ALTIRIS®
Software Virtualization Solution™ 2.0
Reference

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Notice

Altiris Software Virtualization Solution 2.0 Reference Guide

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Contents

Part I
Software Virtualization Solution Overview

This part includes the following chapters that provide an overview of Software Virtualization Solution.

Chapter 1
Introducing Altiris® Software Virtualization Solution™

Altiris® Software Virtualization Solution™ (SVS) is a revolutionary approach to software management. By placing applications and data into managed units called Virtual Software Packages, Software Virtualization Solution lets you instantly activate, deactivate or reset applications and to completely avoid conflicts between applications without altering the base Windows installation.

Software Virtualization Solution is based on Altiris patents-pending core technology known as the SVS File System Filter driver.

Software Virtualization Solution leverages the Altiris Extensible Management Architecture of Notification Server, the Altiris Agent, and the Altiris Console.

This chapter contains the following topics:

Solving Problems with Software Virtualization Solution

Software Virtualization Solution solves the following common application management problems:

Provisioning and deprovisioning applications is disruptive to the user and time consuming

With Software Virtualization Solution, you can easily deploy virtualized applications without running an application install or uninstall on client computers. Application availability is instantaneous—you can easily and immediately activate or deactivate your applications by sending a single command to the client computer. The user is not required to have system rights to run an installation, and you don’t have to worry about restarting when you activate or deactivate an application. The solution can also register any services that the application installed with the Windows Service Control Manager, which then loads the service so that the application is fully functional.

Recovering a damaged application is time consuming

Rather than repairing or recovering a damaged application, you can simply reset it to the original deployed condition. Application resets can be performed instantly or on a schedule. An application can be reset whether the client computer is connected to the network or not. Resetting a virtual application does not damage other applications installed on the computer.

Conflicting applications are difficult or impossible to manage

Software Virtualization Solution ensures applications use the correct files and registry settings without modifying the operating system and interfering with other applications. This provides numerous benefits, including improved reliability and flexibility. Example: When installing new software or application updates, administrators might inadvertently replace newer .DLLs with older .DLLs, which can cause immediate problems between applications sharing those .DLLs, causing application failure or reintroducing security holes that previously were patched. With Software Virtualization Solution, you can stop worrying about "DLL hell."

Other benefits include allowing different versions of the same application to co-exist on the same computer. Also, virtualized applications will never corrupt an operation system.

Migrating to new application versions requires significant testing and planning; takes a long time to execute and rollback is difficult

Rolling out new versions of an application requires significant time to test for conflicts and reprovisiong lab testing computers. Software Virtualization Solution simplifies pre-deployment testing, accelerates the deployment cycle, and reduces post-deployment support costs. With Software Virtualization Solution, you can host multiple versions of an application on the same system without conflicts between older and newer files.

Even phased rollouts are greatly accelerated because rollback can occur immediately at any time. Once the transition from an older application to a newer application is complete, simply deactivate and remove the older version.

Software Virtualization Solution Benefits

Integrates With Altiris® Extensible Management Architecture™

Software Virtualization Solution integrates with Altiris® Extensible Management Architecture™ (EMA™), so you benefit from native integration with Altiris service management, asset management, and systems management solutions. Take advantage of reports and policies that let you quickly troubleshoot and better forecast potential system problems. Example: Altiris pre-packaged Web Reports™ allow you to drill down for detailed information about your environment.And not only does EMA let you leverage your existing investment in Altiris solutions, it also makes it easy to extend capabilities as your business grows and your business needs change.

Supports Any Management Framework

Software Virtualization Solution is designed to work independently of the Altiris framework, if desired. API, WMI, and command-line interfaces are supported. This means Software Virtualization Solution client-side operations can be managed with any desktop management product.

Low Overhead Without Compromising Application Performance

Other vendors run virtualized applications inside a proprietary isolation wrapper, which introduces more performance overhead. Software Virtualization Solution incurs negligible overhead; the core of the system is a filter driver that is around 160 KB.

Product Documentation

The following documentation is provided with Software Virtualization Solution:

- **Release Notes.** The *Altiris Software Virtualization Solution Releases Notes* contain a list of the new features and known issues in this version of the product. It also contains any last-minute information that is not included in the main documentation.
- **Altiris Software Virtualization Solution Reference.** The *Altiris Software Virtualization Solution Reference* provides complete product documentation for administrators.

Altiris product documentation is available in Microsoft HTML Help (.CHM) and Adobe Acrobat (.PDF) formats. Documentation files are installed in the following directory:

C:\Program Files\Altiris\Notification Server\NSCap\Help

You can access documentation from the Altiris Console by clicking the following icons in the upper-right corner of the Altiris Console:

Access the contextual online help by clicking the online help icon.

Access an index of all help by clicking the index icon.

The complete and most current versions of documentation are available from the Altiris Knowledge Base, which is available from the Altiris support Web page at www.altiris.com/support.

Altiris Juice

Additional information can be found the Software Virtualization Solution Web Community Web site called Juice. The Juice Web site provides articles, tools, and tips to help you maximize the benefits of Software Virtualization Solution. You can visit the Juice at http://www.altiris.com/juice.

Chapter 2
Understanding Software Virtualization Solution

This chapter helps you understand Software Virtualization Solution (SVS) and includes the following topics:

How Software Virtualization Works

An application or set of data is virtualized by using a capture process that creates a Virtual Software Package (VSP). A VSP contains all the files and registry settings of the application or data. A VSP can be used on a client computer that has the Software Virtualization Agent. The VSP is installed to a special area on the hard drive. After the VSP is activated through the Software Virtualization Agent, the application becomes visible along with its files, folders, and settings. Even though it is a "virtual" application, it looks and behaves like any other application to the end user.

This section describes the following topics:

Software Virtualization and Redirection

Each VSP is managed by SVS as a distinct entity. When activated, VSPs are like "layers" over the base Windows operating system so the system appears to contain the aggregate contents of the base Operating System plus the active VSPs.

When a VSP is imported onto a computer, the contents of the VSP (both files and registry settings) are placed in a folder in a special protected SVS area on the hard dive, referred to as the SVS redirection area.

When a VSP is imported on a client computer, the contents of the VSP are placed in the redirected folder, such as C:\fslrdr\1. When the VSP is activated on a client computer, the contents of the VSP are made available to the user. The files and settings appear to the user in the location they would be in if the application had been installed on the computer.

Example: You have a VSP for Mozilla Firefox. When the Firefox VSP is activated, all the contents of the VSP are "layered" over the base file system and registry to make it visible to the user. The user then sees it's appropriate folders, files, registry settings,

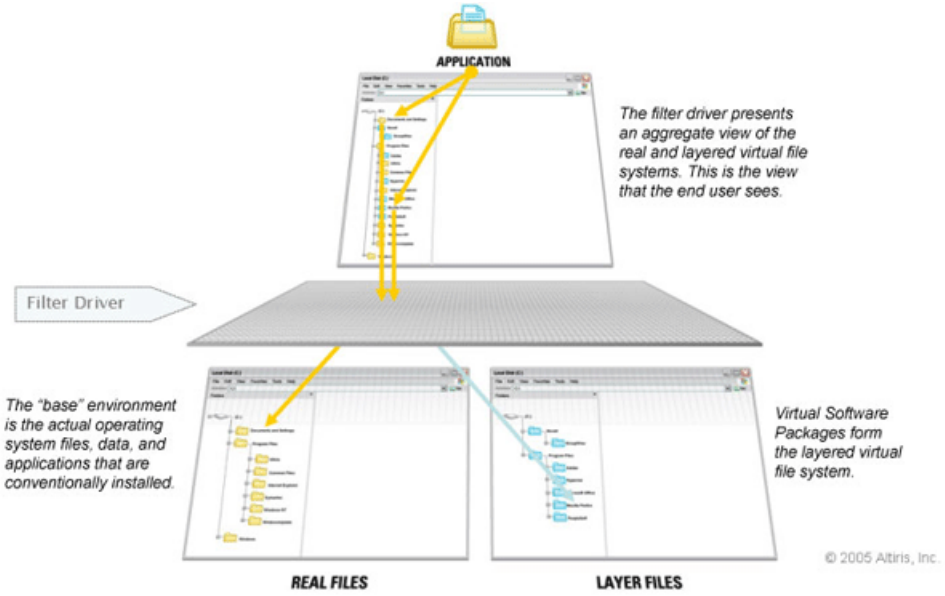
and shortcuts. When the contents are made visible, they are not displayed in the hidden area, but they are displayed in the locations that the user would see them had Firefox been installed on the computer. Example: Even though the Firefox application file may physically be located at

C:\fslrdr\1\PROGRAMFILES\Mozilla Firefox\firefox.exe

to the user, it is visible as

C:\Program Files\Mozilla Firefox\firefox.exe

Software Virtualization Solution accomplishes this by using a filter that intercepts requests to the file system and registry, and when needed, redirects requests to the active VSPs. Software Virtualization Solution uses the SVS File System Filter Driver to aggregate the real and virtual file systems into one view for the end-user. The SVS File System Filter Driver is the main component of the Software Virtualization Agent. The Software Virtualization Agent must be installed on any computer that you want to use VSPs on.



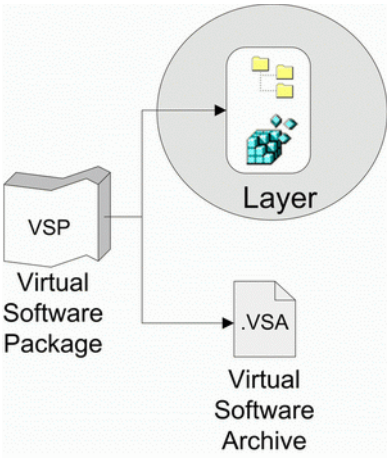
Example: The Firefox VSP is active. When a user browses to C:\Program Files\, all the subfolders in the actual file system folder appear, but the filter driver also looks at any active VSPs, and in this case, also displays the folder C:\Program Files\Mozilla Firefox.

With redirection, SVS can maintain discrete settings and file versions for different applications on a single system. By working with VSPs, a required version of a file will never be overwritten. This is particularly important when you are working with Dynamic Link Libraries (DLL). Incompatible .DLL files are known to cause application instability. By using applications within VSP, you can ensure that applications use its own set of .DLL files without interfering with the rest of the operating system or other applications running at the same time.

This extends not only to files that relate to applications, but also to registry settings and data files.

Virtual Software Package Architecture

A Virtual Software Package (VSP) is a generic term used for a set of captured data in its complete life-cycle while being managed by SVS. A VSP can be in one of two formats: a "Virtual Software Layer" or a "Virtual Software Archive" file.



Virtual Software Layers

When an application or set of data is captured into a Virtual Software Package, everything that is captured is contained in a "layer." The "layer" represents all the files and registry settings that make up the virtualized application or data.

Typically, one layer is created for one application. However, one layer can contain multiple applications. Each layer is managed as a single entity.

The files and settings captured in a layer are stored in the SVS redirection area on the computer's hard drive. However, when a layer is active, all files and settings appear in the system just as they would if the application or data was installed on the computer. This is accomplished through redirection using the SVS File System Filter Driver.

Virtual Software Archive (VSA) files

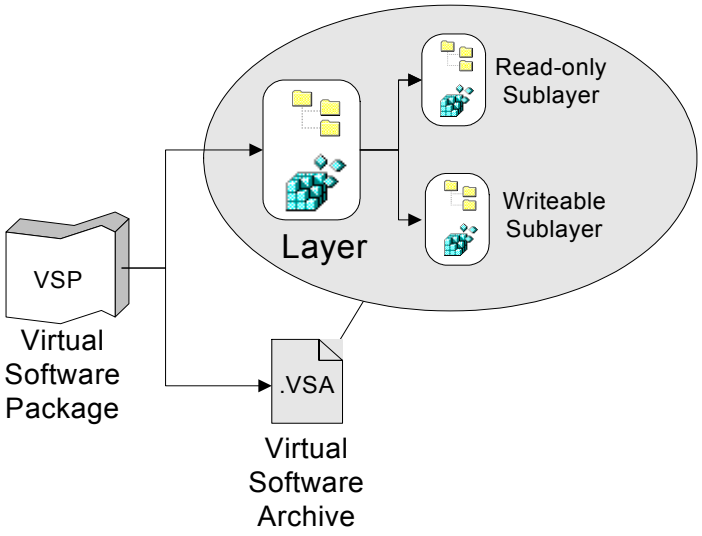
If you want to make a layer portable so that it can be used on another computer, the contents of the layer are exported to a single Virtual Software Archive (VSA) file. These archive files have a .VSA extension.

VSA files can then be copied or deployed to other computers. To make the contents of the VSA usable on a computer, the VSA must be imported using the Software Virtualization Agent. When a VSA is imported on a computer, the layer (the files and registry settings in the VSA) are installed to the SVS redirection area on the client computer's hard drive.

Layer Architecture

There are two components or sublayers in a layer:

Read-only sublayer	Contains all captured files and settings.
Writeable sublayer	Contains any files or settings that are added or changed by a user of a layer.



Example: You create a layer for Firefox. As a person uses Firefox, they may make some changes to the program. They may select a unique home page, add bookmarks, or change the original security settings. They may also install a browser plug-in. Those user changes are stored in the Writeable sublayer. The original files and settings are maintained in the Read-only sublayer.

Having these distinct sublayers is useful in being able to reset a layer. When a layer is reset, any data added by a user is deleted, and the layer is returned to its original configuration.

Example: If a user's Firefox application ever becomes damaged, you can simply reset the layer to restore it to the way it was first deployed. The application does not have to be uninstalled/reinstalled.

Resetting layers also maintains specific versions and configurations of applications across your network. You can control how the applications are installed and configured on client computers.

Note
The two sublayers currently apply only to virtualized application layers, not data layers.

Caution
When you reset a layer, any data that is written to the Writeable sublayer will be lost. For information, see Resetting Layers (page 37).

Layer Actions and States

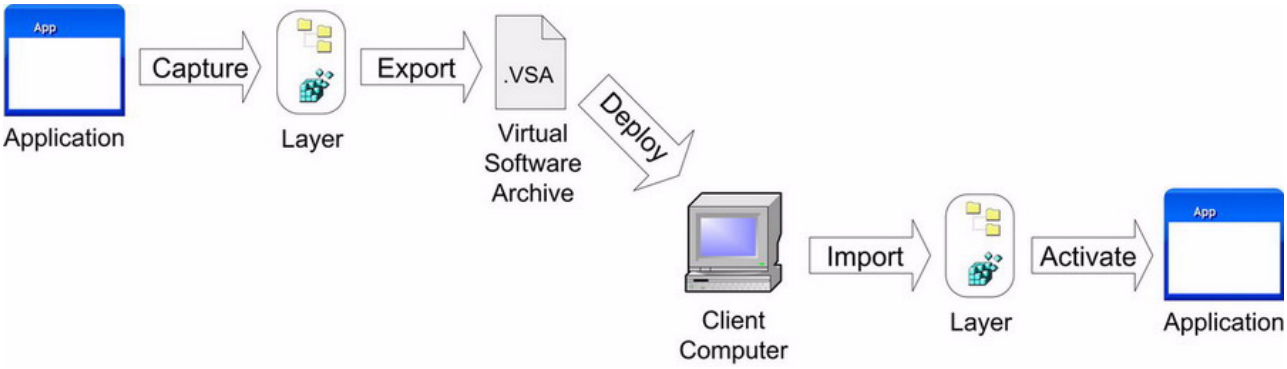
You can perform the following actions on layers:

Name	Description
Layer Actions	
Import	The layer files in a VSA file are installed in the hidden SVS redirection area on the client computer. However, imported files are not visible until the layer is activated.

Name	Description
Activate	The layer files that have been imported on a client computer are made visible to the user. Activation and deactivation occur almost instantaneously.
Deactivate	The imported layer files are hidden from the user but are kept on the computer. **Note** You cannot deactivate a layer while a process is running from that layer. For information, see Deactivating Layers with Services Running (page 37).
Deactivate (Force)	The layer is forcefully deactivated by killing all the running applications from that layer. This might cause undesired results.
Delete	The imported layer files are removed from the computer.
Delete (Force)	The layer is forcefully removed by killing all the running applications from that layer. This might cause undesired results.
Reset	Deletes all of the user's profiles in a layer that were added or changed. The data in the Writeable sublayer is deleted, leaving only the files in the Read-only sublayer. See Resetting Layers (page 37). **Note** Data layers cannot be reset. Hence, "Reset", "Reset and Activate" and "Reset and Deactivate" are not available for data layers.
Reset (Force)	Deletes all of the user's profiles in a layer that were added or changed, killing all the running applications from that layer. This might cause undesired results.
Layer States	
Activated	The imported layer files are made visible to the user.
Deactivated	The imported layer files are hidden from the user.
Combination of Actions and States	
Import and Activate	The layer files are placed in the SVS redirection area on the client computer and are made visible to the user.
Reset and Activate	The layer files are reset to their original imported state by deleting all user data and changes (Writeable sublayer), and the layer is visible to the user.
Reset and Deactivate	The layer files are reset to their original imported state by deleting all user data and changes (Writeable sublayer), and the layer is not visible to the user.

Software Virtualization Workflow

The following diagram illustrates a typical Software Virtualization workflow:



1. Using Software Virtualization Solution tools (SVS Admin), capture an application into a layer.
2. To make the layer portable, export the layer to a Virtual Software Archive (VSA) file.
3. Deploy the VSA to a client computer.
4. Import the VSA into a layer on the client computer.
5. Activate the layer to access the application.

Software Virtualization and Variablization

Many applications have specific environment settings for file paths, paths in registry values, MSI paths, and so forth. To make VSPs portable across computers, many application settings and data layer properties are variablized by Software Virtualization Solution.

Example: SVS uses common system variables to substitute for well-known locations on a Microsoft Windows based installation, such as WINDIR as a substitute for the "Windows" folder. This provides seamless compatibility with systems that may not be using the standard folder structure, such as systems that have moved their "My Documents" folder or that have renamed OS folders.

Example: If you have a VSP for My Documents, it may be on C drive on one computer but on D drive on another computer. Variablization allows the data layer to work correctly on both computers. For information, see View Variables used in a Layer (page 47).

Software Virtualization Solution Usage Scenarios

This section describes the different ways you can use Software Virtualization Solution.

What Can be Virtualized?

You can virtualize applications and collections of data.

Application Layers

Most every application can be virtualized, including office applications, databases, Internet browsers, media, and spyware utilities. Applications function normally when virtualized by SVS. All functionality and configuration options are available to the user.

Data Layers

You can also redirect user data to be stored within a layer. (Example: All files created with a .DOC extension can be stored within a layer, letting users easily group their documents together. Users can also define folders in the same way.) (Example: The "My Documents" folder can be redirected to a data layer.) By giving multiple paths and directing that content to a data layer, you can manage all user content invisibly. Coupled with the layer import/export function, this lets a user copy not only an application from one machine to another, but also all of their customizations and files. By having data files in their own layers, those files are protected when application layers are reset and writeable data in those layers are lost. For information, see Creating and Using Virtual Data Layers (page 34).

What Cannot be Virtualized?

Some applications and file types do not work well virtualized at this time. For information, see Software Virtualization Solution Limitations (page 20).

How are Applications and Data Virtualized?

Virtualized applications and data are captured into Virtual Software Packages using a simple capture tool called Software Virtualization Solution Admin tool (SVS Admin). Virtual Software Packages contain all the files and registry settings required for an application to run.

How Can Virtual Software Packages be Used?

Virtual Software Packages are highly portable and can be easily used between different computers and Windows operating system versions. The virtualization technology is invisible to the user, the applications, and operation system, yet virtualized applications and data are visible system-wide and execute normally. Virtualization has negligible system and performance overhead.

You can use Virtual Software Packages in the following environments:

- *Using Software Virtualization Solution Stand-alone*
- *Using Software Virtualization Solution in an Altiris® Notification Server Environment*
- *Using Software Virtualization Solution in an Altiris® Deployment Solution™ Environment*

Using Software Virtualization Solution Stand-alone

You can use Virtual Software Packages in a stand-alone environment on Windows-based computers. To use Virtual Software Packages, install the Software Virtualization Solution Admin tool on a computer and then create or import existing Virtual Software Packages.

For information, see Getting Started with Virtual Software Layers and Archive Files (page 24).

You can use the *Software Virtualization Solution for Personal Use* version to create and use your own virtual layers in a single-computer environment.

You can also make VSA files available to network users by using network shares, login scripts, SMS, and so forth.

For information, visit the Juice at http://www.altiris.com/juice.

Using Software Virtualization Solution in an Altiris® Notification Server Environment

Using the Notification Server-based Software Virtualization Solution, you can remotely deploy Virtual Software Packages to client computers on managed computers on your network. You can also remotely control the state of the Virtual Software Packages on client computers and view reports about Virtual Software Packages deployment and usage. Software Virtualization Solution is also integrated with Altiris® Inventory Solution™ and the Altiris® Software Delivery Solution™ Software Portal. For information, see Using Software Virtualization Solution in a Notification Server Environment (page 72).

Using Software Virtualization Solution in an Altiris® Deployment Solution™ Environment

Using Software Virtualization Solution and Deployment Solution, you can remotely deploy Virtual Software Packages to client computers on your network. For information, see Using Software Virtualization with Altiris® Deployment Solution™ (page 118).

How does Software Virtualization Solution Affect my Network?

What Demands does SVS place on the Physical Network?

SVS does not add any unique demands on a network. When used in a Notification Server environment, the only demand is during the initial package delivery, the same as with Software Delivery Solution. All of the same tools available in Software Delivery Solution (multicasting, bandwidth throttling, automatic resume of failed transfer, and so on) are available to you to maximize bandwidth usage. However, Software Delivery Solution is not required (both products use the same back-end architecture for management).

Are there Minimum Bandwidths Requirements for Deploying Virtualized Applications to Off-site Users?

There is no "recommended" minimum bandwidth, although the Altiris framework provides tools to help make distributions to remote users easier (see *What Demands does SVS place on the Physical Network?*), including the ability to require a minimum bandwidth before attempting a download. VSPs can be deployed on Package Servers and Deployment Servers.

Are there Requirements for Microsoft Active Directory to Support SVS?

There are no additional configuration requirements for SVS to work with Microsoft Active Directory. At this time, there is no specific interaction between Active Directory and SVS.

Does SVS Use any of the Native Microsoft MSI Methods for "Application distribution"?

You can use "Live Capture" to deploy an .MSI using Software Delivery Solution. When doing this, a capture is started on the client before the install runs and ended after the install ends. The result is a virtualized application. This allows customers to leverage their existing .MSI libraries but results in dissimilar instances of the VSP on every workstation.

However, for greater manageability, we recommend performing a single installation in a controlled environment, then optimizing and testing a standardized VSP to deploy to every client computer.

How does SVS Work with Recovery Solution and other Backup Products?

If a client computer is protected using Recovery Solution or a similar backup application, the SVS redirection area shows in the Recovery Solution name space, and can be part of snapshots. Layers can be successfully restored through a Full System Recovery or full Rollback. Using these methods, the entire redirection area with accompanying registry settings are restored and will function correctly.

However, full functionality is not possible if only files from the redirection are restored. For this reason, a simple restore of files from the redirected folder (Example: C:\fslrdr, C:\fslrdr\1) should not be done through Recovery Solution. Instead, the whole system needs to be restored together.

