Solaris Smartcard Administration Guide

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Contents

Preface

Solaris™ Smartcard enables a user to log in securely to the Solaris 8, Solaris 9, or Solaris 10 desktop environment. A smart card is a plastic card that allows you to access a system by inserting a programmable card into a card reader. This guide explains how to configure systems and smart cards for this form of authentication. The guide also explains how to use a smart card after Solaris Smartcard has been configured.

Who Should Use This Book

The *Solaris Smartcard Administration Guide* is intended for the system administrator who sets up and administers the Solaris Smartcard environment. This guide assumes that you have a thorough knowledge of authentication and related network security concepts.

If you are merely a user of a Solaris Smartcard, you do not need to read this book. Simply insert your smart card in your card reader and enter your personal identification number (PIN) when prompted to do so.

Related Books

Solaris Smartcard can be used in conjunction with any Solaris administration tools or Solaris commands and procedures. Refer to one or more of the following for additional information about Solaris installation or administration procedures:

- *Solaris Installation Guide: Basic Installations*
- *System Administration Guide: Basic Administration*

- *System Administration Guide: Advanced Administration*
- *System Administration Guide: IP Services*
- *System Administration Guide: Network Services*
- *System Administration Guide: Security Services*
- Other software documentation that you received with your system

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Typographic Conventions

The following table describes the typographic changes that are used in this book.

TABLE P–1 Typographic Conventions

Typeface or Symbol	Meaning	Example
`AaBbCc123`	The names of commands, files, and directories, and onscreen computer output	Edit your `.login` file. Use `ls -a` to list all files. `machine_name% you have mail.`
`AaBbCc123`	What you type, contrasted with onscreen computer output	`machine_name%` **`su`** `Password:`

TABLE P–1 Typographic Conventions *(Continued)*

Typeface or Symbol	Meaning	Example
AaBbCc123	Command-line placeholder: replace with a real name or value	The command to remove a file is `rm` *filename*.
AaBbCc123	Book titles, new terms, and terms to be emphasized	Read Chapter 6 in the *User's Guide*. Perform a *patch analysis*. Do *not* save the file. [Note that some emphasized items appear bold online.]

Shell Prompts in Command Examples

The following table shows the default system prompt and superuser prompt for the C shell, Bourne shell, and Korn shell.

TABLE P–2 Shell Prompts

Shell	Prompt
C shell prompt	`machine_name%`
C shell superuser prompt	`machine_name#`
Bourne shell and Korn shell prompt	`$`
Bourne shell and Korn shell superuser prompt	`#`

CHAPTER 1

Solaris Smartcard Overview

This chapter provides an overview of Solaris Smartcard features and provides basic information about installing and using Smartcard. The chapter also provides an overview of setting up a smart card. You can set up a smart card from the Smartcard Console or the command line. The tasks described in this chapter assume that you have identified how to implement smart cards at your site. The tasks also assume that you have set up a card reader on all systems for smart card use.

What's New With Smartcard

The Smartcard service is managed by the Service Management Facility. Administrative actions on this service, such as enabling, disabling, or restarting, can be performed by using the `svcadm` command. The service's status can be queried by using the `svcs` command. For more information about the Service Management Facility, refer to the `smf`(5) man page.

Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

Smartcard Features

A Solaris Smartcard provides a more secure method for logging in to the Solaris desktop environment than is provided by the standard UNIX login. Information that is stored on the smart card verifies the identity of the user during login. A user who cannot provide the login information that is on the smart card is denied access to the desktop. The Solaris Smartcard software does the following:

- Implements the Smartcard framework
- Allows management from the Solaris Smartcard Console or the Solaris command line
- Protects login to the desktop environment through PIN authentication
- Provides a screen lock, using `dtsession` or `xscreensaver`, when a smart card is removed from the card reader

Smartcard Requirements

To use the Solaris Smartcard software, you need the following:

- A SPARC system that is running Solaris 8, Solaris 9, or Solaris 10 OS
- A supported internal or external card reader and smart cards

Note – For the Solaris 9 release, any card reader for which you have an IFD handler can be used if patch 112926-04 has been installed.

Smartcard Login

Secure desktop environments can be protected by requiring users to log in with a configured Solaris Smartcard. The following sequence explains what happens in the login process:

1. The `dtlogin` daemon prompts the user to insert a smart card and then to enter a personal identification number (PIN).
2. The `pam_smartcard` module compares the entered PIN with the PIN that is stored on the card.
3. If the typed PIN and the PIN stored on the card match, the user name and password are read from the card and used to authenticate the user. The authentication is based on the specified search order for `passwd` in `/etc/nsswitch.conf`.

Package Descriptions

The following table lists the Solaris Smartcard packages added during a Solaris 10 installation.

TABLE 1–1 Solaris Smartcard Packages

Package Name	Description
`SUNWjcom`	Java Communications API for smart card support—Java code and Native code
`SUNWjib`	Dallas Semiconductor serial iButton OCF Card Terminal Driver
`SUNWocf`	Open Card Framework—core libraries and utilities
`SUNWocfr`	Open Card Framework—configuration files
`SUNWocfh`	Open Card Framework—header files
`SUNWpamsc`	Pluggable authentication module (PAM) for smart card authentication
`SUNWscgui`	Solaris Smartcard Console
`SUNWscmhdlr`	IFD handler for the internal reader

To remove a package, use the standard `pkgrm` command. Reinstall the package by using the `pkgadd` command.

