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The Definitive Guide to Delivering Microsoft Office with App-V

Virtualizing and Delivering Microsoft Office 2010, 2007 and 2003 with App-V 4.6 SP1 & SP2



Aaron Parker
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About This Document

This document may be subject to change at any time. For the most up to date version of this document, download it from <http://stealthpuppy.com>.

The aim of this document is to be the best resource for virtualizing Office 2010, 2007 and 2003 with App-V 4.6 SP1 & SP2 available. Feedback, corrections and criticisms are welcome.

Target Audience

This document is intended for readers with some experience virtualizing applications with App-V and those who have experience deploying Office. This is an advanced topic and the task of virtualizing Office with App-V is not recommended for those new to App-V or Office deployments.

If you are new to App-V, the following guides are highly recommended reading:

- [Microsoft Application Virtualization Version 4.6 SP1 Trial Guide](#)
- [App-V 4.6 Service Pack 1 Sequencing Guide](#)

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- Matt McDermott (App-V MVP) & Jason Welton from 43tc for this series of blog posts: [Sequencing Microsoft Office 2010](#)

About the Author

I'm an End User Computing Solutions Architect with 17 years experience in the IT industry. I've spent the majority of that time in desktop and application delivery with various solution providers. Since 1999, I've mainly focused on projects for desktop delivery, server-based computing, desktop virtualization and more recently application and user virtualization.

I'm an Aussie expat, currently residing in London, UK where I'm involved in deployments for private and government clients including Fortune Global 500 companies.

You can find me contributing to the [TechNet App-V forums](#) and [AppVirtGuru.com](#), blogging at [stealthpuppy.com](#), speaking at event such as [BriForum](#) or even contributing to [technical books](#).

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Part 1: To virtualize or not to virtualize

On whether you should virtualize Office or not, and what you need to consider if you do

1 Microsoft Office and Application Virtualization

1.1 Introduction

It's probably fair to say that some version of Microsoft Office is deployed to just about every enterprise Windows desktop. Office deployment and administration is a mature science but with new ways to deploy a Windows desktop, must come new, more flexible ways to deploy Microsoft Office.

There are numerous official resources, articles and blog posts for virtualizing Microsoft Office with Microsoft Application Virtualization (App-V) available. However there are still some steps and considerations missing from these. This document aims to bring them together with a discussion on the pros and cons of virtualizing Office and some additional tips to give the reader the current best source on this topic.

Microsoft App-V is an excellent solution for the delivery of applications and solving challenging issues such as application-to-application compatibility. Additionally, it can be a key component of layering to create a truly user-centric desktop.

App-V 4.6 is able to achieve this due to the isolation of applications from the operating system and other applications. However isolation is a double-edged sword – isolation can change the user experience because an application no longer enjoys the same integration with the operating system that an installed application might offer.

This is especially true for a complex application suite like Microsoft Office. For example, Office applications such as Outlook integrate quite heavily into the OS and Excel is often referenced by other applications. Isolation therefore, makes the delivery of Office a challenge.

So should you virtualize Microsoft Office? In these first few chapters I'll discuss the reasons for and against virtualizing Office and things you should be considering before deciding on whether the virtualization of Office is the right approach for your organisation.



While App-V certainly makes it simpler to package and deploy applications by reducing conflicts and regression testing, there is a certain art to sequencing that only comes from experience and a good understanding of applications. Unless you are an advanced or expert level sequencer and have a strong understanding and experience of deploying Microsoft Office, do not virtualize Office until you or your organisation has this level of experience.

1.2 Why virtualizing Office can be useful

The choice to virtualize your primary version of Office should be carefully considered. There are several reasons why virtualization may be the right choice in certain scenarios. These may include, but are not limited to:

- Your desktop environment is very simple – perhaps the desktop environment only requires a handful of applications with little integration between them

- You have deployed Microsoft Office 2003 and are in the process of planning an upgrade of Office 2010. Delivering Office 2010 via App-V enables deployment for user acceptance testing without impacting the users existing environment
- The 32-bit version of Office 2010 has been deployed, but a set of users requires the 64-bit version of Excel to work with larger data sets. App-V can provide for the co-existence 32-bit and 64-bit version of Office on the same desktop
- A line of business application only works with an earlier version of Office (such as an Access database or an application that might require Excel support). App-V enables the administrator to deliver that application along with the previous Office version without impacting the locally installed version
- Office is used in a Remote Desktop Session Host or Citrix XenApp environment to support a line of business application (for example, Microsoft Dynamics AX) and these applications are delivered remotely using RDP (RemoteApp) or ICA (XenApp published applications). Office is already isolated from the end-point so the user experience is different to a local application and the user expectation can thus be managed.

1.3 Why virtualizing Office may not be the right solution

There are several good reasons why application virtualization may not be the right choice for delivering your primary version of Microsoft Office:

- Office is a core application - Microsoft Office is delivered as a core component of the majority of corporate Windows desktops. Other applications integrate with and rely on Office for various functions. Examples include Excel Add-Ins, exporting data to Excel (SAP, Dynamics AX), creating reports in Word or sending emails in Outlook
- Office deploys easily – Microsoft provides a comprehensive toolset for customizing, automating and patching an Office suite or application during deployment. The same amount of work that goes into a standard deployment of Office is required (or should be required) for deploying Office with App-V
- Office is maintained easily – Microsoft provides a complete toolset for updating and maintaining an installed Office application or suite (Office Customization Tool, Group Policy, WSUS, System Center Configuration Manager, Microsoft Deployment Toolkit). App-V can often make the process of updating and deploying applications simpler, but for an application that already has these approaches built-in, adding an additional layer of deployment potentially increases the complexity of managing that application
- Office is licensed per-device – application virtualization is a core component of moving to a user-centric desktop, however Microsoft still licenses Office per-device (per-user is not an option). Application virtualization does not change the licensing requirements for Office, so extra steps may need to be taken to control where Office is delivered, especially when using the App-V Management Server
- Delivering Office with application virtualization changes the user experience – whilst the user experience has improved with the Office 2010 Deployment Kit for App-V, there are still some limitations that users may not accept
- Known issues – there are several known issues that are documented later in this paper

1.4 Microsoft's Recommendations

Microsoft outlines recommended best practices for running multiple versions of Microsoft Office in this knowledgebase article: [Office documents may not open in the expected version when using multiple versions of Office with Microsoft Application Virtualization \(App-V\)](#). These recommendations are:

1. Locally install the version of Office that you plan to use primarily.
2. Virtualize additional versions of Office by using Application Virtualization (App-V).
3. The recommended practice is to have a primary local version that has all the FTA's by default and a virtual version that has all the FTAs removed and is called only through shortcuts

1.5 Known Issues when virtualizing Office 2010

There are several known issues and limitations (documented and undocumented) when Office 2010 is virtualized. Microsoft has published a set of these in the following knowledgebase article:

[Known issues and limitations when using virtualized Office 2010 applications on App-V 4.6 and App-V 4.5 SP2 clients](#)

Those issues and limitations include:

- **Cannot start x64 Visio 2010 during the monitoring phase of sequencing on an x64 Vista computer:** to resolve the issue, restart monitoring. To do this, click Stop monitoring, then click Start monitoring, then launch Visio. Note that this approach won't work in App-V 4.6 SP1 – ensure that Visio is started during monitoring and then again during the First Launch phase. Alternatively, sequence on x86 Windows Vista.
- **Outlook 2003 Launches Instead of Outlook 2010:** if Outlook 2003 is installed locally, Send to\Mail Recipient functionality in Explorer will always launch Outlook 2003. To prevent this behavior, uninstall Outlook 2003.
- **SharePoint Site Taking a Long Time To Launch:** see the following blog post on this issue:
<http://blogs.technet.com/b/appv/archive/2010/09/27/troubleshooting-slow-sharepoint-integration-with-virtualized-microsoft-office-2010-in-app-v.aspx>
- Unable to create a new block timeline in Visio 2010
- Unable to see the names of other users editing shared Excel workbooks at the same time
- Outlook emails are not included in Windows Search results – Windows Search is only fully functional from within Outlook
- Office co-existence: Office documents may not open in the expected version when using multiple versions of Office (file type associations)
- The "Connect to Outlook" feature is not available when viewing a calendar on a SharePoint site
- In Windows Explorer, the SharePoint Shared Folder Synchronization menu is not displayed
- The SharePoint multiple uploads feature is not available

- The SharePoint datasheet view feature is not available
- The "Send to OneNote 2010" printer option is not available
- The "Send to OneNote" feature in Internet Explorer and other applications is not available
- Unable to search for shapes in Visio 2010
- InfoPath XML files fail to open when launched from a SharePoint document library

Additionally, there are more issues and limitations documented in this article that covers the Click-to-Run delivery mechanism for Office 2010 (Click-to-Run utilises App-V for delivery): [Click-to-Run: Known Issues](#)

- Many third-party Microsoft Office add-ins will not function properly with Outlook (due to isolation), for example:
 - iTunes Calendar: You will not be able to sync Outlook Calendar events via iTunes to your portable device.
 - Google Search Toolbar: Search functionality provided by Google Search Toolbar will not be available.
- Microsoft Office Communicator or Lync is not fully integrated with Outlook (work around this by installing Communicator or Lync into the Office package)
- Windows Mobile Device Center or ActiveSync does not detect Outlook as installed
- When running the Click-to-Run edition of Outlook, the Indexing Options dialog box in Windows does not allow you to choose specific Outlook stores for indexing
- Third-party Microsoft OneNote add-ins do not function with OneNote. Because of the add-in model for OneNote, add-ins are not available when using Click-to-Run.
- The Send to OneNote printer is not available on Windows XP. When using OneNote on Windows XP, you might use an alternate method to import content, such as the Screen Grabbing feature or the clipboard

Additional Issues with Office 2010

Additional issues that aren't directly documented by Microsoft include:

- Applications that use the BMAPI (or extended MAPI) function to send mail using the default mail application (Outlook) fail to find the default mail application (Adobe Reader and Acrobat are examples of applications that use this function). More information on this issue can be found in this article: [Virtualized Office 2010 and Extended MAPI](#)
- Exporting Visual Reports from Project to Excel fails with "Cannot open a copy while the template <filename> is open". More information can be found here: [Project 2010 in App-V and Visual Reports](#)

1.6 Known issues when virtualizing Office 2007

The Office Deployment Kit for App-V does not support Office 2007, so other than shortcuts and file type associations, there is very little integration between virtualized Office 2007 and the operating system. Known issues include:

1. The Outlook 2007 Instant Search feature does not function in an App-V environment. The registry key change that is described in the sequencing guide turns on the Classic form of Outlook search.
2. After streaming, the shortcut that is created in the Quick Launch area by Outlook 2007 and the shortcut that is created in the Startup folder for Microsoft Office OneNote 2007 are no longer valid. Therefore, users must manually re-create these shortcuts.
3. Items that require interaction with Outlook 2007 from the operating system or from other programs do not function correctly. This includes "mailto:" links and the Start menu shortcut for the default e-mail client.
4. The audio and video functionalities in Microsoft Office Live Meeting 2007 will not work in a virtualized Windows XP environment.

1.7 Known issues when virtualizing Office 2003

The Office Deployment Kit for App-V does not support Office 2003, so other than shortcuts and file type associations, there is very little integration between virtualized Office 2003 and the operating system. Known issues include:

- Items that require interaction with Outlook 2007 from the operating system or from other programs do not function correctly. This includes MAPI integration, "mailto:" links and the Start menu shortcut for the default e-mail client.

1.8 Making the right choice

The choice of whether or not to virtualize Office depends on several factors and will be different for every environment. There are a number of questions that should be answered first:

- Does virtualizing Office change the user experience? User acceptance may be low if Office behaves differently to what users expect. Changing the user experience may impact productivity
- Do other applications, whether virtualized or not, rely on integration with Office or Office functionality? This is often not straightforward to determine. What does it mean for deployment and usage of those applications if Office is virtualized?
- Does virtualizing Office introduce an unacceptable performance hit when launching Office applications? How many times a day does a user launch an Office application and do they experience any launch delays?
- Will App-V improve or adversely affect the delivery and maintenance of Office in your environment? Virtualizing Office can be used to simplify your Windows images, but how does doing so fit into your on-going maintenance strategy?

- Are there any requirements for delivering multiple versions of Office (for example older versions for compatibility reasons)? App-V is an excellent choice for virtualizing legacy versions of Office applications that may be required to support older line of business applications

Along with other core applications such as Adobe Reader, Internet Explorer and other browsers and plug-ins such as Adobe Flash, your primary version of Microsoft Office is a good candidate for deployment into your base desktop image. Virtualizing secondary versions will be a much simpler task.

Whilst Office 2010 offers the best user experience when virtualized, don't assume that the default deployment solution for Office 2010 should be App-V. Determine whether it makes sense in your environment.

2 Office Licensing and Product Activation

To successfully deploy a virtualized version of Microsoft Office, you must use a Volume License edition of Office. If you attempt to use retail versions of Microsoft Office with application virtualization, any product activation will occur inside the App-V package. If activation occurs within the package, the changes will not be written to the Windows itself – activation is machine specific and cannot be virtualized.

Volume license editions of an Office suite or application supports different forms of product activation:

- Volume license editions of Office 2010 suites and applications support Key Management Service (KMS) and Multiple Activation Key (MAK) forms of activation
- Volume license edition of Office 2007 and Office 2003 do not require activation but come with a volume license product key



This means that Retail (boxed product, purchased from the Microsoft Store or the version that comes with an Office 365 license), TechNet or MSDN editions of Microsoft Office 2010 are not supported under App-V.

2.1 Office 2007 and 2003 Product Activation

If you are virtualizing Office 2007 or Office 2003, obtain the volume license installers and product keys. The product keys that come with these versions are known as Static Activation Keys. A key is required for installation of the product, but the key does not require activation, so it can be used for any number of installations.

As long as you are using the volume license editions (media and keys) of Office 2007 and 2003 suites and applications, virtualizing these versions is straightforward. No extra consideration to activation is required.

2.2 Office 2010 Product Activation

Deployment of Office 2010 suites and applications with App-V will require the volume license editions. Before attempting to virtualize Office 2010 with App-V, it is highly recommended that you understand your product activation approach in the context of your Office 2010 deployment.