How does Software Virtualization Solution Affect Client Computers?

How does SVS Affect Application Performance?

Virtualized applications have nearly no performance degradation over applications installed locally. There is a 2-3% measurable overhead, primarily on file opens. However, once files are open, there is almost no overhead at all.

Are there Special Requirements for Running Virtualized Applications?

SVS requires no additional hardware requirements. You only need to install the Software Virtualization Agent. The SVS File System Filter Driver is around 160 KB and consumes less than 1 MB of working memory under heavy load.

How SVS Affects Local Drive Space Usage

Currently, the hidden redirection area that layers are stored on is only on the client computer's C drive. The C drive must have enough free space to accommodate all desired layers.

How SVS Affects Drive Space Usage Statistics in Windows

The hidden redirection area that layers are stored on is on the client computer's C drive. The drive space usage statistics for the C drive will reflect these files.

However, if the layer is pointing to the D drive, the files are still physically on the C drive, not the D drive. Example: Suppose you have a layer for an application like MS Office that is pointing to a D drive (used as an "apps drive"). Drive space usage statistics for the D drive will not reflect the files, but statistics for the C drive will.

Software Virtualization Solution Limitations

The following are current limitations of Software Virtualization Solution:

- What Things Cannot or Should not be Virtualized? (page 20)
- SVS File System Filter Driver and Running Windows in Safe Mode (page 20)

What Things Cannot or Should not be Virtualized?

Some applications do not work well virtualized at this time. These include drivers, virus checkers, file encryption products, OS patches, computer management agents, and applications that have dedicated drivers (Example: client firewalls).

You cannot encrypt files that are stored in a data layer. If you encrypt a folder that is in the layer, the folder is moved to the base. When files are moved to that folder, you get an error that the files cannot be encrypted and you can move them into the layer only as unencrypted files.

SVS File System Filter Driver and Running Windows in Safe Mode

The SVS File System Filter Driver is not loaded when a computer is booted into Windows Safe Mode. Any diagnostic or recovery utilities that could be usable in safe mode to

diagnose and recover a system should not be included in a layer. These utilities will not be available if they have been added to the system through a layer, thus possibly making it too late to recover after they become necessary.

Software Virtualization Solution Glossary

SVS File System Filter Driver

The SVS File System Filter Driver is a Windows NT technology that manages the data flow between applications and the operating system.

Software Virtualization Agent

The agent software on a client computer containing the SVS File System Filter Driver that manages Virtual Software Packages.

Software Virtualization Solution Admin (SVS Admin)

The Software Virtualization Solution Windows-based tool used to create, edit, and export Virtual Software Layers. You can also use SVSAdmin to manually manage layers on a client computer.

SVS redirection area

When a VSP is imported onto a computer, the contents of the VSP (both files and registry settings) are placed in a folder in a special protected SVS area on the hard dive, referred to as the SVS redirection area. The SVS redirection area is a folder named C:\fslrdr.

Virtual Software Package

The generic term for all the files that makes an application work, including applications and data, files and registry settings. A Virtual Software Package can be in one of two formats: a “Virtual Software Layer” or a “Virtual Software Archive” file.

Virtual Software Layer

A Virtual Software Layer is the base collection of files and registry definitions and data for a Virtual Software Package.

When a layer is imported to a client computer, the data from the layer is placed in a hidden SVS redirection area. When a layer is activated, the contents of the layer are overlaid over the base file system and registry and the contents of the layer appear as if it had been installed.

There are two kinds of layers: Application layers and Data layers.

Layers contain two sublayers: the Read-only sublayer and the Writeable sublayer.

Virtual Software Archive (VSA)

The portable version of a Virtual Software Package. A Virtual Software Archive contains the compressed data from a layer in a single portable file that can be deployed and imported on client computers.

Virtual Software Package resource object

The deployed payload when deploying VSA files in a Notification Server environment. These are similar to Software Delivery Packages used with Software Delivery Solution.

Part II
Using Software Virtualization Solution Packages and Client Tools

This part includes the following chapters that explain how to create and use Virtual Software Layers in a stand-alone environment.

Chapter 3
Getting Started with Virtual Software Layers and Archive Files

The Getting Started tasks guide you through the basic setup, configuration, and use of Virtual Software Layers and Archive Files. Each task has a procedure and, in many cases, exercises to illustrate the steps of the procedure.

Prerequisites for Getting Started tasks

- A client computer running one of the following operating systems:
  - Windows 2000 Professional SP4 or higher
  - Windows 2000 Advanced Server SP4 or higher
  - Windows XP Professional SP1 or higher
  - Windows Server 2003 or higher
- Access to application setup files that you want to create layers for.

Getting started tasks

1. Configuring a Base Computer (page 24)
2. Installing the Software Virtualization Agent and Admin Tool on a Base Computer (page 25)
3. Creating a Virtual Software Layer using SVS Admin (page 25)
4. Testing, Activating, and Deactivating Layers (page 27)
5. Modifying a Layer (page 28)
6. Resetting a Layer (page 30)
7. Exporting a Layer to a Virtual Software Archive File (page 30)
8. Importing VSA Files (page 31)
9. Using Virtual Software Archive Files (page 31)

For a complete list of tasks you can perform with layers, see Performing Virtual Software Layer Tasks (page 32) and Advanced Virtual Software Layer Topics (page 42).

Exercise Scenario

The exercises below will guide you through the process of creating and using a layer for Mozilla Firefox. If you want to follow the exercise, download the Firefox setup file (Firefox Setup *ver*.exe) from http://www.mozilla.org/products/firefox/.

Configuring a Base Computer

A base computer is the computer that you will capture application and data files on. The installed application and data files and settings will be captured into Virtual Software Layers.

The base computer should have a clean installation of your Windows operating system and little else. This computer should not have background processes or programs running that will get captured into your layers. We recommend that your base computer not be running antivirus or other computer management programs, and if possible, not have an active Internet connection.

We suggest creating layers on a virtual computer. This lets you easily disconnect the computer from the network and reset the computer after each capture so you have a clean operating system.

Exercise
For this exercise, you will want to use a computer that does not currently have Firefox installed on it, but has Internet Explorer.

Installing the Software Virtualization Agent and Admin Tool on a Base Computer

The Software Virtualization Agent can be installed with the Software Virtualization Admin tool (SVS Admin) and used to create and manage Virtual Software Layers and Virtual Software Archive Files. You will install the Software Virtualization Agent and SVS Admin on your base computer.

You can access the setup file from anywhere. Because we recommend that you not have an active Internet connection, the setup file should be local.

For client computer prerequisites, see Prerequisites for Getting Started tasks (page 24) and Software Virtualization Solution Security (page 69).

Installing SVS Agent and Admin

To install the Software Virtualization Agent and Admin tool (SVS Admin)

1. On your base computer, run the agent setup file Software_Virtualization_Agent.msi.
2. Enter the product key and click **Next**.
3. From the Select Features screen, select the **Software Virtualization Admin Tool** checkbox.
4. Complete the setup wizard.
5. Restart the computer.

Creating a Virtual Software Layer using SVS Admin

After you have installed SVS Admin, you can create Virtual Software Layers. In order to create a layer for an application, you will "capture" the installation of the application. All installed files, registry settings, and application settings will be captured and stored in the layer.

To create a Virtual Software Layer

In the following steps, you will create a new layer for Mozilla Firefox.

1. On the base computer, make sure you have access to the setup files for the application you will be creating a layer for. Example: Firefox Setup *ver*.exe.
2. On the base computer, open the SVS Admin tool by clicking the SVS Admin icon on the desktop.
3. Select **File > Create New Layer**.
4. Choose **Install application** and click **Next**.
5. Name the layer. Example: Firefox 1_5.

   The maximum name length is 64 characters.

   Caution
   Layers must not have the following characters in the layer name: & < > " ' .
6. Click **Next**.
7. Select the capture method.

   For this exercise, choose **Single program capture.**

   For information on capture options, see Creating Virtual Software Layers (page 32).
8. Click **Browse**.
9. Navigate to the setup file. Exercise: Firefox Setup *ver*_exe.
10. Click **Next**.
11. Click **Finish**.

    The animated capture icon (yellow lightning) appears in the system tray. The icon is animated (top to bottom) signifying that you are capturing.
12. Follow any dialogs to install the application.

    In most cases, when the application installation is complete, the capture is automatically ended and the layer is listed in SVS Admin.

    However, in the Firefox exercise, when the installation is complete, you have the option to **Launch Mozilla Firefox now**. If this option is selected when you click **Finish**, Firefox will load and because it was loaded by the installer, SVS will still be in capture mode. If this option is cleared when you click **Finish**, the capture mode will terminate with the installer and the capture process is finished.
13. For the exercise, keep the **Launch Mozilla Firefox now** option selected and click **Finish**.

    The first time you launch Firefox, you are given configuration options. Since you are still in capture mode, these configuration settings will be stored in the Read-only sublayer.

    If you were not in capture mode when you launched Firefox for the first time, but simply launched it through the layer, these settings would be stored in the Writeable sublayer. (For information about sublayers, see Layer Architecture (page 13).)
14. Select an import option and click **Next**.
15. Select the Home Page options and click **Next**.

Because you are still in capture mode, this Home Page setting will be stored in the Read-only sublayer.

16. Select default browser settings.

    The default browser setting will determine if Firefox is the default browser when the Firefox layer is active. This setting will only apply when the Firefox layer is active. Example: You may have Internet Explorer previously set as the default browser. If you make Firefox the default browser, then when the Firefox layer is active, Firefox will be the default browser. When the Firefox layer is not active, Internet Explorer will be the default browser.

    For this exercise, make Firefox the default browser by clicking **Yes**.

    Firefox is now installed and running and you are still in capture mode. You can either continue to manually configure Firefox or you can end the SVS capture.

17. For this exercise, terminate the capture now by closing Firefox.

    When Firefox is closed, the capture is terminated, the capture icon disappears from the system tray, and the Firefox layer is now listed in SVS Admin.

    Information about modifying layers is provided in Modifying a Layer (page 28).

Testing Layers

After you have created a layer, you can test it to make sure it functions properly. To test a layer, you can manually activate and use the layer on a computer. For information, see Testing, Activating, and Deactivating Layers on page 27.

To test portability, you should test the layer on another computer. This ensures that everything needed to run the program was captured into the layer.

Testing, Activating, and Deactivating Layers

When a layer is created, it is activated by default. When a layer is activated, that means that all the contents of the layer are visible.

To activate or deactivate a layer

1. In SVS Admin, do one of the following:
   - Highlight a layer and click **File**.
   - Right-click a layer.
2. Click either **Activate** or **Deactivate**.

   When a layer is active, the layer name is displayed in bold type.

Using the SVS Admin tool, you can activate and deactivate layers and test that the layer is functioning properly.

Example: When Mozilla Firefox is installed, by default a shortcut to the application appears on the Windows Desktop. When the layer is activated, the shortcut is visible. A Short cut is also displayed in the **Start > Programs** list.

When a layer is deactivated, the application components are hidden. The shortcut will not be displayed on the Windows Desktop or **Start > Programs** list, and the files are not viewable in the file system.

To test the active Firefox layer

1. Launch Firefox:
   - Click the Mozilla Firefox shortcut icon on the desktop.
   - Select **Start > Programs > Mozilla Firefox > Mozilla Firefox**.
2. Verify that the application files are viewable in the file system:
   a. Open Windows Explorer.
   b. Browse to C:\Program Files\Mozilla Firefox.
3. Verify that Firefox is the default browser:
   a. Open Windows Explorer.
   b. Select **Tools > Folder Options**.
   c. Click the **File Types** tab.
   d. Scroll down and click the HTML extension.

   The default application for HTML files is listed by "Opens with:". If you made Firefox the default browser, it will be listed.

To deactivate and test the deactivated Firefox layer

1. In SVS Admin, right-click the Firefox layer and click **Deactivate Layer**.
2. Verify that the following shortcuts are no longer virtualized:
   - The Mozilla Firefox shortcut icon on the desktop.
   - The **Start > Programs > Mozilla Firefox** folder.
3. Verify that the application files are hidden in the file system:
   a. Open Windows Explorer.
   b. Browse to C:\Program Files.

   The \Mozilla Firefox folder should no longer be virtualized.
4. Verify that Firefox is not the default browser:
   a. Open Windows Explorer.
   b. Select **Tools > Folder Options**.
   c. Click the **File Types** tab.
   d. Scroll down and click the HTML extension.

   The default application for HTML files is listed by "Opens with:". Firefox will not be listed. The default program before you installed Firefox will be listed.

Modifying a Layer

You can modify layers to add or remove files, settings, and so on. Example: You can add bookmarks to or change the default security settings in the Firefox layer.

When you modify a layer, you can make changes to the Read-only sublayer or the Writeable sublayer. (For information about sublayers, see Layer Architecture on page 13.) Changes to the Read-only sublayer are permanent, whereas changes to the Writeable sublayer will be deleted if the layer is ever reset.

- Making Layer Changes in the Read-only Sublayer (page 29)
- Making Layer Changes in the Writeable Sublayer (page 29)

Making Layer Changes in the Read-only Sublayer

To make permanent changes to the Read-only sublayer, open the layer in capture mode. This is the same mode used when creating the layer.

To modify a layer, it must be deactivated.

To modify a layer using capture mode

1. In SVS Admin, deactivate all layers.
2. Select **File > Update Existing Layer**.
3. Select the layer you want to update. Example: Firefox 1_5.
4. Click **Next**.
5. Select **Single program capture** and click **Next**.
6. Click **Browse**.
7. Navigate to the setup file. Example: C:\windows\system32\cmd.exe.
8. Click **Next**.
9. Click **Finish**.

   The layer is activated and the animated capture icon appears in the system tray signifying that you are in capture mode.
10. Make the changes you want to make.

    For the Firefox exercise, do the following:

    a. Launch Firefox.

    b. In the address bar, enter the following URL:

       www.altiris.com/juice/svs

    c. Select **Tools > Options**.

    d. Click **General**.

    e. Click **Use Current Page**.

       This sets www.altiris.com/juice/svs as the default home page.

    f. Click **OK**.
11. After you have configured the application, right-click the capture icon in the system tray and choose **Stop Capture**.

The new default home page is stored in the permanent Read-only sublayer.

For more information about updating application layers, see Updating Layers (page 38)

Making Layer Changes in the Writeable Sublayer

To make changes to the Writeable sublayer, simply activate the layer, and make any desired changes.

For the Firefox exercise, do the following:

1. Launch Firefox.
2. Select **Tools > Options**.
3. Click **Content**.
4. Clear the **Enable Java** and **Enable Javescript** checkboxes.
5. Click **OK**.

The Java settings are stored in the Writeable sublayer and will be deleted if the layer is reset.

Note
You can also edit the Writeable sublayer through the SVS Admin.

Resetting a Layer

When a layer is created, the data captured is stored in a Read-only sublayer (see Layer Architecture on page 13). If a user makes any changes to the application/data, that data is stored in a Writeable sublayer. You can reset the layer, which deletes all the data added by the user (writeable data) and maintains the original read-only data.

For information, see Resetting Layers (page 37).

To manually reset the Firefox layer

1. In SVS Admin, right-click the Firefox layer.
2. Click **Reset Layer** and click **Yes**.

   This deletes all data in the Writeable sublayer.

   For the Firefox exercise, when you launch Firefox, the Java settings are reset to enabled.

Exporting a Layer to a Virtual Software Archive File

After you have created and configured a layer, you can export it to a portable Virtual Software Archive file (VSA). You can then share the VSA file or include it in a Notification Server Virtual Software Package to deploy to network users using Software Virtualization Solution in Notification Server.

To export a layer to an archive VSA file

1. In SVS Admin, right-click the layer and click **Deactivate Layer**.
2. If this layer is to be distributed to other users, you may now want to **Reset** the layer to remove existing user-specific information.
3. Right-click the layer and click **Export Layer**.
4. Select a filename and location to save the file. Example: C:\archives\Firefox1.5.vsa.
5. Click **OK**.

All the contents of the layer are exported to the VSA file.

Importing VSA Files

Using SVS Admin, you can import an existing VSA file to make the layer available through the SVS Agent.

To manually import a VSA archive file

1. Copy an existing VSA file to a place you can access it from.
2. In SVS Admin, select **File > Import from Layer**.
3. Browse to the VSA file you want to import.
4. Click **Open**.

   The layer appears in SVS Admin.

Accessing Sample VSA Files

The Altiris Juice Web page contains sample VSA files that you can download and import.

1. Open a Web browser to www.altiris.com/juice/svs.
2. From the links on the left, click **Topic Cloud**.
3. Under the Topic Cloud, click **sample applications**.
4. Click a sample application.
5. Click the download link.
6. Select **Save to disk** and click **OK**.

Using Virtual Software Archive Files

You can use Virtual Software Archive files in several different ways. For information, see the following topics:

Additional stand-alone tasks you can perform with layers	See Performing Virtual Software Layer Tasks (page 32) and Advanced Virtual Software Layer Topics (page 42).
Deploying VSA files using Notification Server	See Using Software Virtualization Solution in a Notification Server Environment (page 72).
Deploying VSA files using Deployment Solution	See Using Software Virtualization with Altiris® Deployment Solution™ (page 118).
General usage information	See Software Virtualization Solution Usage Scenarios (page 16).

Chapter 4
Performing Virtual Software Layer Tasks

Virtual Software Layers are created and managed using the Software Virtualization Solution Admin (SVS Admin) tool. For instructions on installing SVS Admin, see Getting Started with Virtual Software Layers and Archive Files (page 24).

This section describes how to perform the following Virtual Software Layer tasks:

- Creating Virtual Software Layers (page 32)
- Activating and Deactivating Layers (page 37)
- Resetting Layers (page 37)
- Updating Layers (page 38)
- Deleting Layers (page 39)
- Exporting and Importing Layers (page 40)
- Starting a Layer Automatically (page 41)
- Viewing Layer Properties (page 41)
- Renaming a Layer (page 41)

For information on advanced layer tasks, see Advanced Virtual Software Layer Topics (page 42).

Creating Virtual Software Layers

You can create three different kinds of Virtual Software Layers:

Application layer	All installed files, registry settings, and application settings will be captured and stored in the layer.
Data layer	Data files are captured and stored in a dedicated data layer.
Empty layer	An Empty layer is an application layer without an application installed into it. Nothing is initially captured but you can edit the layer manually. There is no functional difference between creating an application layer by capture versus creating an empty layer and then updating it by capturing an application install.

The following topics explain the following tasks:

- Creating Virtual Application Layers (page 33)
- Creating and Using Virtual Data Layers (page 34)
- Creating and Using Empty Layers (page 36)

You can create layers using SVS Admin or command-line parameters. For information about command-line parameters, see Using SVSCMD Command-line Parameters (page 51).

Caution
Layers must not have the following characters in the layer name: & < > " ' .

Creating Virtual Application Layers

To create a layer for an application, you will "capture" the installation of the application. All installed files, registry settings, and application settings will be captured and stored in the layer.

To create a Virtual Software Layer

1. On the base computer, make sure you have access to the setup files for the application you will be creating a layer for.
2. On the base computer, open the SVS Admin tool by clicking the SVS Admin icon on the desktop.
3. Select **File > Create New Layer**.
4. Choose **Install application** and click **Next**.
5. Name the layer. Exercise: Firefox 1_0_7.

   The maximum name length is 64 characters.

   Caution
   Layers must not have the following characters in the layer name: & < > " ' .

6. Click **Next**.
7. Select the capture method.

   There are two methods of capturing an application:

Single program capture	Only the changes during the installation of a specified program will be captured. Using this method, you select an application setup file. The capture automatically begins when the setup is started and the capture is automatically ended when the setup is completed. During this capture, only changes made for the selected application will be captured. Any other activity on the computer will be ignored. This is the preferred method of creating virtual software layers. If an application is installed through a packaging tool, such as Wise or InstallShield, SVS tracks the initial package process as well as any client instances of msiexec.exe. All client instances of msiexec.exe and accompanying service instances are captured as long as they are running, whether or not the original packaged .EXE terminates. See To create a layer using Single Program Capture (page 34). **Caution** All processes that were started by the application (Example: a system tray application) must be exited before the capture process will complete.

Global capture	All changes made to the computer during the capture process will be saved into the layer. This option is useful in capturing default application settings, shortcuts, or application updates after an installation is complete. You can also combine multiple applications into a single layer. See To create a layer using Global Capture (page 34).

To create a layer using Single Program Capture

1. Choose **Single program capture.**
2. Click **Browse**.
3. Navigate to the setup file. Example: Firefox Setup 1.0.7.exe.
4. Click **Next**.
5. Click **Finish**.
6. The animated capture icon (yellow lightning) appears in the system tray. The icon is animated (top to bottom) signifying that you are capturing.
7. Follow any dialogs to install the application.
8. When the application is complete, the capture is automatically ended and the layer is listed in SVS Admin.

To create a layer using Global Capture

1. Select the **Global capture** method.
2. Click **Next**.
3. Click **Finish**.

   The animated capture icon (yellow lightning) appears in the system tray. The icon is animated (top to bottom) signifying that you are capturing.
4. Install the application. Example: Run Firefox Setup 1.0.7.exe.
5. (Optional) After the installation is complete, open the application and set any application preferences that you want to be default for your users. For example, you can set a default home page or custom security settings.
6. After you have configured the application, exit the application.
7. Right-click the capture icon in the system tray and choose **Stop Capture**.
8. The layer is now listed in SVS Admin.

Testing Layers

After you have created a layer, you can test it to make sure it functions properly. To test a layer, you can manually activate and use the layer on a computer. For more information, see Testing, Activating, and Deactivating Layers (page 27).

Creating and Using Virtual Data Layers

Not only can you create virtual applications, but you can create virtual data layers. Using data layers, you can capture data files and redirect them to a layer rather than having them written to an application layer or the core file system. You can use one or more data layers for each user.

- *Uses for Data Layers*
- *How Data Layers Work*
- *Creating Data Layers*

Uses for Data Layers

Data layers can be useful in the following ways:

Storing data from virtual applications

Data layers can be useful in managing data generated from virtual applications.

Any data generated by a virtual application will, by default, be saved within the Writeable sublayer of that application layer. This data will be lost if the layer is reset. By using a data layer, the data is stored separately and will not be deleted due to a layer reset. For general information about managing data with SVS, see Managing Data Within Layers (page 42).

Providing a single, portable data store

Data layers can also be useful for having a single source of user data files that can easily be exported to a VSA and moved or copied to a different computer. Example: You could create a data layer to store a company's product catalog and price list that is updated monthly. Each month, this layer could be exported to a VSA and distributed to the sales force to ensure they have the current files. The layer could then be deleted at the end of each month to ensure that obsolete data is not circulated or available.

How Data Layers Work

Using data layers, you can capture all files of a certain file extension and/or all files saved to a specified directory.

Using file extensions

You can create a data layer that will capture all files with a specified extension.

Example: You have a layer for Microsoft Office. You can create a data layer and configure that layer to capture all .DOC and .XLS file types. When a user saves a file from the Office layer, all .DOC and .XLS files are stored into the data layer rather than the Office layer. Those files are then protected if the Office layer is ever reset.

Files with the specified extension will be captured even if they are generated outside a layer.

Using directories

You can also create a data layer for a specific directory. You can select whether or not to include sub-directories. Example: You can create a data layer that captures all files written to the My Documents folder. Any file saved to My Documents or one of it's subfolders would be redirected to the data layer.

