

# VMware App Volumes User Guide

VMware App Volumes 2.10

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# About This Book

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The *VMware App Volumes User Guide* provides information about how to deploy and configure VMware App Volumes infrastructure.

This guide also provides guidance on creating, managing and deploying AppStacks to users managing user assignments, volume creation, storage and infrastructure with the App Volumes Manager.

## Intended Audience

This information is intended for VMware App Volumes administrators, virtual infrastructure administrators, and operations engineers who track and maintain the App Volumes infrastructure.

## VMware Technical Publications Glossary

VMware Technical Publications provides a glossary of terms that might be unfamiliar to you. For definitions of terms as they are used in VMware technical documentation, go to <http://www.vmware.com/support/pubs>.



# About VMware App Volumes

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VMware App Volumes is a real-time application delivery system that enterprises can use to dynamically deliver and manage applications.

Applications are centrally managed and delivered to desktops through virtual disks. There is no need to modify desktops or applications and the App Volumes solution can be scaled out easily and cost-effectively, without compromising end-user experience.

This chapter includes the following topics:

- [“VMware App Volumes Features,”](#) on page 7
- [“VMware App Volumes Components,”](#) on page 8
- [“App Volumes Operation Modes,”](#) on page 10
- [“Types of Hypervisor Connections,”](#) on page 10

## VMware App Volumes Features

VMware App Volumes provides a seamless end-user experience while reducing infrastructure and management costs.

Unlike traditional application management solutions, VMware App Volumes provides a stateless desktop without compromising user experience. In a virtual desktop environment, it provides several benefits.

### Real-Time Application Delivery and Management

App Volumes allows administrators to dynamically deliver applications to end-users in seconds. It eases application management and eliminates packaging, modifying, or streamlining applications.

- Instantly provision applications at scale
- Dynamically attach applications to users, groups, or target computers, while users are logged in to their desktop
- Provision, deliver, update, and retire applications in real-time

### Agility

- Logically manage application sets based on business needs
- Deliver and integrate application sets across all virtual desktops

### Simplicity

- Integrate into existing infrastructure

- Provision applications as easily as installing them

## Flexibility

- Persistent user experience with non-persistent economics
- Works with VMware Horizon with View and Citrix XenApp

## Efficiency

- Optimize the use of storage, SAN, IOPS, and network
- Reduce base image size and variations

# VMware App Volumes Components

A typical VMware App Volumes environment consists of a few key components that interact with each other and external infrastructure.

### AppStack

This is a read-only volume containing one or more Windows applications. AppStacks are created by using the App Volumes Manager and the provisioning process. Once provisioned, an individual AppStack or multiple AppStacks can be mapped to a user, a group of users or computers at login, or in real time.

### Writable Volume

Optional read/write volume for persisting user-specific information between sessions. Writable volumes can be used to store the following:

- User installed applications and application settings
- Application licensing information
- User and computer profile
- Data files

Users can have more than one writable volumes assigned to them. However, a user can use only one writable volume at any given time.

### App Volumes Manager

App Volumes Manager is a core component that is installed on Windows Server and consists of services that orchestrate application delivery and interface with IT infrastructure.

- Orchestrates the required infrastructure components such as Storage, Active Directory, and volume attachments.
- Manages assignments of volumes to users, groups, and target computers.
- Collects AppStacks and writable volumes usage information.
- Maintains history of administrative actions.
- Acts as a broker for the App Volumes agents for automated assignment of applications and writable volumes during desktop startup and user login.
- Provides graphical user interface to create and manage the environment.

### App Volumes Agent

A software component that is installed on computers running supported versions of Windows server for RDSH use cases or Windows desktop operating systems where users receive AppStack and writable volume assignments. The agent runs as a service and utilizes a filter driver to handle

application calls and file system redirects to AppStack and writable volume virtual disks. Windows desktops do not have to be members of the domain on which the App Volumes Manager server resides when they are used for AppStack provisioning.

**App Volumes Manager Console**

Web console for administration and configuration of App Volumes and assignment of AppStacks and writable volumes. Web Console is installed as a part of App Volumes Manager.

**App Volumes Database**

A Microsoft SQL server database that contains configuration information for AppStacks, writable volumes, users, computers, assignments, and transactions.

**App Volumes User**

Active Directory (AD) user account or organizational unit (OU) to which AppStacks and writable volumes are assigned.

**Storage Group**

You can use Storage Groups to automatically replicate AppStacks or distribute writable volumes across many datastores. They are also used to define a group of datastores that should all contain the same AppStacks. Some of the attributes for the group, such as template location and strategy, only apply when using the group for distributing writable volumes. The distribution strategy setting controls how writable volumes are distributed across the group.

- Spread. Distribute files evenly across all the storage locations. When a file is created, the storage with the most available space is selected.
- Round Robin. Distribute files by sequentially using the storage locations. When a file is created, the storage with the oldest used time is selected.

You can manage the capabilities of storage groups by selecting required storages and ignoring unwanted or slow-performing storages while mounting volumes. When you mark a storage as Not Attachable, the App Volumes Manager ignores it while mounting volumes.

For example, you can set up two vCenter Server server instances. Each server can have a local storage and shared storage capability. You can mark the slower-performing storage as Not Attachable. This storage is ignored by the App Volumes Manager while mounting volumes and can be used solely for replication of AppStacks.

**Provisioning Computer**

A computer that includes operating system, any necessary updates and service packs, and has required core applications installed. This computer acts as a master device that is used to install new applications to the AppStack. The provisioning computer must have the App Volumes agent installed and configured to connect to the App Volumes Manager.

**Target Computer**

A VDI desktop, physical client computer, Remote Desktop Services Host or Citrix XenApp Server where users are logging in to access their applications delivered from the AppStack. The Target Computer must have the App Volumes agent installed and configured to connect to the App Volumes Manager.

## App Volumes Operation Modes

App Volumes has two operation modes. These modes define how AppStacks and writable volumes are stored and used.

### **VMDK Direct Attach Operation Mode**

The preferred operation mode for App Volumes. In this mode, AppStacks and writable volumes are stored within a hypervisor datastore as VMDK files and are attached to the virtual machine using standard hypervisor functionality.

### **VHD In-Guest Operation Mode**

In this operation mode, AppStacks and writable volumes are stored on a standard Common Internet File System (CIFS) file share in VHD file format and attached to the target computer using operating system functionality.

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**NOTE** Once you configure the hypervisor connection type or select the operation mode, you cannot change it without reinstalling the App Volumes Manager and clearing the App Volumes database.

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## Types of Hypervisor Connections

The type of hypervisor connection determines the operation mode for App Volumes.

App Volumes supports three hypervisor connection types.

- **VMware vCenter Server.** This is a preferred connection type for mid-to-large environments. This connection type enables the use of VMDK Direct Attached operation mode . When using this connection type, you can assign AppStacks and writable volumes to the virtual machines running on multiple hypervisor hosts.
- **Single ESXi Host.** This connection type also enables the use of VMDK Direct Attached Operation Mode, but only for a single ESXi host. Use this connection type for small deployments and proofs of concepts. When using this connection type, you can assign AppStacks and writable volumes to the virtual machines running on a single hypervisor host.
- **VHD In-Guest Services.** This connection type disables hypervisor connection and enables the use of VHD In-Guest operation mode. Use this connection type to assign AppStacks and writable volumes either to virtual machines running on an unsupported third-party hypervisor or to the physical computers.

# System Requirements

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You must verify that your system meets the requirements for installing VMware App Volumes.

This chapter includes the following topics:

- [“Software Requirements,”](#) on page 11
- [“Hardware Requirements,”](#) on page 12
- [“User Accounts and Credentials,”](#) on page 13

## Software Requirements

Ensure that your system meets certain database and browser requirements when working with App Volumes.

### Database Requirements

App Volumes Manager supports different versions of the Microsoft SQL database.

- SQL Server 2012 SP1, Express, Standard, and Enterprise editions
- SQL Server 2008 R2 SP2, Express, Standard, Enterprise, and Datacenter editions

For high availability, the database features that are supported by App Volumes are:

- SQL Server Clustered Instances
- SQL Server Mirroring

### Browser Requirements

Use a supported browser to manage VMware App Volumes using App Volumes Manager console.

- Internet Explorer 9 or later
- Mozilla Firefox 28 or later
- Safari 5.1 or later
- Google Chrome 21 or later

## Hardware Requirements

Hardware requirements for App Volumes include requirements for App Volumes management server, agent, and networking.

