

VMware App Volumes User Guide

VMware App Volumes 2.7

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Updated Information

This *VMware App Volumes User Guide* is updated with each release of the product or when necessary.

This table provides the update history of the *VMware App Volumes User Guide*.

Version	Description
VMware App Volumes 2.7	Added the following information: <ul style="list-style-type: none">▪ Trusted Domain Credentials▪ Active Directory Synchronization▪ Delete Unreachable AppStacks and Writable Volumes▪ Dynamic File Permissions▪ vCenter Direct-To-Host Mounting
VMware App Volumes 2.6 and VMware App Volumes 2.5	Initial versions

About This User Guide

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 VMware 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>

Getting Started With VMware App Volumes

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

How The VMware App Volumes Approach Works

With VMware App Volumes, applications become objects and are moved across data centers and then shared with thousands of virtual machines.

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

- Ease of management — 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, VMware 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.

VMware App Volumes Manager

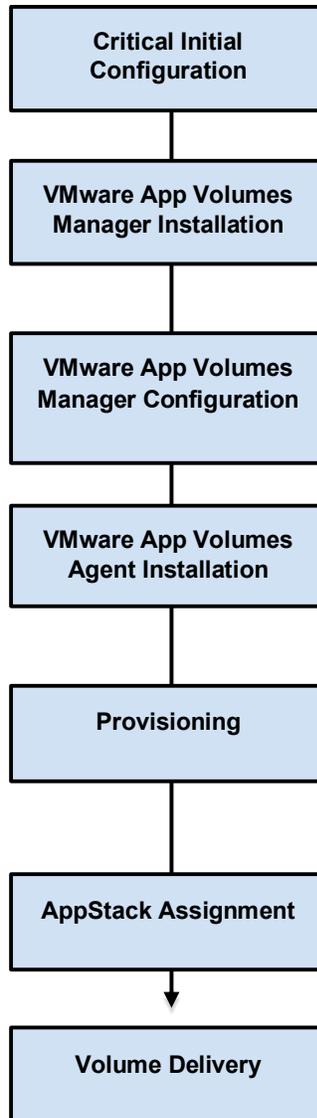
VMware App Volumes Manager is a software that orchestrates and interfaces with IT infrastructure.

It provides the following benefits:

- Orchestrates the required infrastructure components, storage, Active Directory communications and if required hypervisor communications
- Provides the interface to create and manage volumes
- Manages assignments of volumes to user, groups and machines
- Provides archival information on the usage of AppStacks and Writable volumes

Task Flow

This guides provides information on how to complete the following tasks:



System Requirements

Component	OS/Other	Memory/CPU	Free Disk Space	Hypervisor
VMware App Volumes Manager	Windows 2008 R2 Windows Server 2012 R2 .NET 3.5 Microsoft AD Domain SQL Express 2008 (local) SQL Server 2008 (remote)	4GB of RAM 2 vCPUs minimum 4 vCPUs ideal	1 Gigabyte	VMware ESX 5.x with Virtual Center 5.x CIFS file share if using VHD mode.
VMware App Volumes Agent	Windows 7 64/32bit Windows Server 2012 R2 Windows 8.1 Windows 2008 R2 for VDI desktops and RDSH	1GB of RAM	5 Megabyte	

Networking Requirements

Component	Purpose	Port Number
VMware 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 Cloud Manager environments.	1433 (SQL)

Privileges

Installation and configuration of the VMware App Volumes Agent or 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).

Preparing For VMware App Volumes Manager Installation 2

You prepare for VMware App Volumes Manager installation by evaluating your environment and following the appropriate pre-installation procedures. This chapter discusses the critical initial configuration.

VMware vCenter or ESX Connection For VMDK Direct Attached Mode (Preferred)

The App Volumes Manager requires local or shared storage to be configured on the hypervisor. Ensure that you configure at least one storage before you proceed with App Volumes Manager configuration.

Setting Up Folder Permissions When Using In-Guest VHDs

The App Volumes Manager and Agent computers require the ability to perform certain tasks on VHDs during the normal operation of App Volumes.

