

App Volumes User's Guide

App Volumes 2.6

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App Volumes User's Guide

The *App Volumes User's Guide* provides information about how to deploy and configure App Volumes.

Getting Started with App Volumes

The App Volumes solution enables quick, secure and inexpensive virtualization management of thousands of applications and virtual machines as if they were one.

This chapter includes the following topics:

“How App Volumes Works”

“Definition of Terms”

“App Volumes Manager”

“App Volumes Agent”

“System Requirements”

“Network Requirements”

“Privileges”

“Troubleshooting”

How App Volumes Approach Works

With App Volumes, applications are installed once into a portable container. Once created the container can be delivered to thousands of virtual machines in seconds.

In a virtual desktop environment, App Volumes provides the following benefits:

- Ease of management — Only install one copy of an application, update and upgrade the application from a single place.
- Storage cost savings — Store one copy of an application.
- Speed of deployment — Deploy an application within seconds to thousands of users or computers.

In a shared computing/RDSH environment, App Volumes provides the following benefits:

- Capacity, expansion, and contraction — Easily expand or contract your environment on demand, deploying applications to thousands of stateless servers within seconds.
- High availability — Applications are no longer tied to a particular computer or virtual machine. If there is a failure, easily move a workload (app/data) to any available stateless server and within seconds it is up and running again.

Definition of Terms

Active Directory

The Microsoft application that is a central location for network administration and security.

AppStack

A container with one or more installed applications.

Provisioning

Process of installing the application into the container called an AppStack.

Assignment

The entitlement between Active Directory entities (users, computers, groups and organizational units) with AppStacks.

Attachment

An attachment represents the availability of a volume (AppStack or Writable) on a computer.

Entity

ActiveDirectory entries - Users, Computers, Groups, Organizational Units.

Writable Volumes

Writable volumes are the option container where user-specific information can be stored, including: user/computer profile (optional), application settings, licensing information and User Installed Applications (UIA).

UIA

User Installed Applications.

GPO

Group Policy Object.

RDSH

Remote Desktop Shared Host.

VDI

Virtual Desktop Infrastructure

App Volumes Manager

Software that orchestrates and interfaces with IT infrastructure.

1. Orchestrates the required infrastructure components. Storage, Active Directory communications and if required hypervisor communications.
2. Provides the interface to create and manage AppStacks and Writable Volumes.
3. Manages assignments of volumes to user, groups Organizational Units and computers.
4. Provides archival information on the usage of AppStacks and Writable Volumes.

App Volumes Agent

File system and registry virtualization engine.

Communicates the following system events to the Manager:

1. Computer Startup
2. User Logon
3. User Logout
4. Computer shutdown

System Requirements

Component	OS/Other	Memory/CPU	Disk Space	Hypervisor
App Volumes Manager	Windows 2008 R2 Windows Server 2012 R2 .NET 3.5 SQL Express 2008 (local) SQL Server 2008 (remote)	4GB of Ram 2 vCPUs minimum 4 vCPUs ideal	1 Gigabyte	VMware vSphere 5.x with Virtual Center 5.x CIFS file share if using VHD mode. vCenter Datastore Browsing enabled (Enabled by default)
App Volumes Agent	Windows 7 64/32bit Windows 2008 R2 for VDI desktops and RDSH Write access for removable disks (provisioning and Writable Volumes)	1GB of Ram	5 Megabyte	

Microsoft Hotfix (KB2614892) should be applied in environments with multiple filter drivers (such as Anti-Virus engines or other application virtualization technologies).

The GPO "Control Read or Write Access to Removable Devices or Media" should be disabled. This will allow Volumes to be attached to the system.

Networking Requirements

Component	Purpose	Port Number
App Volumes Manager	Agent/Manager communications	80 (HTTP) 443 (HTTPS) 5985 PowerShell Web Services 5986 Horizon View Broker integration service.
Remote SQL Database (optional)	Database communication. Usually used in multiple Manager environments.	1433 (SQL)

Privileges

Installation and configuration of the App Volumes Agent/Manager requires full administrator rights: local or domain.

Note: For VDI, the end-users must have administrator privileges to install applications into their writable volumes (UIA).

Troubleshooting

If you encounter problems installing or configuring the software, accomplishing provisioning, or assigning AppStacks, please contact VMware Technical Support.

App Volumes Technical Support might ask you to gather log files from either the App Volumes Manager or App Volumes Agent. The LogCollector tool is provided with the .ISO. Place the LogCollector tool on the C: drive and run the following tools to collect log files on the affected virtual machine or system as the administrator:

SVLogCollector64.exe

SVLogCollector32.exe

Files are created in the below locations:

Manager:

C:\CloudVolumesLogs

Agent machine:

C:\CloudVolumesAgentLogs

Installing the App Volumes Manager

This section describes how to install the App Volumes Manager.

This chapter includes the following topics:

- “App Volumes Installation Wizard”
- “App Volumes Manager Installation Wizard”
- “Scalability”

App Volumes Installation Wizard

Note: The Manager and Agent share the same installer. Install the Manager before installing the Agent. This is required to provide the Manager DNS or IP address to the Agent during installation.

Procedure

1. Mount the .ISO provided to a virtual machine, or burn as a CD/DVD and navigate to the installation directory
2. Log on as Administrator.
3. Double click on the setup.exe in the Installation folder in Windows Explorer.
4. The App Volumes Installer Wizard opens, click **Next**.
5. Read and agree to the terms of End User License Agreement, click **Next**.
6. Select **Install App Volumes Manager** option, click **Next**.

What to do next

You will install App Volumes Agents after you install the App Volumes Manager.

