



Microsoft®
Desktop Optimization Pack
for Software Assurance

Virtual Application Management with Microsoft® Application Virtualization 4.6 and System Center 2012 Configuration Manager

This whitepaper describes the virtual application management capabilities provided by the integration of Microsoft Application Virtualization 4.6 and Microsoft System Center 2012 Configuration Manager.

Introduction	5
Audience.....	5
Prior Knowledge	5
Configuration Manager and App-V Infrastructure Overview	6
Process.....	6
Components	7
New features of Configuration Manager 2012.....	8
Overview of Configuration Manager and App-V Integration.....	11
App-V Client-Side Architecture.....	12
Benefits of Integration.....	13
Active Upgrade and Configuration Manager	14
Configuration Manager and App-V Software Requirements	15
Required Software Components	15
Configuration Manager Asset Intelligence and App-V	16
Configuration Manager Virtual Application Delivery Methods	17
Streaming Delivery	17
Streaming Delivery Process	18
Distribution Point Selection Process	19
Local Delivery (Download and Execute)	21
Local Delivery Process	21
Choosing a Delivery Method	22
Advantages of Streaming Delivery	22
Disadvantages of Streaming Delivery	23
Advantages of Local Delivery.....	23
Disadvantages of Local Delivery	23
Supported Scenarios for Virtual Application Deployment with Configuration Manager and App-V	25
Scenario 1: Multiple location content	25
Scenario 2: Serverless branches	25

Roaming Client Scenarios	26
Internet-Based Scenarios	28
Planning for Virtual Application Deployment with Configuration Manager	28
Disk Space Considerations for Distribution Point Servers and Clients	29
Recommended Disk Space Allocation for the Configuration Manager and App-V Client Caches	30
Migration from App-V Full Infrastructure or Standalone MSI to Configuration Manager	31
App-V Migration from Configuration Manager 2007 to Configuration Manager 2012.....	32
Virtual Application Delivery to Remote Desktop Services	33
How to Perform Common Virtual Application Management Tasks with Configuration Manager	34
Deploy the App-V Client Software to Configuration Manager Client PCs.....	34
Deploy a Virtual Application to Configuration Manager Clients	36
Verify Virtual Application Delivery to a Specific Client	37
Report Virtual Application Deployment Data.....	38
Upgrade a Previously Deployed Virtual Application.....	38
Delete a Virtual Application from All Members of a Collection or a Specific Client.....	39
Distribute Virtual Application Packages Using a Configuration Manager Task Sequence	39
Track Virtual Application Usage with Configuration Manager Metering.....	39
Troubleshooting	41
New Configuration Manager Client Log Files.....	41
Configuration Manager Client State Messages for Virtual Application Registration and Launch ...	41
App-V Client Log Files and Event Log Entries	42
Frequently Asked Questions (FAQ).....	43
Package Creation / Update	43
Content Distribution.....	43
Virtual Application Package Registration (execution of the Configuration Manager deployment) ..	43
App-V Dynamic Suite Composition	44
App-V Local Interaction	44
Miscellaneous.....	44

Glossary.....	46
Conclusion	47
More Information	47

Introduction

System Center 2012 Configuration Manager helps IT empower people to use the devices and applications they need to be productive, while maintaining corporate compliance and control. As consumerization becomes a reality, IT organizations face the challenge of delivering a rich experience to users across multiple devices without giving up the control needed to protect corporate assets. Configuration Manager 2012 provides a unified infrastructure for mobile, physical, and virtual environments that allows IT to deliver and manage user experiences based on identity, connectivity, and device. Configuration Manager 2012 also increases IT efficiency with simplified administrative tools and improved compliance enforcement.

Microsoft Application Virtualization (App-V) transforms applications into centrally managed virtual services that are never installed and do not conflict with other applications. App-V dramatically accelerates application deployment, upgrades, patching, and retirement by eliminating time-consuming processes and simplifying the application management lifecycle.

App-V integration is built into System Center Configuration Manager workflows, enabling IT administrators to manage physical and virtual applications through a single management experience. Together, App-V and System Center 2012 Configuration Manager lets IT empower users with the services they need to be productive from anywhere, on whatever device they choose.

Note: Throughout this document, the term “Configuration Manager” refers to Microsoft System Center 2012 Configuration Manager, and the term “App-V” refers to Microsoft Application Virtualization 4.6 SP1.

Audience

This document is intended for IT administrators interested in using Configuration Manager to deploy virtualized applications to users and devices. It provides a technical overview of the integration of Configuration Manager 2012 and App-V, and describes how to configure and use a Configuration Manager infrastructure to deploy virtual applications.

Prior Knowledge

The administrator using this guide should have previous knowledge of the following technologies:

- System Center 2012 Configuration Manager
- Microsoft App-V
- Internet Information Server (IIS)

Additional technical information on System Center 2012 Configuration Manager is available at: <http://technet.microsoft.com/en-us/library/gg682041.aspx>

Configuration Manager and App-V Infrastructure Overview

System Center 2012 Configuration Manager has built-in support for App-V providing a comprehensive deployment and update service for virtual applications. Configuration Manager reduces typical App-V infrastructure to the App-V Sequencer and Client and takes the place of the management and streaming components in a typical App-V full infrastructure. The following figure illustrates the minimal Configuration Manager and App-V processes and components required to manage virtual applications with Configuration Manager. Configuration Manager can deploy both traditional and virtual applications, created by the App-V sequencer, which eliminates the need for two separate infrastructures to support application deployment.

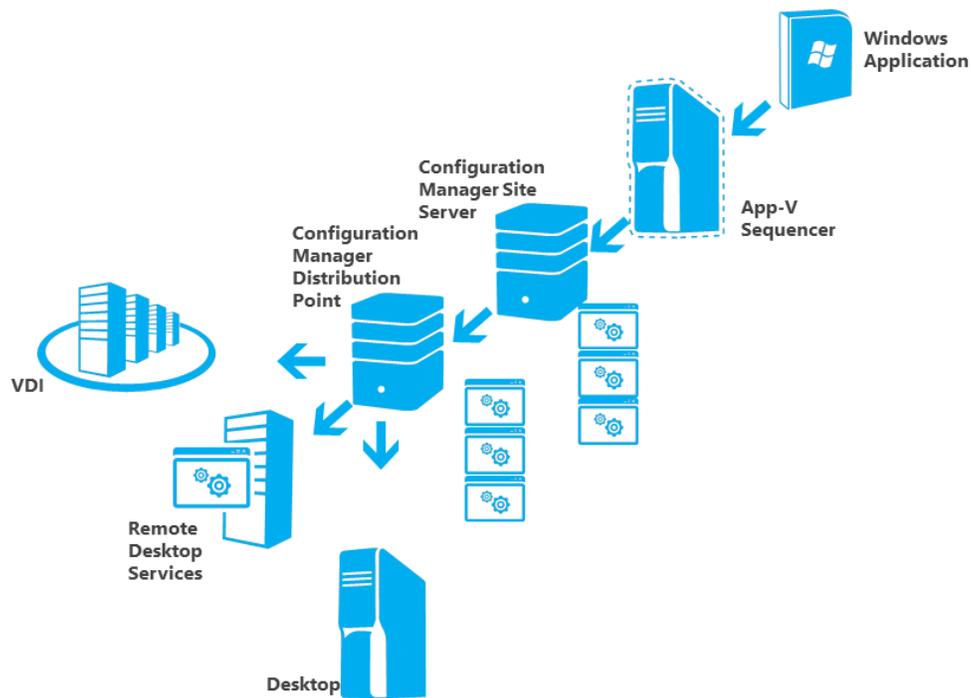


Figure 1 – Configuration Manager and App-V Infrastructure

Publishing virtual applications using Configuration Manager requires following a simple process. The following section describes the virtualization (using App-V) and distribution (using Configuration Manager) process.

Process

At a high level, virtual applications management with Configuration Manager requires sequencing applications, distributing virtual applications to end-users and client devices using Configuration Manager deployments, and finally, publishing those applications for use. The following information describes the minimum requirements to support App-V in a Configuration Manager infrastructure:

Sequencing – Sequencing is the process of taking a physical application and turning it into a virtual application. Configuration Manager requires sequencing applications with an App-V 4.6 or newer Sequencer to create the necessary files for publishing and delivery.

Distribution – Distribution is the process of placing App-V application packages locally for access by clients, avoiding pulling content across slow links multiple times. Configuration Manager Distribution Points are targeted for replication of App-V applications or BranchCache™ for smaller branch or remote offices.

Deployment – Deployment is the process of creating a policy that associates an application to users or devices and initiates moving the virtual application assets to the client computers. This is normally referred to as “streaming” in an App-V full infrastructure. Configuration Manager provides two options for deployment of virtual applications (“Streaming” and “Download and Execute”).

Publishing – Publishing is the process of provisioning virtual applications to users or devices by presenting shortcuts and registering file type associations. Configuration Manager enables administrators to choose which applications, shortcuts, and file type associations present in virtual application packages are published to end-users.

Components

Managing virtual applications with Configuration Manger requires an App-V Sequencer for creating packages, a Configuration Manager Site Server, Configuration Manager Distribution Point(s) for delivery of the packages, and Configuration Manager client computers with the App-V Client installed. The following minimum components are required to support App-V in a Configuration Manager Infrastructure.

Microsoft App-V Sequencer – The App-V Sequencer packages virtual applications for deployment with Configuration Manager.

Configuration Manager Site Server – A part of the Configuration Manager Site hierarchy, the Configuration Manager Site Server manages virtual application distribution through Configuration Manager Distribution Points to target systems, either as a streaming service, or as a locally delivered package.

Configuration Manager Distribution Point – The Configuration Manager Distribution Point is a site system role that contains source files for clients to download, such as application content, software packages, software updates, operating system images, and boot images.

Configuration Manager / App-V Clients – Client devices include desktop/laptop PCs, session (Remote Desktop Session Host and Citrix XenApp™) and Virtual Desktop Infrastructure (VDI) clients. Configuration Manager Clients that receive delivery of virtual applications from a Configuration Manager infrastructure require installation and configuration of both the Configuration Manager Client and App-V Client software. The Configuration Manager and App-V Client software work together to deliver, locate, and launch virtual application packages. The Configuration Manager Client manages the delivery of virtual application packages to the App-V Client. The App-V Client executes the virtual application on the client.

New features of System Center 2012 Configuration Manager

Configuration Manager 2012 enables a user-centric approach to managing applications. This approach increases user productivity by allowing users to request and install applications on their devices as needed. Configuration Manager 2012 enables IT to provide this self-service and user approach to applications, while maintaining corporate compliance by delivering business critical applications and requirements and enforcing delivery. There are many changes in Configuration Manager 2012, below is a list of changes that apply to App-V management.

- The Configuration Manager 2012 Application model enables the user-centric approach to managing applications by specifying the data required for the Configuration Manager agent to process and determine the correct deployment type and delivery method. This includes populating applications with information:
 - **Application:** In Configuration Manager 2012, an application is the primary object of administrator or end-user software interaction. This is administrative and end-user metadata about an application, and is not actually the technical mechanics of how to deliver the application.
 - **Deployment Types:** Deployment types are the technical mechanics for how to deliver an application. In today's world, an "application" may have multiple means of technical delivery to a user or system. For example, files may be delivered via a MSI file, a general script, an App-V package, remotely from a server (remote app, XenApp), or CAB files to mobile devices. Therefore, an application can have one or more deployment types representing different application delivery methods given the current condition of the user system. Configuration Manager 2012 features a fully integrated App-V deployment type optimized for the quickest and easiest creation and management of an App-V package. Configuration Manager handles many of the unique capabilities App-V provides to customers, allowing them to appreciate the full value of the Configuration Manager and App-V integration. A deployment type has the following elements:
 - **Detection Method** – Since the Configuration Manager 2012 application model is now "state-based", every deployment type is capable of determining whether the particular deployment type is already present on a system. This detection method is based on three properties; App-V package GUID, Version GUID, and the virtualized application components selected for publishing. For App-V packages, Configuration Manager automatically populates the App-V GUID.
 - **Requirements** – Requirements are the set of criteria evaluated before deployment of a particular deployment type. Some built-in requirement rules include machine rules (RAM, disk space, operating system version, etc...), or User rules (primary devices). An IT professional can build custom rules based on virtually any system artifact including registry, file system, WMI, or script. The Configuration Manager 2012 Settings Management infrastructure is used to create custom rules and reuse them across multiple deployment types. For App-V packages, Configuration Manager 2012 will automatically create

platform requirement rules based on the information inside the App-V manifest created at sequencing. After creating App-V applications, review the OS requirement rules, as the OSD file OS Values tags are converted into OS requirements and removed from the OSD files.