See Chapter 16, "Managing Software by Using Package Commands (Tasks)," in *System Administration Guide: Basic Administration* for information about using these commands.

Smartcard Man Pages

Refer to the following man pages for detailed information about Smartcard commands:

- `ocfserv`(1M)
- `pam_smartcard`(5)
- `smartcard`(1M)

Loading the `SolarisAuthApplet`

You must add the default `SolarisAuthApplet` applet to the card before you can add the user profile information. See "To Load the Smartcard Applet to a Smart Card (Console)" on page 25 for instructions.

Initializing a Smart Card

After the default applet (`SolarisAuthApplet`) has been loaded, create the user profile information on the card. The user profile information specifies a login name and password for the card user. The user profile also names the protected application. The default PIN for the `SolarisAuthApplet` is `$$$$java`.

▼ To Create User Information on a Smart Card (Command Line)

User information includes login name, password, and the application that the card provides access to.

Steps **1. Insert the card in the card reader.**

2. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

3. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

4. **Set the login name, password, and application for the card.**

   Type the following on one line:

```
# smartcard -c init -A A000000062030400 -P '$$$$java' user=me password=xx application=dtlogin
```

   This command is appropriate for all smart card devices that are supported by Solaris Smartcard.

   In this example, the user name is set to `me`, the password to `xx`, and the application is `dtlogin`. The user name and password can be set to any value. The user name and password can be changed by a system administrator or by the user when the card is issued. See "To Set Up a User Profile (Console)" on page 26 for instructions.

   Note – You must enter the loaded applet ID and the current PIN. The `-A A000000062030400` part of the command specifies the `SolarisAuthApplet` applet ID. You must enclose the default PIN, `$$$$java`, or any PIN containing shell special characters—such as `$`—within single quotes. Otherwise, the shell tries to interpret the PIN as a variable, and the command fails.

See Also For Smartcard Console instructions, see the following:

- "To Set Up a User Profile (Console)" on page 26
- "To Change the PIN on a Card (Console)" on page 29

Defining Authentication Properties on a Smart Card

You base the property settings of each smart card on the user's requirements, your site's security policies, and the limitations of the type of smart card used. Use the Configure Applets dialog box to define corresponding properties for each smart card. The client and server programs on the system read the properties on the smart card to determine whether to give the user access to a particular application.

Note – These properties apply only to cards that have been initialized with the `SolarisAuthApplet` applet provided with Solaris Smartcard. If your site uses a different smart card applet, the available properties might differ. Refer to the `smartcard`(1M) man page for more information.

PIN Property

The PIN property is an authentication property that defines a personal identification number (PIN) for the card. The default PIN that is created on the card is `$$$$java`. Either you or the user can change `$$$$java` to a personalized PIN. Consider giving all users at your site the same default PIN name: `changeme`, for example. Then make sure each user changes the PIN to a value that is known only to that user.

See "To Change the PIN on a Card (Console)" on page 29 for step-by-step instructions on changing the PIN on a smart card.

User and Password Properties

The user and password properties are authentication properties that identify the user and associate the user with the smart card's PIN. To set these properties, you must know the user's login name and password.

On systems that use the default authentication mechanism of PIN, `ocfserv` verifies the authenticity of the PIN. Next, `ocfserv` reads the user and password properties on the card. If the password on the smart card matches the user's entry in the system's password database, `ocfserv` gives the user access to the application.

Application Property

Use the application authentication property to designate which applications the user needs to log in to with a login name and password. The application authentication property is called a "user profile" in the Smartcard Console. For example, to require a

smart card login to the desktop, specify `dtlogin` as the application associated with the login name and password on the card. You can also require a smart card login for an application specific to your site, such as a financial package or a personnel database. To require a smart card login for such an application, specify its name as the application property.

Before initializing an application on the card, find out which applications a user needs to access through smart card authentication. This step is particularly important when preparing a smart card for anyone who needs to log in to an application as root or another restricted login name.

Note – PayFlex cards do not support multiple profiles. PayFlex cards cannot be used in cases where a user needs to log in to the desktop and to one or more secure applications. PayFlex cards cannot be used with multiple user names.

The application property on the smart card works in tandem with the other authentication properties. For example, suppose you initialized a smart card for user Ed with the following information:

- `A000000062030400` – The `SolarisAuthApplet` applet
- `'$$$$java'` – The default PIN for this card, which user Ed can change later
- `dtlogin` – The application that requires the smart card login
- `ed` – The name that Ed must provide to log in to the desktop
- `xx` – The password that Ed must type to log in to the desktop

The preceding information would be typed on the command line, as follows:

```
# smartcard -c init -A A000000062030400 -P '$$$$java' application=dtlogin user=ed password=xx
```

When Ed inserts his card into the reader and tries to log in to the desktop (`dtlogin`), `ocfserv` reads the card to determine whether any authentication properties are associated with `dtlogin`. The `ocfserv` server finds that the user and password properties are associated with `dtlogin`.