New and existing files

When you create or deploy a data layer, there will usually be existing data files on the computer with either the specified file extension or in the specified paths. Those files are not automatically captured into the layer. Instead, as soon as the files are modified, they are then redirected to the layer and removed from the core file system.

Creating Data Layers

To create a data layer

1. On the base computer, open the SVS Admin tool.
2. Select **File > Create Layer**.
3. Click **Data Layer** and click **Next**.
4. Name the layer.
5. Select the capture method, file extension, or directory.

   Note
   When creating a data layer, you can configure either file extensions or a directory. To use both, you must edit the layer after it is created. For information, see Viewing and Editing Layer Properties (page 45).

   - To specify file extensions, do the following:
     a. Select **File extension(s)**.
     b. Enter the file extensions.

        Multiple extensions can be used by separating them with a semi-colon.

        Example: doc;xls

        Do not include the wildcard asterisk, as it will be interpreted as part of the file extension.

        Example: do not use *.doc;*.xls
   - To specify a directory, do the following:
     a. Select **Directory**.
     b. Click **Browse** and select the directory.

        By default, sub-directories will also be included. To not include subdirectories, clear the **Include subdirectories** checkbox.
6. Click **Next**.
7. Click **Finish**.

   The layer appears in SVS Admin.
8. To activate the layer, right-click it and click **Activate Layer**.

Creating and Using Empty Layers

An empty layer has nothing captured into it. You can manually edit the empty layer later. One useful purpose is creating an application layer for a program that does not have an installer. You would create the empty layer and then use the Advanced Layer Editor to add the files that are needed for the application.

To create an empty layer

1. On the base computer, open the SVS Admin tool by clicking the SVS Admin icon on the desktop.
2. Select **File > Create Layer**.

3. Choose **Empty Layer** and click **Next**.
4. Name the layer and click **Next**.
5. Click **Finish**.

For information on manually adding files to layers, see Viewing and Editing Layer Properties (page 45).

Activating and Deactivating Layers

When a layer is created, it is activated by default. When a layer is activated, that means that all the contents of the layer are visible. When a layer is deactivated, the contents of the layer are hidden.

Activating and deactivating layers can be performed remotely or locally. Example: If you are using Software Virtualization Solution in a Notification Server or Deployment Solution environment, a helpdesk worker can remotely send a command to activate/deactivate an application. If a computer is not connected to the network, a user can manually activate/deactivate the layer.

For information about remotely activating and deactivating layers, see Using SVSCMD Command-line Parameters (page 51).

For information about manually activating and deactivating layers, see Testing, Activating, and Deactivating Layers (page 27).

Quick Link

- *Deactivating Layers with Services Running*

Deactivating Layers with Services Running

You cannot deactivate a layer while a process is running from that layer. If you try to deactivate a layer with a process running, you will get a message stating that a process is running and asks you if you want to stop the service. If you click **Yes**, the service will be stopped and the layer will be deactivated.

The service PID (Process Identifier) is also displayed. You can use this PID to look up the process in Task Manager. To see PIDs in Task Manager, it will need to be configured to show the PID.

To see PIDs in Task Manager

1. Open Windows Task Manager.
2. Click the **Processes** tab.
3. Select **View > Select Columns**.
4. Select the **PID (Process Identifier)** checkbox.
5. Click **OK**.

Resetting Layers

When a layer is created, the data captured is stored in a Read-only sublayer (see Layer Architecture on page 13). If a user makes any changes to the application/data, that data

is stored in a Writeable sublayer. You can reset the layer, which deletes all the data added by the user (writeable data) and maintains the original read-only data.

Resetting the layer is useful if an application becomes damaged. You can reset the layer without having to uninstall/re-install the application. This is also useful in maintaining standard versions and configurations of applications across your network.

Another advantage to resetting a layer is that is does not damage other applications installed on the computer.

Using the Advanced Layer Editor, you can view files and settings that are contained in the Read-only and Writeable sublayers. For information, see Viewing and Editing Layer Properties (page 45).

Resets can be performed remotely or locally. Example: If you are using Software Virtualization Solution in a Notification Server or Deployment Solution environment, a helpdesk worker can remotely send a reset command to reset a damaged application. If a computer is not connected to the network, a user can manually reset the layer.

To manually reset a layer

1. In SVS Admin, do one of the following:
   - Highlight a layer and click **File**.
   - Right-click a layer.
2. Click **Reset Layer.**

For information about remotely resetting layers, see Using SVSCMD Command-line Parameters (page 51).

Caution
Any data generated by a virtual application will, by default, be saved within the Writeable sublayer of that application layer. This data will be lost if the application layer is reset. For general information about managing data with SVS, see Managing Data Within Layers (page 42).

Updating Layers

You can update layers by modifying the contents of an existing layer. When you update a layer, the capture mode is turned on, and any changes made on the computer are captured. For example, you could open an application and change default settings.

When you update a layer using capture mode, the changes are made to the Read-only sublayer making them permanent (see Layer Architecture on page 13).

Example: You may have a layer for Mozilla Firefox and you may want to change some application preferences that you want to be default for your users.

You have the same capture options as when you created the layer—you can use either Global capture or Single program capture.

- Updating Layers Using Global Capture (page 39)
- Updating Layers Using Single Program Capture (page 39)

You can also use a command-line parameter to update a layer. For information, see Using SVSCMD Command-line Parameters (page 51).

Note
You cannot update a layer if any layers are active on the computer.

Updating Layers Using Global Capture

To update a layer using Global capture

Follow the instructions provided at Modifying a Layer (page 28).

Updating Layers Using Single Program Capture

If you want to update a virtual application using Single program capture, there is currently not a way to select the application process directly because the executable is in the layer and the layer is not active.

Example: You may want to update a layer for Firefox by launching it using Single program capture, letting it perform its auto updates, then automatically ending capture. There is currently not a way to select the Firefox executable within an inactive layer. However, there is a work-around available listed below.

To update a layer using Single program capture

1. On the base computer, open the SVS Admin tool by clicking the SVS Admin icon on the desktop.
2. Select **File > Update Existing Layer**.
3. Select the layer you want to update. Example: Firefox.
4. Click **Next**.
5. Select **Single program capture**.
6. Browse to C:\WINDOWS\system32\cmd.exe.
7. Click **Next**.
8. Click **Finish**.

   This activates the layer and opens the command prompt window.
9. In the DOS window, run the application file. Example: C:\Program Files\Mozilla Firefox\Firefox.exe.
10. Make the changes you want to make.
11. After you have configured the application, exit the application.
12. Exit the command prompt window.
13. The capture process terminates.

Deleting Layers

You can delete an existing layer.

Deleting a layer deletes all data in the layer. Ensure that any files you want are moved out of the layer before deleting it.

To delete a layer

1. In SVS Admin, right-click the layer and click **Delete Layer**.
2. Confirm that you want to delete the layer.

You can also use a command-line parameter to delete a layer. For information, see Using SVSCMD Command-line Parameters (page 51).

Exporting and Importing Layers

Layers can be exported to a Virtual Software Archive (VSA file) so that they can be shared. VSA files can be stored on a network share, e-mailed, or deployed to client computers on your network using Software Virtualization Solution or Deployment Solution.

You can manually import an existing VSA using SVS Admin so that you can edit, update, or use the layer as a stand-alone layer.

- Exporting Layers to VSA Files (page 40)
- Importing VSA Files (page 40)

Exporting Layers to VSA Files

To export a layer to an archive VSA file

1. In SVS Admin, right-click the layer and click **Deactivate Layer**.
2. Right-click the layer and choose **Export Layer**.
3. Save the file. Example: C:\archives\AcrobatReader7.vsa.
4. Click **OK**.

Importing VSA Files

You can import an existing VSA file to make the layer available through the SVS Agent.

Activating and deactivating layers can be performed remotely or locally. Example: If you are using Software Virtualization Solution in a Notification Server or Deployment Solution environment, a helpdesk worker can remotely send a command to import a VSA file. You can also manually activate/deactivate a layer.

For information about remotely importing layers, see Using SVSCMD Command-line Parameters (page 51).

You can also manually import a VSA file using SVS Admin.

To manually import a VSA archive file

1. In SVS Admin, select **File > Import from Layer**.
2. Browse to the VSA file you want to import.
3. Click **Open**.

   The layer appears in SVS Admin.

Starting a Layer Automatically

You can configure a layer to start (activate) automatically on system boot or not start automatically on system boot when the layer is deployed to a client computer.

Note
Layers should be set to start automatically on client computers that do not have the SVS Admin console installed; otherwise users may not be able to access the data in the layers.

To set a layer to start automatically

1. In SVS Admin, do one of the following:
   - Highlight a layer and click **File**.
   - Right-click a layer.
2. Click **Start Layer Automatically**.

   If a checkmark appears next to the option, Start Layer Automatically is enabled.

You can also use a command-line parameter to set a layer to start automatically. For information, see Using SVSCMD Command-line Parameters (page 51).

Viewing Layer Properties

You can view layer properties that will display useful information about the layer, such as the type of layer, the number of files in the layer, and the disk space used by the layer.

To view layer properties

1. In SVS Admin, right-click a layer and click **Layer Properties**.

Renaming a Layer

You can rename a layer, but only when it is deactivated.

To rename a layer

1. In SVS Admin, select a layer to rename.
2. If the later is activated, deactivate it by selecting **File > Deactivate Layer**.
3. Select the layer and select **Edit > Rename**.
4. Type the new name for the layer.

   The maximum name length is 64 characters and any characters can be used.

You can also use a command-line parameter to rename a layer. For information, see Using SVSCMD Command-line Parameters (page 51).

Chapter 5
Advanced Virtual Software Layer Topics

This section describes the following advanced Virtual Software Layer topics:

Managing Data Within Layers

Data can be easily preserved or deleted depending on how layers are used.

This section includes the following topics:

Preserving Data

When an application layer is active, all files created or modified by that layer, and that are stored on the client computer, are redirected by the SVS File System Filter Driver to the layer itself. (If files are stored on a network share, the SVS File System Filter Driver does not redirect the file to the layer.) The files redirected to a layer are stored in the Writeable sublayer. If a layer is reset, all data in the Writeable sublayer is deleted. In many cases, you may want to preserve the files created from a layer. As a result, it is important to properly manage the data within a layer so that data that should be preserved is not deleted.

Example: If you have a Microsoft Word layer, and from that layer you save a DOC file to the client computer's hard drive, in any folder, that file will be redirected by the SVS File System Filter Driver to the Microsoft Word layer. When the layer is active, the file will appear to be stored in the destination folder that was selected, but the file is actually stored in the SVS redirection area. If the Microsoft Word layer is reset, that DOC file will be deleted.

There are three ways to preserve data created through layers:

Layer Exclude Entries

You can configure a layer to exclude file types or folder locations so that a file will be not be redirected by the SVS File System Filter Driver to the layer, but will instead be saved to the core file system.

Example: Suppose you have a layer for Microsoft Word, you can exclude file types .DOC, .RTF, .TXT, .HTML, .XML, and so on, so that any data file that is saved by the Word layer is excluded from being redirected to the layer. Instead, those files will be saved in the core file system. You can also exclude a directory, so that any files saved to that folder and it's subfolders are not redirected.

The disadvantage with using exclude entries is that you have to configure the excludes for each layer. For a more global solution, you can use Data Layers (page 43).

To configure exclude entries

Note
To configure exclude entries, the layer must be deactivated.

1. Open SVS Admin.
2. Double-click a deactivated layer.
3. Click the **Exclude Entries** tab.
4. Under **Type**, right-click and select **New Exclude Entry**.
5. Select the entry type, file extension, or directory.
   - To specify file extensions, do the following:
     a. Select **File extension(s)**.
     b. Enter the file extension(s).

        You can specify one or more extensions. Multiple extensions can be used by separating them with a semi-colon.

        Example: doc;xls

        Do not include the wildcard asterisk, as it will be interpreted as part of the file extension.

        Example: do not use *.doc;*.xls
   - To specify a directory, do the following:
     a. Select **Directory**.
     b. Click **Browse** and select the directory.

        By default, sub-directories will also be included. To not include subdirectories, clear the **Include subdirectories** checkbox.

After an entry has been created, you can modify or delete it by right-clicking the entry and clicking **Modify** or **Delete**.

Data Layers

You can create a data layer that will capture data files into a dedicated data layer. This is useful in storing data files that are created by other layers. Data layers cannot be reset so the data files contained in data layers are protected.

For more information, see Creating and Using Virtual Data Layers (page 34).

Non-local Storage

If you save a file from a layer to a non-local storage device, such as a network share, the SVS File System Filter Driver will not redirect the file to the layer.

Deleting Data

This topic describes what happens when you delete files when using layers.

There are two possible outcomes for deleting files while working with layers:

- The file is not really deleted, but hidden while the layer is active.
- The file is actually deleted.

These different results depend on how the layer is being used when a file is deleted and also how the file was deleted.

Note
A file rename can also result in these delete entries being created. Use a layered application to rename a file, and you really get a delete entry covering the original file (which will still exist), and a new copy of the file under the new name.

When Files are not Deleted, but Hidden

When a layer is activated, under normal circumstance, files in the layer are visible that are not visible when the layer deactivated. The opposite can also occur. Files in the core file system may be deleted (hidden) when a layer is activated.

Example: During the capture process of installing Firefox, you create a shortcut for Firefox and you also delete a shortcut for Internet Explorer. When the Firefox layer is activated, the Firefox shortcut is visible while the Internet Explorer shortcut is not. When the Firefox layer is deactivated, the Internet Explorer shortcut is again visible while the Firefox shortcut is not.

When a file in the core file system is deleted through a layer, the file is not actually deleted, but marked as a delete entry and is hidden while the layer is active.

Delete entries can be viewed through the Advanced Layer Editor. For more information, see Viewing and Editing Layer Properties (page 45).

Delete entries can be stored in either the Read-only sublayer or the Writeable sublayer depending on the way a layer is being used.

Delete Entries stored in the Read-only sublayer

When in capture mode, all changes made to the file system are stored in the layer's Read-only sublayer. If a file was deleted while in capture mode, the files is not actually deleted, but a delete entry is stored in the Read-only sublayer. This would be the case in the Internet Explorer shortcut example listed above.

Delete Entries stored in the Writeable sublayer

When performing tasks through a virtual application all changes made are stored in the Writeable sublayer. As a result, if you use a service in a virtual application to delete a file in the core file system or the Read-only sublayer, a delete entry is stored in the Read-only sublayer.

Example: You have a layer for Microsoft Word. From Word, you select **File > Save As**, and a list of files is displayed in the current folder. You can delete an existing file from the Save As dialog. If you delete a file that is either in the core file system or in the Read-only sublayer, the file is not actually deleted, but a delete entry is stored in the Writeable sublayer and the file is hidden.

This occurs because the file deletion was performed by a service running from the layer.

If the layer is reset, the delete entry is deleted and the deleted file would reappear from the layer.

Another case of a delete entry being stored in a Writeable sublayer is when a file in the Read-only sublayer is deleted by a process running outside of a layer. Example: If while a Firefox layer is active, and using Windows Explorer, a Firefox program file in the Read-only sublayer is deleted, the file is not actually deleted, but hidden and a delete entry is stored in the Writeable sublayer. The file will be restored if the layer is reset.

This illustrates one of the benefits of virtualized applications. If a virtualized application becomes unusable because required files were deleted, the layer can be reset and all original files are restored.

When Files are Actually Deleted

There are cases where files are actually deleted.

While a layer is active, if you delete a file in a layer's Writeable sublayer, the file is actually deleted from the layer. The files are deleted whether the deleting process is in or out of a layer.

Since all files in a data layer are stored in a Writeable sublayer, deletions of files in a data layer are permanent.

Note
In the case where a file is not really deleted but moved to the Recycle bin, the file is still in the layer, under an folder node representing the recycle bin. The file is not actually deleted until the recycle bin is emptied while the layer is active.

While a layer is active, if you delete a file that is not in a layer through a process that is not in a layer, SVS is not involved and the file is deleted.

Viewing and Editing Layer Properties

Using SVS Admin, you can view and edit the contents of layers. In order to view or edit layer properties, the layer must be deactivated.

To open the Advanced Layer Editor

1. Open SVS Admin.
2. Double-click a deactivated layer

   This opens the Advanced Layer Editor.

This topic explains how to do the following tasks:

- View and Modify Files Contained in a Layer (page 46)
- View and Edit Registry Settings Contained in a Layer (page 47)
- View Variables used in a Layer (page 47)
- Configure Exclude Entries of a Layer (page 50)
- View Delete Entries of a Layer (Application layers only) (page 51)
- Configure Data Capture Properties of a Layer (Data layers only) (page 51)

View and Modify Files Contained in a Layer

In the Advanced Layer Editor under the Files tab, you can view all the folders and files that are contained in the layer. The Read-only and Writeable sublayers are separated in two different nodes (Read-only) and (Writeable). By default, the (Read-only) node is displayed on top. You can either scroll down or collapse the (Read-only) node to see the (Writeable) files.

The folder names that are displayed are the variablized names. For information about variablization, see View Variables used in a Layer (page 47). To see what folders the variablized folders represent, click the **Variables** tab.

- *Viewing Layer Files*
- *Modifying Layer Files*

Viewing Layer Files

To view the files in a layer, click a folder in the left pane and the files in the folder are displayed in the right pane.

For example, you can view the following files in a Mozilla Firefox application layer.

To see the main program executable files, click ***layer name*** **(Read-only) > System > [Programfiles]**. In this case, [PROGRAMFILES] represents C:\Program Files.

To see the Firefox bookmarks file that was captured with the layer, click ***layer name*** **(Read-only) > User-specific > USER_TEMPLATE > [APPDATA]** > **Mozilla** > **Firefox** > **Profiles** > ***xxx*** (where xxx is a Firefox controlled name. In this case, [APPDATA] represents C:\Documents and Settings*username*\Application Data.

If you have added a bookmark to the Firefox layer, the updated bookmarks file is written to the Writeable sublayer and can be found under ***layer name*** **(Writeable)** > **User-specific > USER_SID > [APPDATA]** > **Mozilla** > **Firefox** > **Profiles** > ***xxx***.

If you reset a layer, you can see that all the files in the Writeable node are deleted.

Modifying Layer Files

In a layer, you can create new folders and copy, rename, and delete folders. You can also copy, rename, and delete files. This is useful in modifying a layer without having to recapture it.

Not only can you copy files within a layer, you can copy files and folders into a layer from outside the layer and vice-versa. You can either use copy/paste or drag and drop.

Caution

Using the Advanced Layer Editor, you can't overwrite files. To update a file, delete the original and copy or move the new file.

When using drag and drop, you can only move files into the layer, not copy. To copy, use copy and paste, rather than drag and drop.

You can't modify the actual file in a layer. Example: You can't open and edit an .INI file. You must activate the layer and then edit the file.

View and Edit Registry Settings Contained in a Layer

In the Advanced Layer Editor under the Registry tab, you can view or modify all the registry settings that are contained in the layer. The Read-only and Writeable sublayers are separated in two different nodes (Read-only) and (Writeable).

To edit registry settings you follow the same process as you would with Microsoft Registry Editor. However, you must keep in mind that you have both the Read-only and Writeable sublayers to maintain.

Note
SVS does not store data in the virtual HKEY_CLASSES_ROOT key. Instead it stores it in its real location under either HKEY_CURRENT_USER\Software\Classes or HKEY_LOCAL_MACHINE\Software\Classes. At runtime, Windows reads the SVS data for active layers from these locations and properly renders HKEY_CLASSES_ROOT.

View Variables used in a Layer

Many applications have specific environment settings for file paths, paths in registry values, .MSI paths, and so forth. To make VSPs portable across computers, many application settings and data layer properties are variablized by Software Virtualization Solution.

For instance, SVS uses common system variables to substitute for well-known locations on a Microsoft Windows based installation, such as WINDIR as a substitute for the "Windows" folder. This provides seamless compatibility with systems that may not be using the standard folder structure, such as systems that have moved their "My Documents" folder, or that have renamed operating system folders.

Example: If you have a VSP for My Documents, that may be on the C drive on one computer but on a D drive on a different computer. Variablization allows the data layer to work correctly on both computers.

- *Variable Types*
- *Variable List and Description*

Examples of items that are variablized include:

- File Paths
- Paths in Registry Values
- Short Paths
- .MSI Paths
- Data Layer Specifications

- Exclude Entries
- Delete List Entries

You can use the layer editor to see the variables used for each layer and what values they have in them.

To open the layer editor

1. Open SVS Admin.
2. Double-click a deactivated layer.
3. Click the **Variables** tab.

Variable Types

There are two types of variables: SYSTEM and USER.

System variables	System variables are static and loaded at boot time. Example: WINDIR = C:\Windows SYSTEMDRIVE = C:
User variables	User variables are per user and are loaded when the user logs on. Example: DESKTOP = C:\Documents and Settings\User\Desktop USERPROFILE = C:\Documents and Settings\User

These are set as environment variables when layers are active

SVS uses the following tags to denote variables:

- [_B_] = Beginning tag
- [_E_] = Ending tag
- [_CS_] = Convert to short path
- [_MSI_] = Convert to .MSI path

When converting a path to its variablized form, the longest matching variablized path is used. Example: C:\Documents and Settings\User\Desktop\1.txt would convert to DESKTOP\1.txt not USERPROFILE\Desktop\1.txt

Variable List and Description

The following is a list of default variables that the system uses.