A domain group can be used to manage permissions for the following roles:

- Managers – App Volumes Managers
- Agents – Machines receiving App Volumes and Writable Volumes assignments
- Capture Agents – Machines used for provisioning new App Volumes

The table below describes the minimum permissions required for each role:

Folder	Managers	Agents	Capture Agents
apps	Full	Read	Write
apps_templates	Read	None	None
writable	Full	Write Note: Permissions on the writable folder should be set to None when Dynamic Permissions is enabled.	None
writable_templates	Read	None	None

Installing The VMware App Volumes Manager

This section describes how to install the VMware App Volumes Manager.

Set Up The VMware App Volumes Installer

Set up the App Volumes Installer to install the App Volumes Manager.

Note:

1. For App Volumes installation, the machine running the App Volumes Manager must be connected to the internet.
2. The VMware App Volumes Manager and the VMware App Volumes Agent share the same installer. Install the VMware App Volumes Manager before installing the VMware App Volumes Agent to provide the VMware App Volumes Manager DNS or IP address while installing the VMware App Volumes Agent.

Procedure:

1. Mount the .ISO file provided to a virtual machine and navigate to the installation directory.
2. Log in as an administrator.
3. In Windows Explorer, double-click the setup.exe file in the Installation folder.
4. In the VMware App Volumes Installer wizard, click **Next**.
5. Read and select the End User License Agreement check box, then click **Next**.
6. Select the **Install VMware App Volumes Manager** option, and click **Next**.

VMware App Volumes Manager Installation Wizard

Follow the procedure below to set up the VMware App Volumes Manager Installation wizard.

Procedure:

1. From the introduction screen, click **Next**.
2. Select the required database.

- a. Local SQL Server 2008 Express Database – Select this option if you have not installed the database 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 local database installation, the setup process does not detect the SQL server database and the software will install it. Database name and database hostname can have only ASCII characters.
4. Enter the HTTP and HTTPS the ports that the Manager service will listen on (default values: HTTP:80, HTTPS:443), and click **Next**.
 5. Enter the local or remote database server, authentication method, name of the database to use or create, and information whether to overwrite the existing database (if any), then click **Next**.
 6. Set the program installation path, click **Next**.
 - a. To change the installation path, click **Change**.
 - b. To check whether you have enough disk space for the installation, click **Space**.
 7. Click **Install**.

The VMware App Volumes Manager will be installed on the system.
 8. Once the VMware App Volumes Installation Wizard has completed the process, click **Finish**.
 - a. Select the checkbox to see the Windows Installer log, click **Finish**.

Scale The VMware App Volumes Manager

You can easily scale VMware App Volumes Managers by installing several instances and pointing them to a remote SQL database or database cluster.

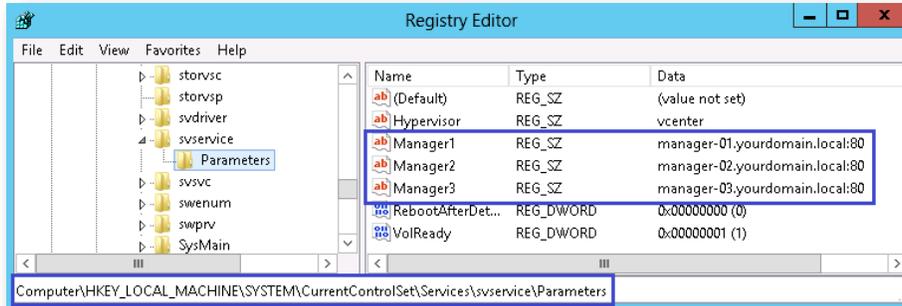
Procedure:

1. Install the VMware App Volumes Manager.
2. During the installation, point towards the remote SQL Server.

3. Configure the VMware App Volumes Manager by applying license and going through the configuration wizard.
4. After that install more App Volume Managers by pointing them to the same remote SQL server. Uncheck the Create a new database or overwrite the existing database checkbox. All managers would read data from the same SQL database/cluster.
5. During VMware App Volumes Agent configuration, specify all managers DNS names (or IPS if they are static) in one of the following ways:
 - a. Use DNS name that resolves to more than one IP.
 - b. Point VMware App Volumes Agent to a Load Balancer that would handle all manager names/IPs.
 - c. Add new string values for additional manager names in the registry:

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\svservice\Parameters.

