



Sun™ Virtual Desktop Connector 1.0 Installation and Administration Guide

Sun Microsystems, Inc.
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Preface

This manual provides instructions for installing, using, and administering the Sun™ Virtual Desktop Connector 1.0 (VDC). VDC is a software product that connects users' desktop environments to virtualization platforms such as VMware® VirtualCenter, making it possible to run users' desktop environments on *virtual machines*. Individual instances of the desktop environment are called *virtual desktops*.

The Sun Virtual Desktop Connector's management and administrative functions handle the lifecycles of virtual machines and desktops and their assignment to users. Users can access their virtual desktops from physical devices such as Sun Ray™ virtual display clients, usually called desktop units (*DTU*), or, if Sun™ Secure Global Desktop Software (SGD) is deployed, through Web-based software clients running on physical devices such as PCs. The effect is to enable access to the same desktop from anywhere.

Audience

The target audience for this manual consists of system and network administrators who are already familiar with Windows operating systems and the Sun Ray™ or SGD computing paradigm. Some familiarity with UNIX® commands and procedures is assumed.

Scope

This manual is provided to help administrators find what they need to install, set up, and administer the Sun Virtual Desktop Connector. Although this product interacts with products belonging to other companies than Sun Microsystems — notably VMware and Microsoft — no attempt is made to duplicate the documentation those companies provide for their respective products. Instead, references and, when possible, URLs, are provided to the appropriate documents on the VMware and Microsoft Web sites.

How This Document Is Organized

This manual is organized as follows:

- [Chapter 1](#) gives a concise introduction, describing the Virtual Desktop Connector's capabilities and operation.
- [Chapter 2](#) provides installation instructions for the Virtual Desktop Connector and links to installation instructions for the other components of the virtual desktop solution that it enables.
- [Chapter 3](#) describes the administration of virtual desktops using the Virtual Desktop Connector's administrative interface (Admin GUI).
- [Chapter 4](#) contains troubleshooting tips.

This manual also has a glossary and an index.

Using UNIX Commands

This document might not contain information about basic UNIX commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to the following for this information:

- Software documentation that you received with your system
- Solaris™ Operating System documentation, which is published on:
<http://docs.sun.com>

Shell Prompts

Shell	Prompt
C shell	<i>machine-name%</i>
C shell superuser	<i>machine-name#</i>
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#

Typographic Conventions

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

* The settings on your browser might differ from these settings.

Related Documentation

The latest release notes for this product can be located at:

<http://docs.sun.com/app/docs/doc/820-3022>

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Introduction

The Sun Virtual Desktop Connector (VDC) presents users with easy access to their *virtual desktops*, typically instances of Microsoft Windows XP, from a wide range of devices, such as PCs and Sun Ray DTUs. The effect is to enable access to the same desktop from anywhere.

The Virtual Desktop Connector consists primarily of:

- Agents installed on virtualization hosts to handle interactions with virtual machines (VMs).
- Services running on Sun Ray Server Software (SRSS) or Sun Secure Global Desktop Software (SGD) servers that handle the virtual desktops' access and lifecycles.
- A clean, intuitive user interface to connect the various elements and simplify the administration of virtual desktops. See [“Using the Admin GUI” on page 23](#).

Description

The Sun Virtual Desktop Connector can control both access management and the *lifecycle* of virtual desktops, creating new virtual desktop instances on demand, provisioning them to users on a temporary or permanent basis, and decommissioning outdated instances. Its functionality encompasses:

- Connecting users with their virtual desktops from Sun Ray DTUs and/or PCs
- Managing hundreds of virtual desktops through a simple user interface
- Permanently assigning virtual desktops to users
- Temporarily assigning virtual desktops to users from pools of identical instances
- Offering policies to control the creation, lifetime, and end-of-life of a virtual desktop as part of a pool
- Support of VMware VirtualCenter as a virtualization platform, including all resource and high-availability features

Rationale

By providing a virtual desktop with a choice of operating systems, access methods, and devices, the Virtual Desktop Connector caters to user preferences while leveraging existing investments in desktop devices and network infrastructure and maximizing utilization of existing computing resources.

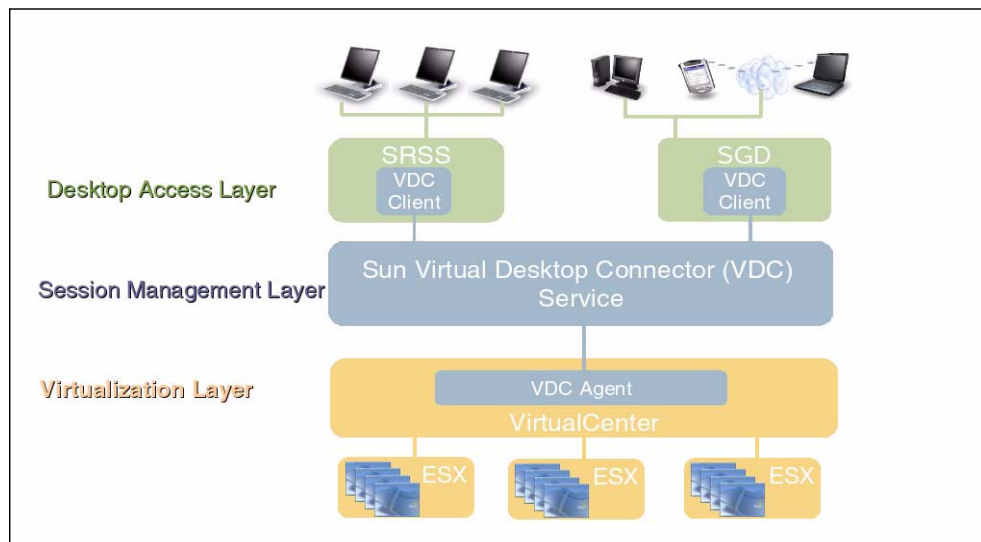
By moving applications, operating systems, and computing from individual desktops to secure, centralized servers, the Virtual Desktop Connector reduces risks associated with virus attack, intrusion, and loss of data.

The Virtual Desktop Connector also helps system and network administrators to manage large installations of virtual machines with well-designed tools for centralized administration, largely removing the burden of maintaining individual physical desktops.

Architecture

The Virtual Desktop Connector architecture has three main layers: virtualization, session management, and desktop access. The virtualization layer, where the virtual machines reside, abstracts interaction with the virtualization solution to allow multiple setups. A Virtual Desktop Connector *agent* installed on each virtualization server manages the interaction with the various elements.

FIGURE 1-1 Virtual Desktop Connector Layers



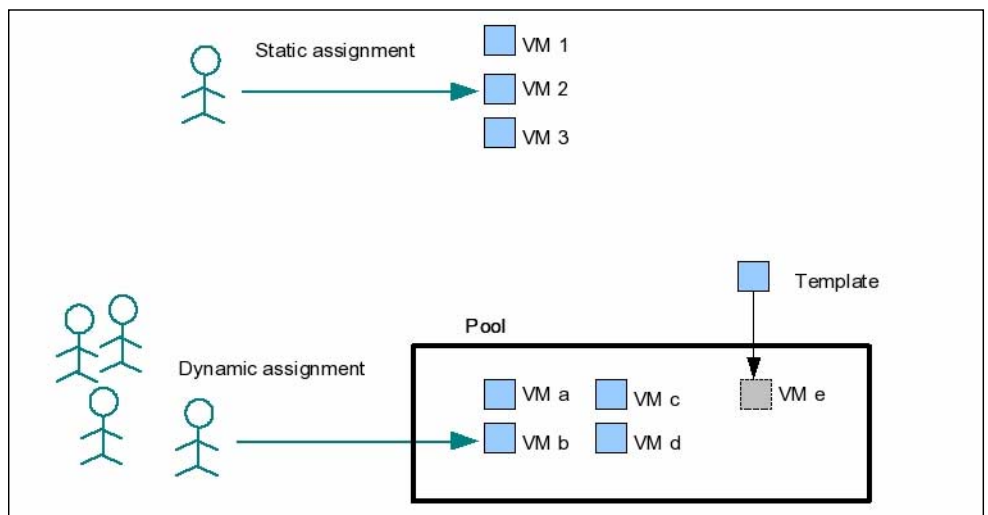
The session management layer, consisting typically of either a Sun Ray failover group or a Secure Global Desktop array, is where operation of the Virtual Desktop Connector and the virtual desktop lifecycle are managed. You can use the Virtual Desktop Connector's Admin GUI to manage the product operation parameters and the Virtual Desktop Connector service to handle desktop lifecycles.