The volume license media make use of KMS or product MAK activation keys. KMS product activation will be the simplest and easiest method of activating Office 2010, as it simplifies the actual deployment of the binaries, is the default method of production activation for volume license editions of Office and requires no manual steps beyond activating and configuring the KMS host.

MAK activation will require deploying the activation key with the Office 2010 Deployment Kit for App-V and performing activation manually after install or via a script during installation.

For more information on product activation for volume license editions of Office 2010, the following articles and resources are recommended reading:

- [Office 2010 Volume Activation](#)
- [Configure and deploy volume activation of Office 2010](#)

2.3 MSDN and TechNet Subscribers

MSDN and TechNet subscriptions come with Static Activation Keys for the Office 2007 and Office 2003 product suites, but Retail Activation Keys for individual applications (such as Visio and Project).

The product keys for the Office 2010 suites and applications in these subscriptions are retail only – no MAK or KMS keys are available with these subscriptions.

For individual consultants, contractors and others who may not have access to volume license editions of Office 2010, virtualizing Office 2010 with App-V, if only for training purposes, can be a difficult task.

For more information on product activation for MSDN and TechNet subscribers, the following articles are recommended reading:

- [Windows Activation in Development and Test Environments](#)
- [MSDN Product Keys and Activation](#)
- [Managing product activation with a TechNet subscription](#)



If you are able to obtain the volume license ISOs or installers for Office 2010, you can test deployment with App-V by using KMS activation even without a KMS server. This approach allows you to test virtualizing Office 2010 without a volume license product activation key but will require rebuilding test VMs once the activation grace period expires.

2.4 Office 365

Microsoft's Office 365 offering provides users with access to Office 2010 Professional Plus, depending on the plan purchased. There are, however, some caveats around this delivery of an Office suite or application that impacts the use of App-V in this scenario.

Unlike volume-licensed media, Office Professional Plus for Office 365 cannot use Microsoft Application Virtualization (App-V) or Windows Server 2008 Remote Desktop Services as deployment options. Because Office Professional Plus for Office 365 is based on the Retail SKU, activation issues will prevent you from deploying this version of Office with App-V or to an RD Session Host.

For more information on the deployment options for Office Professional Plus for Office 365, read [Deploy Office Professional Plus for Office 365](#). To understand more about the licensing of Office and Office 365 view the video: [TechNet Licensing: Office 365 Use Rights and the Impact for an IT Pro](#).

2.5 Office Deployment and Licensing

Regardless of how you purchase it, Microsoft only licenses Office on a per-device basis. Although your plans for delivering multiple versions of Office may involve delivering specific versions or suites to users, you should also plan for restricting access to those applications on specific devices that are covered by those Office licenses.

Your solution for the delivery of a virtualized Office applications or suites may dictate your approach to ensuring license compliance. System Center Configuration Manager allows for the delivery of App-V packages to a device as well as user whilst the native Application Virtualization Management Server provides for targeting users only. Mix in technologies such as Remote Desktop Session Host and you'll have a challenge delivering Office whilst complying with the license agreement.

Third party solutions, such as [AppSense Application Manager](#), maybe required for restricting access to Office per-device, regardless of where Office is executed. Microsoft Application Virtualization provides no mechanisms for controlling licenses for per-device licensing schemes.

3 The User Profile

3.1 Profile Virtualization

When sequencing an application with App-V, by default, the portions of the user profile will become isolated from the real profile (the registry – HKEY_CURRENT_USER and %APPDATA%). Applications generally write to the user profile at runtime and thus during the sequencing process when performing first-run tasks in applications, those changes are captured by the Sequencer.

Particular attention needs to be paid to the file system, as any changes to the registry at runtime will always end up in the virtual environment. File system changes may end up in the real file system depending on how parent folders are configured.

If the prescriptive guidance for Microsoft Office is followed, only a subset of the user profile folders will be captured during sequencing. In the screenshot below, the `CSIDL_APPDATA\Microsoft` has a number of sub-folders that have been captured. The parent Microsoft folder is set to *Merge with Local*, while the sub-folders are set to *Override Local* because they did not exist pre-sequencing.

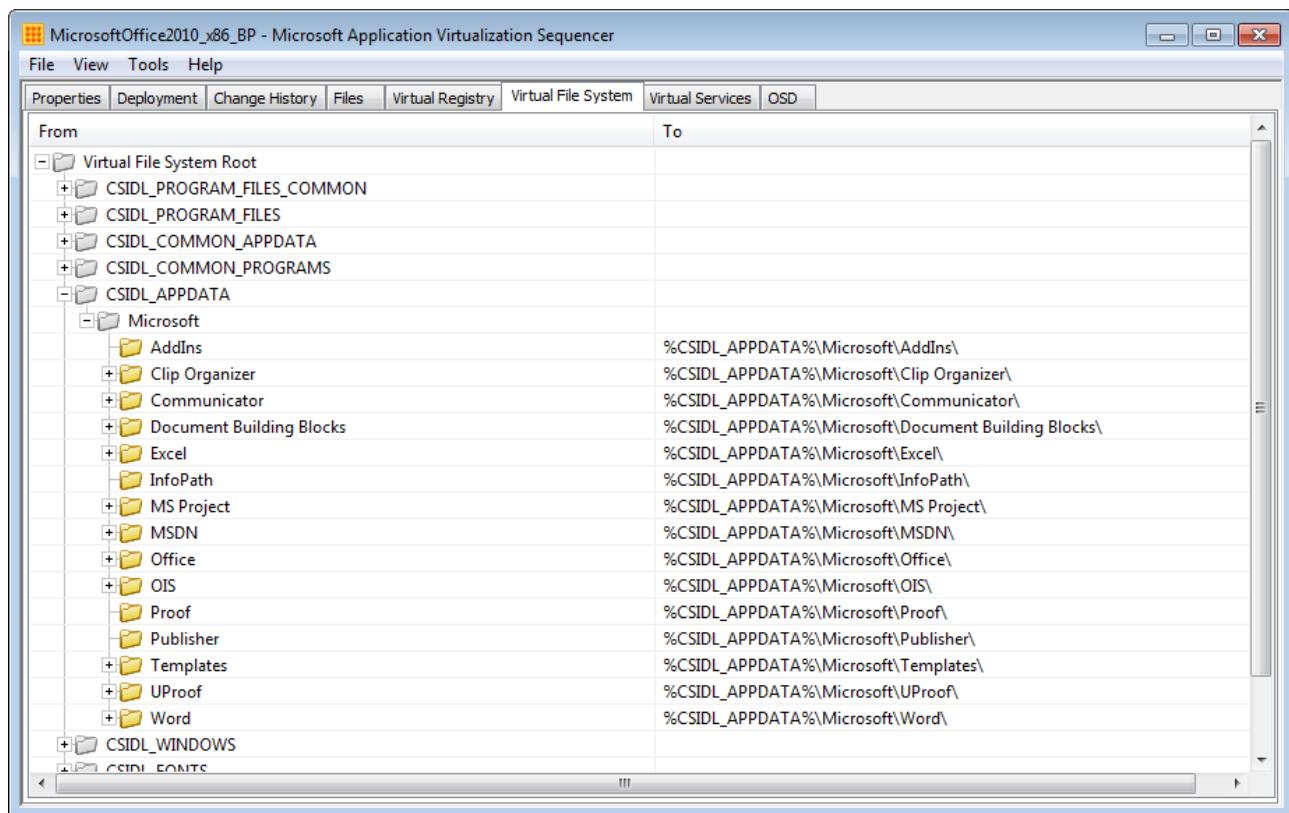


Figure 1: User profile folders captured in an Office package

The effect of this default configuration is two-fold:

1. Any files created in these locations during sequencing will be deployed to each user and will not merge with any existing data in the user profile
2. When Office is delivered to clients and executed by users, a number of folders that are not created during sequencing will then be written to the real file system, as can be seen in the following example screenshot:

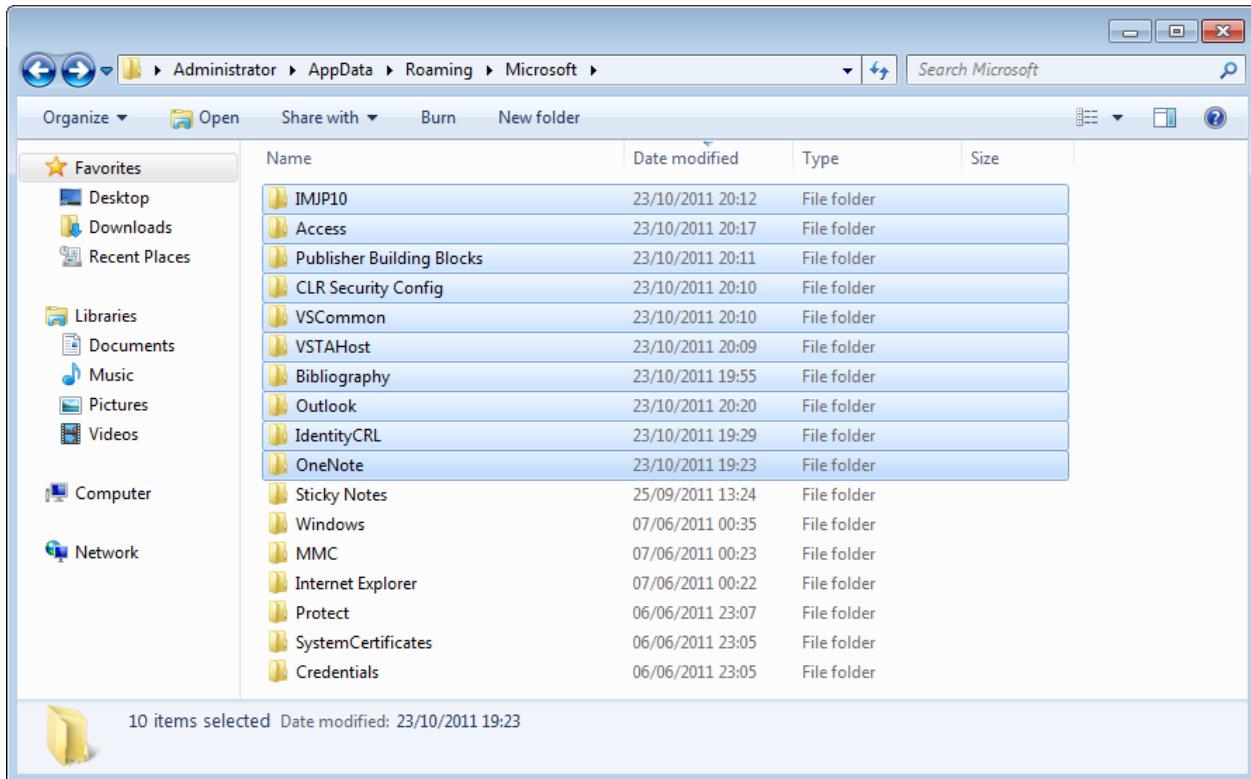


Figure 2: Additional user profile folders for Office created at runtime

There are two approaches to handling these folders when sequencing Office:

1. Add an exclusion to your Sequencer template for `%CSIDL_APPDATA%`. This will ensure that these folders are not captured during sequencing and will then end up in the real file system. Additional work after sequencing may be required to ensure that the Office first-run tasks execute when the package is delivered to new users
2. Create all of the folders that Office can potentially create in `%APPDATA%` during sequencing, so that any new data will end up remaining in the bubble (and stored in the PKG file for the Office package).

The approach that you take may be determined by how you manage user profiles on the desktop. Note that the native Microsoft tools such as Group Policy Preferences and Roaming Profiles cannot see into the App-V bubble and therefore are unable to effectively manage user preferences independently of an App-V package.

3.1.1 Profile Folders

The table below lists the folders related to Microsoft Office applications that are found within the user profile. Use this list to create the full set of sub-folders in `%APPDATA%` during the monitoring phase of sequencing.

Path	Description
<code>%APPDATA%\Microsoft\AddIns</code>	Add-ins
<code>%APPDATA%\Microsoft\Bibliography</code>	Bibliography
<code>%APPDATA%\Microsoft\Clip Organizer</code>	Clip Art organiser
<code>%APPDATA%\Microsoft\CLView</code>	Web viewer
<code>%APPDATA%\Microsoft\Document Building Blocks</code>	Quick Parts
<code>%APPDATA%\Microsoft\Excel</code>	Microsoft Excel

Path	Description
%APPDATA%\Microsoft\Forms	Outlook forms
%APPDATA%\Microsoft\InterConnect	Microsoft InterConnect
%APPDATA%\Microsoft\MS Project	Microsoft Project
%APPDATA%\Microsoft\Office	Office preferences & recent files list
%APPDATA%\Microsoft\OneNote	Microsoft OneNote
%APPDATA%\Microsoft\Outlook	Microsoft Outlook
%APPDATA%\Microsoft\PowerPoint	Microsoft PowerPoint
%APPDATA%\Microsoft\Proof	Custom dictionary in ANSI format
%APPDATA%\Microsoft\Publisher	Microsoft Publisher
%APPDATA%\Microsoft\Publisher Building Blocks	Publisher Building Blocks
%APPDATA%\Microsoft\Queries	Microsoft Queries/Excel
%APPDATA%\Microsoft\QuickStyles	User-customised QuickStyles & Style Sets
%APPDATA%\Microsoft\SharePoint Designer	SharePoint Designer
%APPDATA%\Microsoft\Signatures	Outlook signatures
%APPDATA%\Microsoft\Stationery	Outlook stationary
%APPDATA%\Microsoft\Templates	Office document templates
%APPDATA%\Microsoft\UProof	Custom dictionary in UNICODE format
%APPDATA%\Microsoft\Word	Microsoft Word
%APPDATA%\Microsoft\Media Catalog	Office Media Catalog (Clip Art?)
%APPDATA%\Microsoft\Graph	Microsoft Graph
%APPDATA%\Microsoft\InfoPath	Microsoft InfoPath
%APPDATA%\Microsoft\Themes	Office Themes
%APPDATA%\Microsoft\OIS	Office Picture Manager
%APPDATA%\Microsoft\VSTAHost	Visual Studio Tools for Applications
%APPDATA%\Microsoft\VSCommon	Visual Studio common
%APPDATA%\Microsoft\VSTA	Visual Studio Tools for Applications
%APPDATA%\Microsoft\Web Server Extensions	SharePoint related
%APPDATA%\Microsoft\IMJP10	Input Method Editor related
%APPDATA%\Microsoft\IME12	Input Method Editor related
%APPDATA%\Microsoft\IMJP8_1	Input Method Editor related
%APPDATA%\Microsoft\IMJP9_0	Input Method Editor related
%APPDATA%\Microsoft\IMJP12	Input Method Editor related

3.2 The Need for Profile Management

Because Office is a core application of most desktop deployments, user interaction with Office and the user experience are important factors in the deployment of Office. From an administration perspective, providing a seamless user experience requires managing the user preferences of an application, independent of the application delivery method.

