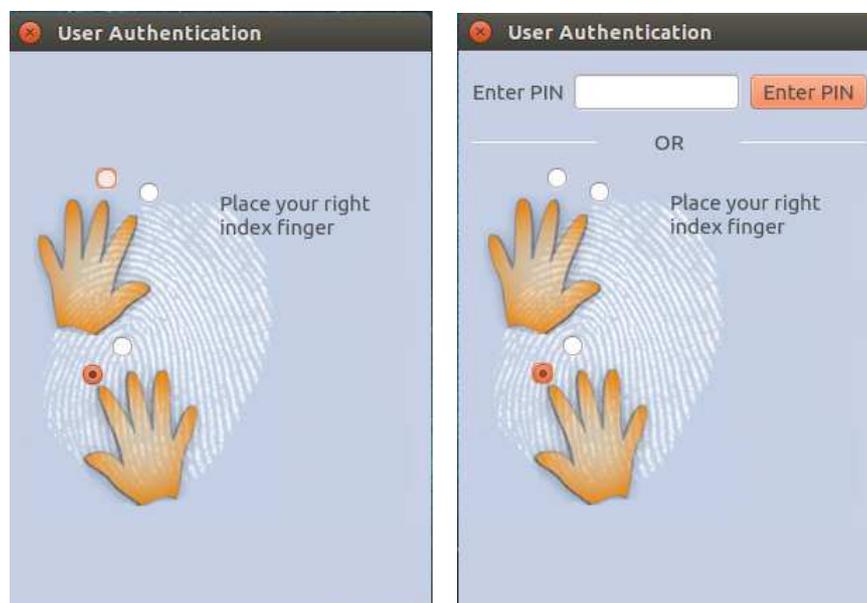
Requirements

For fingerprint authentication to work, the fingerprints must already be present on the smart card. The smart card must have the MoC (Match on Card) algorithm loaded on it. The fingerprint authentication can be configured with the following options:

- Configured fingerprints only
- Any fingerprint (IAS Classic V4 only)
- User PIN/Signature PIN or configured fingerprint (IAS Classic V4 only)
- User PIN/Signature PIN or any fingerprint (IAS Classic V4 only)
- User PIN/Signature PIN and configured fingerprint (IAS Classic V4 only)
- User PIN/Signature PIN and any fingerprint (IAS Classic V4 only)

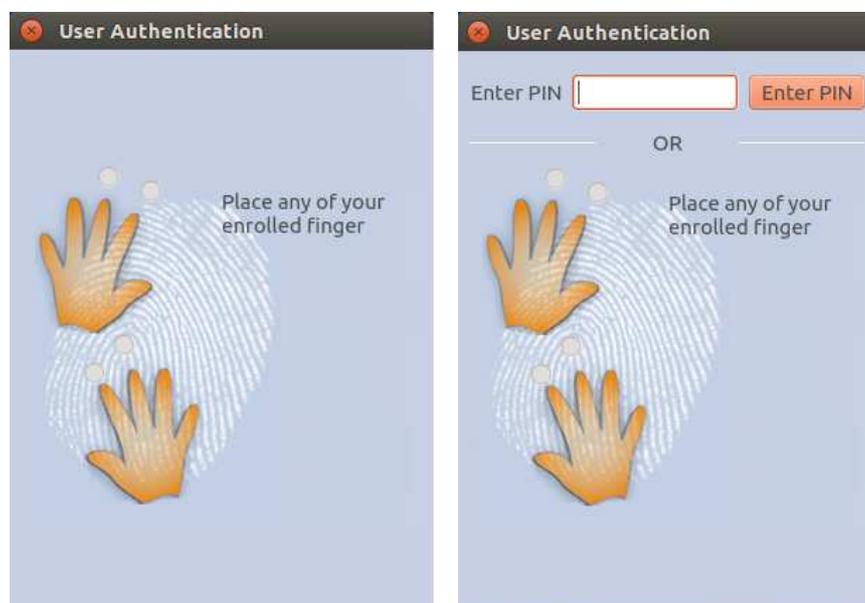
Authentication Process

If the requirements are fulfilled and the applications are configured properly, the applications should prompt the user to authenticate with a PIN or fingerprint as shown below.



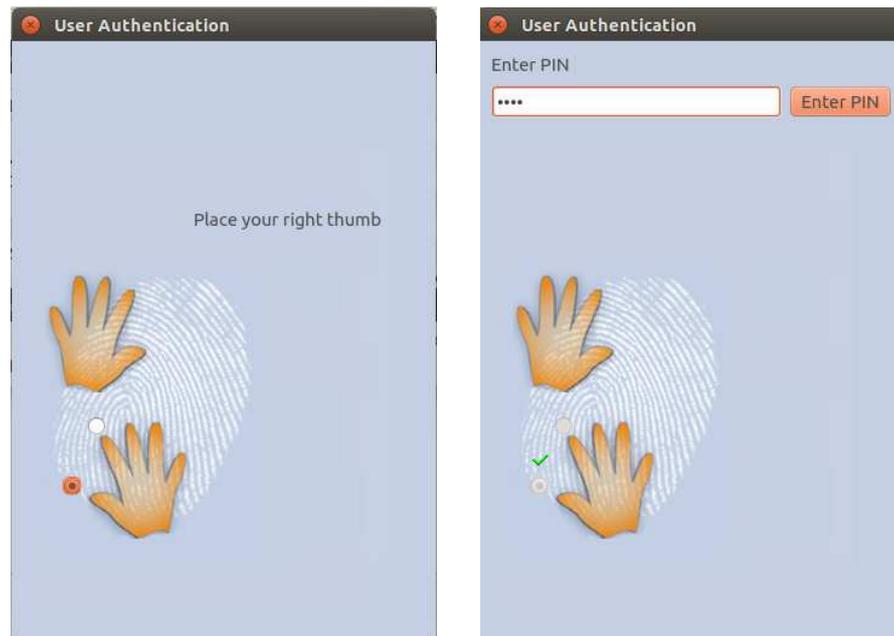
User must present the selected enrolled finger to scanner for fingerprint authentication.

Figure 8 - 1 to N Fingerprint Verification



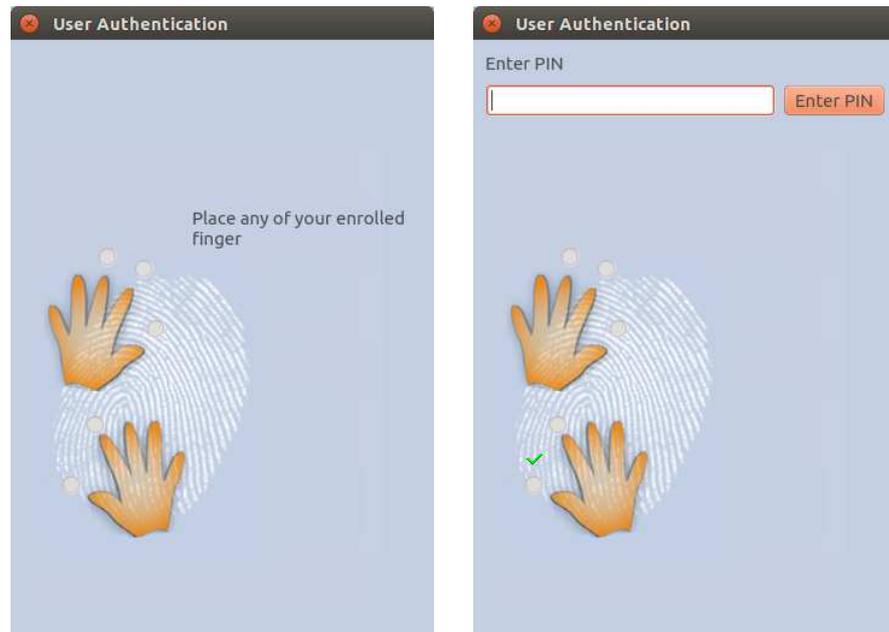
User must present any enrolled finger to the scanner for fingerprint authentication.

Figure 9 - 1 to 1 Fingerprint and User PIN Authentication



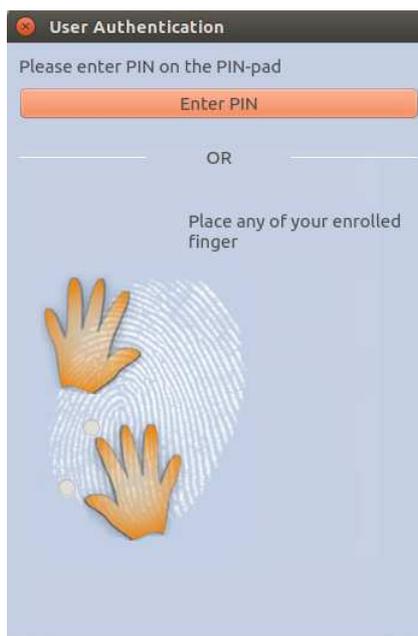
User must present selected enrolled fingerprint to the scanner followed by PIN to complete the authentication.

Figure 10 - 1 to N Fingerprint and User PIN Authentication



User must present any enrolled fingerprint to the scanner followed by PIN to complete authentication.

Figure 11 - PIN-pad Authentication



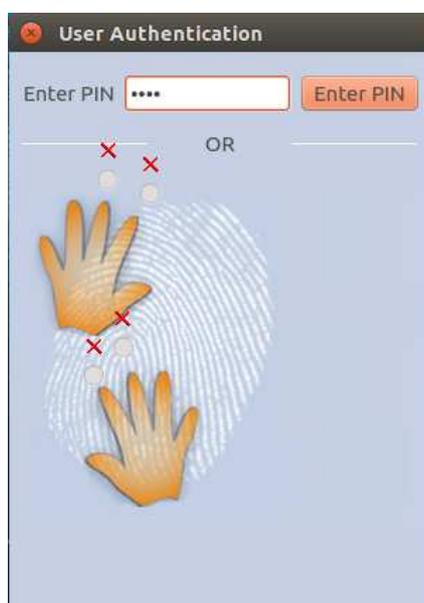
When using a PIN-pad, "Figure 11" appears for authentication.