App Volumes Manager Installation Wizard

Procedure

1. From the introduction screen, click **Next**.
2. Select desired database.
 - a. Install local SQL Server 2008 Express Database - Select this option if you have not installed the database and would like one to be installed on this machine.
 - b. Connect to an existing SQL Server 2008 Database - Select this option if you have an existing "external" SQL Server database available
3. Click **Next**.

Note: For redundancy it is possible to have multiple App Volumes Managers connected to a single remote SQL Database farm or cluster.

4. Enter the HTTP and HTTPS the ports the Manager service will listen on (defaults HTTP:80, HTTPS:443), click **Next**.
5. Enter the local or remote database server, authentication method, name the database to use or create and whether to overwrite the existing database (if any), click **Next**.
6. Set the program installation path, click **Next**.
 - a. To change the installation path, click **Change** (non-ASCII characters are not supported).
 - b. To check whether you have enough disk space for the installation, click **Space**.
7. Click **Install**.

The App Volumes Manager will be installed on the system.

8. App Volumes Installation Wizard has completed the process, click **Finish**.
 - a. Select the checkbox to see the Windows Installer log if desired, click **Finish**.

The App Volumes Manager software has been installed.

Configuring App Volumes Manager

This section describes how to configure the App Volumes Manager.

This chapter includes the following topics:

- “Getting Started”
- “Active Directory”
- “App Volumes Administrators Group”
- “Hypervisor Credentials”
- “Storage”
- “VHD In-Guest Mode”

Manager will need to be configured after installation and before the Agent installation.

Getting Started

The installed App Volumes Manager icon appears on the Windows Start menu and on the desktop.

Procedure

1. From the Start menu, select App Volumes Manager or click on the desktop icon.
2. Click **Get Started**.

What to do next

Setup Active Directory.

Active Directory

App Volumes uses Active Directory for assignment of AppStacks and Writable Volumes to Users/Groups/Organizational Units and Computers.

Note: User names for Active Directory must contain only ASCII characters.

Procedure

1. Enter the following information:

- a. Active Directory Domain Name
- b. DC Host Name (Optional)

The domain controller for the domain is normally automatically discovered, but if it is different, it can be explicitly specified here.

- c. LDAP Base (Optional)
- d. User name (Requires only read-only access to the Active Directory)
- e. User password

2. To enable secure communication with Active Directory, select **Use LDAPS**.

3. Assign and Attach volumes to non-domain entities (users and computers) for provisioning operations only, click **Next**.

Note: Enable this feature only if you have computers and/or users that will be using App Volumes and do not have a domain account.

What to do next

Set up Active Directory Administrative Groups.

App Volumes Administrators Group

The configured administrator group determines which Active Directory service account can login into and perform functions in the Manager. The AD service account user is not required to be in the Administrator Group.

Procedure

1. Enter the full (or partial) name of a group and press search (or press search without any text to search all). After entering the name of the group, the group will be selectable from the pull down menu.
2. Click **Next**.

What to do next

Provide Hypervisor credentials.

Hypervisor Credentials (applies to vCenter and VHD In-Guest Mode)

From the Hypervisor drop down menu select either vCenter Server or [VHD] In-guest Mounting.

Procedure

For vCenter Server

1. Enter the vCenter Server hostname FQDN or IP Address.
2. Enter vCenter Server Service Account user name.
3. Enter password for vCenter Server Service Account.

"Mount Local" - When a volume is mounted, the manager will check the datastore where this virtual machine files is located to see if an AppStack with the exact same path and filename are present. If the volume is found there, it is mounted from this location instead of the default datastore location.

"Mount on Host" - Issue a volume attach command directly to ESX servers as apposed to vCenter. This feature can be used to increase performance.

This requires the admin to enter a username and password that must be the same for all ESX hosts. The UI will verify that it can connect to all previously seen ESX server hosts when this is configured.

For ESX (Single Host)

1. Enter the ESX Server hostname FQDN or IP Address.
2. Enter ESX Server Service Account user name.
3. Enter password for ESX Server Service Account.

Note: Once the Hypervisor type is configured, it cannot be changed.

For VHD In-Guest Mounting

1. No additional configuration is required.

What to do next

Configure Storage.

Storage

Configuring the default storage location and default paths for App Stacks and writable volumes.

Procedure

1. Select Add Available Storage from the Default Storage Location menu.

Note: The button to Add Available Storage is only available when the Manager is configured to use In-Guest VHD mode. Otherwise the list of storage locations (datastores) is populated from vCenter.

2. Supply the location path.
3. Review the datastore information.
4. Click **Next** to be prompted to import volumes from the selected locations if desired. You can do this immediately or in the background.
5. Click **Set Defaults**.
6. Verify that the settings are correct on the **Summary** tab. **Edit** these settings from the **Configuration tab** on the App Volumes Manager page.
7. Click **Next**.

The App Volumes Manager is now configured.

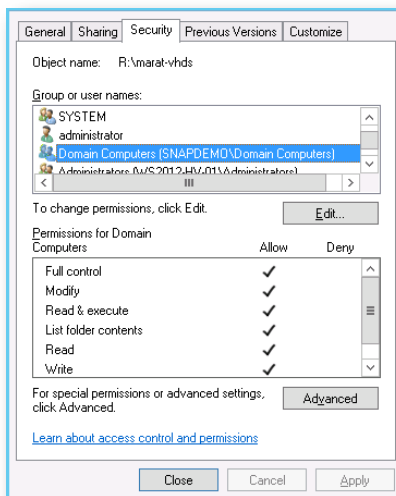
VHD In-Guest Mode

Only if using VHD In-Guest, complete the following:

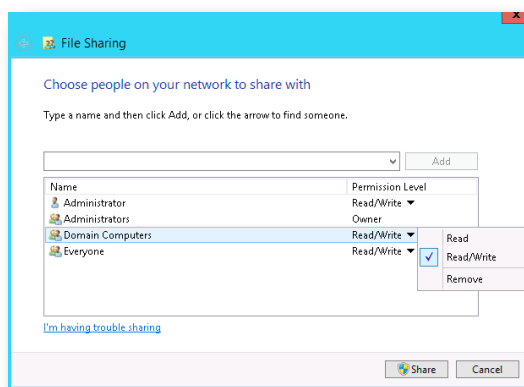
1. Place “App Volumes” folder (located in the .ISO file under \Hypervisor\In-Guest VHD) on network share, for example:

\\server\vhds\App Volumes\....