The `ocfserv` server prompts Ed for his PIN. The typed PIN is compared with the PIN that is stored on the smart card that is assigned to the `dtlogin` application. Also, `ocfserv` uses the login name and password on Ed's card, along with the passwords in the system's password database, to verify that Ed is who he claims to be. If these properties match, Ed is logged in to the desktop.

Enabling Desktop Login With a Solaris Smartcard

The final step in setting up a desktop system is to enable the use of a Solaris Smartcard for desktop login. See "To Enable Smartcard Usage (Command Line)" on page 16 for step-by-step instructions.

You cannot log in through `dtlogin` if you enable Smartcard and either of the following conditions is true:

- You do not have a working smart card
- You have not configured a smart card successfully

If you enable Smartcard before you have set up a working smart-card configuration, you must first disable Smartcard. Do the following to disable Smartcard so that you can set up Smartcard for use:

1. Log in to the system remotely with the `ssh` or `rlogin` command.
2. Become superuser (`root`).
3. Disable smart-card operations.

```
# smartcard -c disable
```

▼ To Enable Smartcard Usage (Command Line)

Use this procedure to enable Solaris Smartcard usage on a system. A user must use an accepted smart card for the system. A user might also need to type a PIN to log in to the system.

Steps

1. **Become superuser on each system to be used in Smartcard operations.**
2. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   # svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

3. **(Optional) If necessary, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

4. **Stop the desktop.**

   ```
   # /etc/init.d/dtlogin stop
   ```

5. **Enable Solaris Smartcard operations.**

   ```
   # smartcard -c enable
   ```

6. **Restart the desktop.**

   ```
   # /etc/init.d/dtlogin start
   ```

Note – When CDE is configured for Smartcard login, `/etc/pam.conf` is modified to include `pam_smartcard`. For example, when `smartcard -c enable` is executed, the following lines are inserted at the top of the `auth` stacks for `dtlogin` and `dtsession`:

```
dtlogin auth requisite pam_smartcard.so
dtsession auth requisite pam_smartcard.so
```

CHAPTER 2

Getting Started With Solaris Smartcard

This chapter shows an administrator how to set up an initial Solaris Smartcard configuration:

See Chapter 1 for the following instructions:

See Chapter 3 for these instructions:

Starting the Smartcard Console

The Smartcard Console is the graphical user interface (GUI) used to manage the Solaris Smartcard software.

Note – Solaris Smartcard can also be administered from the command line. Both command line and Smartcard Console instructions are included in this document.

▼ To Start the Smartcard Console From the Command Line

Steps

1. **Log in as `root` or `su` to `root`.**

   Note – If you log in as a regular user, you can run Smartcard, but you can only perform two tasks: Load Applets and Configure Applets.

2. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   # svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

3. **(Optional) If necessary, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

4. **Start the Smartcard Console:**

   ```
   # /usr/dt/bin/sdtsmartcardadmin &
   ```

   Note – Before you `su` to root, you might need to disable X server access control, because `root` is not granted access by default. Disable X server access control by running `/usr/openwin/bin/xhost +`*hostname* where *hostname* is the local host. After starting the Smartcard Console, run `xhost -`*hostname* to enable access control again.

▼ To Start the Smartcard Console From the CDE Desktop

Steps

1. **Log in as `root` to the Common Desktop Environment (CDE).**

   If you are currently running CDE under your login name, exit CDE and log in as `root`.

Note – If you log in as a regular user, you can run Smartcard, but you can only perform two tasks: Load Applets and Configure Applets.

2. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   # svcs network/rpc/ocfserv
   ```

Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

3. **(Optional) If necessary, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

4. **On the CDE control panel, click the up arrow on the Applications subpanel.**

   By default, the Text Note icon, a pinned note with a pencil above the note, represents the Application's subpanel.

5. **Select Applications to display the Application Manager.**

6. **Double-click the System_Admin icon in Application Manager.**

7. **Double-click the Smart Card icon to start the Smartcard Console.**

   You might have to scroll down to find the Smart Card icon.

See Also You can also start the Smartcard Console from the desktop Workspace menu. `sdtsmartcardadmin` should be found at the top level or in the Tools submenu.

Setting Up for Smartcard Login

Use the following procedure to set up Smartcard login for a machine that is running Solaris 8, Solaris 9, or Solaris 10 OS. For some tasks, a command-line example is shown first, followed by Smartcard Console instructions. For some complex tasks, the command-line example is a link to another chapter.

Note – You must be `root` to perform most of these tasks.

▼ To Add a Card Reader (Console)

Instructions for adding a card reader from the Smartcard Console are shown here.

Steps

1. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

   ---

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **Start the Solaris Smartcard Console.**

   Run `sdtsmartcardadmin` from the command line or select `sdtsmartcardadmin` from the Workspace menu.

4. **Click Card Readers in the Navigation pane.**

   The Add Reader and IFD Terminal icons are displayed in the Console pane. Icons for any other enabled card reader types are also displayed.

5. **Double-click Add Reader in the Console pane.**

   The Add Reader dialog box is displayed. You can also display the Add Reader dialog box by selecting Add Reader in the Console pane and choosing Properties in the Action menu.

6. **Double-click the IFD Card Terminal Reader, select the card reader, and click OK.**

   The Card-Readers dialog box is displayed.

7. **Select the Basic Configuration tab.**

   This tab is selected by default.

8. **Type a name for the reader in the Unique Card Terminal Name field.**

   Leave the current name if you do not want to change the name. Do not include any spaces in the name.

9. **From the Device Port pulldown menu, select the port that the card reader is attached to.**

   The Sun Internal Card Reader is attached to `/dev/scmi2c0` by default.

10. **Enter the IFD handler location in the IFD Handler field.**

    This is the full-path location of the IFD handler. The IFD handler for the internal reader is in `/usr/lib/smartcard/ifdh_scmi2c.so`.

11. **Click Apply or OK.**

    The IFD Terminal is displayed in the Console pane. A dialog is displayed, stating that the OCF Server must be restarted to complete the operation.

12. **Click Restart OCF Now to add the internal reader.**

    The internal reader is not added until OCF is killed and restarted.

Note – If you do not restart OCF now, you must restart OCF from the command line to add the internal reader.