The desktop access layer is where the user gets access to the appropriate desktop, based on the Virtual Desktop Connector configuration and the user environment. The appropriate desktop can be delivered via a Sun Ray Kiosk session, an SGD application object accessed through a Web browser, or some other mechanism. The desktop access layer relies on the Virtual Desktop Connector *client*, which runs on the SRSS or SGD server, to initiate the virtual desktop lookup process on behalf of the user. Once the lookup process is complete, the VDC client returns the IP address of the virtual desktop so that an *RDP* connection can be established.

Operation

Virtual desktops can be provided to users either from statically assigned virtual machines or from pools of identical virtual machines that are dynamically assigned to sessions as needed. A given user session is associated with the virtual machine used as the desktop through a session identifier and, optionally, the name of a pool from which a dynamic machine is retrieved.

FIGURE 1-2 Static vs. Dynamic Assignment of Virtual Machines



Static assignments are useful for users who require a persistent, dedicated desktop session—the same virtual machine every time they log in. As shown in [FIGURE 1-2](#), static assignment ensures that the user is always directed to the same virtual machine, VM 2 in this case.

Dynamic pools are useful for sharing resources when the desktop is standardized and does not need to retain its state between usages. The lower portion of [FIGURE 1-2](#) shows the dynamic use case, in which various users get access to VMs on demand. The VMs are created from a single template and are assigned to users temporarily.

Using the Admin GUI, you can define which virtualization hosts to use for virtual machine management. You then assign session identifiers to specific virtual machines and create pools of dynamic virtual machines. The pools can be populated either manually, in which case you must assign existing virtual machines to their respective pools, or automatically, from a virtual machine template.

A user session that requires a virtual desktop can be started from a Sun Ray Kiosk session or from an SGD application object. It invokes the Virtual Desktop Connector client, and the proper session identifier and pool name are computed based on the user session environment. The client then contacts the Virtual Desktop Connector service, which in turn contacts the defined Virtual Desktop Connector agents to locate a suitable virtual machine for that identifier and pool.

- If the identifier has been statically assigned a virtual machine, that machine is used.
- If the identifier has no static assignment, the contents of the specified pool are used.
 - If the pool contains a virtual machine that has been dynamically assigned to the session identifier, that virtual machine is used.
 - If no virtual machine has been dynamically assigned to the session identifier, an available virtual machine is assigned to it from the pool.

Once a suitable machine is selected, it is started, and connectivity is established over the Remote Desktop Protocol (RDP) port. The virtual desktop's IP address is then returned to the client, and an RDP client connects to the IP address to provide the user's desktop session. The RDP client can be the Sun Ray Connector for Windows OS or the Sun Secure Global Desktop client.

Periodically, the Virtual Desktop Connector service ensures that the pools are properly populated according to the parameters you have defined, and clones new virtual machines from the specified template if the need arises. It also checks the state of the dynamically assigned machines in the various pools. Those virtual machines which have not been used for a given period of time are reclaimed, thus removing their association with a session identifier.

Usage Scenario

Once the Virtual Desktop Connector components are installed and configured, you can use the Admin GUI to set up session provisioning. The first step is to add a VirtualCenter server to the system. You can then browse the associated resources.

In a scenario with two groups of users—salespeople who use their desktops to access a variety of remote resources (with applications such as a Web browser, an email client, and an internal database front-end application), and developers who use their desktops for coding and testing applications—you might assign a specific virtual machine to each developer and create a pool for salespeople, based on a template machine with the appropriate applications installed.

Assume that the virtual machines are configured to go into *standby* mode and suspend themselves after 30 minutes of inactivity, and that a pool machine remains assigned to an inactive session identifier for up to an hour, after which it can be recycled.

Users insert smart cards into a Sun Ray DTU to access their desktops. The smart cards have been registered in the Sun Ray Server Software data store and thus associated with their owners, and the Sun Ray Server Software has been configured to provide Kiosk sessions for smart card owners.

When a user inserts the smart card, the Kiosk session asks the Virtual Desktop Connector client for the virtual desktop associated with the user's smart card token. The Kiosk session also specifies the name of the desired pool.

If the user is a developer with static assignment to a specific virtual desktop, the Virtual Desktop Connector client retrieves it. When the user disconnects from the virtual desktop session and later tries to reconnect, the Virtual Desktop Connector client retrieves the same virtual desktop.

If the user is a salesperson, the Virtual Desktop Connector client selects a virtual desktop from the pool of available virtual machines. After the user disconnects from the virtual desktop session, the virtual machine reverts to the pool to be recycled. If the user tries to reconnect before the specified time is up (after about an hour and a half in this scenario), the Virtual Desktop Connector client retrieves the same dynamically assigned machine. If the connection attempt occurs later, the Virtual Desktop Connector client dynamically assigns another virtual machine to that user from the pool.

Installation

Each of the Sun Virtual Desktop Connector's three layers — virtualization, desktop access, and session management (see [FIGURE 1-1](#)) — has associated installation tasks that must be performed. They are described in this chapter, which is organized as follows:

- [“Virtualization Layer” on page 8](#)
 - [“Installing VMware VirtualCenter” on page 8](#)
 - [“Installing the Virtual Desktop Connector Agent” on page 8](#)
 - [“Uninstalling the Virtual Desktop Connector Agent” on page 9](#)
 - [“Defining Virtual Machines and Templates” on page 9](#)
 - [“Creating a Virtual Machine Template” on page 9](#)
 - [“Installing VMware Tools” on page 9](#)
 - [“Installing Virtual Desktop Connector Tools” on page 10](#)
 - [“Uninstalling Virtual Desktop Connector Tools” on page 10](#)
 - [“Enabling Remote Desktop Access” on page 10](#)
 - [“System Preparation \(sysprep\) and Customization” on page 11](#)
- [“Desktop Access Layer” on page 13](#)
- [“Session Management Layer” on page 15](#)

Virtualization Layer

Note – Although this manual provides references to the documentation required for installation of third-party products from VMware and Microsoft, it does not attempt to replicate the information they contain.

Installing VMware VirtualCenter

To install VMware VirtualCenter, follow the instructions on the VMware Website at http://www.vmware.com/support/pubs/vi_pubs.html.

1. **Locate the *Installation and Upgrade Guide*.**
2. **Select “Installing VMware VirtualCenter”.**
3. **Make sure that:**
 - a. **Ports 6060 and 6061 are enabled in any firewall that may be active on the system.**

The Virtual Desktop Connector agent, which needs to be installed on VirtualCenter, uses these ports to communicate with the outside world.
 - b. **VirtualCenter’s Webaccess component is installed and configured.**
 - c. **A user account with sufficient privileges is defined (see [TABLE 3-1](#)).**

Note – It is easier to inspect VMware activity logs if you create a specific VMware user with permissions at the Hosts & Clusters level for the Virtual Desktop Connector.