 - i. Value Name: ManagerN (where N is number of manager)
 - ii. Value Data: dnsname.yourdomain:port
 - iii. **Example:** manager-02.yourdomain.local:8



Configuring The VMware App Volumes Manager and Installing The Agent 4

Configure the App Volumes Manager after you install the application and before the Agent installation.

To configure the VMware App Volumes Manager and install the App Volumes Agent, perform the following actions that are described in detail in this chapter:

1. Set up Active Directory
2. Set Up The VMware App Volumes Administrators Group
3. Provide Hypervisor Credentials
4. Configure Storage
5. Install The VMware App Volumes Agent

Set Up The Active Directory

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

VMware App Volumes uses Active Directory to assign application to users.

Procedure:

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

Once you click **Next**, the database record for the user name provided is created. This user is considered as the current logged-in administrator. If the Active Directory user is not in the same domain as the App Volumes Manager, a two way trust must exist from the domain Manager to the Active Directory user account.

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

3. 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
4. Enable secure communication with the Active Directory, select the **Use LDAPS** checkbox.
5. Assign and Attach volumes to non-domain entities (users and computers), then click **Next**.

Note: Enable this feature only if you have machines and/or users that will use VMware App Volumes and do not have a domain account.

Trusted Domain Credentials

The App Volumes Manager automatically connects to domains trusted by the primary domain specified during configuration. The credentials provided can be used to authenticate to each trusted domain as most trusted domains have two-way trust.

For example, the DOMAIN1\av_manager can be used to authenticate and query DOMAIN2. However, if when there is a one-way trust, DOMAIN1 can trust DOMAIN2, but DOMAIN1 credentials cannot be used to authenticate on DOMAIN2.

You can now specify a second set of credentials that will be used whenever connecting to a trust during Active Directory configuration. These credentials are used when connecting to any trust instead of the primary domains credentials.

A list of domains to use the new trust credentials can be provided. Instead of using the credentials on all trusted domains, they are only used on the specified domains. The list should be separated by spaces: 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 semi-colon.

For example: domain2.local;10.0.0.1 domain3.com;ldap.domain3.com.

Such a configuration allows you to even use a domain that is not trusted by the primary domain.

Active Directory Synchronization

The App Volumes Manager maintains a database record for any Active Directory seen by an Agent, or assigned to an App Stack or a Writable Volume. A background job is run every hour to

synchronize up to 1000 entities. If you have more than 1000 items, then a new batch of 1000 will be synchronized the next hour.

The synchronization activity mainly updates human-readable information such as Name. It also checks the entry's enabled or disabled state.

You can perform manual synchronization in two ways:

- Use the **Sync** button on the **Detail View** page for an individual or a computer.
- Use the **Sync** button on the Users or Computers **Index** pages.

Using these buttons will schedule a background job to synchronize every user or computer in the App Volumes Manager database.

Set Up The VMware App Volumes Administrators Group

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

Procedure

1. Enter the full (or partial) name of a group and click **Search**. (To search all, do not enter any text).
2. Click **Next**.

Provide Hypervisor Credentials

VMware App Volumes supports three methods of assigning AppStacks and Writable Volumes:

- **Connection to VMware vSphere vCenter** – This is a preferred method for mid-to-large environments. By using this method, you can assign AppStacks and Writable Volumes to the virtual machines running on multiple hypervisor hosts.
- **Direct connection to ESX host** – Use this method for small deployments and proof of concepts. By using this method, you can assign AppStacks and Writable Volumes to the virtual machines running on a single hypervisor or host.
- **VHD In-Guest Mode** – This method can be used to assign AppStacks and Writable Volumes to the virtual machines running on third-party unsupported hypervisors or to the physical desktops.