```
# svcadm restart network/rpc/ocfserv
```

The `ocfserv` process is restarted the next time you start the Smartcard Console or issue the `smartcard` command.

See Also For command-line instructions, see "Adding a Card Reader" on page 35.

▼ To Add Support for a New Card Type (Console)

To use a new type of smart card, you have to provide its Answer to Reset (ATR) property to `ocfserv`. The following is Smartcard Console instructions.

Steps

1. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

---

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **Insert the smart card with the new ATR in the card reader.**

4. **In the Navigation pane, select Smart Cards.**

5. **Double-click the icon in the Console pane that represents the type of card currently inserted.**

   The Smart Card dialog box displays a list of the known ATRs for this card type. You can also display the Smart Card dialog box by selecting the appropriate card in the Console pane and choosing Properties in the Action menu.

6. **If the ATR on the card is new and not in the list, click Add.**

   The Add ATR dialog box is displayed. The ATR of the card inserted in the card reader is shown in the Inserted Card's ATR listbox.

   Note – To determine if the ATR value of the inserted card has been registered, click the Add button. If nothing is listed, your card's ATR is already known. Otherwise, you should perform the following steps.

   ---

7. **Select the ATR of the inserted card or type the new ATR in the New ATR field.**

   You can find the new ATR value in the smart-card product literature.

8. **Click OK in the Add ATR dialog box.**

   The new ATR is added to the list in the Smart Card dialog box.

9. **Select the new ATR in the list in the Smart Card dialog box.**

10. **Click OK in the Smart Card dialog box to activate the change.**

▼ To Add Support for a New Card Type (Command Line)

If you prefer the command line, use this procedure.

Steps

1. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

   ---

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **Type the following to add "12345" as a new PayFlex ATR:**

```
# smartcard -c admin -x modify "PayFlex.ATR=3B69000057100A9 3B6911000000010100 12345"
```

Note – If you want to retain the current ATR, you must enter the current ATR *and* the new ATR.

▼ To Load the Smartcard Applet to a Smart Card (Console)

Use this procedure to load the Solaris Smartcard applet (`SolarisAuthApplet`) to a smart card. You must load the Solaris Smartcard applet before you can add the user profile information. The following is Smartcard Console instructions.

Steps

1. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **Insert the smart card into the reader.**

4. **Select the Load Applets icon in the Navigation pane.**

5. **Double-click the SolarisAuthApplet icon in the Console pane.**

   The Load Applets dialog box is displayed. Applets for various card types are displayed in the left listbox. You can also display the Load Applets dialog box by selecting the appropriate card in the Console pane and choosing Properties in the Action menu.

6. **Select the card type that you want to initialize.**

   Choices include the following:

   - CyberFlex
   - iButton
   - PayFlex

7. **Click the arrow between the two listboxes.**

   The selected applet is copied to the Pending Applet Installations listbox, with a check in the checkbox and the name of the smart card displayed. If no card or the wrong smart card is inserted in the card reader, "No compatible devices inserted"

is displayed. Insert the appropriate card.

8. **Click the Install button.**

   A window that is labeled "Loading Applet to Device" is displayed. The applet loads in approximately one minute. When the installation is complete, a window displays the confirmation message "Applet Installation Successful."

9. **Click OK to dismiss the confirmation window.**

   The card now stores default values. If the card previously stored different PIN or different user profile values, those values have been overwritten. See "PIN Property" on page 14 and "User and Password Properties" on page 14 for more information.

▼ To Load the Smartcard Applet to a Smart Card (Command Line)

Steps

1. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

   ---

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **With the smart card inserted in the card reader, type the following:**

   ```
   # smartcard -c load -i /usr/share/lib/smartcard/SolarisAuthApplet.capx
   ```

   When the load finishes, the following message is displayed:

   ```
   Operation successful.
   ```

▼ To Set Up a User Profile (Console)

Use this procedure to specify the user name and password that is associated with the application (`dtlogin`) for the card being set up. The following is Smartcard Console instructions.

Steps

1. **Verify that the `ocfserv` daemon is enabled.**

The following command provides the status of the service.