- **Dependencies** – Dependencies are additional components devices must have prior to deployment. If a dependency is missing on a client, it can be remediated as part of the application deployment or as a separate task outside of the deployment. For App-V packages, administrators should create the App-V 4.6 SP1 client as an application and deployment type separate from the virtualized applications that will be deployed, and then make all App-V deployment types dependent upon it.
- **Publishing** – Exclusively on an App-V deployment type, the administrator can use the added “publishing” tab to choose which components of virtualized applications to publish for the specific App-V deployment type presented to the end-user.
- **Content** – Administrators specify the location of the assets for delivery for a specific deployment type as well as how the content will be delivered via streaming or download and execute as well as cache management settings.
 - **Single instance application storage** reduces the consumption of disk space on distribution points. This feature allows placement of a single App-V package on the distribution point once per version, and enables use across multiple deployment types for both **streaming** and **download and execute**.
 - **Persist content in client cache** gives administrators the choice of retaining the App-V package in the Configuration Manager cache or having it removed by the normal cache management settings. Retaining the content in cache enables remote differential compression for updates to App-V applications.
 - The ability to **preload App-V packages** from the Configuration Manager cache to the App-V cache for download and execute deployments. This ensures that the first launch experience is immediate.
- **App-V Streaming Distribution Points** support virtual application streaming by default and no longer require enabling that functionality in the distribution point settings as in Configuration Manager 2007.
- **User device affinity** associates a user with one or more specified devices. This allows application deployment even when the name of the user’s device is unknown. Instead of deploying the application to all the user’s devices, the application deploys to the user and automatically installs on all devices associated with that user. This feature also enables execution of different deployment types (MSI versus App-V) depending on the device originating the application installation.

- The **Software Center** and self-service **Application Catalog** allow users to manage their own application deployments. The Software Center displays current installation status and what software has already been installed. The self-service Application Catalog web portal enables users to request software for installation and manage devices they use regularly for work.
- **Selective Publishing** of App-V virtualized application components enables administrators to utilize one App-V package with several applications and choose to publish only specific applications to devices or users.
- **Internet-based Streaming** of App-V applications extends the delivery capabilities and enables additional devices and users targeted with virtual applications.
- **User-based deployment to session virtualization** solutions like Remote Desktop Session Host servers or Citrix XenApp servers while users are actively logged into sessions.
- **App-V applications are retained in the App-V cache** for environments where an App-V Full Infrastructure had previously deployed applications. These virtual applications are not removed from the App-V cache as with previous versions.
- View **Deployment Status** for all deployment types from one console. The administrators can view the process from distribution to deployment from the application in the console and do not need to change from view to view to find the complete status.

Overview of Configuration Manager and App-V Integration

System Center 2012 Configuration Manager manages App-V applications out-of-the box as part of the software library. Configuration Manager uses publicly documented interfaces to interact with the App-V Client software. All integration is implemented with the following methods:

- Configuration Manager uses the App-V Client's enhanced SFTMIME command line interface to manage virtual application publishing and delivery to the App-V Client cache.
- Configuration Manager uses the App-V Client's OverrideURL registry value to direct the App-V Client to retrieve application packages from a specific Distribution Point server.
- Configuration Manager uses the App-V Client's SFTTRAY command line interface to launch virtual applications.
- Configuration Manager uses the App-V Client's Windows[®] Management Instrumentation (WMI) provider to query and report on the status of virtual applications that reside in the App-V Client cache. For more information about WMI, see <http://www.microsoft.com/technet/scriptcenter/resources/wmifaq.mspx>
- Standard Configuration Manager software metering rules and reports must be manually configured in Configuration Manager to track virtual application usage.

App-V Integration with Configuration Manager is streamlined as Configuration Manager is simply automating tasks that can be done with the full App-V infrastructure. Organizations with Configuration Manager already in place or those in the process of implementing Configuration Manager; can implement one infrastructure using a seamless, scalable solution to deliver, report, and manage the application lifecycle from one console. The technical implementation of each of the above points will be detailed and their usage explained throughout this document.

App-V Client-Side Architecture

The Configuration Manager Client uses the functions provided by the App-V Client to provide virtual application publishing, intelligent delivery, and inventory management. The following figure shows a high-level overview of the App-V client-side architecture and illustrates communication paths between the Configuration Manager Client and the App-V Client.

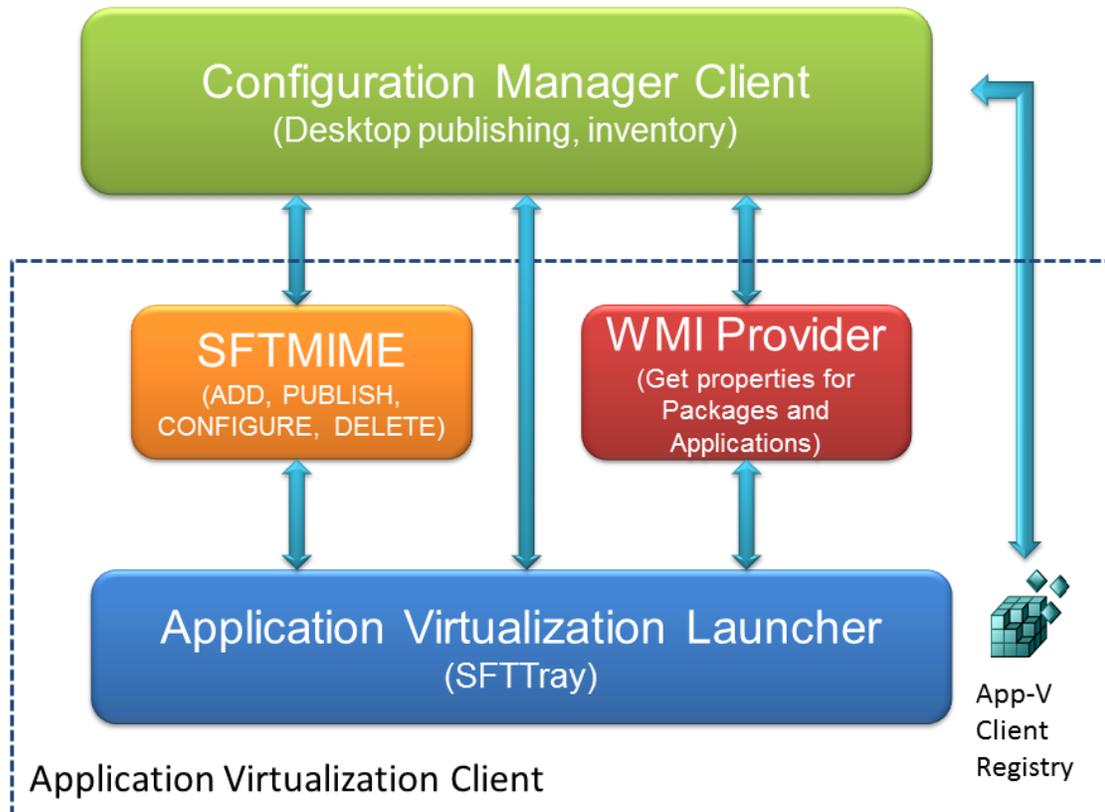


Figure 2 – App-V Client-Side Architecture

The App-V Desktop Client has the following features to support integration with Configuration Manager and third-party solutions:

- App-V Client SFTMIME command line interface options provide greater external control of the operation of the App-V Client.
- The OverrideURL App-V Client registry value directs the App-V client to retrieve application packages from an alternate server location, regardless of the source path information contained within virtual application packages or the ASR (Application Source Root) registry setting on a per package basis.
- The App-V Client WMI provider enables any WMI-enabled application to perform WMI queries to retrieve information about the status of virtual applications residing in the App-V Client cache.

- The App-V Client includes support for streaming application packages via HTTP, HTTPS and Server Messages Block (SMB) network protocols.

The Configuration Manager Client agent utilizes a virtual application launcher process to support virtual application management.

The integrated operation of the Configuration Manager Client and App-V Client is explained in detail later in this document in the section titled [Configuration Manager Virtual Application Delivery Methods](#).

Benefits of Integration

System Center 2012 Configuration Manager offers a rich set of capabilities for managing virtual applications from the Configuration Manager infrastructure. Configuration Manager with App-V integration enhances the virtual application delivery model and provides features that cannot be accomplished with an App-V full infrastructure model alone.

Configuration Manager and App-V integration improvements and enhancements

- **Single management infrastructure:** By integrating App-V's virtual application management capabilities into Configuration Manager, enterprises can leverage Configuration Manager to manage all of their application management tasks, both virtual and physical. App-V integration in Configuration Manager provides most of the native App-V classic infrastructure capabilities, including user targeting, streaming, ease of deployment, quick application update process, asset management, and application lifecycle management. Integration helps IT reduce the cost of managing and maintaining multiple infrastructures and training personnel. Integration provides the added benefit of using a single lens/unified tool for viewing, comparing, or aggregating information about their virtual and physical applications.
- **Scalability:** Configuration Manager is designed for large enterprise management and can scale to support hundreds of thousands of devices. Configuration Manager Distribution Points can host the virtual application package content for both streaming and local delivery scenarios, thus removing the need to deploy and maintain a large number of App-V streaming servers. In addition, Configuration Manager provides robust client roaming capabilities, allowing end users to access their content from the nearest Distribution Point when roaming outside of their assigned site boundaries.
- **Explicit targeting and scheduling:** Configuration Manager provides the ability to target systems or users with a collection of management capabilities, including virtual applications. Depending on the customer's Active Directory infrastructure, computer targeting of virtual application delivery is required for some applications, whereas some applications are made available to users. The ability to schedule and deploy applications and updates to specific devices and users provides the flexibility that organizations need today with required applications, while allowing users to install optional applications as needed at the same time.

Additional capabilities with Configuration Manager and App-V Integration

- **Operating system deployment:** Configuration Manager's operating system deployment feature can deploy virtual applications as part of the process of laying down the OS, thereby reducing the time required to get a new system up and running for an end user.
- **Empower user productivity:** With Configuration Manager 2012, IT can provide users the ability to select their own applications. Users visit a self-service portal and request the applications they need to be productive. This feature also enables IT to set up applications that have multiple deployment types and ensures delivery of the correct type of application (MSI or App-V) to the correct device. For example, users could receive MSI-based applications on their primary device and App-V applications when they log on to non-primary devices. In addition, support for third party solutions, like Citrix, enable users to receive the same application on their non-managed and potentially non-Windows devices via a session hosting an App-V version for improved server consolidation and ease of provisioning. All of this is accomplished by defining an application with the metadata required to select the best deployment method for specific users, locations, and devices, according to criteria defined by IT.
- **Complete desktop management:** App-V also integrates with existing features within Configuration Manager such as support for system targeting, operating system deployment, software and hardware inventory, software metering, asset intelligence, and Wake-On-LAN to support virtual applications. Enterprises get the best of both worlds: The flexibility of using virtual applications in App-V and the rich set of management features that Configuration Manager provides with this integration.