**Table 2-1. Infrastructure Requirements**

Component	Details
App Volumes Management Server	<ul style="list-style-type: none"> <li>■ Microsoft Windows Server 2008 R2, Standard, Enterprise, or Datacenter editions</li> <li>■ Microsoft Windows Server 2012 R2 Standard and Datacenter editions</li> <li>■ .NET 3.5 framework</li> <li>■ 2 vCPU required, 4 vCPU recommended</li> <li>■ 4 GB RAM</li> <li>■ 1 GB Disk Space</li> </ul>
App Volumes Agent (client OS)	<ul style="list-style-type: none"> <li>■ Microsoft Windows 7 Professional (Microsoft Hot fix 2614892 applied) and Enterprise editions</li> <li>■ Microsoft Windows 8.1 Professional and Enterprise</li> <li>■ Microsoft Windows 10 Professional and Enterprise</li> <li>■ Both 64-bit and 32-bit versions of OS are supported</li> <li>■ 1 GB RAM</li> <li>■ 5 MB Disk Space</li> </ul> <p><b>NOTE</b> Ensure that you disable the GPO Control Read and Write Access to Removable Devices or Media option.</p>
App Volumes Agent (RDSH)	<ul style="list-style-type: none"> <li>■ Microsoft Windows Server 2008 R2 Standard, Enterprise, and Datacenter editions</li> <li>■ Microsoft Windows Server 2012 R2 Standard and Datacenter editions</li> <li>■ 1 GB RAM</li> <li>■ 5 MB Disk Space</li> </ul>
VMware software for VMDK Direct Attached Mode (Preferred)	<ul style="list-style-type: none"> <li>■ VMware ESXi 5.5.x, 6.x and vCenter Server (ESXi and vCenter Server must be the same version)</li> <li>■ VMware Horizon with View 6.0.1 or later</li> </ul>
CIFS file share if using VHD mode	SMB version 3.02 (Windows Server 2012 R2) is recommended for a better performance
Active Directory	Microsoft Active Directory domain, Microsoft Windows Server 2003 functional level or later

**Table 2-2. Networking Requirements**

Component	Purpose	Port number
App Volumes Manager	Agent and Manager communications	<ul style="list-style-type: none"> <li>■ TCP 80 (HTTP)</li> <li>■ TCP 443 (HTTPS)</li> <li>■ TCP 5985 for PowerShell Web services</li> </ul>
App Volumes SQL Database	Database communication	TCP 1433 (SQL)

## User Accounts and Credentials

You can create and manage accounts for local users, Active Directory users and groups.

### User Accounts

You can create user accounts and grant privileges for different roles.

- Local administrator privileges are required to install App Volumes components on target servers. If you plan to use writable volumes in combination with user-installed applications, end users must have local administrator privileges on target computers to install such applications. AppStack provisioning process requires the provisioning user to have local administrator privileges on the provisioning computer.
- To integrate App Volumes with vCenter Server, you need to create a service account within a vCenter Server with administrator privileges. Optionally, you can create a service account with privileges granted by a custom user role.
- If you plan to use direct connection to ESXi host or plan to use Mount to Host option with vCenter Server connection, you need to have credentials of the user account that have administrator privileges on all ESXi hosts.

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**NOTE** user names must contain only ASCII characters.

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### Active Directory Credentials

The App Volumes Manager connects to the Active Directory using the service account. To prepare for installation you must create an account within the Active Directory domain that meets the following requirements:

- Provides read access to the Active Directory domain. Administrator privileges are not required.
- Password for the service account does not expire.

The App Volumes Manager fully supports trusted Active Directory domains if they are configured for two-way trust. If your environment contains domains that are configured for one-way trust and that does not trust the primary App Volumes domain, you can configure separate credentials to access these domains. These credentials are used when connecting to any trust instead of the primary domain credentials.

### Administrators Group

Access to the App Volumes Manager is restricted to the App Volumes Administrators group. When you perform the initial configuration, you need to provide the name of the Active Directory security group that will have access to the App Volumes Manager.

The Active Directory service account user is not required to be an administrator.



# Install and Configure VMware App Volumes

# 3

You can prepare for VMware App Volumes installation by evaluating your environment and following the appropriate pre-installation procedures.

## Procedure

- 1 [Install the App Volumes Manager](#) on page 15  
The App Volumes Manager is a Windows server system used as the Web console for administration and configuration of App Volumes and assignment of AppStacks and writable volumes.
- 2 [Configure App Volumes Manager](#) on page 16  
After you install the App Volumes Manager, proceed with the configuration.
- 3 [Install the App Volumes Agent](#) on page 22  
After you have installed App Volumes Manager, install the App Volumes agent on the provisioning computer and target desktops. Do not install the agent on the server where the App Volumes Manager is installed.

## Install the App Volumes Manager

The App Volumes Manager is a Windows server system used as the Web console for administration and configuration of App Volumes and assignment of AppStacks and writable volumes.

### Prerequisites

- Verify that your environment meets the system requirements.
- Verify that your account has local administrator privileges on the target server.

### Procedure

- 1 Start the installation by running the `setup.exe` installer found in the Installation folder on the App Volumes installation media.
- 2 Read and accept the End User License Agreement.
- 3 Select the **Install App Volumes Manager** option.
- 4 From the database options, either use the remote database or local installation of SQL Server Express. When you select the SQL Server Express option, it is installed automatically.

- 5 Select the database connection method.

To use **Windows Integrated Authentication** method, you need to provide db\_owner permissions on the new database to the computer account of the App Volumes Manager server. To use SQL authentication, create a new user and provide db\_owner permissions on the new database.

A new ODBC connection named svmanager is created automatically.

- 6 Select the **Overwrite existing database (if any)** checkbox.

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**NOTE** Ensure that the **Overwrite existing database (if any)** checkbox is deselected when you upgrade App Volumes or install an additional manager server.

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- 7 Select the ports on which App Volumes Manager can listen for incoming connections and complete the installation.

The default ports are, HTTP:80 and HTTPS:443

## Configure App Volumes Manager

After you install the App Volumes Manager, proceed with the configuration.

### Procedure

- 1 [Configure the Active Directory](#) on page 17  
VMware App Volumes uses Active Directory to assign application to users, computers, groups, and organizational units.
- 2 [Set Up the App Volumes Administrators Group](#) on page 19  
Set up users in the App Volumes administrator group who can log in to the App Volumes Manager.
- 3 [Set Up the Machine Manager Connection](#) on page 19  
App Volumes operation mode is determined by configuring a machine manager. You cannot change the operation mode after you configure the machine manager.
- 4 [Configure the App Volumes Storage](#) on page 20  
You can select datastores and paths where AppStacks and writable volumes will be stored. You can configure a Hypervisor or VHD In-Guest storage type.

### Procedure

- 1 In a supported Internet browser, go to the IP address of App Volumes Manager server.  
The Welcome to App Volumes Manager setup wizard is displayed.
- 2 Click **Get Started** to proceed with the configuration.
- 3 Verify the license information that you require for this management console.  
The evaluation license has the following limitations:
  - Maximum number of users: 10
  - Maximum number of attachments per user: 2
  - Expiration date: June 01, 2016
 For production deployments, you must install the license file by downloading it from the MyVMware.com portal.
- 4 (Optional) To apply a different license, click **Edit** and upload the App Volumes license file.
- 5 Click **Next**.

## Configure the Active Directory

VMware App Volumes uses Active Directory to assign application to users, computers, groups, and organizational units.

### Procedure

- ◆ Enter the following information on the Active Directory configuration screen.

Parameter	Description
<b>Active Directory Domain Name</b>	A fully qualified domain name of the Active Directory domain where users and target computers are residing, for example corp.example.com
<b>Domain Controller Host Name (Optional)</b>	You can configure the fully qualified domain name of the domain controller in this option, for example dc01.corp.example.com
<b>LDAP Base (Optional)</b>	By default, App Volumes Manager enumerates all user, group, OU and computer objects within Active Directory. If you want to limit the scope of such enumeration, provide the distinguished name of the Active Directory container or organizational unit that stores required entities. Example: OU=Engineering, DC=corp, DC=vmware, DC=com
<b>Username</b>	The user name of the service account that has a read-only access to the target Active Directory domain, for example, svc-appvolumes.
<b>Password</b>	The password for the service account. Ensure that domain policies do not enforce password expiration for the service account.
<b>Use secure connection (Port 636) (Optional)</b>	If your domain controllers are configured for with TLS certificates for LDAP connections, you can enable this option to ensure that communication with the domain controller is encrypted.
<b>Allow non-domain entities (Optional)</b>	If this option is enabled, App Volumes Manager allows AppStack assignments for non-domain users and computers. This is used for provisioning.
<b>Trust Username (Optional)</b>	The user name of the service account that has a read-only access to the Active Directory domain configured for one-way trust, for example svc-appvolumes.

Parameter	Description
<b>Trust Password (Optional)</b>	The password for the service account. Ensure that domain policies do not enforce password expiration for the service account.
<b>Trust Domains (Optional)</b>	Provide a list of domains to use the new trust credentials. Instead of using the credentials on all trusted domains, use them in the specified domains. Use a space to separate items in the list, for example domain2.local domain3.com  If the domain controller cannot be automatically detected from DNS, you can add that to a domain in the list using a semicolon, for example, domain3.com;ldap.domain3.com.

License
Active Directory
Administrators
Machine Managers
Storage
Summary

### Active Directory

App Volumes uses Active Directory to assign applications to users, computers, groups, and OUs.

**Important Information:**

- The credentials you provide are stored encrypted.
- The account you provide only requires read access.
- Ensure the account you provide is not required to periodic reset its password.

Active Directory Domain Name:  Fully qualified Active Directory domain name  
Example: vmware.com

Domain Controller Host Name:  This may be left blank (to use any Domain Controller)  
Example: adserver.vmware.com

LDAP Base:  This may be left blank (to use all of Active Directory)  
Example: OU=engineering,DC=vmware,DC=com

Username:  This may be a user with read-only access  
Example: administrator

Password:  Password is stored encrypted

Use LDAPS:  Use secure connection (port 636) Requires corresponding ActiveDirectory configuration

Non-domain:  Allow non-domain entities Attach volumes to non-domain users and computers

If provided, the username and password below will be used when connecting to any trusted domain.