2. Add domain computers under sharing and security tabs. (full control). This should be done for \\server\vhds (Tips: These settings should be done locally on the network



shared with the virtual machine, otherwise you won't have these tabs)



What to do next

Install the App Volumes Agent.

Installing the App Volumes Agent

Note: The Manager and Agent share the same installer. Install the Manager before installing the Agent. This is required to provide the Manager DNS or IP address to the Agent during installation.

Installation

Procedure

1. Log on to the virtual machine as **Administrator**.
2. Double-click on the **setup.exe icon** in the Installation folder for Windows Explorer.
3. On the Welcome to the App Volumes Installer wizard page, click **Next**.
4. On the License Agreement page, accept the terms, click **Next**.
5. Select Install App Volumes Agent, click **Next**.
6. The App Volumes Agent Installation Wizard, click **Next**.
7. Enter the App Volumes Manager host name or IP address and port, click **Next**.
8. Click **Install**.
9. Wait for installer completion, click **Finish**.

Important: You must restart your system. You can do so now or later.

10. Click **Yes** to restart the App Volumes Agent right away.

What to do next

After the App Volumes Agent restarts, the system is ready to use.

Tip: If you intend to use this virtual machine as a provisioner of applications, then you should create a “clean” snapshot of this machine. Revert to this snapshot before provisioning new AppStacks.

AppStacks

This section describes how to create AppStacks, provision applications, assign AppStacks.

This chapter includes the following topics:

- “Creating an AppStack”

- “Provisioning”

- “Install Apps”

- “Edit an AppStack”

- “Update an AppStack”

Creating an AppStack

Procedure

1. Go to the App Volumes Manager.
2. Select the **Volumes** tab.
3. If you are not on the AppStacks page, select the **AppStack** sub tab.
4. Click **Create AppStack**.
5. Enter a name for the AppStack.
6. The storage field is populated with the name of your default datastore. Use the pull-down menu to select a different datastore.
7. Set the path for the volume.

The Path (the path to the apps_templates and writable_templates file on the datastore) was created during the initial setup process.

Users can change the path to further sub-categorize volumes if desired. For Example:

For Example: "cloudvolumes/apps/your_folder" is recommended, whereas "my_volumes" might work, but is not ideal due to possible collisions with other software.

8. Select a template for the AppStack.
9. Supply a description (optional).
10. Click **Create**.

If choosing to have the volume created in the background, the volume will not immediately appear on the next screen. Reload the page after the job has completed (a job spinner in the upper right corner).

11. A pop-up will ask if they would like to have the volume created in the background or immediately. Verify the data and click **Create** again.

What to do next

Provision the App Stack.

Provisioning

Important: The provisioning of AppStacks must be performed on a clean base image; that being a machine that resembles as closely as possible 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.

Provisioning must be done on a machine that did not have any AppStacks previously assigned to it. If there were any AppStacks assigned to the virtual machine, or the virtual machine has been used for Provisioning before, that virtual machine should be set back to the clean snapshot before provisioning a new AppStack. For more information please refer to the Provisioning Best Practice section of this guide.

Procedure

1. Find the name of the AppStack you have created and click anywhere on the row.

The row expands and the Provision and Delete buttons are revealed.

Note: The AppStack's status is "Un-provisioned", indicating that the provisioning process is not yet complete.

2. Click **Provision**.
3. Enter search criteria into the search box.

The search function will perform a string search using the characters entered into the search box. Only machines running the Agent configured to this Manager will be shown in the results. Using no characters will return all machines configured to the manager. Select the correct machine being used for AppStack provisioning. Additional information on the configuration of the provisioning machine can be found in the Provisioning Best Practice section of this guide.

4. Click **Search**.
5. Select the appropriate machine for provisioning from the list.
6. Click **Provision**.

Click **Start Provisioning**. From the "Confirm Start Provisioning" pop-up

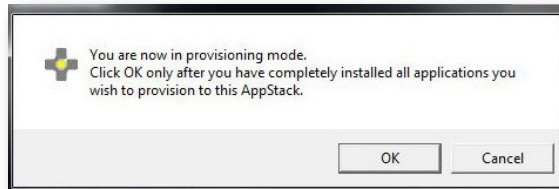
What to do next

Install your applications.

Install Apps

Procedure

1. Log in to the provisioning machine. A pop-up will be displayed to inform you that the machine is now in a provisioning state.



2. Install your applications. It is safe to reboot the machine during the provisioning process. After reboot the pop-up will be displayed to inform you that the machine is still in a provisioning state.
3. Click **OK**. Click **Yes** to confirm you have completed application provisioning. Wait for the final provisioning complete pop-up. Click **OK** to reboot the machine.

The system will reboot.

4. Log in to the provisioning machine. You should now see a pop-up stating that the provisioning process has completed successfully.
5. Click **OK**.
6. Return to the App Volumes Manager, The AppStack will now be ready to assign.

Once an AppStack is provisioned additional options are available from the Volumes > AppStacks subtab.