Active Upgrade and Configuration Manager

The active upgrade feature of App-V is implemented differently between the App-V Full Infrastructure and Configuration Manager virtual application deployment models. This difference relates to how clients in each type of infrastructure learn about updated App-V applications. With an App-V Full-Infrastructure, App-V clients communicating with the RTSP(S) protocol learn of new versions of an App-V application at launch, and the only action required is to restart the application. This is a benefit of an App-V Full Infrastructure with an immediate updating process, but with a couple of caveats. The new version introduced requires a coordinated update with the back-end infrastructure, which is a manual process of introducing the new version after the backend updates are completed. The App-V Full Infrastructure updating process is an all or none task. The updating process does not support targeting a newer version for a small group of pilot users without branching the package and publishing two different versions to a group of users for a pilot implementation.

With Configuration Manager, selected devices and users learn of the update (supersedence) upon refreshing the machine or user policy. The updated version of the App-V application is applied based upon the deployment type method. By default, Configuration Manager updates the machine policy every hour. If the update is deployed to a collection of users, the user policy is also refreshed hourly as well as at certain events including locking and unlocking of the computer and at login and logoff.

Configuration Manager deployed updates do not have the same instant gratification as an App-V Full Infrastructure active update by design. The above mentioned caveats to active upgrade are addressed with Configuration Manager. Applications and their updates can be deployed to a collection of pilot computers or users, and then incrementally deployed to additional collections of computers or users, ultimately resulting in full deployment across the enterprise. Virtual application update deployments

can be coordinated with back-end updates and maintenance windows in accordance with an organization's service agreements.

Configuration Manger provides the flexibility administrators want in situations where updates are required for security or other critical reasons and regardless of whether the application is App-V or traditional. However, in some cases, updates to applications are optional or can be done over much longer periods. Configuration Manager's scheduling and user-centric capabilities enables those scenarios as well.

Configuration Manager and App-V Software Requirements

This section details the required software and component configuration of a Configuration Manager infrastructure with App-V integration. Additional information about the features of Configuration Manager and supported App-V software versions are provided for planning the infrastructure.

Required Software Components

A healthy Configuration Manager infrastructure is critical to ensure that the customer's Configuration Manager will support App-V management features.

The following table lists the minimum Configuration Manager infrastructure components required for virtual application management with Configuration Manager. These components can be installed on a single server in a test environment, but for production environments follow the guidance provided for Configuration Manager 2012.

Component	Description
Standalone Primary Site	A Configuration Manager Standalone Primary Site with System Center 2012 Configuration Manager
Site Server	A Configuration Manager Site Server configured with the following site system roles: Site System, Site Server, Component Server, Distribution Point, Management Point and Reporting Services Point. (Optional) Application Catalog web services point and Application Catalog website point are not required. These components enable user enablement for self-service portal and Software Center application management on client computers.
Distribution Point Servers	One or more standard Distribution Point servers.
Clients	One or more Configuration Manager client PCs.

Table 1 – Minimum Required Configuration Manager Components

The following table lists the minimum App-V infrastructure components required for virtual application management with Configuration Manager 2012.

Component	Description	
App-V Sequencer	Required to sequence applications	4.6 SP1*
App-V Client for Windows Desktops	Required to run virtual applications on desktop and laptop PCs	4.6 SP1*
App-V Client for Remote Desktop Services (formerly Terminal Services)	Required to run virtual applications on Windows Terminal Servers	4.6 SP1*

Table 2 – Minimum Required App-V Components

*Hotfix Package 5 is recommended and available at: <http://support.microsoft.com/kb/2645225>.

Configuration Manager Asset Intelligence and App-V

The Configuration Manager Asset Intelligence feature allows administrators to inventory and manage software in use throughout the Configuration Manager hierarchy. Asset Intelligence enhances the inventory capabilities of Configuration Manager to help manage software in use and software license management in the enterprise.

- The Asset Intelligence features of Configuration Manager 2012 can report application data (i.e., digital PID, MSI product codes, publisher names, etc.) for each virtual application registered on a client computer.

Note: Only applications that have at least Feature Block 1 in the App-V Client cache can be inventoried. For more information on Asset Intelligence in Configuration Manager, see <http://technet.microsoft.com/en-us/library/cc161988.aspx>

Note: It is not currently possible to inventory a virtual application with Configuration Manager Asset Intelligence reports when the same version of that application is locally installed on the client PC. The inventory data for the locally installed version of the application will overwrite the inventory data for the virtual version of the application in the inventory.

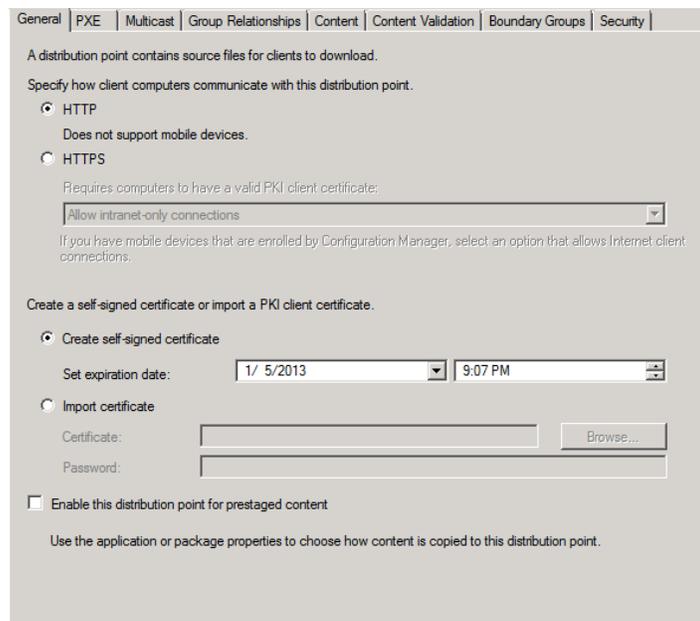
Configuration Manager Virtual Application Delivery Methods

Configuration Manager supports two methods for delivery of virtual applications to clients: streaming delivery and local delivery (download and execute). This section describes these delivery methods.

Sequenced application packages contain a fully pre-configured run-time environment for the virtualized application. The application installation process occurs only on the App-V Sequencer workstation during the packaging process. Any system reboots that would normally occur during the application installation process are intercepted and handled by the Sequencer program. When a virtual application is delivered to a client PC, the application is ready to run. No application software installation, client PC reboot or post-installation application configuration is required when delivering a virtual application to client PCs. This significantly reduces the time required to deliver a virtual application to a client PC versus the time that is required to deliver a non-virtualized (i.e., locally installed) application to a client PC. This benefit is independent of the Configuration Manager application delivery method (i.e., streaming or local delivery) used to deliver the application to client PCs.

Streaming Delivery

When managed by Configuration Manager, the App-V Client supports streaming virtual applications via HTTP or HTTPS from a Configuration Manager standard Distribution Point server. Streaming via HTTP or HTTPS is enabled by default and configured as part of the Distribution Point properties.



The screenshot shows the 'Security' tab of a Configuration Manager Distribution Point properties dialog. It contains the following elements:

- General | PXE | Multicast | Group Relationships | Content | Content Validation | Boundary Groups | Security
- A distribution point contains source files for clients to download.
- Specify how client computers communicate with this distribution point.
 - HTTP
 - Does not support mobile devices.
 - HTTPS
 - Requires computers to have a valid PKI client certificate.
 - Allow intranet-only connections (dropdown menu)
 - If you have mobile devices that are enrolled by Configuration Manager, select an option that allows Internet client connections.
- Create a self-signed certificate or import a PKI client certificate.
 - Create self-signed certificate
 - Set expiration date: 1/ 5/2013 (dropdown) 9:07 PM (dropdown)
 - Import certificate
 - Certificate: [text box] [Browse...]
 - Password: [text box]
- Enable this distribution point for prestaged content
- Use the application or package properties to choose how content is copied to this distribution point.

Figure 3 - Distribution Point communications

Streaming Delivery Process

The following figure illustrates the virtual application steaming delivery process from end to end.

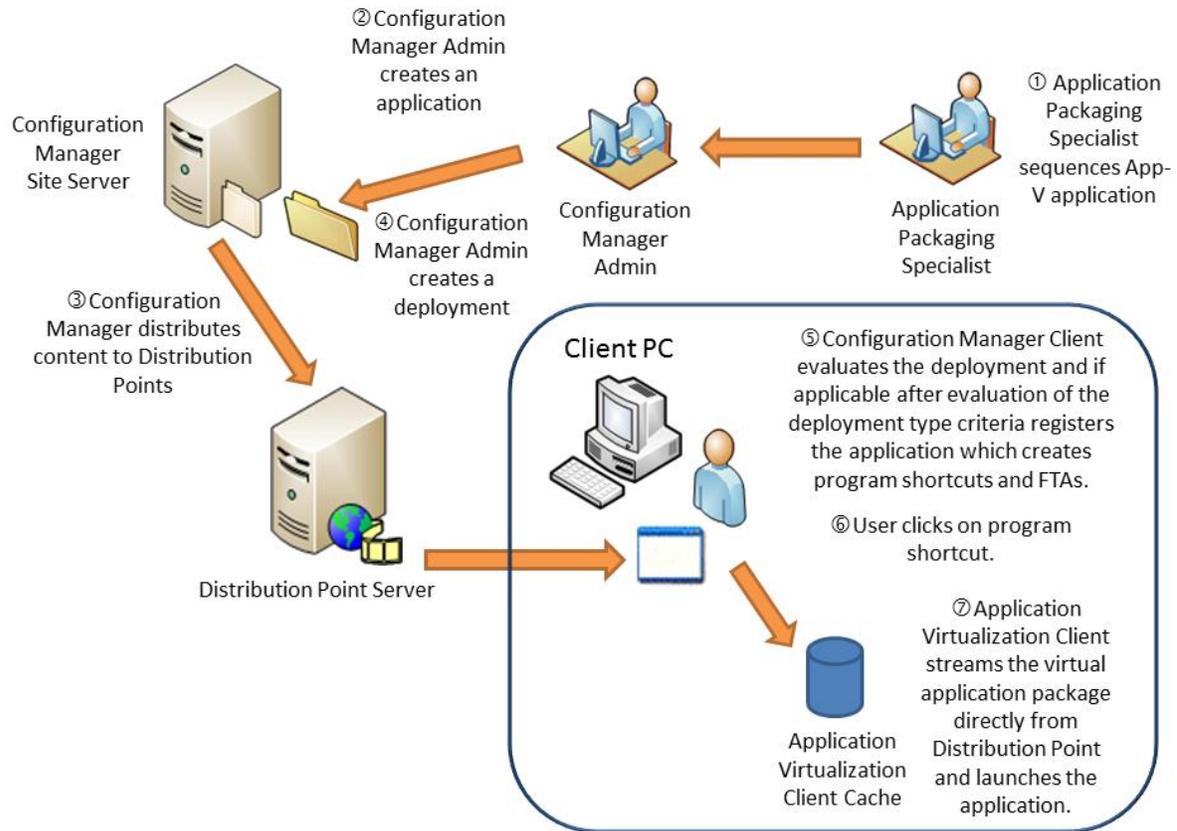


Figure 4 – Streaming Application Delivery Process

1. An application packaging specialist sequences an application and saves the new virtual application package to the App-V Content Source directory. The App-V Content Source directory is a network share that contains sequenced application packages.
2. The Configuration Manager administrator creates an application. To create the new virtual application package, the Configuration Manager administrator runs the *Create Application Wizard* from the Software Library.
For more information on the *Create Application Wizard* see <http://technet.microsoft.com/en-us/library/gg682159.aspx>
3. The Configuration Manager administrator uses the *Distribute Content* wizard and selects the distribution points where the application will be replicated.
For more information on the *Distribute Content Wizard* see http://technet.microsoft.com/en-us/library/gg712694.aspx#BKMK_DistributeContent
4. The Configuration Manager administrator creates a deployment targeting the new App-V application to a collection of client PCs or users using streaming delivery.
For more information on the *Deployment Wizard* see <http://technet.microsoft.com/en-us/library/gg682082.aspx>

- The Configuration Manager Client evaluates the deployment and if it is applicable after evaluation of the deployment type criteria it registers the new application package with the App-V Client. The App-V Client creates program shortcuts and FTAs for each program included in the package.