3.2.1 App-V and User Profiles

The default behaviour of App-V is to not only virtualize the application, but also the user profile data for that application (HKEY_CURRENT_USER and %APPDATA%). This means that that profile information for the Microsoft Office packages will be stored, in its entirety, in the PKG.

The implication of this is that the settings for a virtualized Office package will be specific to that package – that is, a user's Office settings will not only be specific to a version of Office but also specific to an individual Office package.

Consider the following scenarios:

- A user moves between desktops where Office Standard has been deployed to the first desktop, but Office Professional has been deployed to the second. These will be different App-V packages, so by default, user preferences will also be separate
- You create an Office package which has been released to production and later find issues with the package that requires re-creating it from scratch – user preferences from the old package will not be shared with the new package
- You find that you need to create multiple Office packages for different platforms – for example a package for desktops and a package for Remote Desktop Session Host servers. These are separate App-V packages and user preferences will not be consistent across those packages

Each scenario will result in separate App-V packages and user personalisation for the same applications.

If you need to upgrade a package or migrate between Office versions, you now have a further challenge that you would not have if Office were installed instead of virtualized.

By implementing a 3rd party profile management solution, you gain the ability to manage user's Office preferences independent of the Office version (App-V package version or Office version) and remove the reliance on a specific Office package. A profile management solution will allow you to create, update and re-create Office packages without affecting the end-user experience.

3.2.2 Multiple App-V packages are common

Microsoft recommends sequencing applications on the same operating system as the target clients are running. This means that if your target clients are running Windows XP and Windows 7, then you should create two App-V packages for each application – one for each operating system.

However, in practice it is often advisable to sequence on the lowest common denominator. In the example with Windows XP and Windows 7 clients, sequencing should be performed on Windows XP. In the event that a package does not then execute correctly on Windows 7, then the application should be re-sequenced on Windows 7.

The same applies to x86 and x64 processor architectures – if you are delivering 32-bit applications to both x86 and x64 Windows, you should sequence in a 32-bit Windows environment. If you find that a 32-bit virtual application package executes OK on x86 Windows but not on x64 Windows – recreate the package on 64-bit Windows.

There are several reasons for this, but they're out of scope of a discussion on profile management; however what this highlights is that if you have multiple packages for the same application due to different operating systems and/or processor architectures, again the only way to improve the user experience is to rely on a third party profile management solution that works independently of the App-V package.

3.2.3 What solution should I use?

The user profile management or user state virtualization tools built into Windows aren't able to see into the App-V virtual environment and therefore aren't able to manage an application user preferences independent of the App-V package. If you would like to manage user preferences more granularly, a 3rd party solution will be required.

A profile management solution that is capable of managing user preferences *inside and across* App-V packages will provide you with the flexibility and consistency of user experience required to support a core application like Microsoft Office. Without providing users with a consistent user experience or one that matches their existing Office deployments, user acceptance will be low.



For an objective comparison of the 3rd party solutions available, see the following white paper: [UEM Smackdown: Head-to-head analysis of AppSense, Citrix, Immidio, Liquidware Labs, Microsoft, Quest, RES, Scense, Tricerat and others](#)

3.3 AutoRecover and AutoSave

Most of the Office applications offer some form of recovery of documents in the event of an application crash or catastrophic failure. Word, Excel and PowerPoint offer this as the AutoRecover and AutoSave features.

AutoRecover and AutoSave files are written to the user's %APPDATA% location by default, for example: %APPDATA%\Microsoft\Word. This means that, by default, these files will be captured in the PKG file for a virtualized copy of Office. You should be aware of the impacts of these features on the user profile.

To ensure that your documents can be recovered in the event of a failure, the application will automatically save your work at a frequency that you specify (every 10 minutes by default). The data saved is a copy of your document – AutoRecover will save a single copy, while AutoSave will save a new copy of your document each time (it does limit the number of saved copies).

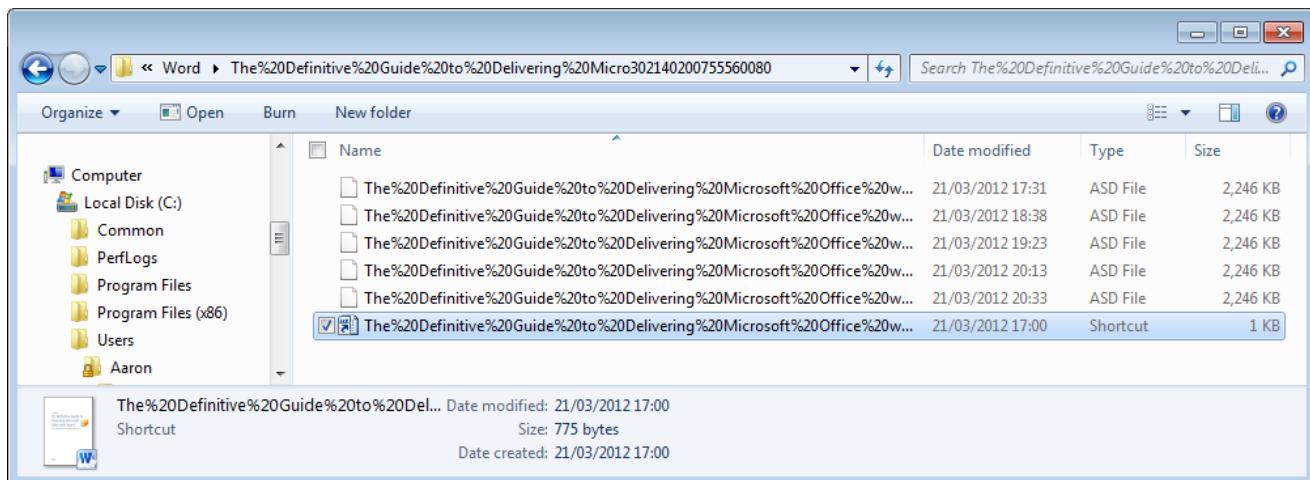


Figure 3 - Microsoft Word AutoSave files in %APPDATA%\Microsoft\Word

A PKG file will only increase in size – as user files are added to the virtual environment, they will be written by the App-V client to the PKG file and the file will increase in size to accommodate additional files. If files are removed

from the virtual environment, the PKG file will not automatically decrease in size. Assuming that the PKG file is stored in the default location, the net effect is that the user's profile will become larger over time.

In addition to this, dependent on all sorts of variables (such as usage patterns, application crashes etc.) Word, Excel and PowerPoint may fail to remove AutoRecover and AutoSave files and thus copies will remain in the PKG file.

Here's the rub – the location for AutoRecover can be changed (and only for Word, Excel and PowerPoint), whereas the location for AutoSave cannot. Additionally the other Office applications, including Access, Visio and Project do not offer any way to change the location of the auto-saved data.

You could avoid this problem by modifying the following settings:

- AutoRecover save location – change the location to the Local AppData folder to ensure the files aren't saved to the PKG file
- Keep the last autosave version if I close without saving – disable this setting because the AutoSave files cannot be stored in a different folder

However, before changing these settings, fully understand the repercussions of doing so. Compromising the integrity of user data for the sake of easier administration is an approach that won't win friends.

A 3rd party solution that can persist user settings across virtual applications can assist with this problem by allowing you to discard the PKG file at logoff, thus not having to worry about the size of those files. Ultimately however, this problem is something that Microsoft needs to address within Office, as, to a lesser extent, the problem exists within a native deployment of Office as well.

4 Sequencer Recommendations

Creation of successful App-V packages requires building on a solid base – that base is the machine used to perform sequencing. This section details recommendations for creating the perfect sequencing machine. Follow these recommendations for the best chance at creating clean, successful App-V packages.

4.1.1 Obtain background information

Microsoft has made available a number of documents as introductions to App-V and the sequencing of applications.

- Review the product documentation that was included together with App-V. This includes the following documents:
 - [Microsoft Application Virtualization Version 4.6 SP1 Trial Guide](#)
 - [How to Install the Application Virtualization Sequencer](#)
 - [App-V 4.6 Service Pack 1 Sequencing Guide](#)
- Review the "Best practices to use for sequencing in Microsoft App-V" article. For more information, click the following article number to view the article in the Microsoft Knowledge Base: [932137](#) (<http://support.microsoft.com/kb/932137/>)
- Install the Office suites and applications to become familiar with the functionality of the program. Additionally understand the deployment requirements for Office

4.2 Do's and Don'ts

Don't make the sequencing machine an exact copy of your Standard Operating Environment (SOE) or add the machine to your domain. That is, do not create a sequencing machine directly from your SOE; instead create a new environment that closely matches your SOE.

There are several reasons for this:

- Your SOE most likely has many pre-requisites or applications installed that may interfere with sequencing, such as security agents and anti-virus
- Changes to your SOE may break virtual applications – if your SOE has a DLL required by a virtual application, that DLL wouldn't be captured in the virtual application package. In the event of the SOE changing and the DLL being removed or the version changing, any virtual application package that doesn't include that DLL may now not work
- Domain computers may have services, process or scheduled tasks that will interfere with sequencing or may cause files or registry settings to be inadvertently captured – changes made by a process that starts during sequencing will be captured in the package

- Domain computers may have policies applied that may be inadvertently captured in the package, causing issues with virtual applications or subsequent changes to those policies to be ignored

Based on my own experiences and those of others that I've spoken to, the most successful App-V packages are created on vanilla installations of Windows.

4.2.1 Don'ts

- Don't add the sequencing VM to the domain, unless sequencing an application that requires it
- Don't use an exact copy of your SOE
- Don't install anti-virus applications or other security agents
- If possible, don't access the Internet directly from the sequencing VM
- Don't take a snapshot of the virtual machine while the sequencer is open

4.2.2 Do's

- Do leave Windows in workgroup mode for the majority of applications
- Do use the same versions of components used in your SOE
- Do choose carefully which of those components should be installed in the sequencing VM
- Do scan the VM with the Microsoft Windows Malicious Software Removal Tool; optionally mount the VM's virtual disk on your host machine and scan it with the anti-virus application on the host
- Do create a snapshot of the sequencing VM in a clean state
- Do patch the sequencing VM each month

4.3 Hardware

Always use a virtual machine to host the sequencing machine – a virtual machine provides snapshots to allow you to capture a clean image of the sequencing VM and then rollback to that clean snapshot after sequencing an application.

When taking a snapshot, ensure that the virtual machine is shutdown – do not leave the Sequencer running when taking a snapshot. Leaving the VM running puts you at risk of creating multiple packages with the same GUID (every App-V package requires a unique GUID).

If you are using a local PC for sequencing, a second hard drive to host the VMs is recommended so that the sequencing process does not affect the host machine.

Virtual machine software or hypervisors available for free include:

- Microsoft [Windows Virtual PC](#) (Virtual PC does not support 64-bit guests)

- Microsoft [Hyper-V](#), available as either a stand-alone product or as a component of Windows Server 2008 R2 SP1
- VMware [Player](#) (note that Player does not support snapshots)
- VMware [vSphere Hypervisor](#)
- Oracle [VirtualBox](#)
- Citrix [XenServer](#)

Create a new virtual machine with the following virtual hardware:

- 1 x vCPU – the Sequencer is still only single threaded and additional CPUs will make little difference
- 1 GB RAM – Windows XP may require less
- Add NICs, a sound card, USB hubs, COM & LPT ports as required
- 2 x vDisks – use fixed size disks if you have the space. Fixed size disks will offer better IO performance. Additionally the App-V 4.6 SP1 Sequencer can automatically create a Q: drive if non already exists; however a second vDisk is a better approach



If no secondary partition exists, the Sequencer setup will create a substituted drive letter for the virtual drive. A known issue exists where this configuration can cause an issue with new and upgraded packages because the Sequencer resolves the full path instead of the substituted drive letter.

This issue looks to be fixed with [Hotfix 3 for the 4.6 SP1 Sequencer](#); however it is still recommended that you create a second vDisk, rather than let setup create the drive for you.

4.4 Windows

Windows XP Professional or Windows 7 Enterprise editions are recommended for client OS deployments. If you are sequencing for both Windows XP/7 and Windows Server, sequence on the lowest common denominator (Windows XP in this example). If issues arise with testing a package on a different operating system, create a new version of the package for that OS.