System Variables

Variable	Description	Example
SYSTEMDRIVE	The drive letter of the volume that contains the Windows directory that the system booted.	C:

System Variables (Continued)

WINDIR	The Windows directory that was booted.	C:\Windows
PROFILESDIRECTORY	The directory that contains local user profile information.	C:\Documents and Settings
ALLUSERSPROFILE	The directory that contains the All Users profile.	C:\Documents and Settings\All Users
DEFAULTUSERPROFILE	The directory that contains the Default User profile.	C:\Documents and Settings\Default User
COMMONADMINTOOLS		C:\Documents and Settings\All Users\Start Menu\Programs\Administrative Tools
COMMONAPPDATA		C:\Documents and Settings\All Users\Application Data
COMMONDESKTOP		C:\Documents and Settings\All Users\Desktop
COMMONDOCUMENTS		C:\Documents and Settings\All Users\Documents
COMMONFAVORITES		C:\Documents and Settings\All Users\Favorites
COMMONPROGRAMS	Folder that contains common items that show up under Start Menu / All Programs	C:\Documents and Settings\All Users\Start Menu\Programs
COMMONSTARTMENU		C:\Documents and Settings\All Users\Start Menu
COMMONSTARTUP		C:\Documents and Settings\All Users\Start Menu\Programs\Startup
COMMONTEMPLATES		C:\Documents and Settings\All Users\Templates
COMMONMUSIC		C:\Documents and Settings\All Users\Documents\My Music
COMMONPICTURES		C:\Documents and Settings\All Users\Documents\My Pictures
COMMONVIDEO		C:\Documents and Settings\All Users\Documents\My Videos
PROGRAMFILES		C:\Program Files
MEDIAPATH		C:\WINDOWS\Media
COMMONFILES		C:\Program Files\Common Files
MSSHAREDTOOLS		C:\Program Files\Common Files\Microsoft Shared

User Specific Variables

Variable	Description	Example
ADMINTOOLS		C:\Documents and Settings\user\Start Menu\Programs\Administrative Tools
APPDATA		C:\Documents and Settings\user\Application Data
CACHE		C:\Documents and Settings\user\Local Settings\Temporary Internet Files

User Specific Variables (Continued)

CDBURNING		C:\Documents and Settings\user\Local Settings\Application Data\Microsoft\CD Burning
COOKIES		C:\Documents and Settings\user\Cookies
DESKTOP		C:\Documents and Settings\user\Desktop
FAVORITES		C:\Documents and Settings\user\Favorites
FONTS		C:\WINDOWS\Fonts
HISTORY		C:\Documents and Settings\user\Local Settings\History
LOCALAPPDATA		C:\Documents and Settings\user\Local Settings\Application Data
LOCALSETTINGS		C:\Documents and Settings\user\Local Settings
MYMUSIC		C:\Documents and Settings\user\My Documents\My Music
MYPICTURES		C:\Documents and Settings\user\My Documents\My Pictures
MYVIDEO		C:\Documents and Settings\user\My Documents\My Videos
NETHOOD		C:\Documents and Settings\user\NetHood
PERSONAL		C:\Documents and Settings\user\My Documents
PRINTHOOD		C:\Documents and Settings\user\PrintHood
PROGRAMS	Folder that contains user specific items that show up under Start Menu / All Programs	C:\Documents and Settings\user\Start Menu\Programs
RECENT		C:\Documents and Settings\user\Recent
SENDTO		C:\Documents and Settings\user\SendTo
STARTMENU		C:\Documents and Settings\user\Start Menu
STARTUP	Folder that contains user specific items to be run on system startup	C:\Documents and Settings\user\Start Menu\Programs\Startup
TEMPLATES	C:\Documents and Settings\user\Templates	
TEMP	Folder where temporary files can be created	C:\DOCUME~1\user\LOCALS~1\Temp
USERPROFILE	Location of the current user's profile	C:\Documents and Settings\user

Configure Exclude Entries of a Layer

By default, data generated by a layer is stored in the layer. You can exclude data from being saved in a layer so that it will be stored in the base file system. For information, see Managing Data Within Layers (page 42).

View Delete Entries of a Layer (Application layers only)

When using a layer, a user may delete a file from the layer. The file is not actually deleted, but only hidden. This is because if a file is from the Read-only sublayer, it needs to exist if the layer is reset.

Example: A user is using an application layer for Firefox and that user deletes a file. That file is part of the Read-only sublayer and needs to be maintained. It is hidden from the user but is displayed in the Delete Entries.

The Delete Entries tab only shows file delete entries. There is also an equivalent to these entries in the registry (they work the same, but are stored and viewed differently). In the registry, a delete entry shows up in the normal registry editor tab and looks like "~FSL~KeyOrValueName".

Configure Data Capture Properties of a Layer (Data layers only)

The data capture properties are configured the same as exclude entries, except for everything is referred to as a data capture item. The dialogs look the same and behave the same as for configuring exclude items.

Using SVSCMD Command-line Parameters

When working with VSA files outside of the SVS Admin tool, you perform actions on VSA files using the SVSCMD executable with command-line parameters. SVSCMD.exe is part of the Software Virtualization Solution Agent installation. The following sections describe how to use command-line parameters.

- SVSCMD Usage Scenarios (page 51)
- SVSCMD Parameters, Flags, and Examples (page 53)

SVSCMD Usage Scenarios

The section explains how SVSCMD is used in the following usage scenarios:

- Notification Server Environment (page 51)
- Deployment Solution Environment (page 52)
- Stand-alone Environment (page 52)

Notification Server Environment

When Software Virtualization Solution is used in a Notification Server environment, the Software Virtualization Agent (SVSCMSD) is deployed to managed computers. You create a Virtual Software Package resource for each VSA file with the desired action and state. Each Virtual Software Package resource specifies the command-line to be used on the VSA file.

Example: You may create a package that will activate a Mozilla Firefox VSA. In the Virtual Software Package resource properties, you would specify the command-line execution properties as:

SVSCMD.exe [LayerName|GUID] "Activate"

You also create a Virtual Software Task to deploy the package with the command-line parameters to client computers. When the client computer receives the package, it runs SVSCMD and activates the specified layer.

Note
The Virtual Software Wizard is provided to easily create packages and tasks with the appropriate command-line statements. For information, see Using Software Virtualization Solution in a Notification Server Environment (page 72).

Deployment Solution Environment

When Software Virtualization Solution is used in a Deployment Server environment, the Software Virtualization Agent (SVSCMSD) is deployed to AClient-enabled computers. You create a Deployment Server job for each VSA file with the desired action and state. Each job specifies the command-line to be used on the VSA file.

Example: You may to deploy a Mozilla Firefox VSA and have it imported and automatically activated. In the job, you would add a "Run Script" and specify the command-line execution properties as:

SVSCMD.exe [LayerName|GUID] I -p [PathToExe] Auto -Y

For information about Deployment Server jobs, see Using Software Virtualization Solution in a Deployment Solution Environment (page 117).

Stand-alone Environment

If you have the Software Virtualization Agent installed on a computer, but not the SVSAdmin tool, you can use SVSCMD to perform layer tasks. Example: You can create new layers or import existing VSA files. You can activate, deactivate, or reset layers.

Example: If you want to create a new layer for Mozilla Firefox, you would do the following:

1. Have access to the Firefox setup file.
2. From the command-line type:

   SVSCMD.EXE "Firefox" CAPTURE -P "C:\Firefox Setup 1.0.7.exe"

   Where "Firefox" is the name of the layer, CAPTURE tells SVSCMD to create a layer, and -P "C:\Firefox Setup 1.0.7.exe" is the path to the setup file.

   Note
   If the layer name or filename has a space, you can put them in quotes. Example: "C:\Firefox Setup 1.0.7". Otherwise, they do not require quotes.

   When the layer is created, it is activated automatically.

   Layers are stored in a protected area on the file system and the files are not viewable.
3. To view a list of layers on the computer, type:

   SVSCMD.EXE ENUM
4. To view the status and properties of a layer, type:

   SVSCMD.EXE "Firefox" p

SVSCMD Parameters, Flags, and Examples

SVSCMD has many parameters that can be used. There are also flags that can be used with specific parameters.

The syntax for using SVSCMD is the following:

SVSCMD [LayerGUID|LayerName] {<command> [flags]} [...n]

The following tables list and describe the available command-line parameters, flags, and provides examples:

Valid Parameters:

Parameter	Associated Flags	Description
A[CTIVATE]		Activates the layer.
D[EACTIVATE]	[-F]	Deactivates the layer.
R[ESET]	[-F]	Resets the layer.
I[MPORT]	[-P|-F]	Imports a VSA file.
E[XPORT]	[-P]	Exports the layer to a VSA file.
DEL[ETE]	[-F]	Deletes the layer.
REN[AME]	-NAME	Renames the layer.
C[APTURE]	[-P|-S|-E]	Creates a new layer by capturing changes. **Note** You cannot perform a capture if any other layer is active on that computer. **Note** The lighting bolt icon only appears if capturing through SVS Admin.
AUTO[ACTIVATE]	[-Y|-N]	Sets a layer to start automatically.
P[ROPERTIES]		Displays properties for the layer, such as its name, state, type, priority, version, guid, last activated time, create time, and last reset time.
CREATE		Creates an empty layer.
VER[SION]		Displays SVS version information.
ENUM[ERATELAYERS]	[-V]	Enumerates all layers on the computer.
SEND[INVENTORY]		Sends updated inventory to Notification Server.
H[ELP]		Displays this help screen.
CHECKKEY	-K	Checks for a valid product serial number. This tells you if your key is good and provides information about it.
SETKEY	-K	Updates the product serial number. You can use this to manually set a key.
PRIORITY	[-T|-L|-R]	Sets the priority of a layer. See Using Layer Prioritization (page 57).
EXEC[FROMLAYER]	[-PID|-PATH]	Executes a process as a part of the layer. This make a certain process look like it is running form a layer. This can be useful in the following ways: • Suppose you are running an audit tool, and you want that tool to see the computer from the perspective of the layer. You can run SVSCMD "LayerName" EXEC [path to the executable] and then any process that is run will have the same priority as if run from the layer. • You can run a process that will make changes to the file system or registry and those changes will be saved in the layer, and not in the base.

Valid Parameter Options (Flags):

Flag	Description
-F[ORCE]	Force command when it might otherwise fail (forces an overwrite during import, or applications closed if running from layer).
-S[TART]	Start capture.
-E[ND]	End capture.
-P[ATH] <path>	Full filename path to VSA file or program to capture. If the filename has a space, you can put the path and filename in quotes. For example, "C:\Firefox Setup 1.0.7".
-Y[ES]	Turns the option on.
-N[O]	Turns the option off.
-V[ERBOSE]	Display verbose output from the command.
-NAME <name>	Specifies the new name.
-K[EY] <serial>	Specifies the product serial number.
-L[EVEL] <level>	Priority of the layer.
-T[YPE] <type>	Priority type (NORMAL or HKCR).
-R[ESET]	Resets the priority to default.
-PID <PID>	Specifies the Pid of the process that needs to be executed as a part of layer.

Command-line Examples:

Command-line examples	Result
SVSCMD.EXE "Sample App" CREATE	Creates an empty layer named Sample App.
SVSCMD.EXE "Sample App" A	Activates the Sample App layer.
SVSCMD.EXE "Sample App" D -F	Forces a deactivation of the Sample App layer.
SVSCMD.EXE "Sample App" DEL -F	Forces a deletion of the Sample App layer.
SVSCMD.EXE 4db31efa-9163-45de-b33f-bb4737aa022c RESET -F	Forces a reset of the layer with the specified GUID.
SVSCMD.EXE "Sample App" CAPTURE -START	Creates a new layer named Sample App by capturing changes. The capturing is started and is active.
SVSCMD.EXE "Sample App" CAPTURE -E	Ends the capture of changes to the layer named Sample App. (Used after the CAPTURE -START command).
SVSCMD.EXE "Sample App" CAPTURE -P C:\WINDOWS\system32\notepad.exe	Creates a layer for the specified application Notepad.exe.
SVSCMD.EXE MyData Layer P	Displays the properties for the layer named MyDataLayer.
SVSCMD.EXE 4db31efa-9163-45de-b33f-bb4737aa022c AUTO -Y	Sets the layer with the specified GUID to start automatically.
SVSCMD.EXE I -P C:\VSP\Layer.vsa -F	Forces the import the specified VSA file.
SVSCMD.EXE "Sample App" EXPORT -PATH "C:\My Packages\Sample App.vsa"	Exports the layer named Sample App to the specified VSA file.
SVSCMD.EXE VER	Displays the current version of the Software Virtualization Agent files.
SVSCMD.EXE ENUM	Lists all existing layers.
SVSCMD.EXE SEND	Sends inventory information to Notification Server.
SVSCMD.EXE HELP	Displays the help for SVSCMD.
SVSCMD.EXE CHECKKEY -KEY xxxxx-xxxxx-xxxxx-xxxxx	Lets you know if the key you pass on the command line is a valid key.
SVSCMD.EXE SETKEY -KEY xxxxx-xxxxx-xxxxx-xxxxx	Sets the product key.
SVSCMD.EXE "Sample App" PRIORITY -T NORMAL -L 34.231 (For information about priorities, see Using Layer Prioritization on page 57).	Sets the priority for the Sample App layer to type Normal with a priority value of 34.231.

Command-line examples	Result
SVSCMD.EXE "Sample App" PRIORITY -L 34.231	Sets the priority for the Sample App layer with a priority value of 34.231.
SVSCMD.EXE "Sample App" PRIORITY -T HKCR -L 34.231	Sets the priority for the Sample App layer to type HKCR with a priority value of 34.231.
SVSCMD.EXE "Sample App" PRIORITY -R	Resets the priority of the Sample App layer.
SVSCMD.EXE "Sample App" PRIORITY -T NORMAL -R	Resets the priority of the Sample App layer and sets the type to normal.
SVSCMD.EXE "Sample App" PRIORITY -T HKCR -R	Resets the priority of the Sample App layer and sets the type to HKCR.

Using Layer Prioritization

There may be times when you need to control which layer has precedence in the event that different layers have conflicting contents. Prioritization lets you control the priority of those conflicting contents.

Example: If you open an HTML file, Windows Explorer will go to the registry and determine which application is registered to open that file. When using Software Virtualization Solution, you may have different application layers that are associated with HTML files, such as Internet Explorer, Firefox, or Opera. You can control which layer (which Web browser application) gets the priority and opens the file.

In another example, you may have different versions of the same .DLL file in different layers. Prioritization lets you control which version of the .DLL file has the highest priority and is therefore used.

How Prioritization Works

When a request is made, Software Virtualization Agent does the following:

1. Builds a list of all the active layers
2. Assigns a priority to each active layers based on the following:
   - The type of request that is being made (Normal or HKEY_CLASSES_ROOT)
   - Where is the request coming from
3. Orders and searches the layers based on priority

Request Types

Prioritization is based on two types of requests:

- The request being made to the normal file system
- The request being made to HKEY_CLASSES_ROOT

Each type of request has a different set of priorities.

The following sections describe how to use prioritization:

- Normal Layer Priorities (page 58)
- HKEY_CLASSES_ROOT Priorities (page 60)
- Configuring Layer Priorities (page 62)

Normal Layer Priorities

Normal layer priorities are the priorities assigned to layers for all files and registry data except HKEY_CLASSES_ROOT data.

Example: Opening a certain data file

After the request is identified as a normal layer priority type request, the priority is based on the location of the file or registry entry. Each priority is given a priority value. The lower the value number, the higher the priority.

Note
When changing the default properties, you should only change the .5 value of the layer.

- *Conflicting Files within the Same Layer Priority*

Normal Layer Priorities

Default Priority Values	Priorities	Description
45.5 (Highest)	Data Layer	Data layer are layers that contain data files. Data layers are given highest priority because only one copy of the file should be available for reading and writing. Users expect the same file every time they open a data file. (This is not necessarily the case for an executable or .DLL file.)
55.5	Owner Layer	If the executable that is used to start a process comes from an active layer, that layer is the "owner layer" for the process. Also, child processes have the same "owner layer" as their parent process, regardless of where their executable is located. This way, an application will use files in its own layer before using a file in the base or a different application layer. Example: If you have an active layer for Microsoft Office, and if the request comes from an application in that Microsoft Office layer, the files in that layer are given "base owner" priority.

Normal Layer Priorities

Default Priority Values	Priorities	Description
65.5	Base Owner	The base is the normal folders and files on the computer outside of any layers. If the process comes from an application running from the base, a pseudo layer is created for the base and given this priority. In this case, the base functions as an owner layer. Example: Suppose you have active layers for Microsoft Office and Firefox, but Adobe Acrobat is installed in the base and not in a layer. When Acrobat makes a request, the files in the base file system are given "base owner" priority.
75.5	Base	The base is the normal folders and files on the computer outside of any layers. If the process is *not* running from the base, the base is given this priority. The difference between "base" and the "base owner" is whether or not the requesting application is running from the base. If the application is running from the base, then it is considered the "base owner." If the requesting application is running from a layer, then the base files are given "base" priority. Example: Suppose you have active layers for Microsoft Office and Firefox. If a request comes from an application in the Microsoft Office layer, any files in the base (outside of all active layers) would be given "base" priority.
85.5 (Lowest)	Normal	Normal priority is given to files in any other active layer that the application is not running from. For example, if you have two layers, one for Microsoft Office and one for Firefox, and if the request comes from the Microsoft Office layer, files in the Firefox layer are given "normal" (lowest) priority.

Default Layer Priorities Example #1

You have an active data layer as well as active layers for Microsoft Office and Firefox and you are running Office from that active layer. If Office makes a request for EEFONTS.DLL, the Software Virtualization Agent will do the following:

1. Build a list of all active layers and the base.
2. Assign the following priorities:
   - 45.5 assigned to the data layer (highest priority)
   - 55.5 assigned to the Microsoft Office layer that is the "owner layer"
   - 75.5 assigned to the base
   - 85.5 assigned to the Firefox normal layer

     Because the request came from a layer, there is no base owner priority.
3. Searches for the .DLL based on the priorities assigned:
   a. Searches first in the active data layer. If it finds the .DLL in the data layer, it will use that version.

b. If the .DLL is not found in an active data layer, it will look in the layer that Office was launched from, which is considered the owner layer. If it finds the .DLL in the owner layer, it use that version.

c. If the .DLL is not found in the owner layer, it will look in the base. If it finds the .DLL in the base, it will use that version.

d. If the .DLL is not found in the base, it will look in other active layers. If it finds the .DLL in a different active layer, it will use that version.

4. In this example, the EEFONTS.DLL is in the Microsoft Office layer the request is directed there.

Default Layer Priorities Example #2

You have an active data layer as well as an active layer for Microsoft Office but you are running Adobe Acrobat from the base. If Acrobat makes a request for ACRORD32.DLL, the Software Virtualization Agent will do the following:

1. Build a list of all active layers and the base.
2. Assign the following priorities:
   - 45.5 assigned to the data layer
   - 65.5 assigned to the base layer that is the "base owner"
   - 85.5 assigned to the Microsoft normal layer

     Because the request came from the base, a "base owner" layer is created and there is no base priority.
3. Searches for the .DLL based on the priorities assigned:
   a. Searches first in the active data layer. If it finds the .DLL in the data layer, it will use that version.

   b. If the .DLL is not found in a data layer, it will look in the layer that Acrobat was launched from. In this case, Acrobat was launched from the base, which is then considered the base owner layer. If it finds the .DLL in the base owner layer, it will use that version. (In this case, this no "owner layer" or "base" priorities.)

   c. If the .DLL is not found in the base owner, it will look in other active layers. If it finds the .DLL in an active layer, it will use that version.
4. In this example, the .DLL is in the owner base layer the request is directed there.

Conflicting Files within the Same Layer Priority

You may have a situation where you have conflicting files within the same priority. For example, files in data layers are always given the highest priority. What if you have two different active data layers and each one has a different version of a file that is requested by an application? You can set a different priority for each data layer.

For information on how to resolve priority conflicts, see Configuring Layer Priorities (page 62).

HKEY_CLASSES_ROOT Priorities

This is the priority assigned to a layer when looking at HKEY_CLASSES_ROOT data. HKEY_CLASSES_ROOT priorities are handled differently because this is typically what

applications use to register what files they use and they are not tied to the rest of the layer priorities.

By using HKEY_CLASSES_ROOT priorities, you can control when an application registers to handle certain extensions in HKEY_CLASSES_ROOT and you can order separately than the file order of the application.

Example: Which application will be opened to handle a given file type.

For example, you may have two active layers for two different Web browser applications. Both of them are registered to handle opened HTML files. You can use priorities to determine which layer you want to open the HTML files.

Note
The HKEY_CLASSES_ROOT key is a virtual key that Windows creates by combining the data from HKEY_CURRENT_USER\Software\Classes and HKEY_LOCAL_MACHINE\Software\Classes. When there is a conflict in this data, preference is given to the data contained in HKEY_CURRENT_USER\Software\Classes.

SVS does not store data in the virtual HKEY_CLASSES_ROOT key. Instead it stores it in its real location under either HKEY_CURRENT_USER\Software\Classes or HKEY_LOCAL_MACHINE\Software\Classes. At runtime, Windows reads the SVS data for active layers from these locations and properly renders HKEY_CLASSES_ROOT.

- *Conflicting Settings within the Same HKEY_CLASSES_ROOT Priority*

After the request is identified as a HKEY_CLASSES_ROOT type request, the priority is based on where the location of the file or registry entry is located.

HKEY_CLASSES_ROOT Priorities

Default Priority	Location	Description
55.5 Highest	Owner Layer	If the executable that is used to start a process comes from a layer, that layer is the "owner layer" for the process. Also, child processes have the same "owner layer" as their parent process, regardless of where their executable is located. Example: Suppose you have an active layer for Firefox and you have Internet Explorer installed in the base and both are registered in HKEY_CLASSES_ROOT to be the default application for HTML files, then when the Firefox layer is active, Firefox will be given priority and will be used when an HTML file is opened.
65.5	Normal	Normal priority is given to HKEY_CLASSES_ROOT settings in any other active layer than the application is not running from.
75.5	Base Owner	The base is the normal HKEY_CLASSES_ROOT settings on the computer outside of any layers. If the process is running from the base, the settings in the base are given this priority.
85.5 Lowest	Base	The base is the normal HKEY_CLASSES_ROOT settings on the computer outside of any layers. If the process is *not* running from the base, the settings in the base are given this priority.

Because there are no registry entries in a data layer, data layers are not considered for HKEY_CLASSES_ROOT priorities.

HKEY_CLASSES_ROOT Priorities Example #1

You have an active layer for Firefox but also have Internet Explorer installed on the base. If you open an HTML file, the Software Virtualization Agent will do the following:

1. Build a list of all active layers and the base.
2. Assign the following priorities:
   - 65.5 assigned to the Firefox layer that is the "owner layer"
   - 85.5 assigned to the base
3. In this example, Firefox has the highest priority; therefore, it is launched.

Conflicting Settings within the Same HKEY_CLASSES_ROOT Priority

You may have a situation where you have conflicting settings within the same priority. For example, what if you have two different active layers and each one is registered in HKEY_CLASSES_ROOT to handle HTML files? You can set a different priority for each layer.

For information on how to resolve priority conflicts, see Configuring Layer Priorities (page 62).

Configuring Layer Priorities

You may have a situation where you have conflicting files within the same priority. For example, for general layer priorities, files in data layers are always given the highest priority. What if you have two different active data layers and each one has a different version of a file that is requested by an application? You can set a different priority for each data layer.

Or what if you have two different active layers and each one is registered in HKEY_CLASSES_ROOT to handle HTML files? You can set a different priority for each layer.

Conflicting Normal Priorities Example #1

You have two active data layers and you are running Microsoft Word from the base. If Word makes a request for CUSTOM.DIC (the custom spell checking dictionary), it will do the following:

1. Build a list of all active layers and the base.
2. Assign the following priorities:
   - 45.5 assigned to the "data layer A"
   - 45.5 assigned to the "data layer B"
   - 65.5 assigned to the base layer that is the "base owner"
3. Searches for the file based on the priorities assigned:
   a. Searches first in the active data layers.

      Suppose it finds two different versions of the same CUSTOM.DIC in two different active data layers. By default, it will not know which file to use.

      You can configure "data layer A" to be priority 45.2 and "data layer B" to be priority 45.3.

b. It will look in the data layer with the highest priority (if different), which in this case is “data layer A”, and will use the file in that layer.

Caution
If the two data layers have the same priority, such as 45.5, then the priority is undeterminable and which file is used cannot be guaranteed.

Conflicting HKEY_CLASSES_ROOT Priorities Example #2

You have two active layers for different Web browsers, Firefox and Opera. If you open an HTML file, it will do the following:

1. Build a list of all active layers and the base.
2. Assign the following priorities:
   - 65.5 assigned to the Firefox layer
   - 65.5 assigned to the Opera layer
   - 85.5 is assigned to the base
3. Determines which application to launch.

   By default, because both Firefox and Opera have the same priority, it will not know application to launch.