When any of the above dialog boxes appear:

- 1 Place the indicated finger and/or enter the PIN where applicable.
- 2 If successful, the fingerprint window disappears.

In the event of all fingerprints are blocked, enter the PIN as shown in "Figure 12".

Figure 12 - PIN Authentication for Blocked Fingerprints



Note: All fingerprint dialog boxes may differ depending on enrolled fingerprints.

Background Service

When a smart card/token is connected, the Classic Client background service automatically reads the data on the smart card/token and performs some task such as prompting user to initialize PIN, notify user of certificate expiration and prompting user to enter transport PIN before proceeding to use IAS Classic applet functionalities.

Managing Background Service

Classic Client background service uses shell script to manage the Classic Client process.

Note: User may need to have some knowledge on basic Linux terminal commands to manage the Classic Client background service.

The shell script is installed in `/etc/ClassicClient` and its name is `ccchangepinservice`.

The shell script takes in arguments that allow user to perform some task with the background service such as check status, stop or start or restart service, enable or disable service.

Below shows a list of functionalities to manage the background service:

Table 1 - Classic Client Background Service Management

Function	Command
Check status whether background service is running	/etc/ClassicClient/ccchangepinservice status
Start background service	etc/ClassicClient/ccchangepinservice start
Stop background service	etc/ClassicClient/ccchangepinservice stop
Restart background service	etc/ClassicClient/ccchangepinservice restart
Enable background service to be automatically started on next machine restart.	etc/ClassicClient/ccchangepinservice enable
Disable background service to not be automatically started on next machine restart.	etc/ClassicClient/ccchangepinservice disable

Force Change PIN

The background service may detect that the User PIN or Signature PIN in the smart card/token must be changed. There are two main reasons for this:

- The smart card/token is a brand new smart card/token whose PIN has not yet been initialized.
- The smart card/token has had its User PIN or Signature PIN reset by the administrator, for example because it was blocked, and the administrator has set **Force User to Change PIN**.

In either case, when you connect the smart card/token a **Change PIN** dialog appears as shown below:

Figure 13 - Classic Client Background Service - Change PIN Dialog

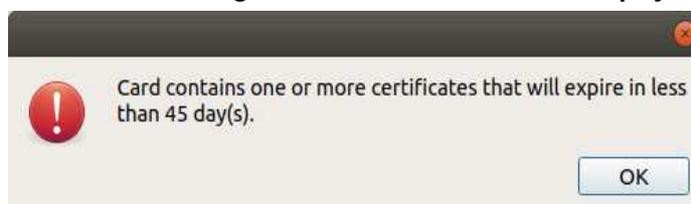
Enter the values and click **Change PIN**.

For details about forced PIN changes when using a PIN Pad reader, the steps are similar to “How to Change a PIN with PIN Pad reader” on page 33

Certificate Expiration

The Classic Client background service will notify user when one or more certificates soon-to-expire present in the smartcard/token. The prompt like in “Figure 14” will be shown if expiration date is 45 days or less.

Figure 14 - Classic Client Background Service - Certificate expiry notification



To change the default number of days prior certification expiration for notification, kindly approach any of our Thales technical support.

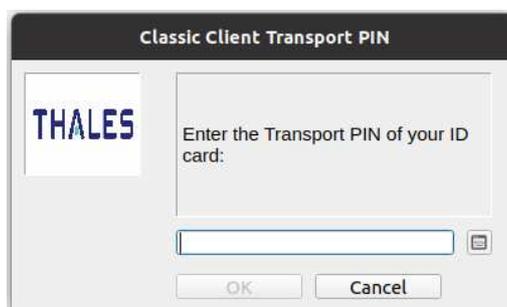
Transport PIN

The Classic Client background service may detect that transport PIN is activated in the smart card/token.

The service will ask user to verify transport PIN before allowing them to resume activity.

In this case, when you connect the smart card/token, a verify transport PIN dialog appears as shown:

Figure 15 - Classic Client Background Service - Verify Transport PIN dialog



Tasks

This chapter discusses information related to specific tasks that you will most often be required to carry out when using the Classic Client for Linux software and where to find the information about them.

These tasks are:

- “How to Use E-mail Securely” on this page.
- “How to View Secure Web Sites” on page 24
- “How to Add Digital Signatures to a Document” on page 27
- “PACE Authentication” on page 36

Tasks concerning PINs are described in “Chapter 2 - PIN Management”.

How to Use E-mail Securely

The following sections explain how to send secure e-mail using Classic Client for Linux.

About Secure E-mail

With Classic Client for Linux, you can improve e-mail security by using the digital certificate on your smart card/token to:

- Sign your e-mail so that the recipient can verify that the message is really from you and has not been altered.
- Encrypt, or “scramble” a message so that only the intended recipient can read it. This eliminates concerns about intercepted messages and e-mail monitoring.
- Sign or encrypt your message using one e-mail program, while your intended recipient can read it with any other S/MIME-enabled e-mail program.
- Receive signed and encrypted e-mail messages.

Setting up Secure E-mail

You must do the following before you can send secure e-mail:

- **Configure the application to recognize the PKCS#11 security module**
- **Configure security settings**

Set the security settings for digitally signing and/or encrypting the contents and attachments of outgoing messages.

- **Specify certificates to be used for signing and encryption**

Choose the digital certificate(s) that you will use to encrypt and digitally sign your e-mails. You can use the same certificate for both operations or two different ones. These certificates are associated with your e-mail account.

- **Send yourself a digitally-signed e-mail**

When you send a signed e-mail, you sign it with the private key. The recipient receives the corresponding public key with the mail which he or she uses to decipher your mail.

Before you can send e-mails to anybody else, you need to send a signed message to yourself in order for Thunderbird to store your public key.

Then you can send your public key to other people, for example by sending them a signed message. Once they have your public key, they can use it to encrypt mails they send to you (which you decipher using your private key).

The following sections describe how to perform the above operations using the Mozilla Thunderbird e-mail program. The dialog boxes shown may differ slightly from your own software, depending on what version you are using.

Working with Mozilla Thunderbird

The following sections explain how to set up and send secure e-mail with Mozilla's Thunderbird e-mail program.

There are three stages:

- 1 Configure Thunderbird to recognize the Security Module, described in the following section.
- 2 Configure the security settings and specify the certificates to use for signing and encryption, described on page 19.
- 3 Send a digitally signed e-mail to yourself in order to store your public key in Thunderbird, described on page 22.

Configure Thunderbird to Recognize the Security Module

You only need to do this once.

To configure Mozilla Thunderbird

- 1 Make sure your smart card/token is connected.
- 2 Start **Mozilla Thunderbird**.
- 3 Enter your password if you are prompted for it and click on **OK**.
- 4 For the rest of the procedure, follow the instructions in "To configure Firefox to recognize the security module."

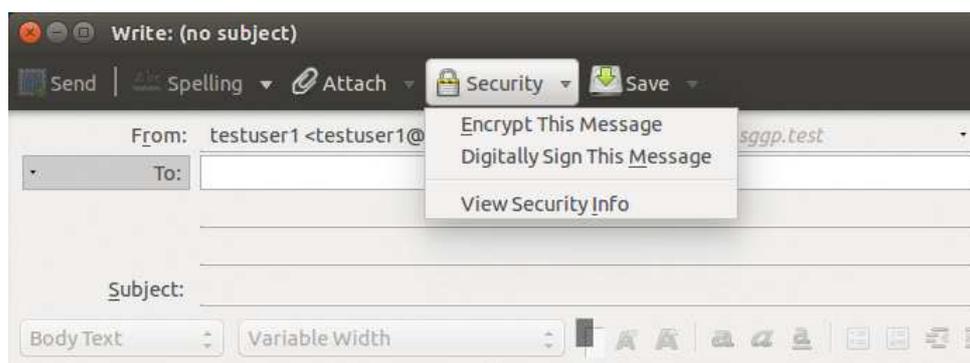
This new module will be used with all e-mail you send with Thunderbird.

Configuring Settings and Specifying Certificates

You only need to do this the first time you use your smart card/token to sign or encrypt an e-mail.

- 1 Make sure your smart card/token is connected.
- 2 Start **Mozilla Thunderbird**.
- 3 Enter your password if you are prompted for it.
- 4 In **Thunderbird**, click the **Write** icon  .
This opens the **Compose** window.
- 5 In the **Compose** window's **Options** menu, choose **Security > Encrypt This Message** as shown in "Figure 16".

