

# **Sun Ray Connector for Windows OS 2.3 Administration Guide**

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## About SRWC (All Topics)

### Features

The Sun Ray(TM) Connector for Windows OS is a client based on the Microsoft Remote Desktop Protocol (RDP) that enables Sun Ray users to access applications running on remote Microsoft Windows systems. This client is especially useful to those who are accustomed to Windows-based applications or who want to access documents in certain formats from a Sun Ray thin client. Users can access their Windows desktop, which can either occupy the entire Sun Ray screen or run in a window in a Solaris(TM) or Linux environment.

The Sun Ray Connector for Windows OS is often referred to as the Sun Ray Windows Connector (SRWC).

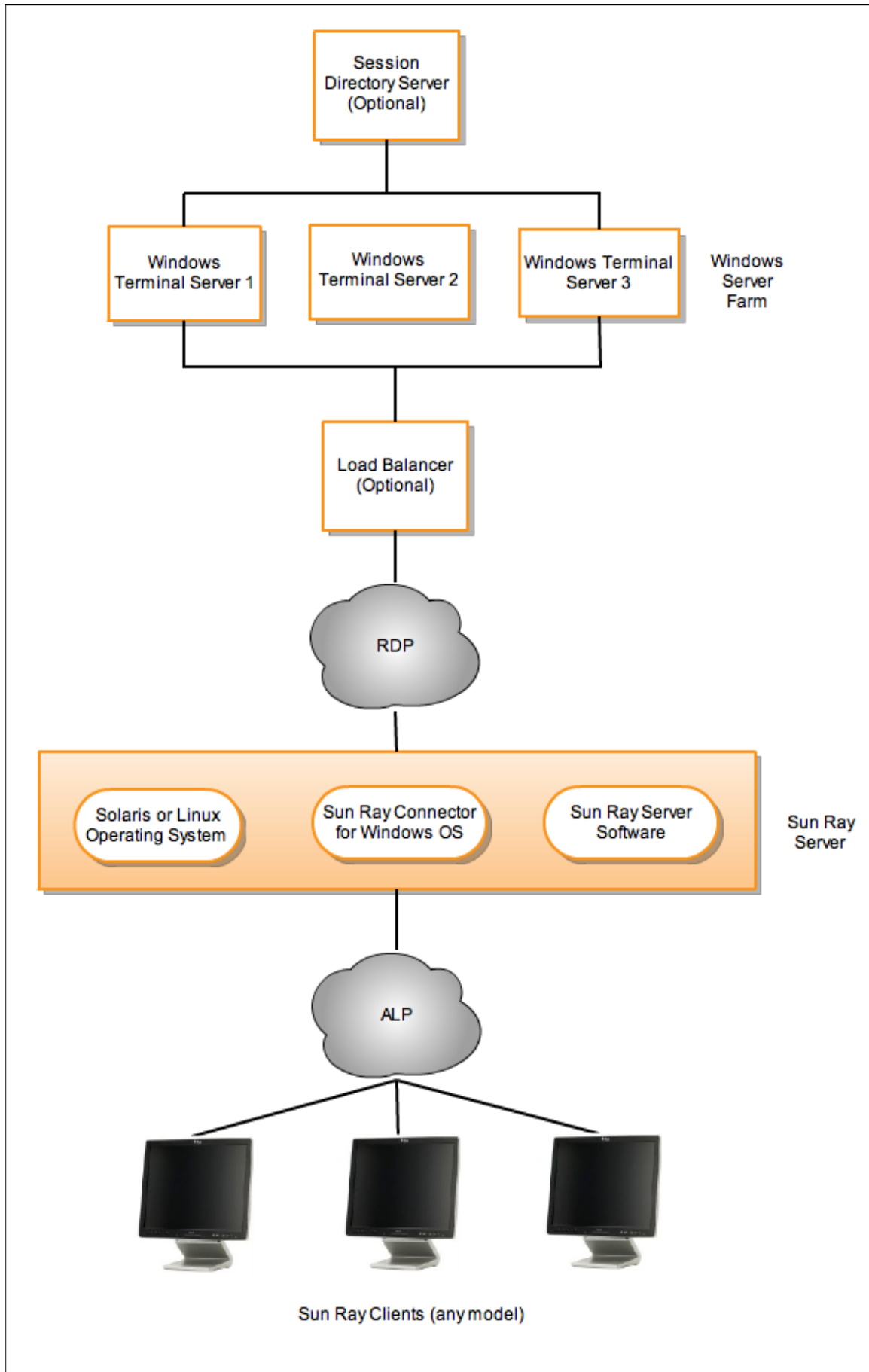
The following table outlines the features provided by SRWC.

Feature	Description
Audio Support	Users can play sound files on their Sun Ray desktops (audio out) with audio applications located on the Windows system. Recording from the Sun Ray DTU to the Windows system (audio in) is also supported.
Clipboard	<p>The Sun Ray Windows 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. The Sun Ray Windows Connector does not support copying and pasting functionality for Rich Text Format.</p> <p>The following behaviors, although similar, are caused by limitations in different applications:</p> <ul style="list-style-type: none"><li>• Once a copy-and-paste operation has been performed from a <code>dterm</code> window, subsequent copy-and-paste operations from the same window to a Windows application always show the data from the first such operation.</li><li>• Cut-and-paste operations do not work from <code>dtpad</code> to Windows applications.</li><li>• Cut-and-paste menu options do not work correctly in transfers from StarOffice applications.</li></ul>
Compression	The Sun Ray Windows Connector uses RDP bulk compression to compress data between the Sun Ray Server, which runs the Sun Ray Windows Connector, and the Windows system. For more information, see <a href="#">Managing Session Connections</a> .
Encryption	The Sun Ray Windows Connector uses RSA Security's RC4 cipher, which encrypts data of varying size with a 56-bit or a 128-bit key, to secure all data being transferred to and from the Windows server. For more information, see <a href="#">Managing Session Connections</a> .
Local Drive Mapping	File systems from removable media devices, such as Flash drives, can be connected to the Sun Ray server USB ports and mapped to the Windows environment through the <code>utstoraged</code> command, where they appear as locally mounted drives. Any file can be mounted and mapped from the Sun Ray environment to the Windows environment.
Multimedia Redirection	The Sun Ray Windows Connector provides features to increase the performance for video streams and Adobe Flash content, including rapidly-changing screen content in some scenarios. The support provided is dependent on the Windows OS. For more information, see <a href="#">Managing Multimedia</a> .
Printing	From a Windows session, a user can print from a Windows application using any of the following configurations: a network printer or a locally attached printer on the Windows system, a network printer or a locally-attached printer on the Sun Ray server, or a local printer attached to the Sun Ray client.

Serial Port Mapping	Users can access the 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 by means of a serial adapter.
Session Directory	The Sun Ray Windows Connector supports server session reconnection based on load balancing information and Session Directory, a database that keeps track of which users are running which sessions on which Windows Terminal Servers. Session Directory functionality enables Sun Ray Windows Connector users to reconnect automatically to the right Windows session. Terminal services session load balancing is handled transparently by the Windows Terminal Server. For more information, see <a href="#">About Session Directory</a> .
Smart Cards	The Sun Ray Windows Connector uses the PC/SC framework to enable applications on the Windows system 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.
USB Device Redirection	Enables users to access USB devices connected to a Sun Ray DTU from their Windows sessions, provided that the appropriate device drivers are installed on the Windows server. For more information, see <a href="#">About USB Device Redirection</a> .

## SRWC Architecture Overview

From a user point of view, the Sun Ray Windows Connector mediates between the Sun Ray desktop and a Windows system, which can be a Windows Terminal Server. It resides on the Sun Ray server and uses the Remote Desktop Protocol (RDP) to communicate with the Windows system and the Appliance Link Protocol(TM) (ALP) to communicate with the Sun Ray desktop, as shown in the following figure.



Once the Sun Ray Windows Connector is installed, the user can type a simple command to connect to a Windows system where the usual applications reside. The command can be modified to accommodate a variety of preferences, or options, for example, to specify screen size or a list of available printers.

For a list of procedures describing how to use the Sun Ray Windows Connector, see [Using \(All Topics\)](#).

## About Licensing

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

Licenses can be administered, such as listing and deleting licenses, with the `utlicenseadm` command. See the `utlicenseadm` man page for details.

The Sun Ray Windows Connector supports both per-user and per-device Terminal Server Client Access Licenses (TS-CAL):

- Per-user mode - The user's hotdesking experience is virtually seamless.
- Per-device mode - The user must reauthenticate every time they hotdesk to a different DTU to ensure correct TS-CAL license handling.



### 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 that you are using to determine which licenses you must acquire. Currently, information regarding Terminal Services can be found at:

<http://www.microsoft.com/windowsserver2008/en/us/how-to-buy.aspx>

## Per-user Mode Versus Per-device Mode

To show the different behavior between the per-user and per-device modes, let's start with the user logging into a Sun Ray session with a smart card and opening a connection to a Windows session. The following table shows what happens next when the user removes the smart card and inserts it again.

The User Removes the Smart Card and...	Per-user Mode	Per-device Mode
Reinserts the Smart Card in the same DTU.	The user is instantly reconnected to the existing Windows session.	The user is instantly reconnected to the existing Windows session.
Inserts the Smart Card in a different DTU.	The user is instantly reconnected to the existing Windows session.	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: <ul style="list-style-type: none"><li>• Windows Media Player stops playing audio/video file, although the application is still active on the Windows session. The user needs to replay the audio/video file.</li><li>• Any serial port transfer is stopped. All the command line options specified remain valid.</li></ul>



You can use the `-O` option of the `uttscc` command to prevent the Sun Ray Windows Connector from disconnecting upon detection of hotdesking events.



With the `-O` option, the Sun Ray Windows Connector does not disconnect and reconnect when a hotdesk event occurs, nor does it refresh licenses on different DTUs. Instead, it uses the original license granted upon connection to the first DTU. This behavior might cause you to inadvertently violate your Microsoft Terminal Server license agreement. Because you have full responsibility for license compliance, be aware of the danger and use the `-O` option only with caution.



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# Managing USB Device Redirection (All Topics)

## About USB Device Redirection

The USB redirection feature enables users to access USB devices connected to a Sun Ray DTU from their Windows sessions, provided that the appropriate device drivers are installed on the Windows server.

Once you [install the USB redirection component](#) and [add USB Drivers to the Virtual Machines](#), users can simply plug in and access supported USB devices from their Sun Ray DTU.



### Note

Human Interface Devices (HID) such as keyboards and mice do not use the USB redirection component.

## Device Access

The accessibility of USB devices through USB redirection is determined by what Windows OS you are using for the remote desktop connection.

When using the single-user Windows XP or Windows 7 platforms, the USB devices connected to a client are accessible only to the user logged into the client's Windows session.

When using the Windows Server 2003 R2 or Windows Server 2008 R2 platforms, the USB devices connected to a client are accessible and visible to all desktops running on the Windows server. Sharing USB devices between multiple clients does not require any additional setup. Users are always prompted to verify if it is acceptable to share their USB device with others.

## Supported Configurations

For the list of supported Windows operating systems, see [Sun Ray Software 5.1 System Requirements](#).

USB redirection is available through the following configurations:

Configuration	Description
SRS 5.1 and Sun Ray Connector Kiosk Session	Supports connection to Windows desktop using the Kiosk session.
SRS 5.1 and Sun Ray Connector for VMware View Manager (SRVC) 1.2.	In this configuration, the kiosk mode should be configured with the session type as "VMware View Manager session."

## Supported USB Devices

For the list of supported USB devices for the USB redirection feature, see [Sun Ray USB Peripherals List for Windows \(Oracle Supported\)](#).

## Important Notes

- Devices should be connected to a user's session only after a Windows session is established. When users exit their session, the device should be disconnected.
- If a device is connected before a Windows session is established and the device is not available in the Windows session, hotplugging the device will make it available to the Windows session.
- Before disconnecting a USB device being used through USB-R during a live Windows session, users must follow the same steps to safely remove the USB device as if the device were directly connected to Windows.
- There is no limit to the number of USB devices that USB redirection can support on a client. A USB hub can be used to expand the number of physical USB ports if needed.
- USB external smart card readers cannot be used for session authentication with USB redirection.
- The following scenarios might lead to data corruption on the device:
  - Hotplugging a device during data transfer
  - Hotdesking during data transfer
  - If the session is disconnected for any reason
- Some unpowered USB devices may draw more current than what is supported by the Sun Ray DTU. If you see the following overcurrent icon, then the device may not work properly.