Procedure

1. Select and configure the Hypervisor.
2. Click **Next**.

Note:

- Host Name is the full vCenter name, not the ESX host name.

- ESX Server requires a valid VMware license.
- Once the Hypervisor is configured, it cannot be changed.

Connection To VMware vSphere vCenter

For this type of connection, you need to provide a fully qualified host name of the vCenter Server and credentials that have administrator privileges in vCenter.

Additionally, you can configure the following advanced options:

Mount Local – This option allows App Volumes Manager to check if the local virtual machine datastore contains the AppStack with the same path and file name, prior to mounting the assigned AppStack. If the AppStack is found there, it is mounted from this location instead of the default location.

Mount on Host – This option instructs App Volumes Manager to issue a volume attach command directly at ESX servers instead of going through vCenter. This option requires credentials that have administrative access on all ESX servers.

It is possible to create a less privileged vCenter account. To do this, create a new vCenter role manually, and assign the following privileges:

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

Resource	<ul style="list-style-type: none"> • Assign virtual machine to resource pool
Sessions	<ul style="list-style-type: none"> • View and stop sessions
Tasks	<ul style="list-style-type: none"> • Create task
Virtual machine	<ul style="list-style-type: none"> • Configuration • Add existing disk • Add new disk • Add or remove device • Change resource • Remove disk • Settings • Interaction • Power Off • Power On • Suspend • Inventory • Create from existing • Create new • Move • Register • Remove • Unregister • Provisioning • Clone template • Clone virtual machine • Create template from virtual machine • Customize • Deploy template • Mark as template

	<ul style="list-style-type: none"> • Mark as virtual machine • Modify customization specification • Promote disks • Read customization specifications
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Direct Connection To ESX Host

For this connection type, you need to provide a fully qualified host name or IP address of the ESX server and credentials that have administrative privileges on the host.

VHD In-Guest Mode

For this connection type, no configuration is needed.

Configure Storage

Before using App Volumes, you need to specify the default storage location and default paths for AppStacks and Writable Volumes.

Procedure

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

Note: The **Add Available Storage** button 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 and review the datastore information.
3. Click **Next** to be prompted to import volumes from the selected locations if desired. You can do this immediately or in the background.
4. Click **Set Defaults**.
5. Verify that the settings are correct on the **Summary** tab. **Edit** these settings from the **Configuration tab** on the VMware App Volumes Manager page.
6. Click **Next**.

The VMware App Volumes Manager is now configured.

Install The VMware App Volumes Agent

This section describes the installation and initial configuration of the VMware App Volumes agent.

Important: You must install a VMware App Volumes Agent in a Windows 7 (64 or 32 bit), Windows Server 2008 R2 virtual machine.

Note: Both the VMware App Volumes Agent and Manager share the same installer. Install the VMware App Volumes Manager first, before installing the VMware App Volumes Agent. This is because you must provide the VMware App Volumes Manager name or IP address while installing the VMware App Volumes Agent.

To install multiple Agents, each on its own virtual machine, copy the Installation folder to each virtual machine in use. You cannot install a VMware App Volumes Agent on the same virtual machine that contains the VMware App Volumes Manager.

After installing the VMware App Volumes Manager, log in to another virtual machine to install the VMware App Volumes Agent.

Procedure

1. Log on to the virtual machine as an administrator.
2. Double-click the **setup.exe** icon in the Installation folder for Windows Explorer.
Important: Do not click on the **Agent** folder.
3. On the Welcome to the VMware App Volumes Installer wizard page, click **Next**.
4. On the License Agreement page, accept the terms, click **Next**.
5. Select Install VMware App Volumes Agent, click **Next**.
6. The VMware App Volumes Agent Installation Wizard, click **Next**.
7. Enter the VMware App Volumes Manager host name or IP address and port, click **Next**.

Entering the host name rather than IP address is preferable because the VMware App Volumes Manager IP address could change.

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

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

Working With AppStacks

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

Important: The provisioning of AppStacks must be performed on a clean base image, a virtual 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 should be done on a virtual 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.

