Sun Ray™ Connector for Windows OS, Version 1.1 Installation and Administration Guide

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Contents

Figures

Preface

This volume provides instructions for installing, using, and administering the Sun Ray™ Connector for Windows OS, a Sun-supported terminal services client based on the Microsoft Remote Desktop Protocol (RDP).

Audience

This manual is intended for system and network administrators who are already familiar with Windows operating systems and the Sun Ray™ computing paradigm. In particular, this document should provide Windows administrators with what they need to install, set up, and administer the Sun Ray Connector. For information on administering Sun Ray servers, please see the *Sun Ray Server Software 3.1 Administrator's Guide for the Solaris Operating System* or the *Sun Ray Server Software 3.1.1 Administrator's Guide for the Linux Operating System*.

For information on administering Windows terminal services, see `www.microsoft.com`.

Scope

This manual is written from the point of view of the Sun Ray Connector software and the Solaris™ and Linux operating systems. Although the Sun Ray Connector is a Windows terminal services client, this manual does not give any instructions for administering Windows Terminal Servers or other Microsoft products.

Before You Read This Book

This guide assumes that you have access to a Sun Ray Desktop Unit (DTU) attached to a Sun Ray Server running version 3.1 or 3.1.1 of the Sun Ray Server Software and have a network connection to at least one Microsoft Windows Terminal Server.

Using UNIX Commands

This document does not contain information on basic UNIX® commands and procedures, such as shutting down the system, booting the system, or configuring devices. This document does, however, contain information about specific Sun Ray system commands as they pertain to management of the Sun Ray Connector.

Typographic Conventions

Typeface	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output	`% su` `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this.
	Command-line variable; replace with a real name or value	To delete a file, type `rm` *filename*.

Shell Prompts

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

Related Documentation

Application	Title	Part Number
Installation	*Sun Ray Server Software 3.1 Installation and Configuration Guide for the Solaris Operating System*	819-2383-10
	Sun Ray Server Software 3.1.1 Installation and Configuration Guide for the Linux Operating System	819-6685-10
Administration	*Sun Ray Server Software 3.1 Administrator's Guide for the Solaris Operating System*	819-2384-10
	Sun Ray Server Software 3.1.1 Administrator's Guide for the Linux Operating System	819-6686-10
Release Notes	*Sun Ray Server Software 3.1 Release Notes for the Solaris Operating System*	819-7069-10
	Sun Ray Server Software 3.1.1 Release Notes for the Linux Operating System	819-6688-10
	Sun Ray Connector for Windows OS, Version 1.1 Release Notes	819-6691-10

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Sun Ray Connector for Windows OS

Introduction

The Sun Ray™ Connector for Windows OS is a Sun-supported terminal services client, based on the Microsoft Remote Desktop Protocol (RDP), that enables Sun Ray users to access applications running on remote Windows Terminal Servers. It is especially useful to those who are accustomed to Windows-based applications or who wish to access documents in certain formats from a Sun Ray thin client. The Sun Ray Connector for Windows OS is often referred to simply as the Sun Ray Connector.

The Sun Ray Connector gives users access to a Windows desktop, either occupying the entire Sun Ray screen or running in a window in a Solaris™ or Linux environment.

Architectural Overview

From a user point of view, the Sun Ray Connector mediates between the Sun Ray desktop and the Microsoft Windows Terminal Server. Residing on the Sun Ray server, it uses the Remote Desktop Protocol (RDP) to communicate with the Windows Terminal Server and the Appliance Link Protocol™ (ALP) to communicate with the Sun Ray desktop, as suggested in FIGURE 1. Once installed, the Sun Ray Connector requires only that a user type a simple command to connect to a Windows Terminal Server where the usual applications reside. The command can be modified to accommodate a variety of preferences, or options, for instance to specify screen size or a list of available printers.