To create a clean Windows VM for sequencing, follow these steps:

1. Install Windows via the ISO, or better still, create an unattended deployment using the [Microsoft Deployment Toolkit](#) or your software deployment tool of choice, but keep the Windows deployment as vanilla as possible. Use the same Windows version and service pack level as your App-V client machines. This may mean creating multiple sequencing VMs. If you are deploying to both x86 and x64 clients, sequence on an x86 Windows machine, re-sequence the application on 64-bit Windows if required
 - Service Pack deployment is recommended via a slipstreamed Windows ISO (that is the ISO with the latest service pack integrated into it)
2. Install the hypervisor tools or additions to install drivers and services required by the hypervisor to support the VM correctly

3. Enable Windows Firewall including the File and Printer Sharing rule to prevent remote PCs from connecting to the virtual machine
4. Active Windows inside the VM. A KMS will be make this simple; however if you are using a MAK key provided by your TechNet or MSDN subscription, this article is recommended reading: [Managing product activation with a TechNet subscription](#)
5. Disable System Restore on Windows XP or System Protection on Windows 7
6. Disable Windows Defender on Windows 7 (or disable the service)
7. If deploying Windows 7, leave the following Optional Components enabled:
 - Windows Search
 - XPS Services
 - XPS Viewer
8. If deploying Windows XP, remove the following Windows Components:
 - MSN Explorer
 - Internet Gateway Device Discovery and Control Client
 - Windows Messenger
 - Additionally it's recommended to remove the Adobe Flash Player that comes with Windows XP:
http://kb2.adobe.com/cps/141/tn_14157.html
9. If deploying Windows XP or Windows Server 2003, install the following updates from the Microsoft Download Centre: <http://microsoft.com/downloads>
 - XML Paper Specification Essentials Pack
 - Windows Search 4.0 (available via Windows Update)
 - Windows Media Player 11 (available via Windows Update)
 - Update for Root Certificates (available via Windows Update)
10. Install the latest version of Internet Explorer for the target operating system – if you would prefer to match the IE version of your SOE, then stick with that version. Set the home page to *about:tabs*, this will ensure that if Internet Explorer is started during sequencing it won't attempt to load a page from the Internet
11. Install or enable the Microsoft .NET Framework – install the most recent versions of the .NET Framework deployed in your environment. This may require deploying both the .NET Framework 4.0 and 3.5 SP1.
12. Install the Visual C++ Redistributables – 2005, 2008 and 2010 redistributables are recommended. Multiple versions of each redistributable may be required depending on application requirements. It is recommended to install these in order of release
13. Enable Microsoft Update
14. Update Windows with the latest updates – High Priority, Critical and Important updates should be installed at a minimum

- Do not install Microsoft Silverlight – this is important for Microsoft Lync or if you intend to sequence Silverlight
- Windows Update may need to be run multiple times to ensure all updates have been detected and installed

15. Configure the following services (some services are not available on Windows XP):

Service	State
Diagnostic Policy Service	Disabled
Offline Files	Disabled
Security Center	Disabled
Windows Defender	Disabled
Windows Search	Manual
Windows Update	Manual

16. At a minimum, run the following built in applications so that they make changes to the local profile and remove first-run dialogs:

- Control Panel
- Internet Explorer including the Internet Options Control Panel applet
 - Start Internet Explorer a couple of times
 - Set the home page to *about:tabs* so that if IE is launched during sequencing, it will not connect to the Internet
- Windows Media Player
- Notepad
- WordPad

17. Restart the VM several times and log back on to ensure all first-run dialogs have been acknowledged or do not appear

Additional pre-requisites should only be installed when required by an application. For example, if Office is a pre-requisite of another application (such as SAP products or a plug-in) only install Office when sequencing that application.



At this point you will have a VM that can be used as a sequencing environment as well as an App-V client. It is highly recommended that you create two VMs based on this environment so that you have a second VM to perform testing of packages to confirm that the sequenced applications work at runtime.

4.5 Sequencer

Office 2010 is only supported with the 4.5 SP2 and 4.6 SP1 version of the Sequencer. Office 2007 and Office 2003 can be sequenced with earlier versions.

Where possible it is recommended to use the latest Sequencer – this often requires the matching version of the client to be deployed as well (although the App-V 4.6 SP1 Sequencer is backwardly compatible with the App-V 4.6 client). Install the Sequencer into the VM along with the most recent hotfix rollup.

4.5.1 Application Install Source

Installing applications from a copy of the setup files located on a local disk inside the VM is recommended.

Installation of the application from setup files located on a network share may cause files from that location to be captured during sequencing.

Create a local folder inside the VM where application setup files will be copied to before sequencing. For example, use C:\Packages or C:\Source. To ensure successful sequencing, it is not recommended to run setup applications directly from the network

Ensure that the folder is then added as an exclusion in your sequencing projects – often application setups may write log or temporary files to the same folder.

4.6 Snapshots

Once Windows has been configured, shutdown the VM – never take a snapshot of the virtual machine with the App-V Sequencer running. Each App-V package must have a unique GUID and snapshots with the Sequencer running are often a source of duplicate GUIDs.

Additionally a VM in a shutdown state will take less room on disk for a snapshot because the VM's RAM won't be included in the snapshot.

Periodically rollback the VM to this snapshot to install the latest updates from Windows Update, then re-create the snapshot.

4.7 Sequencer Template

The App-V 4.6 SP1 Sequencer supports templates which will allow you to configure project options including exclusions, enabling Windows Update during sequencing and enabling compression when saving the package. Package templates can be used by multiple sequencing engineers or across multiple Office packages to ensure consistency.

4.7.1 Package Options

A number of options can be set in a sequencer template that may be required for an Office package:

- Allow Microsoft Update to run during monitoring – enable updating of an Office package via Windows Update
- Allow all named objects and COM objects to interact with the local system – this enables LOCAL_INTERACTION_ALLOWED in the OSD file. This will save you from having to set this option manually after sequencing. If you are creating an Office package that will co-exist with other Office packages or locally installed Office, do not enable this option
- Compress Package – Reduce the size of your Office package with compression. Recommended for all Office packages. Decompression of the package on the end-point occurs on the initial loading of the package only, not on each launch of an Office application.

4.7.2 Exclusions

The table below lists the recommended exclusions to add when sequencing Office applications.

Path	Description
%CSIDL_COMMON_APPDATA%\Microsoft\RAC	Microsoft Reliability Analysis Component.
%CSIDL_PROFILE%\Lync Recordings	Microsoft Lync saved recordings folder. Just like documents, we don't want these being saved into the virtual environment
%CSIDL_PROGRAM_FILES%\MSECACHE	Outlook Connector cache. Reduce the package size by excluding cached installers
%CSIDL_PROGRAM_FILESS%\OCSetup	Lync/Communicator cached setup files. Reduce the package size by excluding cached installers
%CSIDL_WINDOWS%\Installer	Windows Installer cache. Reduce the package size by excluding cached installers
%CSIDL_WINDOWS%\Debug	Windows debug log files
%CSIDL_WINDOWS%\SoftwareDistribution	Windows Update. Ensure that these files are not cached to prevent breaking future updates to the package
%SFT_MNT%\Config.msi	Windows Installer rollback files. Reduce the package size by excluding cached installers
%SFT_MNT%\MSOCACHE	Microsoft Office installer cache. Reduce the package size by excluding cached installers
C:\MSOCACHE	Microsoft Office installer cache. Reduce the package size by excluding cached installers
<Source Folder> (e.g. C:\Packages)	A local folder that contains Office setup. Ensure that any changed files are not captured
Q:\Config.msi	Windows Installer rollback files. Reduce the package size by excluding cached installers
Q:\MSOCACHE	Microsoft Office installer cache. Reduce the package size by excluding cached installers
\REGISTRY\MACHINE\Software\Policies	Machine-level Group Policies. Ensure that Group Policy can deliver Office policies post deployment
\REGISTRY\USER\%SFT_SID%\Software\Microsoft\Tracing	Microsoft Tracing settings

Path	Description
\REGISTRY\USER\%SFT_SID%\Software\Microsoft\Windows\CurrentVersion\Internet Settings	User-level proxy server and other browser settings. Ensure that proxy settings aren't cached in the package
\REGISTRY\USER\%SFT_SID%\Software\Microsoft\Internet Explorer	Internet Explorer settings. Ensure Internet Explorer settings aren't cached in the package
\REGISTRY\USER\%SFT_SID%\Policies	User level Group Policies. Ensure that Group Policy can deliver Office policies post deployment

4.7.3 Using the Sequencer Template

To create a sequencer template, open the Sequencer and choose Tools / Options to set the package options and exclusions. Then choose File / Save As Template to save the file to disk. Save the template to a file and open in a text editor such as Notepad. The new template will have a number of changes over a default template

Under DEFAULTS, the following options will be set to Yes (if they aren't change them to Yes):

```
<DEFAULT Name="AllowMUADuringMonitoring" Value="Yes"/>
<DEFAULT Name="CompressPackage" Value="Yes"/>
```

Additional exclusions should also be listed, for example:

```
<EXCLUSION Pattern="Q:\MSOCACHE" Context="VFS_EXC" Type="PSR_DataSystem"/>
```

The DEFAULTOSD section sets the LOCAL_INTERACTION_ALLOWED option:

```
<DEFAULTOSD>&lt;SOFTPKG&gt;&lt;IMPLEMENTATION&gt;&lt;CODEBASE
HREF="rtsp://%SFT_SOFTGRIDSERVER%:322//&gt;&lt;OS
VALUE="Win7"/&gt;&lt;VIRTUALENV&gt;&lt;POLICIES&gt;&lt;LOCAL_INTERACTION_ALLOWED&gt;TRUE&lt;/LO
CAL_INTERACTION_ALLOWED&gt;&lt;/POLICIES&gt;&lt;/VIRTUALENV&gt;&lt;/IMPLEMENTATION&gt;&lt;/SOFT
PKG&gt;;
</DEFAULTOSD>
```

To use the template during sequencing, start the Sequencer and choose File / New from Template, and choose your Sequencer Template file.

5 Automating Office Setup

The steps in the Microsoft supplied prescriptive guidance for sequencing Office walks through manually starting the Office setup application during sequencing. That guidance does not take into account any preparation work (other than for sequencing itself) that should go into an Office deployment. It is left up to the reader to understand, based on experience, what planning is required.

Before virtualizing Office with App-V, you will need to have a good understanding of the preparation and planning work required for an Office deployment. The [Microsoft Office TechCenter](#) on TechNet has resources on planning your Office deployment.

An important component of any Office deployment is creating a custom setup tailored for your environment, which is then delivered by an automation solution such as Microsoft System Center Configuration Manager.

5.1 Why automate Office setup?

Office is a complex application which, to deploy successfully, will take effort to assess, plan and test. A native deployment will require automating Office setup with the features, settings and user preferences required for a specific environment, although many of these will be common across all deployments.

While App-V simplifies that actual delivery of Office, it does not remove this requirement for a structured, best practice approach to installation.

There are several reasons why an automated Office setup is beneficial during sequencing:

- Documented – an automated Office setup makes the task of documentation easier – rather than consult a document with settings, an administrator can view the Office customisations directly
- Repeatable – an automated Office setup is repeatable. A sequencing engineer can create an Office package using the exact steps used to create a previous package. Manual steps will invariably introduce human error. Additionally, re-creating an automated sequence will be faster by reducing manual steps
- Multiple packages – if the Office needs to be sequenced in multiple packages (for example, for different Windows versions, or supporting multiple primary applications) and automated Office setup will ensure all packages are consistent
- Default settings and user preferences – a custom Office deployment can set computer level settings and user preferences to customise Office for the environment. There are a number of additional settings that the administrator should implement when virtualizing Office – a custom deployment can be used to set these without manual intervention
- First run dialogs – there are several dialogs that you will want to prevent users from seeing, including from OneNote, InfoPath, Office Picture Manager and the Clip Organizer. Some of these dialogs you may not see during sequencing
- Preparation makes a better package – an automated Office sequence will produce a cleaner and more predictable package by knowing exactly what goes into the sequence

An automated Office setup will allow you to know exactly what goes into your Office package and will reduce the amount of time it takes to virtualize Office. Automating setup and the installation process is highly recommended. This document will go into more detail on automating the installation when we cover the sequencing of each Office version.

5.2 Resources for Office Automated Setup

The following resources are recommended reading for planning an Office deployment and understanding how to customize the installation of Office:

- [Customize the installation for Office 2010](#)
- [Customize Setup before installing the 2007 Office system](#)
- [Customizing How Setup Runs for Office 2003](#)

5.3 Tying it together with a Script

Automating Office setup is just one component of automation when sequencing Office. There are a number of actions that need to be taken when sequencing Office, such as preparing the sequencing VM, installing and configuring Office and performing first launch tasks. All of these steps can be automated to assist in speeding the sequencing process and making it repeatable and creating a better package.

Most deployment will require two scripts – one to prepare the sequencing VM (a pre-sequencing script) and another to launch during the monitoring phase (the install script).

The pre-sequencing script will usually contain commands to make registry changes and in the case of Office 2010 will install the Deployment Kit for App-V. The install script will install Office, make any necessary configuration changes and launch each application to allow the sequencing engineer to perform first-launch tasks.

The deployment sections in this document will use example scripts to illustrate the approach to virtualizing Office.

Part 2: Virtualizing Office with App-V

Virtualizing Office 2010, 2007 and 2003 and getting it right

6 Sequencing Office 2010

Office 2010 is the first version of the Office suite and applications that supports advanced integration with the operating system via the Office 2010 Deployment Kit for App-V. As such, the user experience is closer to what is achieved when Office is installed locally. This is important for applications such as Outlook and integration with SharePoint.

Building the sequencing VM has been covered in the previous section, so this section will cover the following high-level steps that need to be followed when sequencing Office 2010:

1. Create a customised Office 2010 deployment
2. Prepare the VM for sequencing Office 2010 including installing the Deployment Kit for App-V
3. Sequence Office 2010, Configure Proxies, Optimize and Edit the Package
4. Deploy the Deployment Kit for App-V to client PCs
5. Deploy the Office 2010 package

IMPORTANT: Before starting to sequence, it is strongly recommended to read this guide completely in order to understand Microsoft Office 2010 Deployment Kit for App-V.

6.1 Prerequisites

You will need the following software to use this guide:

- **Microsoft Application Virtualization version 4.6 SP1:** The [App-V 4.6 SP1](#) Sequencer is installed on the Sequencing workstation. It is strongly recommended to apply the latest App-V Sequencer updates

For a complete list of available App-V versions (client, server and Sequencer), see [current versions of App-V 4.x](#). At the time of writing, the latest version of the App-V 4.6 SP1 Sequencer is 4.6.1.30091 as updated with App-V 4.6 SP1 Hotfix Rollup 3: <http://support.microsoft.com/kb/2571168>

- **Microsoft Office 2010 volume SKU (32-bit).** This can be the entire Office 2010 suite or individual Office applications. The volume SKU provides the necessary product activation options for virtualizing Office. This may be deployed to either 32 or 64-bit operating systems
- **Microsoft Office 2010 Service Pack 1.** The most recent post-Service Pack 1 cumulative update is also recommended (see support.microsoft.com)
- **Microsoft Office 2010 Deployment Kit for App-V:** The [Deployment Kit](#) installs the Office 2010 licensing service and optionally installs proxies to enable integration features
- **Microsoft Lync 2010:** An optional component if you are deploying the Lync client along with Office 2010

6.2 Step 1: Creating a customised Office 2010 deployment

6.2.1 Creating a custom installation

In this section, I've outlined the key steps for creating a customization file, but you can read about [customizing your Office 2010 deployment](#) in more detail on TechNet.

- The process for [creating a customization file for Office 2010](#) is straightforward – start the Office Customization Tool (SETUP /ADMIN) and create a new file or [open an existing file for modifying](#).