Installing the Virtual Desktop Connector Agent

To install the Virtual Desktop Connector agent for use with VirtualCenter:

1. **Locate the `vda-agent.msi` installer file in the directory where you have unzipped the `vda_1.0.zip` archive.**

The `vda-agent.msi` is located in the `./image/vda_1.0/Windows/Packages/` subdirectory. The default location for the VirtualCenter agent on Windows is `<a-z>:\Program Files\Sun\Virtual Desktop Access\Agent`.

2. Double-click the installer and follow the prompts to complete installation.

Your Services list should now contain a new service named Sun Virtual Desktop Connector Agent, running and set to start automatically.

Uninstalling the Virtual Desktop Connector Agent

To uninstall the Virtual Desktop Connector Agent:

1. Go to the Add/Remove Software control panel.
2. Select the Remove action for the Virtual Desktop Connector Agent.

Defining Virtual Machines and Templates

Creating a Virtual Machine Template

To configure a virtual machine for use as a template:

1. Create a Microsoft Windows XP virtual machine using the instructions in “Creating Virtual Machines” in *Basic System Administration* (http://www.vmware.com/support/pubs/vi_pubs.html).
2. Install Windows XP, following the instructions on the Microsoft Website (<http://www.microsoft.com/windowsxp/using/setup/winxp/install.msp>).
3. Make sure that networking is configured and that the virtual machine can get an IP address.

At this point, you should also install any additional software for your virtual machines.

Note – If you plan to use a customized template for Vista virtual machines, see “Machines” on page 34.

Installing VMware Tools

Once you have created a virtual machine with Microsoft Windows XP installed on it, install VMware tools. See “Installing and Upgrading VMware Tools” in *Basic System Administration* (http://www.vmware.com/support/pubs/vi_pubs.html).

Installing Virtual Desktop Connector Tools

For the Virtual Desktop Connector to manage virtual machines properly, the Virtual Desktop Connector Tools, which handle RDP connections when a guest OS initiates a standby, must be installed on the guest operating system.

Note – Be sure to enable time synchronization between the guest OS and the virtualization host. The Virtual Desktop Connector tools and the recycling process rely on it and cannot function correctly without it. For detailed setup information, see the instructions on the VMware Website at

http://www.vmware.com/support/gsx3/doc/tools_guestd_sync_gsx.html.

To install the Virtual Desktop Connector tools:

1. **Locate the `vda-tools.msi` installer file in the directory where you have unzipped the `vda_1.0.zip` archive.**

The `vda-tools.msi` is located in the `./image/vda_1.0/Windows/Packages/` subdirectory.

2. **Double-click the installer and follow the prompts to complete installation.**

The default target location for the Virtual Desktop Connector tools on Windows is
`<a-z>:\Program Files\Sun\Virtual Desktop Access\Tools`.

Your Services list should now contain a new service named Sun Virtual Desktop Connector Tools, running and set to start automatically.

Uninstalling Virtual Desktop Connector Tools

To uninstall the Virtual Desktop Connector tools:

1. **Go to the Add/Remove Software control panel.**
2. **Select the Remove action for the Virtual Desktop Connector Tools.**

Enabling Remote Desktop Access

To enable remote desktop access, launch VMware's Virtual Infrastructure Client, with your virtual machine still powered on and logged in, then follow these steps:

1. **Open a console.**
2. **In the console, click on the virtual machine's Start button.**
3. **Right-click on My Computer on the start menu, and select Properties.**

4. In the System Properties window, select the Remote tab.
5. Under Remote Desktop, check the box marked Enable Remote Desktop on this computer so that this item is selected.
6. Click OK to save the settings and close the dialog.

You can now shut down the virtual machine by selecting Shut Down from the Start menu.

System Preparation (sysprep) and Customization

Before VirtualCenter can use customization specifications to customize virtual machines, you must install the Microsoft System Preparation Tool (sysprep) on the server running VirtualCenter. See Appendix B in *Basic System Administration* (http://www.vmware.com/support/pubs/vi_pubs.html).

1. Install sysprep on the VirtualCenter Server.

a. Download the sysprep package from:

<http://www.microsoft.com/downloads/details.aspx?FamilyId=3E90DC91-AC56-4665-949B-BEDA3080E0F6&displaylang=en>

b. Unpack to a directory, for example:

C:\Documents and Settings\All Users\VMWare\VMWare VirtualCenter\sysprep\xp

2. Create a Customization Specification.

A customization specification stores settings that VirtualCenter can use to customize a Windows installation during the cloning process. To create a customization specification:

- a. Open Virtual Infrastructure Client.
- b. Click Edit from the menu above the tool bar and select Customization Specifications...
- c. Click the New icon in the Customization Specification Manager to start the wizard.
- d. On the first wizard step, choose Windows as the target virtual machine OS, and give the specification a name and description.

The following steps ask the standard Windows installation questions and should be completed to correspond with your requirements, with exception of the following:

- Computer Name

Make sure that the Use the Virtual Machine Name item is selected. If not, you may end up with duplicate hostnames.

- Windows License

Enter your Windows XP serial number. The Include Server License Information item should be unchecked.

- Networking

Make sure the interface is configured for DHCP. If not, your cloned virtual machines will not have unique IP addresses and will not work with the Sun Virtual Desktop Connector.

- e. After completing the wizard and saving your customization specification, close the Customization Specification Manager.**

3. Test the Customization Specification and Networking.

At this point you should have a Virtual Infrastructure Client open and the template virtual machine you created earlier shut down.

- a. Right-click the virtual machine in the left pane, and select Clone.**

- b. In the Clone Virtual Machine Wizard, choose a name for the new virtual machine (such as *Clone_Test*), and click Next.**

- c. Choose the host or cluster that you want to run the new virtual machine, and click Next.**

- d. Select a data store with sufficient free space, and click Next.**

- e. On the Guest Customization step, select the Customize Using an Existing Customization Specification radio button, then choose the customization specification you just created from the list, and click Next.**

- f. Review your selections, and click Finish to begin cloning.**

- g. After the test virtual machine has finished cloning, select it in the left pane, and power it on.**

After it has finished booting, you should see its IP address and hostname appear in the right pane. Make sure that it has a unique IP address and that the hostname corresponds to the virtual machine name. If the virtual machine has no IP address, see [“Networking” on page 36](#).

- h. On the VMware VirtualCenter server, open a Remote Desktop Connection by clicking Start->All Programs->Accessories->Communications.**

- i. In the Remote Desktop Connection window, enter the IP address of the newly cloned test virtual machine, and click Connect.

If everything is configured correctly, a full-screen Remote Desktop session to your test virtual machine should be displayed.

If the Remote Desktop Connection client cannot connect to the virtual machine, you must resolve the issue before continuing. See “Networking” on page 36 for possible issues.

If you can get a Remote Desktop Connection to your test virtual machine and it has a unique hostname, the original template virtual machine you created is ready to be used.

Note – Do not start this virtual machine again or you will have to sysprep it again.

Desktop Access Layer

The desktop access layer includes Sun Ray Server Software (SRSS) for access to virtual desktops from Sun Ray DTUs, Sun Secure Global Desktop Software (SGD), for Web access from other devices.

Installing Sun Ray Server Software

The Sun Virtual Desktop Connector can be used in conjunction with Sun Ray Server Software 4.0 and Sun Ray Connector for Windows OS 2.0. Install and configure both products before you continue with the installation and configuration of the Virtual Desktop Connector. Installation and configuration instructions are located in the *Sun Ray Software 4 09/07 Collection* at <http://docs.sun.com/app/docs/coll/1230.6>.

Note – Both Sun Ray Server Software and the Sun Ray Connector for Windows OS require configuration after they have been installed.