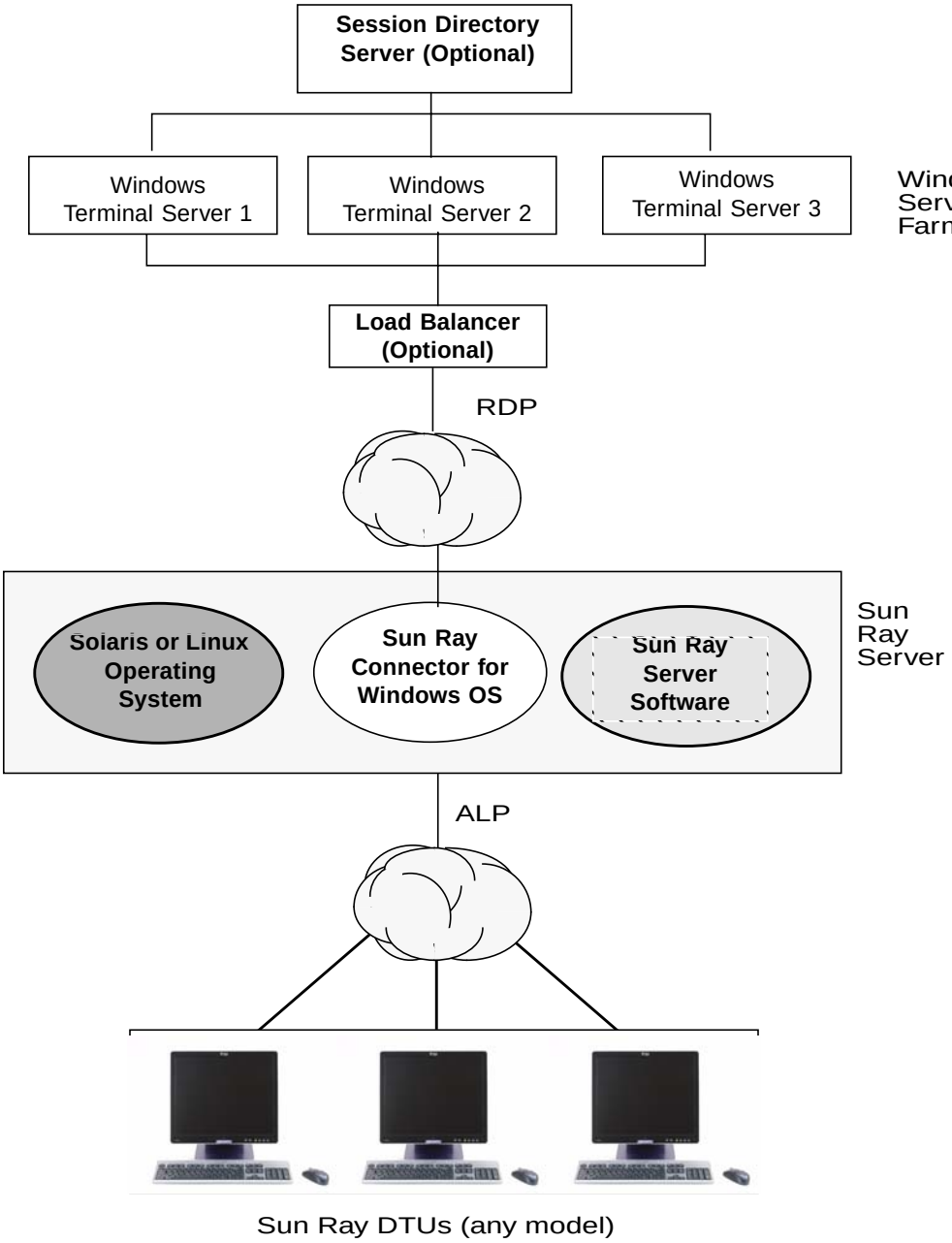

FIGURE 1 Sun Ray-Windows Connectivity via RDP and ALP Protocols Showing Optional Load Balancing and Session Directory

Features

The Sun Ray Connector provides audio support, compression and encryption, device support for smart cards, local drives, and serial devices, printer redirection, session directory, and text cut-and-paste functionality between Windows applications and applications running on the Sun Ray desktop. These features are described in the following sections.

Audio Support

Users can use audio applications located on the Windows Terminal Server to play sound files on their Sun Ray desktops (downstream audio); however, recording from the Sun Ray desktop unit to the Windows Terminal Server (upstream audio) is not supported by the RDP Protocol and is therefore not implemented.

Clipboard

The Sun Ray Connector enables cut-and-paste text functionality between Windows applications and applications running on the Sun Ray desktop, whether Linux or Solaris versions. Copying and pasting is enabled for all supported languages, including double-byte languages, such as Chinese, Japanese, and Korean.

Note – Release 1.1 of the Sun Ray Connector does not support copying and pasting functionality for Rich Text format.

Compression

The Sun Ray Connector uses Microsoft Point-to-Point Compression (MPPC) to compress data between the Sun Ray Server, which runs the Sun Ray Connector, and the Windows Terminal Server.

Encryption

The Sun Ray Connector provides encryption of the connection to secure all data being transferred from and to the Windows server. For this purpose, it uses RSA Security's RC4 cipher, which encrypts data of varying size with a 56-bit or a 128-bit key.

Four levels of encryption can be configured at the Terminal Server:

- Low

  All data from client to server is encrypted, based on maximum key strength supported by the client.

- Client-compatible

  All data between client and server in both directions is encrypted based on the maximum key strength supported by the client.

- High

  All data between the client and server in both directions is encrypted based on the server's maximum key strength. Clients that do not support this strength of encryption cannot connect.

- FIPS-Compliant

  FIPS-compliant encryption is not supported[1].

Note – Data encryption is bidirectional except at the Low setting, which encrypts data only from the client to the server.

Local Drive Mapping

Filesystems from removable media devices, such as flash drives or ZIP drives, connected to Sun Ray USB ports can be mapped to the Windows environment, where they appear as locally mounted drives. In fact, any file can be mounted and mapped from the Sun Ray environment to the Windows environment.

Printing

Once a connection is established, the user can print from Windows applications via any of the following:

- a network printer or locally attached printer on the Windows Terminal Server
- a network printer or a local printer on the Sun Ray server
- a local printer attached to the Sun Ray DTU.

Network printing is recommended over locally attached printing.

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1. FIPS is an acronym for the Federal Information Processing Standards defined by the National Institute of Standards and Technology.

Serial Port Mapping

Users can access serial devices connected to a Sun Ray DTU from their Windows sessions. Serial devices can be connected either directly to the serial ports on a Sun Ray DTU or via a serial adapter.