Create An AppStack

If the VMware App Volumes Manager is not open already, go to the Windows Start menu and select VMware App Volumes Manager, navigate to the Manager's IP address or hostname, or click on the desktop icon.

Note: ThinApp users need to go to *Delivering ThinApp Packages*.

Procedure

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

The Path (the path to the apps_templates and writable_templates file on the datastore) is created during the initial setup process. Users can change the path to further sub-categorize volumes.

For Example: cloudvolumes/apps/your_folder

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

Provision The AppStack

Procedure

1. Find the name of the AppStack you have created and click on the (+) or (-) located on the left side of the corresponding row. Click **anywhere on the row**.

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

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

2. Click **Provision**.

The search function will perform a string search using using the characters entered into the search box against AD objects. Using no characters will return all AD objects. Select the correct machine being used for AppStack provisioning. Additional information on the configuration of the provisioning machine can be found in the best practice section of this guide.

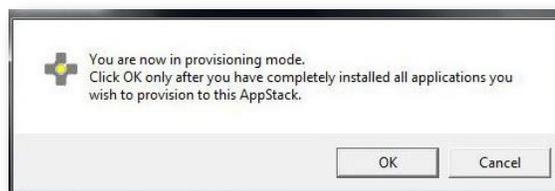
3. Click on a **row to select** agent virtual machine where you want to install the AppStack. For In-Guest — it is required that the VM be powered off.
4. Click **Provision**.
5. Click **Start Provisioning**.

Install Applications

Procedure

1. Log in to a virtual machine where the VMware App Volumes Agent is installed.

The pop-up displays on the VMware App Volumes Agent's virtual machine.



2. Install your applications.

Warning: Do not click OK until you have fully completed the software installation of all your applications. If you click OK before installation is finished for the first application, the AppStack will be created; however, it will be empty. If you click OK before you have finished installing all of the applications you want in the AppStack, the AppStack will contain only the applications you have completed installing.

3. Click **OK**.

The system will reboot.

4. Log in to the VMware App Volumes Agent virtual machine.
5. Provisioning has succeeded. Click **OK**.
6. Return to the VMware App Volumes Manager, Click **Complete**.
7. Confirm Provisioning.

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.

Update An AppStack

The VMware App Volumes update feature makes a copy of an existing AppStack, and allows the adding of 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 VMware 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 VMware App Volumes Manager page, **click** on the Volumes tab.

Existing AppStacks are shown. Find an AppStack to be updated and click on the (+) icon or anywhere in the row to view AppStack details and expose the **Update** button

3. Click **Update**.

4. Type a name for the AppStack copy and provide a description of the AppStack (optional).

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

5. 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.

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

7. 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 be in the "Powered Off" state **prior** to provisioning.

8. Click **Provision**, and then click **Start Provisioning**.

The provisioning process is the same as it is for Create AppStack.

9. **Select** the agent and install applications on the agent, then click **OK**.

After the provisioning process is complete, a success pop-up message displays.

10. In the VMware App Volumes Manager, click **Complete**.

You can now assign this AppStack to users, computers, or groups.

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

Assign An AppStack To Users And Computers

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.

Procedure

1. To expand the AppStack row, click **Arrow** or the **Row**.

The **Assign**, **Edit**, and **Delete** buttons are revealed. To view a list of applications, click **Applications**.

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. User can limit the assignment to a specific 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 that with "Win7-" such as "Win7-64-Steve".

5. Click on **Row** to select 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 options:

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

7. Select and click **Assign**.

Assign AppStack To Users

Use the Users sub-tab to assign AppStack to users.

Procedure

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

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

4. Click **Assign**.

Assign AppStack To Computers

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

Procedure

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

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

4. Click **Assign**.

Reorder The AppStack

If there are two applications in conflict, reordering the AppStack can resolve the conflicts. 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. VMware 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 or directory\computers tab, then 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 was a group assignment which need to be a fix order.