Before installing the Virtual Desktop Connector, download and install the following Sun Ray Server Software patches from <http://sunsolve.sun.com>:

TABLE 2-1 Required SRSS 4.0 Patches

Patch Number	Operating System
127553-01 or later	Solaris 10 11/06 SPARC
127554-01 or later	Solaris 10 11/06 x86
127555-01 or later	Red Hat Enterprise Linux Advanced Server (RHEL AS) 4 update 3 SuSE Linux Enterprise Server (SLES) 9 with Service Pack 3

Note – Check to see if any other patches are available and recommended for your system. If so, retrieve and install them using the instructions given in the README files. The customary commands are `patchadd` on Solaris platforms and `rpm` on Linux. Be sure to restart the Sun Ray Server after you have patched the installation.

Before you continue to set up the Virtual Desktop Connector, confirm that the Sun Ray Connector for Windows OS is working, for instance by trying to connect to an existing Windows machine, as follows:

```
# /opt/SUNWutts/bin/utts <name or IP-address of Windows machine>
```

If all steps have been executed correctly so far, continue to install and configure the Virtual Desktop Connector.

Installing Sun Secure Global Desktop Software

The Virtual Desktop Connector can be used with Sun Secure Global Desktop software. If you wish to use SGD to deliver virtual desktops to users, install and configure it before you continue with the installation and configuration of the Virtual Desktop Connector. For detailed instructions, see the *Sun Secure Global Desktop 4.4 Installation Guide* at <http://docs.sun.com/source/820-2549/index.html>.

The SGD Webtop contains a list of applications on the left side. During the configuration of the Virtual Desktop Connector, you can choose to add to this list a My Desktop application from which users can launch their full-screen Windows virtual desktop sessions. After you have installed and configured SGD, users should be able to access their virtual desktops using either the My Desktop application object or by setting their browsers to http://<sgd_server>/mydesktop.

Session Management Layer

The Sun Virtual Desktop Connector functions as the session management layer, which connects the desktop access layer (SRSS and SGD) to the virtualization layer. To set up the Virtual Desktop Connector:

1. **Install the Virtual Desktop Connector Solaris packages/RPMs by running the `vda-install` script on the SRSS and/or SGD server.**
2. **Configure the Virtual Desktop Connector by running the `vda-config` script.**

Configuration Settings

As part of the setup process, you must decide where to store the Virtual Desktop Connector configuration settings. For evaluation purposes, it is sufficient to store the settings on the local file system. In a production environment, where you may need to set the Virtual Desktop Connector up on multiple servers for load balancing and failover purposes, it is better to take advantage of a central data store, where configuration settings are automatically replicated and kept synchronized with other servers. Both SRSS and SGD come with their own data store implementations, which provide automatic replication capabilities. Virtual Desktop Connector leverages these techniques and can take advantage of either the [SRSS Data Store](#) or the [SGD Data Store](#). The `vda-config` script allows you to select which one to use.

SGD Data Store

If you plan to use the SGD data store for storing Virtual Desktop Connector settings, you must set up an administrative user account on your system.

Any access to the SGD data store requires username/password authentication. During Virtual Desktop Connector configuration, you must specify an existing UNIX user account (with corresponding password) to be used for authentication against the SGD data store. This user account must be a member of the `ttaserv` UNIX group. Because it is used for authentication only, it does not need to have a valid shell. The following example uses the `useradd` and `passwd` commands to set this account up.

- **Execute the following commands as root (super user):**

```
# useradd -g ttaserv <username>
# passwd <username>
```

SRSS Data Store

If you plan to use the SRSS data store for Virtual Desktop Connector settings, you must have the latest SRSS 4.0 patches installed. See [TABLE 2-1](#).

My Desktop Application Object

If SGD is installed on the server, the configuration script also offers the option of setting up a `My Desktop` application object. This allows users to access a full-screen Windows desktop session by clicking on the My Desktop link in the SGD Web interface.

Kiosk Session

The Virtual Desktop Connector automatically installs a new SRSS Kiosk session type. This makes it easy to configure the SRSS Kiosk mode to serve full-screen Windows sessions from any desktop unit (DTU) connected to the Sun Ray server.

Web Hosting

The Virtual Desktop Connector's administration interface is described under [“Using the Admin GUI” on page 23](#). The corresponding Web application must be hosted in a suitable Web server.

The Virtual Desktop Connector requires Apache Tomcat 5.5 or higher, typically available on your system as part of the SRSS or SGD installation. The `vda-config` script prompts you for the Apache Tomcat installation directory as well as for the desired HTTP/HTTPS ports for accessing the Admin GUI. The default location for Tomcat installation on SRSS is `/opt/apache-tomcat`; the default location on SGD is `/opt/tarantella/webserver/tomcat/5.xx`.

Note – If the Tomcat version is 5.0x instead of 5.5 or higher, you must specify the location of a JDK 5 (Java Development Kit), instead of a JRE 5, during `vda-config`. SGD installs a suitable JDK under `/opt/tarantella/bin/jdk.xx`.

Pre-installation Preparation

The following requirements must be met before you install the Sun Virtual Desktop Connector:

TABLE 2-2 Installation and Configuration Requirements

Requirement	Comments
SRSS 4.0 and/or SGD 4.4	See “ Desktop Access Layer ” on page 13 for instructions.
Java Runtime Environment (JRE) 5 or higher	The latest Java release is available at: http://java.sun.com/j2se
Apache Tomcat 5.5 or higher	The JRE and Apache Tomcat are normally part of the SRSS/SGD setup.
Data Store	See SGD Data Store and SRSS Data Store .

Installation and Configuration

1. As root (super user), change to the Sun Virtual Desktop Connector image directory, and execute the following command to start the installation script:

```
# ./vda-install
```

The installation script displays the text of the Sun Software License Agreement and prompts you to accept its terms and conditions. After the license confirmation, the installation process begins, and all Virtual Desktop Connector packages are installed.

Upon completion, **vda-install** prints an installation finished message. A time-stamped log file is available at:

- On Solaris platforms:

```
/var/sadm/install/logs/vda-install.<year_month_date_hour:minute:second>.log
```

- On Linux platforms:

```
/var/log/vda-install.<year_month_date_hour:minute:second>.log
```

After successful installation, you need to configure the Virtual Desktop Connector.

2. Execute the following command to start the configuration script:

```
# /opt/SUNWvda/sbin/vda-config
```

The configuration script prompts you to supply some information and make certain configuration choices:

- JRE Location

The default JRE location is `/usr/java`.

- Configuration Data Store

If SRSS or SGD is available on your system, the script asks you to select whether to use the SRSS, SGD, or file-based data store to store Virtual Desktop Connector configuration settings.

The file-based data store is the default; however:

- If you select the SGD data store, the script prompts you for the name and password of an existing user account to use for authentication. This user must be a member of the `ttaserv` UNIX group, as described in [“SGD Data Store” on page 15](#). The default is `VDAUser`.

All security-relevant configuration settings are stored in an encrypted form in the data store, so the script also prompts you for a password to use for encryption.

Note – If Virtual Desktop Connector is installed on multiple servers in a failover group or an SGD array, then all servers must use the same encryption password.

- If you select SRSS data store, all security-relevant configuration settings are stored in encrypted form in the SRSS data store. **vda-config** prompts you for a password to use for encryption.

- My Desktop Application Object

If SGD is installed on your system, **vda-config** asks whether to set up/configure a My Desktop application object. The default is Yes.

- Admin GUI Configuration

vda-config enables you to configure the Virtual Desktop Connector’s Admin GUI. It prompts for configuration settings such as the path to the Apache Tomcat installation and port numbers and supplies reasonable default values.

Note – If remote server administration is disabled (the default), you can access the Admin GUI via <http://127.0.0.1:1800> or <http://localhost:1800> only. Access to the Admin GUI via <http://<servername>:1800> is blocked unless remote administration is enabled.