Trusts Username:  This may be a user with read-only access  
Example: read\_only\_user

Trust Password:  Password is stored encrypted

Trust Domains:  Use only with these domains (leave blank for all)  
ex: com bar.com;foo.com trust.com;10.0.0.2

## Set Up the App Volumes Administrators Group

Set up users in the App Volumes administrator group who can log in to the App Volumes Manager.

### Procedure

- ◆ On the App Volumes Administrators Group screen, select the Active Directory Group that will act as the App Volumes administrators group.

**NOTE** Only the users from this group will be able to login to the App Volumes Manager.

## Set Up the Machine Manager Connection

App Volumes operation mode is determined by configuring a machine manager. You cannot change the operation mode after you configure the machine manager.

### Procedure

- 1 In the Hypervisor Credentials page, select and configure the required machine manager.

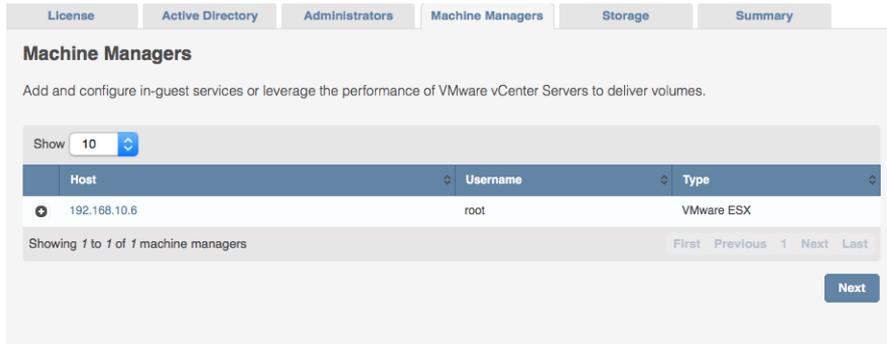
Connection Type	Description
<b>vCenter Server</b>	Provide host name, user name, and password details. You can optionally enable the Mount Local or Mount on Host options. You can also optionally provide the ESXi user name and password. If you select vCenter Server server as the first configured machine manager, you can add and configure additional vCenter Server servers.
<b>ESXi (Single Host)</b>	Provide host name, user name, and password details for the ESXi host. <b>NOTE</b> Ensure that the domain policies do not enforce password expiration for the service account.
<b>VHD In-Guest</b>	This option does not require any credentials to be configured. When you select this option, the permissions for writable volumes are managed. Prior to instructing the agent to mount the volume for read-write access, write permissions for the volume are granted.

**NOTE** To view the permissions required by the service account, click the Required vCenter Permissions link.

- 2 Click **Save**.

The configured machine manager is displayed on the Machine Manager page.

- 3 (Optional) To add additional machine managers, click **Add Machine Manager**.
- 4 Click **Next**.



## Configure the App Volumes Storage

You can select datastores and paths where AppStacks and writable volumes will be stored. You can configure a Hypervisor or VHD In-Guest storage type.

Use a storage location that is accessible to all virtual machine host servers. When using VMDK Direct Attach Operation Mode, the App Volumes Manager requires local or shared storage to be configured on the hypervisor.

You can use local host storage, but volumes will only be attached for virtual machines on the host. The option to add available storage only appears when App Volumes Manager is configured in the VHD In-Guest mode. Otherwise, the list of storage locations and datastores is populated from vCenter Server

### Procedure

- 1 On the Storage page select values for **Default Storage Location** and enter values for **Default Storage Path** for AppStacks and writable volumes.
- 2 Click **Next**.

The Confirm Storage Settings page appears.

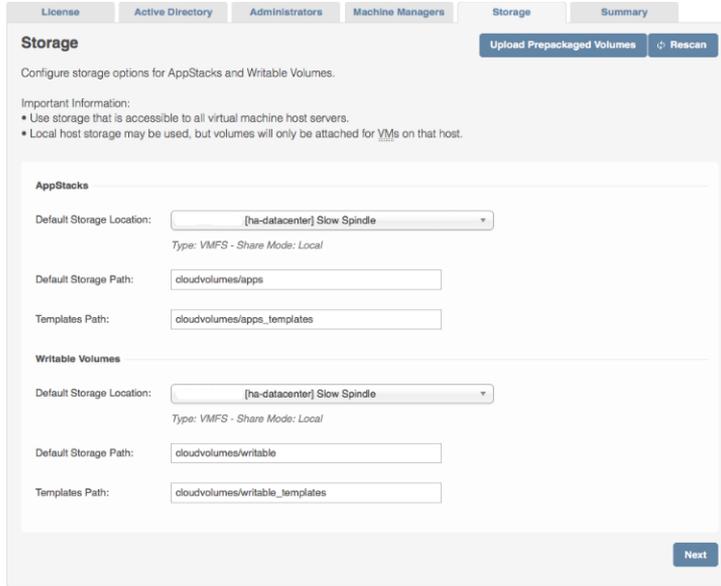
- 3 Confirm your storage settings and click **Set Defaults**.

On this page you can also see options on how App Volumes imports default volumes into the datastore. The **Import volumes immediately** option does not allow you to perform administrative tasks while import is underway.

- 4 On the Upload Prepackaged Volumes page, select the volumes and click **Upload**.

This uploads the volumes packaged with this Manager to the selected datastore.

- 5 Confirm the details on the Confirm Upload Prepackaged Volumes page and click **Upload**.



### Configure VHD In-Guest Storage

To use App Volumes with VHD In-Guest Operation mode, the App Volumes Manager, and Agent computers require the special permissions on the CIFS file share to perform certain tasks on VHDs during the normal operation of App Volumes.

#### Procedure

- 1 On a file server, create a new empty folder.
- 2 Copy the contents of the Hypervisor\In-Guest VHD folder from the App Volumes Installation media to the new folder.
- 3 Share the folder and grant full access permissions on the file share to everyone.
- 4 Configure NTFS permissions as described below.

An Active Directory domain group might be used to manage permissions for the following roles:

- Managers: App Volume Managers
- Agents: Machines that receive App Volumes and writable volumes assignments
- Capture Agents: Machines that are used for provisioning new App Volumes

**Table 3-1.** NTFS folder permissions required for each role

Folder	Managers	Agents	Capture Agents
apps	Full	Read	Write
apps_templates	Read	None	None
writable	Full	Write or None <b>NOTE</b> Write permissions are required by Agents when Dynamic Permissions are not enabled.	None
writable_templates	Read	None	None

## Install the App Volumes Agent

After you have installed App Volumes Manager, install the App Volumes agent on the provisioning computer and target desktops. Do not install the agent on the server where the App Volumes Manager is installed.

### Prerequisites

- Verify that your environment meets the system requirements.
- Verify that your account has local administrator privileges on the target computer.

### Procedure

- 1 Start the installation by running the `setup.exe` installer found in Installation folder on the App Volumes installation media.
- 2 Read and accept the End User License Agreement.
- 3 Select the **Install App Volumes Agent** option.
- 4 Enter the App Volumes Manager host name or IP address and port.
- 5 Complete the installation and restart the computer after installation.

---

**NOTE** If you intend to use this virtual machine as a provisioning computer, create a clean snapshot or backup of this machine. Revert to this snapshot or backup before provisioning new AppStacks.

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# Upgrading VMware App Volumes Components

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# 4

In VMware App Volumes, you cannot directly upgrade the components to a new version. You can only uninstall the previous version and install the new version of the components.

Different components such as App Volumes Manager, agent, and templates, can be upgraded by uninstalling the previous version and installing the new version in any order.

This chapter includes the following topics:

- [“Upgrade the App Volumes Manager,”](#) on page 23
- [“Upgrade the VMware App Volumes Templates,”](#) on page 24
- [“Upgrade the App Volumes Agent,”](#) on page 24

## Upgrade the App Volumes Manager

As a best practice you can schedule a maintenance window to ensure that there is no service degradation during the uninstall and new install process.

### Prerequisites

- Detach all volumes before you upgrade the App Volumes Manager.

### Procedure

- 1 Using the **ODBC Data Source** applet in the Control Panel, note the database and server name defined in the system ODBC source svmanager.
- 2 Create a backup of the App Volumes database using SQL Server tools.
- 3 Create a full server backup or snapshot of the App Volumes Manager server.
- 4 Using the **Programs and Features** applet in the Control Panel, uninstall the previous version of the App Volumes Manager.
- 5 Install a new version of the App Volumes Manager.
- 6 Specify the database server and name.

---

**NOTE** Ensure that you do not select the **Overwrite existing database** checkbox.

---

- 7 To verify the installation, connect to the App Volumes Management console.

## Upgrade the VMware App Volumes Templates

You can upgrade or upload all available templates for AppStacks and writable volumes from the Storage page.

### Procedure

- 1 On the **Configuration** tab of the App Volumes Manager console, click the **Storage**.
- 2 Click **Upload Prepackaged Volumes**.
- 3 Select the datastore and host, then provide host credentials.
- 4 Select all available templates.
- 5 Click **Upload**.

## Upgrade the App Volumes Agent

As a best practice, you can schedule a maintenance window to ensure that there is no service degradation during the uninstall and new install process.