Session Directory

The Sun Ray Connector for Windows OS Version 1.1 supports server session reconnection, based on session directory and load balancing information. Session Directory is a database that keeps track of which users are running which sessions on which Windows Terminal Servers, making it possible for users to reconnect to their previously disconnected Windows sessions. Both IP address-based and token-based reconnection are supported; however, token-based redirection requires the use of a hardware-based load balancer for the Windows Terminal Servers.

The addition of Session Directory functionality enables Sun Ray Connector users to reconnect not only to an existing Sun Ray session but also to be reconnected automatically to the right Windows session. Apart from extra convenience for users, the capacity to utilize server farms and load balancing allows Windows Terminal Servers to accommodate a larger number of Sun Ray users and DTUs.

Note – To participate in a Session Directory-enabled server farm, Windows Terminal Servers must run Windows Server 2003 Enterprise Edition or Windows Server 2003 Data Center edition. Session Directory is an optional component that can be configured to use Microsoft proprietary or third-party load balancing products.

For details of setup, configuration, and operation, please see Microsoft's documentation, for instance at:

`http://www.microsoft.com/windowsserver2003/techinfo/overview/sessiondirectory.mspx`

Smart Cards

The Sun Ray Connector uses the PC/SC SRCOM bypass, based on the PC/SC framework, to allow applications on the Windows Terminal Server to access smart cards inserted in the Sun Ray DTU. Typically, this feature is used to provide two-factor authentication with digital certificates or to permit the use of electronic signatures or other information stored on a smart card. See "Smart Cards" on page 21.

Note – Smart Cards and the PC/SC SRCOM bypass are supported on the Solaris Operating System but not on Linux.

Licensing

The Sun Ray Connector supports both per-user and per-device Terminal Server Client Access Licenses (TS-CAL). When per-device licensing is configured for Windows Terminal Server, each Sun Ray DTU is granted a new license from the licensing server. Implications of these licensing modes are discussed under "Hotdesking and Licensing Modes" on page 12.

Licensing information is stored in the Sun Ray data store and can be retrieved and presented each time a Windows connection is made.

For information on administering licenses, see the `utlicenseadm` man page. See also the Note on page 8.

Installation

Installation Requirements

The Sun Ray Connector requires one of the following, with appropriate licenses, on any supported operating system:

- Sun Ray Server Software (SRSS) version 3.1 or later for Solaris SPARC and x86
- Sun Ray Server Software (SRSS) version 3.1.1 or later for Linux platforms

TABLE 1 Supported Operating System Versions for the Sun Ray Connector

SuSE Linux Enterprise Server (SLES)	Red Hat Enterprise Linux Advanced Server (RHEL AS)	Solaris 8	Solaris 9	Solaris 10	Trusted Solaris (TSOL)
9 Service Pack 3	4 Update 3	Solaris 8 Update 7 or higher (Solaris 8 2/02)	Solaris 9 Update 7 or higher (Solaris 9 9/04)	SPARC and x86 (Solaris 10 3/05)	Trusted Solaris 8 (7/03 and 2/04)

The Sun Ray Connector software must *always* be installed and configured on the primary data store server, otherwise Terminal Server licenses and printer configurations will not be stored. This is the case even if primary data store server is not used to host Sun Ray sessions.

Additional installation requirements include:

- The latest operating systems patches (as applicable):
  - 119067-02 or later for Solaris 8 SPARC
  - 112785-56 or later for Solaris 9 SPARC
  - 119059-14 or later for Solaris 10 SPARC
  - 119060-14 or later for Solaris 10 x86
- The latest SRSS patches:
  - 120879-04 or later for SRSS on Solaris SPARC
  - 120880-04 or later for SRSS on Solaris x86
- The latest `uttscwrap` patches:
  - 122212-05 or later for Solaris 10 SPARC
  - 122213-05 or later for Solaris 10 x86
- The `SMClibgcc` package (on Solaris 8 and Solaris 9 systems only)
- For Solaris 8 and Trusted Solaris 8, the latest `libCstd` and `libCrun` patches are:
  - 108434-22 or later
  - 108435-22 or later

- OpenSSL

  OpenSSL is installed by default on Solaris 10 as well as on Red Hat and SuSE, but not on earlier version of Solaris, and is sometimes removed from Solaris 10 installations. Please confirm that OpenSSL is installed before proceeding.

- Windows 2000 Server with Service Pack 4 Rollup 1 or
  Windows 2003 Server with Service Pack 1 or
  Windows XP Professional with Service Pack 2
- All necessary Microsoft licenses for accessing Windows Terminal Services

  Please read the Note on page 8.

Note – If you access terminal server functionality provided by Microsoft operating system products, you need to purchase additional licenses to use such products. Consult the license agreements for the Microsoft operating system products you are using to determine which licenses you must acquire. Currently, information regarding Terminal Services can be found in the following URL:
`http://www.microsoft.com/windowsserver2003/howtobuy/licensing/ts2003.mspx`

Installation Procedure

If you have already mounted the Sun Ray Connector for Windows OS CD-ROM locally or from a remote server, or if you have extracted the ESD files to an image directory, begin at Step 4.