After a final confirmation question, **vda-config** performs the necessary system adaptations. This may take up to several minutes. A time-stamped log file is available at:

- On Solaris platforms:

```
/var/sadm/log/logs/vda-config.<year_month_date_hour:minute:second>.log
```

- On Linux platforms:

```
/var/log/vda-config.<year_month_date_hour:minute:second>.log
```

3. Execute the following commands to verify the correct startup:

```
# /opt/SUNWvda/sbin/vda-service status
# /opt/SUNWvda/sbin/vda-webadmin status
```

If everything works as expected, all Virtual Desktop Connector services should now be up and running.

Uninstallation

To remove the Virtual Desktop Connector:

1. Execute the following command to unconfigure the Virtual Desktop Connector:

```
# /opt/SUNWvda/sbin/vda-config -u
```

This shuts down all Virtual Desktop Connector services and removes all configuration settings. Afterwards, you can safely remove the packages:

2. Execute the following command to invoke the installation script with the **uninstall option:**

```
# /opt/SUNWvda/sbin/vda-install -u
```

Note – Be sure to invoke this script from outside the `/opt/SUNWvda` directory, otherwise the system may not be able to remove the `SUNWvda` directory.

Standalone Virtual Desktop Connector Client

In certain circumstances, you may need to install and use only the Sun Virtual Desktop Connector Client. The following sections provide basic instructions.

Installing a Standalone Virtual Desktop Connector Client

By default, the `vda-install` installation script installs all Sun Virtual Desktop Connector packages needed for thin client or Web access on a single host. To perform a standalone installation.

1. Locate the Sun Virtual Desktop Connector Client package in the installation image.

On Solaris platforms the Sun Virtual Desktop Connector Client is provided as:

`vda_1.0/Solaris_10+/i386/Packages/SUNWvda-client`

or

`vda_1.0/Solaris10+/sparc/Packages/SUNWvda-client`

On Linux platforms the Sun Virtual Desktop Connector Client is provided as:

`vda_1.0/Linux/Packages/SUNWvda-client-1.0-*.rpm`

2. Install the Sun Virtual Desktop Connector Client package.

Use the `pkgadd` command on Solaris platforms or the `rpm` command on Linux.

Using a Standalone Virtual Desktop Connector Client

By default, the Sun Virtual Desktop Connector Client and Service are installed on the same host, and the client attempts to connect to a service running locally. If you have installed a standalone Sun Virtual Desktop Connector Client, you must identify the location (host and port) of a remote Sun Virtual Desktop Connector Service to be used in client invocations. For more information, see the `vda-client(1)` man page.

In a standalone scenario, it is best to configure the Sun Virtual Desktop Connector Service to use a fixed port number for its client communications. By default, the service chooses a different port number each time it starts. For more information on configuring the service port, see [“Service Settings” on page 31](#).

Administration

The Virtual Desktop Connector provides a Web-based GUI to simplify the tasks of creating and managing pools of virtual machines, assigning virtual machines to users, and monitoring the current system state. This chapter describes the Admin GUI and the basic tasks associated with administering the Virtual Desktop Connector.

Setting Up the Admin GUI

The VDC Admin GUI provides an interface for managing virtual machine assignments and monitoring the state of the underlying virtualization platform. To enable the Admin GUI:

1. **Go to `http://localhost:1800` (or `http://<servername>:1800` if remote administration is enabled).**

If secure communication has been enabled, you will be automatically redirected to an HTTPS port.

2. **Log in using a valid administrator account for that host.**

Initially, only the system's super user (root) is configured as administrator, so if you log in for the first time, you must do so as root, with the corresponding password. You can define additional administrator accounts later, as described under "[Administrators](#)" on page 31.

3. **Click the Start Configuration button to launch the Connection Wizard.**

VMware VirtualCenter Connection Wizard

The following table describes the fields in the VirtualCenter Server Connection Wizard:

TABLE 3-1 VMware VirtualCenter Connection Wizard

Field	Description
Server Information	<p>Enter the name and authentication credentials for the VMware VirtualCenter Server, and click the Next button.</p> <p>To make sure that all VMware Datacenters can be controlled, enter a name that corresponds to a local or domain user who has been assigned the VMware Administrator role. All members of the local or domain administrators group are assigned this role by default. If you wish to create a local or domain user specifically for the purpose of VMware administration, ensure that the user has been assigned the VMware Administrator role for the desired VC entity, such as Datacenter, Folder, Virtual Machine, etc., before that person tries to connect. For more information on VMware roles, see www.vmware.com/support/pubs.</p> <p>If you specify a domain user account, the system hosting VirtualCenter must be joined to the domain.</p>
Verify the SSL Certificate	<p>The wizard tries to connect to the Virtual Desktop Connector agent running on the specified server. Upon successful communication with the Virtual Desktop Connector agent, the agent's SSL Certificate is displayed. If the details of the certificate match the details of the agent running on the specified server, then click the Next Button to proceed. If no agent is running, then communication fails, and you must make sure that the Virtual Desktop Connector agent is installed and running on the server and that you provided the correct credentials in the Server Information step. You need to install the Virtual Desktop Connector agent on the server manually.</p>
Select Datacenters	<p>The wizard displays the table of available VMware Datacenters. Select the Datacenters you wish to manage, and click the Next button.</p>
Review Selections	<p>Review the details displayed, and click the Finish button to complete configuration of the VirtualCenter server. The clusters contained in the selected VMware Datacenters are now viewable on the Hosts & Clusters tab.</p>

Using the Admin GUI

The Admin GUI is organized around primary Virtual Desktop Connector objects, such as *hosts*, *virtual machines*, *pools*, and *storage*. A simple tab navigation model with several sub-tabs makes it easy to drill down into system details and view or modify any desired settings. All tables can be sorted by clicking on the column headers. You can also use each table's preferences dialog to display or hide table columns.

Navigation Hierarchy

- **Hosts & Clusters Tab**
 - View Host/Cluster Details
 - View Virtual Machines of Host/Cluster
- **Virtual Machines Tab** (see “Managing Virtual Machine Assignments” on page 25)
 - Assign/Unassign Virtual Machines to pools or owners
 - Search for Virtual Machines (with different search criteria)
 - View Virtual Machine Details
 - Edit Details (change assignment)
- **Pools Tab** (see “Managing Pools” on page 27)
 - Create/Delete Pool of Virtual Machines
 - View Pool Details
 - Edit Pool Details (Virtual Machine template, lifecycle policy, etc.)
 - View Virtual Machines of Pool (in preparation/available/used)
- **Storage Tab**
 - View Storage Disk Space and Usage
- **Log Files Tab**
 - View Administration Logs
 - View Service Logs
 - View Web Server Logs
- **Advanced Settings Tab** (see “Advanced Settings” on page 30)
 - Edit Global Pool Settings (default pool, clone/recycle intervals)
 - Define Preferred Storage
 - Manage Administrators (add/remove administrators)
 - Edit Service Settings (log level, service port)
 - View Agents States

Hosts & Clusters Tab

The Hosts & Clusters tab gives you an overview of the status of the underlying virtualization platform. It lists all computers (hosts) that provide physical resources, such as memory and CPU power, for the execution of virtual machines. You can click on the host name to display additional details, such as the operating system, model, and total number of virtual machines.

Using VirtualCenter as the virtualization platform allows several hosts to be clustered to maximize high availability and load balancing. Clustered hosts work together closely and can, in many respects, be viewed as a single computer. Consequently, the Admin GUI displays the names of clusters, not the names of the individual hosts forming the cluster or clusters. The names of hosts that do not participate in a cluster appear as separate table entries.

Virtual Machines Tab

The Virtual Machines tab lets you browse through all available virtual machines and to view them by owners or by pools. You can also search for specific machines by name, host, or storage location. Clicking on the machine name displays additional details, such as the guest operating system, IP address, CPU, and memory settings. You can also check the virtual machine's state as well as start, stop, suspend, or delete it.