Note: The App-V Client will not stream the new application package until the user clicks on one of the program shortcuts associated with the new package.

Note: Deployments that are **Available** enable user invocation from the Application Catalog including administrator approval prior to publishing App-V and traditional applications.

- The user clicks on one of the program shortcuts associated with the virtual application package.
- The App-V Client streams the blocks of the virtual application package required to launch the program (i.e., Feature Block 1) into the App-V Client cache directly from a Configuration Manager Distribution Point. Which Distribution Point server is used for streaming is determined by the current location of the Configuration Manager Client and the policies contained in the deployment type for the virtual application package.

After Feature Block 1 is streamed into the App-V Client cache, the application is launched and presented to the user. By default, any additional blocks are streamed in the background until the package is fully cached. This ensures that all features of the application are available when the client system is offline.

Distribution Point Selection Process

The following figure illustrates the Distribution Point selection process that occurs whenever a virtual application is launched on a client PC.

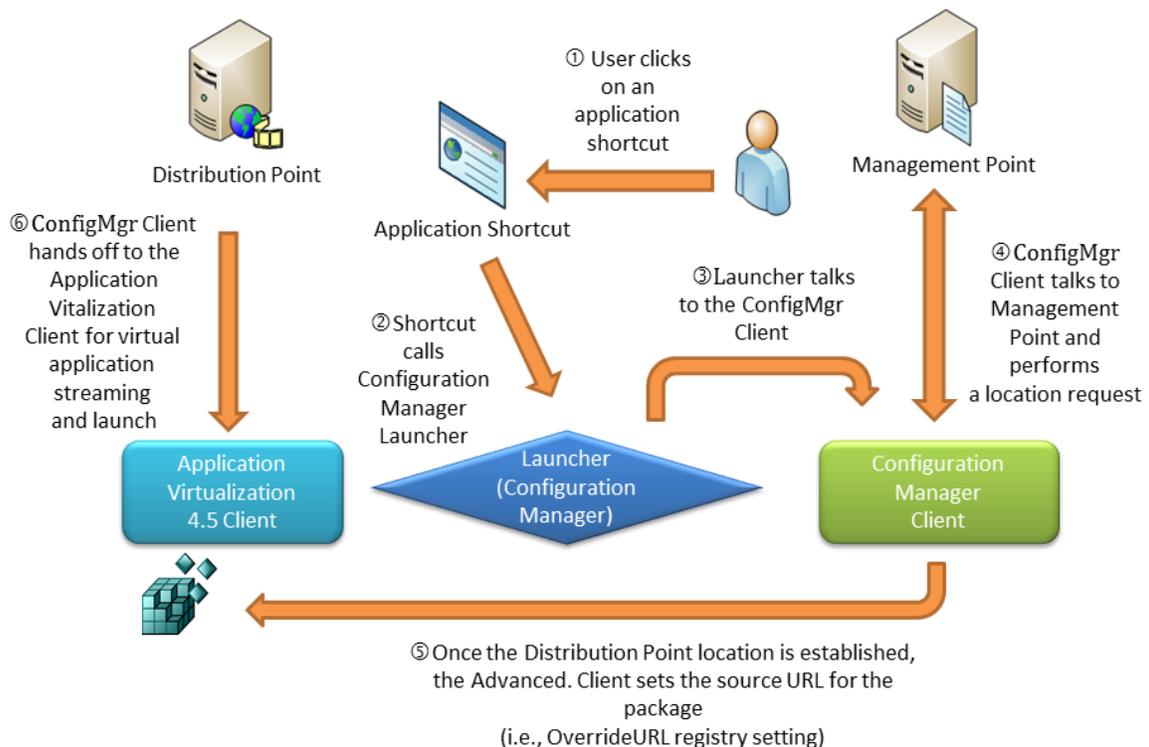


Figure 5 – Streaming Application Delivery to a Client PC

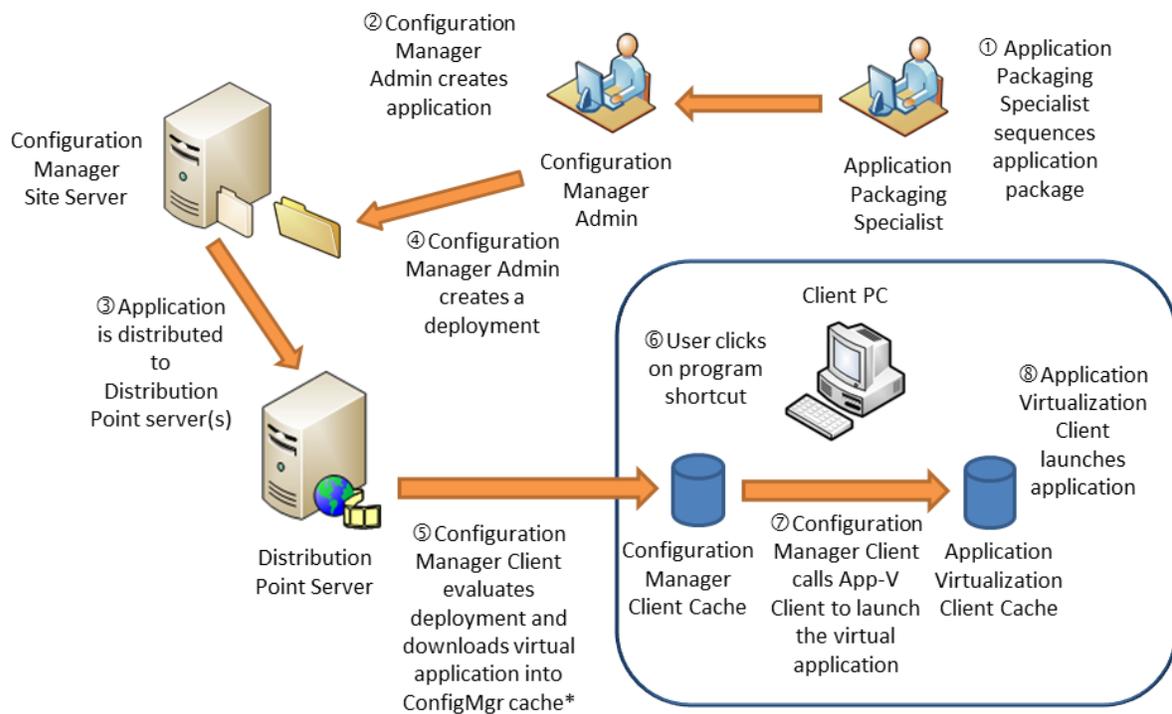
1. The user clicks on one of the program shortcuts associated with a virtual application package.
Note: All program shortcuts for virtual applications are linked to a “Launcher” program included in the Configuration Manager Client.
2. The shortcut runs the Configuration Manager launcher program (VappLauncher.exe).
3. The Launcher program sends a request to the Configuration Manager Client to poll the Management Point for the location of the virtual application package.
4. The Configuration Manager Client polls the Management Point to determine which Distribution Point should be used to stream the application package and the location of the SFT on the Distribution Point.
5. The Configuration Manager Client sets the App-V Client’s OverrideURL registry value with the explicit path to the SFT file for that application package on the selected Distribution Point.
6. The Configuration Manager Client calls the App-V Client’s App-V Launcher program (sftray.exe) to launch the virtual application. At this point, the Configuration Manager Client has effectively handed off the virtual application launch to the App-V Client and is no longer involved. The App-V Client then streams and launches the application.

Local Delivery (Download and Execute)

The Configuration Manager Client also supports local delivery of virtual applications. With this delivery method, the Configuration Manager Client first downloads the entire virtual application package into the Configuration Manager Client cache and then directs the App-V Client to stream the SFT file from the Configuration Manager cache into the App-V cache.

Local Delivery Process

The following figure illustrates the virtual local delivery (download and execute) process.



*By default the application is preloaded in the App-V Cache.

Figure 6 – Download and Execute Delivery from Distribution Point Server

1. An application packaging specialist sequences an application and saves the new virtual application package to the App-V Content Source directory.
2. The Configuration Manager administrator creates an application. To create the new App-V application, the Configuration Manager administrator runs the *Create Application Wizard* from the Software Library or creates an additional Deployment Type for an already existing application.

For more information on the *Create Application Wizard* see <http://technet.microsoft.com/en-us/library/gg682159.aspx>

3. The Configuration Manager administrator uses the *Distribute Content* wizard and selects the distribution points where the application will be replicated.

For more information on the *Distribute Content Wizard* see http://technet.microsoft.com/en-us/library/gg712694.aspx#BKMK_DistributeContent

4. The Configuration Manager administrator creates a deployment targeting the new virtual application package to a collection of client PCs or users using streaming delivery.

For more information on the *Deployment Wizard* see <http://technet.microsoft.com/en-us/library/gg682082.aspx>

5. The Configuration Manager Client evaluates the deployment and if it is applicable after evaluation of the deployment type criteria it copies the application into the Configuration Manager Cache and registers the new application package with the App-V Client. The App-V Client creates program shortcuts and FTAs for each program included in the package.

Note: The App-V package is preloaded in the App-V cache with the **Load content in App-V cache before launch** option is selected on the deployment type.

6. The user clicks on one of the program shortcuts associated with the virtual application package.
7. The Configuration Manager Client Launcher program runs and calls the App-V Client to launch the application.
8. The App-V Client streams the SFT file from the Configuration Manager Client cache into the App-V cache and launches the application. After a successful launch of the application, the Configuration Manager Launcher deletes any older versions of the package that exist in the Configuration Manager Client cache.

Choosing a Delivery Method

Selecting Configuration Manager App-V Delivery type will not be the same for each organization and may be a mixture of streaming and local delivery. When deciding which Configuration Manager virtual application delivery method to use, it is necessary to weigh the reduced disk space requirement for streaming delivery versus the guaranteed availability of App-V applications with download and execute. The increased client disk space required for local delivery is often worth ensuring that the end user always has the application available from any location.

Advantages of Streaming Delivery

When planning a Configuration Manager with App-V delivery method, the following advantages of streaming delivery should be considered.

- Uses well-known network protocols to stream package content from Distribution Points.
- Program shortcuts for virtual applications invoke a connection to the Distribution Point so the virtual application delivery is on demand.
- Works well for clients with high-bandwidth connections to the Distribution Point servers.
- Updated virtual applications distributed throughout the enterprise are available as clients learn about the supersedence of their version and seamlessly download only the changes from the previous version.
- Access permissions are defined at the Distribution Point to prevent users from accessing unauthorized applications/packages.

Disadvantages of Streaming Delivery

The following disadvantages of streaming delivery should be considered when planning the delivery method.

- With streaming delivery, a virtual application is not streamed until the user launches the application for the first time. When using streaming delivery, it is possible for a user to receive program shortcuts for virtual applications and then unplug from the network before launching the virtual applications for the first time. If the user tries to launch the virtual application while the client is offline, the user will receive an error and will not be able to launch the virtualized application because a Configuration Manager Distribution Point server is not available to stream the application. The application will be unavailable until the user reconnects the client to the network and launches the application. This scenario can result in a negative user experience. This issue can be avoided by using the local delivery method for virtual application delivery to clients or enabling Internet-based client management for streaming delivery.

Advantages of Local Delivery

When planning a Configuration Manager with App-V delivery method, the following advantages of local delivery should be considered.