“Assign”
“Update”
“Edit”
“Delete”
“Import AppStack”

Assign an AppStack

Procedure

1. Click **Assign**.
2. Enter search criteria into the search box.

The search function will perform a string search against AD using the characters entered into the search box. Using no characters will return all AD objects. Select the correct AD object (User, Group, OU, Computer) being used for AppStack assignment.

3. Select the AD object from the list and click **Assign**.
4. Select to assign on next login or reboot or immediately. This option is given to the admin in a confirmation dialog box. If "Immediately" is selected, the AppStacks will be attached in "real-time" to any computers the user is currently logged into. click **Assign**.

Update an AppStack

Procedure

1. Click **Update**.
2. Enter a name for the AppStack. This AppStack will be created from a copy of the original.
3. The storage field is populated with the name of your default datastore. Use the pull-down menu to select a different datastore.
4. Set the path for the volume.

The Path (the path to the apps_templates and writable_templates file on the datastore) was created during the initial setup process.

Users can change the path to further sub-categorize volumes if desired. For Example:

For Example: "cloudvolumes/apps/your_folder" is recommended, whereas "my_volumes" might work, but is not ideal due to possible collisions with other software.

5. Select a template for the AppStack.
6. Supply a description (optional).
7. Click **Create**.

If choosing to have the volume created in the background, the volume will not immediately appear on the next screen. Reload the page after the job has completed (a job spinner in the upper right corner).

8. Find the AppStack and click anywhere on the row.
9. Click **Provision**.
10. Enter search criteria into the search box.

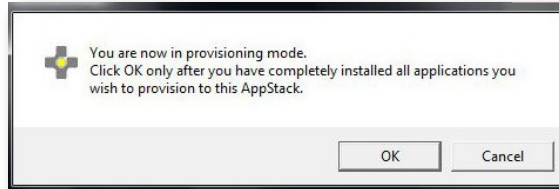
The search function will perform a string search using the characters entered into the search box. Only computers running the Agent configured to this Manager will be shown in the results. Using no characters will return all machines configured to the manager. Select the correct machine being used for AppStack provisioning. Additional information on the configuration of the provisioning machine can be found in the Provisioning Best Practice section of this guide.

11. Click **Search**.

12. Select the appropriate machine for provisioning from the list.
13. Click **Provision**.

Click **Start Provisioning**. From the “Confirm Start Provisioning” pop-up

14. Log in to the provisioning machine. A pop-up will be displayed to inform you that the machine is now in a provisioning state.



15. Install your applications. It is safe to reboot the machine during the provisioning process. After reboot the pop-up will be displayed to inform you that the machine is still in a provisioning state.
16. Click **OK**. Click **Yes** to confirm you have completed application provisioning. Wait for the final provisioning complete pop-up. Click **OK** to reboot the machine.

The system will reboot.

17. Log in to the provisioning machine. You should now see a pop-up stating that the provisioning process has completed successfully.
18. Click **OK**.
19. Return to the App Volumes Manager, The AppStack will now be ready to assign.

Important: Un-assign the original AppStack before you assign the updated AppStack.

Edit an AppStack

When an AppStack is provisioned, it will automatically be associated to the Operating System type it was provisioned on. It will only be attached to that exact same OS type unless otherwise specified. Administrator user can go to the Edit AppStacks section to change the OS that each AppStack might be attached on.

Procedure

1. Change the display name of the AppStack.
 - a. Filename and path are not editable.
2. Supply a description (optional).
3. Select additional Operating Systems. Not all OS configurations are supported. Please refer to the currently Release notes for supported OS.

Delete an AppStack

Procedure

1. Click **Delete**.
2. Click **Delete** on Confirm Delete Pop-Up. This will delete the database entry *and* the underlying VMDK or VHD.

Import an AppStack

For already created AppStacks, click on Import AppStack to import them.

Files available at the same path and filename on different datastores are considered to be copies of each other. Each AppStack now has a Locations count and pop-up display to show the child files. When mounting, only 1 file for each AppStack will be attached. This is determined by whether or not the target virtual machine can access the storage. When multiple files are eligible, the file with the least amount of active attachments (by other users) is used.

Procedure

1. Go to the App Volumes Manager.
2. Click **Writables** (sub-tab of **Volumes**).
3. Click **Import Writable Volume**.
4. Select volume, click **Import**.

Writable Volumes

This chapter includes the following topics:

- “Creating a Writable Volume”
- “Import a Writable Volume”
- “Update a Writable Volume”
- “Rescan for Volumes”
- “Reassign Writable Volumes”

Creating a Writable Volume

Procedure

1. Go to the App Volumes Manager.
2. Click **Writables** (sub-tab of **Volumes**).
3. Click **Create Writable Volume**.
4. To search existing users, type the name of the user, group or computer and click **Search** to query Active Directory. User Principal Name (user@domain.local) and Down-Level Logon Name (domain\user) formats can be used.
5. Select one or more users, groups, or computers to create a writable volume.
 - a. The Destination Storage is populated with the name of the default datastore. Use the pull-down menu to select a different datastore or storage group.
 - b. The Destination Path was created during the initial setup process. Modification is optional.
 - c. Prevent user login if the writable is in use on another computer.
 - d. Limit the attachment of user Writables to specific computers.
 - e. Delay writable creation for group/org members until they login.

Click **Help Link (?)** for more information.

Note: If choosing a group, then individual writable volumes will be created for each member of that group. This can be delayed until the first time they login by using the “delay” checkbox.

6. Click **Create**.

The software begins to create the writable volume. A status bar is displayed.

When creating writable volumes for a group, the software schedules the task in the background. Once writable volumes are created, they are visible under the Writable Volumes tab. The software creates an individual writable volume for each member of that group.

The writable volume is now created.

Groups are recursed, meaning that users/computers in sub-groups will also receive volumes. However, when creating writables for Organization Units, groups are not recursed.