```
% svcs network/rpc/ocfserv
```

Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

---

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **Insert the smart card that you want to configure into the card reader.**

4. **Select Configure Applets in the Navigation pane.**

   The icon for the type of card in the reader is displayed in the Console pane.

5. **Double-click the icon in the Console pane.**

   The Configure Applets dialog box is displayed. You can also display the Configure Applets dialog box by selecting the icon in the Console pane and choosing Properties in the Action menu.

6. **Select `SolarisAuthApplet` in the Configure Applets dialog box.**

   The `SolarisAuthApplet` configuration folders appear on the right side of the dialog box. The folders are represented by tabs labeled “PIN” and “User Profiles.” For some smart cards, “RSA Key” and “PKI Cert” folders might also be represented. Only User Profiles changes are described here. See “To Change the PIN on a Card (Console)” on page 29 for PIN change information.

7. **Select the User Profiles tab in the Configure Applets dialog box.**

8. **Type `dtlogin` in the User Profile Name field.**

   `dtlogin` represents the CDE desktop.

9. **Type a user name in User Name field.**

   The name is the user name of the person to use the card. The user name cannot be more than eight characters long.

Note – Click the Get button to determine the current user name that is associated with the card. You need to type the PIN to get the current user name or to change the user name or password.

---

10. **Type password in Password field.**

    The password is the password that is associated with the user name that was typed in a previous step. The password must correspond to the user’s password based on

the search order for `passwd` in `/etc/nsswitch.conf`: LDAP, NIS, NIS+, or local files. The password cannot be more than eight characters long.

Note – If the user's password is changed after you have configured the smart card, you or the user must repeat these steps. The new password on the smart card is not updated automatically.

---

11. **Click the Set button.**

    The Set User Profile popup is displayed, asking for the current PIN.

12. **Type the PIN and click OK.**

    The new user name and new password are stored on the card.

13. **Click OK to dismiss the dialog box.**

▼ To Set Up a User Profile (Command Line)

If you prefer the command line, use the following procedure.

Steps

1. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

---

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **Set the user name and the password for the `dtlogin` application.**

   Type the following on one line to set the user name to `x` and the password to `y` for the `dtlogin` application. In this example, the PIN is `$$$$java`, the default value.