1. **Open a shell window as superuser on the Sun Ray server.**

   To avoid installation script errors that can occur if user environment settings are carried forward, use one of the following commands for superuser login instead of using the `su` command without arguments:

   ```
   % su -
   ```

   ```
   % su - root
   ```

2. **Insert the Sun Ray Connector for Windows OS CD-ROM.**

   If a file manager window opens, close it. The file manager CD-ROM window is not necessary for installation.

3. **Change to the image directory, for example:**

```
# cd /cdrom/cdrom0
```

4. **Install the Sun Ray Connector for Windows OS software.**

```
# ./installer
```

5. **Run the automatic configuration script.**

```
# /opt/SUNWuttsc/sbin/uttscadm -c
```

The `uttscadm` script prompts you at this point for a path to the OpenSSL libraries.

6. **Accept the default path, or supply a different path, if applicable.**
7. **Restart Sun Ray services if the script asks you to do so.**

```
# /opt/SUNWut/sbin/utrestart
```

Note – It is not necessary to restart Sun Ray services if the `uttscadm` script does not ask you to do so.

Uninstallation Procedure

1. **Before uninstalling the Sun Ray Connector for Windows OS, use the following command to unconfigure it:**

```
# /opt/SUNWuttsc/sbin/uttscadm -u
```

2. **To remove the Sun Ray Connector for Windows OS software, type the following command:**

```
# /opt/SUNWuttsc/sbin/uninstaller
```

Upgrade Procedure

To upgrade from an earlier version of the Sun Ray Connector:

1. **Change to the image directory of the Sun Ray Connector for Windows OS CD-ROM, for example:**

```
# cd /cdrom/cdrom0
```

2. **Install the Sun Ray Connector for Windows OS software.**

```
# ./installer
```

The installer script indicates what Sun Ray Connector software is already installed on your system, for example:

```
Sun Ray Connector 1.0 is currently installed.
Do you want to uninstall it
and install Sun Ray Connector 1.1?
Accept (Y/N):
```

3. **Answer Y or N to the Accept (Y/N) prompt.**

   a. **Answer N to leave the existing installation in place.**

      OR

   b. **Answer Y to uninstall the old version of Sun Ray Connector software and install the newer version.**

      The existing Sun Ray Data Store is not removed or touched by the upgrade procedure.

4. **For Linux implementations, run the automatic configuration script again.**

```
# /opt/SUNWuttsc/sbin/uttscadm -c
```

Reconfiguration is not necessary for Solaris implementations.

Using the Sun Ray Connector

Once the Sun Ray Connector software has been installed, type the following command to connect to the desired Windows Terminal Server:

```
% /opt/SUNWuttsc/bin/uttsc <options> <hostname.domain>
```

If the Windows Terminal Server is in the same domain as the Sun Ray desktop, it is not necessary to specify the domain name; however, you may specify the full IP address instead of *hostname.domain* if you prefer.

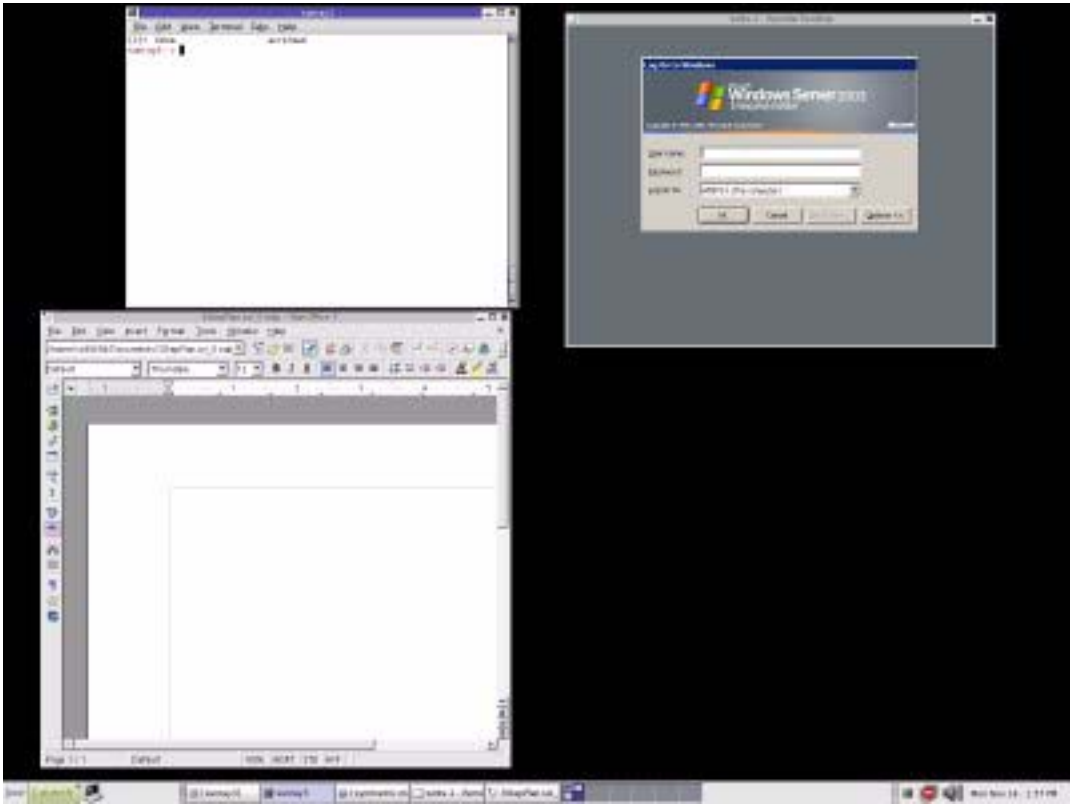

FIGURE 2 A Windows session can occupy the whole screen or run inside a Solaris or Linux window as shown in this figure

Command Line Options

The `uttsc` command with no options specified other than the name or address of a Windows Terminal Server displays a Windows session on the Sun Ray DTU (See FIGURE 2). The default screen size is 640 x 480 pixels.