### Prerequisites

Ensure that the App Volumes Manager is updated.

### Procedure

- 1 Unassign all AppStacks and writable volumes from the target computer that you plan to upgrade.
- 2 Log in with a user account that does not have any AppStacks and writable volumes assigned.
- 3 Uninstall the previous version of the App Volumes Agent using the **Programs and Features** applet in the Control panel.
- 4 Install a new version of the App Volumes Agent.

# Managing VMware App Volumes

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You can use the App Volumes Manager console for day-to-day management of App Volumes infrastructure.

This chapter includes the following topics:

- [“App Volumes Manager Console,”](#) on page 25
- [“Using Internet Explorer on Windows Server to Manage App Volumes,”](#) on page 26

## App Volumes Manager Console

This topic provides an overview of the App Volumes Manager console.

Tab Name	Details
Dashboard	<p>The dashboard provides the following information:</p> <ul style="list-style-type: none"> <li>■ The number of user and server licenses in use</li> <li>■ User utilization</li> <li>■ Most recent user logins</li> <li>■ Computer utilization</li> <li>■ Most recent computer logins</li> <li>■ AppStack utilization</li> <li>■ Most recent AppStack attachments</li> </ul>
Volumes	<p>The <b>Volumes</b> tab is used to create and manage AppStacks and writable volume and for monitoring currently attached volumes.</p>
Directory	<p>The <b>Directory</b> tab display the information about users, computers, groups and OUs that have assignments or were logged in to the computer that has the App Volumes agent installed. Active Directory objects are automatically synchronized with App Volumes database every 4 hours. To force synchronization, click <b>Sync</b> within the <b>Directory</b> tab.</p>
Infrastructure	<p>The <b>Infrastructure</b> tab displays the information about computers and storage seen by the App Volumes Manager. This tab also provides information about configured storage groups and allows you to configure new storage groups.</p>

Tab Name	Details
Activity	<p>The <b>Activity</b> tab has three sub-tabs that can help with monitoring App Volumes Infrastructure:</p> <ul style="list-style-type: none"> <li>■ <b>Pending Actions:</b> Displays actions waiting to be performed in the background and will be completed in the order submitted.</li> <li>■ <b>Activity Log:</b> Displays records of system activity such as user logins, computer power-ups, volume attachments, and so forth.</li> <li>■ <b>System Messages:</b> Displays messages and errors generated by internal events such as volume attachment, Active Directory access, and so forth.</li> </ul>
Configuration	<p>You can change the settings specified during App Volumes Manager configuration. There are five sub-tabs:</p> <ul style="list-style-type: none"> <li>■ <b>License:</b> Contains information on the license. A valid license issued by VMware App Volumes is required to use this management console.</li> <li>■ <b>Active Directory:</b> Provides information about your active directory. App Volumes uses the Active Directory to assign AppStacks to users, computers, and groups.</li> <li>■ <b>Administrators:</b> Enables the choice of the Active Directory group responsible for administering the App Volumes Manager.</li> <li>■ <b>Machine Managers:</b> Enables you to specify the login credentials to the vCenter Server.</li> <li>■ <b>Storage:</b> Enables you to set the default database where AppStacks and writable volumes are stored.</li> </ul>

## Using Internet Explorer on Windows Server to Manage App Volumes

You can use Internet Explorer on a Windows server to manage App Volumes.

You can perform one of the following tasks:

- Turn off the Internet Explorer Enhanced Security.
- Add the Manager host name to the list of trusted sites in Internet Explorer.

# Working With AppStacks

---

Application management containers such as data files, middleware, and settings are layered above the operating system. These are called application stacks, or AppStacks.

Working with AppStacks can include creating AppStacks, provisioning applications, and assigning AppStacks.

This chapter includes the following topics:

- [“Preparing a Provisioning Machine,”](#) on page 27
- [“Create An AppStack,”](#) on page 28
- [“Provision An AppStack,”](#) on page 28
- [“Install Applications,”](#) on page 29
- [“Editing An AppStack,”](#) on page 30
- [“Update An AppStack,”](#) on page 30
- [“Assign an AppStack,”](#) on page 31
- [“Overriding Precedence,”](#) on page 32
- [“Import AppStacks,”](#) on page 32
- [“Rescan AppStacks,”](#) on page 32
- [“Delete AppStacks,”](#) on page 33
- [“Considerations For AppStacks,”](#) on page 33
- [“Best Practices for Provisioning,”](#) on page 33

## Preparing a Provisioning Machine

The provisioning of AppStacks must be performed on a clean base image, a virtual machine that closely resembles the target environment to which you later plan to deploy the AppStack.

For example, the provisioning virtual machine and the target should be at the same patch and service pack level. If applications are included in the base image, they should also be in the provisioning virtual machine.

Provisioning should be done on a virtual machine that does not have any previously assigned AppStacks to it. If there are any previously assigned AppStacks to the virtual machine, or if the virtual machine has been used for provisioning before, that virtual machine should be set back to a clean snapshot before provisioning a new AppStack.

## Create An AppStack

Create an AppStack after you open the App Volumes Manager.

### Procedure

- 1 On the App Volumes Manager page, select the **Volumes** tab .
- 2 Select the **AppStack** tab.
- 3 Click **Create AppStack**.
- 4 Enter a name for the AppStack.

The storage field is populated with the name of your default datastore.

- 5 Select a datastore from the drop-down menu.
- 6 Set the path for the volume .

The path (to the `apps_templates` and `writable_templates` file on the datastore) is created during the initial setup process. You can change the path to further subcategorize volumes . For example: `appvolumes/apps/your_folder`.

- 7 Select the template for the AppStack.
- 8 Provide a description and click **Create** .
- 9 If you want to have the volume created in the background or immediately, verify the data and click **Create** again.

The screenshot shows the 'Create AppStack' form with the following fields and values:

- Name:** (empty text input)
- Storage:** [ha-datacenter] Slow Spindle (dropdown menu)
- Path:** cloudvolumes/apps (text input)
- Template:** cloudvolumes/apps\_templates/template.vmdk (dropdown menu)
- Description:** (empty text area)

A blue 'Create' button is located at the bottom right of the form.

## Provision An AppStack

After a new AppStack is created, you need to provision by attaching it to the provisioning computer and installing the applications you need.

### Procedure

- 1 In the App Volumes Manager console, click **Volumes > AppStack**, then select the AppStack you have created.

---

**NOTE** Ensure that the status of the AppStack is unprovisioned, indicating that the provisioning is not yet complete.

---

The **Provision** and **Delete** buttons are displayed.

- 2 Click **Provision**.
- 3 Search for and select the provisioning computer by entering a full or partial name of the computer.  
If you leave the search field empty, all computer objects are displayed in the results.
- 4 Click **Provision**.

---

**NOTE** For VHD In-Guest mounting, the provisioning computer must be powered off.

---

## Install Applications

After a new AppStack is attached to the provisioning computer, you need to install applications and complete the provisioning process.

### Procedure

- 1 Log in to the Provisioning Computer.

---

**NOTE** Ensure that the pop-up window displays information that you are now in the provisioning mode.

---

- 2 Install your applications.

---

**NOTE** Do not click **OK** until you have completed the installation of all your applications.

---

- 3 After installing all your applications, click **OK**.

---

**NOTE** If you click **OK** before installation is finished for the first application, the AppStack is created, but it is empty. If you click **OK** before you have installed all of the applications you want in the AppStack, the AppStack will contain only the applications you have completed installing.

---

The system restarts after you click **OK**.

- 4 Log in to the provisioning computer.
- 5 When the provisioning process finishes, click **OK**.
- 6 Click **Complete**.
- 7 Confirm provisioning.

## Editing An AppStack

When you provision an AppStack, it is automatically associated to the operating system type it is provisioned on. It is only attached to that exact same OS type unless otherwise specified.

An administrator can go to the Edit AppStacks section to change the OS that each AppStack might be attached on.

The screenshot shows the 'Edit AppStack' page in the VMware App Volumes Manager. At the top, there are navigation tabs: 'AppStacks', 'Writables', 'Attachments', 'Assignments', and 'Applications'. The 'AppStacks' tab is selected. Below the tabs, the title 'Edit AppStack' is displayed. A note states: 'Note: Changing the name will not affect the underlying filename.' The form contains the following fields:

- Name:** A text input field containing 'Lots of apps'.
- Filename:** A text input field containing 'Lots\20\of\20\apps.vmdk'.
- Path:** A text input field containing 'cloudvolumes/apps\_old'.
- Description:** A large text area that is currently empty.

Below the form, there is a section titled 'Operating Systems:' with a list of operating systems, each with a checked checkbox:

- Windows 7 (x64)
- Windows 8 (x64)
- Windows 8.1 (x64)
- Windows 10 (x64)
- Windows Server 2008 (x64)
- Windows Server 2008 R2 (x64)
- Windows Server 2012 (x64)
- Windows Server 2012 R2 (x64)
- Windows 7 (x86)
- Windows 8 (x86)
- Windows 8.1 (x86)
- Windows 10 (x86)
- Windows Server 2008 (x86)

A blue 'Save' button is located at the bottom right of the form.

## Update An AppStack

The VMware App Volumes update feature makes a copy of an existing AppStack, and allows you to add more applications, update current applications, or make any other changes to the newly copied AppStack . The original AppStack still exists and is unaffected by the changes to the copy.