AppStacks that were provisioned with VMware App Volumes v2.1 and after could be reordered. The old AppStacks won't support the reordering feature. Users need to update the old AppStack.

Note: Multiple users logged into a desktop is not supported. If a second user logs into a desktop that already has a user, the volumes for the first user will be removed.

Delete Unreachable AppStacks And Writable Volumes

AppStacks and Writable Volumes that can no longer be contacted on a datastore have their state set to Unreachable. You can now remove AppStacks or Writable Volumes even when they are

Unreachable. This enables a datastore to be removed without having any left-over stale records and volume files.

Working With Writable Volumes

This section explains how to create Writable Volumes for computers and reassign them to other computers as well as how to create Writable Volumes for users.

Create A Writable Volume

Procedure

1. In the VMware App Volumes Manager, click **Writables** (sub-tab of **Volumes**).
2. Click **Create Writable Volume**.
3. To search existing users, type the name of the user, group or computer and click **Search**.
4. To query Active Directory, use the User Principal Name (user@domain.local) and Down-Level Logon Name (domain\user) formats.

The datastore field is populated with the name of the default datastore. Use the pull-down menu to select a different datastore or storage group.

5. Select one or more users, groups, or computers to create a writable volume.
 - a. Prevent user login if the writable is in use on another computer.
 - b. Limit the attachment of user writables to specific computers.
 - c. Delay writable creation for group/org members until they login.

Note: If you select a group, then individual writable volumes are 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.

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.

Create Storage Groups

Storage Groups are used to automatically distribute writable volumes across many datastores. They are also used to define a group of datastores that should all contain the same AppStacks

(automatic replication). Some of the attributes for the group (such as template location and strategy only apply when using the group for distributing writable volumes).

Procedure

1. On the VMware App Volumes Manager, select the **Infrastructure > Storage Groups**.
2. Click **Create Storage Group**.
3. Enter a name for the group.
4. Select the automation strategy for the group. There is a checkbox available when creating a storage group **Automatically Import AppStacks**. When enabled, all storage locations in the group are checked for new volumes every 15 minutes. This is intended to be combined with AppStack Grouping so that new volume files are automatically imported and associated with their primary AppStack for scale-out use-cases.
5. Set the **Distribution Strategy** from the drop-down list.

Note: Distribution strategy only applies to writable volumes. The distribution strategy determines how files are distributed across the group. The strategies are as follows:

Spread – To distribute files evenly across the group.

Round-Robin – To distribute files sequentially across the locations.

6. Select a template storage location from the pull down menu.
7. Make the storage selection from the drop-down list.
You make select **Direct** (manual selection of locations) or **Automatic**.
8. Click **Create**.

Import A Writable Volume

For already created writable volumes, click **Import Writable Volumes**.

Procedure

1. In the VMware App Volumes Manager, click **Writables** (sub-tab of **Volumes**).
2. Click **Import Writable Volume**.
3. 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.

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. The zip file must be smaller than 5Mb. The files are placed to the root Writable Volume.

Procedure

1. In the VMware App Volumes Manager, click **Writables** (sub-tab of **Volumes**).
2. Click **Update Writable Volume**.
3. Browse and select required zip file.
4. Click **Upload**.

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

Rescan For Volumes

To update AppStacks and writable volumes 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. In the VMware App Volumes Manager, click **Writables** (sub-tab of **Volumes**).
2. Click **Rescan**.

View Attachments

The Attachments sub-tab shows all attached AppStacks and Writable Volumes.

Procedure

1. Go to the VMware App Volumes Manager.
2. Click **Attachments** (sub-tab of the **Volumes** tab).

Reassign Writable Volumes

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

Procedure

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

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

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

Install Google Chrome To A Writable Volume

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

To install Chrome plugins to a writable volume, the writable volume must be assigned a drive letter. 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.

Additional App Volumes Manager Features

This section discusses the different App Volume Manager features that are available as different tabs in the application.

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

Files available at the same path and file name on different datastores are considered to be copies of each other. Each AppStack now has a Location count and pop-up display to show the child files. When mounting, only one 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.