   If you wanted to Firefox to always have priority of Opera, you can configure the Firefox layer to be priority 65.3 and Opera would keep the default priority 65.5.
4. In this example, because the Firefox label has the higher priority, Firefox will be launched instead of Opera.

Note
If the two layers have the same priority, such as 65.5, then the priority is undeterminable and which file or registry entry is used cannot be guaranteed.

To set layer priorities

You can set the priorities for a layer using command-line parameters with SVSCMD.EXE.

Note
Use caution when changing the priorities of layers. When setting a priority value, you can specify any numeric value. However, we recommend that you only change the values to the right of the decimal. If you change the values to the left of the decimal, you will change the default priorities and may cause problems when new layer types are created in the future. Example: If you have two layers that have a default priority of 65.5, you can change one to 65.3, giving it a higher priority than the other layer, but still maintaining the general class of priority.

For general information about SVSCMD.EXE, see Using SVSCMD Command-line Parameters (page 51).

1. On a computer where you have the agent installed, open a DOS window (Start > Run > CMD > OK).
2. From the DOS prompt, Type SVSCMD.EXE “LayerName” PRIORITY [-T|-L|-R]

   -T[YPE] <type> = Priority type (NORMAL or HKCR).

   -L[EVEL] <Level> = Priority of the layer.

-R[ESET] = Resets the priority to default.

The following table list examples changing layer priorities.

SVSCMD.EXE "Sample App" PRIORITY -T NORMAL -L 34.231	Sets the priority for the Sample App layer to type Normal with a priority value of 34.231.
SVSCMD.EXE "Sample App" PRIORITY -L 34.231	Sets the priority for the Sample App layer with a priority value of 34.231.
SVSCMD.EXE "Sample App" PRIORITY -T HKCR -L 34.231	Sets the priority for the Sample App layer to type HKCR with a priority value of 34.231.
SVSCMD.EXE "Sample App" PRIORITY -R	Resets the priority of the Sample App layer.
SVSCMD.EXE "Sample App" PRIORITY -T NORMAL -R	Resets the priority of the Sample App layer and sets the type to normal.
SVSCMD.EXE "Sample App" PRIORITY -T HKCR -R	Resets the priority of the Sample App layer and sets the type to HKCR.

Managing Application Updates within Layers

A common use of Software Virtualization Solution is to have layers for application that you commonly use. What if you want to update the application in a layer? For example, suppose you have a layer for Microsoft Office, but an update or patch is released for Office that you want to add to your Office layer.

It is possible to update the application within a layer; however, we recommend that rather than updating an application layer that you create a new layer that contains both the application and the update, and then remove the old layer and use the new one.

There are a couple of reasons for this:

- If you update the application in a layer, the changes are captured into the Writeable sublayer. If you ever reset the layer, those changes are deleted (see Layer Architecture on page 13). So if you apply a security patch to a layer, but then later reset the layer, the patch is deleted.
- By patching individual layers, you lose the consistency of managing which users are using which versions of applications. For example, if you run and .MSI repair on different computers, different changes may be made and captured in the layer.

If you do want to update an application within a layer, do the following:

1. Make sure that the .MSI for the application is in the layer (this will be the case by default).
2. In SVS Admin, select **File** > **Update Existing Layer.**
3. Highlight the layer you want to update and click **Next**.
4. Select **Single program capture** and click **Next**.
5. Click **Browse**.
6. Navigate to the setup file.
7. Click **Next**.
8. Click **Finish**.

   This puts you in capture mode.

9. Update the .MSI.
10. Right-click the capture icon in the system tray and choose **Stop Capture**.

If this is a layer that you have deployed on your network, you will need to re-export it to a VSA file and redistribute to client computers.

Handling Duplicate Services in Multiple Layers

You may have a situation where a service is run from the base or from a layer, and then the same service is launched through a different layer. Software Virtualization Solution uses reference counts to properly control the creation, starting, stopping, and deletion of services with the Service Control Manager. If you deactivate the layer running a service, the first instance of the service continues to run. The reference count information is stored under HKLM\SYSTEM\Altiris\FSL\Services.

Software Virtualization Agent Installation

The following sections provide information on installation, upgrading, and maintenance of the Software Virtualization Agent.

- *Installer Basics*
- *Automating Installation*
- *Upgrades and Repairs*
- *Troubleshooting Failed Installs*

Installer Basics

The SVS Agent installer is a Windows Installer package and therefore includes many features common to all Windows Installer packages. Some of the more common options are documentation in this section

The SVS Agent package installs a number of components on the system, some optionally. The components installed and corresponding files are shown in the following table. The paths shown are the defaults on a Windows XP English computer, so adjust them appropriately for the systems you are working with.

Driver	C:\Windows\system32\drivers\fslx.sys
Library	C:\Windows\system32\fsllib32.dll
WMI Provider	C:\Program Files\Altiris\Software Virtualization Agent\AltirisVSProvider.dll C:\Program Files\Altiris\Software Virtualization Agent\AltirisVSProvider.mof
Command-line Utility	C:\Program Files\Altiris\Software Virtualization Agent\svscmd.exe

Graphical Admin Tool	C:\Program Files\Altiris\Software Virtualization Agent\svsadmin.exe C:\Program Files\Altiris\Software Virtualization Agent\<Language>\svsadmin_resources.exe C:\Program Files\Altiris\Software Virtualization Agent\fslui.dll C:\Program Files\Altiris\Software Virtualization Agent\<LCID>\fslui_resources.dll
File Redirection Area	C:\fslrdr

In addition to installing these files on the hard drive, the installer also creates the file redirection area at C:\fslrdr. This is where files that are contained in virtual layers are stored. There is a corresponding area of the registry where registry entries for the virtual layers are stored. The installer creates this area at HKEY_LOCAL_MACHINE\SYSTEM\Altiris\FLS in the registry. A few other registry keys are created by the installer as described below.

Virtual Layer Metadata	HKEY_LOCAL_MACHINE\SYSTEM\Altiris\FSL
SVS Product Settings	HKEY_LOCAL_MACHINE\SYSTEM\Altiris\SVS
Registry Redirection Area	HKEY_LOCAL_MACHINE\SOFTWARE\fslrdr

After creating these resources, the installer has to register some of them on the system. It installs the driver in a fashion similar to how a service is installed. (Do not expect to see it in your services list, but the registry keys look very similar to a service.) The WMI provider is installed using the programmatic equivalent of mofcomp.exe.

The installer sets the security permissions on the File Redirection Area and the Registry Redirection Area. For these, administrators and the SYSTEM account are given full access.

Finally, Windows Installer itself has some information that it stores about the installation. It caches the installer package on the hard drive, creates an entry for the agent in Add/Remove Programs, and stores some internal information about the components installed.

After the installer has completed, it needs a restart in order for the product to become fully usable.

Automating Installation

Now that you have an understanding of the installer package, what do you actually do with it? An individual user may double-click the package and run the installer user-interface to perform the installation. The more advanced user or administrator may want to use additional options discussed in this section to customize the installation and automate it.

Rolling the agent out to an organization probably means doing a silent install. The typical Windows Installer switches are a good start, but not sufficient. At a minimum you will need to specify a product key in order to complete the installation. The following command-line is an example of this:

```
msiexec.exe /qn /i Software_Virtualization_Agent.msi
PRODUCT_KEY=<product-key>
```

A few other command line parameters can be used to customize the installation, as discussed on the following table.

INSTALL_ADMIN=1	Installs the SVS Admin Tool. Note: INSTALL_ADMIN=<*any value*> will cause SVS Admin to be installed.
REBOOT=ReallySuppress	Suppresses restarts and restart prompts. Without this switch, the installer will automatically restart the computer (assuming that you are doing a silent install).
D_FSLRDR=D:\fslrdr	Changes the location of the file redirect area. This switch is untested.
INSTALLDIR=C:\SVSAgent	Changes the install location of the command line utility, WMI provider, and Admin tool.
PRODUCT_KEY=<product key>	Specifies the product key to be used to install. This product key is obtained from Altiris, either when you purchase the product or when you download a key for free personal use of the product.

The following command line silently installs the SVS Agent with SVS Admin:

```
msiexec.exe /i "C:\Software_Virtualization_Agent.msi" /qb-
PRODUCT_KEY=<product-key> INSTALL_ADMIN=1
```

The following command installs the SVS Agent without SVS Admin:

```
msiexec.exe /i "C:\Software_Virtualization_Agent.msi" /qb-
PRODUCT_KEY=<product-key>
```

Upgrades and Repairs

Upgrades and repairs of a broken installation can be accomplished through standard Windows Installer methods. The product key is validated each time the install runs, and therefore must be provided. The following commands repair an existing install and upgrade the installation respectively.

```
msiexec.exe /qn /i {7D8DBB7C-1C55-4950-A107-043C164F379A}
REINSTALL=All REINSTALLMODE=omus PRODUCT_KEY=<product-key>
```

In this example, we use the Windows Installer product code for the SVS Agent rather than pointing to an .MSI file. Since the installer has cached the .MSI file on the computer during the initial install, the cached copy can be used for future repair work.

You can use a repair to install SVS Admin at some point after the initial install. This is useful if you forget to include the parameter the first time the installer was run.

An upgrade looks almost identical, but provides a slight variation on the switches. In order to do an upgrade, you need to provide a new .MSI file. You also need to tell Windows Installer to recache the installer package using the new file (the v switch on REINSTALLMODE does this).

```
msiexec.exe /qn /i Software_Virtualization_Agent.msi REINSTALL=All
REINSTALLMODE=vomus PRODUCT_KEY=<product-key>
```

Troubleshooting Failed Installs

Most failed installs can be successfully completed after a restart and reattempting the install. In the event that this does not work, more drastic steps may be necessary.

In the event of an installation failure, you need to create a Windows Installer log in order to determine where the failure occurs. You can add the `/l*v <logfile>` switch to the command-line for the installation to generate a log file. Search for "return value 3" inside the install log and the few lines above it should have an error message regarding the failure.

This error message may tell you exactly what the problem is, such as an invalid product key. In other cases, the error message indicates a more involved failure, such as not being able to install the driver or WMI provider, or something similar. In those cases, you may need to contact Altiris support or do a manual cleanup of the installation.

Manually cleaning up a computer is a simple matter of cleaning up everything the installer does.

To clean up a computer

1. Removing all the files and registry keys listed in the above sections.
2. Delete the FSLX driver with the following command:

   ```
   sc.exe delete FSLX
   ```

3. Use the following command to remove the local group created for SVS Agent security:

   ```
   net.exe localgroup "Software Virtualization Administrators" /
   delete
   ```

Removing the WMI Provider is a little more complex. Use the built-in tool named wbemtest.exe for this purpose.

To remove the WMI Provider

1. Launch wbemtest.exe.
2. Click the **Connect** button.
3. Enter the namespace "root\default" and click **Connect**.
4. Click the **Delete Class** button
5. Enter the class name "AltirisVSProv" and follow the prompts to delete the class. For completeness, you also need to remove the registry keys created by the WMI provider:

   ```
   HKEY_CLASSES_ROOT\AppID\AltirisVSProvider.DLL
   ```

   ```
   HKEY_CLASSES_ROOT\CLSID\{71D8DF9A-AD2D-44BF-A542-1412F68061D1}
   ```

   ```
   HKEY_CLASSES_ROOT\TypeLib\{888967EF-E75C-4480-992D-
   93FDA658F21E}
   ```

6. Clean up the information that Windows Installer caches about the package. The easiest way to do this is with a tool called msizap.exe from the Windows Installer SDK. The following command removes all Windows Installer data for the SVS Agent:

   ```
   msizap.exe TW! {7D8DBB7C-1C55-4950-A107-043C164F379A}
   ```

Software Virtualization Solution Security

Software Virtualization Solution uses the security systems that are built into the Windows NT family of operating systems. Access to Software Virtualization Solution is controlled by Access Control Lists (ACLs) in the registry and file system. The ability to protect files and directories through ACLs requires the use of the NTFS file system. ACLs on virtualized items (registry entries, files, and services) are persisted normally and Software Virtualization Solution moves the ACLs when a Virtual Software Package (VSP) is exported and imported. This section explains how SVS handles rights on virtual files, and the on-disk structure of a VSP. It also explains how to make sure that anti-virus, inventory, and other programs function correctly in the virtualized environment.

Rights necessary to administer Software Virtualization Solution

In order for a user to manipulate Software Virtualization Solution or VSP data through SVS Admin, that user must be a member of the local Administrators group. There are two exceptions: the rights to activate and deactivate can be delegated. Users that have Read access to a key named HKLM\System\Altiris\FSL\Rights\Activate are able to activate VSPs through SVSCMD or SVS Admin. Users that have Read access to a key named HKLM\System\Altiris\FSL\Rights\Deactivate are able to deactivate VSPs through SVSCMD or SVS Admin. Users that have rights to change the permissions on these keys are able to modify these privileges for other users. While SVS Admin requires a user to be an administrator in order to modify VSP data, the user may still be able to browse directly into the Software Virtualization Solution redirection areas and modify files and registry keys. The user will have the same rights to the files and registry keys in the redirection areas as if the application had been installed normally, so this is not a problem if the application properly creates ACLs for its files during install.

Anti-virus products and inventory products

Software Virtualization Solution does not affect the run-time protection feature of anti-virus software. Anti-virus products properly scan virtualized files when they are opened. Any measures that the anti-virus product takes against a file that it thinks is infected really happen and are not virtualized. However, there is an issue with manual anti-virus scanning. If multiple files exist in the base and in one or more VSPs and these overlay each other, the scanner only sees and scans one of the files. For example, it might enumerate a file named C:\TEST.TXT and scan it, but what it does not see is that a VSP may have another version of the same named file. For this reason, we recommend that anti-virus scanner programs be configured to be "ignored" by the SVS system. This means that when the scanner programs run, they will not see any virtualized files; they will only see the file system as it really exists. This guarantees that all files are properly scanned. The list of ignored executables can be modified by adding or removing strings to HKLM\System\Altiris\FSL\ProgramIgnoreList which is a MULTI-SZ value. The paths can be hard-coded (c:\windows\scan.exe) or variablized ([_B_]WINDIR[_E_]\scan.exe). If you have other programs, like an inventory product, that you wish to have view the file system data without any virtualization, you can add them to this list. You must restart in order for these to be in affect.

VSP User Specific Areas

Data layers and the Writeable sublayer of Application layers are user specific. This means that the layer has a unique area for each user that holds information that is unique to each user. In the advanced editor in SVS Admin on the File tab, you can see that these layers contain some areas that are common for all users, like the Windows directory, but areas that are unique for each user exist under a SID directory. The directory is named with a string representation of the user's SID. This directory contains directories like the user's profile directory and desktop directory. A corresponding area exists in the registry. Under HU (HKEY_USERS) you will see a SID directory for each user. At runtime, this maps to HKEY_CURRENT_USER.

The Read-only sublayer of an Application layer does not contain unique entries for each user. It contains only one copy of user data that is contained in a section called USER_TEMPLATE. During the capture process, any user specific data goes into this area. When the layer is first used by any user outside of capture mode, a SID directory is created for the current user and the contents of the USER_TEMPLATE area are copied. The USER_TEMPLATE area in the Read-only sublayer is not used during normal operation.

Files, directories, and registry keys are protected with the same rights that protect the corresponding objects in the base. Example: When the DESKTOP folder is created in the layer, the ACLs are copied from the user's base DESKTOP folder. This assures that only the proper users have rights to this folder.

The FAT file system is not secure. It does not support the protecting of files and directories with rights. When you build layers that you plan to use on a computer that is using an NTFS file system, you must build the layer on a computer that is using the NTFS file system. If you build a layer on a computer that is using the FAT file system, no rights will be used and when the layer is moved to a computer that is using the NTFS file system, all files and directories will simply get default rights.

When a layer is exported, the rights that are contained in the file system are represented in a file called “acls” in SDDL format. At import time, after the files and directories have been extracted, this information is used to re-apply the proper rights.

Rights to services are handled in a similar fashion. An SDDL string is generated and used to maintain the proper rights on the service.

Hiding the FSLRDR Redirect Locations

The SVS File System Filter driver has the ability to actively hide the fslrdr redirect locations in the registry and the file system. These areas are already protected with ACLs so that, by default, limited rights users are not able to enter these areas. Causing the driver to actively hide these areas has the advantage that the locations are not visible to anyone even if the system is configured to show hidden files. The disadvantage of using this is that programs that traverse the entire file system looking for data (Example: anti-virus scanners and inventory programs) will not see these areas either.

Note
Enabling this does not affect run-time virus checking. To enable the active hiding of the redirect locations by the driver, create a value called “HideRedirectAreas” of type DWORD under HKLM\SYSTEM\Altiris\FSL. Set the value to “1”. A restart is required to put into effect any changes to this value.

Launching of Startup Items

The information in this section does not apply when a layer is activated at start time because it is marked to be active on start. This only applies when a layer is manually activated.

When a layer is activated, Software Virtualization Solution typically launches all of the items in the layer that are configured to run at startup. This includes entries in the startup folder, the common startup folder, run entries, and run-once entries. The launching of these programs happens in the context of the user that activates the layer. This is a potential security concern. Example: When a layer is activated remotely by Notification Server, this happens in the SYSTEM context by default. Because of this, Software Virtualization Solution will not launch these items unless the activation is being done by the interactive user who is logged on to the system.

This does not apply to the OnEvent actions. OnEvent actions are run regardless of how the layer is activated. Care must be taken to ensure that actions configured to run in these scenarios are secure and cannot be exploited by any users on the system.

Part III
Using Software Virtualization Solution in a Notification Server Environment

The following chapters explain how to use Software Virtualization Solution in the Notification Server Environment:

Chapter 6
Software Virtualization Solution Overview

Software Virtualization Solution lets you remotely deploy and manage virtual applications and data using Notification Server-based packages and policies. Software Virtualization Solution works similarly to Software Delivery Solution and shares many features.

Quick Links

- Software Virtualization Solution Components (page 73)
- Software Virtualization Solution Usage Overview (page 77)
- Software Virtualization Solution Features (page 78)

Software Virtualization Solution Components

When Software Virtualization Solution is installed, folders and items are placed in various tab views of the Altiris Console. You can use these folders and items to create and manage packages, programs, and software virtualization tasks. All folders and items for Software Virtualization Solution are placed in the **Software Management > Software Virtualization > Windows** folder in the left pane of the various tab views.

- *Virtual Software Packages Overview*
- *Package Download Overview*

Tasks tab

The following table lists the shortcut menu items that are added after Software Virtualization Solution is installed. These can be accessed when you right-click a folder or item in the left pane on the **Tasks** tab.

Folder	Shortcut Menu Item	Description
Virtual Software Tasks		A container for the software virtualization tasks that you create.
	Wizard and Status	Opens the software virtualization Wizard. This wizard takes you through the steps of creating packages and setting up software virtualization tasks to deliver those packages. See Creating Virtual Software Packages (page 93).

Resources tab

The Virtual Software Package folder is provided as a container for the software virtualization packages that you create.

You can also manage the virtual packages on client computers. You can do this in one of two ways:

- Open a computer resource and view and manage the Virtual Software Packages on the computer.
- Open a Virtual Software Package Resource and view and manage it on the computers it is deployed to.

For information, see Managing Virtual Software Packages using the Resource Manager (page 113).

Reports tab

From the Reports tab, you can view software virtualization reports. Reports let you analyze your data. Each Altiris solution includes predefined reports that you can use or modify, or you can create your own reports.

Software Virtualization Solution provides numerous predefined reports to help you analyze your asset information.

These reports are found in the Altiris Console under the **Reports** tab by selecting **Reports > Software Management > Software Virtualization > Windows** in the left pane.

In addition to the above reports, you can create reports related to software virtualization task usage. Software Virtualization Solution also provides the ability to automatically delete old reports.

For information on these features, as well as using predefined reports and creating custom reports, see *Altiris Notification Server Reference*.

Configuration tab

From the Configuration Tab, you can install, upgrade, or install the Software Virtualization Agent. You can also assign security privileges for software virtualization administrative functions. For information, see Installing Software Virtualization Solution (page 81).

Virtual Software Packages Overview

Virtual Software Packages are Notification Server resource objects that are used to deploy virtual applications or virtual data layers to managed client computers. These are similar to Software Delivery Packages that are used in Software Delivery Solution.

Virtual Software Packages contain Virtual Software Archive (VSA) files that are created using the Software Virtualization Solution Admin (SVS Admin) tool. For information on creating VSAs, see Getting Started with Virtual Software Layers and Archive Files (page 24).

As part of the package definition process, you specify the locations from which an Altiris Agent can download the package. By default, a package can be downloaded from the location specified in the package as the source for the package. You can also specify Package Servers where a package can be obtained. Package Servers let you reduce the load on the Notification Server and the network by distributing packages to multiple locations from which they can be downloaded. For more information on package servers, see the Altiris Notification Server documentation.

The Altiris Agent stores package files on the same drive that the agent installed (in the *install path*\Altiris\Altiris Agent\software virtualization*Package GUID* folder). When installing the Altiris Agent, install the Altiris Agent on a drive with sufficient space for all the files that will be downloaded. If the Altiris Agent does not have sufficient disk space

to download a package, a message is displayed by the Altiris Agent and a status message is sent to the Notification Server. If the end user manually deletes the package files, the Altiris Agent will re-download them from the Notification Server the next time the Altiris Agent tries to run the package.

Virtual Software Package Actions and States

When a package is deployed to a client computer, there are different actions that you can perform on it. Those actions control the two different states of a package: activated and deactivated. The following table describes the possible actions and states:

Name	Description
Layer Actions	
Import	The layer files in a VSA file are installed in the hidden SVS redirection area on the client computer. However, imported files are not visible until the layer is activated.
Activate	The layer files that have been imported on a client computer are made visible to the user. Activation and deactivation occur almost instantaneously.
Deactivate	The imported layer files are hidden from the user but are kept on the computer. **Note** You cannot deactivate a layer while a process is running from that layer. For information, see Deactivating Layers with Services Running (page 37).
Deactivate (Force)	The layer is forcefully deactivated by killing all the running applications from that layer. This might cause undesired results.
Delete	The imported layer files are removed from the computer.
Delete (Force)	The layer is forcefully removed by killing all the running applications from that layer. This might cause undesired results.
Reset	Deletes all of the user's profiles in a layer that were added or changed. The data in the Writeable sublayer is deleted, leaving only the files in the Read-only sublayer. See Resetting Layers (page 37). **Note** Data layers cannot be reset. Hence, "Reset", "Reset and Activate" and "Reset and Deactivate" are not available for data layers.
Reset (Force)	Deletes all of the user's profiles in a layer that were added or changed, killing all the running applications from that layer. This might cause undesired results.
Layer States	
Activated	The imported layer files are made visible to the user.
Deactivated	The imported layer files are hidden from the user.
Combination of Actions and States	

Name	Description
Import and Activate	The layer files are placed in the SVS redirection area on the client computer and are made visible to the user.
Reset and Activate	The layer files are reset to their original imported state by deleting all user data and changes (Writeable sublayer), and the layer is visible to the user.
Reset and Deactivate	The layer files are reset to their original imported state by deleting all user data and changes (Writeable sublayer), and the layer is not visible to the user.