### Procedure

1 If the App Volumes Manager is not open already, go to the Windows **Start** menu and select **VMware App Volumes Manager** or click on the desktop icon or navigate to the Manager host name.

2 On the App Volumes Manager page, click on the **Volumes** tab .

Existing AppStacks are displayed .

3 Find an AppStack to be updated, click on the **Add (+)** icon or anywhere in the row to view AppStack details .

4 Click **Update**.

5 Enter a name name for the AppStack copy and provide a description for the AppStack .

The Datastore field is populated with the name of your default datastore. The path is created during the initial setup process .

6 Click **Create** to confirm Update AppStack via pop-up then click **Update** .

When the process is complete, the main page of the AppStacks is displayed.

- 7 Find the AppStack click on the (+) or (-) located on the left side of the row and click anywhere on the row .

---

**NOTE** The status of the AppStack should be unprovisioned indicating that the provisioning process is not yet complete .

---

The row expands and the **Provision** and **Delete** buttons are displayed .

- 8 Click **Provision** and then click on a row to select the agent where to install the AppStack .  
The row selected is highlighted . For In-guest VHD, it is recommended that the provisioning computer is powered off state prior to provisioning .
- 9 Click **Provision** and then click **Start Provisioning** .
- 10 Select the agent, install applications on the agent, and then click **OK** .  
After the provisioning process is complete, a pop-up window displays a success message.
- 11 In the App Volumes Manager, click **Complete**.

---

**NOTE** Unassign the original AppStack before you assign the updated AppStack .

---

## Assign an AppStack

After you create and provision an AppStack, you can assign to users, groups or computers. Once assigned, the application will deploy within seconds in real time or next login.

### Procedure

- 1 In the App Volumes Manager console, click **Volumes > AppStack**, and select the AppStack you want to update.
- 2 Click **Assign**.
- 3 Enter a search string to find the name of the entity to assign the AppStack.
- 4 (Optional) Select the Search all domains option in the **Active Directory forest** check box.

NOTE: User Principal Name string searches (search\_term@domain.local) and Down-Level Logon Name string searches (domain\search\_string) are supported.

- 5 Click **Search**.

The App Volumes Manager finds the name of the entity to assign the AppStack. You can limit the assignment to a particular computer. This is done by entering a prefix for the computer name(s) to match. For example, enter Win7- to match any computer with a name that begins with Win7.

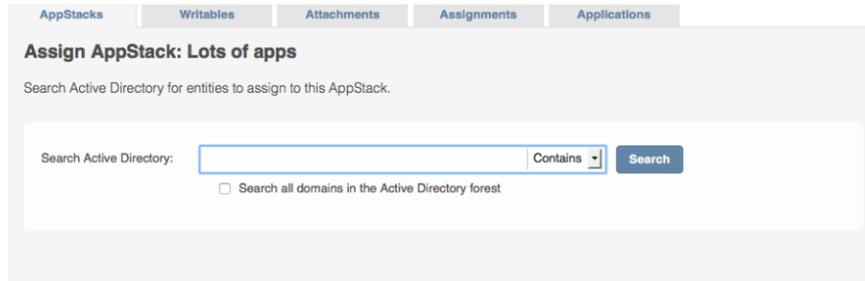
- 6 Search the user, group, or the computer, and click **Assign**.

NOTE: If you choose to attach the AppStack immediately, all computers that the selected users are logged in to will have the volume attached. If a group, or OU, all users/computers in those groups will get the attachments immediately. There are two options:

- Attach AppStack on next login or reboot
- Attach AppStack immediately

## 7 Select and click **Assign**.

After AppStack is assigned to the entity, this entity becomes known to App Volumes, and you can use the **Directory** tab to manage assignments to users, computers or groups.



## Overriding Precedence

When multiple AppStacks that share common components are assigned, you can reorder AppStacks to prioritize a specific AppStack and the applications contained in it.

You can re-order AppStacks provisioned with VMware App Volumes 2.5 or later.

As an example, with VMware App Volumes, you can have both Adobe 9 and Adobe 10.x AppStack attached, although they cannot co-exist natively. When users double-click a PDF file on the desktop, only one Adobe Reader is launched. If Adobe 9 is placed on top of Adobe 10.x in the Assigned AppStacks list, Adobe 9 gets the priority as the default PDF reader application. If you want to modify the default application, you can use the reordering feature to adjust the stack order so that Adobe 10.x can be default PDF reader to use.

Use the **Override Precedence** check box on directory or users, or directory or computers tab, then the arrow icons display on the left side of AppStacks, to show that the AppStack can be reordered.

You can drag and drop the AppStack to change the order of each AppStack. If the AppStack is unavailable, this AppStack cannot be reordered.

## Import AppStacks

If you have preconfigured third-party AppStacks or AppStacks from another deployment, you can import them to App Volumes.

### Procedure

- 1 Create a new folder on selected datastore and upload AppStack .vmdk files to this folder using a vCenter Server datastore browser.
- 2 In App Volumes Manager console, select **Volumes > AppStack** and click **Import AppStacks**.
- 3 Select the datastore and path and click **Import**.

## Rescan AppStacks

The rescan operation checks whether the AppStacks on the datastore are still present and accessible.

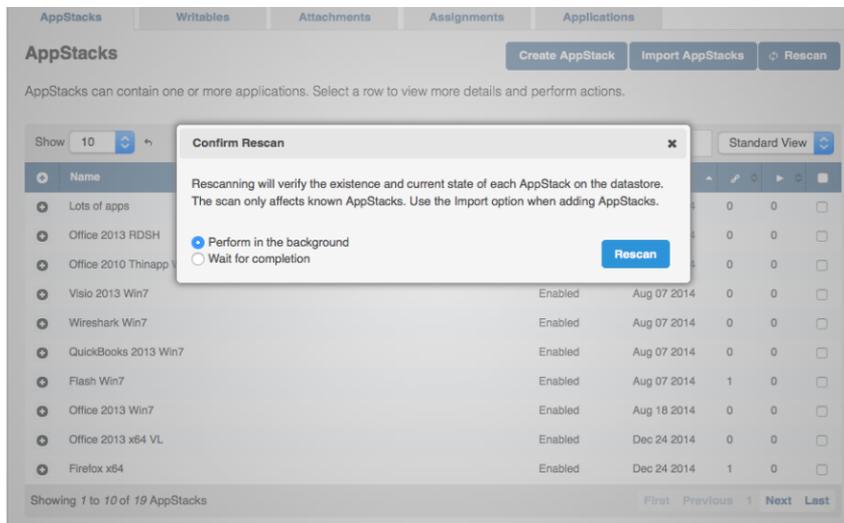
### Procedure

- ◆ To update the AppStack information from the datastore, select **Volumes > AppStack**, and click **Rescan**.

---

**NOTE** If new AppStacks have been added to the datastore from a different manager, use the **Import** option to have this information on this Manager.

---



## Delete AppStacks

You can delete legacy and deprecated AppStacks from the disk and inventory when needed.

### Procedure

- 1 Unassign AppStack from all entities.
- 2 In the App Volumes Manager console, select **Volumes > AppStack** and select the AppStack you want to remove.
- 3 Click **Delete**.

---

**NOTE** AppStacks and Writable Volumes that can no longer be contacted on a datastore have their state set to Unreachable. You can remove AppStacks or Writable Volumes even when they are unreachable. This action cleans up the metadata in the App Volumes database.

---

## Considerations For AppStacks

You might come across some limitations while working with AppStacks.

- Support for physical endpoints and AppStacks is only given under the following constraints:
  - VHD In-Guest mode is the only supported machine manager mode
  - Constant network connection is required
  - OS on the physical device should be non-persistent, streamed, or both
- Provisioning of Internet Explorer into an AppStack is not supported. Due to the tight OS integration and dependencies, use an application isolation technology such as VMware ThinApp. VMware App Volumes can then be utilized for delivery of the isolated application package.

## Best Practices for Provisioning

You can follow some best practices while provisioning virtual machines and applications.

- Ensure that you have the local administrator rights for provisioning.
- Perform only one provisioning process in each virtual machine, but you can provision multiple virtual machines at once.

- If the provisioning virtual machine has a service pack, such as Service Pack 1, all virtual machines delivering applications must be at the same or later service pack level.
- While not required, for best performance application dependencies (such as Java, or .NET) should be included in the same AppStack as the application.
- The provisioning system should not have the antivirus agents, VMware Horizon with View agent, or any other filter driver applications installed or enabled.
- When provisioning an application, always install the application for all users. This ensures the application installs under Program Files rather than user profile. This also creates application icons in the All Users folder.
- The provisioning virtual machine usually joins the same domain as the production virtual machine, However, this is dependent on applications being provisioned. Some application requirements and licensing models require that the virtual machine shares a common SID with the production virtual machine.
- Do not deliver applications that require a common SID to a pool or to virtual machines that have had Sysprep run on them. These cases should be used in conjunction with VMware Horizon with View Composer or other similar OS cloning technologies that preserve the machine SID.
- Virtual machines used for provisioning should have a snapshot dedicated to the state of a user's desktop. After provisioning, virtual machines should have a clean snapshot that was made directly following the App Volumes agent installation. After the completion of provisioning, the virtual machine reverts to a clean state, that is, the snapshot.
- The provisioning of AppStacks must be performed on a clean base image, a virtual machine that closely resembles the target environment to which you later plan to deploy the AppStack. For example, the provisioning virtual machine and target should be at the same patch and service pack level and, if applications are included in the base image, they should also be in the provisioning virtual machine.
- Provision a virtual machine that has never had any AppStacks assigned to it. If AppStacks are assigned to the virtual machine, or the virtual machine has been used for provisioning before, the virtual machine should be set back to the clean snapshot before provisioning a new AppStack.