Figure 16 - Encrypt This Message

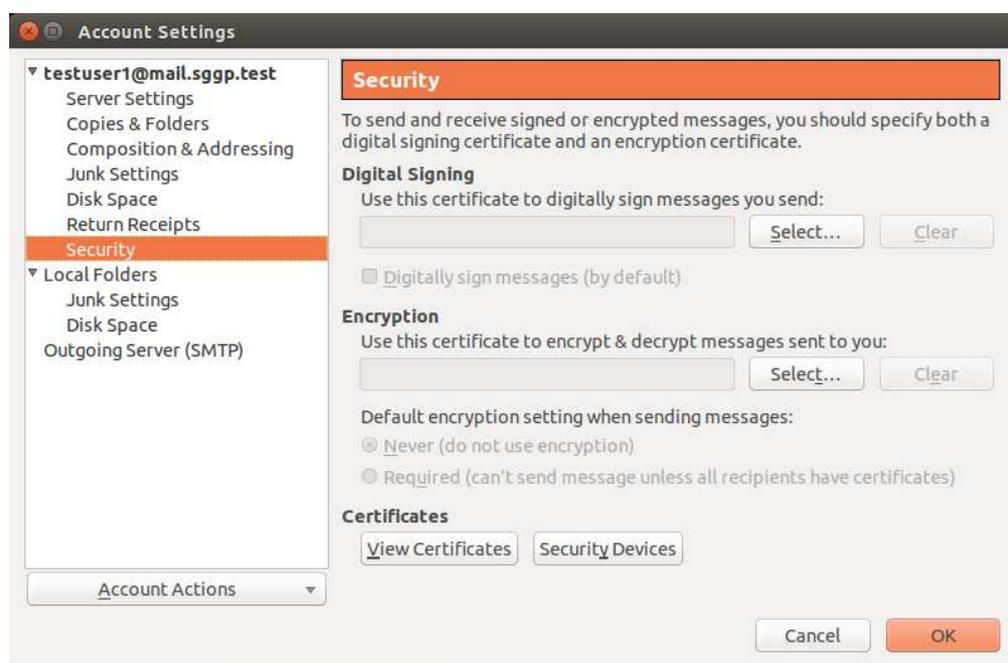


As the certificates in the smart card/token are not yet set up, the following message appears:



- 6 Click **Yes**. This opens the security account settings window for your e-mail account as shown in "Figure 17" on page 20.

Figure 17 - Security Account Settings



- 7 In **Digital Signing**, click **Select** and choose the certificate you want to use from the list that appears.

Note: You may be prompted to enter a "master password" as shown in "Figure 18". If so, enter the PIN for the card and click **OK**. This can be a User PIN or a Signature PIN.

Figure 18 - Enter Password



The details of the selected certificate appear, as shown in "Figure 19".

Figure 19 - Details of Selected Certificate



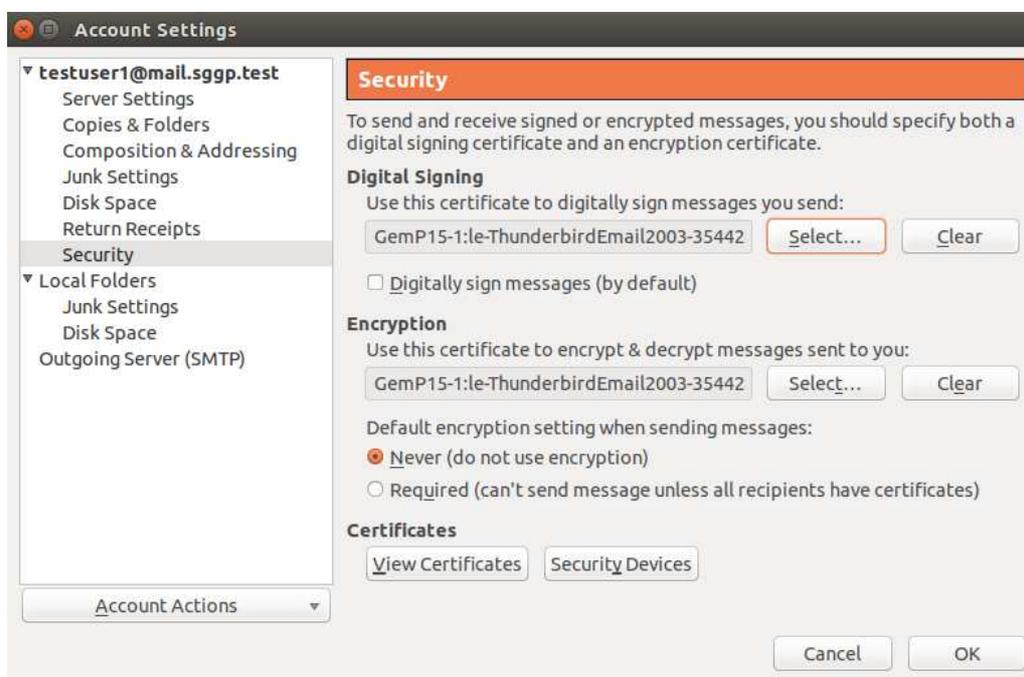
8 Click **OK**. The following message appears:

Figure 20 - "Use Same Certificate" Message



9 If you want to use the same certificate to encrypt and decrypt messages, click **OK**. This selects the certificate for you in the **Encryption** panel as shown in "Figure 21". Otherwise click **Cancel**.

Figure 21 - Security Account Settings (2)



10 If you want all of your e-mails to be digitally signed by default, check the box **Digitally sign messages (by default)**.

- 11 In **Encryption**, if you chose not to use the same certificate as the one used for digital signing, click **Select** and choose the certificate from the list that appears. A message similar to the one in “Figure 20” on page 21 appears, but this time asking if you want to use the Encryption certificate for digital signing. This is just in case you select your encryption certificate before you select your digital signature certificate.
- 12 In **Default encryption setting when sending messages**, choose one of the option buttons **Never** or **Required**.
- 13 Click **OK** to close the **Security Account Settings** window.

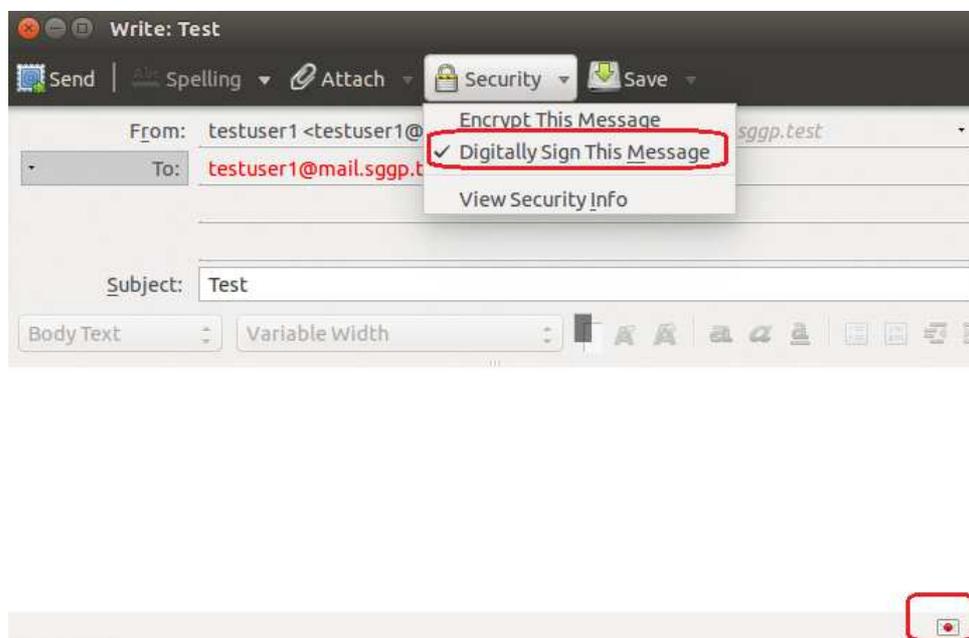
Note: If you want to modify the account settings at any point, open the **Account Settings** window from the Tools menu by choosing **Account Settings**.

Sending Digitally Signed E-mail with Mozilla Thunderbird

To send a signed e-mail to yourself with Mozilla Thunderbird

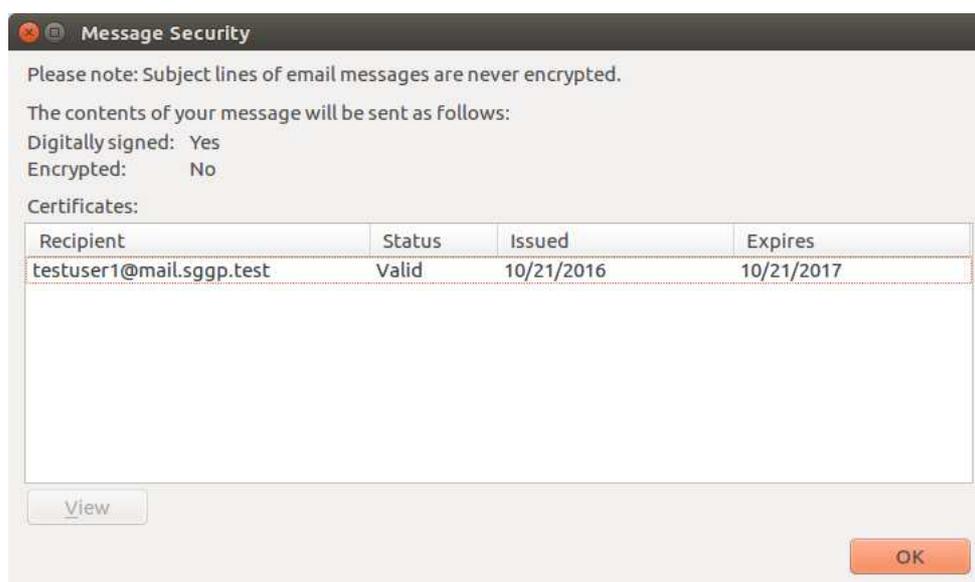
- 1 Make sure your smart card/token is connected.
- 2 Start **Mozilla Thunderbird**.
- 3 Enter your password if you are prompted for it.
- 4 In **Thunderbird**, click the **Write** icon  .
This opens the **Compose** window.
- 5 In the **Compose** window, write a short message **addressed to yourself**.
Be sure to include a subject heading.