Virtual Software Package Programs

You can configure tasks to perform actions to control the state of the Virtual Software Packages. Software Virtualization Solution provides the following predefined programs:

Virtual Software Package Program Options

Name	Function
Import and Activate	Use this to deploy the Virtual Software Package, import the layer, and activate the layer. This means the package contents will be copied to the client computer and the files will be visible to the user.
Import	Use this to deploy the Virtual Software Package and import the layer, but not make the files visible to the user.
Activate	Use this to activate a Virtual Software Package that has been imported, but is not currently visible to the user.
Deactivate	Use this to make an imported Virtual Software Package not visible to the user.
Reset	Use this to return the Virtual Software Package to its original imported state and delete all user data and changes. The package remains in the activated/ deactivated state that it is currently in.
Reset and Activate	Use this to return the Virtual Software Package to its original imported state by deleting all user data and changes, then making the files visible to the user.
Reset and Deactivate	Use this to return the Virtual Software Package to its original imported state by deleting all user data and changes, then make the files not visible to the user.
Delete	Use this to delete Virtual Software Packages from the client computers.

For information on defining Virtual Software Packages, see Creating and Using Notification Server Virtual Software Packages (page 93). For information on defining Virtual Software Tasks, see Deploying Virtual Software Packages (page 101).

Package Download Overview

When a new package is defined, the package will be automatically downloaded to the appropriate Altiris Agent Package Server the next time the Altiris Agent requests configuration information from Notification Server. If you modify a package definition within the Altiris Console, the changed files in the package will also be downloaded to the appropriate Altiris Agent computers when the Altiris Agents check for configuration information.

To send a package to a group of computers, the package must be assigned to a software virtualization task, the destination computers must be a part of a collection assigned to

the task, and the task must be enabled. For information, see Deploying Virtual Software Packages (page 101).

If the actual files in a package change, Notification Server automatically recognizes the changes. Notification Server checks for changed package files on a regular basis (once a day by default). If Notification Server determines that files in a package have changed, Notification Server will inform the appropriate Altiris Agents that the package has changed. Only the changed files will be downloaded to the Altiris Agent again. The interval that Notification Server checks for changed files can be modified (for information, see Changing the Check for Updated Package Files Schedule on page 100). The less frequently the check is made, the longer the time is required for a changed package to be available on an Altiris Agent computer. The more frequently the check is made, the more processing resources are required by Notification Server.

If the Software Virtualization Solution Agent cannot download a package due to a link failure or denied access so a connection cannot be established, the Altiris Agent will report a "Download failed - Link failure" status message. The Software Virtualization Solution Agent will back off for N minutes (where N increases exponentially from a default of 3 minutes to a default of 2 hours) before attempting to download the package again.

If the Altiris Agent detects a network status change (a new network link), any package waiting for a retry at being downloaded immediately restarts. The back off interval is then reset to the initial value.

If a connection is lost during the download of a package, the transfer rate is throttled. When the Altiris Agent attempts to download the package again, a buffer transfer delay applies and slows down the download. The Altiris Agent determines which files in the package still need to be downloaded and downloads those files.

If a source or destination fails during a package download, the checkpoint recovery feature lets you continue the download of a package without starting over. Example: You are deploying a package that is 20 MB in size and there is a network failure 15 MB into the deployment process. When your systems are back up, the package deployment resumes at the 15 MB point. The checkpoint recovery feature is always available; you do not need to enable it.

Software Virtualization Solution Usage Overview

Using Software Virtualization Solution involves defining Virtual Software Layers and Packages, creating Software Virtualization Tasks to deploy packages, and monitoring feedback. The following steps outline the virtual software deployment procedure.

To deploy a Virtual Software Package

1. Install Software Virtualization Solution on a Notification Server. See Installing Software Virtualization Solution (page 81).
2. Create Virtual Software Layers and Archive Files to include in Virtual Software Packages. See Getting Started with Virtual Software Layers and Archive Files (page 24).
3. Rollout the Software Virtualization Agent to client computers. See Deploy the Software Virtualization Agent (page 84).
4. Use the Software Virtualization Wizard to do the following:
   - Create a Virtual Software Package

- Create a Software Virtualization Task to deploy the Virtual Software Package to client computers

You can quickly create both packages and tasks using the Software Virtualization Wizard. For information, see Create a new Virtual Software Package and Task (page 84).

For information about manually creating packages and tasks, see Manually Creating Virtual Software Packages (page 94) and Manually Creating a Virtual Software Task (page 105).

Software Virtualization Solution Features

Software Virtualization Solution shares the following features with Software Delivery Solution:

- Bandwidth Throttling (page 78)
- Blockout (page 78)
- Multicasting (page 79)
- Software Portal (page 80)

Bandwidth Throttling

Bandwidth throttling lets you control the amount of bandwidth used in the delivery of packages. This feature can help minimize the impact of software deployment at peak network usage times.

When the Software Delivery Agent (which is installed along with the Altiris Agent) downloads a file, the agent downloads the file buffer by buffer with a delay between each buffer. The buffer size and the amount of delay between buffers are both configurable through the Altiris Agent. Different values can be used depending on the bandwidth usage.

If bandwidth control is disabled by the user, the Software Delivery Agent will use no (0) delay between buffers when downloading files. Effectively, the agent uses all of the available bandwidth for package download.

If bandwidth control is enabled, the agent will test the data transfer rate by using full bandwidth to download a package for 10 seconds, and then estimate the transfer rate during that period of time. If the estimated transfer rate is less than a threshold, the agent will then use a delay between buffer downloads to slow down the download process. The data transfer rate test is done every two minutes to re-evaluate the link speed during the package download. Therefore, bandwidth usage depends on the transfer rate of the package download. For more information on the throttling feature, see the *Altiris Notification Server Reference*.

Blockout

Blockout lets you block out times in which packages are delivered with a high priority, low priority, or not at all. This feature lets you ensure that package delivery does not take up significant network bandwidth during peak usage times. For more information on the blockout feature, see the *Altiris Notification Server Reference*.

Multicasting

Multicasting lets you transmit packages to a select group of recipients. This feature improves Package Server performance on large networks for large customers using significant amounts of network bandwidth. It protects Package Servers from being overloaded and helps prevent slow network responses when distributing large packages.

Multicasting reduces the load on Package Servers by reducing the number of Altiris Agents that connect to the Package Server and decreases network utilization by multicasting package data to peers.

Sample Multicasting Scenario

A remote network segment consists of five Altiris Agents that remotely communicate to the Notification Server.

When the first Altiris Agent updates its configuration, it is notified that there is a package ready for download. If this Altiris Agent has multicasting enabled, it will begin a multicast session and ask if any other Altiris Agents in the segment already have this package. As other Altiris Agents in turn update their configuration and are also asked to download this package they will join the multicast session to register that they too need to download the package.

The Altiris Agents first negotiate to see who is going to be the 'master' of the session. After the minimum numbers of Agents per multicast session join, one of two things will occur:

- If one of the Altiris Agents has the package, then it becomes the multicast master. The master then waits for the minimum number of agents to join the session.
- If no Altiris Agent in the session has the package, then they negotiate with each other and pick a multicast master based on their respective OS, OS type, CPU speed, and memory. This has a minimum timeout of 240 seconds. After the master is chosen, it downloads the package in the usual manner and then waits for the minimum number of agents to join the session.

The master Altiris Agent then multicasts the package over the physical subnet so that each of the Altiris Agents in the multicast session can receive it.

If an Altiris Agent requests a package after it has been available for some time, it attempts to join an existing session or else it begins a multicast session as normal.

This process optimizes the package download procedure. Only one Altiris Agent per session will communicate with the Package Server or Notification Server to download the package. Previously, each Altiris Agent required bandwidth and CPU usage to communicate directly to the Package Server or the Notification Server. Multicasting reduces this overhead by reducing significant amounts of network bandwidth usage and thereby reducing load on the Package Server or the Notification Server.

Altiris Agents revert to unicast for downloading packages under the following circumstances:

- If the **Maximum sessions per physical subnet** value has been reached, the backoff period initiates. If this occurs more times than the **Maximum transmission attempts per package**, the Altiris Agent reverts to unicast.
- If an Altiris Agent is connected to the session at less than 64 Kbytes/second, it is removed from the session.
- If the **Maximum bandwidth used for multicasting** has been reached.

- If the **Maximum sessions per physical subnet** value has been reached.
- If the package is smaller than the **Disable multicast for packages smaller than** value.

Package Servers and Multicasting

The following applies to Package Servers when multicasting:

- Package Servers will always download a package using unicast.
- If there is a Package Server on the subnet that has already downloaded a package, it participates in the multicast session as the master.

Configuring Multicasting

You can select to use multicasting on the Advanced tab (Virtual Software Task Page) (page 109). By default, all Software Delivery tasks that meet the criteria use multicasting.

Caution
For a client computer to be included in a multicasting session, the Altiris Agent on that computer must have multicasting enabled. Package multicasting is configured in the Package Multicast tab on the Altiris Agent Settings page.

To enable multicasting

1. In the Altiris Console, click the **Configuration** tab.
2. Select **Configuration > Altiris Agent > Altiris Agent Configuration**.
3. Click the policy you want to configure multicasting for. For example, **All Desktop computers**.
4. Click the **Package Multicast** tab.
5. Select the **Allow Altiris Agents to use multicast for downloading packages** checkbox.

   For information on multicasting options, click the help icon.
6. Click **Apply**.

Software Portal

The Software Portal lets users install software on their computers by executing Software Delivery programs for which they have been given permission by the administrator. Software Portal options are provided in addition to existing Software Delivery Package and Program settings. For information, see Step 4 - Advanced Settings (page 86).

Chapter 7
Installing Software Virtualization Solution

The following procedures explain the steps to install and configure Software Virtualization Solution.

Software Virtualization Solution Prerequisites

Software Virtualization Solution requires the following:

Notification Server

- Notification Server 6.0 SP2 or higher

Client Computer

- One of the following operating systems:
  - Windows 2000 Professional SP4 or higher
  - Windows 2000 Advanced Server SP4 or higher
  - Windows XP Professional SP1 or higher
  - Windows Server 2003 or higher
- Altiris Agent 6.0

Notification Server and SQL Server

If Notification Server and the Microsoft SQL Server database are NOT running on the same computer, make sure that the two computers are in the same time zone and their clocks are reasonably synchronized. Differences in times or time zones between the two computers can cause package update problems.

Installing Software Virtualization Solution

Before installing Software Virtualization Solution, review Software Virtualization Solution Prerequisites (page 81).

To install Software Virtualization Solution on a Notification Server

1. Select **Start > Programs > Altiris > Altiris Console**.

   This starts the Altiris Console.
2. Click the **Configuration** tab.
3. In the left pane, navigate to **Upgrade/Install Additional Solutions**.

4. Click the **Available Solutions** tab.
5. Click the **Software Virtualization Solution** link.
6. Click **Start**.

   This starts the installation of the solution. When the installation is complete, the window will automatically close.

Registration

Each Altiris product comes with a 7-day trial license that is installed by default. You can register and obtain a 30-day evaluation license through our Web site at www.altiris.com or purchase a full product license.

To view your current license, open the Altiris Console, click the **Configuration** tab, and select **Licensing**.

For more information, see "Licensing Altiris Software" in the *Altiris Getting Started Guide* on the product CD or on our Web site: www.altiris.com/support/documentation

Chapter 8
Getting Started with Software Virtualization Solution

The Getting Started tasks guide you through the basic setup, configuration, and use of Software Virtualization Solution. Each task has a procedure and, in some cases, exercises to illustrate the steps of the procedure.

Getting started tasks

1. Create a Virtual Software Archive (VSA) File (page 83)
2. Copy Virtual Software Archive Files (page 83)
3. Deploy the Software Virtualization Agent (page 84)
4. Create a new Virtual Software Package and Task (page 84)
5. Using Software Virtualization Solution Reports (page 87)

Prerequisites for Getting Started tasks

- Notification Server 6.0 with SP3.
- Software Virtualization Solution 6.0 installed on the Notification Server. See Installing Software Virtualization Solution (page 81).
- A client computer running a supported Windows operating system. See Software Virtualization Solution Prerequisites (page 81).
- The Altiris Agent 6.0 installed on the client computer.

Exercise scenario

You are the IT manager. You want to create a virtual application for Mozilla Firefox and deploy it using Software Virtualization Solution to managed client computers on your network.

Create a Virtual Software Archive (VSA) File

Create a Virtual Software Layer and export it to a Virtual Software Archive (VSA) file to include in a Virtual Software Package. For information, see Getting Started with Virtual Software Layers and Archive Files (page 24).

Copy Virtual Software Archive Files

After you have created a VSA file, in order to deploy it, you must be able to access it from your Notification Server. You can copy it to either your Notification Server, to another network share that you can access from your Notification Server, or to a Web server.

Note
The folder the VSA file is in needs to have Read permission at a minimum.

Caution
Notification Server-based software packages are defined as the contents of a given folder. If you want a VSA to be delivered as a single file, each VSA must be placed in its own folder. If you include more than one VSA file in a folder, then all the VSAs will be delivered together in the Software Delivery Package. This will cause additional network traffic and extra disk space used on client computers.

Deploy the Software Virtualization Agent

The Software Virtualization Agent manages the Virtual Software Packages deployed to client computers. Each computer that will use Virtual Software Packages must have the Software Virtualization Agent deployed on it.

To deploy the Software Virtualization Agent

1. From the Altiris Console, click on the **Configuration** tab.
2. In the left pane, select **Configuration > Solutions Settings > Software Management > Software Virtualization > Windows > Software Virtualization Agent Rollout > Software Virtualization Agent Install**.
3. In the right pane, select **Enable**.

   Caution
   Client computers must be restarted after the agent is installed. The default program prompts the user for a restart. For more information, see Restart the Client Computer Automatically after Agent Install (page 91).

4. Select the collection to install to.

   By default, the agent will be installed on all computers in the **All Windows Computers with NS 6 Altiris Agent** collection.
5. Configure the multicast and scheduling options.

   For information, click the help icon.
6. Click the **Apply** button.

Create a new Virtual Software Package and Task

The Software Virtualization Wizard simplifies the steps of creating and delivering new and existing Virtual Software Packages. For general information about Virtual Software Packages, see Virtual Software Packages Overview (page 74). Because packages are delivered through Virtual Software Tasks, this wizard guides you through creating packages and setting up tasks to deliver those packages.

This is the easiest and most efficient way to create packages, assign programs to them, and set up tasks to deliver them.

You can also select to **Use the advanced wizard**. When running the Advanced Wizard, you also have the option to configure package server options, event logging options, the package display name in the Altiris Agent, and task download and execute options. For a

description of these options see Advanced tab (Virtual Software Package Page) (page 98) and Advanced tab (Virtual Software Task Page) (page 109).

To create and deliver a new Virtual Package

The Software Virtualization Wizard can be accessed by clicking the **Tasks** tab and selecting **Software Management > Software Virtualization > Windows > Virtual Software Tasks > Wizard and Status**, then clicking **Run Virtual Software Wizard**.

Step 1 - Select Package Options

In this step, you select that you want to create and deliver a new Virtual Package, select the package source and location, and select the program you want to run.

Before using the wizard, you must have an existing Virtual Software Archive file (.vsa) to use. For information on how to create VSA files, see Getting Started with Virtual Software Layers and Archive Files (page 24).

How would you like to begin?

Select **Create and deliver a new Virtual Package**.

1. **Select the package source and location**

   a. Archive File Source: Select the source of the VSA file. For information, see Copy Virtual Software Archive Files (page 83) and Package tab (Virtual Software Package Page) (page 95).

   Exercise
   Select Access package from a local directory on the Notification Server computer.

   b. Archive File Location: Browse to the VSA file you want to use.

   Exercise
   Browse to the Firefox VSA.

2. **Select the program that will run**

   Select the program to run for the package. For information about package programs, see Virtual Software Package Actions and States (page 75).

   The actual command line appears. In most cases you do not need to edit this information.

3. Click **Next**.

   The required fields are tested and if the information you entered is correct, the wizard goes to Step 2 or 4.

Step 2 - Program Options

In this step, you select how the program will run, which rights to use, and what should happen when the program has finished running. For information on program options, see Programs tab (Virtual Software Package Page) (page 97).

1. Configure the desired options.

   Exercise
   Accept the defaults.

2. Click **Next** to go to Step 3 in the wizard.

Step 3 - Select Collection and Schedule

In this step, you select the collection of computers to which you want the package of software to be delivered and when you want it delivered.

Note
This step will set up a Virtual Software Task to deliver the package.

1. **Select the collection to which the package will be delivered**

   You can only select one collection per Virtual Software Task. If you want to send the package to more than one collection, you can either create a collection which includes all other collections to which you want to send the package or you can run the Software Virtualization Wizard again.

2. **Select when to run this task**

   - **Manual**

     User must manually activate the task on the target computer.

     If this is selected, the task will not run on the target computer unless the user activates it manually.

   - **On a Schedule**

     If this is selected, the task will run automatically on the target computer.

     For information on scheduling options, see General tab (Virtual Software Task Page) (page 106).

3. Select **On a schedule** and accept the defaults. Click **Next** to go to Step 4 in the wizard.

Step 4 - Advanced Settings

If you selected the **Use the advanced wizard** option, you can configure package server options, event logging options, advanced task options, and software portal options.

Configure package options

1. Configure the package server and event logging options.

   For a description of these options see Advanced tab (Virtual Software Package Page) (page 98).

2. Click **Next** to go to Step 5 in the wizard.

Configure advanced task options

1. Specify the name and description of the virtual task this is displayed on the Altiris Agent UI.
2. Specify download and execute options.

   For a description of these options, see Advanced tab (Virtual Software Task Page) (page 109).

3. Click **Finish** to go to Step 5 in the wizard.

Step 5 - Summary

In this step, you enter your task, package, and program names. Next, you review your settings, and click the **Finish** button.

1. Enable or disable the software virtualization task.

   If the checkbox is selected, the software virtualization task will be enabled when it is created. Software virtualization tasks must be enabled before they can be run.

2. Enter the name for the Virtual Software task, package, and program.

   These are the names of the objects as they appear in the Altiris Console. You can use the default names or use your own.

3. Verify the information in the table and click **OK**.

   Make sure the information in the table is correct.

4. Click **OK**.

   This creates the Virtual Software Package and software virtualization task and attaches the package to the task.

   The task will be run according to your scheduling options.

   The task is available under the **Tasks** tab > **Software Management > Software Virtualization > Windows > Virtual Software Tasks**.

   The package is available under the **Resources** tab > **Resource Management > Resources > Software Management > Software Virtualization > Windows > Virtual Software Packages**.

Using Software Virtualization Solution Reports

Software Virtualization Solution provides numerous predefined reports to help you analyze your software virtualization information.

The reports are organized into the following categories:

- Agents
- Packages

The following procedures provide sample instructions for using reports.

To run a report to count the computers with/without the Software Virtualization Agent installed

This report will provide a count of the number of computers with and without the Software Virtualization Agent installed.

1. In the Altiris Console, click the **Reports** tab and select **Reports > Software Management > Software Virtualization > Windows**.
2. Click the **Agents** folder.
3. Click **Count of Computers with/without the SVS Agent Installed**.
4. Click **Run this report in a new window**.
5. You can use the default collection, **All Windows Computers**, or select another.
6. To search for all computers in all domains, leave the fields as **Any**.

7. Click **Refresh**.

   A count for both computers without, and with, the SVS Agent is displayed.

To run a report with a count of computers with each Virtual Software Package (VSP)

This report will provide a list of each Virtual Software Package (VSP) with a count of the number of computers with that VSP.

1. In the Altiris Console, click the **Reports** tab and select **Reports > Software Management > Software Virtualization > Windows**.
2. Click the **Package** folder.
3. Click **Count of Computers by VSP**.
4. Click **Run this report in a new window**.
5. You can use the default collection, **All Windows Computers**, or select another.
6. To search for all VSPs and computers in all domains, leave the fields as **Any**.
7. Click **Refresh**.

In addition to the predefined reports, you can create custom reports related to Software Virtualization task usage. Software Delivery Solution also provides the ability to automatically delete old reports.

For information on these features, as well as using predefined reports and creating custom reports, see the Notification Server documentation.

Chapter 9
Configuring Software Virtualization Solution

The following procedures explain the steps to configure Software Virtualization Solution in a Notification Server environment.

Configuring Software Virtualization Security Privileges

You can assign security privileges for software virtualization administrative functions. Using role-based security, you can control who has rights to do the following:

- Create Virtual Software Packages
- Create Virtual Software Tasks

Quick Links

- *Security Role Management Example*
- *Security Privileges Example*

Security Role Management Example

You may want to give certain IT staff rights to create Virtual Software Packages. You may want to give certain other IT staff rights to only create and deploy Virtual Software Tasks based on predefined Virtual Software Packages.

To configure Software Virtualization Security Role Management

1. From the Altiris Console, click on the **Configuration** tab.
2. In the left pane, select **Configuration > Server Settings > Notification Server Settings** > **Security Roles**.
3. Under **Security Roles**, highlight a user role.
4. In the right pane, under **Privileges**, scroll down to **Software Virtualization Solution Privileges**.
5. Select the privileges that you want the select role to have.
6. Click other roles to assign them privileges as well.
7. Click **Apply**.

For information about configuring security, see **Security Role Management** in the Notification Server help.

Manage This Package	This is the right to manage a Virtual Software Package resource that is present on various computer resources.
Manage Virtual Software Packages	This is the right to manage the Virtual Software Packages that are present on a specific computer resource.
Software Virtualization Wizard	This is the right to launch the Software Virtualization Wizard to create Virtual Software Packages and task policies.

Security Privileges Example

You may want to give certain IT staff rights to change the status of a Virtual Software Package on a client computer without giving the right to use the wizard to create Virtual Software Packages.

To configure Software Virtualization Security Privileges

1. From the Altiris Console, click on the **Configuration** tab.
2. In the left pane, select **Configuration > Server Settings > Notification Server Settings > Item Tasks**.
3. Right-click an item task you want to see security for and click **Properties**.
4. Click **Security**.
5. Set the desired security options for this item task.
6. Click **Apply**.

For more information about configuring security, see **Security Role Management** in the Notification Server help.

Deploying and Managing the Software Virtualization Agent

This section describes how to deploy and manage the Software Virtualization Agent.

Deploying the Software Virtualization Agent

The Software Virtualization Agent manages the Virtual Software Packages deployed to client computers. Each computer that will use Virtual Software Packages must have the Software Virtualization Agent deployed and installed on it. For instructions, see Deploy the Software Virtualization Agent (page 84).

Custom Agent Installation Settings

You can modify the agent installation settings to do the following:

- Restart the Client Computer Automatically after Agent Install (page 91)
- Install SVS Admin Tool during Agent Install (page 91)

Restart the Client Computer Automatically after Agent Install

The Software Virtualization Agent Package is used to install the agent. The package has three predefined programs:

- Installation
- Uninstallation
- Upgrade

When you use the default **Software Virtualization Agent Installation Program**, client computers will not be restarted by default. However, after the agent installation, the client computers must be restarted to enable the agent.

If you want to force a computer restart after the agent is installed, you can modify the Software Virtualization Agent Package.

To modify Restart Options for the Software Virtualization Agent Package

1. From the Altiris Console, click the **Configuration** tab.
2. In the left pane, select **Configuration > Solution Settings > Software Management > Software Virtualization > Windows > Software Virtualization Agent Rollout**.
3. Select **Software Virtualization Agent Package**.
4. In the right pane, click the **Programs** tab.
5. From the **After running** drop-down list, select **Restart Computer**.