To display a session in full screen mode or to modify it in other ways, see the command line options listed in the `uttsc` man page.

To allow your users to access the `man` command directly, add the following entry to your users' man path:

```
/opt/SUNWuttsc/man
```

They can then display the man page by typing:

```
% man uttsc
```

Graphical User Interface (GUI)

No graphical user interface is available for the Sun Ray Connector at this time; however, launchers can be set up to provide users with desktop icons or menu items to connect to the Windows session.

For details on how to set up launchers, please consult the desktop documentation for your operating system.

Hotdesking and Licensing Modes

Terminal Server Client Access Licenses can be configured in two modes on the Windows Terminal Server: per-user and per-device. In per-user mode, the user's hotdesking experience is virtually seamless. In per-device mode, however, to ensure correct SC-CAL license handling, users must re-authenticate every time they hotdesk to a different DTU.

The differences in the user's hotdesking experience are summarized below.

Per-user Mode

The user logs into a Sun Ray session with a smart card and opens a connection to a Windows session.

1. The user removes the smart card and reinserts it in the same DTU.
2. The user removes the smart card and inserts it in a different DTU.

In both cases, the user is instantly reconnected to the existing Windows session, and other features and services are unaffected.

Per-device Mode

The user logs into a Sun Ray session with a smart card and opens a connection to a Windows session.

1. The user removes the smart card and reinserts it in the same DTU.

   The user is instantly reconnected to the existing Windows session.

2. The user removes the smart card and inserts it in a different DTU.

   The Windows login screen prompts the user for username and password, after which the user is reconnected to the existing Windows session. Other features and services are similarly affected. For example:

   - Windows Media Player stops playing audio, although the application is still active on the Windows session. The user needs to replay the audio.
   - Any serial port transfer is stopped.

   However, all the command line options specified remain valid.

Note – The `uttsc` command provides a CLI option (`-0`) that can be used to prevent the Sun Ray Connector from disconnecting upon detection of hotdesking events. Please see the `uttsc` man page for details.

Trusted Solaris™ Configuration

To launch Windows terminal server session in a Trusted Solaris environment:

1. **Assume the primaryadmin role.**

2. **Create a profile and assign** `file_dac_read`, `file_dac_search`, `file_dac_write`, `file_mac_write`, **and** `net_mac_read` **privileges to the** `/opt/SUNWuttsc/bin/uttsc` **command.**

   After the changes, the profile description database `/etc/security/prof_attr` will have the following entry:

```
Sun Ray Connector:::Sun Ray Connector for Windows Terminal Services:help=RtSunrayConnector.html
```

   The execution attributes database `/etc/security/exec_attr` will have the following entry:

```
Sun Ray Connector:tsol:cmd:::/opt/SUNWuttsc/bin/uttsc:uid=0;privs=4,5,6,10,12,32,33
```

3. **Add** `net_mac_read` **and** `net_reply_equal` **privileges to** `utdsd`**.**

4. **Configure the Windows server to match the same label as the** `uttsc` **by updating trusted network database** `/etc/security/tsol/tnrhdb`**.**

   For example, if `uttsc` is launched from an unclassified label, then the trusted network database `/etc/security/tsol/tnrhdb` will have the following entry:

```
10.6.132.155:unclassified
```

5. **Assign the profile created in Step 1 to a role/user which launches** `uttsc` **client in a profile shell.**

   For example, if the Sun Ray Connector profile is created and assigned to a demouser, then the extended user attributes database `/etc/user_attr` will have the following entry:

```
demouser::::lock_after_retries=yes;idletime=30;idlecmd=lock;
profiles=Sun Ray Connector; type=normal;labelview=showsl
```

6. **Launch a terminal server session using the profile shell.**

   For example, open a terminal and type:

```
$ pfcsh
% /opt/SUNWuttsc/bin/uttsc <windows_terminal_server_name>
```

Trusted Solaris Limitations

Because of user permission restrictions, `uttsc` cannot launch a new audio stream on the Trusted Solaris platform. Instead, it continues to use the default session audio stream. Thus, only one audio application can play on a Trusted Solaris server at any given time.

The following features are not supported on Trusted Solaris platforms at this time for security reasons:

- Disk and serial port redirection
- Specifying an X display to launch the Sun Ray Connector

Administration

The Sun Ray Connector requires very little administration; however, administrators should be aware of the following issues, suggestions, and configuration instructions.

Compression and Encryption

The administrator needs to decide which of the available levels of encryption to use, after which the Windows Terminal Server can be configured accordingly. (See "Encryption" on page 3.)