Figure 22 - New Msg Composition Window



- 6 From the **Options** menu in the **Compose** window, choose **Security > Digitally Sign this Message** in order to sign the message.

Figure 23 - Message Security Info Window



You can display details about the certificate by clicking **View**.

7 Click **OK** to close the **Message Security** window.

8 Back in the **Compose** window, click **Send**.

If you are prompted for a master password for your security module, as shown in “Figure 18” on page 20, then enter the PIN for your smart card/token.

9 Open the message you sent yourself from in your inbox.

Notice the  icon showing you that the message has been signed.

You have successfully sent yourself a digitally signed e-mail.

Now that Thunderbird recognizes your public key, you can send signed messages to other people, thus sending them your public key.

Sending Encrypted E-mail with Mozilla Thunderbird

Once you have configured your e-mail account in **Mozilla Thunderbird**, you can retrieve a person’s public key when he or she sends a signed message to you. When you send e-mail to that person, you use his or her public key to encrypt the e-mail. This is done automatically by Thunderbird; you just need to specify the recipient(s) of the mail. Since no one except the person who has the private key can decrypt it, the e-mail is secure.

To send an encrypted e-mail:

Follow the same steps as “To send a signed e-mail to yourself with Mozilla Thunderbird” on page 22, except in the **Compose** window, choose **Encrypt this message** from the **Options** menu.

Reading Encrypted E-mail with Mozilla Thunderbird

When you open an encrypted e-mail, the application prompts you for a password.

Enter the User PIN of your smart card/token to decrypt and read the e-mail.

How to View Secure Web Sites

Communicating and conducting business on the Web is quickly becoming the most convenient, effective means of transaction. Therefore, Web sites must be secure to protect the corporation, the individual and the information exchanged.

With your Classic Client smart card/token, you can browse secure Web sites knowing that your private key and digital certificate are safely stored on your smart card/token instead of your hard drive, where they might be susceptible to unauthorized access.

When you connect to a secure Web site, your certificate must be specified in your browser so that you can authenticate yourself to the Web server. For example, when you bank online, your bank must be sure that you are the correct person to get account information. Your certificate confirms your identity to the online bank.

The following sections explain how to check that your certificates are correctly registered in your browsers when authenticating with secure web sites using Mozilla Firefox.

Choosing a Certificate to Authenticate Yourself to Secure Web Sites

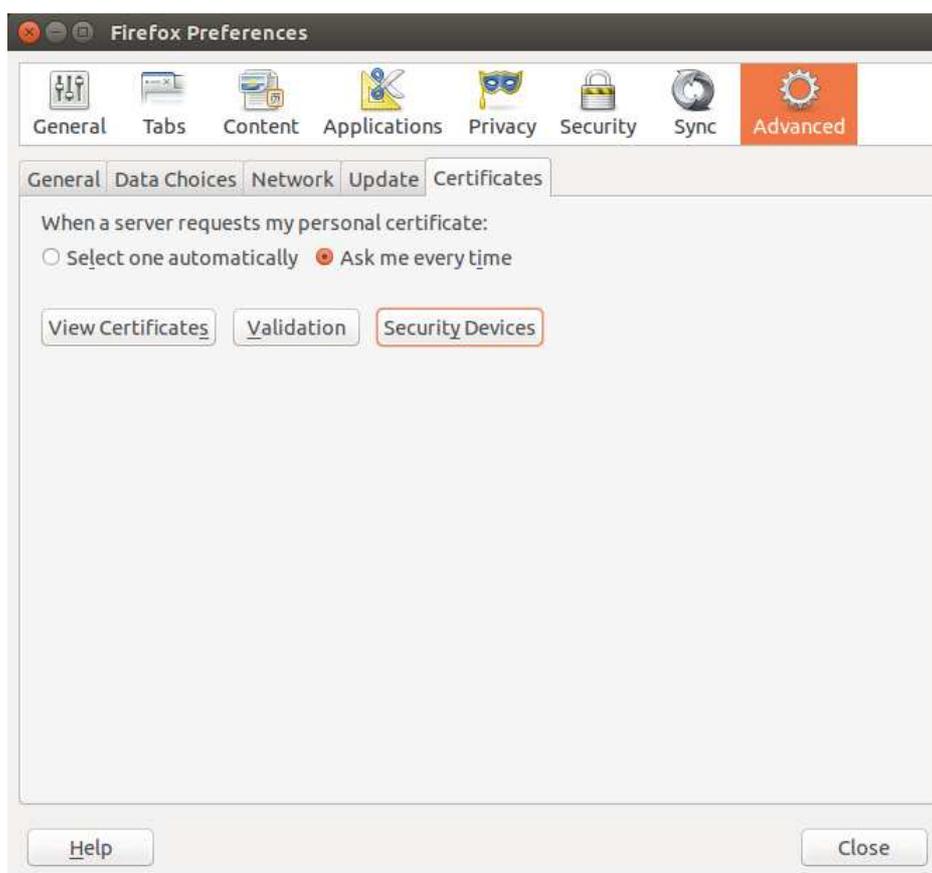
To authenticate using the Mozilla Firefox browser, your certificate must be registered in the browser. This section describes how to check that a certificate is registered and also how to tell the browser whether it should select the certificate itself, or ask you.

The screen shots in this section were made using Firefox.

To check certificates registered in Mozilla Firefox:

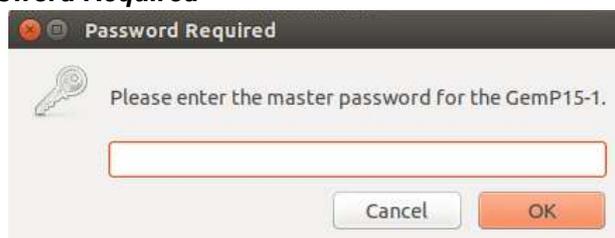
- 1 Make sure your smart card/token is connected.
- 2 Open Mozilla Firefox.
- 3 From the **Edit** menu choose **Preferences**.
- 4 Click the **Advanced** icon, then the **Certificates** tab as shown in “Figure 24”.

Figure 24 - Mozilla Firefox Options Dialog



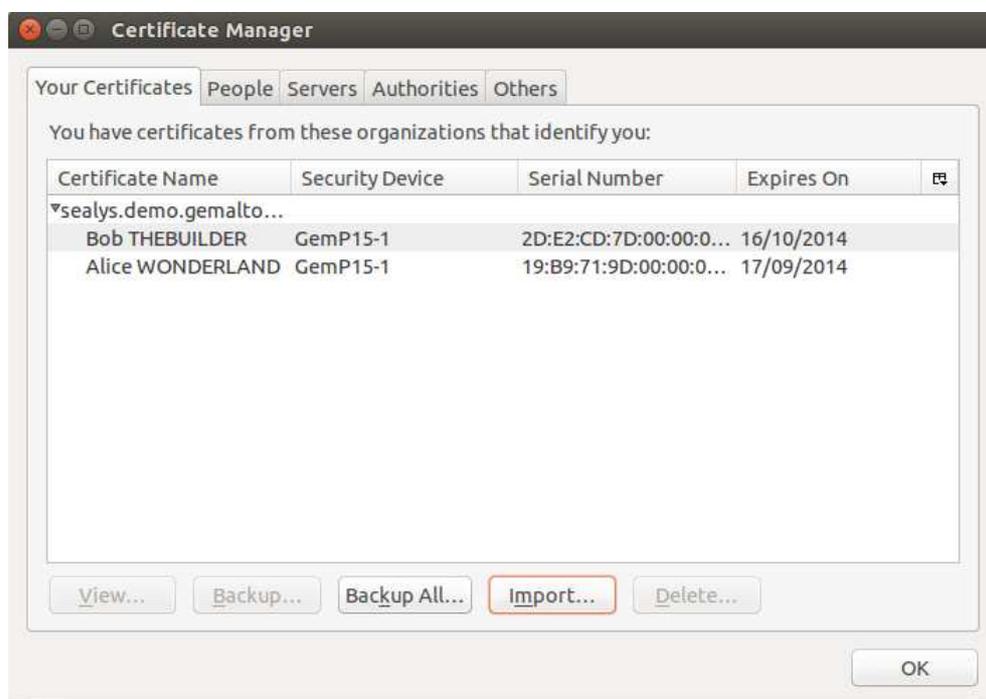
- 5 In **Certificates**, choose one of the options for the action to take when a web site requires a certificate:
 - Select one automatically
 - Ask me every time
- 6 To display the certificates that are on your smart card/token, click **View Certificates**. You will be prompted for a password as shown in “Figure 25”.

Figure 25 - Password Required



- 7 Enter the User PIN for your smart card/token.
The **Certificate Manager** window appears.

Figure 26 - Certificate Manager Window



- 8 Under **Your Certificates** appears the certificates that are stored on the smart card/token. To display the properties of a particular certificate, select it and click **View**.

How to Add Digital Signatures to a Document

This section explains how to add digital signatures to a document and how to sign PDF documents. Users are able to add the digital signatures using LibreOffice.

Note: LibreOffice uses the PKCS#11 module in Mozilla Firefox or Thunderbird's Device Manager to have access to smartcard/token. Hence, ensure Classic Client's PKCS#11 module is loaded to the Device Manager prior using LibreOffice. Refer to "Configuring Thales Cryptographic Security Modules" on page 2 for details.

Configure LibreOffice to Recognize the Security Module

You only need to do this once.

To load Security Module

- 1 LibreOffice shares the same PKCS#11 module in Mozilla Firefox or Thunderbird's Device Manager to have access to smartcard/token.
- 2 Hence, ensure Classic Client's PKCS#11 module is loaded to the Device Manager prior using LibreOffice. Refer to "Configuring Thales Cryptographic Security Modules" on page 2 for details.