   You can modify the restart option for either the default installation program, or you can create a new program, copy all settings from the default installation program, and change the **After running** option in the new program.

   For more information about package and program settings, click the help icon.
6. Click **Apply**.

Install SVS Admin Tool during Agent Install

By default, when you deploy the Software Virtualization Agent, the SVS Admin tool is not installed. There is a separate policy that will install the agent with the SVS Admin utility.

To Install SVS Admin with the Software Virtualization Agent Package

1. From the Altiris Console, click the **Configuration** tab.

2. In the left pane, select **Configuration > Solution Settings > Software Management > Software Virtualization > Windows > Software Virtualization Agent Rollout**.
3. Select **Software Virtualization Agent Package**.
4. In the right pane, click **Software Virtualization Agent With SVS Admin Install**.
5. In the right pane, select **Enable**.
6. Use the default Program name.

   Caution
   Client computers must be restarted after the agent is installed. The default program prompts the user for a restart. For information, see Restart the Client Computer Automatically after Agent Install (page 91).

7. Select the collection to install to.

   By default, the agent will be installed on all computers in the **All Windows 2000/ XP/2003 Computers** collection. You can use the default or click the link to make changes.

8. Configure the multicast and scheduling options.

   For information, click the help icon.

9. Click **Apply**.

Upgrading the Software Virtualization Agent

You can use a policy to upgrade the Software Virtualization Agent from managed computers. You would use this policy after upgrading to a new version of Software Virtualization Solution that has an updated version of the Software Virtualization Agent.

The Software Virtualization Agent Upgrade policy is found under **Configuration > Solution Settings > Software Management > Software Virtualization > Windows > Software Virtualization Agent Rollout**.

Uninstalling the Software Virtualization Agent

You can use a policy to uninstall the Software Virtualization Agent from managed computers. The Software Virtualization Agent Uninstall policy is found under **Configuration > Solution Settings > Software Management > Software Virtualization > Windows > Software Virtualization Agent Uninstall**.

By default, this policy uninstalls the Software Virtualization Agent from all computers listed in the **Computers With Software Virtualization Agent Installed** collection. To uninstall the agent from a smaller group of computers, you can specify a different collection.

Chapter 10
Using Software Virtualization Solution

This chapter describes the following tasks you can perform using Software Virtualization Solution in a Notification Server environment.

- Creating and Using Notification Server Virtual Software Packages (page 93)
- Deploying Virtual Software Packages (page 101)
- Using the Software Virtualization Status Page (page 111)
- Managing Virtual Software Packages using the Resource Manager (page 113)
- Using the Software Portal (page 114)
- Using Notification Policies and Automated Actions (page 114)

Creating and Using Notification Server Virtual Software Packages

After you have created Virtual Software Layers and Virtual Software Archive files, you can create Virtual Software Packages. For general information about Virtual Software Packages, see Virtual Software Packages Overview (page 74).

There are two ways to create Virtual Software Packages.

- Creating Virtual Software Packages (page 93)
- Manually Creating Virtual Software Packages (page 94)

This section also describes the following:

- Editing Virtual Software Packages (page 94)
- Virtual Software Packages Page (page 94)
- *Checking for Package Download Errors*
- *Changing the Check for Updated Package Files Schedule*

Creating Virtual Software Packages

The Software Virtualization Wizard simplifies the steps of creating and delivering new and existing Virtual Software Packages. Because packages are delivered through Virtual Software Tasks, this wizard guides you through creating packages and setting up tasks to deliver those packages.

This is the easiest and most efficient way to create packages, assign programs to them, and set up tasks to deliver them.

You can also select to **Use the advanced wizard**. When running the Advanced Wizard, you also have the option to configure package server options, event logging options, the package display name in the Altiris Agent, and task download and execute options. For a description of these options see Advanced tab (Virtual Software Package Page) (page 98) and Advanced tab (Virtual Software Task Page) (page 109).

You can use the wizard in the following two ways:

- Create a new Virtual Software Package and Task (page 84)
- Create a new Virtual Software Task with an Existing Virtual Package (page 102)

Manually Creating Virtual Software Packages

Note
To quickly create a new Software Virtualization Package and Task at the same time, use the Software Virtualization Wizard. For information, see Creating Virtual Software Packages (page 93).

To manually create a Virtual Software Package

1. In the Altiris Console, click the **Resources** tab.
2. In the left pane, select **Resource Management > Resources > Software Management > Software Virtualization > Windows**.
3. Right-click the **Virtual Software Packages** folder, and select **New > Virtual Software Package**.
4. In the right pane, specify the package properties.

   For information about package properties, see Virtual Software Packages Page (page 94).
5. Click **Apply**.

Editing Virtual Software Packages

After you create a virtual software package, you can edit the package.

To edit a package

1. Open the Virtual Software Packages Page on page 94.
2. Make any desired changes.
3. Save the package.

Virtual Software Packages Page

Note
When configuring package programs, it is important to understand Virtual Software Package states and actions. For information on states and programs, see Creating Virtual Software Packages (page 93).

This page is used to configure Virtual Software Packages and specify Package Servers for the package. It contains the following four tabs:

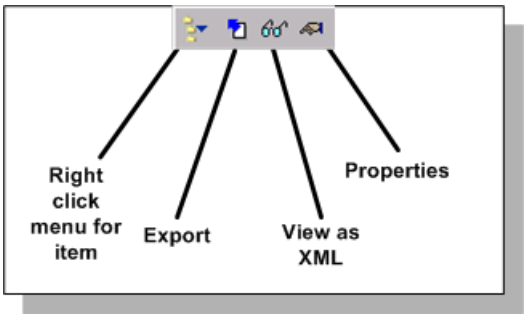
- Package tab (Virtual Software Package Page) (page 95)
- Programs tab (Virtual Software Package Page) (page 97)
- Advanced tab (Virtual Software Package Page) (page 98)
- Software Portal tab (Virtual Software Package Page) (page 99)

To access the Virtual Software Packages page

1. In the Altiris Console, click the **Resources** tab.
2. In the left pane, select **Resource Management > Resources > Software Management > Software Virtualization > Windows** > **Virtual Software Packages**.
3. In the right pane, double-click a software package resource or right-click to create a new package.
4. In Resource Manager, click the **Package** tab.

Virtual Software Package Toolbar

The Virtual Software Package toolbar contains icons that let you perform actions while using the Virtual Software Package page.



The clickable icons on the Virtual Software Package toolbar are as follows:

- **Right click menu for item -** Displays the right click menu for the folder.
- **Export** - Lets you export the software package to XML.
- **View as XML** - Lets you view the software package as XML.
- **Properties** - Lets you view the **Properties** page of the Virtual Software Package. The **Properties** page contains general information of the package and also lets you set up security for the package.

Package tab (Virtual Software Package Page)

This tab is used to configure a package. Items in italics are settings options.

Package tab page items

Item	Description
Name	Name of the package.
Description	Description of the package.
Publisher	Publisher of the package.
Language	Language for which the package is designed.
Version	Version of the package.

Package tab page items (Continued)

Item	Description
Archive File Source	Drop-down list with the following options: **Package does not contain source files:** Select this if the package does not contain source files. Normally, you would not use this option for Software Virtualization Solution. **Access package from a local directory on the NS computer:** Select this to access the package from a local directory on the Notification Server computer. If this is selected, you must enter a Package Location. Notification Server will map HTTP URLs to this location through which Altiris Agents will access the package. Package Location: The location of the package on a local directory on the Notification Server computer. **Access package from existing UNC:** Select this to access the package from an existing Universal Naming Convention (UNC) path. In order for the Notification Server to access packages that exist at a UNC path, you must first enter the credentials that the Notification Server will use when connecting to the UNC path. To do this, go to the Package Server Configuration page and fill in the credentials in the Distribution Point Connection Parameters drop-down list. This option requires a package location. Notification Server will map HTTP URLs to this location through which the Altiris Agents will access the package. Package Location UNC: The location of the package at a UNC path. **Access package from a URL:** Select this to access the package from a URL. This option requires a package location URL. Package Location: The Altiris Agent will access the package through this anonymous URL. Archive File Directory: The alternate UNC package location when the Package source is Access Package from a URL. This UNC package location is used to generate a snapshot of all of the files in the package. The URL is the location where the Altiris Agent will download the package from. The snapshot is used by Altiris Agents as a list of files that will be downloaded. This UNC package location should be the path to the directory used to create the virtual directory.
Archive File Location	The location of the Virtual Software Archive file. This can be a local directory, a UNC path, or URL location depending on the package source.
Apply	Click **Apply** to save changes.
Cancel	Click **Cancel** to discard changes.
Update Distribution Point	Click this button to update this package information as soon as possible on all enabled Package Servers.

Programs tab (Virtual Software Package Page)

This tab is used to configure the programs associated with a package. Software Virtualization Solution provides several predefined programs.

Select a program from the drop-down list to view the details on that program. To add a new program to the package, click **New**. To delete a program from the package, select the program from the drop-down list and click **Delete**.

Program tab page items

Item	Description
Program	Drop-down list that lets you select the program to be associated with the selected package. The programs defined here will be available when you create a Virtual Software Task for this package.
New	Creates a new program definition using the information currently listed in the **Program Details** section of the page.
Delete	Deletes the program definition selected in the **Program** drop-down list.
Name	(Required) Name of the program.
Description	(Optional) Description of the program.
Command line	(Required) Command line entry to run the program, including switches and parameters if applicable. If you use a predefined program, the correct information is inserted. For information on command-line options, see "Advanced Virtual Software Layer Topics" in the *Altiris Software Virtualization Solution Reference*.
Estimated disk space	(Optional) Estimated disk space required by the installed program. This is only an information field.
Estimated run time	(Optional) Estimated time in minutes required to complete the deployment. This is only an information field.
Terminate after	(Optional) Terminates running of the program after the specified number of minutes.
After running	(Optional) Specifies the action to take after running the program. The options are **No action required**, **Restart computer,** and **Log off user**.
Starting window	Specifies the status of the program window when the program is run. The options are **Normal**, **Hidden**, **Minimized**, and **Maximized**.
Run with rights	Specifies whether the program is run with the **System Account**, **Logged in User**, or **Specified User** account. If you select the **Specified User**, you must specify the user's domain, name, and password in the field below.
User domain	Domain information of the account to use if you use **Specified User** in the **Run with Rights** field. Enter the domain, user name, and password of the specified user.
Program can run	Specifies the conditions in which the program can run. The options are: • **Only when a user is logged on** • **Whether or not a user is logged on** • **Only when no user is logged on**

Advanced tab (Virtual Software Package Page)

This tab is used to specify Package Servers associated with a package. For information on Package Servers, see the *Altiris Notification Server Help* and *Altiris Notification Server Reference*.

Advanced tab page items

Item	Description
Agent display name	The name of the package that will be displayed on the Altiris Agent. This can be different than the package name you specified on the **Package** tab. The purpose of this field is for you to be able to supply package names to the end user that makes sense to users while also being able to have package names that make sense to you on an administrative level.
Agent display description	The description of the package that will be displayed on the Altiris Agent. This can be different than the package description you specified on the **Package** tab. It is recommended that you enter a description here that will let the end user know what the package will do to the managed computer.
Enable verbose reporting of package status events	This setting controls whether the Altiris Agent sends all package status events for this package to the Notification Server. Select the check box to enable sending all package status events to the Notification Server. **Note** The **Advanced Settings** in the **Configuration** tab take precedence to this setting. Events are only sent if their corresponding check box is enabled in the **Capture Event Name** section of the **Advanced Settings**. The following types of Status events are not sent if package verbose reporting events are disabled: ● Package Updated ● Package Added ● Package To Be Removed ● Package Removed ● Unable To Check Package ● Insufficient Disk To Download Package ● Download Start ● Download Complete ● Package Download Blocked For information on capturing events in large environments, see "Scalability" in the *Altiris Notification Server Reverence*.

Advanced tab page items (Continued)

Item	Description
Use Alternate Download Destination on Client	Select this to use an alternate package download destination to the managed computer besides the default. This option makes it possible to deliver package files to computers at alternate destinations. When the task executes, the package files will be copied from the internal cache location to the location specified. After they are copied, the copied package files will never be deleted by the Altiris Agent. They will be recopied every time the task is run; so if the task is on a recurring schedule, the files will be copied repeatedly. This can be useful to ensure the user does not delete a required file. **Note** The default of the internal cache location is *install path*\altiris\altiris agent\software virtualization\{package guid}\cache).
Package servers Settings	
All Package Servers	Select this to send the package to all available Package Servers.
Selected Package Servers	Select this to show a table of available Package Servers. You can then choose the Package Servers that you want this package sent to.
Enabled Package Servers	This table lists the Package Servers available for your Notification Server. The **Package Servers** section lets you specify which Package Servers you would like this package to be replicated to. The grid contains a list of all Package Servers that have been created for the Notification Server. Select the box in the enabled column next to each of the Package Servers that you wish this package to be replicated to. The default and recommended option is to have the package replicated to all Package Servers (by selecting **All Package Servers**). All selected computers will have the package copied to them.
Package Destination Location on Package Servers	Enter the desired package destination location on the Package Servers if you do not want the default. Enter a UNC path. The default package delivery location on Package Servers is *install path*\altiris\altiris agent\package delivery\{package guid}\cache).

Software Portal tab (Virtual Software Package Page)

This tab lets you view and modify Software Portal permissions for the programs found in this package.

Note
The Software Portal tab will be visible only if Software Delivery Solution is installed.

The Software Portal is used to manage the availability of software that can be added manually by a user from the managed computer.

The table lists the programs that are currently defined for the package and the state of their Software Portal permissions.

When you click a program in the table, you can see who has permission to install the software without administrator approval (Install Software permission) and who requires administrator approval before installing the software (Install On Approval permission).

When you click the **Modify** button, the Security Descriptor dialog appears. This lets you modify the security settings for the program by group, user, or Altiris role, by defining the Software Portal permissions you desire.

You can use Alert Manager and the Software Portal to retrieve user software requests, approve or deny them, and send out e-mails if required.

For more information about how to use the Software Portal with Software Virtualization Solution, see the Best Practices section of the *Altiris Software Virtualization Solution Reference*.

Checking for Package Download Errors

After deploying packages, we recommend verifying that the packages were deployed successfully. If some packages were not successfully deployed, you need to know on which computers the deployment was not successful. To facilitate this process, Software Delivery provides the "Package download errors" report.

To determine package download errors

1. In the Altiris Console, click the **Reports** tab.
2. In the left pane, select **Reports > Software Management > Software Delivery > Windows > Client Package Download > Package Download - Errors item**.
3. In the right pane, click the **Run this report** link.

A report using the latest data will be created displaying package deployment error information. You can click on items in the report to drill down for more details.

Tip
For other client status information, use the above procedure, but select one of the other reports.

Changing the Check for Updated Package Files Schedule

By default, Notification Server checks all packages every day for changes. You can change this schedule as needed. For information on how software packages are updated, see Package Download Overview (page 76).

To change the check for updated package files schedule

1. In the Altiris Console, click the **Configuration** tab.
2. In the left pane, select **Configuration > Server Settings > Notification Server Settings > Shared Schedules**.
3. In the right pane, click on the **Package Refresh** schedule link.
4. In the Schedule Editor dialog, specify the desired schedule, and click **OK**.

Deploying Virtual Software Packages

Virtual Software Tasks deploy Virtual Software Packages.

Quick Links

Virtual Software Task Overview

Virtual Software Tasks are policies that specify delivery and deployment information about a Virtual Software Package. For a Virtual Software Package to be downloaded to and deployed on the managed computer, there must be at least one Virtual Software Task associated with that package. Each package can have more than one task associated with it, but each Virtual Software Task is only associated with one package.

Virtual Software Tasks have several options on how they are run, depending upon how they are configured. A Virtual Software Task can be run:

- By the user of the managed computer through the Altiris Agent program or Software Portal.
- As soon as possible after the task has been requested by the Altiris Agent and the run conditions are met. The run conditions are specified in the package definition policy on the **Programs** tab. The condition options are **Only when a user is logged on**, **Only when no user is logged on**, and **Whether or not a user is logged on**.
- According to a schedule specified in the Virtual Software Task.

Each Virtual Software Task has availability dates associated with it. These dates specify when a task is first available and no longer available. The Virtual Software Package associated with a task specifies the security context under which a program runs (local system administrator or logged on user rights).

For information on creating a Virtual Software Task, see Manually Creating a Virtual Software Task (page 105).

Virtual Software Task Priority

Each Virtual Software Task has an associated priority that is set in the definition of the Virtual Software Task. The priority is used to set a priority when more than one Virtual Software Task needs to download an associated package. The package associated with the Virtual Software Task having the highest priority is downloaded first.

The Virtual Software Task will also be executed according to their priority order. Each task will be executed to completion before another task is started.

The priority options are **Low**, **Normal**, **High**, and **Very High**.

Virtual Software Task Status Files

The Software Virtualization Solution Agent keeps track of package download status information for each package in a status file. The status is kept here: *install path*\Altiris\Altiris Agent\software virtualization\Status*package guid*\log.xml.

This file keeps track of the last 30 download attempts. This value can be adjusted by editing the registry value "Download history size" located under the key "HKLM\SOFTWARE\Altiris\Communications\Package Delivery" on the client computer.

The Software Virtualization Solution Agent keeps track of package execution status for each task in the *install path*\Altiris\Altiris Agent\software virtualization\AexSWDPolicy.xml file.

Disabled Virtual Software Tasks

If you disable a Virtual Software Task, or it is disabled due to platform mismatch, expiration, filtering, or unavailability, the Software Virtualization Solution Agent will keep that task's status information for 10080 minutes (one week) by default, including any downloaded packages. After one week, the associated status information is removed entirely from the Altiris Agent computer. If the associated packages are no longer referenced by any other active Virtual Software policies on the Altiris Agent, the packages are also removed. (If you re-enable the policy after one week, any associated software packages are downloaded again.) The one-week default can be changed by modifying the software virtualization package and changing the package deletion option.

This cleanup process is performed once a day. For testing purposes, you can force a cleanup within the next 5 minutes by removing the AdsStatusLastCleanUp registry value under the following registry key:

HKLM\Software\Altiris\Altiris Agent\software virtualization

The following registry setting configures how long, in minutes, a Virtual Software Task must be disabled before the status and packages are removed from the Altiris Agent computer.

HKLM\Altiris\Altiris Agent\software virtualization\RemovedSoftPkgsCleanUpPeriod

Creating Virtual Software Tasks

There are three ways to create Virtual Software Tasks:

- Create a new Virtual Software Package and Task (page 84)
- Create a new Virtual Software Task with an Existing Virtual Package (page 102)
- Manually Creating a Virtual Software Task (page 105)

Create a new Virtual Software Task with an Existing Virtual Package

The Software Virtualization Wizard simplifies the steps of delivering existing Virtual Software Packages by setting up tasks to deliver those packages. This is the easiest and most efficient way to set up tasks to deliver packages.

The Software Virtualization Wizard can be accessed by clicking the **Tasks** tab and selecting **Software Management > Software Virtualization > Windows > Virtual Software Tasks > Wizard and Status** and clicking **Run Software Virtualization Wizard**.

You can also select to **Use the advanced wizard**. When running the Advanced Wizard, you also have the option to configure package server options, event logging options, the package display name in the Altiris Agent, and task download and execute options. For a description of these options, see Advanced tab (Virtual Software Package Page) (page 98) and Advanced tab (Virtual Software Task Page) (page 109).

In this scenario, you will deliver an existing Virtual Software Package. For instructions on using the wizard to create and delivery a new package, see Create a new Virtual Software Package and Task (page 84).

Step 1 - Select Package Options

In this step, you select that you want to deliver an existing package and select the package you want to deliver.

How would you like to begin?

Select **Deliver an existing virtual package**.

1. Select an existing virtual package.

   The existing packages in the default package location are displayed. If you have not yet created the package you want to deliver, see Creating and Using Notification Server Virtual Software Packages (page 93).

2. Verify package details.

   Verify that this is the package you want by observing the name, description, and location of the package.

3. Select a program to run from within the package.

   Select a program that has been attached to the package. If the program you want to run is not attached to the package, you must cancel this wizard and edit the package. For information about package programs, see Creating Virtual Software Packages (page 93).

4. Click **Next** to go to Step 2 in the wizard.

Step 2 - Select Collection and Schedule

In this step, you select the collection of computers to which you want the package of software to be delivered. Next, you select when you want it delivered.

Note
This step lets you set up a Virtual Software Task to deliver the package.

1. (Required) Select the collection to which the package will be delivered.

   You can only select one collection per Virtual Software Task. If you want to send the package to more than one collection, you can either create a collection which includes all collections to which you want to send the package or you can run the Software Virtualization Wizard again.

2. Select when to run this task.

   - **Manual**

User must manually activate the task on the target computer.

If this is selected, the task will not run on the target computer unless the user activates it manually.

- **On a Schedule**

  If this is selected, the task will run automatically on the target computer.

  For information on scheduling options, see General tab (Virtual Software Task Page) (page 106).

3. Click **Finish** to go to Step 3 in the wizard.

Step 3 - Advanced Settings

If you selected the **Use the advanced wizard** option, you can configure package server options, event logging options, and advanced task options.

Configure package options

1. Configure the package server and event logging options.

   For a description of these options see Advanced tab (Virtual Software Package Page) on page 98

2. Click **Next** to go to Step 4 in the wizard.

Configure advanced task options

1. Specify the name and description of the virtual task this is displayed on the Altiris Agent UI.
2. Specify download and execute options.

   For a description of these options see Advanced tab (Virtual Software Task Page) (page 109).

3. Click **Finish** to go to Step 4 in the wizard.

Step 4 - Summary

In this step, you enter a name for your task, review your settings, and then click the **Finish** button.

In this step, you enter your task, package, and program names. Next, you review your settings, and click the **Finish** button.

1. Enable or disable the Virtual Software Task.

   If the checkbox is selected, the Virtual Software Task will be enabled when it is created. Virtual Software Tasks must be enabled before they can be run.

2. Enter the name for the Virtual Software task.

   This is the name of the task as it appears in the Altiris Console. You can use the default name or use your own.

3. Verify the information in the table and click **OK**.
4. Click **OK**.

   This creates the Virtual Software Package and attaches the selected package to the task.

The task will be run according to your scheduling options.

The task is available under the **Tasks** tab > **Software Management > Software Virtualization > Windows > Virtual Software Tasks**.

Manually Creating a Virtual Software Task

For general information on Virtual Software Tasks, see Deploying Virtual Software Packages (page 101).

Note
To quickly create a new Software Virtualization Package and Task at the same time, use the Software Virtualization Wizard. For information, see Creating Virtual Software Packages (page 93).

To create a Virtual Software Task

1. In the Altiris Console, click the **Tasks** tab.
2. In the left pane, select **Tasks > Software Management >Software Virtualization > Windows**.
3. Right-click the **Virtual Software Tasks** folder and select **New > Virtual Software Task**.
4. In the right pane, specify the Virtual Software Task details.

   For information about task properties, see Virtual Software Task Page (page 105).

If you want to verify that a Virtual Software Task has been deployed properly, see Verifying that a Policy Has Been Successfully Delivered to the Altiris Agent Computer (page 111).