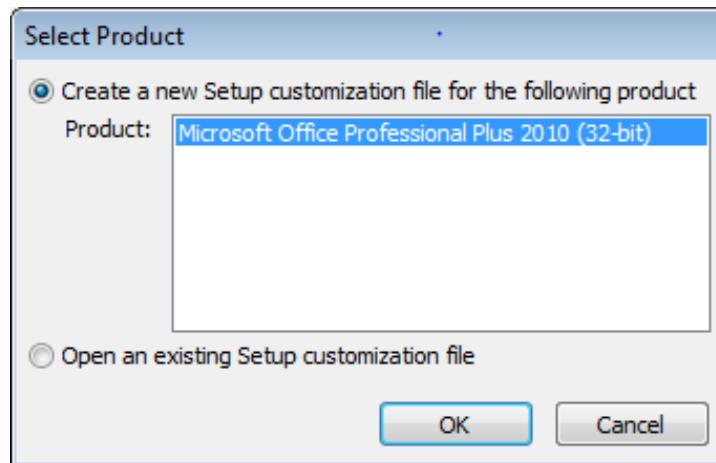


Figure 4: Creating a new or opening an existing customization file

- Just as you would be prompted once Office 2010 is installed, you will need to choose the default file types. Most organizations will probably choose to stick with the Microsoft Open XML formats. Making a choice here will modify the user settings that you will see in a later step.

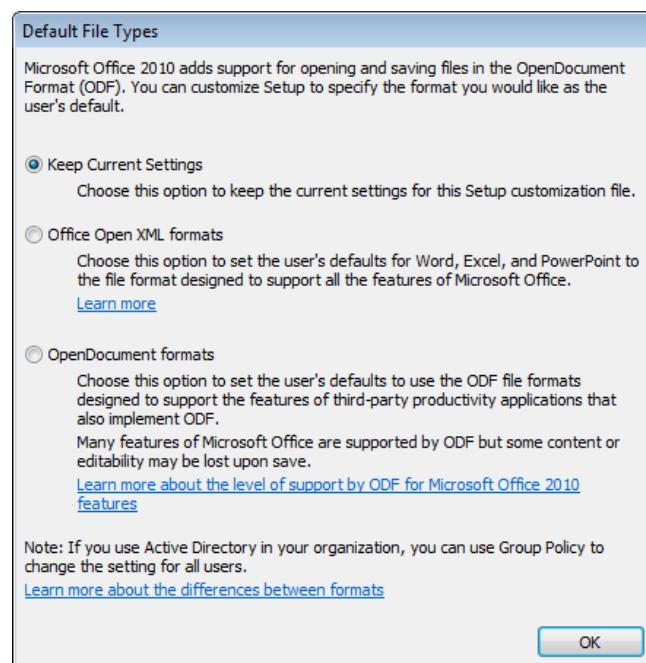


Figure 5: Choosing the default Office file type formats

3. Change the installation path to a path on the Q: drive – the default installation path is *[ProgramFilesFolder]\Microsoft Office*, so a recommended path for virtualizing Office with App-V 4.6 SP1 might be *Q:\MicrosoftOffice2010_x86\Microsoft Office* or *Q:\MicrosoftOffice2010_x86\Office*.

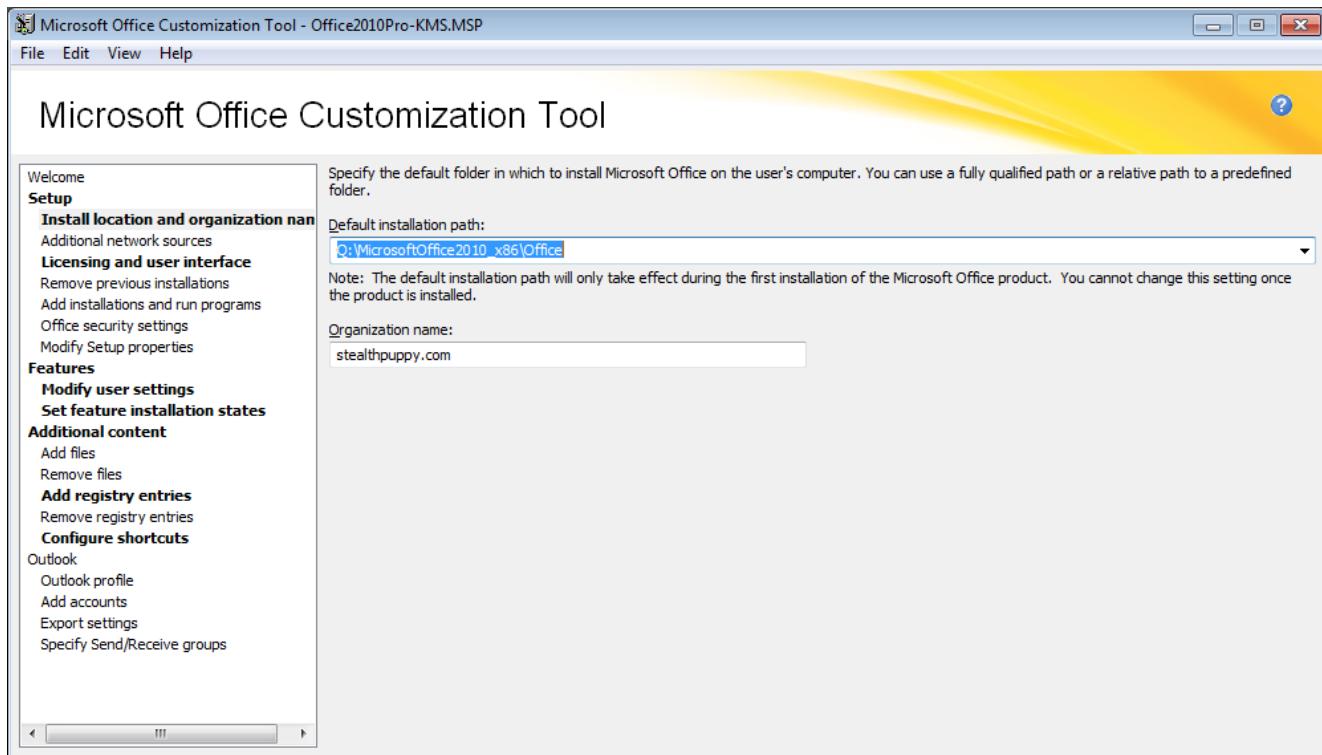


Figure 6: The Default Installation Path and Organization name in the OCT

4. Office 2010 enforces activation with Volume Activation 2.0 – the best strategy for activating Office 2010 is to use a KMS host, which will avoid deploying the product key in your deployment and manual activations. KMS activation is the default activation method of volume license editions of Office 2010.

Accept the license agreement and choose the type of user interface that setup will display during installation and sequencing.

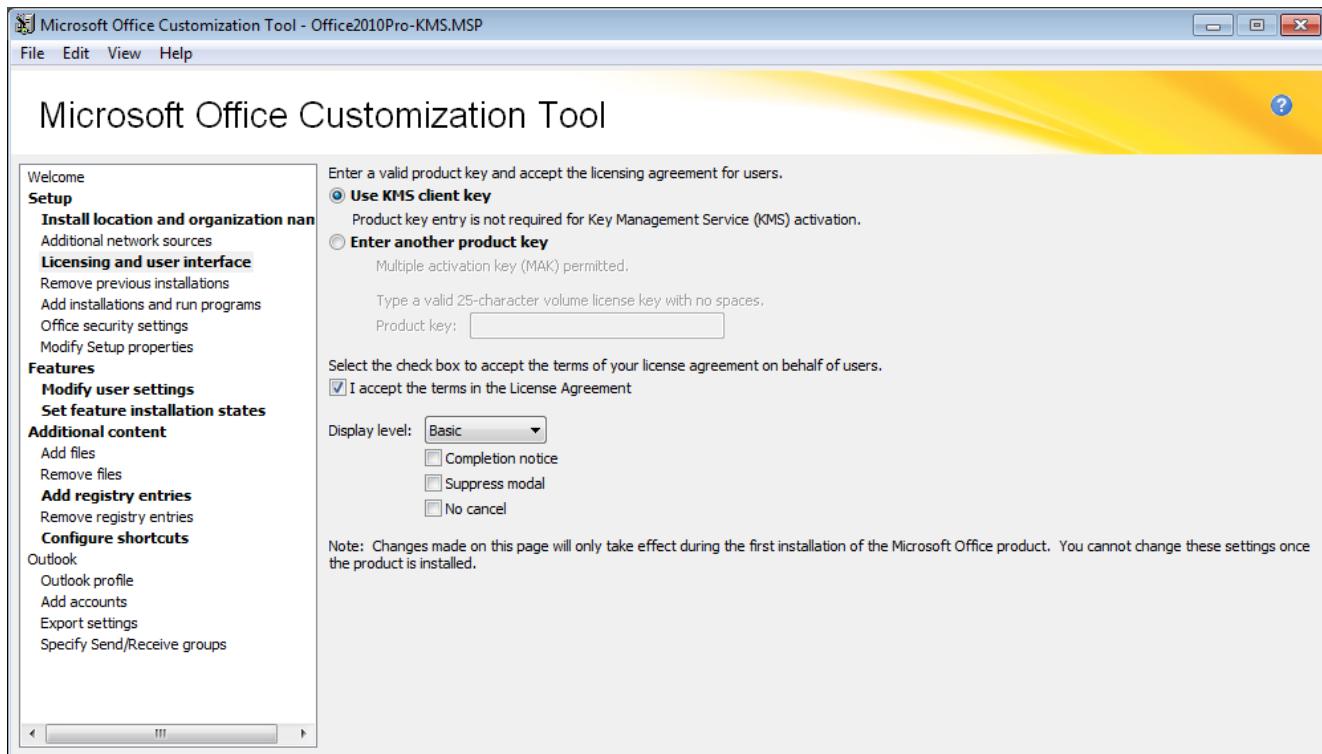


Figure 7: Set the licensing (KMS or MAK) used in your environment

5. One of the most important (and time consuming) aspects of the customization file is modifying the default user settings. What you set here will depend on the environment you are deploying to, but it's worth investing in some time to get these default settings correct.

By modifying these settings in the customization file, users can get up and running with Office 2010 sooner; however treat these as default preferences. Group Policy (or some other policy management tool) should be used to enforce settings, not set defaults – the less settings you have in Group Policy the better (the desktop will spend less time processing policies at logon).

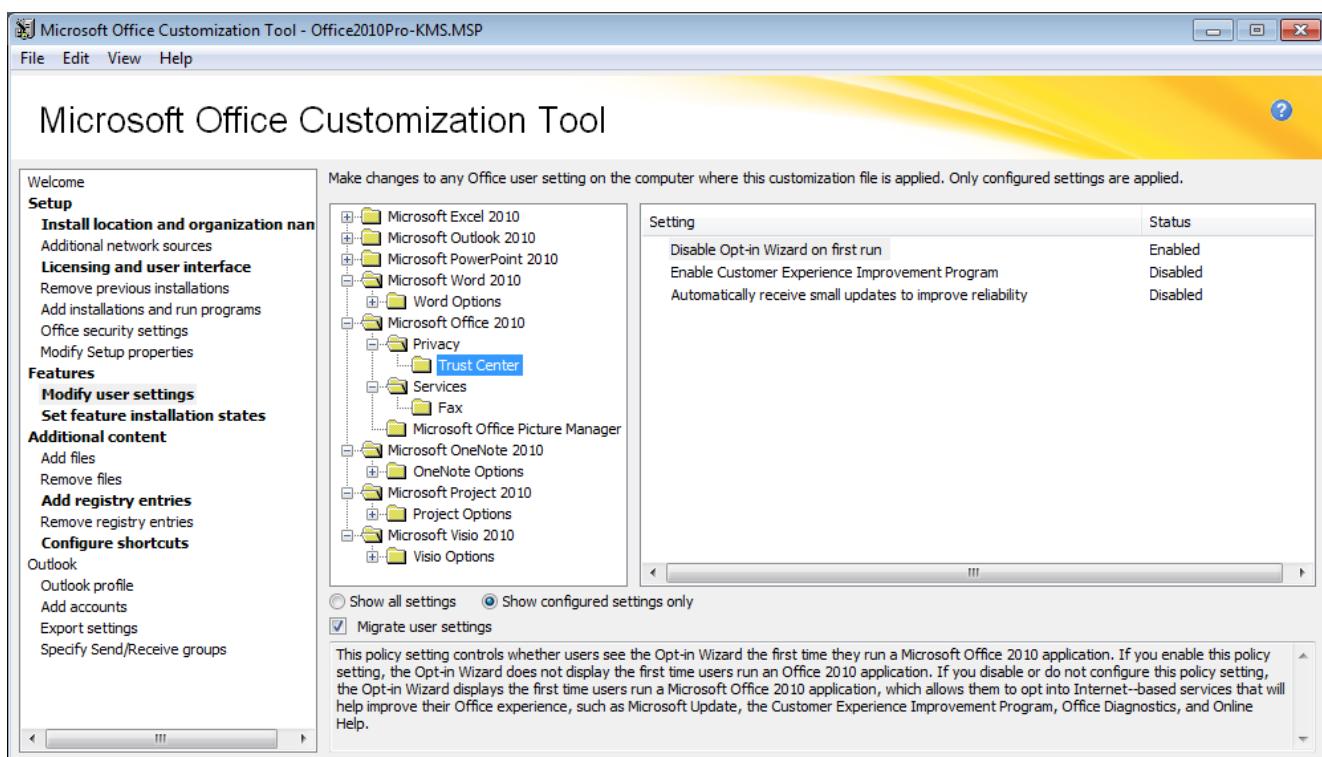


Figure 8: Default user settings are important for the user experience

Recommended user customisations to set via the Office Customization Wizard, with important settings for virtual environments highlighted:

Product	Path	Setting	Value
Excel	Excel Options – Save	Default file format	Enabled, Excel Workbook (*.xlsx)
Excel	Excel Options – Save	Keep the last AutoSaved versions of files for the next session	Disabled
Outlook	Outlook Social Connector	Turn off Outlook Social Connector	Disabled Enabled
Outlook	Outlook Options - Other – AutoArchive	AutoArchive Settings	Disabled
PowerPoint	PowerPoint Options – Save	Default file format	Enabled, PowerPoint Presentation (*.pptx)
PowerPoint	PowerPoint Options – Save	Keep the last AutoSaved versions of files for the next session	Disabled
Word	Word Options – Save	Default file format	Enabled, Word Document (*.docx)
Word	Word Options – Save	Keep the last AutoSaved versions of files for the next session	Disabled
Office	Global Options - Customize	Allow roaming of all user customizations	Enabled
Office	Privacy - Trust Center	Disable Opt-in Wizard on first run	Enabled
Office	Privacy - Trust Center	Enable Customer Experience Improvement Program	Disabled
Office	Privacy - Trust Center	Automatically receive small updates to improve reliability	Disabled