# Working with Writable Volumes

---

Writable volumes are user-specific volumes which can be used to store user-installed applications and local profile information.

You can create writable volumes for computers, and reassign them to other computers and users. A user can be attached to only one writable volume at a time.

This chapter includes the following topics:

- [“Create a Writable Volume,”](#) on page 35
- [“Import Writable Volumes,”](#) on page 36
- [“Update Writable Volumes,”](#) on page 37
- [“Rescan Writable Volumes,”](#) on page 38
- [“Expanding Writable Volumes,”](#) on page 38
- [“Manual Active Directory Synchronization,”](#) on page 38
- [“Install Google Chrome to a Writable Volume,”](#) on page 39
- [“Considerations For Writable Volumes,”](#) on page 39

## Create a Writable Volume

You can create writable volumes for your computer and users.

### Procedure

- 1 On the App Volumes Manager page, select **Volumes > Writables** .
- 2 Click **Create Writable**.
- 3 Enter a search string to find the name of the entity to assign the Writable Volume.
- 4 Select the **Search all domains in the Active Directory forest** check box .

---

**NOTE** User Principal Name string searches (search\_term@domain.local) and Down-Level Logon Name string searches (domain\search\_string) are supported.

---

- 5 Click **Search**.
- 6 To specify the location of the writable volumes, select **Destination Storage** and **Destination Path**.
- 7 Select a template for the new writable volume.

8 Configure the advanced options for the writable volume.

Option	Description
<b>Prevent user login if the writable is in use on another computer</b>	<p>For a writable volume to work as expected, ensure that users do not log in to a computer to which their writable volume is not attached because their user's local profile might interfere with their profile on the writable volume.</p> <p>To avoid confusion, the App Volumes Manager prevents a user from logging in to an additional computer when their writable volume is attached elsewhere. You can toggle the user login block by using the <b>Block Login</b> option on each writable volume.</p> <p>This option is best used to protect users from logging in to persistent desktops without their writable volume. It is not needed when using nonpersistent pools since the computer is reverted to a clean snapshot before use.</p>
<b>Limit the attachment of users writables to specific computers</b>	<p>Users might not need their writable volume on all the computers they use. Additionally, some users might need separate writable volumes that are only attached to specific computers.</p> <p>The <b>Limit Attachment</b> option allows you to specify the prefix to a computer name. When you provide such a prefix, the writable volume is attached only to a computer with a name that begins with the prefix.</p> <p>For example, consider a user having two writable volumes, one limited to Win7-Dev and another limited to Win7-Test. When the user logs in to the computer named Win7-Dev-021, the user gets the first volume. When the user logs in to Win7-Testing, the user gets the second volume. If the user logs in to Win2012R2, no writable volume is attached.</p>
<b>Delay writable creation for group/OU members until they log in</b>	<p>When you select a Group or Organization Unit, a writable volume is created for each one of the current members. Often these containers can have hundreds or thousands of members. This can be problematic because creating a large number of volumes at once can take a long time. Every member might not need a writable volume.</p> <p>The <b>Defer Create</b> option defers the creation of writables for Group and OU members until their next login. This option only affects Groups and Organization Units. Users and Computer entities directly selected still have their volumes created immediately.</p>

9 Click **Create**.

**NOTE** If you select a group, then individual writable volumes are created for each member of that group. You can delay this until the first log in by using the **delay** check box.

Group membership is discovered with recursion, meaning that users and computers in sub groups also receive volumes. However, when creating writable volumes for organization units, groups are not recursed.



## Import Writable Volumes

If you have writable volumes from another deployment, you can import them to the App Volumes.

### Procedure

- 1 Use the vCenter Server datastore browser to create a new folder on the selected datastore and upload the writable volume .vmdk files to this folder.
- 2 On the **Writables** tab of the **Volumes** tab within the App Volumes Manager console, click **Import Writables**.

- 3 Select the datastore and path and click **Import**.

**Import Writable Volumes**

Scan the selected storage for existing Writable Volumes.

Storage: [ha-datacenter] Slow Spindle

Path: cloudvolumes/writable

**Import**

## Update Writable Volumes

Updating a writable volume helps an administrator to create a .zip package of files that will be created or updated in each writable volume when it is next attached.

### Prerequisites

- The .zip file must be smaller than 5 MB.
- The files must be placed in the root of the writable volume.

### Procedure

- 1 On the **Writables** tab of the **Volumes** tab within App Volumes Manager console, click **Update Writables**.
- 2 Browse and select required .zip file.
- 3 Click **Upload**.

---

**NOTE** After writable volumes are updated, the updates cannot be reversed. To make changes, use an additional update to overwrite the files.

---

**Update Writable Volumes**

Upload a zip file containing files that will be written to all writable volumes next time they are attached.

Important Information:

- Zip file may not exceed 5 megabytes in size.
- Once applied, updates can not be reversed. Use an additional update to overwrite files.

Current Zip: No zip file has been uploaded yet.

Upload new zip file: **Browse...** No file selected.

**Upload**

## Rescan Writable Volumes

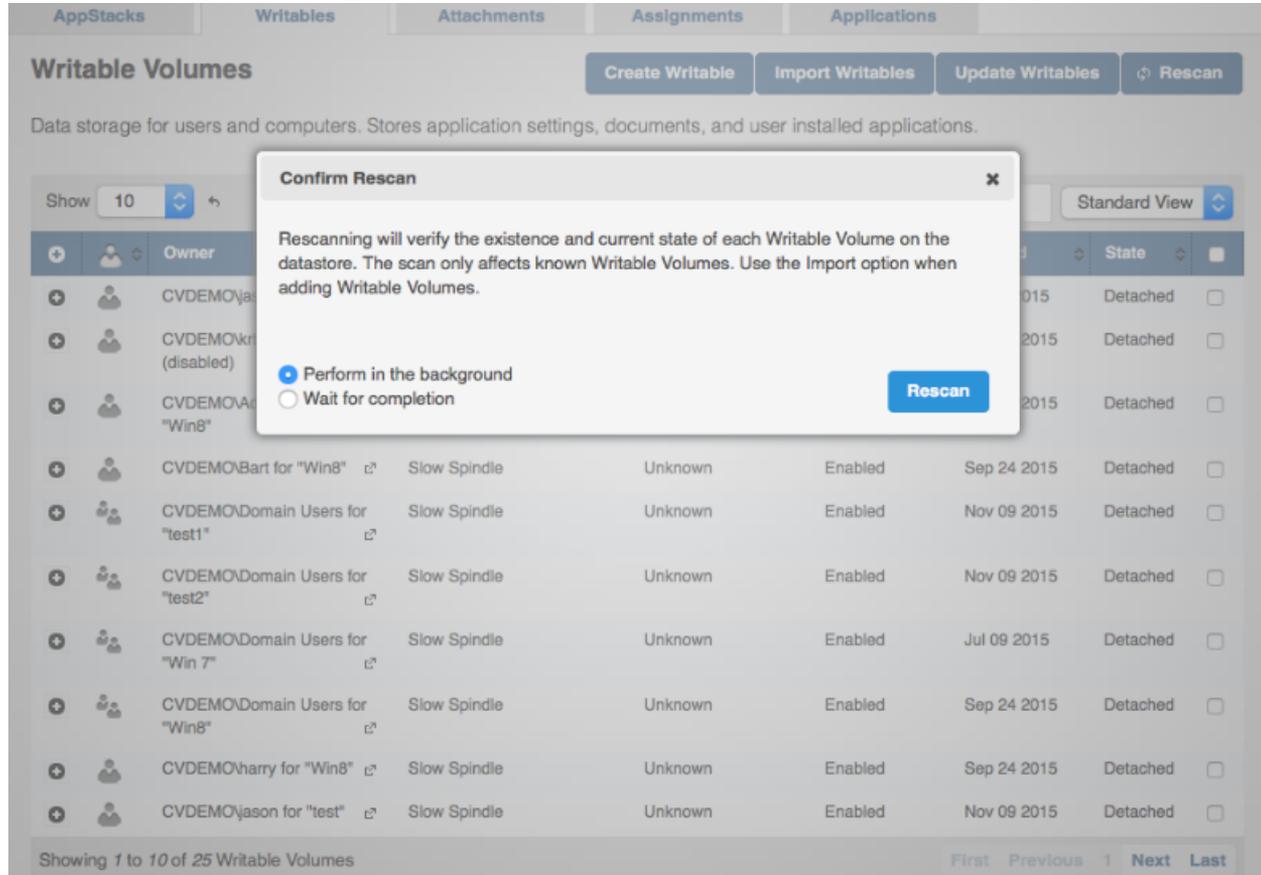
A rescan checks whether the writable volume files are present and accessible on the datastore.

### Procedure

- ◆ To update the writable volume information from the datastore, click **Rescan**.