What to do next

Writable Volume Status is now enabled and ready to use.

Note: After detaching a Writable Volume the machine should be rebooted or refreshed. The destination system should not have a local profile of the user logging in with a writable volume.

Import a Writable Volume

For already created writable volumes, click on Import Writable Volumes to import them now.

Procedure

5. Go to the App Volumes Manager.
6. Click **Writables** (sub-tab of **Volumes**).
7. Click **Import Writable Volume**.
8. Select volume, click **Import**.

The software begins to import the writable volume. A status bar displays.

Once writable volumes are imported, they are visible under the Writable Volumes tab. The software creates an individual writable volume for each member of that group.

What to do next

Writable Volume Status is imported, enabled and ready to use.

To disable/enable the writable volume, click the checkbox next to the name of the writable volume. To delete a writable volume, click the checkbox next to the writable volume name and click Delete.

Update a Writable Volume

Updating a writable volume allows an administrator to create a package of files that will be created/updated in each writable volume when it is next attached. This can be used to modify the policy and behavior of the Writable Volume. The zip file must be smaller than 5Mb. The files are placed into the root of the Writable Volume.

Procedure

1. Go to the App Volumes Manager.
2. Click **Writables** (sub-tab of **Volumes**).
3. Click **Update Writable Volume**.
4. Browse and select desired zip file.
5. Click **Upload**.

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

What to do next

Writable Volume Status is imported, enabled and ready to use.

Rescan for Volumes

To update AppStacks and Writable Volume information from the datastore, click Rescan. Rescan exists to ensure the writable volume files on the datastore are still present and accessible. It only checks known volumes. If new writables have been added to the datastore (from a different manager), use Import to make this manager aware of them.

Procedure

1. Go to the App Volumes Manager.
2. Click **Writables** (sub-tab of **Volumes**).
3. Click **Rescan**.

Reassigning Writable Volumes

After you have created a writable volume for a computer, you can reassign the writable volume to another computer.

Procedure

1. Open App Volumes Manager and click on the **Directory** tab.
2. Click **Computers** sub-tab.
 1. Select the computer that contains the writable volume to reassign.
 2. Look for the Writable Volume section and find the volume name to reassign.
3. Click **Reassign**.
4. Select the computer where to reassign the writable volume.
5. Click **Reassign**.

Confirmation page displays the page for the computer reassigned the writable volume is displayed.

What to do next

To return to the page for the original computer, click **Computers**.

Note: If there are no writable volumes appearing in the Writable Volume section, all writable volumes have been reassigned.

Assigning AppStacks

Assign an AppStack to users, groups, and/or computers. Once assigned the AppStack, the application will deploy within seconds in real time, or next login.

This chapter includes the following topics:

- “Assigning AppStacks to Users and Computers”

- “Assigning AppStacks to Users”

- “Assigning AppStacks to Computers”

- “Reordering the AppStacks”

Assigning AppStacks to Users and Computers

Procedure

1. To expand the AppStack row, click **(+)** or the **Row**.

The **Assign**, **Edit**, and **Delete** buttons are revealed. To view a list of applications, click **Applications**. Current assignments and attachments can also be viewed with the row expanded

2. Click **Assign**.
3. Type a search string to find the name of the entity to assign the AppStack.

Check "Search all domains in the Active Directory forest" (if necessary). User Principal Name string searches (search_term@domain.local) and Down-Level Logon Name string searches (domain\search_string) are supported.

4. Click **Search**.

The software finds the name of the entity to assign the AppStack. Click on **Row** to select user.

5. Administrator can limit the assignment to a specific computer. Entering a prefix for the computer name(s) to match does this. For example, enter "Win7-" to match any computer with a name that begins that with "Win7-" such as "Win7-64-user".
6. Click **Assign**.

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

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

7. Select and click **Assign**.

The AppStack has been assigned to users and computers.

Assigning AppStacks to Users

Using the Users sub-tab to assign AppStacks to users.

Procedure

1. Select **Directory > Users**.
2. Select the desired user.
3. Click **Assign AppStack**.
4. Select the AppStack to assign to the user.

Note: The chain-link icon on a row indicates that the AppStack is already assigned to the user.

5. Click **Assign**.

The AppStack has been assigned to the user.

Assigning AppStacks to Computers

Using the Computers sub-tab to assign AppStacks to a computer.

Procedure

1. Select **Directory > Computers**.
2. Select the desired computer.
3. Click **Assign AppStack**.
4. Select the AppStack to assign to the user.

Note: The chain-link icon on a row indicates that the AppStack is already assigned to the computer.

5. Click **Assign**.

The AppStack has been assigned to the computer.

AppStack Precedence

If there are two applications in conflict, reordering the AppStack can resolve the conflicts. This feature can also be used to force a specific application to be used as a default over another (Use Quicktime to open a .MOV file instead of Media Player). Previously, the user could have both Adobe 9 and Adobe 10.x AppStack attached, although Adobe 9 and Adobe 10.x cannot co-exists natively. App Volumes makes this possible. When users double-click a PDF file on the desktop, only one Adobe Reader will be launched. If Adobe 9 was on top of Adobe 10.x in the "Assigned AppStacks" list, Adobe 9 will get the priority so it will be the default PDF reader application. If user wants to modify this, the reordering feature will allow customers to adjust the stack order so Adobe 10.x can be default PDF reader to use.

Use the "Override Precedence" check box on Directory > Users sub tab or Directory > Computers sub tab. The arrow icons will show up on the left side of AppStacks, to show that the AppStack can be reordered. Drag and Drop the AppStack to change the order of each AppStack.

If the AppStack is greyed out, this AppStack cannot be reordered. It could be that this AppStack is in a group assignment. Group Assignments can reordered from the Directory > Groups sub tab.