Product	Path	Setting	Value
Office	Office Live Workspace	Turn Off Office Live Workspace Integration	Enabled
Office	Services – Fax	Disable Internet Fax feature	Enabled
Office	Microsoft Office Picture Manager	Disable File Types association dialog box on first launch	Enabled
Office	Miscellaneous	Do not allow Save to Web integration	Enabled
Office	Miscellaneous	Suppress recommended settings dialog	Enabled
OneNote	OneNote Options - Other	Add OneNote icon to the notification area	Disabled
Project	Project Options - Save	Save Microsoft Project files as	Enable, Project (*.mpp)
Visio	Visio Options - Advanced - General Options	Put all settings in Windows registry	Enabled

6. Like user settings, feature installation states will impact the default Office experience, so you will need to know in advance which features you are deploying. For various reasons, there are a number of features that you might consider disabling when virtualizing Office:

- .NET Programmability Support – this may be required by Office add-ins, which can be delivered via DSC; however an external, custom application will not have access to this support, unless it is run within the Office package
- Microsoft OneNote / Send to OneNote Add-ins / Internet Explorer Integration – this feature will not be available from Internet Explorer unless it runs from within the Office package
- Office Shared Features / Microsoft Office Download Control – this feature will not be available from Internet Explorer unless it runs from within the Office package
- Office Tools / Visio Viewer – this feature will not be available from Internet Explorer unless it runs from within the Office package

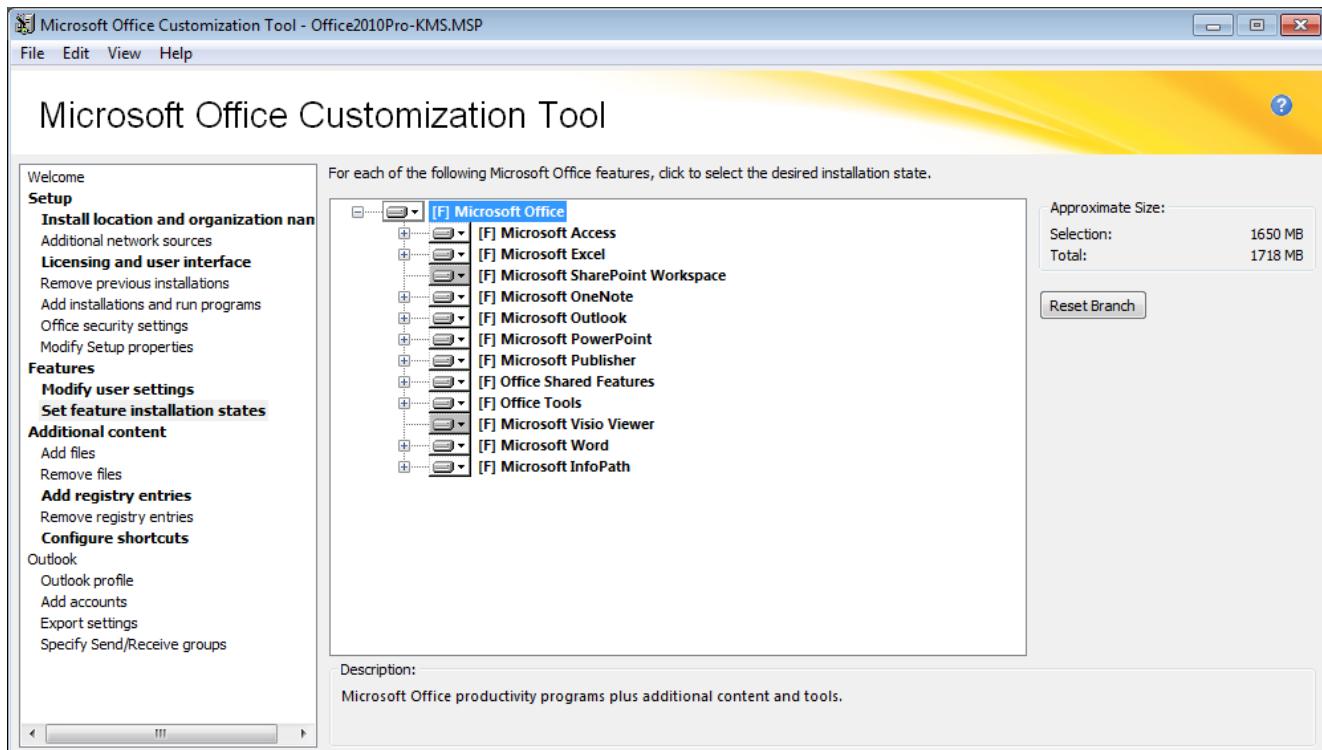


Figure 9: Feature installations states should be enabled or disabled only

- To avoid manual registry updates during sequencing, add the following registry entries to the 'Add registry entries' page:

Root	Key	Value name	Value data
HKCU	Software\Classes\clsid\{AB968F1E-E20B-403A-9EB8-72EB0EB6797E}	DisableDetection	1
HKCU	Software\Microsoft\Office\Common\OfficeUpdate	BlockUpdates	1

These entries will disable user prompts and update options that are not suitable for Office when virtualized.

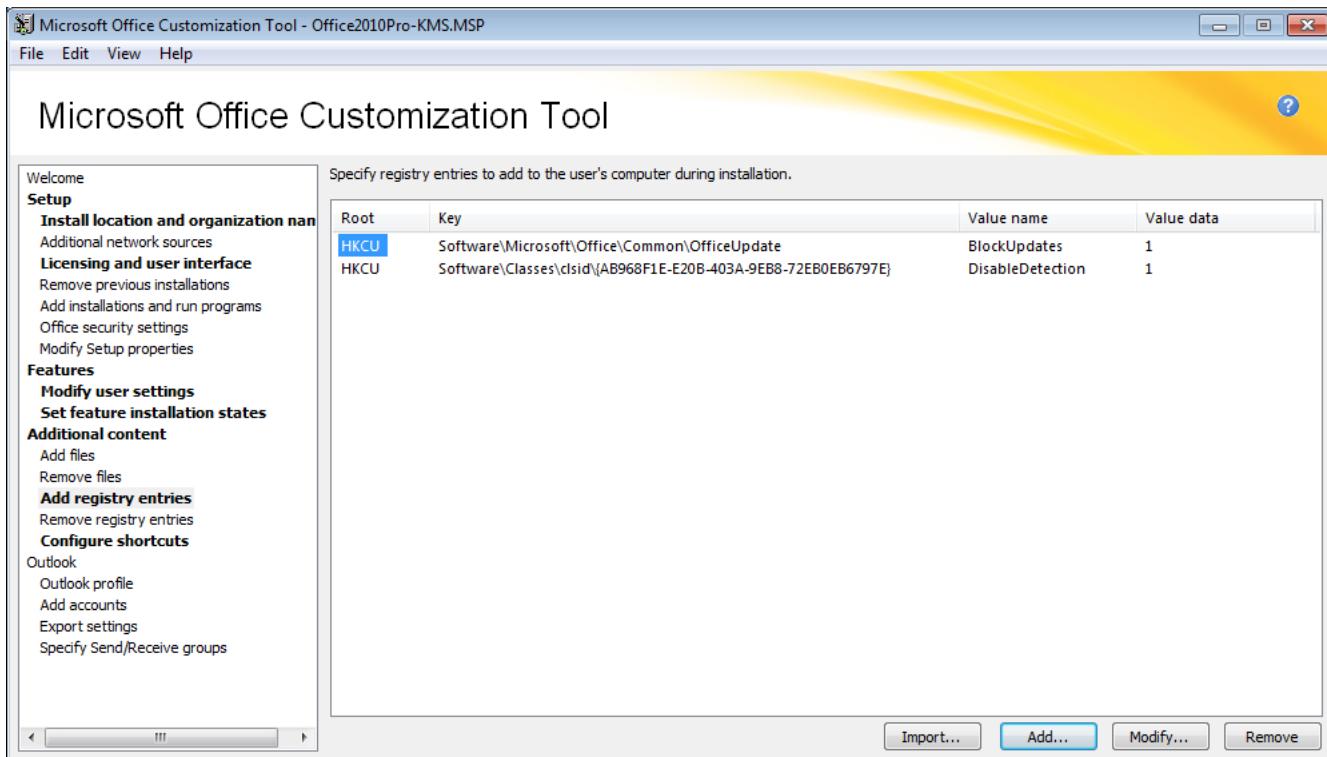


Figure 10: Required registry settings can be baked into Office Setup instead of a script

8. Configure the Office shortcuts as you would like them to appear on the client. In the screen shot below, the default Start Menu folder has been changed for a deployment into a lab environment – you should ensure no conflicts between local shortcuts or shortcuts from other Office 2010 packages.

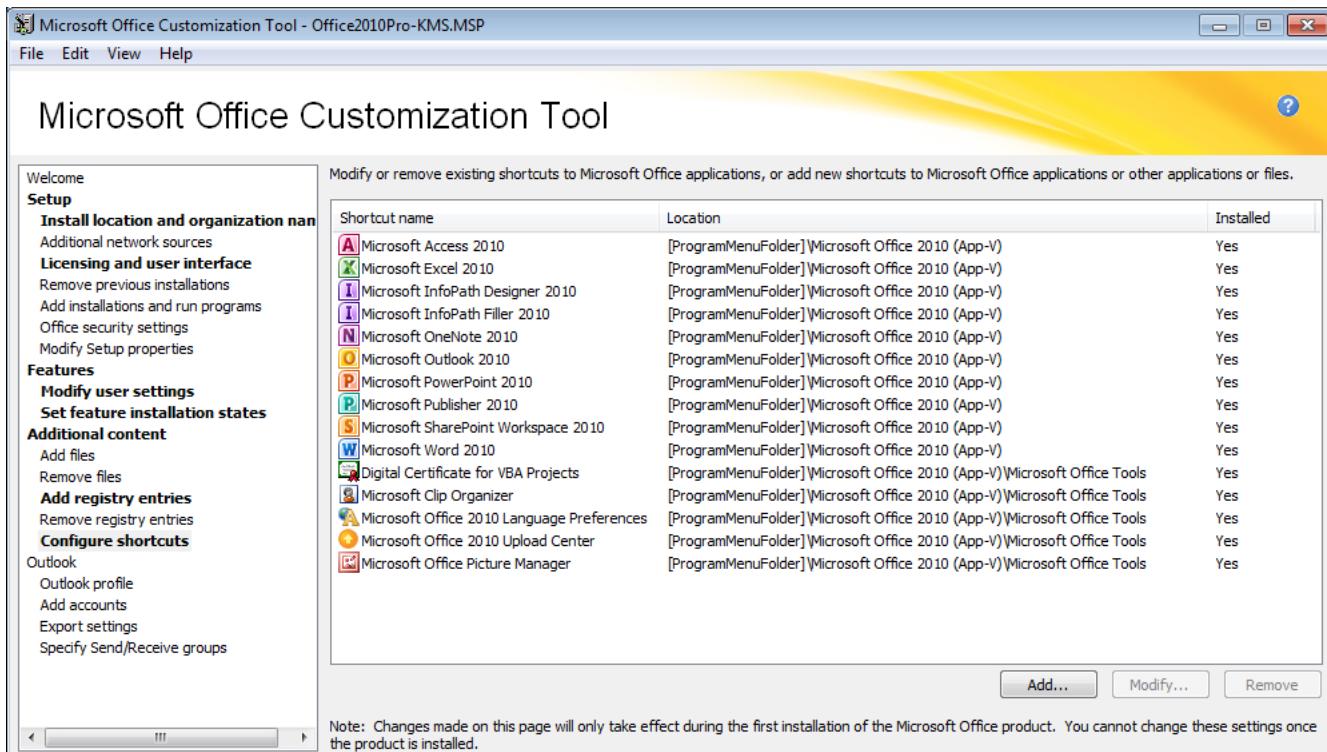


Figure 11: Control how the shortcuts are displayed to the user

There are several other options available from within the OCT – you can [deploy additional files and programs along side Office](#), [automatically configure Outlook profiles](#) when users first start Outlook and [configure SharePoint Workspaces](#).

9. Once you have finished creating the customization file, save it and now you're ready to start the [Office 2010 deployment process](#).

6.2.2 Office Applications – Microsoft Project and Visio

If you are adding other Office applications to your package, then create an unattended deployment for those applications as well. The same approach for creating custom installation packages Office, applies to Project and Visio. There are a couple of guidelines that you should follow:

- Apply the same service pack levels as the core Office suite
- Use the same license approach, user settings, shortcuts and feature states as the core Office suite

6.2.3 Microsoft Lync

Microsoft uses a different approach to Lync 2010 deployment and uses a different installer type. Lync has Silverlight and the Visual C++ 2008 Redistributable as dependencies. While the Visual C++ 2008 Redistributable should be installed on the client (i.e. not captured in the package), you'll need to make a decision on whether to include Silverlight in the package or deploy it natively. If you have no other requirement for Silverlight in your SOE, include Silverlight in your Office package.

If Silverlight will be included in the Office/Lync package, use the following command to install Lync to the default installation folder:

```
LyncSetup.exe /Install /Silent /InstallDir <install folder> /fulluisuppression
```

The downside of this command line is that once setup completes, Lync will automatically launch and may require exiting before finishing the sequencing phase. Silverlight should then be updated to the most recent version after installing Lync.

If you're including Silverlight in the Office package, follow these steps to automate the installation of Lync and Silverlight:

- Extract the Lync installer – by installing Lync to a test machine, you'll then be able to find the setup files in C:\Program Files\OCSetup (on a 32-bit system)
- By default, the Lync Windows Installer package will require being launched from LyncSetup.exe. To work around that, use the following command to install the Lync client:

```
MSIEXEC /I Lync.msi OCSETUP=1 INSTALLDIR=<install folder> ALLUSERS=TRUE REBOOT=SUPPRESS /QB-
```

6.2.4 Automating Office Setup during Sequencing

Although we now have an automated Office 2010 deployment, we can go a step further and automate the entire installation and configuration process of Office 2010 during sequencing. This can be done with a simple batch file that will complete many of the manual steps automatically.