If new writables have been added to the datastore (from a different manager), use the **Import** option to make this manager aware of them.

This rescan operation only checks the known volumes.



## Expanding Writable Volumes

You can specify a new size for a writable volume and the App Volumes Manager increases the volume file to the new size.

You must specify a size that is at least 1 GB greater than the current size of the writable volume. At your subsequent login to the virtual machine with App Volumes agent, the App Volumes Manager automatically increases the volume file to the new size.

## Manual Active Directory Synchronization

The App Volumes Manager maintains a database record for any Active Directory seen by an agent or assigned to an AppStack or a writable volume.

A background job runs every hour to synchronize up to 1000 entities. If you have more than 1000 items, then a new batch of 1000 is synchronized the next hour.

## Install Google Chrome to a Writable Volume

You can install Google Chrome or Google Chrome plug-ins to a writable volume.

### Procedure

- 1 Create the following DWORD registry value:  
`HKLM\SYSTEM\CurrentControlSet\services\svdriver\Parameters\DriveLetterSettings`
- 2 Set the value to 4.

## Considerations For Writable Volumes

You might come across some limitations when working with writable volumes.

- Support for physical endpoints and writable volumes is only given under the following constraints:
  - VHD In-Guest mode is the only supported machine manager mode
  - Constant network connection is required
  - Automatic Windows update should be disabled
  - Any update to the OS should not be performed with writable volumes detached
- Detach writable volumes when performing a user log out. Profiles in the writable volume might be corrupted and on next login cause the profile to be recreated.
- All volumes should be detached when performing any revert, recompose, or refresh of the virtual machines.



# Advanced App Volumes Configuration

---

# 8

You can configure App Volumes Manager by selecting configuration options such as batch script files called at various points during system startup and login, registry options for services, drivers, and other parameters.

This chapter includes the following topics:

- [“Batch Script Files,”](#) on page 41
- [“Timeouts,”](#) on page 42
- [“Advanced App Volumes Agent Configuration,”](#) on page 42
- [“SVdriver Configuration Parameters,”](#) on page 43
- [“Drive Letter Settings,”](#) on page 43
- [“Configuring the SVservice Parameters,”](#) on page 44
- [“Volume Behavior Parameters,”](#) on page 45
- [“General Behavior Parameters,”](#) on page 45
- [“vCenter Server Custom Role,”](#) on page 45
- [“Create a Custom vCenter Server Role Using PowerCLI,”](#) on page 47
- [“Scaling the App Volumes Manager,”](#) on page 48

## Batch Script Files

App Volumes agent executes batch script files either when an AppStack or a writable volume is attached dynamically or at various points during system startup and login.

If the attached volume does not contain some or all of the scripts, these scripts are ignored. These scripts can contain any scriptable action. The use for each is to be able to script an action at various points during the volume-attachment and virtualization procedures. Some of the scripts are executed with the **SYSTEM** privileges and should be modified and added with caution.

---

**NOTE** Script file names are case-sensitive.

---

## Timeouts

When executing batch files, App Volumes can be configured to wait for a script completion before processing to the next step.

Wait times are defined in seconds and can be configured by creating a corresponding registry value of REG\_DWORD type under the following registry key :

HKLM\SYSTEM\CurrentControlSet\services\svservice\Parameters

## Advanced App Volumes Agent Configuration

The App Volumes agent consists of two major components, SVdriver and SVservice.

- SVdriver is responsible for the virtualization of volumes into the OS.
- SVservice is responsible for how the virtualization and volumes are controlled and for the communication with the App Volumes Manager.

Both these components can be configured by configuring the registry values.

Script Name	Execution Condition	Security Context	Wait Time Registry Parameter
prestartup.bat	Called when a volume is dynamically attached, or on during system startup but before virtualization is activated.	System account	WaitPrestartup (default do not wait)
startup.bat	Called when a volume is dynamically attached, or when system starts up	System account	WaitStartup (default do not wait)
startup_postsvc.bat	Called as and called after services have been started on the volume (not called if there are no services on volume)	System account	WaitStartupPostSvc (default do not wait)
logon.bat	Called at log in and before Windows Explorer starts	User account	WaitLogon (default wait until it finishes)
logon_postsvc.bat	Called after services have been started (not called if there are no services on volume)	User account	WaitLogonPostsvc (default do not wait)
shellstart.bat	Called when a volume is dynamically attached or when Windows Explorer starts	User account	WaitShellstart (default do not wait)
shellstop.bat	Called when the user is logging out before Windows Explorer is closed	User account	WaitShellstop (default do not wait)
logoff.bat	Called at log out and Windows Explorer has terminated.	User account	WaitLogoff (default do not wait)
shutdown_presvc.bat	Called when the computer is shutting down before services are stopped	System account	WaitShutdownPresvc (default do not wait)
shutdown.bat	Called when the computer is shutting down after services are stopped	System account	WaitShutdown (default do not wait)
allvolattached.bat	Called after all volumes are processed (so if user has 3 AppStack, this will be called after all 3 have loaded)	User account	WaitAllvolattached (default do not wait)

Script Name	Execution Condition	Security Context	Wait Time Registry Parameter
post_prov.bat	Called at the end of provisioning to do any one-time steps that should be performed at the end of provisioning. Invoked when clicking the provisioning complete pop-up window while the volume is still virtualized.	System account	WaitPostProv (default wait forever)
prov_p2.bat	Invoked at phase 2 of the provisioning process. After the machine is rebooted but before App Volumes Manager has been notified that provisioning is complete. This is the last chance to perform any actions on the provisioned volume with virtualization disabled.	System account	WaitProvP2 (default wait forever)

## SVdriver Configuration Parameters

SVdriver can be configured by configuring registry keys and optional values in the HKLM\SYSTEM\CurrentControlSet\services\svdriver\Parameters registry key.

Parameter	Type	Description
LogFileSizeInKB	REG_DWORD	The size of the log file before rotating the log file. The default value is 51200 (50 MB).
ReorderTimeOutInSeconds	REG_DWORD	Defined in seconds, how long to wait for all volumes to be attached and processed based on Order Precedence set from within App Volumes Manager.
MinimizeReplication	REG_DWORD	If this value is 1, only changes to data are preserved in a writable volume. If this value is 0, changes to data and file attributes (hidden, Read Only, and so on) permissions are preserved in writable volume.
EnableShortFileName	REG_DWORD	For legacy AppStacks created earlier than 2.3 set this parameter to 0 to disable DOS short names.
EnableRegValueMerging	REG_DWORD	If this value is 1, merge certain registry values such as AppInitDlls across volumes. This is action is additive across the volumes.
DriveLetterSettings	REG_DWORD	The value for DriveLetterSettings is in a hexadecimal format, and any number of flags might be combined to implement multiple parameters.

## Drive Letter Settings

App Volumes agent interacts with mapped volumes using a system path to the volume, without mapping it to a drive letter.

Most of the modern applications are entirely compatible with this behavior. However, some of the applications might require a drive letter to access program or application files. To support such a situation, while maintaining the familiar user interface, App Volumes can hide the drive from Windows Explorer after it is mapped.

This behavior is configurable using the DriveLetterSettings registry value.

The value for DriveLetterSettings is in a hexadecimal format, and any number of flags might be combined to implement multiple parameters. For example, if you want to use the 0x00000001 and 0x00000008 flags as shown, the result is 0x00000009. Enter this as 9 because you only work with the significant digits.

Value	Description
0x0000001	DRIVELETTER_REMOVE_WRITABLE. Do not assign drive letter for writable volumes
0x0000002	DRIVELETTER_REMOVE_READONLY. Do not assign drive letter for AppStack volumes
0x0000004	DRIVELETTER_HIDE_WRITABLE. Hide drive letter for writable volumes
0x0000008	DRIVELETTER_HIDE_READONLY. Hide drive letter for AppStack volumes

The default registry value is 3. This means that for writable volumes, the drive letter is hidden, and for AppStack volumes, the drive letter is not assigned.

## Configuring the SVservice Parameters

You can configure SVservice with the following registry keys and optionally configuring the values in the HKLM\SYSTEM\CurrentControlSet\services\svservice\Parameters registry key.

Parameter	Type	Description
LogFileSizeInKB	REG_DWORD	The size of the log file before rotating the log file. The default is 51200 (50MB).
MaxDelayTimeOutS	REG_DWORD	The maximum wait for a response from the App Volumes Manager, in seconds. If set to 0, the wait for response is forever. The default is 2 minutes.
ResolveTimeOutMs	REG_DWORD	Defined in milliseconds for name resolution. If resolution takes longer than the timeout value, the action is canceled. The default is 0, which waits for completion.
ConnectTimeOutMs	REG_DWORD	Defined in milliseconds for server connection requests. If a connection request takes longer than this timeout value, the request is canceled. The default is 10 seconds.
SendTimeOutMs	REG_DWORD	Defined in milliseconds for sending requests. If sending a request takes longer than this timeout value, the request is canceled. The default is 30 seconds.
ReceiveTimeOutMs	REG_DWORD	Defined in milliseconds to receive a response to a request. If a response takes longer than this timeout value, the request is canceled. The default is 5 minutes.
ProvisioningCompleteTimeOut	REG_DWORD	Defined in seconds to keep trying to contact the App Volumes Manager after provisioning is completed. The default is 120.
DomainNameWaitTimeOut	REG_DWORD	Defined in seconds how long to wait for the computer during startup to resolve Active Directory domain name. On machines that are not joined to any domain, you can set the value to 1 for faster login. The default is 60.
WaitInstallFonts	REG_DWORD	Defines how long to wait in seconds for fonts to be installed. The default is to not wait for completion.
WaitUninstallFonts	REG_DWORD	Defines how long to wait in seconds for fonts to be removed. The default is to not wait for completion.
WaitForFirstVolumeOnly	REG_DWORD	Defined in seconds, only hold logon for the first volume. After the first volume is complete, the remaining are handled in the background, and the logon process is allowed to proceed. To wait for all volumes to load before releasing the logon process, set this value to 0. The default is 1.