- Standard distribution point functionality is used to efficiently download the package using Background Intelligent Transfer Service (BITS). The execute function is virtual application-aware and is used to instruct the App-V to publish the application (i.e., create program shortcuts and FTAs).
- Virtual application package contents are delivered locally to the client, enabling offline first launch support.
- Virtual application program shortcuts refer to a local copy of the virtual application which resides in the Configuration Manager Client cache. No server connection is required.
- Great for unreliable/slow network connections and occasionally connected clients.
- Remote Differential Compression (RDC) is a data transfer method that optimizes data transmission over the network. Configuration Manager uses RDC to send to clients only the portions of files that have changed when virtual application package content is updated. The Configuration Manager Client uses RDC to build a new version of a virtual application package based on the current version of the package and the changes sent to the client.
- Application resiliency for mobile/disconnected users. Administrators can choose to persist the SFT in the Configuration Manager cache after delivery as long as the virtual application has an install deployment. The SFT in the Configuration Manager Client cache effectively serves as a local, reliable streaming source for the App-V Client to pull the SFT into its cache. The App-V Client GUI's application maintenance functions (i.e., load, unload, clear, repair, etc.) still work as expected, even when operating offline.

Disadvantages of Local Delivery

The following disadvantages of local delivery should be considered when planning the delivery method.

- Disk space equaling up to three times the size of the virtual application package (SFT file size) is required on the client when the virtual application is persisted in the Configuration Manager cache.

- The Configuration Manager Client will retain the App-V package (SFT file) in the Configuration manager cache until the content has been moved into the App-V Client cache. It can be moved to the App-V Client cache by launching the application or when the Load **content in App-V cache before launch** option is selected on the deployment type. If the option to persist in Configuration Manager cache is selected, the SFT is not removed from the Configuration Manager cache.
- The contents of the SFT file are extracted (if compressed) and reside in the App-V Client cache.
- A third temporary copy is created on the client while RDC calculates differential deltas for an application upgrade or downgrade and the most recent version of the SFT file is created.

Note: Applications that are not configured to persist in cache still require up to two times the disk space as there will be one copy in the App-V cache and new versions of an App-V application might have to be completely downloaded prior to updating.

Supported Scenarios for Virtual Application Deployment with Configuration Manager and App-V

Configuration Manager supports delivering App-V applications to clients with both Streaming and Download and Execute across all supported methods. The following is a list of supported delivery methods.

- Distribution Points
- BranchCache
- Internet Facing
- Workgroup clients
- Fast network boundaries
- Slow network boundaries

Examples of typical scenarios for virtual application deployment supported with Configuration Manager and App-V follow:

Scenario 1: Multiple location content

Business Scenario

In this scenario, the administrator wants to take advantage of streaming virtual applications to many locations and many users by leveraging the scalability of Configuration Manager. The customer wants client machines to receive content from a local source, and they want to have rich controls on how the content is replicated across their WANs to those local sources. Also, the customer does not want to deploy SQL servers at each location and maintain separate databases for an App-V Full Infrastructure.

Solution Description

Configuration Manager provides App-V application deployment to clients. Configuration Manager Distribution Point servers support streaming by default for client deployment via BITS.

Virtual Application Package Delivery Method

- Virtual application package streaming from Configuration Manager standard Distribution Point.

Streaming Protocols Used

- BITS

Components Needed

- Configuration Manager infrastructure servers.

Scenario 2: Serverless branches

Business Scenario

In this scenario, the customer does not have server-class hardware in their branch office locations but want to deliver virtual applications to client PCs located in the branch offices using Configuration Manager streaming delivery method.

Solution Description

A non-server class PC located in each branch office is configured to support BranchCache via group policies in either hosted or distributed cache mode. When a PC is designated as a BranchCache, requests for application downloads will be stored on the machine for subsequent downloads. The application deployment type option **Enable peer-to-peer content distribution** must be selected. Depending on the deployment option of Streaming or Download and Execute the appropriate protocol is used. Configuration Manager automatically sets the OverrideURL registry value on clients causing them to file stream from the Branch Distribution Point.

Virtual Application Package Delivery Method

- Streaming or Download and Execute delivery from BranchCache computers to clients.

Streaming Protocols Used

- BITS

Components Needed

- BranchCache configured machine.
- Configuration Manager for virtual application deployment policy delivery to clients.

For more information on configuring BranchCache visit: <http://technet.microsoft.com/en-us/network/dd425028>

Roaming Client Scenarios

Business Scenario

A client PC travels between sites that have different speeds of network connections (i.e., fast versus low speed) between the Distribution Point server and the client. The customer wants to deliver virtual applications to the roaming client PC regardless of its current location.

Solution Description

1. Set up Configuration Manager network boundaries and boundary groups to reflect the network connection speed (i.e., fast versus slow) between the client and Distribution Points at each location.

For more information on Configuring Boundaries and Boundary Groups in Configuration Manager, see <http://technet.microsoft.com/en-us/library/hh427326.aspx>

2. Configure the application deployments to use the desired application deployment option in the deployment type (i.e., streaming delivery or download and execute). The following screen shot shows the Content tab of a virtual application deployment type. The selected options will cause the package to be streamed to the client whenever the client is located within a Configuration Manager fast network boundary, or download and execute the application whenever the client is located within a slow network boundary.

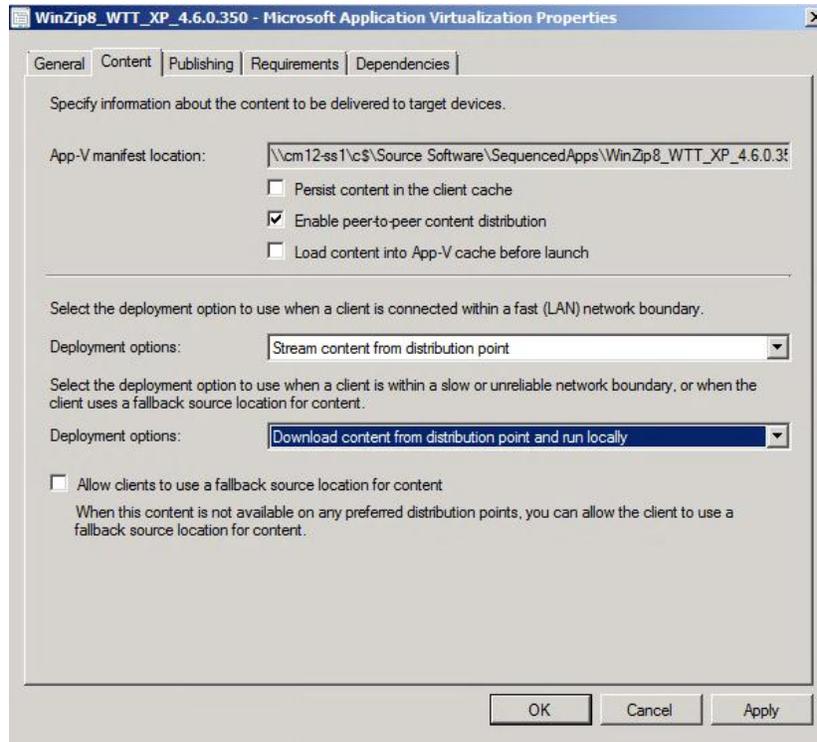


Figure 7 – Configuration Manager Virtual Application Deployment Type

To use local delivery (download and execute) for the application regardless of the network connection speed, select the “Download content from distribution point and run locally” from the drop down of the Content tab of the deployment type properties window.

For more information on deployment of virtual applications, see <http://technet.microsoft.com/en-us/library/gg682082.aspx>

For more information on client roaming in Configuration Manager, see <http://technet.microsoft.com/en-us/library/gg712679.aspx>

Roaming Scenario Example

This example assumes the following Configuration Manager setup:

1. Network boundaries have been properly configured to reflect the network connections speeds between client PCs and Distribution Point servers.
2. A Deployment (Deployment-A) for an App-V application (Application-A) has been created to deliver the application to client PCs residing within fast network boundaries using streaming delivery, and to deliver the application using local delivery to client PCs residing within slow network boundaries. The deployment targets the application delivery to a collection that includes Client-A.
3. Client-A is a mobile laptop PC.

Operation:

1. When Client-A resides in a location within a fast network boundary, the Configuration Manager Client pulls new policy from the Management Point (MP) and determines that it is within a fast network boundary.

2. Client-A streams Application-A via HTTP/ HTTPS from a Distribution Point server directly into the App-V Client cache upon launch of the published shortcuts or through file type invocation.
3. The user then removes Client-A from the docking station and connects to the wireless network.
4. The Configuration Manager Client on Client-A pulls new policy from the Management Point and determines that it now resides within a slow network boundary.
5. The Configuration Manager Client then receives policy that there is a new version of the package that supercedes the current version of Application-A.
6. The Configuration Manager Client downloads the updated version of the SFT for Application-A into the Configuration Manager Client cache.
7. The Configuration Manager Client then changes the App-V Client's OverrideURL for package A from an HTTP:// URL path to a Distribution Point server to the File:// local path of the new SFT file in the Configuration Manager Client cache.
8. The App-V Client streams the updated package (delta blocks) from the local file path specified by the OverrideURL registry value.

Note: After switching to Download and Execute for the slow boundary and for as long as the Configuration Manager cache retains the App-V package, download and execute will be the preferred delivery method.

Internet-Based Scenarios

Configuration Manager can deploy virtual applications to Configuration Manager Internet-based clients. Configuration Manager Internet-Based Client Management (IBCM) requires that the Internet-based management point authenticate users in Active Directory Domain Services by using Windows authentication, ensuring that it trust the forest where the user account resides and user policies are supported. If the Windows authentication fails, only computer policies are supported. Computer policies are supported even when user authentication fails, as computers must have certificates deployed and managed by public key infrastructure.

Note: Internet-based client management does not support roaming, which enables clients to find the closest distribution points to download content. Clients managed on the Internet communicate with site systems from their assigned site when these site systems are configured to use an Internet FQDN and the site system roles allow client connections from the Internet. Clients non-deterministically select one of the Internet-based site systems, regardless of bandwidth or physical location.

For more information on application deployment to Internet-based clients with Configuration Manager, see http://technet.microsoft.com/en-us/library/gg712701.aspx#Support_Internet_Clients.

Planning for Virtual Application Deployment with Configuration Manager

Virtual application deployment with Configuration Manager requires proper planning to ensure a successful infrastructure. Planning should include the following considerations: how much disk space will be required and where the disk impact will be present in the infrastructure (client or Distribution Points), recommended size of the Configuration Manager and App-V Client cache, and migrations from an App-V Full Infrastructure.

Disk Space Considerations for Distribution Point Servers and Clients

One of the first and most important planning activities is proper space allocation. Configuration Manager with App-V integration will increase the amount of disk space consumed by applications. When planning disk space allocation and location, the different delivery methods need to be compared. The following information describes the impact on disk space allocation, as well as location, as it pertains to the two delivery methods.

From the site server and distribution point perspective both streaming and download and execute have the same impact on storage on the server. The content library in System Center 2012 Configuration Manager is the location where all content files are stored for software updates, applications, operating system deployment, and so on. The content library is located on the site server and each distribution point. The content library in System Center 2012 Configuration Manager provides a single instance store for content files on the site server and distribution points. Before content files are downloaded to the site server and copied to distribution points, System Center 2012 Configuration Manager checks to see whether the content file is already in the content library, and if it is, the existing content file is used.

- Disk space requirements
 - Disk space required on Distribution Point server to support local delivery of virtual application packages:
 - 1x SFT file size for the application package that is currently advertised for delivery to clients for each revision of the App-V application.
 - Disk space required on client PCs for local delivery of virtual application packages has two scenarios:
 - **Persist content in the client cache:** Total peak disk space required on a client PC for delivery of a new virtual application package = 3 x SFT file size. This total includes the following:
 - ❖ 1x SFT file size to store a copy of the SFT file in the Configuration Manager Client cache.
 - ❖ 1x SFT file size to store a copy of the expanded SFT content in the App-V Client cache.
 - ❖ 1x SFT file size to temporarily store a new version of the package on the client when an existing package is being updated. This space is needed while RDC (Remote Differential Compression) calculates the deltas and generates the new version of the SFT file.
 - Without **Persist content in the client cache:** Total peak disk space required on a client PC for delivery of a new virtual application package = 2 x SFT file size. This total includes the following:
 - ❖ 1x SFT file size to store a copy of the expanded SFT content in the App-V Client cache.
 - ❖ 1x SFT file size to temporarily to store the application on the client during installation and updates in the Configuration Manager cache.