The script below will perform the following tasks:

- Install Office 2010 with the Outlook Hotmail Connector and Outlook Social Connectors
- Install Project 2010, Visio 2010 and Lync 2010 into the same package
- Make some required registry changes
- Create the Office user profile folders to ensure they are captured in the virtual environment
- Start each Office application to complete first run tasks

```

1  @ECHO OFF
2
3  REM Install Microsoft Office and Applications
4  SET SOURCE=%CD%
5  PUSHD %CD%\Office2010Pro
6  START /WAIT SETUP.EXE /ADMINFILE %SOURCE%\Office2010Pro-KMS.MSP
7  POPD
8
9  PUSHD %CD%\Addons
10 START /WAIT osc2010-kb2583935-fullfile-x86-glb.EXE /PASSIVE /NORESTART
11 START /WAIT OutlookConnector.EXE /QUIET /NORESTART
12 POPD
13
14 PUSHD %CD%\Project2010Pro
15 START /WAIT SETUP.EXE /ADMINFILE %SOURCE%\Project2010Pro-KMS.MSP
16 POPD
17
18 PUSHD %CD%\Visio2010Pro
19 START /WAIT SETUP.EXE /ADMINFILE %SOURCE%\Visio2010Pro-KMS.MSP
20 POPD
21
22 PUSHD %CD%\Lync
23 START /WAIT Lync.MSI OCSETUP=1 INSTALLDIRECTORY=Q:\MicrosoftOffice2010_x86\Lync
ALLUSERS=TRUE REBOOT=SUPPRESS /QB-
24 REN "%ProgramData%\Microsoft\Windows\Start Menu\Programs\Microsoft Lync" "Microsoft Lync
(App-V)"
25 POPD
26
27 REM SharePoint registry keys
28 REG ADD HKEY_CLASSES_ROOT\CLSID\{9203C2CB-1DC1-482d-967E-597AFF270F0D}\TreatAs
29 REG ADD HKEY_CLASSES_ROOT\CLSID\{BDEADEF5-C265-11D0-BCED-00A0C90AB50F}\TreatAs
30 REG DELETE HKEY_CLASSES_ROOT\CLSID\{9203C2CB-1DC1-482d-967E-597AFF270F0D}\TreatAs /f
31 REG DELETE HKEY_CLASSES_ROOT\CLSID\{BDEADEF5-C265-11D0-BCED-00A0C90AB50F}\TreatAs /f
32
33 REM Keep MAPI profile in the virtual environment

```

```

34 REG ADD HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Office\Outlook>Addins\Microsoft.OMSAddin /f
35 REG DELETE HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Office\Outlook>Addins\Microsoft.OMSAddin /f
36 REG ADD "HKEY_CURRENT_USER\Software\Microsoft\Windows NT\CurrentVersion\Windows Messaging Subsystem\Profiles" /f
37 REG ADD "HKEY_CURRENT_USER\Software\WOW6432Node\Microsoft\Windows NT\CurrentVersion\Windows Messaging Subsystem\Profiles" /f
38
39 REM User Profile folders
40 MD "%APPDATA%\Microsoft\AddIns"
41 MD "%APPDATA%\Microsoft\Clip Organizer"
42 MD "%APPDATA%\Microsoft\CLView"
43 MD "%APPDATA%\Microsoft\Document Building Blocks"
44 MD "%APPDATA%\Microsoft\Excel"
45 MD "%APPDATA%\Microsoft\Forms"
46 MD "%APPDATA%\Microsoft\MS Project"
47 MD "%APPDATA%\Microsoft\Office"
48 MD "%APPDATA%\Microsoft\OneNote"
49 MD "%APPDATA%\Microsoft\Outlook"
50 MD "%APPDATA%\Microsoft\PowerPoint"
51 MD "%APPDATA%\Microsoft\Proof"
52 MD "%APPDATA%\Microsoft\Publisher"
53 MD "%APPDATA%\Microsoft\Publisher Building Blocks"
54 MD "%APPDATA%\Microsoft\QuickStyles"
55 MD "%APPDATA%\Microsoft\SharePoint Designer"
56 MD "%APPDATA%\Microsoft\Signatures"
57 MD "%APPDATA%\Microsoft\Stationery"
58 MD "%APPDATA%\Microsoft\Templates"
59 MD "%APPDATA%\Microsoft\UProof"
60 MD "%APPDATA%\Microsoft\Word"
61 MD "%APPDATA%\Microsoft\Media Catalog"
62 MD "%APPDATA%\Microsoft\Queries"
63 MD "%APPDATA%\Microsoft\Graph"
64 MD "%APPDATA%\Microsoft\InfoPath"
65 MD "%APPDATA%\Microsoft\Themes"
66 MD "%APPDATA%\Microsoft\OIS"
67 MD "%APPDATA%\Microsoft\VSTAHost"
68 MD "%APPDATA%\Microsoft\VSCommon"
69 MD "%APPDATA%\Microsoft\Web Server Extensions"
70 MD "%APPDATA%\Microsoft\AttendeeCommunicator"
71 MD "%APPDATA%\Microsoft\Communicator"
72 MD "%APPDATA%\Microsoft\MSDN"
73
74 REM Move AutoSave locations away from AppData
75 MD "%LOCALAPPDATA%\Microsoft\PowerPoint"
76 REG ADD "HKCU\Software\Microsoft\Office\14.0\PowerPoint\Options" /v PathToAutoRecoveryInfo /d "%LOCALAPPDATA%\Microsoft\PowerPoint\\\" /f
77 MD "%LOCALAPPDATA%\Microsoft\Excel"
78 REG ADD "HKCU\Software\Microsoft\Office\14.0\Excel\Options" /v AutoRecoverPath /d "%LOCALAPPDATA%\Microsoft\Excel\\\" /f
79 MD "%LOCALAPPDATA%\Microsoft\Word"

```

```

80 REG ADD "HKCU\Software\Microsoft\Office\14.0\Word\Options" /v AUTOSAVE-PATH /d
  "%LOCALAPPDATA%\Microsoft\Word\" /f
81
82 REM First run actions
83 PUSHD "Q:\MicrosoftOffice2010_x86\Office\OFFICE14"
84 IF EXIST SETLANG.EXE START /WAIT SETLANG.EXE
85 IF EXIST WINWORD.EXE START /WAIT WINWORD.EXE
86 IF EXIST EXCEL.EXE START /WAIT EXCEL.EXE
87 IF EXIST POWERPNT.EXE START /WAIT POWERPNT.EXE
88 IF EXIST MSACCESS.EXE START /WAIT MSACCESS.EXE
89 IF EXIST MSPUB.EXE START /WAIT MSPUB.EXE
90 IF EXIST INFOPATH.EXE START /WAIT INFOPATH.EXE
91 IF EXIST WINPROJ.EXE START /WAIT WINPROJ.EXE
92 IF EXIST VISIO.EXE START /WAIT VISIO.EXE
93 IF EXIST OIS.EXE START /WAIT OIS.EXE
94 IF EXIST MSTORE.EXE START /WAIT MSTORE.EXE
95 POPD
96
97 PUSHD "Q:\MicrosoftOffice2010_x86\Lync"
98 START /WAIT communicator.EXE
99 START /WAIT crecplayer.EXE
100 START /WAIT ocpubmgr.EXE
101 POPD
102
103 REM Run Windows Update to update Office
104 %windir%\system32\wuapp.exe startmenu

```

Save this script as **Install-Office2010.CMD** into the same folder as the Office 2010 setup files.

6.3 Step 2: Prepare the VM for sequencing Office 2010

6.3.1 Local Registry Changes

Edit the data in SxSAppExtensions – using Regedit, modify the following value:

- 32-bit OS: HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\SoftGrid\4.5\Sequencer\SxSAppExtensions
- 64-bit OS:
HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Microsoft\SoftGrid\4.5\Sequencer\SxSAppExtensions

Double-click on the SxSAppExtensions value. In the Edit Multi-String dialog box, append the value **VSL** to the end of the list. Click **OK** to save the change.

6.3.2 Office 2010 Deployment Kit for App-V

The Microsoft Office 2010 Deployment Kit for App-V is a required component to sequence and deploy Microsoft Office 2010. The Deployment Kit is a single installer and provides two main functions:

- Installation and configuration of the Office Software Protection Platform service for licensing

- Optional configuration of virtualized components to allow for improved interaction with the operating system

The Deployment Kit must be installed on the sequencing workstation prior to starting the sequencing steps for Office 2010.

This product must also be installed on the App-V client machines to which the virtualized Office 2010 client packages will be deployed. It can be configured to enable certain system components to interact with virtualized Office 2010, by way of proxies, including:

- Fast search in virtualized Outlook 2010 using Windows Desktop Search
- Ability for virtualized Office 2010 applications to open, edit, and save Office files hosted with Windows SharePoint
- Search indexing support for Office file types
- URL protocol redirection to virtualized Outlook 2010
- Print to virtualized OneNote 2010
- Mail control panel applet for virtualized Outlook 2010

6.3.2.1 Understanding Proxies

Proxies are components included with the Office 2010 Deployment Kit for App-V that allow interaction between Windows and virtualized components such as Outlook, Windows Desktop Search, and Internet Explorer SharePoint add-ons. For example, the Outlook proxy launches the virtualized Outlook 2010 executable when a user-right clicks on a file and chooses Sent To / Mail Recipient.

Running OffVirt.msi with a specific set of command-line parameters installs the proxies. For most installations, this means that you will run MSIEEXEC twice to install first the proxies and then the licensing components. Installing proxies adds files, registry accounts, and the Office Licensing Service to the local computer.

6.3.3 Installing the Deployment Kit

1. Download and install the [Microsoft Office 2010 Deployment Kit for App-V](#). Setup will extract the Microsoft Office 2010 Deployment Kit for App-V and ask you where to save the files.
2. Open an elevated command prompt by right clicking on Start\All Programs\Accessories\Command Prompt and choosing **Run as administrator**. Navigate in the command prompt to the directory that you specified in the previous step (for example, **CD C:\offvirt**).
3. Determine the appropriate command line for your environment and install the Office 2010 Deployment kit for App-V on the Sequencer. The generalized syntax is:

```
MSIEXEC/i OffVirt.msi [licensing flags][feature flags]
```



The Office 2010 Deployment Kit for App-V must be installed via two separate commands – one for the licensing component and another for the proxies. Even though the Deployment Kit is a single Windows Installer file, the licensing and proxies must be installed separately.

6.3.4 Licensing flags

For more detail on Office licensing, see the section on licensing in this document and refer to [Office 2010 volume activation](#) to determine which activation and licensing method to use.

6.3.4.1 KMS activation

Setting these flags to 1 will install the KMS client key for the specified applications or suites. You must specify at least one application or suite. If you are installing an Office suite such as Office 2010 Professional Plus, you do not need to specify individual components (Word, Excel, PowerPoint, etc.) included in the suite. If you will include Visio or Project in your package, those products must be specified individually in addition to the suite.

Suites (pick one):

Flag	Value	Enables licensing for:
PROPLUS	0 or 1	Office Professional Plus
SMALLBUSBASICS	0 or 1	Small Business Basics
STANDARD	0 or 1	Standard

Office 2010 stand-alone applications:

Flag:	Value	Enables licensing for:
ACCESS	0 or 1	Access
EXCEL	0 or 1	Excel
GROOVE	0 or 1	SharePoint Workspace
INFOPATH	0 or 1	InfoPath
ONENOTE	0 or 1	OneNote
OUTLOOK	0 or 1	Outlook
POWERPOINT	0 or 1	PowerPoint
PROJECTPRO	0 or 1	Project Professional
PROJECTSTD	0 or 1	Project Standard
PUBLISHER	0 or 1	Publisher
SPD	0 or 1	SharePoint Designer
VISIOPREM	0 or 1	Visio Premium
VISIOPRO	0 or 1	Visio Professional

VISIOSTD	0 or 1	Visio Standard
WORD	0 or 1	Word

Note: some Office applications (e.g. Visio) may come as a single media and a specific product key manages the edition that is installed.

Properties for KMS Host configuration:

Flag:	Value	Description:
KMSSERVICENAME	[Host name]	Enter KMS host name (not required if KMS host is registered and resolvable in DNS and port = 1688.)
KMSSERVICEPORT	[Port number]	TCP port number of KMS service. Not required if KMS host is registered in DNS and the default port 1688 is used.

Example 1: KMS activation for Office Professional Plus and default KMS host settings:

```
MSIEXEC/i OffVirt.msi PROPLUS=1
```

Example 2: User-defined KMS host settings, Office Professional Plus 2010, Project Professional 2010 and Visio Professional 2010 in the same package:

```
MSIEXEC/i OffVirt.msi PROPLUS=1 PROJECTPRO=1 VISIOPRO=1 KMSSERVICENAME="kms.contoso.com"
KMSSERVICEPORT=1689
```

Example 3: KMS activation, Project Professional 2010 and Visio Professional 2010 in the same package:

```
MSIEXEC/i OffVirt.msi PROJECTPRO=1 VISIOPRO=1
```

6.3.4.2 MAK activation

MAK Option 1: VAMT 2.0 Use VAMT 2.0 (recommended) to install product keys on client computers streaming Office 2010. In this scenario, you do not specify a licensing flag in the setup command line. For example (VAMT activation):

```
MSIEXEC/i OffVirt.msi
```

Mixed activation (KMS and MAK together): If some client computers will use KMS activation, and other client computers to use MAK, use the **KMS flags** to install KMS client keys. Use VAMT 2.0 to install the MAK key after the deployment.

MAK Option 2: Specify 25-Character Product Keys

Flag	Value
PIDKEYS (Multiple product keys are semicolon delimited. For	XXXXXX-XXXXXX-XXXXXX-XXXXXX-XXXXXX

Flag	Value
example: PIDKEYS=X-X-X-X-X; Y-Y-Y-Y-Y;)	
USEROPERATIONS	1

Important: You must set USEROPERATIONS=1 to allow non-administrator users to activate MAK keys. This licensing flag allows standard users (users who are not members of the local administrators groups) to apply a MAK key in order to activate Office applications. By default, this is set to 0 if it is not specified. KMS clients do not use this flag. In general, most MAK installs should specify this setting.