```
# smartcard -c init -A A0000000620304000 -P '$$$$java' user=x password=y application=dtlogin
```

Note – You must type the loaded applet ID and the current PIN. In the previous example, `-A A000000062030400` specifies the `SolarisAuthApplet` applet ID. The PIN is the default `SolarisAuthApplet` value. Enclose the PIN, `$$$$java`, or any PIN that contains the shell special characters—such as `$`—within single quotes. Otherwise, the shell tries to interpret the PIN as a variable, and the command fails.

See Also For more information, see "To Create User Information on a Smart Card (Command Line)" on page 12.

▼ To Verify a PIN for a Smart Card

Use this procedure to verify the PIN for a smart card.

Steps

1. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

   ---

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **Insert the smart card into the card reader.**

4. **As `root`, type the following to verify the PIN for the smart card.**

   ```
   # smartcard -c init -A A000000062030400 -P 'PIN_number'
   ```

   PIN_number represents the PIN set for the card and `A000000062030400` is the applet ID for the `SolarisAuthApplet`.

   If the PIN is invalid, an `Invalid PIN` message is displayed. A valid PIN results in no output.

▼ To Change the PIN on a Card (Console)

Use this procedure to change the PIN on a smart card by using the Smartcard Console.

Note – An end user who knows the current PIN can change the PIN on a card.

Steps

1. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **Insert the smart card that you want to configure into the card reader.**

4. **Select Configure Applets in the Navigation pane.**

   The icon for the type of card in the reader is displayed in the Console pane.

5. **Double-click the card icon in the Console pane.**

   The Configure Applets dialog box is displayed.

6. **Select `SolarisAuthApplet` in the listbox.**

   The `SolarisAuthApplet` configuration folders appear on the right side of the dialog box. The folders are represented by tabs that are labeled “PIN” and “User Profiles.” For some smart cards, “RSA Key” and “PKI Cert” might also appear. Only PIN change is described here.

7. **Select the PIN tab.**

8. **Type and retype a new PIN.**

   A PIN can contain up to eight characters.

9. **Click Change.**

   A popup window that is labeled “Change PIN” is displayed.

10. **Type the previous PIN in the popup window. Click the OK button.**

    The default PIN, loaded on the card when the `SolarisAuthApplet` was installed on the card, is `$$$$java`.

▼ To Change the PIN on a Card (Command Line)

If you prefer the command line, use the following procedure.

Steps

1. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

   ---

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **With the smart card inserted in the card reader, type the following to change the default PIN (`$$$$java`) to `001234`:**

   ```
   # smartcard -c init -A A000000062030400 -P '$$$$java' pin=001234
   ```

   Note – You must type the loaded applet ID and the current PIN. In the previous example, `-A A000000062030400` specifies the `SolarisAuthApplet` applet ID (aid) and the PIN is the default `SolarisAuthApplet` value. Be sure to type the new PIN correctly because you are not prompted to confirm the new PIN. Enclose the PIN, `$$$$java`, or any PIN that contains shell special characters—such as `$`—within single quotes. Otherwise, the shell tries to interpret the PIN as a variable, and the command fails.

▼ To Enable Smartcard on a System (Console)

Use this procedure to enable Solaris Smartcard on a system by using the Smartcard Console. The following must be done on each system that uses Smartcard authentication. For detailed information about Solaris Smartcard commands, see the following man pages:

- `smartcard`(1M)
- `pam_smartcard`(5)
- `ocfserv`(1M)

Steps

1. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **Select OCF Clients in the Navigation pane.**
   The Desktop icon is displayed in the Console pane.
4. **Select the Desktop icon.**
5. **Choose Properties from the Action menu.**
   The Configure Clients dialog box is displayed.
6. **Select the Cards/Authentications tab in the dialog box.**
   The supported smart cards are listed in the listbox at the left.
7. **Select the radio button that is labeled "Activate Desktop's Smart Card Capabilities."**
   As soon as you click OK in the Configure Clients dialog box, Smartcard is activated. You must have a working card reader on the system and a smart card configured with your user name and password.
8. **Click the Apply or OK button.**
   Solaris Smartcard is now enabled on the system.
9. **Exit CDE to activate the change.**

Troubleshooting If you do not know the PIN on the card, you are locked out of the system. If you cannot access your system because of Smartcard, issue a `rlogin` to the system and disable Smartcard. See "To Disable Smartcard" on page 41.

You can disable Smartcard from the Configure Clients dialog box. Select the radio button that is labeled "Deactivate Desktop's Smart Card Capabilities" and click OK.

Setting Timeout and Card Removal Actions

If you don't want to use the default values for Smartcard timeouts and card removal actions, you can change the values. The procedures for changing the values are described in the following sections.

▼ To Set Smartcard Timeouts (Console)

Steps

1. **Verify that the `ocfserv` daemon is enabled.**
   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

   ---

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **Select OCF Clients in the Navigation pane.**
4. **Select the Desktops icon in the Console pane.**
5. **Choose Properties in the Action menu.**
6. **Select the Timeouts tab in the dialog box.**
   The Configure Clients dialog box is displayed.
7. **Select the Timeouts tab in the Configure Clients dialog box.**
8. **Adjust the timeouts by using the mouse to slide the indicator for each timeout.**
   - **Card Removal Timeout** – Specifies the number of seconds the desktop waits after a smart card is removed before locking the screen. The card removal timeout only applies if the "Ignore Card Removal" box is *not* checked under the options tab. If Card Removal Logout Wait is set to 0, a user is never logged out. The screen remains locked until the user reauthenticates to unlock the screen.
   - **Reauthentication Timeout** – Specifies the number of seconds the Reauthentication screen is displayed when the card has been removed. At the end of the specified time, the screen is locked.
   - **Card Removal Logout Wait Timeout** – Specifies the number of seconds the desktop waits for a smart card to be reinserted when the Reauthentication screen is displayed. If the card is not reinserted in time, the user is logged out. Note that this timeout is relevant only if Reauthenticate After Card Removal—in the Options tab—is set to False.
9. **Click the Apply or OK button.**
10. **Exit CDE to activate the change.**

▼ To Set Card Removal Options (Console)

Steps

1. **Verify that the `ocfserv` daemon is enabled.**
   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

   ---

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **Select OCF Clients in the Navigation pane.**
4. **Select the Desktop icon in the Console pane.**
5. **Choose Properties in the Action menu.**
   The Configure Clients dialog box is displayed.
6. **Select the Options tab in the dialog box.**
7. **Click the checkboxes to toggle between on or off.**
   - **Ignore Card Removal** – If checked, nothing happens when a smart card is removed from the reader.
   - **Reauthenticate After Card Removal** – If checked, a user is logged out when a card is removed. If Reauthenticate is not checked, the Card Removal Logout Wait setting—in the Timeouts tab—determines what happens.
8. **Click the Apply or OK button.**
9. **Exit CDE to activate the change.**

CHAPTER 3

Adding or Removing a Card Reader

This chapter describes the procedures for adding or removing a card reader:

Adding a Card Reader

This section provides the following procedures:

Refer to the `smartcard`(1M) man page for other information.

▼ To Add Internal Card Reader (Command Line)

Solaris Smartcard supports an internal card reader, using the IFD handler to configure the reader. Do the following to add an internal card reader from the command line.

Steps

1. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

```
# svcadm enable network/rpc/ocfserv
```

3. **Add the Sun Internal Card Reader by typing, for example, the following command on one line:**

```
# smartcard -c admin -t terminal
-H /usr/lib/smartcard/ifdh_scmi2c.so
-x add -d /dev/scmi2c0 -r MyInternalReader -n SunISCRI
```

`-c admin`
Indicates that you are viewing or are modifying OCF properties.

`-t terminal`
Indicates you are configuring a card reader.

`-H /usr/lib/smartcard/ifdh_scmi2c.so`
Specifies the location of the IFD handler.

`-x add`
Indicates that you are adding a card reader.

`-d /dev/scmi2c`*n*
Defines the device port where the card reader is attached. For example, `/dev/scmi2c`*n*, where *n* is the *n*th Sun Internal Card Reader on the system. Note that no current systems have more than one internal reader, so `/dev/scmi2c0` is the only choice now.

`-r` *MyInternalReader*
Specifies a unique name for the Sun Internal Card Reader.

`-n SunISCRI`
Indicates the model name for the Sun Internal Card Reader.

4. **Restart `ocfserv`.**

```
# svcadm restart network/rpc/ocfserv
```

The `ocfserv` process is restarted the next time you use the Smartcard Console or execute the `smartcard` command.

▼ To Add Internal Card Reader (Console)

Do the following to add an internal card reader from the Solaris Smartcard Console. You have to be root to perform this task.

Steps

1. **Verify that the `ocfserv` daemon is enabled.**

The following command provides the status of the service.