To configure Network Security Services certificate directory

- 1 In LibreOffice, go to **Tools** and click **Options**.
- 2 Click **Security**, and under Certificate Path select **Certificate**.
- 3 Select either Mozilla Firefox or Thunderbird directory that the security module was previously loaded.

Adding Digital Signatures to a Document or PDF

The steps are shown below:

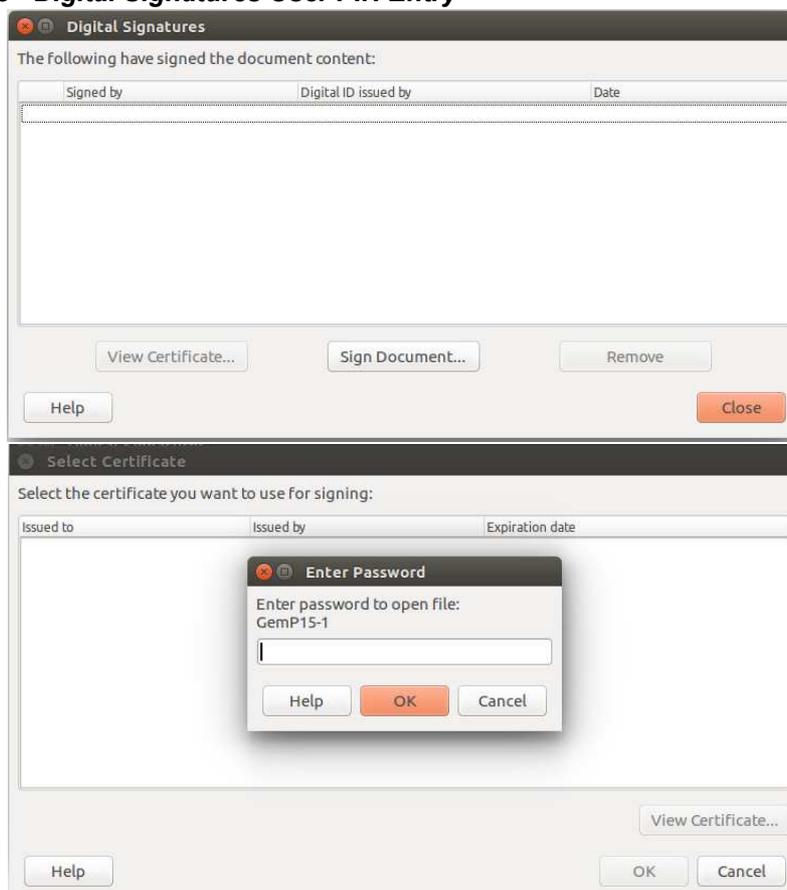
- 1 In LibreOffice, go to **File** and click **Digital Signatures** and select Sign Digital Signatures.
- 2 If the document is not saved, the user is prompted to save. Save the document and click **Digital Signatures** again.

Figure 27 - Digital Signatures



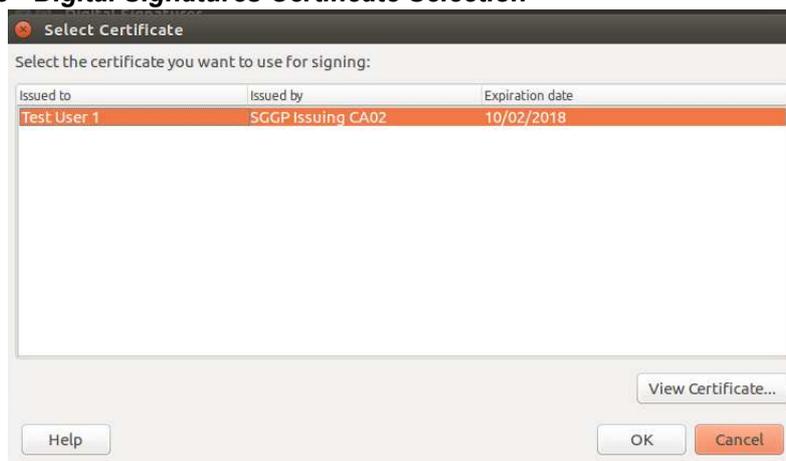
- 3 Click **Sign Document** and enter the PIN to view the available certificates on the card. This PIN can be a user PIN or Signature PIN.

Figure 28 - Digital Signatures User PIN Entry



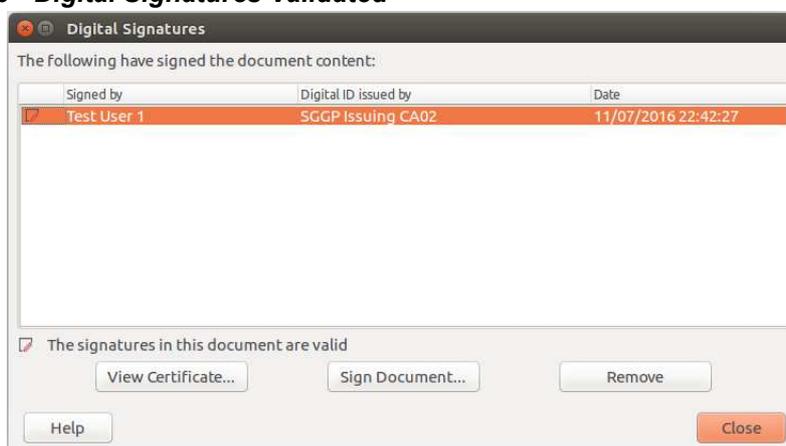
- 4 Select a certificate to sign with and click **OK**.

Figure 29 - Digital Signatures Certificate Selection



- 5 The document is signed and the signature is validated.

Figure 30 - Digital Signatures Validated



How to Use Soft PIN Entry

The user can enter the PIN using the soft keyboard for PIN entry after the card is inserted into the transparent reader for authentication as shown below:

Figure 31 - Authentication using Soft PIN Entry



- 1 Enter the PIN using the PIN pad.
- 2 Once the PIN is sufficient, click **Enter PIN** to login.

Figure 32 - Authentication using Soft PIN Entry 2



How to Change a PIN with Soft PIN Entry

To perform this operation, the Classic Client setup must have been granted the “Change User PIN allowed” access rights by the administrator.

To Change a PIN

- 1 Ensure smart card/token is connected and login as shown in previous section.
- 2 Click the **Change PIN** tab and select your PIN.

Figure 33 - Changing User PIN using Soft PIN Entry

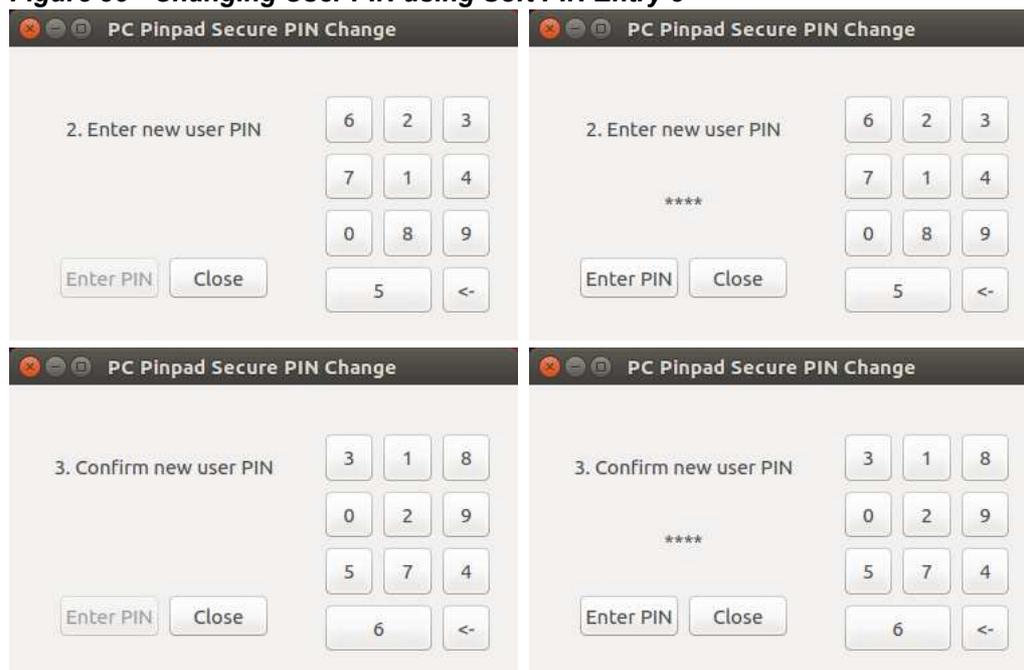


- 3 Click **Change PIN** to access the PIN pad.
- 4 Enter the current PIN in the PIN pad window and click **Enter PIN**.

Figure 34 - Changing User PIN using Soft PIN Entry 2



- 5 The PIN pad window reappears to prompt for the new PIN value and confirm the new value.
Enter the new PIN and click **Enter PIN** in both windows.