## How to Add USB Drivers to a Virtual Machine

This procedure should be done before the USB Redirection feature is installed. For details on installing USB Redirection, see [How to Install the Sun Ray Connector Windows Components](#).

If your Virtual Machine (VM) does not have the USB driver installed by default, you must install the driver for USB device redirection to work properly. Examples of VMs that require this step include VMWare ESX and Hyper-V Server.

1. Make sure the Windows system has access to the Windows XP ISO used to create the VM.
2. Copy the `usbdriver.sys` file from the Windows XP ISO to the VM.

For 32-bit:

```
cp <ISO-image>\i386\usbdriver.sys \windows\system32\drivers
```

For 64-bit:

```
cp <ISO-image>\amd64\usbdriver.sys \windows\system32\drivers
```

3. Change to the `drivers` directory.

```
cd \windows\system32\drivers
```

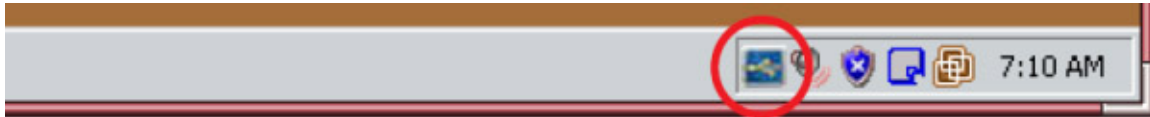
4. Install the USB drivers.

```
expand usbdriver.sys usbdriver.sys
```

5. Reboot the VM.

## How to Verify that USB Redirection is Active

When the USB redirection is active and running in a session, the following icon should appear in the System Tray, indicating that the server is ready for USB devices.



When you see this icon, you can connect USB devices to the Sun Ray DTU.

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## Troubleshooting USB Redirection

For information about the latest known bugs and other issues about USB redirection, see the [SRWC Release Notes](#).

### Supported USB Devices

The first troubleshooting step is to make sure the USB device is supported. This release supports the following USB device types: flash drives, printers, scanners, USB-to-serial adapters, and USB-to-parallel adapters. Check the [Sun Ray USB Peripherals List for Windows \(Oracle Supported\)](#) for the list of tested devices from each of the supported device types.

### General Troubleshooting

Here is a list of questions if USB redirection is not working.

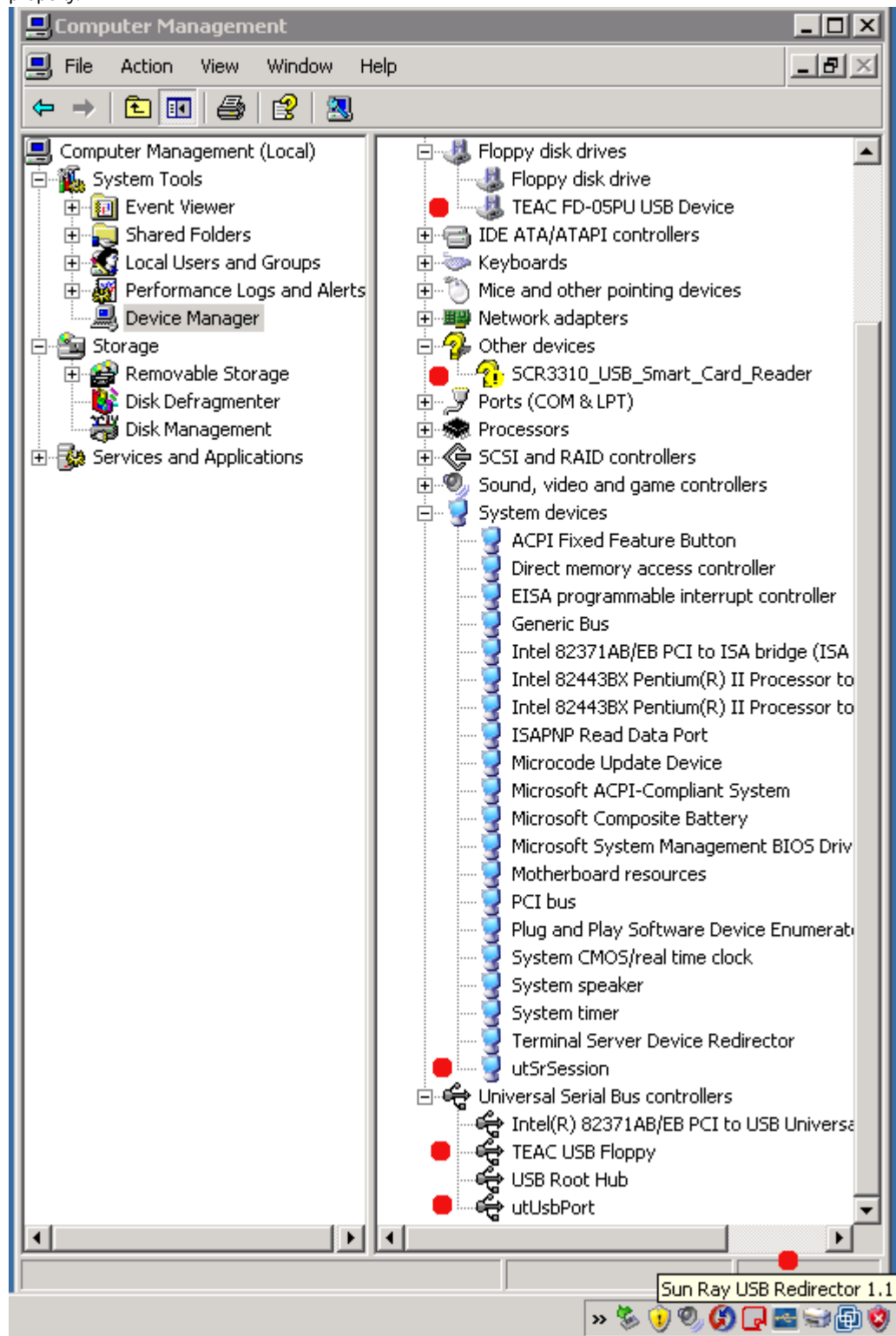
- Is the [USB redirection icon](#) displayed in the Window's System Tray.
- Are you using a supported USB device type. Check the [Sun Ray USB Peripherals List for Windows \(Oracle Supported\)](#) for the list of tested devices from each of the supported device types.
- Are you using USB redirection in a supported configuration. See [Supported Configurations](#) for details.
- Are you using a USB device that draws more current than what is supported by the Sun Ray client. If there is a power problem with the device, the following overcurrent icon is displayed.



- Was the USB device was plugged in after the Windows session was established? If not, disconnect the USB device and plug it in again.
- Are you using a USB external smart card reader for session authentication. If so, this will produce unpredictable behaviors.
- Is the USB redirection feature configured properly in the Windows Device Manager? Is the USB device configured properly (appropriate device driver installed) in the Windows Device Manager?

The following example shows that USB redirection feature is configured properly (`utSrSession` under Device Manager/System devices and `utUsbPort` under Device Manager/Universal Serial Bus controllers). And, it shows that the

TEAC USB Floppy is configured properly, but the SCR3310\_USB\_Smart\_Card\_Reader device is not configured properly.



## Debugging Log Files on Windows



### Note

The tracer utility output should be sent to Sun support. The output is not intended for customer diagnosis.

## Tracer Utility

The tracer utility enables you to capture the log information for the USB redirection activities. Note that these log files are not in

a human readable format.

To use the tracer utility:

1. Log in as the administrator account.
2. Choose Run from the Start menu.
3. Start the tracing utility using the following command:

```
C:\Program Files\Sun\SunRay\utUsbTraceController\uttrace start [-s <filesize>]
```

This example shows the location of the `uttrace` command based on the default installation. The `-s <filesize>` option specifies the size of the log file before the log output rotates to a new file. `<filesize>` must be specified in Mbytes. Default is 500 Mbytes.

4. Log in as the user account and replicate the issue.
5. Stop the tracing utility using the following command:

```
C:\Program Files\Sun\SunRay\utUsbTraceController\uttrace stop
```

The tracer utility log files are located in the following directory:

```
C:\Program Files\Sun\SunRay\Logs
```

The tracer utility log files have the following format:

```
trace log (<YYYY>-<MM>-<DD>)-(<HH>-<MM>-<SS>)-1.etl
```

## Debugging Log Files on Sun Ray Server

### Log Files

You can also refer to the more general [SRWC Log Files](#) for troubleshooting USB redirection issues.

To generate a log file with full debug information for USB redirection:

1. Become superuser on the Sun Ray server.
2. Uncomment the `USB_DEBUG_ON` variable in the `/etc/init.d/uttscp` file and make sure it is set to something like `"-D 20"`.

```
USB_DEBUG_ON="-D 20"
```

3. Restart the SRWC proxy daemon.

```
# /opt/SUNWuttsc/sbin/uttscrestart
```

Log files are located at `/var/opt/SUNWut/log/uttscpd.log*`.

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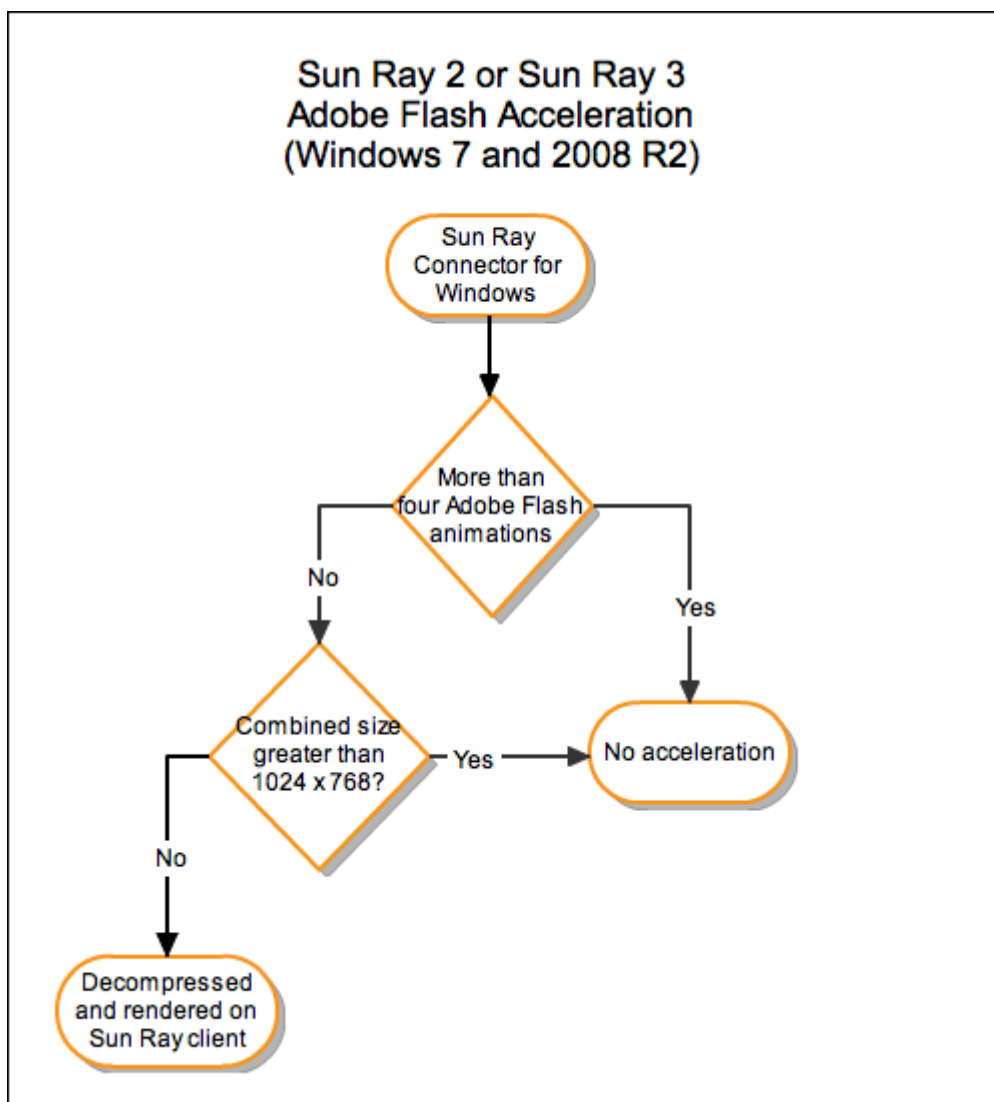
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## Managing Multimedia (All Topics)

### About Adobe Flash Acceleration (Windows 7 and 2008 R2)

For Windows 7 and 2008 R2 in SRWC, Adobe Flash media performance is improved through a customized compression program together with RDP 7. This acceleration not only affects Adobe Flash media, but it improves many instances of rendering an area of the screen that changes often (like an hourglass that indicates progress).