Note: The application is removed from Configuration Manager cache after it has expired based on the tombstone values.
 - Disk space required on client PCs for application packages using streaming delivery:

- 1x SFT file size to store the contents of the SFT file in the App-V Client cache and additional space for updated content.

Recommended Disk Space Allocation for the Configuration Manager and App-V Client Caches

Configuration Manager with App-V integration infrastructure clients will have two cache locations, the Configuration Manager cache and the App-V cache. Depending on the delivery method and options, one or both of the cache locations are used in delivering the virtual applications. The following details the configuration of both the client caches. Choose the appropriate size by using the disk space requirement information in the section above and applying the details and settings of each cache in the list below.

- Disk space for a full copy of the SFT file is required in the App-V Client cache even if the client only streams Feature Block 1 into cache because the App-V Client pre-allocates space for the entire SFT file before it begins to stream the application. This behavior is intentional and improves the reliability of the App-V Client.
- The disk space allocation settings for the Configuration Manager Client cache and App-V Client cache should be configured as follows to limit the risk of locking out the Configuration Manager Client cache due to a low disk space condition on the client, which would affect the ability of Configuration Manager to deploy critical security patches to the client:
 - The disk space allocation for the Configuration Manager Client cache should be set to a maximum size that will provide sufficient space for a full copy of all virtual application packages that will be deployed to the client. The Configuration Manager Client cache size can be set at install time or configured manually as follows:
 1. **Open** the Control Panel → Configuration Manger Applet.
 2. **Select** the Cache tab.
 3. **Click** the Configure Settings button.
 4. **Adjust** the "Amount of disk space to use (MB)" slider to the desired value. For example: to set the Configuration Manager Client cache size to 4 GB, enter 4096.
 5. **Click** OK.
 - The App-V Client cache free disk space threshold parameter should be set to ensure that the available disk space on the client PC is at least 1 GB larger than the Configuration Manager Client cache size. For example, if the Configuration Manager Client cache size is set to 4 GB, set the App-V Client cache to ensure that at least 5 GB of free disk space is available before the App-V Client cache is allowed to grow. The App-V Client cache MINFREESPACEMB parameter can be set at install time or configured manually as follows:
 1. **Select** Start → Programs → Administrative Tools → Application Virtualization Client.
 2. The Application Virtualization Client Management Console will appear.
 3. **Select** Action → Properties from the menu bar.
 4. **Select** the File System tab.
 5. **Select** "Use free disk space threshold."

6. **Enter** the desired value for "Minimum free space (MB)" parameter.
For example, to set the free disk space threshold to 5 GB, enter 5120.
7. **Click** OK.
8. **Close** the Application Virtualization Client Management Console.

Note: Cache management affects overall client PC disk space, as disk space is not recovered, even when a user or administrator removes virtual application data. The space is available to, and reserved for, the App-V Client, but not recovered for the user. This can be an area of concern regarding user experience as users are typically used to removing unneeded files and programs when they get low on disk space. This does not carry over with virtual applications, as removing them has no impact on the available disk space on the client PC.

For a detailed description of the App-V Client installer command line options, see <http://technet.microsoft.com/en-us/library/cc843737.aspx>.

For information about Configuration Manager Client installation properties, see <http://technet.microsoft.com/en-us/library/cc843737.aspx>.

Migration from App-V Full Infrastructure or Standalone MSI to Configuration Manager

This section lists the steps required to migrate from an existing App-V Full Infrastructure or standalone App-V MSI deployment to application virtualization management with Configuration Manager.

The first step is planning for the migration from the previous App-V deployment method into Configuration Manager. Start by rationalizing the current App-V application catalog to determine which applications should be migrated to Configuration Manager by evaluation of the usage and recent deployment. Next, evaluate how the applications are targeted in the App-V Full infrastructure, which typically uses application or organizational groups, while Standalone uses third party, GPO, and scripted based installs. Since Configuration Manager requires collections for targeting, ensure that current collections are utilized instead of creating new collections. Also, note that for Configuration Manager 2012, there may be existing Deployment Types for applications that are traditional MSI and the App-V versions should be an added deployment type to take full advantage of the application model.

Once the migration strategy has been developed and the App-V Clients have the Configuration Manager Client installed, the migration process can commence. The triggering activity for Configuration Manager App-V application management is the first deployment of an App-V application to an App-V Client. Existing App-V applications that were delivered by an App-V Full Infrastructure remain, but are no longer managed by the App-V Management Server. The App-V applications must be managed by Configuration Manager for all future management tasks.

1. **Create applications** from the existing App-V catalog as well as aligning with traditional installations as additional deployment types assigning any necessary requirements, dependencies, and other application model metadata.
2. **Distribute** the content to the appropriate distribution points to enable local delivery of applications.

3. **Create** collections and deployments to target virtual application delivery to clients. Utilize any preexisting collections in the infrastructure where applicable.
4. Configuration Manager application deployments and client policies are evaluated and the App-V applications are re-deployed to clients via Configuration Manager.

Note: It is not necessary to re-sequence all existing virtual application packages to deploy them with Configuration Manager; however, if the package was created with an earlier version of the Sequencer (i.e., prior to version 4.5), each virtual application package must be opened with the App-V Sequencer program and saved. This is necessary to create the App-V manifest.xml file required for virtual application deployment with Configuration Manager.

Virtual application packages created with the SoftGrid 4.1 SP1 or 4.2 versions of the Sequencer are fully supported with App-V 4.5 and 4.6. Virtual application packages created with the SoftGrid 3.x or 4.0 versions of the Sequencer are expected to work; however, some applications created with pre-4.1 SP1 versions of the Sequencer may need to be re-sequenced with newer releases of the App-V Sequencer.

Note: If the applications were previously delivered as MSI-based delivery, each App-V application must be uninstalled before re-deployment of virtual applications.

App-V Migration from Configuration Manager 2007 to Configuration Manager 2012

Migration of App-V packages from Configuration Manager 2007 R2 to App-V applications in Configuration Manager 2012 requires changing from the package format to the application model. In Configuration Manager 2012, there is no support for the package format for App-V applications. Organizations that are migrating must plan the infrastructure upgrade to accommodate Configuration Manager only managing App-V applications that are in the application model. Users and devices that will have App-V applications deployed in a mixed Configuration Manager 2012/2007 environment will need to ensure that they have deployed at least one Configuration Manager 2012 Distribution Point in each site where applications are deployed.

Configuration Manager 2012 migrates App-V packages and converts them to applications. The migration converts existing advertisements for the App-V package into the following deployment types in System Center 2012 Configuration Manager:

- Migrating App-V packages with no advertisement creates one deployment type using the default deployment type settings.
- Migrating App-V packages with one advertisement creates one deployment type using the same settings as the Configuration Manager 2007 advertisement.
- Migrating App-V packages with multiple advertisement creates a deployment type for each Configuration Manager 2007 advertisement, using the settings for that advertisement.

For more information on migration from Configuration Manager 2007 to Configuration Manager 2012 visit: http://technet.microsoft.com/en-us/library/gg712672.aspx#Plan_Migrate_content

Virtual Application Delivery to Remote Desktop Services

Configuration Manager 2012 adds the ability to deliver App-V applications to users on Remote Desktop Services RDSH servers while users are logged in. This eliminates the need to drain the user population and place the server into “install” mode prior to deploying the application. However, upgrades to App-V applications will require that no users are actively using a specific application for the deployment to complete. The recommended practice for application delivery to Remote Desktop Services based systems and users with required deployments that use the “Download and Execute” option and the “Load content in App-V cache before installation” option is to ensure the application is completely available in cache prior to execution. These recommended settings ensure that the application is available for the user with no delay, and will allow application update as soon as all users have exited the application or during a normal maintenance window.

One unavoidable restriction must be considered when using Configuration Manager to target virtual application delivery to Remote Desktop Services (formerly Terminal Services). The Configuration Manager Client does not publish RemoteApp applications. For delivery of App-V applications to Remote Desktop Session Host (RDSH) servers that are serving shared desktops, targeting is the same as traditional desktops. If the applications are delivered to RDSH servers and the desired outcome is to publish with RemoteApp, the App-V or traditional applications must be delivered to a collection that includes the server and administrators must configure RemoteApp publishing and provisioning.

How to Perform Common Virtual Application Management Tasks with Configuration Manager

This section details common management tasks for virtual applications in Configuration Manager. These are tasks that are required or will be part of the normal operation of a Configuration Manager with App-V infrastructure.

Deploy the App-V Client Software to Configuration Manager Client PCs

Deploying the App-V Client software with Configuration Manager can be accomplished in multiple ways. Configuration Manager supports the older package format where the package definition file from Configuration Manager 2007 R2 can be used to build an installation package. This section will focus on using the application model and the MSI for delivery.

1. Obtain the App-V Client software from Microsoft (i.e., download the MDOP 2011 R2 software from the Microsoft Volume Licensing Services Web site) and extract the App-V Client software into a source directory. This directory should include the following App-V Client assets:
 - AppVReadme.htm file
 - Setup.exe file
 - Setup.msi file
 - Support subdirectory containing the Dr Watson 2.0 redistributable (dw20shared.msi) or Application Error Reporting

Note: There are versions of the App-V 4.6 SP1 Client software for both 32-bit and 64-bit system architectures.

2. Obtain the prerequisite software including Visual C++ 2005 and 2008 Redistributable packages. The Application Error Reporting software is already part of the App-V Client installation files. The links to download these prerequisites and subsequent guidance for installation are located at: <http://technet.microsoft.com/en-us/library/ee956914.aspx>.

Note: Only the 32-bit versions of prerequisites are required.
3. Create applications for each installer separately but only create one application for the App-V Client based on the 32-bit client. An example of the applications create are as follows:
 1. App-V Client
 2. Application Error Reporting
 3. Visual C++ 2005 Redistributable x86
 4. Visual C++ 2008 Redistributable x64

By default, each application will have one deployment type based on automatic discovery of the MSI installers.

4. Select the Application Error Reporting application, modify the default deployment type, and create additional deployment types for each App-V Client (Desktop or Remote Desktop Services) and each platform (32-bit and 64-bit) targeted for delivery.
 1. In the **General** tab, change the name for each deployment type (e.g. App-V 4.6 SP1 x86, RDS App-V 4.6 SP1 x64).

2. From the **Programs** tab of each deployment type modify the installation program based on the table under the **To install Microsoft Application Error Reporting** section located at: <http://technet.microsoft.com/en-us/library/ee956914.aspx> .
3. On the **User Experience** tab for each deployment type ensure that the following options are selected:
 - Installation behavior: Install for system
 - Logon requirement: Whether or not a user is logged on
 - Installation program visibility: Hidden
4. From the **Requirements** tab, add the appropriate operating systems that match to the App-V Client that it will support to ensure it is only delivered to the appropriate machines.
5. For Visual C++ 2005 and 2008 Redistributable applications modify the **User Experience** tab ensuring that the following are selected:
 - Installation behavior: Install for system
 - Logon requirement: Whether or not a user is logged on
 - Installation program visibility: Hidden
6. Select the App-V application, modify the default deployment type, and create additional deployment types for each App-V Client (Desktop or Remote Desktop Services) and each platform (32-bit and 64-bit) targeted for delivery.
 1. In the General tab, change the name for each deployment type (e.g. App-V 4.6 SP1 x86, RDS App-V 4.6 SP1 x64).
 2. Modify the program with the options required for the delivery including modifying locations of cache and other options per the guidance located at: <http://technet.microsoft.com/en-us/library/cc843737.aspx>.
 3. In the **User Experience** tab change the options ensuring that the following are selected:
 - Installation behavior: Install for system
 - Logon requirement: Whether or not a user is logged on
 - Installation program visibility: Hidden
 4. From the **Requirements** tab, add the appropriate operating systems that match the App-V Client that it will support, ensuring delivery to only the appropriate machines.
 - For the App-V Client for RDS use additional requirements to ensure that the installation only occurs on machines that have RDSH installed on them. Some examples of requirements are:
 - Use an OU based requirement where all RDSH servers are placed
 - Create a custom requirement and create a WQL query to check for the presence of the RDSH component.
 5. From the **Dependencies** tab create dependency groups for each dependency with the **AND** operator. Make sure that you select the correct prerequisite dependencies for each deployment type.