Figure 35 - Changing User PIN using Soft PIN Entry 3

6 The following window appears to confirm a successful PIN change.

Figure 36 - Changing User PIN using Soft PIN Entry 4

How to Unblock a PIN with Soft PIN Entry

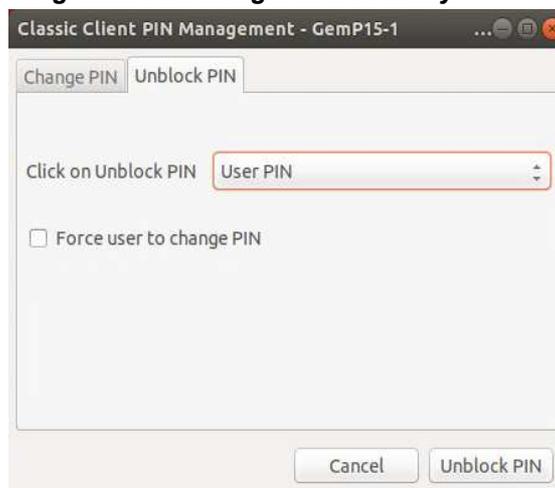
Note: This section is applicable only for user PIN and signature PIN. It is not possible to unblock an Admin PIN. If the Admin PIN becomes blocked, the smart card/token can no longer be used.

To perform this operation, the Classic Client setup must have been granted the “User can Unblock card” access rights by the administrator.

To Unblock a PIN

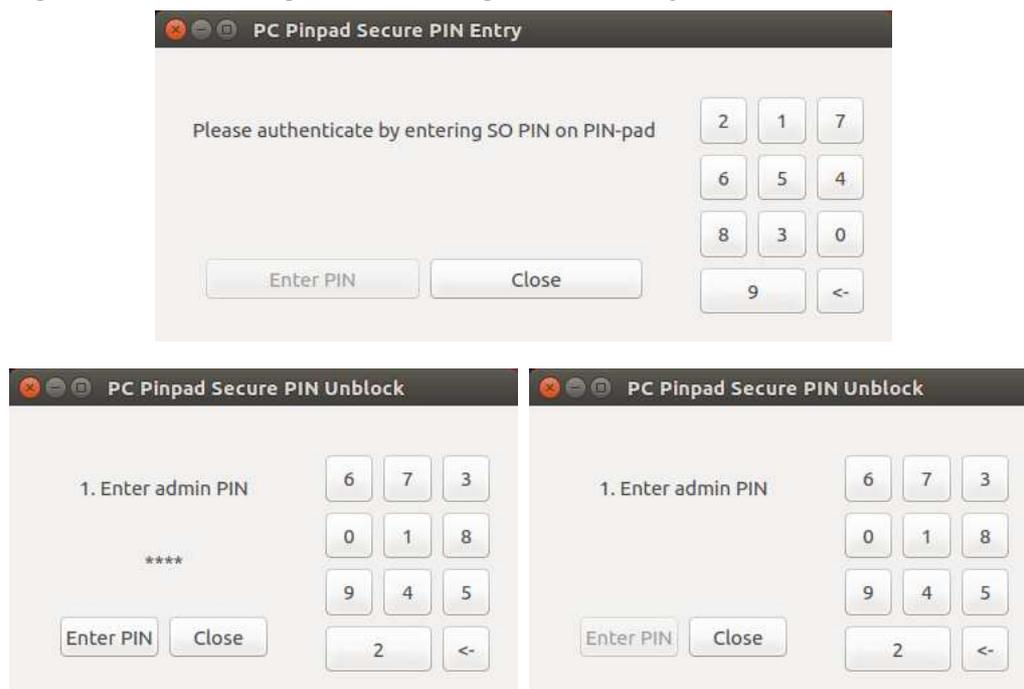
- 1 Login as shown in previous section.
- 2 Click the **Unblock PIN** tab and select type of PIN to unblock.
- 3 Check the box for “Force user to change PIN” if required.

Figure 37 - Unlocking User PIN using Soft PIN Entry



- 4 The following windows appear to prompt for the Admin PIN. Enter the PIN and click **Enter PIN** to continue.

Figure 38 - Unblocking User PIN using Soft PIN Entry 2

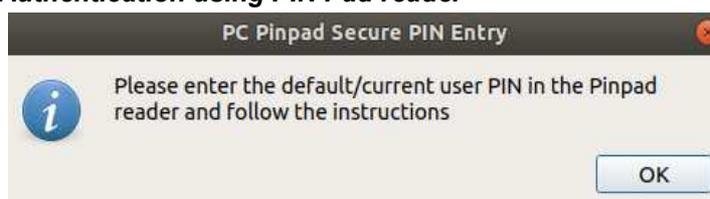


How to Use PIN Pad reader

The flow of usage is similar to that of soft keyboard for PIN entry except that user is entering the PIN using physical PIN pad reader after the card is inserted to the same reader.

For authentication, user needs to input the correct PIN at the PIN pad reader after being prompted for it.

Figure 39 - Authentication using PIN Pad reader



How to Change a PIN with PIN Pad reader

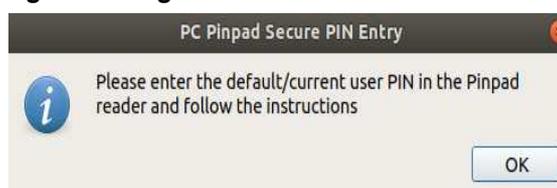
To perform this operation, the Classic Client setup must have been granted the "Change User PIN allowed" access rights by the administrator.

To Change a PIN

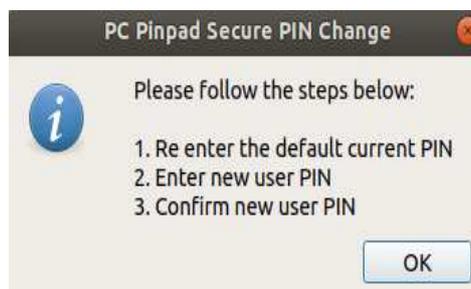
- 1 Ensure smart card/token is inserted into PIN pad reader.
- 2 Click the **Change PIN** tab and select your PIN.

Figure 40 - Changing PIN using PIN Pad reader

- 3 Click **Change PIN** and a prompt asking user to input default/current PIN value in the PIN pad reader will be shown.

Figure 41 - Changing PIN using PIN Pad reader 2

- 4 Enter the default/current PIN in the PIN pad reader.
- 5 Another prompt will be shown, asking user for default/current and new value of the PIN.

Figure 42 - Changing PIN using PIN Pad reader 3

- 6 A confirmation dialog will be shown after PIN change is successful.

Figure 43 - Changing PIN using PIN Pad reader 4

How to Unblock a PIN with PIN Pad reader

Note: This section is applicable only for user PIN and signature PIN. It is not possible to unblock an Admin PIN. If the Admin PIN becomes blocked, the smart card/token can no longer be used.

To perform this operation, the Classic Client setup must have been granted the “Change User PIN allowed” access rights by the administrator.

To unblock a PIN

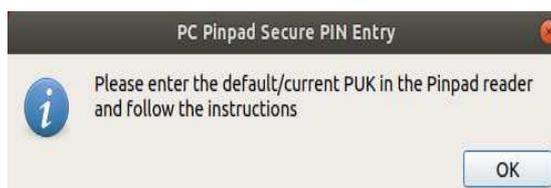
- 1 Ensure smart card/token is inserted into PIN pad reader.
- 2 Click the **Unblock PIN** tab and select your PIN.

Figure 44 - Unlocking PIN using PIN Pad reader



- 3 Select force user to change PIN if needed.
- 4 Click **Unblock PIN** and a prompt asking user to input default/current Admin PIN value in the PIN pad reader will be shown.

Figure 45 - Unlocking PIN using PIN Pad reader 2



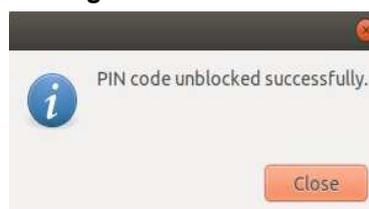
- 5 Enter the default/current Admin PIN value in the PIN pad reader.
- 6 Another prompt will be shown, asking user for default/current Admin PIN value and new value of the PIN.

Figure 46 - Unlocking PIN using PIN Pad reader 3



- 7 A confirmation dialog will be shown after PIN unblock is successful.

Figure 47 - Unblocking PIN using PIN Pad reader 4



PACE Authentication

Password Authenticated Connection Establishment (PACE) is a security feature for contact and contactless cards that require the terminal and the card to share a simple secret in order to authenticate each other. PACE is based on the Diffie-Hellman protocol for strong mutual authentication. PACE also aims to ensure user privacy protection on contactless cards the same way CSD do, but with a higher level of security:

- Authentication is based on Card Access Number (CAN), Machine Readable Zone (MRZ), or possibly a PIN (proprietary solution).
- It is a standardized solution specified by ICAO for ePassport and eResident Permit Card.
- It is introduced in the GlobalPlatform (GP) standard for MultiApp platform use.
- It generates session keys that can be used by ISD (or some applications) to compute a strong secure messaging between the card and terminal.