The following diagram shows when the Adobe Flash acceleration occurs for Sun Ray DTUs when using a Windows 7 or Windows 2008 R2 session.



To verify that the Adobe Flash acceleration is occurring on the Sun Ray client, see [Troubleshooting Multimedia](#).

This feature is enabled by default. You can use the `-D` option of the `uttsc` command to disable the acceleration. For example:

```
% uttsc -u user04 -A 24 -g 1024x768 -D <hostname.domain>
```

## About Multimedia Redirection (Windows XP and 2003)

The multimedia redirection component redirects video streams to provide better performance for various models of Sun Ray DTU. For information about installing the multimedia redirection component, see [How to Install the Sun Ray Connector Windows Components](#).

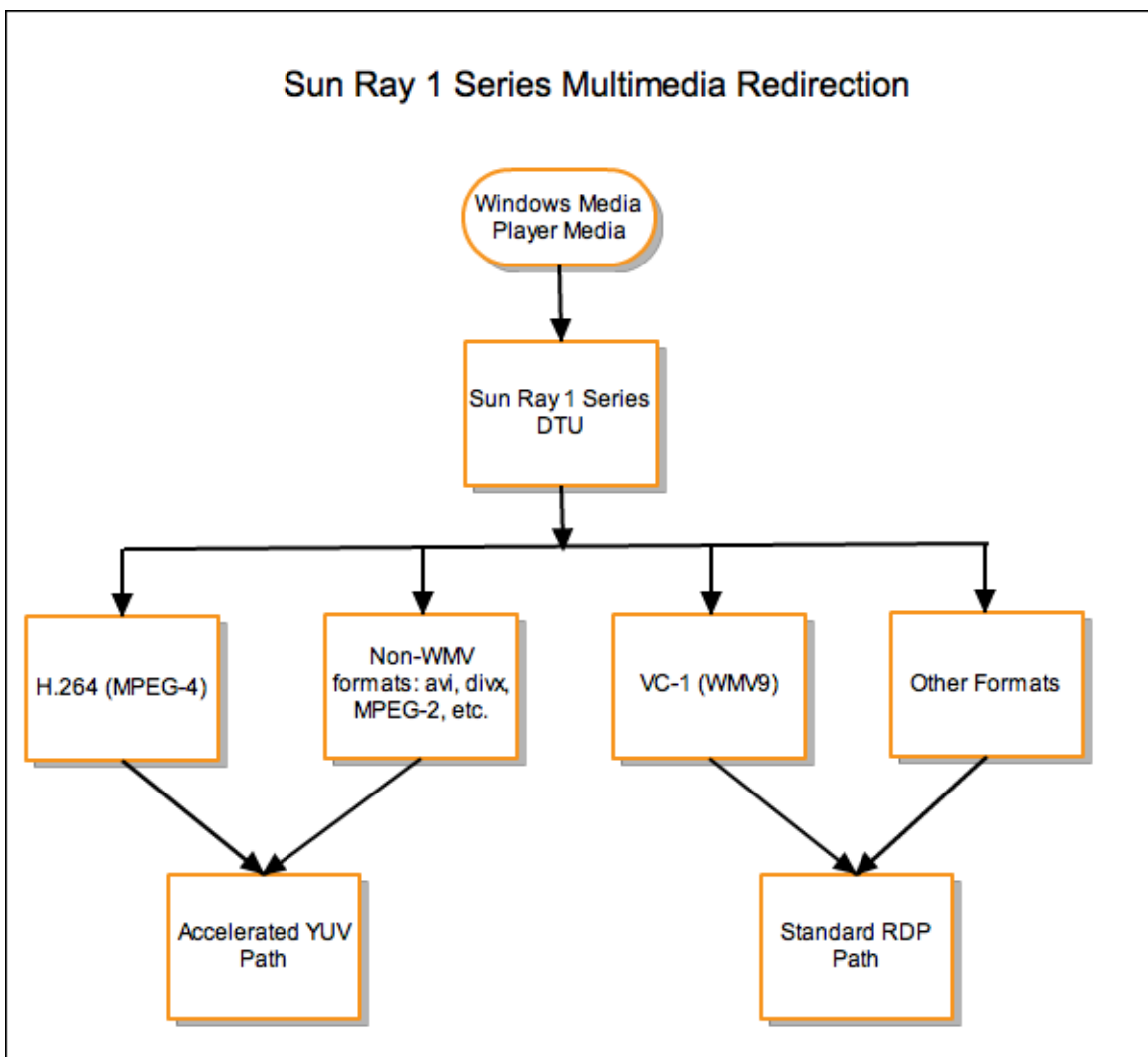
Performance can be improved for the following multimedia paths:

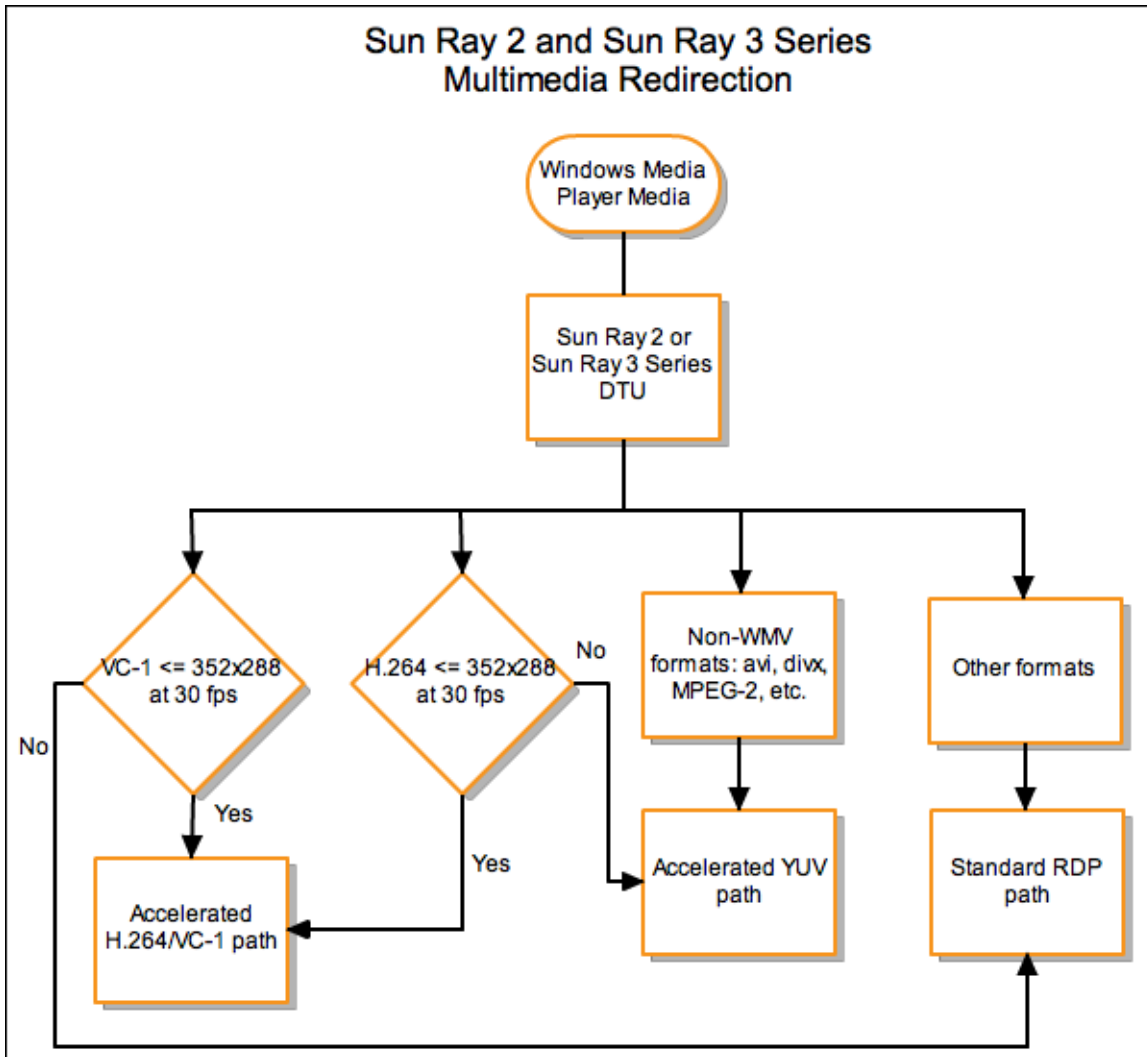
Accelerated Path	Description
YUV	An accelerated YUV path for Sun Ray clients.
H.264 and VC-1	An accelerated H.264/VC-1 path for the Sun Ray 2 and Sun Ray 3 series clients, where H.264 and VC-1 codecs are supported in the hardware.

**Note**  
The multimedia redirection feature for Windows XP and 2003 does not include support for Adobe Flash content. You need to install the [Adobe Flash Acceleration](#) feature.

The multimedia redirection component supports Windows Media Player 10 and 11. A standard RDP path is used for other media formats.

The following diagrams show how the multimedia redirection works for Sun Ray DTUs.





### H.264 Video Support

The best profile supported by the current Sun Ray hardware is Baseline, up to level 2.0. Certain videos encoded in the Main profile might play, however, the Sun Ray decoder does not support CABAC encoding or data partitioning, and cannot decode high-profile streams. Unsupported streams result in a black window or an error reported to the player.

For best results, video files should be encoded in Baseline profile at up to 352x288 pixels (CIF) and 15 frames per second (fps).

### VC-1 Video Support

Sun Ray 2 family DTUs support all Simple and Main VC-1 profiles, up to the following levels:

Profile	Video Level
Simple Profile, Low Level	176x144 pixels (QCIF) at 15 frames per second
Simple Profile, Main Level	352x288 pixels (CIF) at 15 frames per second
	320x240 pixels (QVGA) at 24 frames per second
Main Profile, Low Level	320x240 pixels (QVGA) at 24 frames per second
	352x288 pixels (CIF) at 30 frames per second

VC-1 Simple/Main profiles are compatible with the Windows Media Video 9 (WMV9) format and also use the hardware decoding in Sun Ray 2 series DTUs.





#### Note

\*.wmv files that are not VC-1 encoded cannot take advantage of accelerated playback.

## YUV Video Support

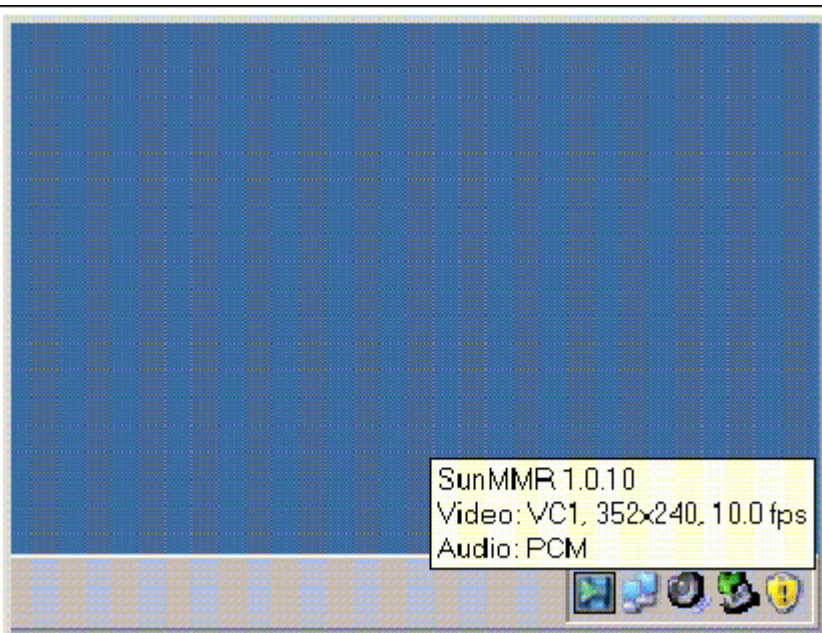
An accelerated path for YUV video delivery enables improved playback of video formats such as MPEG-1 and MPEG-2 by reducing the bandwidth required to deliver the decoded video to the Sun Ray DTU. The accelerated YUV path is used automatically so long as the correct software decoders are available for the video format required and the software is configured to make use of the XVideo extension. The following YUV formats are supported:

- Planar: YV12, I420
- Packed: UYVY, YUY2

H.264 or VC-1 video playback on a Sun Ray 1 DTU, which does not have a hardware decoding capability, uses software decoding and the accelerated YUV path.