Note – Running virtual machines cannot be deleted.

The Virtual Machines tab also enables viewing and editing of the machine assignments to owners or pools. See [“Managing Virtual Machine Assignments” on page 25](#) for further details.

Pools Tab

The Pools tab lets you create and maintain pools of virtual machines to be assigned dynamically to users. It lists, for each pool, how many virtual machines are in preparation (when cloning is in progress), available, and in use.

You can choose to populate a pool with virtual machines manually, or to have the Virtual Desktop Connector service create, or *clone*, additional virtual machines automatically, as needed, from a template. You can define the lifecycle and minimum/maximum number of virtual machines for each pool.

Note – A pool that contains running virtual machines cannot be deleted. You must stop or suspend the virtual machines before deleting the pool.

Storage Tab

Sufficient disk space is essential for the creation of additional virtual machines, and it also affects general system performance. The Storage Tab provides an overview of the disk space, available and consumed, taking into account the storage media attached to each host. This tab allows you to detect bottlenecks early and to perform corrective actions before the system runs out of disk space.

Log Files Tab

The Log Files Tab provides sub-tabs that allow Web-based access to the main Virtual Desktop Connector log files. This makes it easier to detect error conditions from a remote location without the need to log in to each host locally and access the log files through the file system.

Advanced Settings Tab

The Advanced Settings Tab has sub-tabs that provide access to more advanced, system-wide settings. These include global settings for the cloning of virtual machines (clone/recycle interval, preferred storage), the list of users who have administrative privileges, settings for the VDC service, and status information on the VDC agent instances. See [“Advanced Settings” on page 30](#).

Managing Virtual Machine Assignments

The main focus of the Virtual Desktop Connector is the preparation and assignment of virtual machines (VMs) to users. Two common usage scenarios are described under [“Usage Scenario” on page 5](#) and [“Virtual Machines Tab” on page 24](#). In particular, users who require their own virtual machines should receive [static assignment](#).

For those users who have fewer requirements for customizing and maintaining their desktop environments, [dynamic assignment](#) is more appropriate.

How Users Connect to a VM or VM Pool

An unmodified Virtual Desktop Connector uses information stored in SRSS and SGD to identify users and start the desired virtual machine.

When users access their Windows desktops via the SGD Web interface (by clicking on the My Desktop link or by accessing <http://<servername>/sgd/mydesktop>), the Virtual Desktop Connector identifies them by SGD login name.

When users access their Windows desktops via a Sun Ray desktop unit (DTU), the Virtual Desktop Connector evaluates the information associated with the smart card inserted in the DTU.

If the smart card has been registered in SRSS (you can register tokens on the SRSS Admin GUI's Tokens tab), the Virtual Desktop Connector reads the smart card's Owner and Other Information settings. By default, the Other Information setting specifies the virtual machine pool name, and the Owner setting specifies the user identifier. If the smart card is not registered, the Virtual Desktop Connector uses the smart card number.

The Virtual Desktop Connector evaluates both the user identifier and the pool name to select and start the correct virtual machine.

If a pool name has been specified, the Virtual Desktop Connector selects the next available VM from the desired pool. If no pool name has been specified, the user identifier is used to check for any statically assigned VM. If no matching assignment can be found, the Virtual Desktop Connector selects an available VM from the default pool as fallback (see "[Pool Settings](#)" on page 30).

The Virtual Desktop Connector starts the selected virtual machine, if necessary, and connects the user to the Windows desktop.

Note – For a description of how you can adapt the mapping of user identifiers and pool names to users, see "[Production Environments](#)" on page 31.

Assigning a Virtual Machine to an Owner

The Virtual Desktop Connector Admin GUI simplifies the task of assigning virtual machines to users. Use the Virtual Machines tab to browse through all available VMs, or use the Search function to look up specific VMs by name, host, or storage location.

1. To display details such as guest operating system, IP address, and CPU and memory settings, click on the VM name.

You can also check the virtual machine's state and start, stop, or suspend it, if necessary.

2. To modify the VM assignment, click the Edit button.

You can assign the VM to a specific user (owner) or to a VM pool. In the static assignment scenario, you would assign the VM to the desired user.

The Virtual Desktop Connector ordinarily utilizes the user name as an identifier, but you can use more complex items, such as a security token stored on a smart card, depending on your needs.

Assigning a Virtual Machine to a Pool

For those users who do not need *static assignment* to a particular virtual machine, virtual machines can be picked up on demand, or allocated, from a virtual machine pool (see “[Managing Pools](#)” on page 27).

In some cases (especially for testing purposes), you may find it is easier to populate a pool manually with existing virtual machines. The procedure is:

1. Select the desired virtual machine in the VM table and open the Assignment Actions drop-down.
2. Click on the Assign to Pool <poolname> entry to assign the selected VM to the pool.

You can also make the pool assignment from the VM's details page.

Managing Pools

A pool maintains a collection of available and used virtual machines.

The Pools Tab enables the creation and maintenance of pools of virtual machines. These pools can later be used to assign virtual machines dynamically to users. You can populate a pool with virtual machines manually, or the Virtual Desktop Connector can create (clone) additional virtual machines automatically, as needed, from a template. You can define the lifecycle and minimum/maximum number of virtual machines for each pool.

A dynamically assigned virtual machine is created from a standard *golden image*, or *template*, and preserved in a virtual machine *pool*.

A virtual machine is returned to its pool at the end of its recycle interval if:

- The virtual machine is in *suspend* mode.
- The virtual machine is running, but no user is logged in to its guest OS.
- The virtual machine is running, but the guest OS is in *standby* mode, whether a user is logged in to the guest OS or not.

When a virtual machine is returned to its pool, it can be returned to its previous state, reused, or destroyed, depending on the recycle policy (see [“Recycle Policy” on page 29](#)).

Creating a New Pool

To create a new pool:

1. Click the **New** button in the **Pools** tab.
2. Specify the details of the new pool on the **Create New Pool** page.

TABLE 3-2 Required Settings for Creation of a New Pool

Setting	Comments
Name	Specify the name of the new pool. It is usually a good idea to base the pool name on the user group or function for which the pool will supply VMs.
Cloning	A pool can be populated and maintained with machines cloned from a specified template virtual machine, or it can be manually populated with existing virtual machines. Choose one of the following settings:
None (No Cloning) Populate the Pool Manually	Choose this option to create an empty pool and to assign virtual machines to the pool manually. No cloning of machines will occur for this pool.
Populate the Pool Using:	Specify the template virtual machine from which all members of this pool will be cloned.
Virtual Machine Name Prefix	The prefix to use for cloned virtual machine names in the pool. If none is specified, the name of the pool is used.

TABLE 3-2 Required Settings for Creation of a New Pool

Setting	Comments
Custom Spec	Select a Custom Specification (sysprep) file to use for installing the cloned machines. Microsoft sysprep is a tool used to install Windows operating systems with minimal intervention by an administrator.
Minimum Size	The minimum number of available virtual machines a pool may contain.
Maximum Size	The maximum number of virtual machines a pool may contain.

3. Specify virtual machine lifecycle policies on a per-pool basis.

When a virtual machine that has been dynamically allocated has not been used for a specified interval (see [Recycle Interval](#)), or when certain other criteria have been met, the machine is returned to the pool for reallocation. This process is called *recycling*.

TABLE 3-3 Lifecycle Policy Settings

Setting	Comments
Idle Timeout	The length of time (in minutes) a machine can remain suspended before being made available to other users.
Maximum Age	The length of time a cloned machine can be used before being destroyed.
Recycle Policy	Virtual machines in this pool that are no longer in use and have exceeded the idle timeout interval are recycled. This setting specifies the action to be taken when these machines are recycled. The options are
Snapshot	The virtual machine is returned to its prior state before being assigned to the next user. Changes made on the machine made by a previous user are not saved. This is the default setting.
Destroy	The virtual machine is not re-used. It is destroyed after being used once.
Reuse	No cleanup or recycle actions are performed. The virtual machine is assigned as-is to the next user.