```
% svcs network/rpc/ocfserv
```

Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **Start the Solaris Smartcard Console.**

   Run `sdtsmartcardadmin` from the command line or select `sdtsmartcardadmin` from the Workspace menu.

4. **Click Card Readers in the Navigation pane.**

5. **Double-click Add Reader in the Console pane.**

   The Add Reader dialog box is displayed.

6. **Select the IFD Card Terminal Reader and click OK.**

   The Card Readers: IFDTerminal dialog box is displayed, with the Basic Configuration tab selected.

7. **Select `/dev/scmi2c0` from the Device Port pulldown menu.**

   This port is for the internal reader.

8. **Enter the IFD handler location in the IFD Handler field.**

   This is the full-path location of the IFD handler. The IFD handler for the internal reader is in `/usr/lib/smartcard/ifdh_scmi2c.so`.

9. **Click Apply or OK.**

   The IFD Terminal is displayed in the Console pane. A dialog box is displayed, stating that the OCF Server must be restarted to complete the operation.

10. **Click Restart OCF Now to add the internal reader.**

    The internal reader is not added until OCF is killed and restarted.

Note – If you do not restart OCF now, you must restart OCF from the command line to add the internal reader.

```
# svcadm restart network/rpc/ocfserv
```

The `ocfserv` process is restarted the next time you start the Smartcard Console or execute the `smartcard` command.

Removing a Card Reader

You might need to remove an external card reader from a system when a user no longer needs to use a smart card, or when you want to move the card reader to another system. Be sure to remove the card reader logically before you disconnect the physical device. Refer to the following procedures:

- "To Remove a Card Reader (Console)" on page 38
- "To Remove a Card Reader (Command Line)" on page 39

▼ To Remove a Card Reader (Console)

Steps

1. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **Click Card Readers in the Navigation pane.**
4. **In the Console pane, select the card reader that you want to remove.**
5. **Choose Remove Terminal from the Action menu.**
6. **Click OK.**

   A dialog box is displayed, asking if you are sure you want to remove the card reader.

7. **Click OK.**

   A dialog box is displayed, stating that the OCF Server must be restarted to complete the operation.

8. **Click Restart OCF Now or Don't Restart OCF.**

   The IFD handler is not removed until OCF is restarted. The `ocfserv` process is restarted the next time you start the Smartcard Console or execute the `smartcard` command. You can explicitly restart OCF from the command line.

▼ To Remove a Card Reader (Command Line)

Steps

1. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

   ---

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **Remove the card reader.**

   ```
   # smartcard -c admin -t terminal -r user_friendly_reader_name -x delete
   ```

4. **(Optional) Disconnect the external card reader from the port.**

5. **Restart `ocfserv`.**

   ```
   # svcadm restart network/rpc/ocfserv
   ```

   The `ocfserv` process is restarted the next time you use the Smartcard Console or execute the `smartcard` command.

CHAPTER 4

Troubleshooting

This section explains how to solve some Solaris Smartcard problems. The following sections are included:

Resolving Smartcard Login Problems

If a user cannot log in to a system, you might need to disable Solaris Smartcard or correct a setup problem.

▼ To Disable Smartcard

You might need to disable Smartcard on a system in the following instances:

- If a Smartcard setup problem does not allow a user to log in with a smart card
- If a system no longer needs a Smartcard login

Do the following to disable Solaris Smartcard.

Steps **1. Verify that the `ocfserv` daemon is enabled.**

The following command provides the status of the service.

```
% svcs network/rpc/ocfserv
```

Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **Disable smart-card operations.**

   ```
   # smartcard -c disable
   ```

▼ To Correct Smartcard Setup Problem

After you have enabled Smartcard and logged off from a system, the CDE login screen displays the following prompt:

```
Please insert Smart Card
```

If you are unable to log in to a system by using a smart card because of Smartcard setup problems, try the following:

Steps

1. **Log in to the system remotely with the `rlogin` or `telnet` command.**

2. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

3. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

4. **Disable Smartcard:**

   ```
   # smartcard -c disable
   ```

   After Smartcard is disabled, the CDE screen displays the following prompt:

   ```
   Enter User Name
   ```

5. **Correct the Smartcard setup problem.**

Resolving Applet, ATR, or Configuration Problems

You might have a problem downloading an applet to a smart card, adding support for a new type of card, or an illegal entry in your Solaris Smartcard configuration file.

Resolving Applet Downloading Problems

You might see the following message while trying to download the applet on the card:

```
SmartcardInvalidCardException
```

This message probably indicates that you have not added the ATR of the smart card inserted in the reader to the list of valid ATRs the system can accept. Try to update the card's ATR by following the steps in "To Add Support for a New Card Type (Console)" on page 23.

▼ To Add a Missing ATR

When you try to add a smart card in the Smartcard Console, a screen displays the ATR of the card inserted in the reader. If the ATR that is displayed does not exist in the list of valid ATRs, add the ATR to the *card-name*`.ATR` property.

For related information, see "To Add Support for a New Card Type (Console)" on page 23, which provides Smartcard Console instructions and a command-line example.

Steps

1. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **Display `ocfserv` properties to see if the *card_name*`.ATR` property exists.**