Note: Because the App-V Client includes a virtual file system driver, it is necessary to reboot the client PC when upgrading the App-V Client. However, a reboot is not required for installation of the App-V Client on a client PC that does not already include the App-V Client software.

7. Distribute each application to the Distribution Points by right-clicking and selecting **Distribute Content**.

This will setup a single application for App-V that will install the client on the appropriate operating system, platform (32-bit or 64-bit), and Remote Desktop Services. The App-V Client application can be deployed using the Deployment wizard to the appropriate collections, or it can be a dependency on each App-V application deployment type and the delivery is controlled thru the App-V application deployment to ensure that the client is installed or upgraded on the destination device prior to delivery.

Deploy a Virtual Application to Configuration Manager Clients

The following section describes the high-level, end-to-end process of deploying virtual applications to Configuration Manager Clients.

1. **Sequence** an Application

A sequencing engineer uses the App-V Sequencer program to sequence an existing application and saves the new virtual application package to a specified content directory.

2. **Create** a Configuration Manager application

Use the *Create Application Wizard* to specify the sequenced application source directory location and import the sequenced application into the Configuration Manager site.

The *Create Application Wizard* is launched as follows:

1. **Open** the Configuration Manager Admin Console
2. Select **Software Library** → expand Application Management → Applications
3. **Right-click** on Applications and select → Create Application
4. The New Virtual Application Package Wizard will appear

More information about the *Create Application Wizard* can be found at:

<http://technet.microsoft.com/en-us/library/gg682159.aspx>

5. Edit the deployment type to control the content delivery with the **Content** tab and select the following options:
 - Deployment Options: **Download content from distribution point and run locally** or **Stream content from distribution point**.
 - Deployment Options for slow or unreliable network boundary: **Download content from distribution point and run locally**, **Stream content from distribution point**, or **Do not download content**.
 - **Load content into App-V cache before launch** is the option for Download content from distribution point and run locally which preloads the App-V cache.
 - **Persist content in the client cache** that retains a copy of the App-V application in the Configuration Manger cache permanently.
3. **Distribute** the Application to Specific Distribution Point groups

After an App-V application package has been created in Configuration Manager, the package must be replicated to the Distribution Points that will be used to deliver the virtual application package to clients. The Configuration Manager administrator chooses which Distribution Points to send the virtual application package.

4. **Create** Collection(s) that will be used to target virtual application delivery to clients (or users)
Configuration Manager deployments are targeted at collections. These can be collections of computers or users. Both user- and machine-based targeting are fully supported.
5. **Deploy** App-V applications to targeted Configuration Manager users and devices.

After a virtual application package has been replicated to Distribution Points, create a deployment that targets the desired collection(s). When a deployment is created for a virtualized application to a collection of client PCs or users, each target computer or user in a collection will receive the advertisement and all applications contained in the virtual application package. Configuration Manager Clients will use normal Configuration Manager Client polling methods to locate the deployment.

Configurable Options:

- Application deployment installation type: **Required** or **Available**
- Collection selection of client devices or users to which the package should be deployed
- Scheduling deployments
- User experience for integration in the Software Center and display of notifications

For more information on the Create Application Wizard, see <http://technet.microsoft.com/en-us/library/gg682159.aspx>.

For more information on the Deploy Software Wizard, see <http://technet.microsoft.com/en-us/library/gg682082.aspx>.

Verify Virtual Application Delivery to a Specific Client

Verifying the delivery of a virtual application to devices and users can be accomplished from Application Management in the console or by running a Configuration Manager report (see the next topic) or by simulating or manually testing the virtual application on the client as follows:

1. Log on to a client PC that is a member of a collection targeted for delivery of a virtual application package.
2. Wait for the application deployment to run on the client.
3. When the client PC evaluates the deployment, it will create program shortcut(s) for the programs contained in the virtual application package on the Start Menu, Desktop and/or Quick Launch bar. If the virtual application package is advertised for local delivery, the SFT file will also be downloaded to the Configuration Manager and optionally App-V Client caches.
4. Locate one of the program shortcuts for the virtual application on the client and click on the shortcut to launch the application.
5. Depending on the method used to deliver the application to the client, the application should immediately launch (local delivery), or stream and then launch (streaming delivery).

Report Virtual Application Deployment Data

Configuration Manager 2012 includes the following built-in reports that can be used to report the status of application distribution throughout the Configuration Manager hierarchy and application delivery to Configuration Manager Clients:

- All active content distributions
- All application deployments (advanced)
- All application deployments (basic)
- All content on a specific distribution point
- Application content distribution status
- Application Deployments Per Asset
- Applications targeted to a distribution point group
- Applications that are out of synchronization on a specified distribution point group

To list the available Configuration Manager application deployment reports:

1. **Open** the Configuration Manager Console.
2. Select **Monitoring** → expand **Reporting** → **Reports**.
3. The list of all available Configuration Manager reports will appear in the Reports pane.
4. Select or search for reports by name or sort by category.

To run an application report:

1. **Right-click** on the name of the desired report in the Reports pane and select **Run**.
2. **Enter** any required report parameters as needed and click Display.
3. The results of the report will be displayed in a pop-up window.

For more information on Configuration Manager reporting visit: <http://technet.microsoft.com/en-us/library/gg699377.aspx>

Upgrade a Previously Deployed Virtual Application

As with traditionally installed applications, virtual applications will need to be upgraded over their lifetime. In order to upgrade virtual applications, the App-V Sequencer will be used to create the upgraded package. Virtual application packages deployed with Configuration Manager can be upgraded easily to include service packs, software updates, etc.

To deploy multiple versions of the same application to different collections, it is necessary to create separate sequenced application packages (one for each version) and import them into Configuration Manager to create separate Configuration Manager virtual application packages with different Configuration Manager package IDs. This can be done using the Save As feature in the Sequencer program.

Upgrading applications whether traditional or virtual uses the supersedence feature. Administrators copy the original application and then modify the source from the deployment type and modify the new version of the application's deployment type to supersede the previous version. The updated application can be deployed to Configuration Manager Clients and/or users in order for the users to

use the updated applications in the package. For more information on upgrading applications visit: <http://technet.microsoft.com/en-us/library/gg682071.aspx>

Note: Choosing the uninstall option will replace the App-V application including any user personalization for that application. Only select the uninstall option for scenarios where replacement of the entire application including user personalization is desired or required.

Delete a Virtual Application from All Members of a Collection or a Specific Client

Removing virtual applications from a client is one of the benefits of App-V. Virtual applications do not need to be uninstalled like traditional software; they are simply and instantly removed from the client.

To remove an application from a given client, an uninstall deployment must be created targeted at the appropriate collection.

Note: Install deployments always take precedence over uninstall deployments. If an application has an install and uninstall deployment that overlaps and targets the same objects in the targeted collections, the application will remain.

Note: Uninstall deployments do not remove dependencies and require administrators to create additional uninstall deployments.

Distribute Virtual Application Packages Using a Configuration Manager Task Sequence

Task sequences are used to automate procedures during operating system deployment with Configuration Manager. A Configuration Manager task sequence can be used to deploy virtual application packages. This option can be utilized when deploying virtual applications configured for Dynamic Suite Composition.

When using a Configuration Manager task sequence to deploy a virtual application package, it is not necessary to specify a program that will be associated with the package. The virtual application package contains a preconfigured virtual run-time environment including one or more applications.

If the task sequence is advertised with a “download on demand” advertisement, a copy of the SFT file is not retained in the Configuration Manager Client cache. In this case, it is necessary to disable (set to zero) the “RequireAuthorizationIfCached” registry setting on the App-V Client.

For more information on how to distribute virtual application packages using a task sequence, see <http://technet.microsoft.com/en-us/library/cc431389.aspx>.

Note: This documentation is from Configuration Manager 2007 but is similar for Configuration Manager 2012.

Track Virtual Application Usage with Configuration Manager Metering

Configuration Manager can track and report on virtual application usage using Configuration Manager’s built-in software metering features. The same application metering methods are used to track virtual and non-virtual applications with Configuration Manager. Tracking application usage with

Configuration Manager requires the Configuration Manager administrator to set up metering rules to track execution of specific application programs contained within the application package.

For Configuration Manager metering to work correctly, the client system must be restarted after App-V Client installation.

Troubleshooting

New Configuration Manager Client Log Files

The Configuration Manager 2012 Client includes the following a log file used to record virtual application-related state information:

- VirtualApp.log – Tracks virtual application registration, publishing, and launches.

Check the log file for error messages when you are experiencing problems with virtual application registration (i.e., virtual application advertisements not working properly) or virtual application launch (i.e., clicking on a program shortcut for a virtual application does not launch the application or generates an error).

Configuration Manager Client State Messages for Virtual Application Registration and Launch

The Configuration Manager 2012 Client includes new client status messages to track virtual application registration and launch status. Figure 8 shows a screenshot of the CM Trace log viewer program, which is displaying the contents of the new VirtualApp.log Configuration Manager Client log file with some of the new virtual application status messages highlighted.

The following screen shot shows the SMS Trace program displaying the contents of the Configuration Manager Client's VirtualApp.log file with examples of the new status messages highlighted.

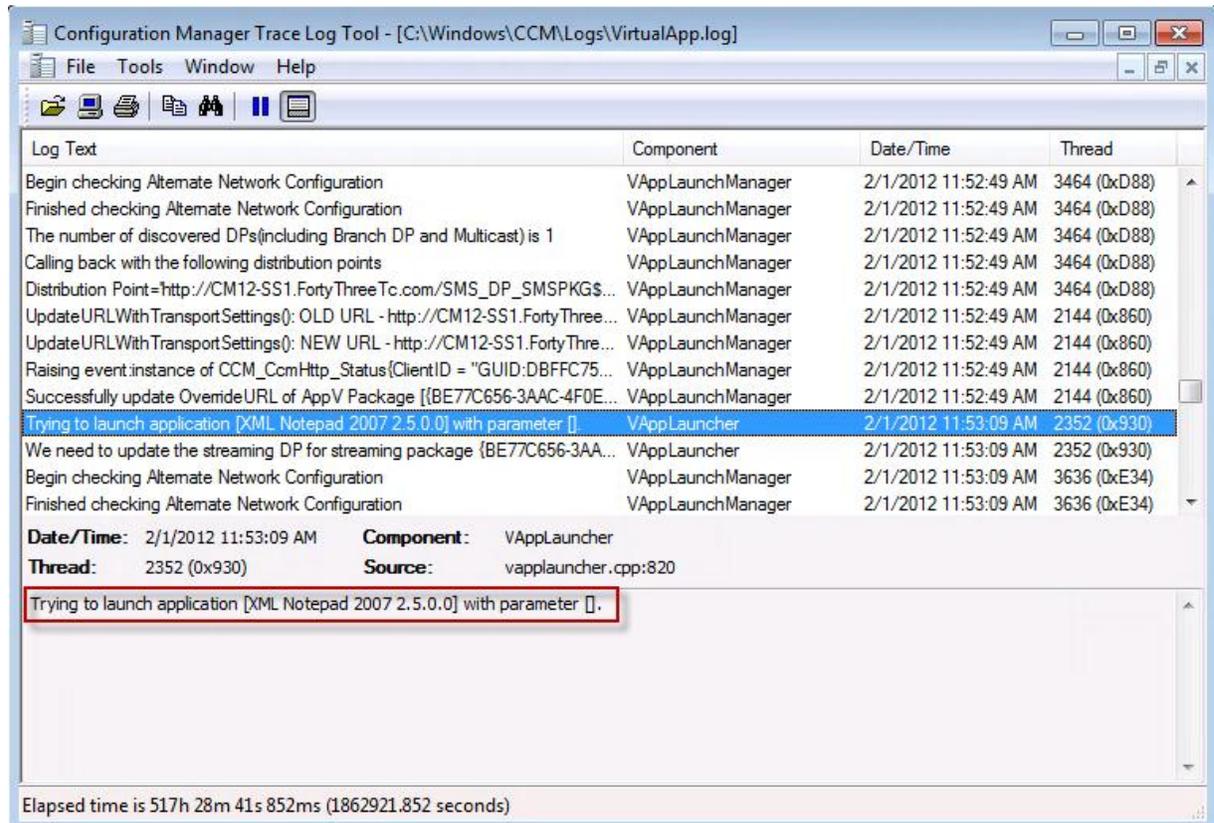


Figure 8 – New Configuration Manager 2012 Client Status Messages

Following is the list of the Configuration Manager 2012 Client status messages for virtual application registration and launch. In the Configuration Manager 2012 Client status messages, the abbreviations “ConfigMgr” and “App-V” refer to Configuration Manager 2012 and Application Virtualization, respectively.