Virtual Software Task Page

This page lets you configure Virtual Software Tasks. It contains the following three tabs:

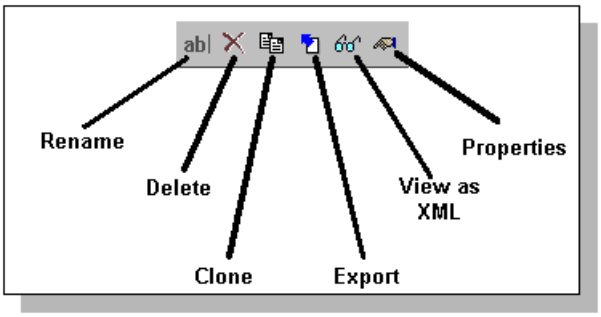
- General tab (Virtual Software Task Page) (page 106)
- Advanced tab (Virtual Software Task Page) (page 109)
- Status tab (Virtual Software Task Page) (page 110)

To access a Virtual Software Task page

1. In the Altiris Console, click the **Tasks** tab.
2. In the left pane, select **Tasks > Software Management > Software Virtualization > Windows > Virtual Software Tasks**.

Virtual Software Task Toolbar

The Virtual Software Task toolbar contains icons which let you perform actions while using the Virtual Software Task page.



The clickable icons on the Virtual Software Task toolbar are as follows:

- **Rename** - Lets you quickly rename the Virtual Software Task.
- **Delete** - Lets you quickly delete the Virtual Software Task.
- **Clone** - Lets you clone the Virtual Software Task.
- **Export** - Lets you export the Virtual Software Task to XML.
- **View as XML** - Lets you view the Virtual Software Task as XML.
- **Properties** - Lets you view the **Properties** page of the Virtual Software Task. The **Properties** page contains general information of the task and also lets you set up security for the task.

General tab (Virtual Software Task Page)

General tab page items

Item	Description
Enable	Enables the Virtual Software Task when selected. Disables the Virtual Software Task when cleared.
Name	Name of the Virtual Software Task.
Description	Description of the Virtual Software Task.
Priority	Defines the order in which packages associated with Virtual Software Task are downloaded. Can be **Low, Normal, High** or **Very high**. Packages associated with higher priority Virtual Software Task get downloaded before those for lower priority Virtual Software Task. Any package that is being downloaded will be suspended if a higher priority Virtual Software Task arrives.
Package name	Specifies the package to be used by the Virtual Software Task. Clicking on the link will open the Package Selector.
Go to Package	Opens the Package page for the package selected in the **Package Name** field.
Program Name	Name of the program to run. The list of available options in the drop-down list depends on the value selected in the **Package** field.
Go to Program	Opens the Program page for the program selected in the **Program name** field.

General tab page items (Continued)

Item	Description
Applies to Collection	Specifies the collection to which the software task applies. Clicking on the link will open the Collection Selector. **Note** You must select at least one collection before you can apply the Virtual Software Task.
Run - Manual	Select manual to run the software virtualization task manually and not according to a schedule. You can choose one or both of the following: **Notify the user when this task is available** - Select this to notify the user when this Virtual Software Task becomes available to run. The user can then control when to run the Virtual Software Task. **Warn the user before running this task** - Select this to warn the user before a software virtualization task is run. The user can then choose to cancel the task, run the task immediately, or be reminded later.

General tab page items (Continued)

Item	Description
Run - On a schedule	Specifies that the software virtualization task is to be run according to a schedule. You can schedule for the software virtualization task to be run as soon as possible and/or set up a schedule for it to be run. You can choose one or more of the following: **Run as soon as computer is notified (only runs once)** - Select this to run the software virtualization task as soon as the package has been downloaded to the managed computer and the run conditions have been met. This option creates a mandatory software virtualization task that does not display a dialog on the managed computer before running. **Run on a schedule** - Select this to run the software virtualization task on a schedule. Click **No schedule has been defined** to open the **Schedule Editor**. Select one of the following: • **Run 'as soon as possible' after the scheduled time** - This option tells the Altiris Agent to run the software virtualization task as soon as possible after the time you have scheduled. The Altiris Agent will wait until the scheduled time, then run the software virtualization task as soon as it can. This option can help spread out the network load as the software virtualization tasks will most likely run at different times on each Altiris Agent. • **Only run at scheduled time** - This option tells the Altiris Agent to run the software virtualization task only at the scheduled time. This option will force all Altiris Agents to run the software virtualization task at the same time. **Power up the computer (Wake on LAN)** - Select this to send a power up signal to the managed computer at the designated scheduled time. **Immediately notify each computer of task** - Select this to immediately notify all computers of the software virtualization task at the designated scheduled time. This can lead to increased network traffic and should be used carefully. **User can run this task immediately** - Select this to let the user run the software virtualization task immediately when it becomes available. **Notify the user when this task is available** - Select this to notify the user when this software virtualization task becomes available to run. The user can then control when to run the software virtualization task. **Warn the user before running this task** - Select this to warn the user before a software virtualization task is run. The user can then choose to cancel the task, run the task immediately, or defer the task.
Use Recovery to backup the computer	If this is selected, Software Virtualization Solution performs a Recovery snapshot on the Altiris Agent prior to running the software virtualization task. **Note** This option only appears if you have Recovery Solution 6.0 or greater installed.

General tab page items (Continued)

Item	Description
Removal - Remove this task after successful install	Removes the software virtualization task (and associated package) from the Altiris Agent user interface on the managed computer. This does not delete the package from the managed computer. However, this makes it so that the user of the managed computer cannot view this task or associated package from the Altiris Agent program. We recommend that you use this for tasks that you only want to run once.
Availability	Specifies the date that this software virtualization task becomes available and whether or not it expires. You can also select whether to use the Notification Server's time or the time of the managed computer.
Apply	Click **Apply** to save changes.
Cancel	Click **Cancel** to discard changes.

Advanced tab (Virtual Software Task Page)

Advanced tab page items

Item	Description
Agent display name	Specifies the name of the software virtualization task that is displayed on the Altiris Agent. You can leave this blank and the default name will be used.
Agent display description	Specifies the description of the software virtualization task that is displayed on the Altiris Agent.

Advanced tab page items (Continued)

Item	Description
Enable verbose reporting of task status events	Select this to track all status events for this task. The status events are added to the log files.
Download and Execute Options	These options control how software virtualization packages are downloaded and executed. The default is to use the Altiris Agent settings found on the Altiris Agent Settings page. **Note** If you choose **Use the following settings when downloading and running**, these options override the default **Download and Execute Options** (found on the Altiris Agent Settings page) for this software virtualization task. ● **Download the package files as soon as possible** - Select this to download the package files right away. ● **Download the package files before running the program** - Select this to download the package files only when the program is required to run. **Multicast package** - Select this to multicast this package to other client computers receiving the same package **Note** Multicasting must be enabled for a computer to participate in a multicast session. This is a configuration setting option available in each computer's Altiris Agent. This option can be found under **Configuration > Altiris Agent > Altiris Agent Configuration > Collection Group > Altiris Agent Settings > Package Multicast**. For information about multicasting, see the Altiris Agent Settings page and the associated Notification Server and Software Delivery Solution help.

Status tab (Virtual Software Task Page)

The **Status** tab displays details about the execution of the task on the managed computers.

Status tab page items

Item	Description
Display computers on which this task ran	Specifies the criteria for displaying computers on which the software virtualization task ran. When you select an item from the drop-down list, a table is displayed with status information.

Verifying that a Policy Has Been Successfully Delivered to the Altiris Agent Computer

To verify that a policy has been successfully delivered to an Altiris Agent computer using the Resource Manager

1. Open the Resource Manager to display information about the desired Altiris Agent computer.

   For information on using the Resource Manager, see the *Altiris Notification Server Reference*.

2. In the left pane, click the **Policy Summary** item.

   A list appears of all the policies that are enabled for the selected computer.

3. Verify that the policy you are checking for is in the list.

To verify that a policy has been successfully delivered to the Altiris Agent computer

1. In Windows Explorer or through **My Computer**, open the *install path*\Altiris\Altiris Agent\Client Policies folder (C:\Program Files\Altiris\Altiris Agent\Client Policies by default).

   This is where policies are stored on the Altiris Agent.

2. Using a text editor or Internet Explorer, open the *notification_server_name*.xml file.

3. Review the contents of the policy file and confirm that the policy you are interested in is included in the file.

Using the Software Virtualization Status Page

The Software Virtualization Status page is available when Software Delivery Solution is installed.

Note
For information on using the Software Virtualization Wizard, see Creating Virtual Software Packages (page 93).

The **Wizard and Status** page gives you access to the Software Virtualization Wizard and also provides status information for your software virtualization tasks.

To access the Wizard and Status page

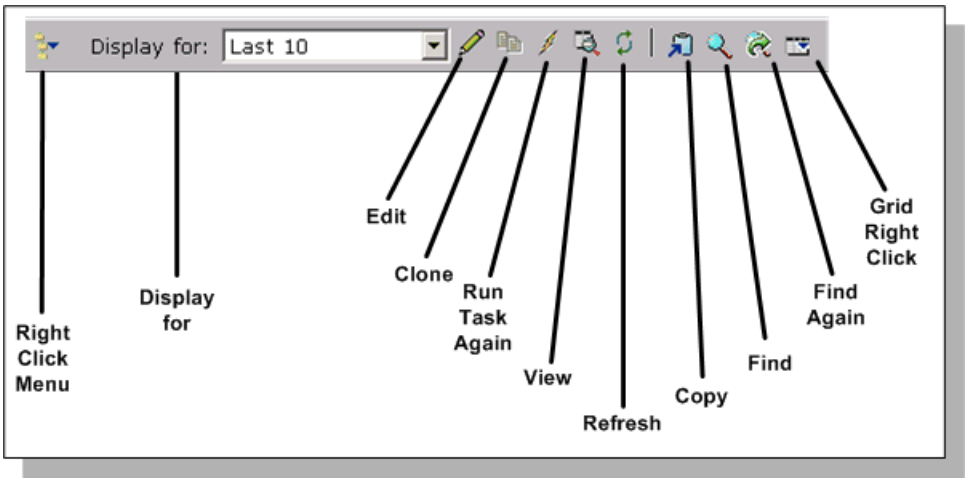
1. In the Altiris Console, click the **Tasks** tab.
2. In the left pane, select **Tasks > Software Management > Software Virtualization > Windows > Virtual Software Tasks > Wizard and Status**.

Page Items

Item	Description
Run Software Virtualization Wizard	Select this to access the Software Virtualization Wizard.
Use the Advanced Wizard	Select to run the Advanced Wizard.
Task list criteria check boxes:	Specifies the criteria for displaying available software virtualization tasks. When you select an item from the drop-down list, a table is displayed with task information.
Created for approved software	Select this to display tasks that have been approved by the administrator.
Created for software requiring approval	Select this to display tasks that require approval by the administrator.
Scheduled by administrator	Select this to display tasks that have been scheduled by the administrator.

Software Virtualization Status Toolbar

The Software Virtualization Status toolbar contains icons which let you perform actions while using the Wizard and Status page.



The clickable icons on the Software Virtualization Status toolbar are as follows:

- **Right click menu -** Provides a shortcut for the right click menu for the item.
- **Display for** - Lets you select which tasks are displayed by age, number of rows, or status.
- **Edit** - Lets you edit the task.
- **Clone Failed Task** - Creates a copy of this task for the computers where it failed. Enter the name for the new copy and then click **OK** to create the copy.
- **Run Task Again** - Runs the task again.
- **View task status details** - Lets you view the success, failure, and not-run details of the task.

- **Refresh** - Refreshes the grid. Changes made to the grid will not appear until you perform a refresh.
- **Copy** - Creates a copy of selected task row to paste elsewhere.
- **Find** - Lets you search for a task in the table. Enter the search text in the **Find** field and then click the **Find** button.
- **Find Again** - Finds the next task based on the last search criteria you entered in **Find**.
- **Grid right click menu** - Provides a shortcut for the right-click menu for the selected row.

See Creating Virtual Software Packages (page 93).

Managing Virtual Software Packages using the Resource Manager

You can use the Resource Manager to manage the state of Virtual Software Packages installed on client computers. You can do this in one of two ways:

From the computer resource	Open a computer resource and view and manage the state of Virtual Software Packages on the computer.
From the Software Package resource	Open a Virtual Software Package resource and view and manage it on the computers it is deployed to.

If you change the state of the Virtual Software Package for a client computer, the following is automatically done:

- A new Virtual Software Package is created with the program set to run the package in the specified state.
- A new collection is created for that computer resource based on the package and state.
- A new Virtual Software Task is created using the new package and collection.

By default, the new task is enabled, assigned to the new collection, and scheduled to run once, as soon as the computer is notified.

To manage Virtual Software Packages on a computer resource

You can view all the Virtual Software Packages imported on a client computer and manage their states.

1. In the Resource Manager, right-click a computer and click **Manage Virtual Software Packages**.

   A list of Virtual Software Packages imported on the computer is displayed along with the current state.

2. To change the state of a package, click the state next to the package you want to modify, and select the new state from the drop-down list.

To manage Virtual Software Packages on the computers with the package installed

You can view all the computers that a Virtual Software Package is installed on and modify the state of that Virtual Software Package on those computers.

1. In the Resource Manager, right-click a Virtual Software Package and click **Manage this Package**.

   A list of client computers with this package installed appears.

2. To change the state of the package, click the state next to the computer you want to modify, and select the new state from the drop-down list.

Note
For a list of package states, see Software Virtualization Solution Usage Overview (page 77).

Using the Software Portal

If you also have Software Delivery Solution installed, you can use the Software Portal to let users install software on their computers by executing software virtualization programs for which they have been given permission by the administrator.

Using Notification Policies and Automated Actions

Software Virtualization Solution supplies Notification Policies that provide active reporting for the Altiris Agent.

Notification Policies automatically notify you when certain conditions exist. Notification Policies can be set on something as simple as a single software virtualization failure or specific set of conditions across multiple computers. Automated responses include sending of e-mail, running corrective commands and scripts, generating SNMP traps, and automatically generating a report and e-mailing you the URL of the report.

The automatic actions that can be taken by a Notification Policy are defined by Automated Actions. Several Automated Actions can be associated with a single Notification Policy. For more information on Automated Actions, see the *Altiris Notification Server documentation*.

The following table lists and describes the predefined Notification Polices.

Policy	Description
Package Download May Be Too Late	Sends an e-mail containing a web report, which summarizes the computers where the package download might not be in time. You can adjust the percent download and the number of days warning (**Day Filter**). Example: Report computers with less than 60 percent download and 4 days before mandatory first execution. This policy applies only to Virtual Software Tasks with mandatory schedules other than ASAP. **Note** If you change the notification policy schedule, you must change the **Days Filter** parameter to match the interval.

Policy	Description
Program Execution Failed	Sends an e-mail containing a web report summarizing failed program execution. **Note** If you change the notification policy schedule, you must change the **Days Filter** parameter to match the interval.
software virtualization Task Completed	Sends an e-mail notification when a Virtual Software Task has run successfully (at least once) on all of the targeted computers. Both mandatory and optional Virtual Software Tasks are reported. **Note** If you change the notification policy schedule, you must change the **Days Filter** parameter to match the interval. **Note** Virtual Software Tasks with a repeating schedule will be continually reported.
software virtualization Task Expired	Sends an e-mail notification when a Virtual Software Task has expired and not all of the targeted computers have successfully run the program. Both mandatory and optional Virtual Software Tasks are reported. **Note** If you change the notification policy schedule, you must change the **Days Filter** parameter to match the interval.
software virtualization Task Expires In Less Than 7 Days	Sends an e-mail notification when a Virtual Software Task is about to expire and not all of the targeted computers have successfully run the program. Both mandatory and optional Virtual Software Tasks are reported. **Note** If you change the notification policy schedule, you must change the **Days Filter** parameter to match the interval.

You can also create your own notification policies using the Notification Policy template. For more information on creating notification policies, see the *Altiris Notification Server Reference*.

Note
It is possible for multiple policies to monitor the same event. If you have more than one policy monitoring the same event, use caution so that the actions taken by the policies do not conflict with each other. Example: If two policies monitor the same event and the action taken by each policy is to add a log entry in the Notification database, you will have duplicate entries in your database.

Part IV
Using Software Virtualization Solution in a Deployment Solution Environment

Chapter 11
Using Software Virtualization with Altiris® Deployment Solution™

You can use Altiris® Deployment Solution™ to install the Software Virtualization Agent on managed computers and deploy and manage Virtual Software Packages (VSPs) on managed client computers.

This chapter describes the following tasks:

Using Deployment Server to Install the Software Virtualization Agent

This procedure explains how to install the Software Virtualization Agent on client computers managed by Deployment Solution.

Note
By default, the managed computer is restarted after the Software Virtualization Agent is installed.

To install the Software Virtualization Agent using a job

1. On your Deployment share, create a folder to store the agent and Virtual Software Archive (VSA) files.

   Example:

   Create a folder named SVS with subfolders named Agent and VSAs, such as \\servername\eXpress\SVS\Agent\

2. Copy the Software_Virtualization_Agent.msi file into the folder that was just created.
3. Open the Deployment Console and create a new job. Example: Name the job, "Install SVS Agent and Restart".
4. Add a "Distribute Software" task to the job.
5. In the task, browse to the Software_Virtualization_Agent.msi file and select it as the file to deploy.
6. Select the "Run in quiet mode" checkbox.
7. Under the **Additional command-line switches** add the following:

PRODUCT_KEY=<*product key*>

For information about agent installation command line options, see Software Virtualization Agent Installation (page 65).

8. In the Code box, enter 1641.

   To see the definition of this exit code open a command prompt and type "net helpmsg 1641". It is a success code, but it is not recognized by DS as one.

9. Click **Finish**.

10. After configuring the job, drag the job onto the managed computer and click **OK**.

Copying Virtual Software Archive Files to Deployment Server

To deploy a Virtual Software Package (VSP), you must export the VSP to a Virtual Software Archive (VSA). For information on creating VSAs, see Getting Started with Virtual Software Layers and Archive Files (page 24). You must then make the VSA available to the Deployment Server. The easiest way to do this is to copy the VSA files to your Deployment Server.

To copy Virtual Software Archive files to Deployment Server

1. We recommend creating a unique location on your Deployment share to store your VSAs.

   Example:

   \\servername\eXpress\SVS\VSAs\

2. Under the VSAs folder, create a subfolder for each VSA.

   Example:

   \\servername\eXpress\SVS\VSAs\AcrobatReader7

   \\servername\eXpress\SVS\VSAs\Firefox 1.5

3. Copy the VSA files to the appropriate folders on your Deployment share.

Using Deployment Server to Deploy VSPs

This procedure explains how to create a job in Deployment Server to import a VSA and set it to activate on start.

To deploy a VSP using a job

1. From the Deployment Console, create a new job. Example: Acrobat Reader 7.

2. Under the job folder, create a new Copy file task.

   Example: Acrobat Reader 7: Import and Set Activate on Start.

3. Enter the source path where the VSA is stored on the share.

4. Enter a destination path for the VSA to be copied on the managed computer. Example: C:\windows\temp.

5. Click **Finish**.

6. Create a new Run Script task inside of the job to call the SVS command-line interface.

   Example:

   SVSCMD.exe I -P "C:\windows\temp\AcrobatReader7.vsa"

   SVSCMD.exe "AcrobatReader7" AUTO -Y

   For a list of available command-line options and information on how to use them, see Using SVSCMD Command-line Parameters (page 51).
7. Select **Windows** as the script operating system.
8. Click **Next**.
9. Click **Finish**.
10. Drag and drop the computer on the job.
11. In many cases, depending on the application, after the job has completed, the managed computer may need to be restarted. You can do this using Deployment Server power controls.

Using Deployment Server to Manage VSPs

You can also use jobs to manage VSPs, such as resetting, deactivating, and deleting.

To manage VSAs using a job

1. Create a new job. Example: Acrobat Reader 7: Reset.
2. Create a new Run Script task inside of the job to call the SVS command-line interface.

   Example: To reset the VSP, use the following script:

   SVSCMD.exe "AcrobatReader7" RESET -F

   You can use a wide variety of command-line options. For a list of available command-line options and information on how to use them, see Using SVSCMD Command-line Parameters (page 51).
3. Select **Windows** as the script operating system.
4. Click **Next**.
5. In the Script Window option, select **Hidden**.
6. Click **Finish**.
7. Drag and drop the client computer onto the job.

Using Deployment Server to Uninstall the Software Virtualization Agent

This procedure describes how to uninstall the Software Virtualization Agent from a managed computer using Deployment Server.

To uninstall the Software Virtualization Agent using a job

1. Under the job, create a new Copy file task.

   Example: Uninstall SVS Agent and Restart.

2. Enter the source path where the VSA is stored on the share.
3. Enter a destination path for the file to be copied on the managed computer. Example: C:\windows\temp.
4. Click **Finish**.
5. Add a run script task to the job to execute the following script:

   Msiexec.exe /x c:\windows\temp\Software_Virtualization_Agent.msi /q

6. Select **Windows** as the script operating system.
7. Click **Next**.
8. In the Script Window option, select **Hidden**.
9. Click **Next**.
10. At the Return Codes screen, click **Add**.
11. In the Code box, enter 1641.

    To see the definition of this exit code open a command prompt and type “net helpmsg 1641". It is a success code, but it is not recognized by Deployment Server as one.

12. Change the Response to **Continue and Result to Success**.
13. In the Status box, enter “SVS Agent removed, machine restarting”.
14. Clear the “Add to Master return code list” checkbox.
15. Click **OK**.
16. Click **Finish**.
17. Drag the computer to the job.

Part V
Software Virtualization Solution Technical Reference

Chapter 12
Software Virtualization Solution Technical Reference

This chapter provides additional Technical Reference information about Software Virtualization Solution (SVS).

Layer Attributes

The attributes section contains the layer attributes for the registry redirection area.

Attribute	Description
ActivateTime	The date and time at which the sublayer was last activated (value = binary_date_time)
Active	The sublayer is currently inactive (value = 0) or the Read-only sublayer is active (value = 1)
ActiveOnStart	The sublayer is active on system start (value = 1)
CreateTime	The date and time at which the layer was created (value = binary_date_time)
Enabled	Deprecated entry, not used
FileRedirect	The path to the sublayer's file redirect area (value = Root:\Fslrdr\sublayer_folder_number)
ID	The sublayer's globally unique identifier (GUID) (value = guid)
MajorVersion	Combines with MinorVersion to indicate the sublayer's format: either blah (value = 0), blahblah (value = 1), or blahblahblah (value = 2)
MinorVersion	Combines with MajorVersion to indicate the sublayer's format: either blah (value = 0), blahblah (value = 1), or blahblahblah (value = 2)
Name	The layer's name; by default, the name of the SVP (value = layer_name)
PeerID	The GUID for the sublayer's companion sublayer (value = companion_sublayer's_guid)
ReadOnly	The sublayer's writeable status; either read-only (value = 1) or writeable (value = 0)
RefreshTime	The date and time at which the layer was last reset (value = binary_date_time)
RegRedirect	The location of the layer's registry data (value = SOFTWARE\fslrdr\sublayer_folder_number)

Attribute	Description
Type	The layer's type: read-only (value = 1), writeable (value = 1), or data layer (value = 2)
ShouldDelete	(Optional) Indicates that Fslx.sys is lazily deleting the sublayer (value = 1)

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