## Volume Behavior Parameters

Volume behavior parameters are values that need to be configured for SVservice configuration.

Parameter	Type	Description
VolWaitTimeout	REG_DWORD	Defined in seconds. Time required to wait for a volume to be processed before ignoring the volume and proceeding with the logon process. The default value is 180.
VolDelayLoadTime	REG_DWORD	Defined in seconds. Time required after logon process to delay volume attachments. This value is ignored if a writable volume is used. Writable volumes must be attached prior to any AppStacks. If the value is greater than VolWaitTimeout, it will be reduced to the value of VolWaitTimeout. This might speed up the login time by delaying the virtualizing of applications until after logon is complete. The default value is 0 (do not delay load time).
CleanSystemWritable	REG_DWORD	If set to 1 and no writable volumes are attached, SVservice will clear any changes saved to the system during operation after a reboot. If set to 0, changes are stored in c:\SVROOT on system volume.

## General Behavior Parameters

You need to configure services, drivers, and general behavior parameters values for SVservice configuration.

Value	Type	Description
RebootAfterDetach	REG_DWORD	If set to 1, automatically reboot the system after a user logs off. If undefined, default is 0.
DisableAutoStartServices	REG_DWORD	If set to 1, do not automatically start services on volumes after attach. If undefined, default is 0.
HidePopups	REG_DWORD	If set to 1, svservice.exe does not generate pop-up messages. If undefined, default is 0.
DisableRunKeys	REG_DWORD	If set to 1, applications in the Run key will not be called. If undefined, default is 0.

## vCenter Server Custom Role

You can use a custom vCenter Server account to create roles.

### Procedure

- ◆ Manually create a new vCenter Server role and assign the privileges.

Object	Permission
Datastore	<ul style="list-style-type: none"> <li>■ Allocate space</li> <li>■ Browse datastore</li> <li>■ Low-level file operations</li> <li>■ Remove file</li> <li>■ Update virtual machine files</li> </ul>
Folder	<ul style="list-style-type: none"> <li>■ Create folder</li> <li>■ Delete folder</li> </ul>
Global	Cancel task
Host	<ul style="list-style-type: none"> <li>■ Local operations</li> <li>■ Create virtual machine</li> <li>■ Delete virtual machine</li> <li>■ Reconfigure virtual machine</li> </ul>

<b>Object</b>	<b>Permission</b>
Resource	Assign virtual machine to resource pool
Sessions	View and stop sessions
Tasks	Create task
Virtual machine	<ul style="list-style-type: none"> <li>■ Configuration</li> <li>■ Add existing disk</li> <li>■ Add new disk</li> <li>■ Add or remove device</li> <li>■ Change resource</li> <li>■ Remove disk</li> <li>■ Settings</li> <li>■ Interaction</li> <li>■ Power Off</li> <li>■ Power On</li> <li>■ Suspend</li> <li>■ Inventory</li> <li>■ Create from existing</li> <li>■ Create new</li> <li>■ Move</li> <li>■ Register</li> <li>■ Remove</li> <li>■ Unregister</li> <li>■ Provisioning</li> <li>■ Clone template</li> <li>■ Clone virtual machine</li> <li>■ Create template from virtual machine</li> <li>■ Customize</li> <li>■ Deploy template</li> <li>■ Mark as template</li> <li>■ Mark as virtual machine</li> <li>■ Modify customization specifications</li> <li>■ Promote disks</li> <li>■ Read customization specifications</li> </ul>
<b>Object</b>	<b>Permission</b>
Datastore	<ul style="list-style-type: none"> <li>■ Allocate space</li> <li>■ Browse datastore</li> <li>■ Low-level file operations</li> <li>■ Remove file</li> <li>■ Update virtual machine files</li> </ul>
Folder	<ul style="list-style-type: none"> <li>■ Create folder</li> <li>■ Delete folder</li> </ul>
Global	Cancel task
Host	<ul style="list-style-type: none"> <li>■ Local operations</li> <li>■ Create virtual machine</li> <li>■ Delete virtual machine</li> <li>■ Reconfigure virtual machine</li> </ul>
Resource	Assign virtual machine to resource pool
Sessions	View and stop sessions

Object	Permission
Tasks	Create task
Virtual machine	<ul style="list-style-type: none"> <li>■ Configuration</li> <li>■ Add existing disk</li> <li>■ Add new disk</li> <li>■ Add or remove device</li> <li>■ Change resource</li> <li>■ Remove disk</li> <li>■ Settings</li> <li>■ Interaction</li> <li>■ Power Off</li> <li>■ Power On</li> <li>■ Suspend</li> <li>■ Inventory</li> <li>■ Create from existing</li> <li>■ Create new</li> <li>■ Move</li> <li>■ Register</li> <li>■ Remove</li> <li>■ Unregister</li> <li>■ Provisioning</li> <li>■ Clone template</li> <li>■ Clone virtual machine</li> <li>■ Create template from virtual machine</li> <li>■ Customize</li> <li>■ Deploy template</li> <li>■ Mark as template</li> <li>■ Mark as virtual machine</li> <li>■ Modify customization specifications</li> <li>■ Promote disks</li> <li>■ Read customization specifications</li> </ul>

## Create a Custom vCenter Server Role Using PowerCLI

You can create custom vCenter Server roles by using PowerCLI.

### Procedure

- 1 Create a text file called `CV_role_ids.txt` and add the following contents:

```
System.Anonymous
System.View
System.Read
Global.CancelTask
Folder.Create
Folder.Delete
Datastore.Browse
Datastore.DeleteFile
Datastore.FileManagement
Datastore.AllocateSpace
Datastore.UpdateVirtualMachineFiles
Host.Local.CreateVM
Host.Local.ReconfigVM
Host.Local.DeleteVM
VirtualMachine.Inventory.Create
```

```

VirtualMachine.Inventory.CreateFromExisting
VirtualMachine.Inventory.Register
VirtualMachine.Inventory.Delete
VirtualMachine.Inventory.Unregister
VirtualMachine.Inventory.Move
VirtualMachine.Interact.PowerOn
VirtualMachine.Interact.PowerOff
VirtualMachine.Interact.Suspend
VirtualMachine.Config.AddExistingDisk
VirtualMachine.Config.AddNewDisk
VirtualMachine.Config.RemoveDisk
VirtualMachine.Config.AddRemoveDevice
VirtualMachine.Config.Settings
VirtualMachine.Config.Resource
VirtualMachine.Provisioning.Customize
VirtualMachine.Provisioning.Clone
VirtualMachine.Provisioning.PromoteDisks
VirtualMachine.Provisioning.CreateTemplateFromVM
VirtualMachine.Provisioning.DeployTemplate
VirtualMachine.Provisioning.CloneTemplate
VirtualMachine.Provisioning.MarkAsTemplate
VirtualMachine.Provisioning.MarkAsVM
VirtualMachine.Provisioning.ReadCustSpecs
VirtualMachine.Provisioning.ModifyCustSpecs
Resource.AssignVMToPool
Task.Create
Sessions.TerminateSession

```

- 2 Execute the following PowerShell script after modifying the vCenter Server location.

```

$cvRole = "App Volumes Role"
$cvRolePermFile = "cv_role_ids.txt"
$viserver = "vcenter.server.fqdn"
Connect-VIServer -server $viserver
$cvRoleIds = @()
Get-Content $cvRolePermFile | Foreach-Object{
    $cvRoleIds += $_.P
}
New-VIRole -name $cvRole -Privilege (Get-VIPrivilege -Server $viserver -id $cvRoleIds) -
Server $viserver
Set-VIRole -Role $cvRole -AddPrivilege (Get-VIPrivilege -Server $viserver -id $cvRoleIds) -
Server $viserver

```

## Scaling the App Volumes Manager

You can install an additional App Volumes Manager component on multiple servers and point them to a shared SQL database.

Multiple App Volumes Managers can be load balanced by a hardware load balancer. Alternatively, App Volumes agent can be configured to communicate with multiple App Volumes Manager servers.

To install additional App Volumes Manager instances, follow standard installation procedures and point a new instance to the existing SQL database.

---

**NOTE** Ensure that the **Create a new database or overwrite the existing database** check box is deselected.

---

While configuring the App Volumes agent, you can specify the load balanced FQDN of the App Volumes Manager.

Alternatively, you can configure App Volumes agent to communicate with multiple managers by modifying the following registry key:

```
HKLM\SYSTEM\CurrentControlSet\Services\svservice\Parameters
```

Add string values named ManagerN (where N is number from 0 to 9) and value data of App Volumes Manager FQDN.



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