PACE V2 is supported in Classic Client and on Classic Applet V4. If a card reader tries to access a PACE-protected smart card, Classic Client prompts you for any of the following passwords (depending on how the card is personalized):

- CAN
- MRZ
- Global PIN

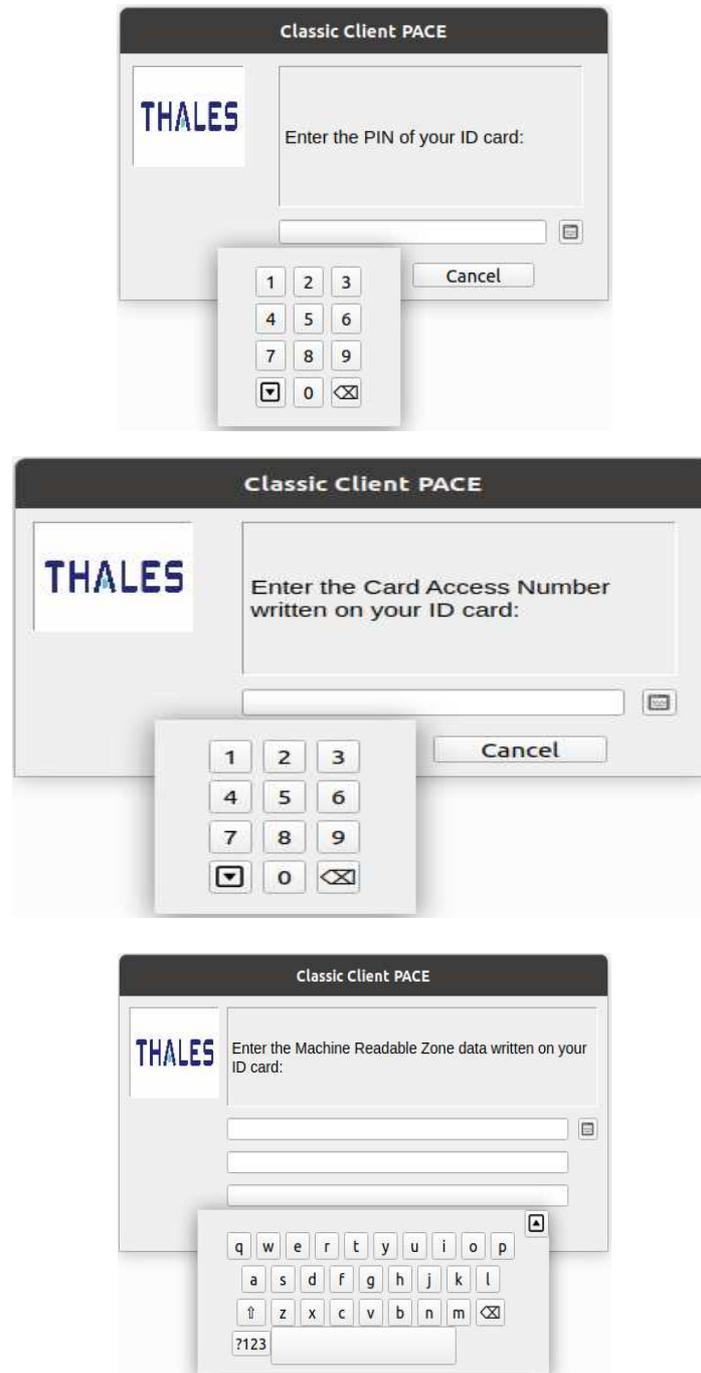
Enter the PACE passwords using the virtual keyboards as shown in “Figure 48”. The virtual keyboards are not displayed by default. Click the icon  to access the virtual keyboard as shown in “Figure 49”.

Figure 48 - PACE Authentication Dialog Boxes

The figure displays three sequential screenshots of the 'Classic Client PACE' authentication dialog boxes. Each dialog features the 'THALES' logo on the left and a central instruction area with an input field and 'OK'/'Cancel' buttons at the bottom.

- Top Dialog:** The instruction is 'Enter the PIN of your ID card:'. It contains a single input field with a small icon to its right.
- Middle Dialog:** The instruction is 'Enter the Card Access Number written on your ID card:'. It contains a single input field with a small icon to its right.
- Bottom Dialog:** The instruction is 'Enter the Machine Readable Zone data written on your ID card:'. It contains three stacked input fields, each with a small icon to its right.

Figure 49 - PACE Authentication Dialog Boxes and Virtual Keyboards



Reader Exclusion in Configuration File

To exclude a reader, the user is required to add the full reader name in the configuration file. In addition to the full name, it is required to include a **colon, space and NotInUse** after the full name as shown below:

- 1 Get the full reader name by typing `pcsc_scan` command in Linux terminal.
- 2 Add the complete reader name in `/etc/ClassicClient/ExcludedReaders/conf`.

Format

- `<reader_name>:<space><NotInUse>`

Example

- Gemalto Prox Dual USB PC Link Reader [Prox-DU Contact_10901084] 00 00:
NotInUse.
- Gemalto Prox Dual USB PC Link Reader [Prox-DU Contactless_10901084] 01 00:
NotInUse.

Note: The user must remove the reader from the configuration if the reader is to be included.

Security Basics

This chapter introduces you to the IT security standards integral to Classic Client.

Cryptography

Communicating and conducting business electronically is quickly becoming the most convenient, effective means of transaction. An essential condition for the continued growth toward an electronic market is security. The identities of both corporations and individuals must be authentic. The integrity and privacy of information must be guaranteed.

Encryption/decryption enables you to send and receive secure e-mail and documents to protect confidential or private information. You can use the signature function to sign your messages. By signing messages, you can prove to the recipient that you are who you claim to be.

The IT industry uses cryptography to render information secret and known only by authorized entities.

There are two types of cryptography:

- Secret Key Cryptography.
- Public Key Cryptography

Both cryptographic systems use *keys* to digitally sign or encrypt/decrypt data. A key is a value in electronic format used to perform cryptographic functions on electronic data.

The differences between secret key and public key cryptography include:

- Key management.
- Complexity of the key structure.

Key management is central to having a successful crypto system. If keys are not managed in a secure environment, the overall security of the crypto system is at risk. Keys must also be convenient to use.

The complexity of a key length is determined by the degree of mathematical properties applied to the random numbers that comprise the key.

Secret Key Cryptography

Secret key cryptography is the traditional crypto system, which remains in widespread use even today. Secret key cryptography uses a single secret key to digitally sign or encrypt/decrypt electronic data. The most widely used secret key crypto systems are DES and RC2 (also known as symmetric key cryptography).

The sender and receiver must use the same secret key for the session in which secure information is exchanged. The sender uses the secret key to encrypt the message; the receiver uses the same secret key to decrypt the message.

The primary advantage of secret key cryptography is the speed at which data can be encrypted/decrypted.

The primary weakness of secret key cryptography regards key management. Because sender and receiver must share knowledge of the secret key, there must be a transfer of the secret key at some point. Introducing a third party (such as a telephone line or courier) to deliver the secret key to the receiver presents a security risk.

Secret keys are included in the cryptographic functionality of Mozilla e-mail and browser products.

Public Key Cryptography

Public key cryptography was introduced in 1976 and is the most advanced, secure crypto system for digitally signing and encrypting/decrypting electronic data. Public key cryptography refers to a crypto system that uses key pairs. The most popular and widely-used public key crypto system uses the RSA key pair.

A key pair is a matched set of keys used to digitally sign or encrypt/decrypt electronic data. RSA key pairs, like secret keys, are strings of random numbers. However, RSA keys are not only significantly longer than secret keys, they also possess complex mathematical properties.

A single user *owns* an RSA key pair. One key is private, while the other key is public. The private key remains private and accessible only to the owner of the key pair. The public key is made available by the owner to public users. The public key is used to encrypt data. The private key is used to decrypt data.

The strengths of using an RSA key pair is that the need for sender and receiver to share knowledge of the single secret key used in secret key crypto systems is eliminated.

Classic Client takes advantage of the speed the secret key offers and the robust security and convenience of the RSA key pair. When you use Classic Client to send secure e-mail, the actual message data is encrypted using a secret key. The secret key is then encrypted using the public key of the intended recipient. Only the recipient's private key can decrypt the secret key. Only the secret key can decrypt the message data.

Classic Client offers the most advanced digital security at the greatest speed and convenience.

What is a digital certificate?

A digital certificate is an electronic document that serves as your digital passport. Your digital certificate stores your public key and other personal information about you and the certificate.

The most widely accepted standard for digital certificates is defined by *International Telecommunications Union standard ITU-T X.509*. Version three is the most current version of X.509.

The X.509v3 certificate includes the following data:

- Version.
- Serial number.
- Signature algorithm ID.
- Issuer name.
- Expiration Date.
- User name.
- User public key information.
- Issuer unique identifier.
- User unique identifier.
- Extensions.
- Signature on the above fields.

As a convenience to recipients, it is standard practice to attach your digital certificate to every secure e-mail that you send. The recipient uses your public key, included in your digital certificate, to encrypt e-mail addressed to you. If you do not attach your digital certificate to outgoing e-mails, recipients must retrieve your public key from a public directory if they want to reply to you with an encrypted e-mail.

What is a Certificate Authority?

Certificate Authorities (CAs) are trusted third parties that issue digital certificates. CAs vouch for the identity of the individual or enterprise to whom they are issuing a certificate. CAs provide a transfer of trust from CA to the individual or enterprise. When you trust the CA certificate, you can transfer that trust to all certificates published by that CA.

When you obtain your digital certificate, you provide the CA with your public key and any personal information requested by the CA. The CA verifies your personal information and the integrity of your public key. After the verification process, the CA signs your public key, stores appropriate personal information and your public key on the digital certificate, and issues your digital certificate to you.

CAs issue certificates with varying levels of identification requirements. CA policies and the level of identification of the digital certificate determine the method and requirements for proving your identity to the CA. The most simple digital certificate only requires your e-mail address and name. However, some CAs require a driver's license, notarized certificate request form, or any other personal documentation attesting to your identity.

The CA public key must be widely available so that users can validate the authenticity of all certificates published by this CA.

What is a digital signature?

A digital signature is a piece of information created using message data and the owner's private key. Digital signatures provide message authentication, non-repudiation of origin, and data integrity.

Digital signatures are created by mathematical, or *hash*, and private signing functions. The one-way hash function produces a message digest, a condensed version of the original message text. The message digest is encrypted using the sender's private key, turning it into a digital signature.

The digital signature can only be decrypted using the public key of the same sender. The recipient of the data decrypts the digital signature and compares the result with a message digest, recalculated from the original message text. If the two are identical, the message was not manipulated, thus is authentic.

What is S/MIME?