## How to Verify that Multimedia Redirection is Active

A small, context-sensitive Play button is displayed as an icon in the task bar when the multimedia redirection component is being used for video playback. Hovering the mouse over the icon displays the media type and size.



## How to Disable Multimedia Redirection

The standard RDP protocol is used for video when the multimedia redirection feature is disabled.

- When issuing the `uttsc` command, use the `-M off` option.

```
% uttsc -M off <more_uttsc_options>
```

## About Adobe Flash Acceleration (Windows XP and 2003)

The Adobe Flash Acceleration feature provides better performance of Flash display on DTUs. For information about installing the Adobe Flash Acceleration feature, see [How to Install the Sun Ray Connector Windows Components](#).

When Flash acceleration is enabled, Flash content is diverted from the default RDP channel and sent through a private channel to

the Sun Ray DTU to achieve better performance and audio/video synchronization. The two main paths for Flash acceleration depend on the display mechanism of the Flash video content:

- DTU (XvEnc) - Flash content is decompressed and rendered in the DTU. This path yields the highest frame rates.
- X11/Xvideo - Flash content is decompressed on the Sun Ray server and is rendered by the X11 or Xvideo API before it is sent to the DTU.

By default, the DTU (XvEnc) path is enabled. You can use the `-F` option of the `uttscc` command to control which flash acceleration path is used.

## Supported Configurations

For the list of supported Windows operating systems, see [SRS 5 System Requirements](#).

Flash acceleration is provided in the following environment:

- Internet Explorer version 7 and 8 (32-bit)
- Adobe Flash 9 content with all Adobe Flash Players from versions 9 and 10



Other browsers and stand-alone applications leveraging the Flash runtime environment will not be accelerated and will continue to leverage existing RDP/X11 rendering.

## How Does Flash Acceleration Work?

Flash animations are compressed on Windows and sent directly to the Windows Connector. This compression dramatically reduces the amount of data transferred between the Windows server and the Sun Ray server.

On Sun Ray 2 and Sun Ray 3 series DTUs, the Flash display updates are sent by SRWC to the DTU to be decompressed and displayed. This process reduces the data transferred between the Sun Ray server and the DTU and does not affect the Sun Ray server CPU load. In Xinerama configurations, DTU decompression is not available.

On Sun Ray 1 series DTUs, the Flash display updates are decompressed on the Sun Ray server and rendered through the Xvideo or X11 APIs.

In multihead configurations, Flash acceleration is available on all heads.

## When Does Flash Acceleration Happen?

A maximum of four concurrently displayed Flash animations can be decompressed in the DTU (Sun Ray 2 and Sun Ray 3 series) or displayed over Xvideo (Sun Ray 1 series). If more than four Flash animations are displayed, the Flash animations beyond the first four are displayed using the X11 API.

On Sun Ray 2 series DTUs, Flash animations are decompressed in the DTU as long as the combined size of all Flash animations is less than 1024x768. When this size is exceeded, the Flash animations that exceed the 1024x768 limit are displayed through Xvideo or, if more than four animations are displayed, through X11.

For example, if there are three animations and the first two combined animations are below the 1024x768 limit, the first two animations will be rendered in the DTU. If the third animation pushes the combined size above the limit, then the third animation will go through Xvideo and the first two animations will still render in the DTU. However, because the largest animations are always rendered through the DTU first, the rendering order might change. To use the same example, if the third animation pushes the combined size over the limit and the first animation is the smallest out of the three, then the smaller animation will go through Xvideo and the other two animations will go to the DTU, provided that their combined size is below the limit.



**Note**

When calculating Flash animation combined sizes, add the pixel sizes of the animations together. For example, the combined pixel size of three animations at 640x480 is 921,600 pixels, which would be over the 1024x768 limit (786,432 pixels).

$$(640 \times 480) + (640 \times 480) + (640 \times 480) = 921,600 \text{ pixels}$$

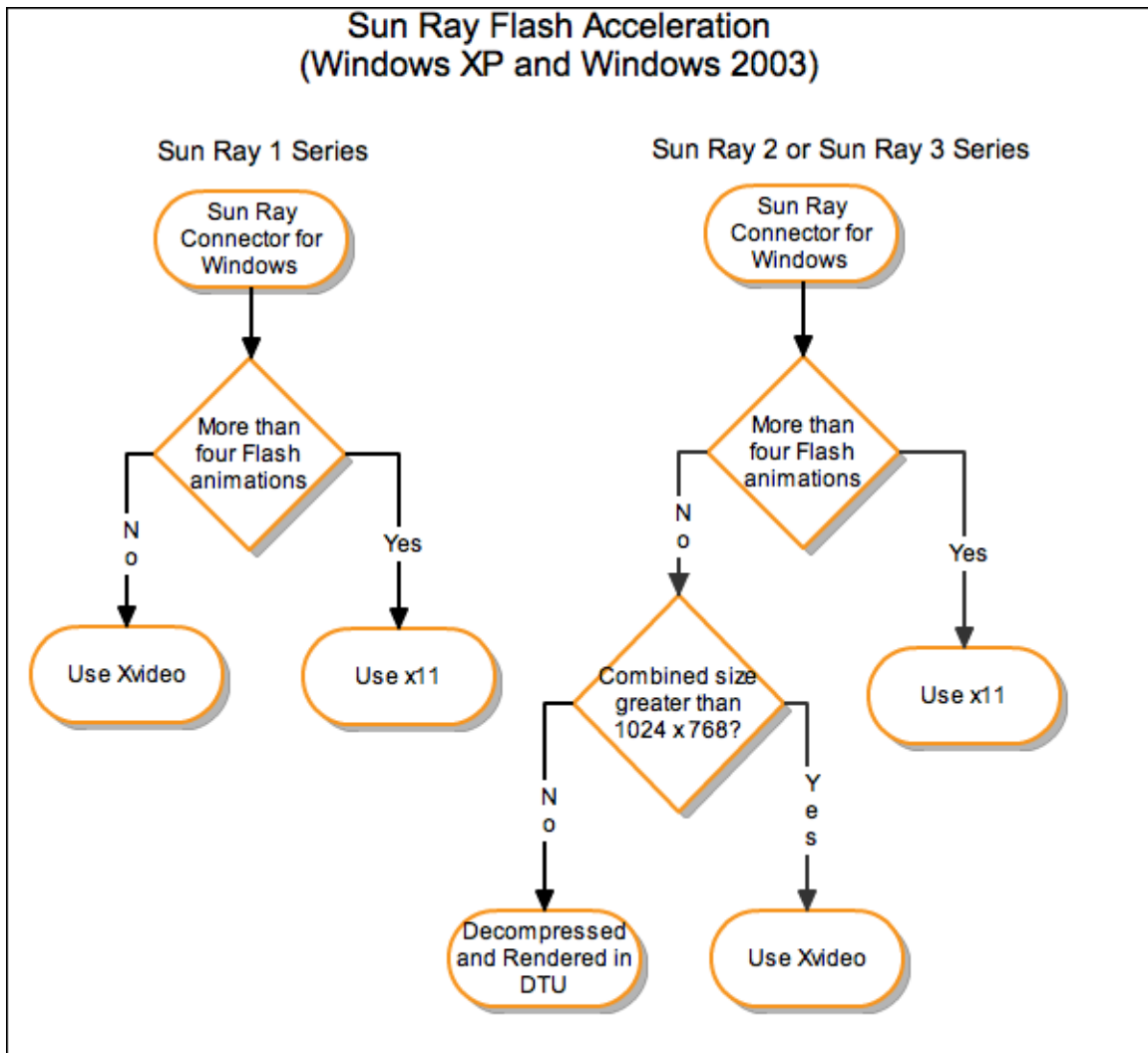


**Note**

When the Flash animation size limit is exceeded, Xvideo or X11-based acceleration is used, with Xvideo given a priority. Depending on the Flash content that is being accelerated, X11-based acceleration or no acceleration at all might provide a better user experience than Xvideo-based acceleration.

Typically, Xvideo-based acceleration is best when most of the Flash area is updated regularly, for example, for a movie where full frames are displayed one after the other. X11-based acceleration or no acceleration can provide a better user experience if only small areas of a large Flash area are updated.

The following diagrams also describe when Adobe Flash acceleration happens.



## How to Disable Adobe Flash Redirection

The standard RDP protocol is used for Adobe Flash content when the Adobe Flash acceleration feature is disabled.

- When issuing the `uttsc` command, use the `-F off` option.

```
% uttsc -F off <more_uttsc_options>
```

## About Audio Input

Audio input redirects incoming audio from a Sun Ray client to a Windows session. When a user connects an analog audio input device (such as a microphone or headset) to a physical Sun Ray client, the Windows session automatically detects and redirects the device, making it work like a local device in the Windows environment.

SRWC provides two versions of an audio input feature depending on the Windows release. For Windows XP and 2003, the feature must be installed as a [Windows Component](#). For Windows 7 and 2008 R2, audio input is automatically provided.

Audio input is disabled by default. You can enable audio input by using the following `uttsc` option:

```
-r soundin:[low|medium|high|off]
```



Windows 7 Enterprise has audio capture disabled by default. Audio capture must be enabled for the audio input feature to work properly. To enable audio capture on Windows 7 Enterprise, see [Microsoft knowledge article 2020918](#).



Audio input is not available through VPN connections.

The page [Troubleshooting Multimedia Redirection](#) does not exist.

---

### Contents

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- [How to Configure a Kiosk Mode Session for SRWC](#)

---

## Managing the SRWC Kiosk Mode Session (All Topics)

### About the SRWC Kiosk Mode Session

The Sun Ray Windows Connector Kiosk Mode Session enables 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 Kiosk Mode, the Sun Ray DTU behaves like a Windows Based Terminal, which means users do not have to interact with the Solaris or Linux login screen and no longer need to specify the `uttsc` command.

The Sun Ray Windows Connector Kiosk Mode Session is installed automatically as part of Sun Ray Windows Connector installation. The package name is `SUNWuttsc-kiosk`.

The core components of the Kiosk Mode Session are:

- Kiosk Session Service session descriptor - `/etc/opt/SUNWkio/sessions/uttsc.conf`
- Kiosk Session Service session script - `/etc/opt/SUNWkio/sessions/uttsc/uttsc`

Added applications are not supported.

## Session Descriptor

The session descriptor defines a number of attributes useful for the administration and launching of the session. These attributes include the following:

Kiosk Session Descriptors	Descriptor Description
KIOSK_SESSION_EXEC	Identifies the location of the session script.
KIOSK_SESSION_LABEL KIOSK_SESSION_DESCRIPTION	Identify a label and description respectively to be used by the Sun Ray Admin GUI.
KIOSK_SESSION_ARGS	Identifies default session script arguments. For more information, see <a href="#">Session Script Arguments</a> .

## Session Script

The session script is used to launch the Sun Ray Windows Connector. The script provides a simple wrapper on the Sun Ray Windows Connector executable, `/opt/SUNWuttsc/bin/uttsc`.

A two-minute timeout is imposed on Windows sessions that remain at the Windows login screen. When this timeout elapses, the associated Windows session is terminated and the Sun Ray Windows Connector terminates subsequently. If no Windows login takes place, the desktop unit appears to reset every two minutes.

To avoid the two-minute timeout, the session script supports its own timeout mechanism, which is initiated when the script detects that the Sun Ray Windows Connector has terminated. If the session script timeout interval has not elapsed, the session script relaunches the Sun Ray Windows Connector. If the session script timeout has elapsed, the session script terminates, and the Kiosk session also terminate as a result. The timeout may be specified as a session script argument. It has a default value of 30 minutes.

## Session Script Arguments

A number of arguments are supported by the session script and they may be specified using the Sun Ray Admin GUI. Sun Ray Windows Connector arguments are not processed by the session script and are simply passed directly to the Sun Ray Windows Connector. Non-Sun Ray Windows Connector arguments are processed by the session script.

The complete argument list should be formatted according to the following example:

```
[<Non Sun Ray Connector arguments>] ["--" <Sun Ray Connector arguments>]
```

## Non-Sun Ray Windows Connector Arguments

Currently, the `-t` and `-h` options are supported.