The Infrastructure tab displays the following information:

- Machines Sub-Tab: Manager assigned machines.
- Storage Sub-Tab: Manager assigned storage locations.
- Storage Groups Sub-Tab: Create storage groupings and assign storage locations to the group.

Activity Tab

The Activity tab has three sub-tabs:

- Pending Actions Sub-Tab: Displays actions waiting to be performed in the background and will be completed in the order submitted.

- Activity Log Sub-Tab: Displays records of system activity such as user logins, computer power-ups, volume attachments, etc.
- System Messages Sub-Tab: Displays 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 Active Directory and updating the version of the record. This can be used after an Active Directory record is updated. VMware App Volumes automatically syncs in the background. Updates can be forced as well.

Configuration Tab

You can change the settings specified during VMware App Volumes Manager configuration. There are five sub-tabs:

- License Sub-Tab: Contains information on the license. A valid license issued by VMware App Volumes is required to use this management console.
- Active Directory Sub-Tab: Provides information about your active directory. VMware App Volumes uses the Active Directory to assign AppStacks to users, computers, and groups.
- Administrators Sub-Tab: Enables the choice of the Active Directory group responsible for administering the VMware App Volumes Manager.
- Hypervisor Sub-Tab: Enables you to specify the logon credentials to the VMware vCenter.
- Storage Sub-Tab: Enables you to set the default database where AppStacks and writable volumes are stored.

Note: 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.

Dynamic File Permissions

Files located on SMB based file shares can be accessed from multiple computers. Enabling this feature for the In-Guest mode will ensure that the Agent computers are only granted access to VHD file dynamically before the Agent computers can mount the file. At logoff (User Assignments) and shutdown (Computer Assignments), the rights are revoked from the Agent computer.

To enable this feature:

1. Select **Configuration > Hypervisor**.
2. Select **Hypervisor:None [VHD] In-Guest Mounting**.
3. Select the **Security: Dynamic File Permissions** checkbox.

Note: An administrator must also configure the minimal file permissions as follows:

manager_server\$ | Full Control

Domain Computers | List Folder Contents

App Volumes now has a new interface for managing VHD file shares. Administrators can now enter the path to browse shared files in a UNC. Alerts and warning messages might also appear to assist the administrators and they can easily view file share permissions.

vCenter Direct-To-Host Mounting

Volume mounts are performed using vSphere's VM reconfigure API. The time it takes to run this command is shorter when it is performed directly on an ESX host.

The App Volumes Manager allows you to enable this functionality when configuring a vCenter hypervisor.

To use this feature, each ESX server being managed by a vCenter must have an identical system or service account. Creating an account on each ESX with limited permissions is recommended.

If enabled, the App Volumes Manager will attempt to connect to every ESX server before saving the hypervisor configuration.

In App Volumes v2.7 or higher, you will receive a warning message if any of the ESX servers cannot be contacted but the configuration settings will still be saved. You can have some ESX servers that need not be included or some of the servers can be offline for maintenance.

Installing Horizon View Integration Service

The following section guides you through the optional installation of the VMware 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

- Install VMware Horizon View
- Install VMware App Volumes Manager

Procedure

1. Run the VMware App Volumes installer on Horizon View server.
2. Select **Install VMware App Volumes Broker Integration Service**.
3. Enter the VMware 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.

Working Of VMware App Volumes With Microsoft Office

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VMware 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 VMware App Volumes, all Office applications must be in a single AppStack.
- If you want to deliver an Office application via VMware App Volumes to a virtual machine that has an Office application installed in the base image, the Office AppStack can be created on a system that includes that Office application in the base. For example, to deploy Visio to virtual machines that contains Office in the base, capture Visio on a machine that already has Office installed.
- The virtual machine used to provision Office cannot include the VMware View Agent. The presence of the View Agent interferes with the ability to capture license information. A desktop pool in View is created from a snapshot of the virtual machine. Revert to this snapshot, uninstall the View Agent and create a new snapshot to use to create the Office AppStack. The snapshot containing the View Agent is used to create the desktop pool. Assign the Office AppStack to users of this desktop pool.