Compression is enabled by default. It can be disabled on a per-connection basis with a CLI option. For example, to disable compression:

```
% /opt/SUNWuttsc/bin/uttsc -z <hostname.domain>
```

JDS Integration Package

The Sun Java™ Desktop System (JDS) integration package for the Solaris Operating System delivers a CLI, `uttscwrap`. This CLI improves integration of the Sun Ray Connector with the JDS desktop on Solaris 10. The JDS integration package is included in the Supplemental folder of the Sun Ray Connector software image.

`uttscwrap` provides a login dialog that allows input of credentials for password-based authentication (*username/domain/password*). The credentials can be saved through the dialog for subsequent invocations. At the next launch, the dialog is pre-filled with the credentials.

Note – `uttscwrap` is designed for credential caching for password-based authentication only. It cannot be used with smart card authentication. For smart card authentication, please use the Sun Ray Connector directly (`/opt/SUNWuttsc/bin/uttsc`).

Credentials are saved separately for each Windows server/application combination. This allows you to save different credentials the following ways:

- For different applications on the same server
- For different applications on different servers
- For different server sessions with no applications launched

Any new credentials saved for a server/application replace previously saved credentials.

Use `uttscwrap` when desktop or menu launchers are defined to launch either Windows Terminal Services sessions or Windows applications on various Windows servers.

To launch the Sun Ray Connector through `uttscwrap`, specify the same parameters on the `uttscwrap` command line as you would use on the `uttsc` command line.

Licensing

Licenses can be administered with a new CLI, `utlicenseadm`. Administrative functions for licenses include listing and deleting. See the `utlicenseadm` man page for details.

Microsoft Terminal Services licensing information is stored in the Sun Ray data store automatically upon startup, based upon the existing LDAP schema. No administrator setup or intervention is required.

Load Balancing

Terminal services session load balancing is handled transparently by the Windows Terminal Server. For more detailed information, please refer to Microsoft documentation at:

`http://www.microsoft.com/windowsserver2003/technologies/clustering/default.mspx`

Printing

The Sun Ray Connector supports printing to:

- network printers visible on the Windows server
- local printers attached to the Windows server
- local printers attached to the Sun Ray server
- network printers visible on the Sun Ray server
- local printers attached to the DTU

Note – Network printers are not affected by hotdesking. Printers connected to DTUs are available for printing from any DTU connected to the same Sun Ray server.

Printer Configuration Caching

The Sun Ray server maintains a cache, in the Sun Ray data store, of printer configurations that users set up on the Windows Terminal Server. The Sun Ray server presents the appropriate configuration to the Windows Terminal Server when a user reconnects via the Sun Ray Connector.

A new CLI, `uttscprinteradm`, helps administrators to maintain this information. It can be used to list the available information and to perform cleanup in case of user or printer deletion. See the `uttscprinteradm` man page for further information.

Setting Up Print Queues

Printer setup in Windows environments is beyond the scope of this document; however, printer setup requirements for Solaris and Linux are described below.

The Windows Terminal Server session is aware only of the print queues specified in the command line when the Sun Ray Connector is started. To change print queues, restart the Sun Ray Connector with the relevant print queues specified on the command line.

Note – These instructions pertain to raw print queues.[2] Please consult your operating system documentation for instructions on setting up queues for PostScript drivers. See also the `lp` and `lpadmin` man pages.

Solaris Printing

To set up a raw print queue on a Sun Ray server running Solaris:

1. **Specify the printer and printer device node using the `lpadmin` command.**

```
# /usr/sbin/lpadmin -p <printer-name> -v \
/tmp/SUNWut/units/IEEE802.<mac-address>/dev/printers/<device node>
```

2. **Enable the print queue.**

```
# /usr/bin/enable <printer-name>
```

2. When a Solaris or Linux print queue is configured with a print driver, the `lp` utility sends print data to the driver for processing before redirecting it to the printer. When a print queue is configured without a driver, lp sends unprocessed, or "raw" data to the printer. A print queue configured without a printer driver is called a raw queue.

3. **Accept the print queue.**

```
# /usr/sbin/accept <printer-name>
```

Linux Printing

To set up a raw print queue on a Sun Ray server running any supported flavor of Linux:

1. **Uncomment the following line from the `/etc/cups/mime.convs` file:**

```
application/octet-stream       application/vnd.cups-raw       0 -
```

2. **Uncomment the following line from the `/etc/cups/mime.types` file:**

```
application/octet-stream
```

3. **Restart the `cups` daemon.**

```
# /etc/init.d/cups restart
```

4. **Create a soft link to the Sun Ray printer node in `/dev/usb`.**

   For example, if the device node is `/tmp/SUNWut/units/IEEE802.`*<mac-address>*`/dev/printers/`*<device node>*, then use the following command:

```
# ln -s \
/tmp/SUNWut/units/IEEE802.<mac-address>/dev/printers/<device node> \
/dev/usb/sunray-printer
```

   Use this soft link (`/dev/usb/sunray-printer`) as the Device URI while creating the print queue.

Note – On Red Hat, it may be necessary to create the `/dev/usb` directory as well as to re-create the soft link after rebooting.