Option	Description
<code>-t</code>	Sets the value of a timeout interval (in seconds) after which the session script will terminate in the event of a Sun Ray Windows Connector termination. If Sun Ray Windows Connector terminates before the timeout has elapsed it will be restarted by the session script. The default value for timeout is 1800 (30 minutes). Values less than or equal to 0 indicate that the session script should never restart the Sun Ray Windows Connector.
<code>-h</code>	Disables the default behavior of starting <code>uttsc</code> with the <code>-m -b</code> options. This option disables full screen mode and enables the pull-down header.

## Sun Ray Windows Connector Arguments

You may specify any valid `uttsc` arguments here. The `-m` and `-b` `uttsc` arguments are used by default. These arguments enable full-screen mode and disable the pull-down header respectively.

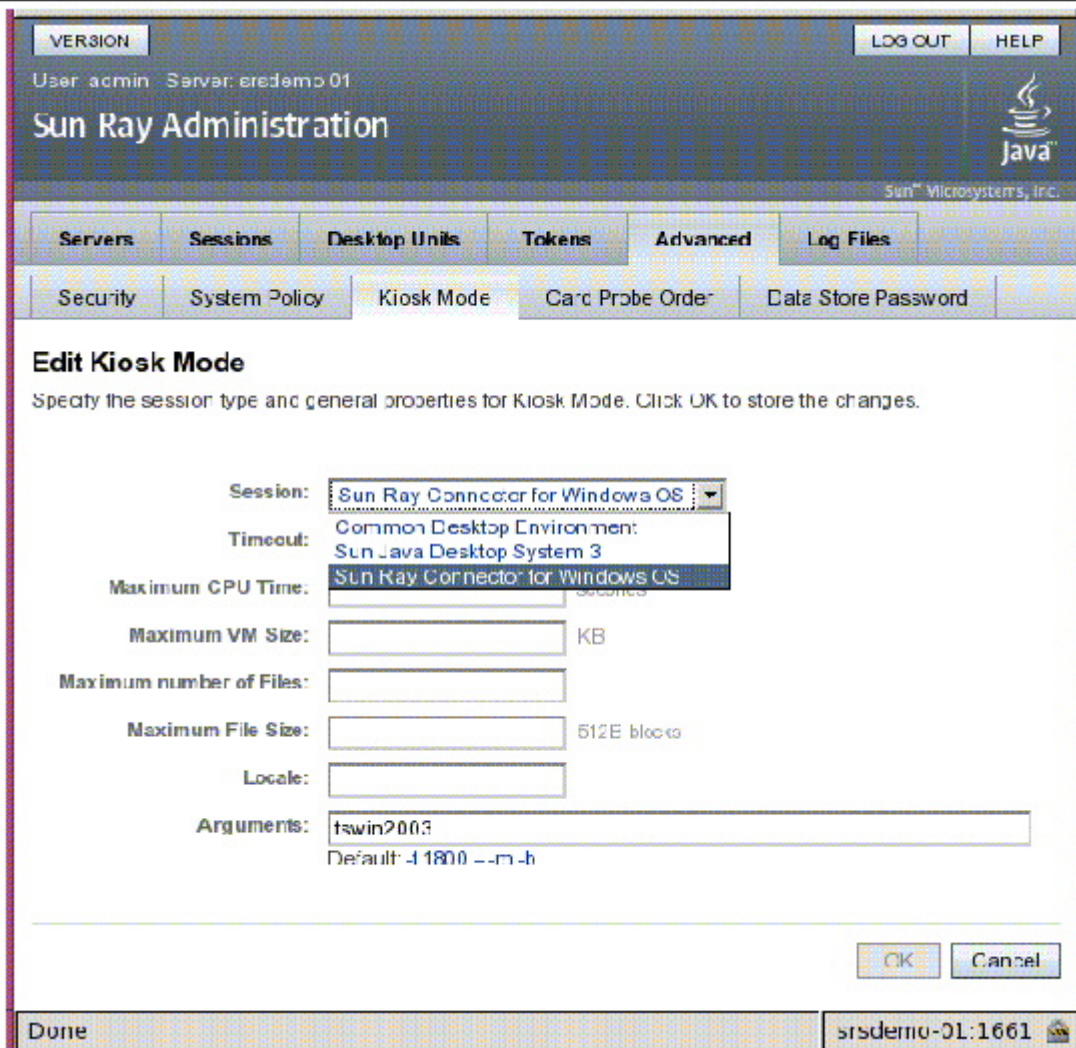


**Note**

The Sun Ray Windows Connector requires at least a server argument. As previously mentioned, you may use the Sun Ray Admin GUI to include this server argument in the session script argument list.

## How to Configure a Kiosk Mode Session for SRWC

1. Log in to the Admin GUI and click the Advanced tab.
2. Click the Kiosk Mode tab.
3. Choose Sun Ray Connector for Windows OS from the Session menu.



**Note**

Once the SRWC session is selected, most of the fields on the main Kiosk page are not available. The Applications list is not available because the Sun Ray Windows Connector session does not support the addition of applications.

4. Add session arguments to the Arguments field at the bottom of the same page.

The minimal required argument is the host name, so the field should contain, at minimum, myhost.mydomain.com. A timeout option (-t timeout) can be added before the -- (two dashes). Further uttsc options can be added after the -- (two dashes).

The following example line specifies:

- A 10-minute timeout (specified in seconds) until the session is cycled if the user does not log in
- Printer forwarding
- Smart card redirection
- Optimized SRWC hotdesking behavior

```
-t 600 -- -r printer:officelaser -r scard:on -O myhost.mydomain.com
```

For more information about session arguments, see [About the SRWC Kiosk Mode Session](#).

---

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# Managing Printers (All Topics)

## About Printing

The Sun Ray Windows Connector supports printing to the following printer configurations:

- Network printers visible on the Windows server
- Network printers visible on the Sun Ray server
- Local printers attached to the Windows server
- Local printers attached to the Sun Ray server
- Local printers attached to the DTU

## Important Notes

- 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.
- For printers accessible through the Sun Ray server (network visible or local), you need to perform some initial configuration to make the printers accessible through SRWC. See [Task Map - Managing Printers](#) for details.

## Task Map - Managing Printers

### Initial Configuration

For printers accessible through the Sun Ray server (network visible or local), you need to perform the following steps to make the printers accessible through SRWC.

Step	Task	Description
------	------	-------------

---

1	<p>Set Up Print Queue (Solaris)</p> <p>Set Up Print Queue (Linux)</p>	This step sets up a raw printer queue on the Sun Ray Server so that a Windows system can access it. If a network printer is visible on the Sun Ray server, the queue has been set up already and you should not have to perform this step.
2	Make Sun Ray Server Printers Available to Windows	This step makes printers configured on a Sun Ray server available to the Windows system.

## Additional Tasks

Task	Description
Set Up Follow Me Printing	Describes how to set up Follow-Me Printing, which retains the user's default printer for a Windows session regardless of the Sun Ray DTU being used.
Maintain a Printer Cache	Describes how to use the <code>uttsprinteradm</code> to manage the users' printer configurations on the Windows system.

## How to Set Up Print Queues (Solaris)

This procedure describes how to set up a raw print queue on a Sun Ray server running Solaris so that a Windows system can access it. This procedure is typically needed for printers locally attached to the Sun Ray server.

### Before You Begin

- If a network printer is visible on the Sun Ray server, this typically indicates that the queue has been set up already and you should not have to perform this task.
- These instructions pertain to raw print queues, which are print queues configured without a printer driver. Please consult your operating system documentation for instructions about setting up queues for PostScript drivers. See also the `lp` and `lpadmin` man pages.

### Steps

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>
```

3. Accept the print queue.

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

### Where to Go Next

To update the Windows session with the available print queues on the Sun Ray Server, you must restart the Sun Ray Windows Connector with the relevant print queues specified on the command line. See [How to Make Sun Ray Printers Available to a Windows Session](#) for details.

## How to Set Up Print Queues (Linux)



This procedure describes how to set up a raw print queue on a Sun Ray server running Linux, so that it can be accessed by a Windows system. This procedure is typically needed for printers locally attached to the Sun Ray server.

## Before You Begin

- If a network printer is visible on the Sun Ray server, the queue has been set up already and you should not have to perform this task.
- These instructions pertain to raw print queues, which is a print queue configured without a printer driver. Please consult your operating system documentation for instructions on setting up queues for PostScript drivers. See also the `lp` and `lpadmin` man pages.

## Steps

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.



After rebooting, you might have to create the `/dev/usb` directory and re-create the soft link.

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. In the `/etc/cups/cupsd.conf` file, set the `RunAsUser` property to `No`.
- b. Restart the `cups` daemon.

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

## Where to Go Next

To update the Windows session with the available print queues on the Sun Ray Server, you must restart the Sun Ray Windows Connector with the relevant print queues specified on the command line. See [How to Make Sun Ray Printers Available to a Windows Session](#) for details.

## How to Make Sun Ray Printers Available to a Windows Session

The Windows session is aware only of the print queues specified in the command line when the Sun Ray Windows Connector is started. To update the Windows session with the available print queues on the Sun Ray server, you must restart the Sun Ray Windows Connector with the relevant print queues specified on the command line.

### Before You Begin

- Make sure the print queues are set up on the Sun Ray server. See [How to Set Up Print Queues \(Solaris\)](#) and [How to Set Up Print Queues \(Linux\)](#) for details.
- Printer data is created on the Windows system, so make sure to specify the name of the printer's Windows driver and install it on the Windows system. If you make a printer available without specifying a driver, the Sun Ray Windows Connector defaults to a PostScript driver.
- To find the printer driver name on a Windows system, check the Windows Registry key at:

```
<MyComputer>/HKEY_LOCAL_MACHINE/System  
/CurrentControlSet/Control/Print/Environments/Windows NT x86/Drivers/Version-3
```

All printer drivers installed on the system is displayed on this list.

### Steps

- To specify a printer's Windows driver:

```
% /opt/SUNWuttsc/bin/uttsc -r printer:<printername>=<driver name>  
<hostname.domain>
```

- To make a printer available without specifying a driver:

```
% /opt/SUNWuttsc/bin/uttsc -r printer:<printername> <hostname.domain>
```

- To make multiple printers available:

```
% /opt/SUNWuttsc/bin/uttsc -r printer:<printer1>=<driver1>,<printer2>=<driver2>  
<hostname.domain>
```

## How to Maintain the Printer Cache File

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

The `uttscprinteradm` CLI 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.

## How to Set Up Follow-Me Printing

This procedure describes how to set up Follow-Me Printing, which retains the user's default printer for a Windows session regardless of the Sun Ray DTU being used.



### Note

Implementation of Follow-Me Printing relies on technology not available by default and non-public Sun Ray interfaces as well as the use of certain public Sun Ray interfaces for purposes other than their intended use. For these reasons, this feature is not a supported feature.

### Steps

1. For each Sun Ray DTU of interest, specify a printer in the Sun Ray data store.
  - a. Log in to the Admin GUI.
  - b. Click Desktop Units.
  - c. Click the Sun Ray DTU for which you want to set up Follow-Me Printing.
  - d. Click Edit and add the printer's name to the Other Information field.
2. Create a shell script that queries the printer name stored in the Sun Ray data store for the current Sun Ray DTU and writes that name to the user's \$HOME/.printers file.

For example:

```
#!/bin/sh
if [ 'uname' = Linux ] ; then
  theFlag="-P"
fi
theMACAddress='cd $theFlag $UTDEVROOT ; /bin/pwd | sed 's/.*<.....>/\1/'
thePrinter='/opt/SUNWut/sbin/utdesktop -o |
            grep $theMACAddress |
            /usr/bin/awk -F, '{print $3}'
echo "_default $thePrinter" > $HOME/.printers
```

3. Use utaction to invoke the script above on an initial connection and subsequently whenever a user moves from one Sun Ray DTU to another.

Provide the following scripts based on the user's login manager:

- dtlogin login manager - Xsession.d script
- Gnome Display Manager (GDM) - xinitrc.d script

For example, you might create the script /usr/dt/config/Xsession.d/1100.SUNWut for dtlogin or /etc/X11/xinit/xinitrc.d/1100.SUNWut for GDM as follows:

```
#!/bin/sh
/opt/SUNWut/bin/utaction -i -c <path-to-script> &
```

where <path-to-script> is the path to the script you created to retrieve the printer name in step 2.



#### Note

The name 1100.SUNWut is chosen purposely in this case to ensure that the script is run or sourced after the existing script 0100.SUNWut. The 0100.SUNWut script is responsible for setting \$UTDEVROOT, which is needed by the first sample script in step 2.



#### Note

For information about the bundled gdmgreeter, see the kiosk man page.

4. Modify your Kiosk session script arguments to redirect the printer to Windows. You may modify these arguments through the Admin GUI. In this example you need to add the argument -r printer:\_default to the existing arguments, resulting in an argument list similar to the following:

```
-t 1800 -- -m -b -r printer:_default <myHost>
```

where <myHost> corresponds to the server argument passed to uttsc.

## Troubleshooting Printers

### Printer Caching

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

To restore the settings, use the same printer driver that was used when the settings were changed.



**Warning**

Using a different driver, even if no settings are changed, can invalidate settings stored 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 (that is, it is 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 [How to Make Sun Ray Printers Available to a Windows Session](#).

## Windows Printing

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

## Solaris or Linux Printing

If a job fails and cannot be diagnosed and fixed with the ordinary UNIX remedies, such as `lpq` or `lprm`, the user should contact the appropriate system administrator.

## Sun Ray DTU Local Printing

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.

For more information, see [Managing Printers](#) and the `uttsc` man page.

---

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  - [How to Enable Smart Card Redirection on a Per-Connection Basis](#)
  - [How to Set Up Smart Card Login for Windows](#)
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## Managing Smart Cards (All Topics)

### About Smart Cards

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

- Strong, two-factor authentication for access control with digital certificates
- PIN-based logins
- Digital signing, encrypting, and decrypting of email messages from Windows-based email clients

For this purpose, SRWC uses the Sun Ray PC/SC-lite framework on the Sun Ray server and smart card middleware on the Windows system.



**Note**

Smart cards and the PC/SC framework are supported on the Solaris Operating System but not on Linux.

The following components are important to implement additional smart card functionality.

---

Component	Information
PC/SC framework	See the <a href="#">PC/SC-lite Release Notes</a> , available from the Sun Download Center (SDLC).
Smart cards	See <a href="#">Managing Smart Cards (All Topics)</a> .
Smart card usage on Microsoft platforms	See Microsoft's Smart Card documentation at: <a href="http://technet.microsoft.com/en-us/library/dd277362.aspx">http://technet.microsoft.com/en-us/library/dd277362.aspx</a> .

## How to Enable Smart Card Redirection on a Per-Connection Basis

This procedure describes how to enable smart card redirection on a per-connection basis.

### Steps

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>
```

## How to Set Up Smart Card Login for Windows

This procedure describes how to set up smart card login for Windows.

1. Set up Active Directory and Certification Authority (CA) on the Windows system.
2. Install the PC/SC framework.  
For more information, see the [PC/SC-lite Installation Guide](#).
3. Install the smart card middleware product on the Windows system.



If you use ActivClient middleware, set the Disable PIN Obfuscation option to Yes through the ActivClient user console on the Windows system.

4. Enroll the necessary certificates onto the Smart Card using either a Sun Ray token reader or an external smart card reader connected to the Windows system.

---

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## Managing Licenses (All Topics)

### About Licensing

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

Licenses can be administered, such as listing and deleting licenses, with the `utlicenseadm` command. See the `utlicenseadm man` page for details.

The Sun Ray Windows Connector supports both per-user and per-device Terminal Server Client Access Licenses (TS-CAL):

- Per-user mode - The user's hotdesking experience is virtually seamless.
- Per-device mode - The user must reauthenticate every time they hotdesk to a different DTU to ensure correct TS-CAL license handling.



#### 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 that you are using to determine which licenses you must acquire. Currently, information regarding Terminal Services can be found at:

<http://www.microsoft.com/windowsserver2008/en/us/how-to-buy.aspx>

## Per-user Mode Versus Per-device Mode

To show the different behavior between the per-user and per-device modes, let's start with the user logging into a Sun Ray session with a smart card and opening a connection to a Windows session. The following table shows what happens next when the user removes the smart card and inserts it again.

The User Removes the Smart Card and...	Per-user Mode	Per-device Mode
Reinserts the Smart Card in the same DTU.	The user is instantly reconnected to the existing Windows session.	The user is instantly reconnected to the existing Windows session.
Inserts the Smart Card in a different DTU.	The user is instantly reconnected to the existing Windows session.	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: <ul style="list-style-type: none"> <li>Windows Media Player stops playing audio/video file, although the application is still active on the Windows session. The user needs to replay the audio/video file.</li> <li>Any serial port transfer is stopped. All the command line options specified remain valid.</li> </ul>



You can use the `-O` option of the `uttscc` command to prevent the Sun Ray Windows Connector from disconnecting upon detection of hotdesking events.



With the `-O` option, the Sun Ray Windows Connector does not disconnect and reconnect when a hotdesk event occurs, nor does it refresh licenses on different DTUs. Instead, it uses the original license granted upon connection to the first DTU. This behavior might cause you to inadvertently violate your Microsoft Terminal Server license agreement. Because you have full responsibility for license compliance, be aware of the danger and use the `-O` option only with caution.

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  - Setting Up, Configuring, and Managing Session Directory
  - Setting Up, Configuring, and Managing Load Balancing
- About Network Security
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## Managing Session Connections (All Topics)

## About Session Directory

The Sun Ray Windows Connector supports server session reconnection based on load-balancing information and Session Directory, a database that keeps track of which users are running which sessions on which Windows Terminal Servers. Session Directory functionality enables Sun Ray Windows Connector users to reconnect automatically to the right Windows session.

Both IP address-based and token-based reconnection are supported. However, token-based redirection requires the use of a hardware-based load balancer for Windows Terminal Servers configured as a server farm. The capacity to use server farms and load balancing enables 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 R2 Enterprise Edition, Windows Server 2003 R2 Data Center edition, or Windows 2008. Session Directory is an optional component that can be configured to use Microsoft proprietary or third-party load balancing products.

## Setting Up, Configuring, and Managing Session Directory

For details of setup, configuration, and operation, see Microsoft's [Session Directory documentation](#).

## Setting Up, Configuring, and Managing Load Balancing

Terminal services session load balancing is handled transparently by the Windows Terminal Server. For more information, please refer to [Microsoft documentation](#)

## About Network Security

To secure all data being transferred to and from the Windows server, the Sun Ray Windows Connector supports built-in RDP network security and enhanced network security options. The built-in RDP security uses the RC4 cipher, which encrypts data of varying size with a 56-bit or a 128-bit key. The enhanced network security options include TLS/SSL (with optional server verification) and Network Level Authentication (NLA) using CredSSP.

## Built-in RDP Network Security

The Sun Ray Windows Connector uses RSA Security's RC4 cipher to secure all data being transferred to and from the Windows system. This cipher encrypts data of varying size with a 56-bit or a 128-bit key.

Four levels of encryption can be configured at the Windows system:

Level	Description
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.



### Note

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

## Enhanced Network Security

The enhanced network security options include TLS/SSL (with optional server verification) and Network Level Authentication

(NLA) using CredSSP. These options protect the Windows session from malicious users and software before a full session connection is established.

For TLS/SSL support, the RDP host must be running Windows 2003 R2, Windows 7, or Windows 2008 R2. For NLA support, the RDP host must be running Windows 7 or Windows 2008 R2, and you must use the `-u` and `-p` options with the `uttscc` command. For both TLS/SSL and NLA support, the Windows server's security layer must be configured as "SSL (TLS 1.0)" or "Negotiate."

The following `uttscc` command line examples show which security mechanism is used when the Windows Remote Desktop Service is configured to negotiate with the client. A result of "RDP" means that the built-in RDP security is used.

#### Command Line Examples for Enhanced Network Security

uttscc Command Line Examples	Windows XP	Windows 2003 R2	Windows 7	Windows 2008 R2
<code>-u user -p</code>	RDP	SSL/TLS	NLA	NLA
<code>-u user -j VerifyPeer:on</code>	RDP	SSL/TLS	SSL/TLS	SSL/TLS
<code>-u user -j VerifyPeer:on -p</code>	RDP	SSL/TLS	NLA	NLA
<code>-N off</code>	RDP	RDP	RDP	RDP

You can enforce NLA security on a Windows server. For example, on a Windows 2008 R2 server, select the following option on the Remote tab of the System Properties window: "Allow connections only from computers running Remote Desktop with Network Level Authentication (more secure)". With this option selected, users must use the `-u` and `-p` options with the `uttscc` command to connect to the server.

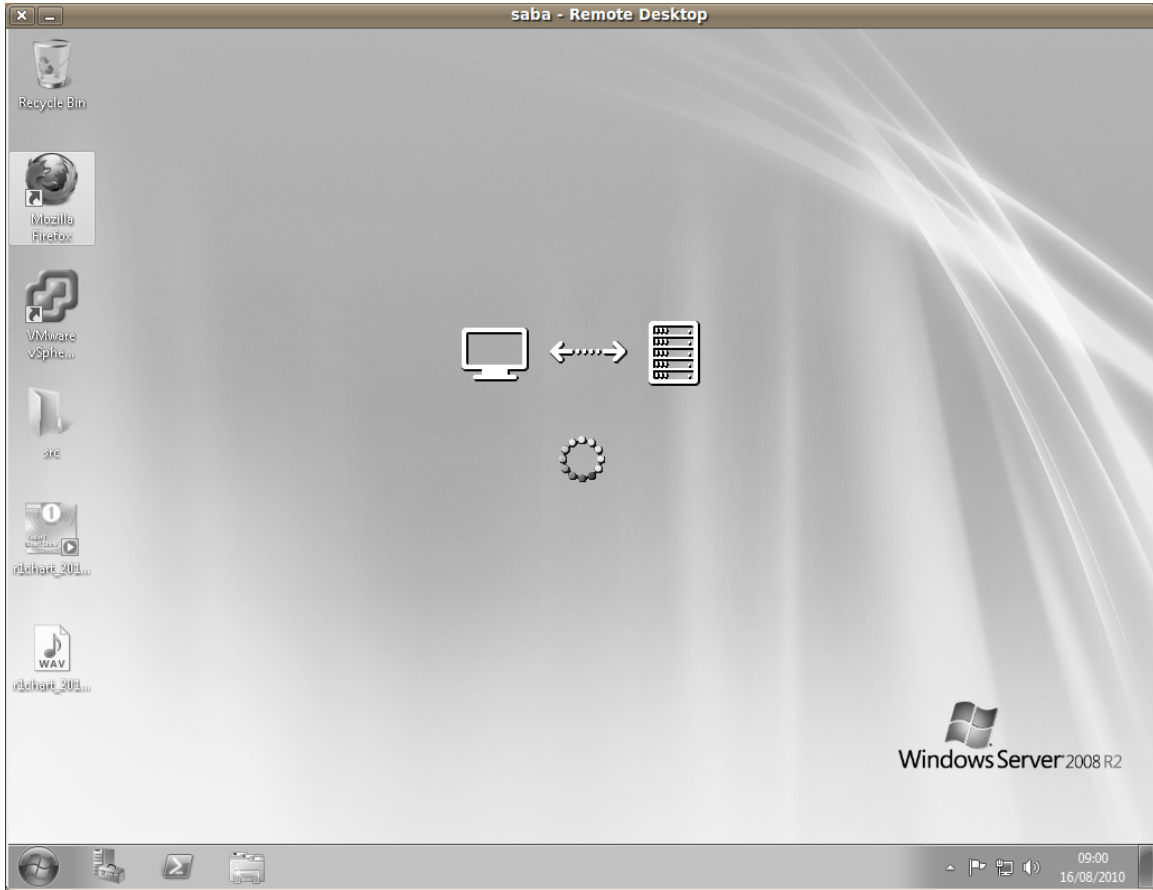
TLS/SSL connections require a certificate to be present on the Windows server. If that is not the case, the connection might fall back to the built-in RDP security (if allowed) or fail.

## About Auto-reconnect

The auto-reconnect feature enables a Windows session to reestablish a network connection if it is unexpectedly disconnected. This feature is supported for Windows 7 and Windows 2008 R2 sessions.

When you are disconnected from a Window session, the `uttscc` command displays the following graphic on your screen.





By default, the `uttsc` command attempts to reconnect six times before ending the connection. You can control the number of reconnects through the `-U <number>` option of the `uttsc` command. Specifying `-U 0` disables the auto-reconnect feature.



#### Note

You may also specify the `-S` option for auto-reconnect to detect network loss.