Note:

- Use Windows 2008 R2 based RDSH for best functionality results.
- To ensure search works with Outlook across different virtual machines, disable the "Windows Search" service. Email search will still work with the service disabled.

Provisioning An Office AppStack

You can provision required applications of Microsoft Office to an 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.

Granular Configuration Settings

This chapter describes the batch files, registry options, services, drivers, and other parameters used when working with VMware App Volumes.

Batch Files Used In AppStacks And Writable Volumes

These scripts are called at the time a volume is dynamically attached or at various point during system startup and logon. They are used in order **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 assign real-time 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 matt (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 matt (but only if there are services/drivers on the volume)

allvolsattached.bat: Runs as matt (if multiple volumes are all attached at the same time such as during logon, this is called only once)

These scripts can in essence contain any scriptable action. The use for each is to be able to script an action 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 the below batch file can be set. Wait times are defined in seconds and all keys are REG_DWORD. The registry key and optional values are defined in the description and 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 using the below example:

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

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 at logon and before Windows Explorer starts.

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

logon_postsvc.bat : Called as the logging in 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 the logging in user or when a volume is dynamically attached or when Windows Explorer starts.

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

shellstop.bat : Called when user is logging off before Windows Explorer is terminated.

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

logoff.bat: Called at logoff and Windows Explorer has terminated.

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

shutdown_presvc.bat : Called as LOCALSYSTEM when the computer is being shutdown before services have been stopped.

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

shutdown.bat: Called as LOCALSYSTEM when the computer is being shutdown after services have been stopped.

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

allvolattached.bat: Called 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 VMware 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. The parameters sub key is not used by default and must be created.

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 KeyValue /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 VMware 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 AppInitDlls 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 KeyValue /t REG_DWORD /d 60
```

Log And Timing Parameters

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

If undefined, default is 5120 (5MB).

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.

Best Practices

This chapter lists some best practices that you can follow when working with VMware App Volumes

- This The use of Internet Explorer in an AppStack is not supported. Due to the tight OS integration and dependencies, it is recommended to use an application isolation technology such as VMware ThinApp. VMware App Volumes can then be then utilized for delivery of the isolated application package.
- To perform provisioning, the provisioning user must be logged in as an administrator on the provisioning virtual machine. Only one provisioning process should be performed in each virtual machine, but multiple virtual machines can be provisioned at once.
- 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 VMware 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 or 64 bit).
- 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.
- The provisioning system should not have the following installed or enabled: Anti Virus agents, Horizon View Agent, 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 dependent on applications being provisioned. Some application requirements and licensing models require the virtual machine should also share a common SID with the production virtual machine.
- vCenter browser options must be enabled.
- 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.
- The destination system should not have a local profile of the user logging in with a writable volume. If the user has logged into the destination system previously, the local profile should be deleted before using a writable volume.
- Outlook search may generate a configuration popup for fail to work when search indexing is enabled. Disable the Windows Search service and search will work without search indexing.
- After detaching a Writable volume the machine should be rebooted or refreshed.

- The GPO "Control Read or Write Access to Removable Devices or Media" should be disabled.
- The following Microsoft Hotfix should be applied to production virtual machines (support.microsoft.com/kb/2614892/EN-US).

Commonly Used Terms and Their Definitions

This chapter provides the definitions for the list of words commonly used while working with VMware App Volumes.

Active Directory

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

AppStack

A volume containing one or more shareable applications. Create AppStacks by using the VMware App Volumes Manager and the Provisioning process. Once provisioned, AppStacks can be assigned to an end user, a group of users and/or computers (servers) at boot, login, or in real time.

Provisioning

Process of installing the application and capturing it in an AppStack to be delivered to users, groups or machines.

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 where user-specific information is stored, including: user/computer profile (optional), application settings, licensing information and User Installed Applications (UIA).

VMware App Volumes Agent

Technology, applied to the target system (either desktop or server), to virtualize the attached AppStack/applications into the operating system, as if natively installed.