Note – See [“Pool Settings” on page 30](#) for details on specifying global pool settings.

4. Click the OK button to save the new pool.

If you have chosen to use a template for cloning, then the pool will begin to be populated with cloned machines after a few minutes.

Viewing Pool Details

- **To view the details of a pool, click on the pool name in the Pools table.**

The Pool Details page shows details for the pool as well as the number of virtual machines currently used, available, and in preparation for the pool.

Advanced Settings

Among the fields and settings provided on the Advanced tab are the following:

Pool Settings

The following items let you specify the global settings for all pools.

- **Default Pool**

In the absence of specific information for a given user, the Virtual Desktop Connector assigns a machine from the default pool. It is up to the administrator to decide how pool information for users is retrieved. See [“Production Environments” on page 31](#) for details on how to customize the example session scripts provided with the Virtual Desktop Connector.

- **Clone Interval**

The length of time the Virtual Desktop Connector service waits before checking whether any pools require new clones to be built.

- **Recycle Interval**

The length of time the Virtual Desktop Connector service waits before checking pools for old machines to be recycled.

Storage Settings

You can specify the list of allowed storage devices where pools should save cloned virtual machine data from among the available storage devices. Specify at least one allowed device.

Administrators

This setting lets you specify the list of administrators allowed on this server. The superuser (root) is automatically configured as administrator and cannot be removed from this list. To add another administrator, click the New button, and enter the username of a valid user on the server.

Service Settings

Two settings are displayed on the Service tab:

- Service Port

This setting lets you specify the port on the which the Virtual Desktop Connector service communicates. Leave the field empty to allow the Virtual Desktop Connector service to choose its own port.

- Log Level

This setting lets you specify the logging level for the Virtual Desktop Connector log files. The log files are located at `/var/opt/SUNWvda/log/`.

Production Environments

Virtual machines can be provided to users either from statically assigned virtual machines or from pools of identical, dynamically assigned virtual machines. Two sample approaches that use these assignments to deliver desktops to users in a SRSS or SGD production environment are included with the Virtual Desktop Connector:

- Virtual Desktop Connector SRSS Kiosk session

`/etc/opt/SUNWkio/sessions/vda`

- Virtual Desktop Connector SGD login script

`/opt/SUNWvda/lib/vda-wcpwts.exp`

In both cases, the Virtual Desktop Connector client retrieves the IP address of a virtual machine assigned to the current user session and uses that address to connect the session to the assigned virtual machine.

The SRSS Kiosk Session and SGD login script are provided for convenience. They may be used as-is or modified to suit a specific environment.

Customization

To customize the SRSS Kiosk session:

- 1. Make a copy of the provided session descriptor**

`/etc/opt/SUNWkio/sessions/vda.conf`

- and session directory**

`/etc/opt/SUNWkio/sessions/vda`

- 2. Modify as appropriate.**

Once you have created a new SRSS Kiosk session, you can select it with the SRSS Admin GUI. For more details on the contents of SRSS Kiosk sessions, see the `kiosk(5)` man page.

For a custom SGD login script:

- 1. Make a copy of the provided login script**

`/opt/SUNWvda/lib/vda-wcpwts.exp`

- and modify as appropriate.**

- 2. Copy the resulting script to the SGD login script directory**

`/opt/tarantella/var/serverresources/expect.`

- 3. Register it with the SGD object manager.**

For more information on the Sun Global Desktop Manager, please see the latest documentation on `docs.sun.com`.

Virtual Desktop Connector Client Usage

You can use the Virtual Desktop Connector client to retrieve the IP address of a virtual machine assigned to a given user session. If the specified assignment does not already exist, it will be created. For usage details, see the `vda-client(1)` man page.

Troubleshooting

Setting up an environment to host virtual desktops can be complicated, and it is not uncommon for a few steps not to work properly in the initial setup. The following sections offer solutions to some common problems.

Pools

If you have created a new pool and virtual machines are not created automatically, the cause may be one of the following:

- You have not defined a template for the pool. Make sure that your pool configuration points to a virtual machine or template.
- There is not enough disk space available to create copies of the template.

If you have created a pool, and new virtual machines are created automatically, but they are not made available:

1. Verify that you still have enough disk space for your virtual machines.

Before a newly created virtual machine is made available for users, a snapshot is taken by default. This operation requires sufficient disk space.

2. Verify that the RDP port (typically 3389) of the Windows guest OS instance is open.

Before a newly created virtual machine is made available, the Virtual Desktop Connector verifies whether RDP communication can be established to the virtual machine. The following issues might prevent a successful test:

- The virtual machine is on a private network and cannot be accessed by the Virtual Desktop Connector. Verify your network configuration.
- Remote access is disabled on the Windows guest OS.
- Firewall settings of the Windows guest OS do not allow RDP connections.

If the Sun Ray DTU is cycling and cannot connect to a virtual machine:

1. **Verify that you have a virtual machine available to connect to.**
2. **Verify that remote access is correctly configured on your Windows guest OS (see [Step 2](#) above.)**
3. **Verify that the Virtual Desktop Connector can communicate with the agent.**
The firewall on the VirtualCenter server might block the communication.
4. **Verify that the VMware tools are installed on the Windows guest OS.**

Users

If users are not able to login to the Windows guest OS instance:

- **Verify that the users are configured for remote access and are allowed to perform a remote access.**

Machines

If unused virtual machines do not suspend:

1. **Verify that the Power Options on the Windows guest OS have been configured for standby.**
2. **Verify that the Virtual Desktop Connector Tools are installed and running on the Windows guest OS.**

3. Verify that the virtual machine is configured to suspend.

Look up the Virtual Machine configuration (Options/Power management), and make sure that the Suspend the Virtual Machine item is selected.

Note – If you experience problems with the standby feature in Windows XP, see http://www.terranovum.com/projects/energystar/ez_gpo.html. EZ GPO includes a group policy for power options.

If the cloning process does not operate as expected:

To determine whether a new virtual machine is ready for use, the Virtual Desktop Connector tries to open an RDP connection to it. In certain cases, especially if you use a customized VM template for Vista, RDP can become available before the build process has completed; however, a virtual machine made available before the build process has completed cannot be used.

The following procedure describes how to set up a customized virtual machine template for Vista using VMware customization specs in such a way as to correct this problem. It requires that RDP be disabled in the virtual machine template and that no firewalls block RDP connections at the end of the cloning process.

Preparations for manual sysprep for Windows XP (Step 3) and Vista VMs (Step 4) are also included. These steps are not needed if you use *only* Windows XP VMs.

Note – If you are using the Windows Firewall, make sure that the Remote Desktop item is checked under Firewall Exceptions.

1. Disable RDP by making sure the Remote Desktop checkbox on the Remote section of the System Preference dialog on the Windows Control Panel is unchecked.
2. Create a registry file called `enableRdp.reg` at C:\ with the following content:

```
REGEDIT4
[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Terminal Server]
"fDenyTSConnections"=dword:00000000
```

The `enableRdp.reg` file enables RDP through the Windows registry. It must be installed as above at the very end of the cloning process, so that when the `SetupComplete.cmd` command changes the configuration key on the Windows registry, the RDP connection can succeed.

3. For Windows XP manual sysprep, include the following under Additional Commands in the Setup Manager tool:

```
regedit /s C:\EnableRdp.reg
```

The Setup Manager tool is used to create answer files for sysprep.