## About Compression

The Sun Ray Windows Connector uses RDP bulk compression to compress data between the Sun Ray Server, which runs the Sun Ray Windows Connector, and the Windows system.

Compression is enabled by default.

## How to Disable Compression

You can be disable compression on a per-connection basis.

To disable compression:

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

## Contents

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- How to Enable and Disable Log and Error Messages

## Troubleshooting (All Topics)

### SRWC Log Files

The following log files are located on the Sun Ray server:

- SRWC logs (uttscpd.log): `/var/opt/SUNWut/log/`
- General messages: `/var/opt/SUNWut/log/messages`

For example:

```
[root][sunrayserv:/var/opt/SUNWut/log] # ls -lrt uttscpd.log*
-rw-r----- 1 root utadmin 524249 Jul 6 08:30 uttscpd.log.9
-rw-r----- 1 root utadmin 524271 Jul 6 08:41 uttscpd.log.8
-rw-r----- 1 root utadmin 524230 Jul 6 08:49 uttscpd.log.7
-rw-r----- 1 root utadmin 524266 Jul 6 08:56 uttscpd.log.6
-rw-r----- 1 root utadmin 524245 Jul 6 09:03 uttscpd.log.5
-rw-r----- 1 root utadmin 524267 Jul 6 09:09 uttscpd.log.4
-rw-r----- 1 root utadmin 524267 Jul 6 09:16 uttscpd.log.3
-rw-r----- 1 root utadmin 524275 Jul 6 09:23 uttscpd.log.2
-rw-r----- 1 root utadmin 524258 Jul 6 09:29 uttscpd.log.1
-rw-r----- 1 root utadmin 524281 Jul 6 09:36 uttscpd.log.0
-rw-r----- 1 root utadmin 110380 Jul 6 09:37 uttscpd.log
```

## Troubleshooting Multimedia

### Log Files

When multimedia enhancements are in use, status messages are logged in the following files:

- `/var/dt/Xerrors` (Solaris)
- `/var/log/gdm/$DISPLAY.log` (Linux)

To enable logging, see [How to Enable and Disable Log and Error Messages](#).

### Adobe Flash Acceleration (Windows 7 and 2008 R2)

When the Adobe Flash acceleration is in progress, the following status messages identify the rendering mechanism used to display the content.

Message	Comments
Display :2.0 Video port Id 39 Compressed: JPEG-D	Indicates that the video and Adobe Flash display updates are decompressed and displayed in the DTU.

## Multimedia Redirection (Windows XP and 2003)

### Problem: Windows Media Player Error During Session Reconnection

If a Sun Ray Windows Connector session is relaunched or hotdesked while a supported media format clip is playing, a Windows Media Player error alert box might be displayed. If the message is displayed, the user must relaunch the clip from Windows Media Player.



### Multimedia Redirection Status Messages

Message	Comments
Display :3.0 Video port Id 39 YUV: YV12 Display :3.0 Video port Id 39 YUV: I420 Display :3.1 Video port Id 49 YUV: YV12	Start of stream for XVideo. Note that the XVideo protocol does not require start/stop, so an application may send multiple streams without a new debug message.
Display :3.0 Video port Id 39 YUV: YV12 low bandwidth on Display :3.0 Video port Id 39 YUV: YV12 low bandwidth ended	An XVideo stream is using the low bandwidth logic or bandwidth has increased so it is resuming the normal logic.
Display :3.0 Video port Id 39 Compressed: H.264 Display :3.0 Video port Id 39 Compressed: VC1	Start of an XvEnc compressed video stream.
Display :3.0 Video port Id 39 YUV: YV12 hotdesked or swapped Display :3.0 Video port Id 39 Compressed: H.264 hotdesked	The session running a media stream has been hotdesked.
Display :3.0 Video port Id 39 Compressed: H.264 hotdesked firmware does not support compressed video	An XvEnc stream has been connected to a DTU that does not support decoding (non-P8 or P8 with old firmware).
Display :3.1 Video port Id 49 YUV: YV12	In a multihead configuration, Display indicates the head on which the video is being played. Each head's port ID is in a different range



#### Note

H.264 and VC-1 support on the DTU is not available for Xinerama sessions. In Xinerama sessions, video windows may be dragged from one DTU to another or may span multiple DTUs, but audio/video synchronization of H.264 and VC-1 support is limited to the primary DTU. Videos cannot be synchronized between DTUs. H.264 and VC-1 videos are rendered by the application in the same manner as they would be rendered on Sun Ray 1 DTUs.

## Adobe Flash Acceleration (Windows XP and 2003)

## Problem: Audio for a YouTube Video Is Out of Sync

Check whether the Sun Ray audio driver is set as the default:

1. From the Windows Desktop, choose Settings->Control Panel.
2. Click Sounds & Audio Devices.
3. Click the Audio tab.
4. If the Sun Ray RDP Audio Driver is not the default, select it and click Apply.
5. Close your browser and reopen it.

## Adobe Flash Acceleration Status Messages

When Flash acceleration is in progress, the following status messages identify the rendering mechanism used to display Flash content.

Message	Comments
Display :2.0 Video port Id 39 Compressed: JPEG-D	Indicates that the Flash display updates are decompressed and displayed in the DTU.
Display :2.0 Video port Id 39 YUV: YV12	Indicates that the Flash display updates are decompressed on the Sun Ray server and displayed through the Xvideo API.


If Flash acceleration occurred (indicated by multimedia redirection icon) and no status messages are in the log file, then Flash display updates were decompressed on the Sun Ray Server and displayed through the X11 API.

## Troubleshooting Printers

### Printer Caching

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

To restore the settings, use the same printer driver that was used when the settings were changed.

 **Warning**  
Using a different driver, even if no settings are changed, can invalidate settings stored 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 (that is, it is 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 [How to Make Sun Ray Printers Available to a Windows Session](#).

### Windows Printing

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

### Solaris or Linux Printing

If a job fails and cannot be diagnosed and fixed with the ordinary UNIX remedies, such as `lpq` or `lprm`, the user should contact the appropriate system administrator.

### Sun Ray DTU Local Printing

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 `uttscc` CLI.

For more information, see [Managing Printers](#) and the `uttsc` man page.

## Troubleshooting Windows Session Connection

### Problem: Unexpected Time Zone Value

`uttsc` only considers time zones listed in `/usr/share/lib/zoneinfo/tab/zone_sun.tab` (for Solaris) and `/usr/share/zoneinfo/zone.tab` (for Linux), as valid zones that can be converted into the equivalent time zones in the Windows session. If the time zone is set to a value other than those defined in these files, then the time zone value in the Windows session can be unexpected.

### Connection Error Messages

Message	Comments
Error(%d): Unable to establish data store connection.	The Sun Ray Windows Connector was unable to open a connection to the Sun Ray data store. Ensure that the SRDS has been configured for Sun Ray software and is reachable. Also, ensure that the Sun Ray Windows Connector has been successfully configured before launching it.
Error(%d): Unable to determine SRSS version.	SRWC could not determine SRSS version information. Ensure that SRSS 4.2 or above is installed and configured successfully.
Error(%d): Unable to launch Sun Ray Connector. Only SRSS 4.2 and above are supported.	SRWC 2.3 is supported only on SRSS 4.2 and above. Ensure that the correct version of SRSS is installed.
Sun Ray session is not connected, please try again.	Ensure that SRWC is being launched from a valid connected Sun Ray session.
Cannot obtain DTU MAC address.	SRWC was unable to contact the Sun Ray Authentication Manager to retrieve the DTUs MAC address. Ensure that this daemon is reachable.
Error: Sun Ray Token ID cannot be determined. Sun Ray Connector can only be launched from a Sun Ray session.	SRWC was launched from a non-Sun Ray session (for example, telnet or console). It can only be launched from a connected DTU session.
Unable to create new audio device. Using default audio device.	<code>utaudio</code> failed to create a new audio device. Check the messages logged by <code>utaudio</code> for more information. SRWC will try to use the default audio device for the session.
Device <device_name> is not allocated. Audio will not work in this session. Continuing..	On Solaris Trusted Extensions platforms, if the default audio device is not allocated, then SRWC will not be able to use any new audio device or the default audio device. In this case, the SRWC session will proceed but without audio support.
Warning. Printer preferences will not be stored. Please run <code>uttscadm</code> to complete configuration before launching Sun Ray Connector.	If <code>uttscadm</code> has not been run before the Sun Ray Windows Connector is launched, the printer preferences as sent by the Windows system will not be stored and hence cannot later be reused. This error is not fatal. The session will continue to be launched.
Unable to connect to Sun Ray Connector Proxy. Please ensure <code>uttscadm</code> has been run before launching the Sun Ray Connector.	Make sure the proxy daemon ( <code>uttscpd</code> ) is up and running. If the Sun Ray Windows Connector is launched before <code>uttscadm</code> has been run to configure it, then the Sun Ray Windows Connector Proxy is not reachable. This message occurs only on Solaris systems.
Unable to launch Sun Ray Connector. Please ensure <code>utconfig</code> has been run before launching the Sun Ray Connector.	If Sun Ray Windows Connector is launched without having configured Sun Ray data store using <code>utconfig</code> (from Sun Ray Server Software), then the connector cannot be used.

### How to Enable and Disable Log and Error Messages

Sun Ray Windows Connector log and error messages are disabled by default.

To enable messages, type the following command:

```
# kill -USR2 <pid>
```

The pid is the process ID for an Xnewt process for an individual Sun Ray session.

To disable messages again, type the same command.

Refer to [SRWC Log Files](#) for more information about the log files, including their location.

## Glossary

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

If you would like to add a term to the list, use the [Add Comment](#) link at the bottom of the page.

### A

Term	Description
AAC	Advanced Audio Coding, a "lossy" compression format capable of delivering relatively high quality at relatively low bit rates.
alias token	An alias token that enables a card owner to access the same Sun Ray session with more than one physical token. This token can be useful when a user needs a duplicate smart card.
ALP	The Sun Appliance Link Protocol, a suite of network protocols that enable communication between Sun Ray servers and DTUs.
AMGH	Automatic Multigroup Hotdesking. See regional hotdesking.
AH	Authentication headers used as part of an IPSec implementation.
authentication policy	The Authentication Manager uses the selected authentication module to determine what tokens are valid and which users, as token owners, have access to the system and sessions.
authentication token	Although all tokens are used by the Authentication Manager to grant or deny access to Sun Ray sessions, this term usually refers to a user's smart card token. See token.

### B

Term	Description
backplane bandwidth	Sometimes also referred to as "switch fabric." A switch's backplane is the pipe through which data flows from an input port to an output port. Backplane bandwidth usually refers to the aggregate bandwidth available among all ports within a switch.
barrier mechanism	To prevent clients from downloading firmware that is older than the firmware that is already installed, the administrator can set a barrier mechanism. The barrier mechanism symbol BarrierLevel is defined by default in the DHCP table of Sun Ray servers running version 2.0 or later of Sun Ray Server Software.
bpp	Bits per pixel.

### C

Term	Description
------	-------------

CABAC	Context-adaptive binary arithmetic coding, a "lossless" entropy coding technique used in H.264/MPEG-4 AVC video encoding.
CAM	Controlled Access Mode, also known as kiosk mode. As of SRSS 4.0, the CAM module was replaced by a rewritten Kiosk module.
card reader	See token reader.
category 5	The most common type of wiring used in LANs. It is approved for both voice and data at up to 100 Mhz. Also called "cat 5."
client-server	A common way to describe network services and the user processes (programs) of those services.
codec	A device or program capable of encoding or decoding a digital data stream or signal.
cold restart	Pressing the Cold Restart button terminates all sessions on a given server before restarting Sun Ray services. See restart.
cut-through switch	The switch begins forwarding the incoming frame onto the outbound port as soon as it reads the MAC address while continuing to receive the remainder of the frame.

## D

Term	Description
DHCP	Dynamic Host Configuration Protocol, a means of distributing IP addresses and initial parameters to the DTUs.
domain	A set of one or more system boards that acts as a separate system capable of booting the OS and running independently of any other board.
DTU	Desktop Terminal Units, the original name of Sun Ray desktop units. These units are also referred to as Sun Ray thin clients, Sun Ray ultra-thin clients, and Sun Ray virtual display terminals.

## E

Term	Description
ESP	Encapsulating Security Payloads, used as part of IPSec.
Ethernet	Physical and link-level communications mechanism defined by the IEEE 802.3 family of standards.
Ethernet address	The unique hardware address assigned to a computer system or interface board when it is manufactured. See MAC address.
Ethernet switch	A unit that redirects packets from input ports to output ports. It can be a component of the Sun Ray interconnect fabric.