---

5. **To complete the procedure, set up a raw print queue.**

```
# /usr/sbin/lpadmin -p <printer-name> -E -v usb:/dev/usb/sunray-printer
```

6. **To complete this procedure for SuSE Linux:**

   a. **Update** `/etc/cups/cupsd.conf` **to set the RunAsUser property to No.**

   b. **Restart the** `cups` **daemon.**

```
# /etc/init.d/cups restart
```

Making Sun Ray Printers Available to Windows

To make Sun Ray-attached printers available to a Windows session, specify the corresponding print queues on the command line. Printer data is created on the Windows server, so the name of the printer's Windows driver should be specified if possible.

- If you specify a Windows driver, use a raw Sun Ray print queue.
- If you do not specify a Windows driver, use a PostScript queue for the Sun Ray printer. The Windows server uses a generic PostScript driver to generate print data.

Tip – To find the printer driver name, check the Windows Registry key *My Computer/HKEY_LOCAL_MACHINE/System/CurrentControlSet/Control/Print/Environments/Windows NT x86/Drivers/Version-3*. All printer drivers installed on the system are in this list.

- **To specify a printer's Windows driver, type:**

```
# uttsc -r printer:<printername>=<driver name> <Windows server>
```

- **To make a printer available without specifying a driver, type:**

```
# uttsc -r printer:<printername> <Windows server>
```

- **To make multiple printers available, type:**

```
# uttsc -r printer:<printer1>=<driver1>,<printer2>=<driver2> <Windows server>
```

Session Directory

The Session Directory feature requires no configuration or administration by the Sun Ray administrator. The Windows administrator has several configuration options, such as whether to allow users to connect to a Windows Terminal Server directly or through a load balancer; however, these options are beyond the scope of this document. Please refer to Microsoft documentation for details.

Smart Cards

In addition to normal Sun Ray smart card functionality, such as hotdesking, the Sun Ray Connector enables additional smart card functionality, such as:

- strong, two-factor authentication for access control
- PIN-based logins
- digital signing, encrypting, and decrypting of email messages from Windows-based email clients.

For this purpose, it uses the Sun Ray PC/SC SRCOM bypass on the Sun Ray server and smart card middleware on the Windows Terminal Server. Please download the PC/SC SRCOM bypass from the Sun Download Center at:
`http://www.sun.com/download/products.xml?id=42c5d3d9`

Smart card redirection is disabled by default. It can be enabled on a per-connection basis with the following CLI option:

```
% /opt/SUNWuttsc/bin/uttsc -r scard:on <hostname.domain>
```

To set up Smart Card login for Windows with the Sun Ray Connector:

1. **Set up Active Directory and Certification Authority (CA) on the Windows Server.**
2. **Install the latest PC/SC SRCOM bypass, version 1.1 build 04, on the Sun Ray server.**
3. **Install Smart Card middleware product on the Windows Terminal Server.**

Note – If you use ActivClient version 5.4 middleware, set “Disable PIN Obfuscation” to Yes through ActivClient user console on the Windows Server.

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4. **Enroll the necessary Certificate(s) onto the Smart Card, using either a Sun Ray Token Reader or an External Smart Card Reader connected to the Windows Server.**

Setting Up a CAM Implementation for the Sun Ray Connector

Sun Ray Controlled Access Mode (CAM) allows the administrator to set up groups of DTUs to access a restricted set of applications, typically in settings where users are expected to use only one application, or where security is an especially important consideration. In CAM, the Sun Ray DTU behaves like a Windows Based Terminal, and users do not interact with the Solaris login.

To configure a CAM implementation for the Sun Ray Connector, follow the instructions in "Controlled Access Mode" on page 177 of the *Sun Ray Server Software 3.1 Administration Guide for Solaris*, specifying the `uttsc` command, Windows server name, and other options in the Add/Edit Apps panel.

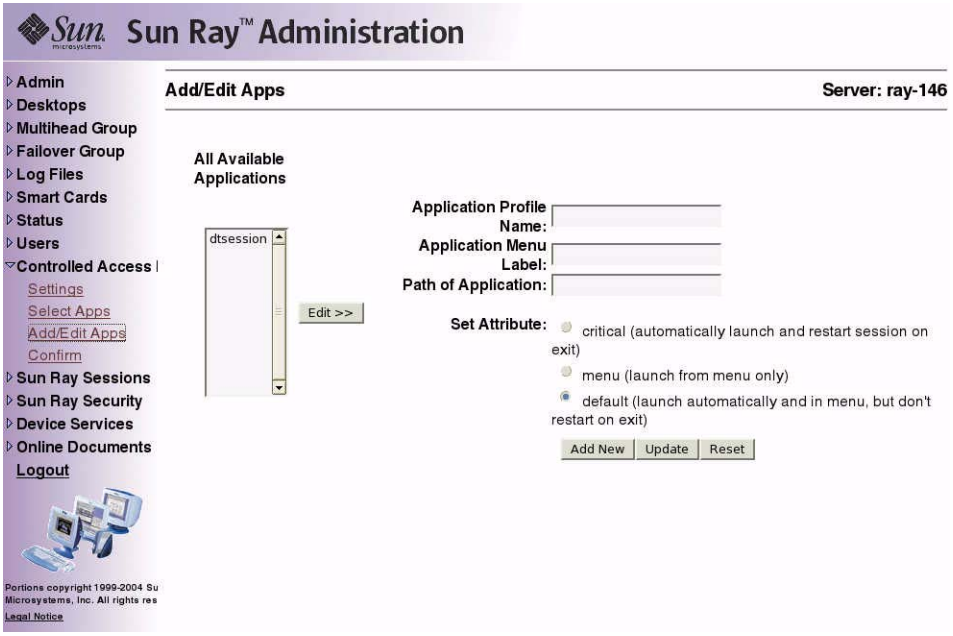

FIGURE 3 Sun Ray Server Software Add/Edit Apps Panel

Troubleshooting

Printer Caching

If a user changes the driver for a printer, the settings are not restored.