Additional Manager Features

This section discusses the App Volumes Manager feature tabs.

This chapter includes the following topics:

- “Dashboard Tab”
- “Infrastructure Tab”
- “Activity Tab”
- “Directory Tab”
- “Configuration Tab”

Dashboard Tab

The Dashboard tab displays the following information:

- The number of user and server licenses in use
- User utilization
- Most recent user logins
- Computer utilization
- Most recent computer logins
- AppStack utilization
- Most recent AppStack attachments

Infrastructure Tab

The Infrastructure tab displays the following information:

Machines Sub-Tab

Manager assigned machines. This represents actual virtual machines and is different from Active Directory Computers.

Storage Sub-Tab

Manager assigned storage locations.

Storage Groups Sub-Tab

Storage groups are a logical grouping storage locations. It allows the Manager to distribute writeable volumes and assist in AppStack replication.

1. Select the **Storage Groups** tab.
2. Click **Create Storage Group**.
3. Enter a name for the group.
4. Select the automation strategy for the group.
5. There is a checkbox available when creating a storage group to **Automatically Import AppStacks**. When enabled, all storage locations in the group are checked for new AppStacks every 15 minutes. This is intended to be combined with AppStack Grouping so that new volume files are automatically imported.
6. **Automatically Replicate AppStacks** will synchronize all AppStacks to all other storage locations within the selected Storage Group
7. Set the **Distribution Strategy** from the pull down menu.

Note: Distribution strategy only applies to Writable Volumes.

The distribution strategy determines how files are distributed across the group.

Spread - Distribute files evenly across the group.

Spillover - Distribute files by filling each storage location completely before moving to the next location.

Round-Robin - Distribute files sequentially across the locations.

8. Select a template storage location from the pull down menu. This is for Writable Volumes only
9. Make the storage selection from the pull down.

You make select **Direct** (manual selection of locations) or **Automatic**. Entering a prefix for the computer name(s) to match does this. For example, enter "Win7-" to match any computer with a name that begins that with "Win7-" such as "Win7-64-user".

10. Click **Create**.

Activity Tab

The Activity tab has three sub-tabs: Pending, Activity Log, System Messages, and Pending Actions.

Pending Actions Sub-Tab

The Pending Actions sub-tab shows actions waiting to be performed in the background and will be completed in the order submitted.

Activity Log Sub-Tab

The Activity Log sub-tab shows records of system activity such as user logins, computer power-ups, volume attachments, etc.

System Messages Sub-Tab

The System Messages sub-tab shows messages and errors generated by internal events such as volume attachment, Active Directory access, etc.

Directory Tab

The Directory tab provides the ability to Sync Users and Groups by contacting AD and updating the version of the record. This can be used after an AD record is updated. App Volumes automatically syncs in the background. Updates can be forced as well.

Configuration Tab

Change the settings specified during App Volumes Manager configuration. There are five sub-tabs: License, Active Directory, Administrators, Hypervisor, and Storage.

License Sub-Tab

The License sub-tab contains information on the license. A valid license issued by App Volumes is required to use this management console.

Active Directory Sub-Tab

The Active Directory sub-tab provides information about your active directory. App Volumes uses the Active Directory to assign AppStacks to users, computers, and groups.

Administrators Sub-Tab

The Administrators sub-tab enables the choice of the Active Directory group responsible for administering the App Volumes Manager.

Hypervisor Sub-Tab

The Hypervisor sub-tab enables you to specify the logon credentials to the VMware vCenter.

Storage Sub-Tab

The Storage sub-tab enables you to set the default database where AppStacks and writable volumes are stored.

Notes: Always use a shared storage unless all virtual machines exist on one ESX server. Local storage can only be used by virtual machines located on the same physical host as the storage.

For vCenter, the datastores selected on this page for AppStacks and writable volumes must reside in the same datacenter. This limitation exists to avoid the possibility of datastore name collision (datastore1 on DC1 vs datastore1 on DC2). Users that want to control multiple datacenters can come back to this screen and change the default datastore to create volumes on a different datacenter.

Horizon View Integration Service

The following section guides you through the optional installation of the App Volumes integration services on a Horizon View connection server.

This optional feature allows the Horizon View Integration service to pre-mount AppStacks prior to user login.

Prerequisites

- VMware Horizon View
- App Volumes Manager

Procedure

1. Run the VMware App Volumes installer on a Horizon View server.
2. Select **Install App Volumes Broker Integration Service**.
3. Enter the App Volumes Manager address/port when prompted.
4. Click **Next**.

Note: Verify connection to the manager by accessing it on a supported web browser before installing the service.

Provisioning Best Practices

This section provides a set of best practices for provisioning AppStacks

- For applications requiring tight OS integration and dependencies (such as Internet Explorer), it is recommended to use an application isolation technology such as VMware ThinApp. App Volumes can then be utilized to deliver the ThinApp Package.
- To perform provisioning, the provisioning user must be logged in as an administrator on the provisioning virtual machine.
- The provisioning system should not have the following installed or enabled; Anti Virus agents, Windows updates, any other filter driver applications.
- Ideally the provisioning virtual machine would be joined to the same domain as the production virtual machine but not required. This is varies dependent on the applications being provisioned.
- Some application requirements and licensing models require the provisioning machine share a common SID with the production machine (such as Microsoft Visual Studio).
- Virtual machines used for provisioning 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 the clean-state (snapshot).
- Applications must be provisioned and delivered to the same OS type (32 vs 64 bit). An application provisioned on a 32bit OS cannot be delivered to a 64bit OS and vice versa.
- If the provisioning virtual machine has a service pack, such as Service Pack 1, all virtual machines delivering applications must be at the same service pack level (or newer).
- While not required, for best performance application dependencies (such as Java, or .NET) should be included in the same AppStack as the application.
- When provisioning an application, always install the application for “All Users”. This ensures the application installs under Program Files rather than user profile itself. This will also allow for the creation of any icons to be placed in the “All Users” folder.