## F

Term	Description
failover	The process of transferring processes from a failed server to a functional server.
failover group	Two or more Sun Ray servers configured to provide continuity of service in the event of a network or system failure. Sometimes abbreviated as FOG or HA (for high availability). The term high availability refers to the benefit of this type of configuration; the term failover group refers to the functionality.
filling station	Any private network configured for Sun Ray services or any shared network in which the Sun Ray DHCP server is the only DHCP server. When a DTU's firmware is downgraded to an earlier version because it connects to a server running the earlier version, it needs to be connected to a filling station so that it can download newer firmware.
firmware barrier	See barrier mechanism.

FOG	See failover group.
fps	Frames per second.
frame buffer	Video output device that drives the video display. See virtual frame buffer.

## G

Term	Description
GEM	Gigabit Ethernet.
group-wide	Across a failover group.

## H

Term	Description
H.264	A standard for video compression developed by MPEG and VCEG for a wide range of bit rates and resolutions. Also known as MPEG-4 AVC (Advanced Video Coding) and MPEG-4 Part 10.
HA	High availability. Sun Ray HA groups have traditionally been called failover groups.
head	Colloquial term for a screen, or display, or monitor, especially in a context where more than one is used in conjunction with the same keyboard and mouse, as in "multihead" feature.
high availability	See failover. The term high availability refers to a benefit of this type of configuration. The term failover group refers to the functionality.
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 available for instantaneous access to the user's windowing environment and current applications from multiple DTUs.
hot key	A predefined keyboard shortcut used to trigger certain activities either on the DTU or within the Sun Ray session running on the Sun Ray server. A hot key is used to bring up the Settings screen on the Sun Ray DTU.
hot-pluggable	A property of a hardware component that can be inserted into or removed from a system that is powered on. USB devices connected to Sun Ray DTUs are hot-pluggable.

## I

Term	Description
idle session	A session that is running on a Sun Ray server but to which no user (identified by a smart card token or a pseudo-token) is logged in.
IKE	Internet Key Exchange, a component of IPSec.
interconnect fabric	All the cabling and switches that connect a Sun Ray server's network interface cards to the Sun Ray DTUs.
intranet	A private network that uses internet protocols and is confined to an organization.
IP address	A unique number that identifies each host or other hardware system on a network. An IP address is composed of four integers separated by periods. Each decimal integer must be in the range 0-255 (for example, 129.144.0.0).
IP address lease	The assignment of an IP address to a computer system for a specified length of time, rather than permanently. IP address leasing is managed by the Dynamic Host Configuration Protocol (DHCP). The IP addresses of Sun Ray DTUs are leased.



IPSec	The Internet Protocol (Security) set of protocols seeks to secure IP communications by encoding data packets through authentication headers (AH) and encapsulating security payloads (ESP) and by providing a key exchange mechanism (IKE).
-------	---

## K

Term	Description
kiosk mode	A facility to run sessions under an anonymous user account without a UNIX login. Kiosk sessions provide a preconfigured, usually restricted, software environment. The term kiosk mode was used interchangeably with CAM in earlier versions of SRSS. As of SRSS 4.0, this module was completely rewritten and is now officially called kiosk mode.

## L

Term	Description
LAN	Local Area Network. A group of computer systems in close proximity that can communicate with one another through connecting hardware and software.
layer 2	The data link layer. The OSI (Open Standards Interconnection) model contains seven layers. Layer 2 is concerned with procedures and protocols for operating the communication lines between networks as well as clients and servers. Layer 2 also has the ability to detect and correct message errors.
local host	The CPU or computer on which a software application is running.
local server	From the DTU's perspective, the most immediate server in the LAN.

## M

Term	Description
MAC address	Media Access Control. A MAC address is a 48-bit number programmed into each local area network interface card (NIC) at the time of manufacture. LAN packets contain destination and source MAC names and can be used by bridges to filter, process, and forward packets. 8:0:20:9e:51:cf is an example of a MAC address. See also Ethernet address
managed object	An object monitored by the Sun Management Center software.
mobile token	If mobile sessions are enabled, this pseudo-token enables a user to log in to an existing session from different locations without a smart card, in which case the user name is associated with the session. This type of pseudo-token is called a mobile token.
mobility	For the purposes of the Sun Ray Server Software, the property of a session that enables it to follow a user from one DTU to another within a server group. On the Sun Ray system, mobility requires the use of a smart card or other identifying mechanism.
modules	Authentication modules are used to implement various site-selectable authentication policies.
MPPC	Microsoft Point-to-Point Compression protocol.
MTU	Maximum Transmission Unit, used to specify the number of bytes in the largest packet a network can transmit.
multicasting	The process of enabling communication between Sun Ray servers over their Sun Ray network interfaces in a failover environment.
multihead	See head.
multiplexing	The process of transmitting multiple channels across one communications circuit.

## N

Term	Description
NAT	See network address translation.
namespace	A set of names in which a specified ID must be unique.
network address	The IP address used to specify a network.
network address translation	Network address translation (NAT) typically involves the mapping of port numbers to allow multiple machines (Sun Ray DTUs, but not Sun Ray servers) to share a single IP address.
network interface	An access point to a computer system on a network. Each interface is associated with a physical device. However, a physical device can have multiple network interfaces.
network interface card	Abbreviated as NIC. The hardware that links a workstation or server to a network device.
network latency	The time delay associated with moving information through a network. Interactive applications such as voice, video displays, and multimedia applications are sensitive to these delays.
network mask	A number used by software to separate the local subnet address from the rest of a given Internet protocol address. An example of a network mask for a class C network is 255 . 255 . 255 . 0.
network protocol stack	A network suite of protocols, organized in a hierarchy of layers called a stack. TCP/IP is an example of a Sun Ray protocol stack.
NIC	Network interface card.
non-smart card mobility	A mobile session on a Sun Ray DTU that does not rely on a smart card. NSCM requires a policy that allows pseudo-tokens.
NSCM	See non-smart card mobility.

## O

Term	Description
OSD	On-screen display. The Sun Ray DTU uses OSD icons to alert the user of potential start-up or connectivity problems.

## P

Term	Description
PAM	Pluggable Authentication Module. A set of dynamically loadable objects that gives system administrators the flexibility of choosing among available user authentication services.
PAM session	A single PAM handle and runtime state associated with all PAM items, data, and the like.
patch	A collection of files and directories that replace or update existing files and directories that prevent proper execution of the software on a computer system. The patch software is derived from a specified package format and can be installed only if the package it fixes is already present.
PCM	Pulse Code Modulation.
policy	See authentication policy.
Pop-up GUI	A mechanism that enables configuration parameters for a Sun Ray DTU to be entered from the attached keyboard.
port	(1) A location for passing data in and out of a computer system. (2) The abstraction used by Internet transport protocols to distinguish among multiple simultaneous connections to a single destination host.

POST	Power-on self test.
power cycling	Using the power cord to restart a DTU.
pseudo-session	A Sun Ray session associated with a pseudo-token rather than a smart card token.
pseudo-token	A user accessing a Sun Ray session without a smart card is identified by the DTU's built-in type and MAC address, known as a pseudo-token. See token.

## R

Term	Description
RDP	Microsoft Remote Desktop Protocol.
regional hotdesking	Originally known as Automatic Multigroup Hotdesking (AMGH), this SRSS feature enables users to access their sessions across wider domains and greater physical distances than was possible in earlier versions of SRSS. Administrators enable this feature by defining how user sessions are mapped to an expanded list of servers in multiple failover groups.
RDS	Remote Desktop Services. Formally known as Terminal Services. See Windows Terminal Services.
RHA	Remote Hotdesk Authentication, a security enhancement that requires SRSS authentication before users can reconnect to an existing session. RHA does not apply to Kiosk sessions, which are designed for anonymous access without authentication. RHA policy can be administered either through a GUI option or with the <code>utpolicy</code> command.
restart	Sun Ray services can be restarted either from the <code>utrestart</code> command or with the Warm Restart or Cold Restart options through the GUI. A cold restart terminates all Sun Ray sessions; a warm restart does not.

## S

screen flipping	The ability on a Sun Ray DTU with a single head to pan to individual screens that were originally created by a multihead group.
server	A computer system that supplies computing services or resources to one or more clients.
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, Xservers, access to other machines, and device control of the DTU.
session	A group of services associated with an authentication token. A session may be associated with a token embedded on a smart card. See token.
session mobility	The ability for a session to "follow" a user's login ID or a token embedded on a smart card.
smart card	Generically, a plastic card containing a microprocessor capable of making calculations. Smart cards that can be used to initiate or connect to Sun Ray sessions contain identifiers such as the card type and ID. Smart card tokens may also be registered in the Sun Ray Data Store, either by the Sun Ray administrator or, if the administrator chooses, by the user.
smart card token	An authentication token contained on a smart card. See token.
SNMP	Simple Network Management Protocol
spanning tree	An intelligent algorithm that enables bridges to map a redundant topology and eliminates packet looping in Local Area Networks (LANs).
store-and-forward switches	The switch reads and stores the entire incoming frame in a buffer, checks it for errors, reads and looks up the MAC addresses, and then forwards the complete good frame out onto the outbound port.
subnet	A working scheme that divides a single logical network into smaller physical networks to simplify routing.
system	The Sun Ray system consists of Sun Ray DTUs, servers, server software and the physical networks that connect them.

## T

TCP/IP	Transmission Control Protocol/Internet Protocol (TCP/IP) is a networking protocol that provides communication across interconnected networks between computers with diverse hardware architectures and operating systems.
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.
tick	The time interval since a specific network event. It is defined as 1/100th of a second, which is the usual SNMP convention.
timeout value	The maximum allowed time interval between communications from a DTU to the Authentication Manager.
token	The Sun Ray system requires each user to present a token, which the Authentication Manager uses to allow or deny access to the system and to sessions. A token consists of a type and an ID. If the user uses a smart card, the smart card's type and ID are used as the token. If the user is not using a smart card, the DTU's built-in type and ID (the unit's Ethernet, or MAC, address) are used instead as a pseudo-token. If mobile sessions are enabled, a user can log in to an existing session from different locations without a smart card, in which case the user name is associated with the session. A pseudo-token used for mobile sessions is called a mobile token. Alias tokens can also be created to enable users to access the same session with more than one physical token.
token reader	A Sun Ray DTU that is dedicated to reading smart cards and returning their identifiers, which can be associate with card owners (users).
trusted server	Servers in the same failover group that "trust" one another.

## U

URI	Uniform Resource Identifier, the generic term for all types of names and addresses that refer to objects on the World Wide Web.
user session	A session that is running on a Sun Ray server and to which a user (identified by a smart card token or a pseudotoken) is logged in.

## V

VC-1	Informal name of the SMPTE 421M video codec standard, now a supported standard for Blu-ray Discs and Windows Media Video 9.
virtual desktop	A virtual machine containing a desktop instance that is executed and managed within the virtual desktop infrastructure, usually a Windows XP or Vista desktop accessed through RDP.
virtual frame buffer	A region of memory on the Sun Ray server that contains the current state of a user's display.

## W

Term	Description
warm restart	See restart.
WMA	Windows Media Audio data compression file format and codec developed by Microsoft.
work group	A collection of associated users who exist in near proximity to one another. A set of Sun Ray DTUs that are connected to a Sun Ray server provides computing services to a work group.
Windows system	Throughout the SRWC documentation, "Windows system" indicates a Windows OS that can be accessed from a Sun Ray DTU using SRWC. A Windows Terminal Server is one example of a Windows system.

Windows Terminal Server	A server running Windows Server software with Windows Terminal Services enabled.
Windows Terminal Service	A Microsoft Windows component that makes Windows applications and desktops accessible to remote users and clients. Depending on the Windows release, this feature may be called Terminal Services, Remote Desktop Services, or Remote Desktop Connection.

## X

Term	Description
Xnewt	The new default Xserver for Sun Ray Server Software 4.1 and later on Solaris.
Xserver	A process which controls a bitmap display device in an X window system. It performs operations on request from client applications. Sun Ray Server Software contains two Xservers: Xsun, which was the default Xserver in previous versions of SRSS, and Xnewt, which is the default Xserver for SRSS 4.1 and later. Xnewt enables the latest multimedia capabilities.

## Y

Term	Description
YUV	Simple, lossless mechanism to store images or a sequence of images.

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