Secure/Multipurpose Internet Mail Extensions (S/MIME) is an open protocol standard, that provides encryption and digital signature functionality to Internet e-mail. S/MIME uses public key cryptography standards to define e-mail security services.

S/MIME enables you to encrypt and digitally sign Internet e-mail using Web messaging applications such as Mozilla Thunderbird. S/MIME also enables you to authenticate incoming messages.

S/MIME provides the following security functions:

- **Sender Authentication** to verify the sender's identity. By reading the sender's digital signature, the recipient can see who signed the message and view the certificate for additional details.
- **Message Encryption** to ensure that your messages remain private. Mozilla Thunderbird supports domestic and export-level public key and secret key encryption.
- **Data Integrity** to guard against unauthorized manipulation of messages. S/MIME uses a secure hashing function to detect message tampering.
- **Inter-operability** to work with other S/MIME-compliant software.

What is TLS?

Transport Layer Security (TLS), developed by Netscape Communications, is a standard security protocol that provides security and privacy on the Web. The protocol allows client/server applications to communicate securely. TLS uses both public and secret key cryptography.

The TLS protocol is application independent, which enables higher-level protocols such as Hyper Text Transfer Protocol (HTTP) to be layered on top of it transparently. Therefore, the client can negotiate encryption and authentication with the server before data is exchanged by the higher-level application.

The TLS Handshake Protocol process includes two phases:

- **Server Authentication** in which the client requests the server's certificate. In response, the server returns its digital certificate and signature to the client. The server certificate provides the server's public key. The signature proves that the server currently has the private key corresponding to the certificate.
- **Client Authentication** (optional) in which the server requests the client's certificate. In response, the client sends the digital certificate and signature to the server. If the TLS Server requests it, the client is prompted to enter a PIN to visit a secure Web site.

The TLS process is repeated for every secure session you attempt to establish unless you specify a permanent session. The TLS process will not proceed if the Web server's certificate is expired.

Note: In some instances, the TLS Handshake takes place between the Web server and the browser and does not require the client's certificate.

TLS provides the following security functions:

- **Data Encryption** to ensure data security and privacy. Both public key and secret key encryption are used to achieve maximum security. All traffic between an TLS server and TLS client is encrypted using both public key and secret key algorithms. Encryption thwarts the capture and decryption of TCP/IP sessions.
- **Mutual Authentication** to verify the identities of the server and client. Identities are digital certificates. The entity presenting the certificate must digitally sign the data to prove ownership of the certificate. The combination of the certificate and signature authenticates the entity.
- **Data Integrity** to ensure that TLS session data is not manipulated en route. TLS uses hash functions to provide the integrity service.

What is PACE Authentication?

Password authenticated connection establishment (PACE) is a service that can be used by the smart card. The PACE Protocol is a password authenticated Diffie-Hellman key agreement protocol that provides secure communication (secure messaging) and password-based authentication of the smart card and the inspection system (that is, the smart card and inspection system share the same password).

What is Classic Client?

Classic Client is a smart card based solution designed to secure e-mail communications and Internet transactions. Classic Client smart cards/tokens support encryption/decryption and signature functions.

Classic Client and a smart card/token provide the following advantages:

- Your private key is never removed from your smart card/token.
- The smart card/token is hardware-based security.
- The PIN code protects key use.
- Classic Client is portable and convenient.

The encryption/decryption function enables you to send and receive secure e-mail to protect confidential or private information. You can use the signature function to sign your messages. By signing messages, you can prove to the recipient that you are who you claim to be.

Classic Client combines the privacy, integrity, and authentication functionality provided by cryptographic algorithms with the simplicity, portability, and convenience of smart cards/tokens. Your private key, digital certificate, and other personal information are securely stored on your Classic Client smart card/token to prevent fraudulent use of your electronic identity.

The latest industry standards such as TLS (for Web access) and S/MIME (for e-mail) enable interoperability of security services between any browser interface and any Web server. However, the security hole in TLS and S/MIME is the management of your private key and digital certificate. Without Classic Client, your private key and digital certificate are stored on your hard drive, which makes them susceptible to unauthorized access and fraudulent use. Without Classic Client, your electronic identity is at risk.

Classic Client provides double-barreled security! Classic Client, you get the hardware-based security inherent in smart cards/tokens and software-based encryption security, as well as the added advantage of individual PIN codes. Hardware-based security is a

principal security advantage. It is significantly more secure than software-only solutions. Without the possession of your smart card/token and knowledge of your PIN code, no one can use your identity.

Classic Client is your electronic passport to the digital world.

What is a Smart Card/Token?

A smart card is the size of a conventional credit card. But unlike the credit card, which has a magnetic stripe, the smart card has a silicon microprocessor chip to store and process electronic data and applications. The advantage of the smart card is **security**.

Thales manufactures various types of smart cards. Contact smart cards use a microprocessor chip to store and process data. They must be inserted into a smart card reader. Contactless smart cards use a microprocessor chip and antenna to store and process data.

Smart cards can also be embedded in tokens such as USB devices, that you can plug directly into a PC.

Smart cards/tokens provide the most sophisticated security available on the market.

What is the Classic Client Smart Card/Token?

Your Classic Client smart card/token stores your private key and digital certificate. In the past, your only option was to store your private key on your local hard drive, rendering it susceptible to theft and fraudulent use. With Classic Client, your electronic identity is secure. You must have both the smart card/token and PIN code to use the smart card/token.

The Classic Client smart card/token is tamper resistant. The structure and operating system of the smart card/token make it practically impossible to penetrate, probe, or pilfer smart card/token data.

Perhaps the most convenient aspect of the Classic Client smart card/token is portability. With Classic Client, you can carry your electronic passport with you at all times and use it on any Classic Client–equipped computer in the world.

The Classic Client smart card/token has a robust and flexible design. These features offer greater freedom and enhanced security.

On-board Key Generation

The Classic Client smart card/token offers on-board key generation. With this feature, every time you enroll a new certificate on your smart card/token, a new key pair is generated on your smart card/token. In other words, you are not limited to using the same key pair for every certificate that you enroll.

One significant advantage of onboard key generation is the ability to monitor and control the life span of your RSA key pairs and that the generated key pair is unique.

Increased Certificate Storage

You can store up to six key pairs and multiple digital certificates on your Classic Client smart card/token, depending upon the size of your certificates and space available on your smart card/token. This feature provides the convenience of using up to eight digital certificates for whatever purposes you want; for example, you can use certificates with varying degrees of encryption (from 1024-bit to 2048-bit RSA key pairs) to communicate securely with contacts in various parts of the world.

Another reason for obtaining more than one digital certificate is the level of certification that the Certificate Authority (CA) requires. You may want to obtain and use a digital certificate from a CA that requires stringent identity certification if you are using the certificate for sensitive business communications or financial transactions. However, if you want to encrypt/sign data for personal communications, you may decide that a certificate from a CA that requires minimal identity certification meets your needs.

The costs of obtaining a digital certificate from a CA are somewhat based on the degree of identity certification the CA requires.

Terminology

Abbreviations

CA	Certificate Authority
ID	Identification
IMAP	Internet Message Access Protocol
OS	Operating System
PIN	Personal Identification Number
PKCS	Public Key Cryptography Standard
PKCS#11	Public Key Cryptography Standard #11. For further information about this, refer to the OASIS Open Standards Web site at http://docs.oasis-open.org/pkcs11
POP	Post Office Protocol
RHEL	Red Hat Enterprise Linux
RSA	Rivest, Shamir, Adleman (inventors of public key cryptography standards)
S/MIME	Secure/Multipurpose Internet Mail Extensions
TLS	Transport Layer Security

Glossary

Algorithm	A mathematical formula used to perform computations that can be used for security purposes.
Certificate	A certificate provides identification for secure transactions. It consists of a public key and other data, all of which have been digitally signed by a CA. It is a condition of access to secure e-mail or to secure Web sites.
Certificate Authority	An entity with the authority and methods to certify the identity of one or more parties in an exchange (an essential function in public key crypto systems).
Cryptography	The science of transforming confidential information to make it unreadable to unauthorized parties.
Digital Signature	A data string produced using a Public Key Crypto system to prove the identity of the sender and the integrity of the message.
Encryption	A cryptographic procedure whereby a legible message is encrypted and made illegible to all but the holder of the appropriate cryptographic key.
Key	A value that is used with a cryptographic algorithm to encrypt, decrypt, or sign data. Secret key crypto systems use only one secret key. Public key crypto systems use a public key to encrypt data and a private key to decrypt data.
Key Length	The number of bits forming a key. The longer the key, the more secure the encryption. Government regulations limit the length of cryptographic keys.
Public Key Crypto system	A cryptographic system that uses two different keys (public and private) for encrypting data. The most well-known public key algorithm is RSA.
SSL	Secure Sockets Layer: A Security protocol used between servers and browsers for secure Web sessions.
SSL Handshake	The SSL handshake, which takes place each time you start a secure Web session, identifies the server. This is automatically performed by your browser.
S/MIME	A Standard offline message format for use in secure e-mail applications.
TLS	Transport Layer Security protocol provides communications security over the Internet. The protocol allows client/server applications to communicate in a way that is designed to prevent eavesdropping, tampering, or message forgery.

TLS Handshake	When a TLS client and server first start communicating, they agree on a protocol version, select cryptographic algorithms, optionally authenticate each other, and use public-key encryption techniques to generate shared secrets.
Token	In a security context, a token is a hardware object like a smart card, but it could also be a pluggable software module designed to interact with a specific hardware module, such as a smart card. Token-based authentication provides enhanced security because success depends on a physical identifier (the smart card) and a personal identification number (PIN).