To restore the settings, use the printer driver that was used when the settings were changed. Using a different driver, even without changing any settings, can invalidate stored settings for that printer with any previous driver.

Printer Not Visible in Windows

If a Sun Ray printer specified on the Solaris or Linux command line is not available on Windows (not visible in the Printers and Faxes View), the user should confirm that the printer driver name is correct and installed on the Windows server. See "Making Sun Ray Printers Available to Windows" on page 20.

Printing via Windows

If a job does not print, the user should contact the Windows system administrator, whether for local or network printing.

Solaris or Linux Printing

If a job fails and cannot be diagnosed and fixed with the ordinary Unix remedies (`lpq`, `lprm`, etc.), the user should contact the appropriate system administrator.

Local Printing via Sun Ray DTU

Users can continue to send jobs from Solaris or Linux applications to printers locally attached to their Sun Ray DTU. To enable access to printers attached to the Sun Ray DTU for Windows jobs, the user must specify the printer with the `uttsc` CLI. See "Printing" on page 17 and the `uttsc` man page.

Glossary

ALP The Sun Appliance Link Protocol, a suite of network protocols that enable communication between Sun Ray servers and DTUs.

CAM Sun Ray Server Software controlled access mode, also known as *kiosk mode*.

client Normally, this term refers both to the physical hardware, such as a Sun Ray thin client desktop unit, and the process that accesses resources such as compute power, memory, and applications from a server. The server may be located remotely or locally. In the present context, the Sun Ray DTU is a client of the Sun Ray server; the Sun Ray Connector software is a Windows Terminal Server client.

client-server A common way to describe network services and the user processes of those services. Although this term can apply to a wide range of interactions between desktops and larger computing facilities, the thin client model suggests that all, or nearly all, computing be performed on the server.

data store The Sun Ray data store is a repository for information needed to administer several aspects of the Sun Ray server software, such as failover groups, for example. The Sun Ray Connector utilizes it to store licensing information and printer preferences.

downstream audio The capability for using applications located on a server to play audio files on a client. For example, `.wmv` files can be played on a remote Windows Terminal Server and heard on a Sun Ray DTU.

DTU Sun Ray desktop units (originally known as Desktop Terminal Units).

hotdesking The ability for a user to remove a smart card, insert it into any other DTU within a server group, and have the user's session "follow" the user, thus allowing the user to have instantaneous access to the user's windowing environment and current applications from multiple DTUs.

kiosk mode Old term for CAM.

MPPC Microsoft Point-to-Point Compression protocol.

raw print queue A print queue enabled without a print driver having been specified. Instead of processing data before sending it to a printer, the `lp` utility sends raw, unprocessed data to the printer.

RDP Microsoft Remote Desktop Protocol.

server Generically defined as a network device that manages resources and supplies services to a client. This manual refers in particular to the Sun Ray server(s), which host Sun Ray sessions and DTUs, and to Windows Terminal Servers,

which act as hosts for Windows applications that can be reached by RDP clients, of which the Sun Ray Connector is an example. The Sun Ray DTU is a client of the Sun Ray server; the Sun Ray Connector is a Windows Terminal Server client.

server farm A cluster of servers linked with load balancing software.

service For the purposes of the Sun Ray Server Software, any application that can directly connect to the Sun Ray DTU. It can include audio, video, X servers, access to other machines, and device control of the DTU.

session A group of services associated with a single user.

session directory A database that keeps track of which users are running which sessions on which Windows Terminal Servers, which makes it possible for users to reconnect to their previously disconnected Windows sessions.

session mobility The ability for a session to "follow" a user's login ID or a token embedded on a smart card.

Sun Ray DTU The desktop unit, originally known as the desktop terminal unit, is the physical appliance used to transmit keystrokes and mouse events to and receive display information from the Sun Ray server. The Sun Ray DTU hardware has a built-in smart card reader, and most models also contain a flat-panel display.

Terminal Server client The client software used to access remote sessions hosted on a Windows Terminal Server, in this case, the Sun Ray Connector.

thin client Thin clients remotely access some resources of a computer server, such as compute power and large memory capacity. The Sun Ray DTUs rely on the server for all computing power and storage. Within the client-server computing model, thin clients are distinguished from fat clients by the absence of local operating systems, applications, disc drives, fans, or other devices that fat clients need in order to operate.

upstream audio The capability for recording sound from the client to the server.

URI Uniform Resource Identifier, the generic term for all types of names and addresses that refer to objects on the World Wide Web.

URL Uniform Resource Locator, the global address of documents and other resources on the World Wide Web. A URL is a specific type of URI.

Windows terminal Any device used to access Windows applications residing on a Windows Terminal Server.

Windows Terminal Server A server that hosts Microsoft applications for remote terminals or clients.