App Volumes with Microsoft Office

App Volumes supports KMS based licensing for Office. As result, MLF ISO media (available from the Microsoft Volume Licensing Service Center) must be used. KMS server/license details can be added during the provisioning process (by running ospp.vbs with appropriate options), or the default KMS discovery process will be used along with the default KMS license keys typically embedded in MLF ISO media.

The entire suite of Microsoft Office applications stores its product and license information in a common data file. No special user interaction is required and this process is completely seamless to the user. All product information is stored in a single data file. The following limitations exist:

- To deliver Office applications via App Volumes, all Office applications must be in a single AppStack.

Note: Use Windows 2008 R2 based RDSH for best functionality results.

Note: To ensure search works with Outlook across different virtual machines, disable the "Windows Search" service. Email search will still work with the service disabled.

Only one AppStack with Office components can be attached at a time. However it can be used in many different configurations.

Example 1: Office in the base, and Visio as an AppStack

Example 2: Office in the base, and Project as an AppStack

Example 3: Office in the base, and Visio AND Project together as one AppStack

Example 4: Office and Visio in the base, and Project as an AppStack

Example 5: Office and Project in the base, and Visio as an AppStack

Example 6: Office, Visio, and Project as ONE AppStack

Provisioning an Office AppStack

Procedure

1. Provision all appropriate Office applications into a fresh AppStack.
2. Do not open any Microsoft Office applications during the provisioning process.
3. Launch a Command prompt as Administrator. Go to the location of the version of office for office 2010. change directory to `c:\Program files\Microsoft office\Office 14` for Office 2013 goto `c:\Program files\Microsoft office\Office 15`. Output of the command must be that the setting has been made successfully.
 - For Office 2010: run command `cscript ospp.vbs /sethst:kmsserver.yourKMSserver.com`
 - For Office 2013: run command `cscript ospp.vbs /sethst:kmsserver.yourKMSserver.com`
4. Run command `cscript ospp.vbs /act`.

Note: Output of the command must be that Office is activated successfully.

Google Chrome and Writable Volumes

This section provides instructions for installing Google Chrome or Chrome Plug-ins to a writable volume.

Procedure

In order for Google Chrome to work properly with a writable volume, the writable volume must be assigned a drive letter. To give the writable volume a drive letter, follow the instructions in the **Granular Configuration Settings** section to define the Windows registry value `WritableVolumeDL` and set it to 1. If you want to hide this drive letter from end users, you can enable the GPO described in Microsoft KB231289.

Granular Configuration Settings

Batch Files Used in AppStacks and Writable Volumes

Batch scripts are called at the time a volume is dynamically attached, or at various point during system startup and logon. They are used sequentially and **only** if present in the AppStack or Writable volume. If not present in the volume the batch file will be skipped.

For example if you immediately assign a volume to a system and there is a user 'user1' logged in, what you would see in chronological order is:

prestartup.bat

Runs as SYSTEM (if the volume is attached from boot, this will run when svservice starts)

startup.bat

Runs as SYSTEM (if the volume is attached from boot, this will run when svservice starts)

shellstart.bat

Runs as 'user1' (if the volume is attached before the user logs in, this is called just before the Windows shell launches)

startup_postsvc.bat

Runs as SYSTEM (but only if there are services/drivers on the volume)

logon_postsvc.bat

Runs as 'user1' (but only if there are services/drivers on the volume)

allvolsattached.bat

Runs as 'user1' (if multiple volumes are all attached at the same time such as during logon, this is called only once)

These scripts can contain any scriptable action for use at various points during the volume attach and virtualization procedure. These scripts are case sensitive and should be modified and added with caution.

Optional wait times for batch files can be set. Wait times are defined in seconds using an optional registry key (type REG_DWORD). Optional values are defined at the following registry path:

HKLM\SYSTEM\CurrentControlSet\services\svservice\Parameters

Keys can also be created via command line on the agent machine, for example:

```
reg.exe add HKLM\SYSTEM\CurrentControlSet\services\svservice\Parameters /v  
KeyValve /t REG_DWORD /d 60
```

List of Batch files

- **prestartup.bat**

Called as SYSTEM when a volume is dynamically attached or on during system startup but before virtualization is activated.

Optional wait time key: **WaitPrestartup** (default do not wait).

- **startup.bat**

Called as SYSTEM when a volume is dynamically attached or on during system startup.

Optional wait time key: **WaitStartup** (default do not wait).

- **startup_postsvc.bat**

Called as SYSTEM and called after services have been started on the volume (not called unless there are services on volume).

Optional wait time key: **WaitStartupPostSvc** (default do not wait).

- **logon.bat**

Called as <USER> at logon and before Windows Explorer starts.

Optional wait time key: **WaitLogon** (default wait until it finishes).

- **logon_postsvc.bat**

Called as <USER> after services have been started (not called unless there are services on volume).

Optional wait time key: **WaitLogonPostsvc** (default do not wait).

- **shellstart.bat**

Called as <USER> when a volume is dynamically attached or when Windows Explorer starts.

Optional wait time key: **WaitShellstart** (default do not wait).

- **shellstop.bat**

Called as <USER> when user is logging off before Windows Explorer is terminated.

Optional wait time key: **WaitShellstop** (default do not wait).

- **logoff.bat**

Called as <USER> at logoff and after Windows Explorer has terminated.

Optional wait time key: **WaitLogoff** (default do not wait).