With Configuration Manager 2012, the common logs used for troubleshooting traditional applications will be utilized for evaluating and troubleshooting application state. These logs are:

- AppIntentEval.log: Displays information on the evaluation process to determine if an applications is applicable for delivery and the action to be performed.
- AppDiscovery.log: Displays information on applications that are available deployments.
- AppEnforce.log: Displays information on applications that are required deployments.

App-V Client Log Files and Event Log Entries

The App-V Client logs status information to a log file and the Application Event Log.

The default location for the App-V Client log file is:

Windows XP: C:\Documents and Settings\All Users\Application Data\Microsoft\Application Virtualization Client

Windows Vista and 7: C:\ProgramData\Microsoft\Application Virtualization Client

App-V Client error codes are comprised of 16 digits organized as two groups of 8 digits separated by a hyphen (e.g., 19006D2A-0000274D). The App-V error codes will be logged to the sftlog.txt log file and the application event log on the client PC. Depending on how the App-V Client is configured, the error message and error code may also appear in the App-V Client status bar located above the Windows System tray area.

When diagnosing an App-V Client error, try looking up the last 10 digits of the error code, including the hyphen (e.g., 2A-0000274D) in the App-V support TechNet database at <http://technet.microsoft.com/en-us/appvirtualization/default.aspx>.

Check the TechNet App-V Community Forum discussion groups to see if anyone has experienced a similar issue and posted a resolution at <http://forums.microsoft.com/TechNet/default.aspx?ForumGroupID=497&SiteID=17>

Frequently Asked Questions (FAQ)

Package Creation / Update

Q: Can I create a virtual application package from a regular package source (i.e., Setup.exe or MSI-based setup)?

A: No. A virtual application package can only be imported from the source created from the App-V 4.5 or newer Sequencer. A regular package source (i.e., Setup.exe or MSI-based setup) can be used to install the application package on the Sequencer workstation during the sequencing process.

Q: How do I apply a patch to an existing virtual application package?

A: First, the App-V 4.5 or newer Sequencer must be used to upgrade a virtual application package as follows:

1. **Copy** the existing virtual application package to a clean Sequencer workstation.
2. **Launch** the Sequencer program and **open** the virtual application package for upgrade.
3. **Install** the desired application updates.
4. **Save** the new version of the package.
5. **Open** the Configuration Manager Admin Console to update the existing package as follows:
6. Select **Software Library** → Applications.
7. **Select** the copied version that has –copy and select **Deployment Types** at the bottom.
8. **Right-click** the deployment type and choose **Update content**.
9. **Browse** and point to the manifest.xml file in the new version of the App-V application and complete the wizard.
10. Go to the properties of the application and from the **Supersedence** tab, **Add** a supercedence relationship for the previous application.
11. From the **New Deployment Type** drop-down, select the previous version of the application.
Note: Do not select **Uninstall** check box.
12. Deploy the new version of the application to the appropriate collections.

For more information on the *Superseding applications*, see <http://technet.microsoft.com/en-us/library/gg682071.aspx>.

Content Distribution

Virtual Application Package Registration (execution of the Configuration Manager deployment)

Q: Why can't I see any shortcuts for the virtual application after running an advertisement for a virtual application package with no visible errors?

A: The likely cause is that the virtual application package is not applicable to the OS where the advertisement ran. During the creation of the application, the App-V package OSD files are read and the OS Values tags are converted into requirements in the deployment type and removed from the OSD files. Examine the requirements for the deployment type. For example, client OS is Windows 7 but there is no requirement in the created deployment type for Windows 7. Use the deployment monitoring status or on the client review the AppIntentEval.log.

App-V Dynamic Suite Composition

Q: What is Dynamic Suite Composition (DSC) and can I use this with virtual applications in Configuration Manager 2012?

A: Dynamic Suite Composition is the ability to define one virtual application package as having a dependency on another virtual application package. In order to enable this, the OSD file for an application in the primary package must be modified to reference the package GUID of the dependent package. When the application is launched, the App-V Client will host both the primary package and the dependent package in the same virtual environment for the application.

In order to use this with Configuration Manager 2012, both packages must be deployed and registered with the App-V Client. It is recommended that dependent packages be delivered to the client via local delivery (download and execute) deployment type so that the dependent package content is hosted locally on the client system. Deploy each DSC App-V package using dependencies to ensure delivery and choosing auto-install dependencies.

For the latest information and recommendations for Dynamic Suite Composition, see the following:

App-V Sequencing Guide document

<http://technet.microsoft.com/en-us/appvirtualization/cc843994.aspx>.

The Official App-V Blog

<http://blogs.technet.com/appv>

The Virtual World Blog

<http://blogs.technet.com/virtualworld/default.aspx>

App-V Local Interaction

Q: What is App-V Local Interaction and can I use this with virtual applications in Configuration Manager 2012?

A: In some application deployment scenarios, some applications are installed locally on client PCs and other applications are deployed as virtual applications to the same client PC. By default, locally installed applications cannot see or communicate directly with virtualized applications. This is intended behavior of the application isolation provided by App-V. Local Interaction is a feature of the App-V Client that can be enabled on a per application basis to allow locally installed applications running on a client PC to see and communicate with virtualized applications. Configuration Manager 2012 and App-V fully support local interaction.

For more information about the App-V Local Interaction feature, see

<http://blogs.technet.com/softgrid/archive/2007/09/20/a-look-under-the-covers-the-local-interaction-allowed-tag.aspx>

Miscellaneous

Q: Is it a supported scenario to pre-cache applications to a client PC using Configuration Manager 2012 and then create a snapshot image of that PC and use that image for OS deployment to other client PCs?

A: Yes, this is a supported scenario.

A potential issue may arise when updating the virtual applications included in the client PC image after the image has been deployed to the client PC. If the pre-loaded virtual application packages in

the client PC image were created on a site different than the site that is later used to update them, binary delta replication would not be used on the client to pull down the updated package. This may be confusing, so an example follows:

1. The OneNote® 2007 application is sequenced as a virtual application.
2. The application is imported to site ABC and distributed via the Local Delivery (download & execute) method to the client that will be used to create the OS image (i.e., the gold master PC). The application is executed once on the gold master PC to ensure that it is loaded into the App-V Client cache. The Configuration Manager package ID for OneNote is ABC00003.
3. The client image is captured and deployed through the Configuration Manager hierarchy. The OneNote virtual application performs as expected when launched on client PCs built from the image.
4. Later, the OneNote package is updated using the App-V Sequencer and imported into site XYZ. The Configuration Manager package ID is XYZ0000A (although the App-V package GUID has not changed).
5. The clients that receive an advertisement for the updated OneNote package (XYZ0000A) will not be able to leverage binary delta replication when downloading the content because the Configuration Manager Client will look for a previous version of the XYZ0000A package, which is not in the Configuration Manager Client cache. This problem would occur whether the applications were pre-cached as part of the image, or delivered via two different sites. This should not affect the user experience other than taking longer to get the updated package downloaded to the client. It is important to ensure that the client PC used to create the gold master image receives the same packages that will later be updated in the production Configuration Manager hierarchy (the actual assigned site does not matter).

Q: Why is package content in the Configuration Manager cache not reclaimed (i.e., deleted) when it is unpinned from the cache?

A: Unpinned content in the Configuration Manager cache must be "tombstoned" for 24 hours before deletion by the Configuration Manager Client to make room for additional package content. If the tombstoned cache is within 24 hours from creation time (default value of `CacheTombstoneContentMinDuration`), Configuration Manager will not remove it even if there is not enough cache free space.

The list of possible workarounds follows:

1. Increase the default size of Configuration Manager Client cache (default 5GB) to accommodate new content.
2. Reduce the duration of `MinTombstoneDuration` by modifying the site control file directly.
3. Check the cache percentage in WMI and `DeleteCacheElementEx` with `true` as second parameter (force deletion) if 100 percent cached in App-V cache.

Q: Is it possible to perform a phased migration from an App-V standalone or App-V Full Infrastructure to Configuration Manager virtual application management?

A: Yes, migration to Configuration Manager virtual application management begins with deployment of an App-V application from Configuration Manager 2012. Upon the first deployment in Configuration Manager 2012, no new applications can be deployed via other methods, but all previously deployed packages will be retained.

Glossary

The following terms describe virtual application packages and the components of virtual application packages.

Microsoft App-V Platform

The name for the Microsoft products used to create, store, distribute, and run sequenced applications.

Microsoft App-V Desktop Client

An application that resides on a Configuration Manager Client computer that communicates and authenticates with the Configuration Manager site to receive the virtual application package and allow a sequenced application to run locally.

Microsoft App-V Remote Desktop Services Client

An application that resides on a Remote Desktop Services that communicates and authenticates with the Configuration Manager site to receive the virtual application package and allow a sequenced application to run locally.

Sequenced Application

An application that has been created by the Microsoft App-V Sequencer, streamed to a computer running the Microsoft App-V Remote Desktop Services Client or the Microsoft App-V Desktop Client, and can run inside its own virtual environment.

Sequencing

Sequencing is the process of creating an application package by using the App-V Sequencer. In this process, an application is monitored, its shortcuts are configured, and a sequenced application package is created containing the **OSD, SFT, SPRJ, ICO, MSI, and manifest.xml** files.

Configuration Manager App-V Application

An App-V-sequenced application that has been imported into Configuration Manager.

Conclusion

The integration of Microsoft System Center 2012 Configuration Manager and Microsoft App-V provides both users and administrators with a seamless experience for deploying, running, and managing virtualized applications throughout the enterprise.

More Information

The Microsoft App-V Blog

<http://blogs.technet.com/appv>

App-V documentation

<http://technet.microsoft.com/en-us/library/cc843848.aspx>

Additional App-V White Papers

<http://www.microsoft.com/download/en/details.aspx?id=27760>

System Center Configuration Manager TechCenter

<http://technet.microsoft.com/en-us/configmgr/default.aspx>

System Center Web Site

<http://www.microsoft.com/systemcenter/configmgr/default.aspx>

App-V Web Site

<http://www.microsoft.com/systemcenter/softgrid/default.aspx>

Management TechCenter

<http://www.microsoft.com/systemcenter/softgrid/default.aspx>

Windows Server Resources

<http://www.microsoft.com/servers/default.aspx>

System Center Team Blog

<http://blogs.technet.com/systemcenter/>

Web Site for Microsoft Desktop Optimization Pack for Software Assurance

<http://www.windowsvista.com/optimizeddesktop>

Microsoft Virtualization 360

<http://www.microsoft.com/virtualization>

myITforum

<http://www.myitforum.com/>