4. For Windows Vista manual sysprep and customization specs, create a batch file called SetupComplete.cmd in the %WINDIR%\Setup\Scripts directory with the following content:

```
regedit /s C:\ EnableRdp.reg
```

Windows Vista looks for %WINDIR%\Setup\Scripts\SetepComplete.cmd and executes it at the end of every setup process, including sysprep. The default setting for %WINDIR% is C:\Windows.

Networking

If the virtual machine does not have a valid IP address or cannot be pinged:

- Verify that your networking interface is properly configured for your ESX server in the Virtual Infrastructure Client.

If the network interface is properly configured for your ESX server:

- Verify that there is a properly configured DHCP server with enough leases running on the subnet your virtual machines will run on.

See the VMware documentation available on line at
http://www.vmware.com/support/pubs/vi_pubs.html.

If you are unable to get a Remote Desktop Connection to your virtual machine:

1. Verify that it has been enabled in the Remote tab of the System Properties dialog.

If this is enabled, the issue probably has to do with your network settings.

- 2. Verify that the virtual machine's subnet can be reached from the Windows machine from which you run the Remote Desktop Connection client.**

If you have set up a private network for your virtual machines, it might not be accessible from a machine not on that network.

If the window displaying your virtual desktop freezes:

If you suspend or power down your virtual machine without first closing the RDP connection, the guest OS dies, but the RDP connection remains active. The result is a non-responsive window displaying the last known state of your Windows session. The following steps show how to set the Run VMware Tools Scripts panel on both the Virtual Infrastructure Client and the guest OS to avoid this problem.

- 1. Configure the Run VMware Tools Scripts panel on the Virtual Infrastructure Client.**

- a. Select Edit Settings of a particular VM to bring up the Virtual Machine Properties page.**

- b. Click the Options tab.**

- c. Select VMware Tools.**

This is where you can modify the behavior of the Power Controls (Start, Stop, Suspend, and Reset).

- d. Next to the Power Off switch (red rectangle), select Shut Down Guest.**

This allows the guest OS to shut down gracefully when the Power Control button is pressed.

- e. In the Run VMware Tools Scripts panel, check the Before Powering Off checkbox.**

- 2. Repeat steps a. through e. above to configure the Run VMware Tools Scripts panel on the guest OS.**

- 3. Modify the `poweroff-vm-default.bat` script on the guest OS.**

The install location on the guest OS, typically
C:\Program Files\VMware\VMware Tools
contains the following default scripts:

```
poweroff-vm-default.bat  
poweron-vm-default.bat  
resume-vm-default.bat  
suspend-vm-default.bat
```

4. Add tsdiscon.exe to the poweroff-vm-default.bat script.

The poweroff-vm-default.bat script is the first to execute when the VM is powered off from the VMware Infrastructure Client. It now calls tsdiscon.exe, which closes all open RDP connections.

Glossary

agent	A software entity that performs tasks on behalf of another software entity. For example, Virtual Desktop Connector agents on virtualization hosts handle interactions with virtual machines.
client	See <i>Virtual Desktop Connector (VDC) client</i> .
clone	To create a new virtual machine by copying it from a <i>template</i> . See also <i>golden image</i> .
cluster	Server group in the virtual environment.
customization	In this context, customization refers to modifications made to a guest operating system in a virtual machine, typically as it is being deployed. Customization options include changing the new virtual machine's identification and network information.
daemon	Programs that start automatically during system startup and run in the background without user interaction are usually called services in Windows and daemons in UNIX.
data store	A data store allows configuration settings to be replicated and kept synchronized with other servers automatically. SRSS and SGD come with their own data store implementations. With the Virtual Desktop Connector, you can choose to use either the SRSS data store or the SGD data store, or define a file-based storage location for configuration settings.
DTU	Sun Ray Desktop Terminal Units (DTU) are also known as Sun Ray virtual display clients.
dynamic assignment	Virtual machines are temporarily assigned to users as needed from a <i>pool</i> . When a user stops using the assigned machine, it can be recycled and made available for other users. Dynamic assignment is suitable for people who typically work in one or a few applications and have fewer requirements for customizing their desktop environment.
dynamic virtual desktop	A virtual desktop that is temporarily assigned to a user.

golden image	A virtual machine template used to create new virtual desktops. See template .
guest operating system	An operating system that runs on a virtual machine.
host	The physical computer on which virtual machine are installed.
host agent	Software installed on a virtual machine host that performs actions on behalf of a remote client.
kiosk mode	Sun Ray controlled access mode, used to provide simplified, controlled access for anonymous users, often in public settings, such as airports.
lifecycle	A virtual machine is created, assigned to a pool, used, perhaps reused, recycled, deleted: this is its lifecycle.
policy	In this context, policies are settings that specify parameters such as timeout intervals, maximum age, and others that affect the lifecycles of virtual machines in pools.
pool	A collection of virtual machines. Pools ordinarily contain virtual machines that are available for assignment as well as those that are no longer in active use and are waiting to be recycled or deleted.
RDP	Microsoft Remote Desktop Protocol.
recycling	When a virtual machine originating in a pool has not been used for a specified interval, or if certain other criteria apply, it is recycled, i.e., returned to the pool for reassignment.
resource pool	Load balancing unit that the Virtual Desktop Connector uses when powering on or cloning virtual machines.
resume	To return a suspended virtual machine to operation, use the resume feature. See suspend .
SSH	Secure Shell, a network protocol that enables exchange of data over a secure channel, using public-key cryptography for authentication.
SSL	Secure Sockets Layer, a cryptographic protocol used for secure data transfer.
service	Programs that start automatically during system startup and run in the background without user interaction are usually called services in Windows and daemons in UNIX.
snapshot	A reproduction of the virtual machine at a given point in time, including the state of the data on all the virtual machine's disks, including whether the virtual machine was powered on, powered off, or suspended.
standby	A guest operating system state indicative of low-power (or standby) mode.

static assignment	Under static assignment, users are explicitly assigned specific virtual machines: they become the machine owners much as though they had their own PCs. This is a typical setup for power workers, such as design engineers or software developers, who normally require a large set of applications and more administrative rights than other users.
static virtual desktop	A virtual desktop that is permanently assigned to a user.
storage	Location for storage of configuration settings. See data store .
suspend	To save the current state of a running virtual machine. To return a suspended virtual machine to operation, use the resume feature. See resume .
template	A master or golden image of a virtual machine.
VirtualCenter Server	A service that acts as a central administrator for VMware servers connected on a network. This service directs actions on the virtual machines and the virtual machine hosts. VirtualCenter Server is the working core of VirtualCenter.
VDA	Virtual Desktop Architecture. The VDC is part of Sun's VDA, and many subcomponents, scripts, etc., use vda as a prefix.
Virtual Desktop Connector (VDC) agent	A Windows service that runs on each virtual machine host to coordinate actions received from the virtualization server and handle interaction with virtual machines.
Virtual Desktop Connector (VDC) client	A client process that locates and manages connections with the virtual desktop on behalf of the user.
Virtual Desktop Connector (VDC) tools	A Windows service that manages RDP connections.
virtual desktop	A virtual machine containing a desktop instance that is executed and managed within the virtual desktop infrastructure, currently a Windows XP or Vista desktop accessed through RDP .
virtual desktop pool	A folder within VirtualCenter that contains virtual desktops sharing the same characteristics.
virtual disk	A file or set of files that appears as a physical disk drive to a guest operating system. These files can be on the host machine or on a remote file system. See also physical disk.
virtual display client	A Sun Ray DTU .
virtual machine	A virtualized x86 PC environment in which a guest operating system and associated application software can run. Multiple virtual machines can operate on the same host system concurrently.

virtual machine configuration file	A file containing a virtual machine configuration, created when you create the virtual machine. It specifies which virtual devices, such as disks and memory, are present in a virtual machine and how they are mapped to host files and devices.
virtual network	A network connecting virtual machines that does not depend on physical hardware connections.

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