```
# smartcard -c admin
```

For example, `ocfserv` lists a property `MySCM.0.ATR`, where `MySCM` is the user-friendly name of the card reader. This property reflects the ATR of the smart card that is inserted in the reader. This property is temporary. The property is added by `ocfserv` only for the time the card is in the reader. This property is removed when the card is removed.

4. **Add this ATR to the *card_name*.`ATR` property if the ATR displayed by this property does not exist in the list of valid ATRs.**

▼ To Resolve Configuration Problems

The `/etc/smartcard/opencard.properties` file stores important smart card configuration information. This file requires no administration. Do not edit this file manually. However, if you inadvertently introduced a problem in your smart card configuration, you can restore the previous version of `/etc/smartcard/opencard.properties`.

Steps

1. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **Change to the `/etc/smartcard` directory.**

4. **Save the current version first.**

   ```
   # cp opencard.properties opencard.properties.bad
   ```

5. **Copy the previous version to the current version.**

   ```
   # cp opencard.properties.bak opencard.properties
   ```

Debugging Smartcard

You can debug smart-card operations on a system by setting the debugging properties. Solaris Smartcard offers standard debugging and a detailed trace of your operations, if specified. If enabled, debugging information is logged to a file. You can control the level and amount of debugging information on a 0–9 scale. Debugging is disabled by default.

The following debugging properties are defined for `ocfserv` by default:

```
debugging.filename          = /var/run/ocf.log
debugging                   = 0
```

`/var/run/ocf_log`	The name of the file to contain debugging information.
`debugging = 0`	Debugging is disabled. Debugging is enabled if `debugging = 1`.

Note – Previous to the Solaris 8 release, the debugging log file might be called `/tmp/ocf_debugfile`.

For debugging procedures, see the following:

- "To Enable Debugging (Console)" on page 45
- "To Enable Debugging (Command Line)" on page 46

▼ To Enable Debugging (Console)

Steps

1. **Verify that the `ocfserv` daemon is enabled.**

   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **Select OCF Server from the Navigation pane.**
4. **Double-click the icon that represents the local system.**
5. **Select the Debug tab.**
6. **Slide the indicator for the OCF Debug Level slider to indicate the level of debugging you want.**
7. **Slide the indicator for the Open Card Trace Level slider to indicate the trace level you want.**
8. **(Optional) Specify an alternate name for the debug file.**
   a. **Click Browse to view the file systems on the system.**
   b. **Type the fully qualified path name for the debug file in the OCF Debug File Location field.**
9. **Click the Apply or OK button.**

▼ To Enable Debugging (Command Line)

Use the following procedure to enable smart-card debugging.

Steps

1. **Verify that the `ocfserv` daemon is enabled.**
   The following command provides the status of the service.

   ```
   % svcs network/rpc/ocfserv
   ```

   Note – Before you make any changes to Smartcard, you must make sure that the `ocfserv` daemon is enabled.

   ---

2. **(Optional) If necessary, as `root`, enable the `ocfserv` daemon.**

   ```
   # svcadm enable network/rpc/ocfserv
   ```

3. **Enable smart card debugging by setting `debugging=1`.**

   ```
   # smartcard -c admin -x modify debugging=1
   ```

   In the following example, the location of the `ocfserv` debugging file is changed. The location is changed by using the `-x modify debugging.filename` option and by specifying a fully qualified file name for the debugging file.

   ```
   # smartcard -c admin -x modify debugging.filename=/var/tmp/sc.debug
   ```

Glossary

Answer to Reset (ATR)	A property that is assigned to each smart card type by the manufacturer that identifies the version of the smart card. An equivalent property is stored on the system to assist in authentication.
ATR	See Answer to Reset.
authentication	The process of verifying a user's identity.
CDE	See Common Desktop Environment.
challenge-response	A form of authentication whereby the smart card is loaded with a DES key used in response to a random number generated by the system and sent to the card when the card is inserted in the card reader.
Common Desktop Environment (CDE)	A desktop application used in the Solaris Operating System (OS).
Console pane	The pane in the Smartcard Console that contains icons for various management tasks.
Information pane	The pane in the Smartcard Console that contains a brief description of the category or icon just clicked, as well as instructions for beginning the task associated with that category or icon.
Navigation pane	The pane in the Smartcard Console that lists major categories of tasks that are involved in setting up smart cards.
personal identification number (PIN)	A unique number used to identify a user.
PIN	See personal identification number.
private key	A type of security that works in a public-key infrastructure, involving pairs of key strings. The private-key part of this pair is stored on the smart card.
Solaris Smartcard	Name of the software that enables the use of smart cards in a Solaris Operating System (OS).

smart card	A plastic card that has been initialized in such a way as to allow the user to access a system by inserting the card into a card reader.
Smartcard Console	The GUI tool that enables an administrator to manage Solaris Smartcard.
symmetric key	Another term for the DES key described in the challenge-response authentication method.

Index

E

F

G

I

L

M

O

P