- **shutdown_presvc.bat**

Called as LOCALSYSTEM when the computer is being shut down before services have been stopped.

Optional wait time key: **WaitShutdownPresvc** (default do not wait).

- **shutdown.bat**

Called as LOCALSYSTEM when the computer is being shut down after services have been stopped.

Optional wait time key: **WaitShutdown** (default do not wait).

- **allvolattached.bat**

Called as <USER> after all volumes have been processed (so if user has 3 AppStacks, this will be called after all 3 have loaded).

Optional wait time key: **WaitAllvolattached** (default do not wait).

- **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 at the point of clicking the provisioning complete pop-up while the volume is still virtualized.

Optional wait time key: **WaitPostProv** (default wait forever).

- **prov_p2.bat**

Invoked at phase 2 of the provisioning process. After the machine has rebooted but before App Volumes Manager has been notified that provisioning has completed. This is the last chance to perform any actions to the provisioned volume with virtualization disabled.

Optional wait time key: **WaitProvP2** (default wait forever).

App Volumes Service Registry Options

The App Volumes virtualization engine comprises two major components, the 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 communication with the App Volumes Manager.

SVDriver Configuration Parameters

Registry keys and optional values are set at the configuration key path HKLM\SYSTEM\CurrentControlSet\services\svdriver\Parameters.

Keys can also be created on the agent machine using a command line shown in the example below:

```
reg.exe add HKLM\SYSTEM\CurrentControlSet\services\svdriver\Parameters /v  
Key\Value /t REG_DWORD /d 60
```

Values

LogFileSizeInKB

This is to specify the size of the log file before rotating the log file. If undefined, default is 51200 (50MB).

DriveLetterSettings

To remove, hide or show drive letters for AppStacks and Writable volumes

```
DRIVELETTER_REMOVE_WRITABLE 1 (bit 0)  
DRIVELETTER_REMOVE_READONLY 2 (bit 1)  
DRIVELETTER_HIDE_WRITABLE 4 (bit 2)  
DRIVELETTER_HIDE_READONLY 8 (bit 3)
```

The default registry value is 6. this will hide the writable volume's drive letter and remove AppStack drive letters.

ReorderTimeOutInSeconds

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

If this value is 1, only changes to data will be preserved on a writable volume. If this value is 0 changes to data and file attributes (hidden, Read Only, etc) permissions will be preserved on Writable Volume.

EnableShortFileName

For legacy AppStacks created prior to 2.3 this setting should be set to 0 to disable DOS shortnames.

EnableRegValueMerging

If this value is 1 merge certain registry values such as ApplnitDlls across volumes. This is action is additive across the volumes.

SVservice Configuration Options

Registry keys and optional values are set at the configuration key path HKLM\SYSTEM\CurrentControlSet\services\svservice\Parameters.

Keys can also be created on the agent machine using a command line shown in the example below:

```
reg.exe add HKLM\SYSTEM\CurrentControlSet\services\svservice\Parameters /v
Key\Value /t REG_DWORD /d 60
```

Logging related Values**LogFileSizeInKB**

This is to specify the size of the log file before rotating the log file.

If undefined, default is 5120 (5MB).

Timing related Values**MaxDelayTimeOutS**

Defined in seconds the maximum wait for a response from the App Volumes Manager. If set to 0, wait forever.

If undefined, default is 2 minutes.

ResolveTimeOutMs

Defined in milliseconds for name resolution. If resolution takes longer than this time-out value, the action is canceled.

If undefined, default is to wait for completion.

ConnectTimeOutMs

Defined in milliseconds for server connection requests. If a connection request takes longer than this time-out value, the request is canceled.

If undefined, default is 10 seconds.

SendTimeOutMs

Defined in milliseconds for sending requests. If sending a request takes longer than this time-out value, the send is canceled.

If undefined, default is 30 seconds.

ReceiveTimeOutMs

Defined in milliseconds to receive a response to a request. If a response takes longer than this time-out value, the request is canceled.

If undefined, default is 5 minutes.

ProvisioningCompleteTimeOut

Defined in seconds to keep trying to contact the App Volumes Manager after provisioning is completed. If undefined, default is 120

DomainNameWaitTimeOut

Defined in seconds how long to wait for the computer during startup to resolve Active Directory domain name. On non-domain joined machines this can be set to 1 allowing for a faster log in time.

If undefined, default is 60.

WaitInstallFonts

Defines how long to wait in seconds for fonts to be installed

If undefined, default is to not wait for completion.

WaitUninstallFonts

Defines how long to wait in seconds for fonts to be removed

If undefined, default is to not wait for completion.

Volume Behavior Parameters**WaitForFirstVolumeOnly**

Defined in seconds, only hold logon for the first volume. Once first volume is complete the rest will be 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.

If undefined, default is 1.

VolWaitTimeout

Defined in seconds, how long to wait for a volume to be processed before ignoring the volume and proceeding with the logon process.

If undefined, default is 180.

VolDelayLoadTime

Defined in seconds, how long 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 value is greater than VolWaitTimeout it will be reduced to the value of VolWaitTimeout. This may speed up login time by delaying the virtualizing of applications until after logon is complete.

If undefined, default is 0 (do not delay load time)

CleanSystemWritable

If set to 1 and no writable volume is 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.

Services, Drivers and General Behavior Parameters**RebootAfterDetach**

If set to 1, automatically reboot the system after a user logs off.

If undefined, default is 0.

DisableAutoStartServices

If set to 1, Do not automatically start services on volumes after attach

If undefined, default is 0.

HidePopups

If set to 1, svservice.exe will not generate popups.

If undefined, default is 0.

DisableRunKeys

If set to 1, applications in the Run key will not be called. This will be in both AppStacks and writable volumes.

If undefined, default is 0.