The following is an example of a command line for MAK activation for a package with two Office applications (or a suite and application):

```
MSIEXEC/i OffVirt.msi PIDKEYS=XXXXXX-XXXXXX-XXXXXX-XXXXXX;YYYYYY-YYYYYY-YYYYYY-YYYYYY-YYYYYY  
USEROPERATIONS=1
```

6.3.5 Feature flags

Feature flags prepare the Sequencer for to configure the package to make use of proxy components for Office-OS integration. Licensing flags specify the licensing mode the package will be configured to use. Both are critical to successfully sequencing Office 2010.

Use the feature flags for the architecture that matches your Sequencing computer's operating system:

Sequencing VM with a 32-bit OS:

```
ADDLOCAL=Click2runMapi,Click2runOWSSupp,Click2runWDS,OSpp,OSpp_Core
```

Sequencing VM with a 64-bit OS:

```
ADDLOCAL=Click2runMapi,Click2runOWSSupp,Click2runWDS,OSpp,OSpp_Core,OSppWoW64
```



The Office 2010 Deployment Kit for App-V is provided as a separate installer for 32-bit and 64-bit Windows. The processor architecture of the operating system determines which installer you use, not the processor architecture of Office 2010 that you are deploying.

6.3.6 Automating the Steps to Prepare the Sequencing VM

To simplify the process of preparing the sequencing VM, the tasks outlined in step 2 can be automated with a script. Performing these tasks via a script will save time and ensure the process is repeatable.

Here's an example script that will make changes to the SxSAppExtensions registry value, add additional registry keys that need to exist outside of the virtual environment and install the Office 2010 Deployment Kit for App-V (in this instance enabling proxies on a 32-bit OS and using KMS activation).

```
1 @ECHO OFF
```

```

2  REG ADD HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\SoftGrid\4.5\Sequencer /v SxSAppExtensions
/d OLB\0MML\0MMW\0SAM\0FAE\0CPL\0DAT\0CNV\0FLT\0PSP\0ODF\0LEX\0TLB\0RL\0VSL /t
REG_MULTI_SZ /f
3  REG ADD HKEY_CLASSES_ROOT\CLSID\{9203C2CB-1DC1-482d-967E-597AFF270F0D}\TreatAs
4  REG ADD HKEY_CLASSES_ROOT\CLSID\{BDEADEF5-C265-11D0-BCED-00A0C90AB50F}\TreatAs
5  REG ADD HKEY_LOCAL_MACHINE\Software\Microsoft\Office\14.0
6  REG ADD HKEY_LOCAL_MACHINE\Software\Wow6432Node\Microsoft\Office\14.0
7  PUSHD C:\Packages\Offvirt
8  START /WAIT MSIEXEC/I OffVirt.MSI
ADDLOCAL=Click2runMapi,Click2runOWSSupp,Click2runWDS,OSpp,OSpp_Core
9  START /WAIT MSIEXEC/I OffVirt.msi PROPLUS=1 PROJECTPRO=1 VISIOPRO=1
10 POPD

```

Save this as a script (.CMD or .BAT file), along with a copy of the Deployment Kit for App-V and run the script **before** starting the Sequencer.

6.4 Step 3: Sequence Office 2010, Configure Proxies, Optimize and Edit the Package

Before starting the sequencing process, copy the Office 2010 setup files, customisations and scripts to a local folder in the sequencing VM. Create a snapshot of the sequencing VM to allow for rolling back to this point if sequencing Office 2010 fails.

1. Launch the App-V 4.6 SP1 Sequencer
2. Select **File / New from Template** from the drop down menu, and choose your Sequencer Template file
3. Select **Create Package (default)** then click **Next**

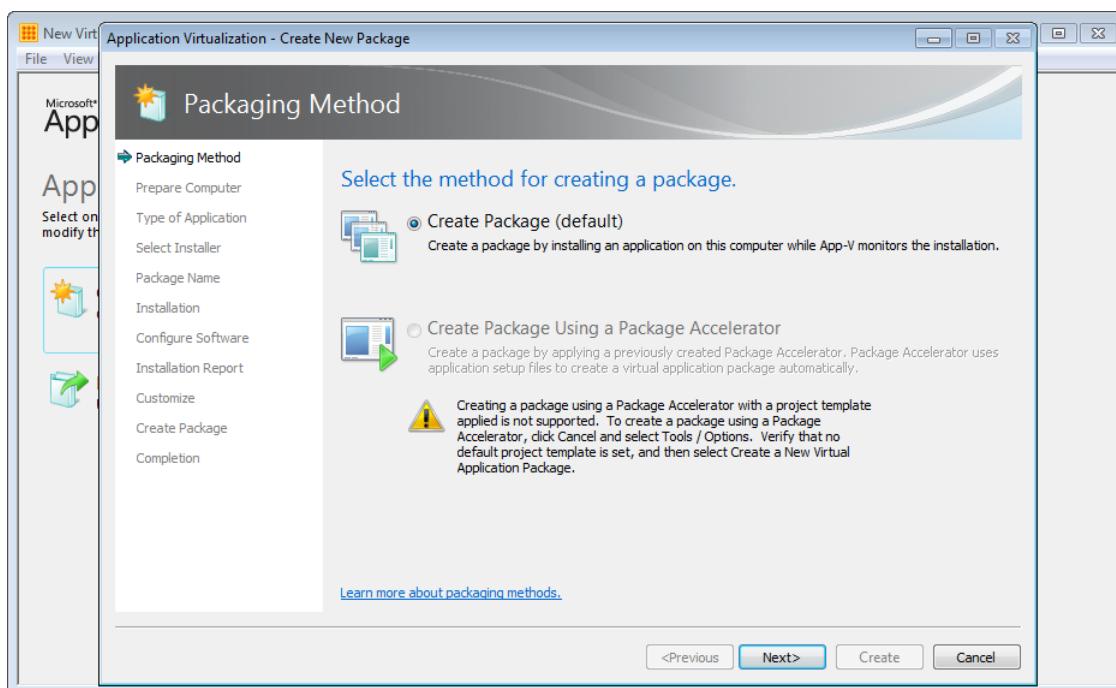


Figure 12: Select the packaging method

4. On the **Prepare the computer for creating a virtual package** dialog, follow the instructions to correct any warning messages and then click **Next**

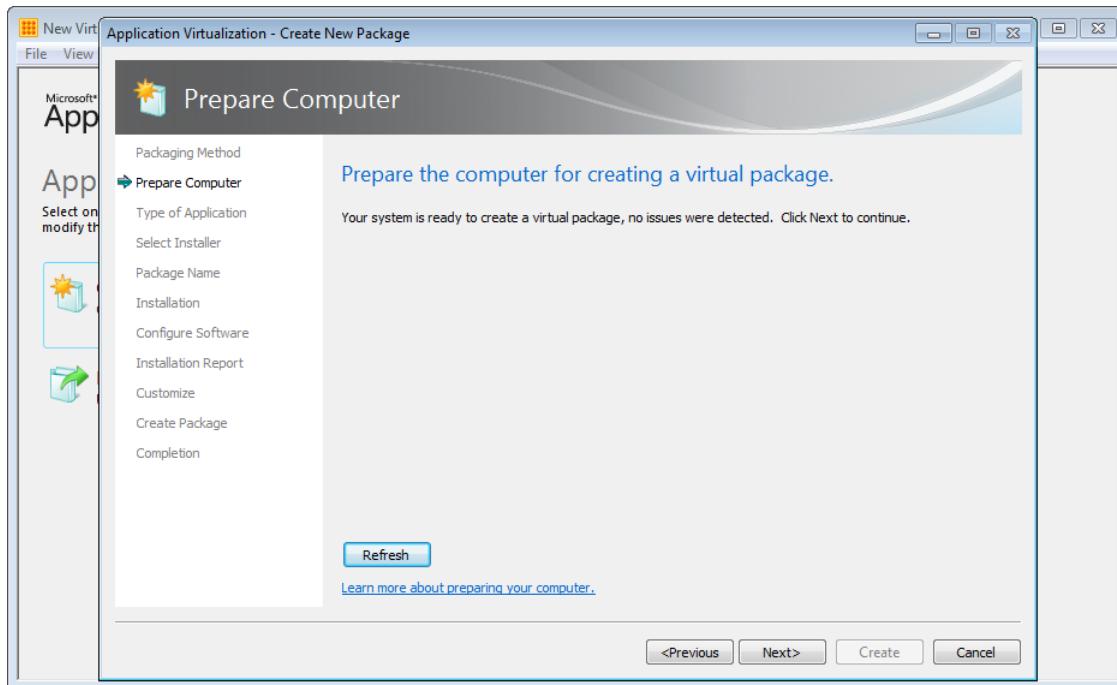


Figure 13: No issues detected before starting monitoring

5. On the **Describe the type of application you want to package** dialog, select **Standard Application (default)**, then click **Next**

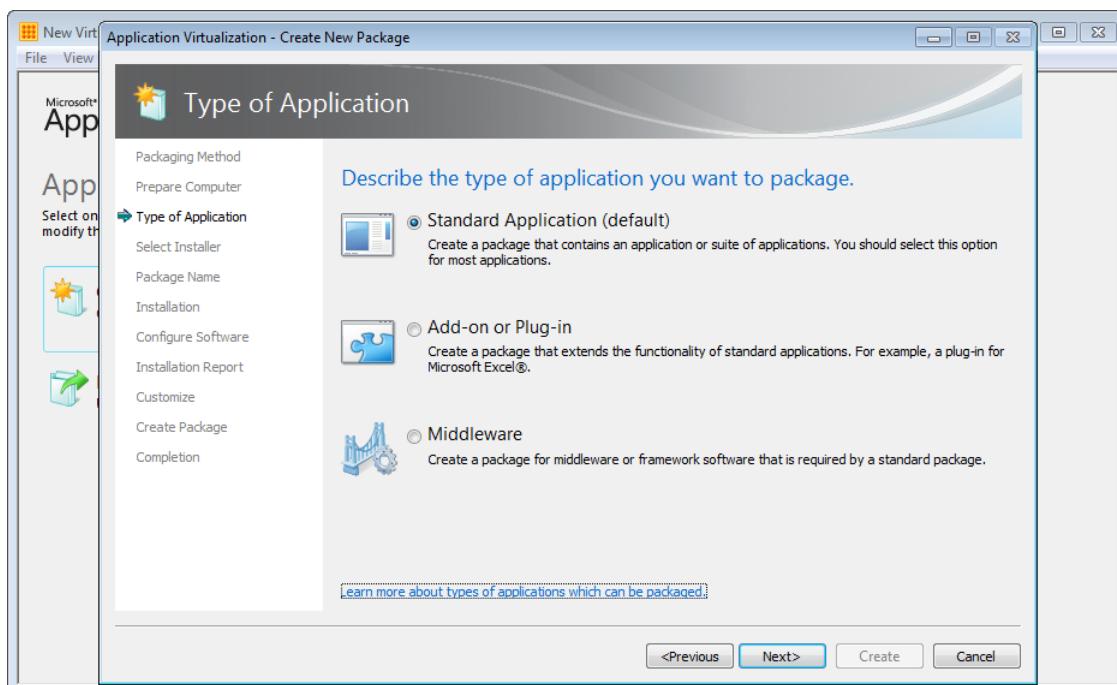


Figure 14: Application types - choose Standard Application

6. On the **Select Installer** dialog, select **Browse** and locate the script that will automate the installation and configuration steps for Office. Alternatively, choose C:\Windows\System32\CMD.EXE to launch a Command Prompt during the monitoring phase to launch the script from there. Then click **Next**

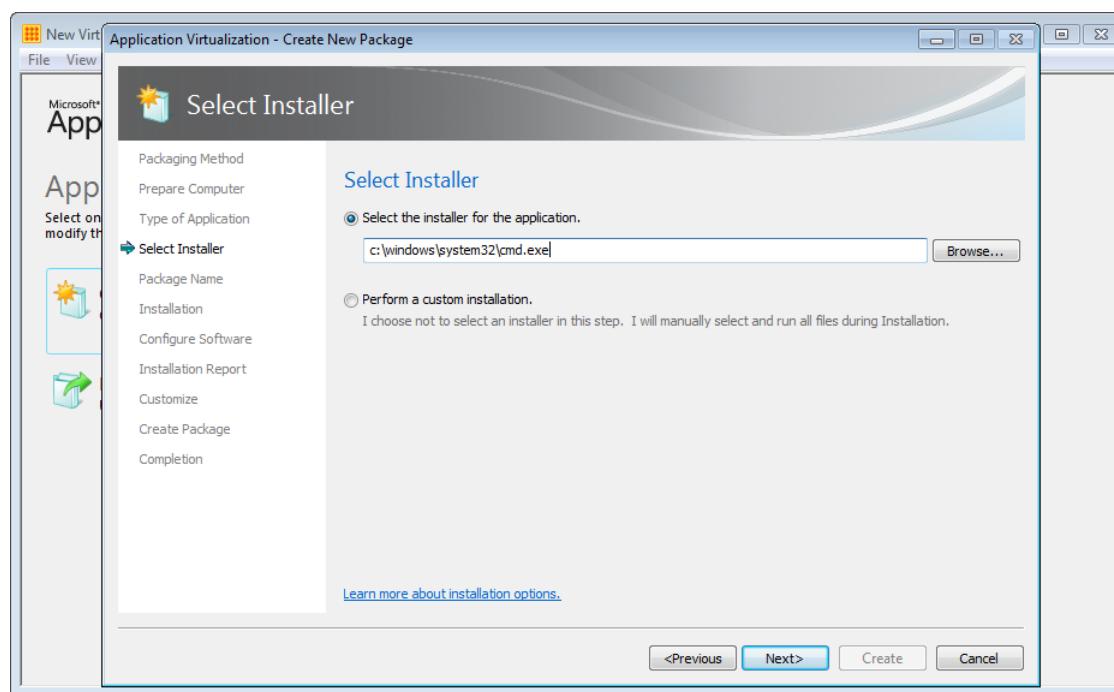


Figure 15: Select the installer - use a script or Command Prompt

7. On the **Package Name** dialog, give the package a descriptive name. Notice that the folder on Q:\ that will serve as the application root is automatically filled in. If you need to change it, select *Edit (advanced)* and enter a different path. Click **Next**

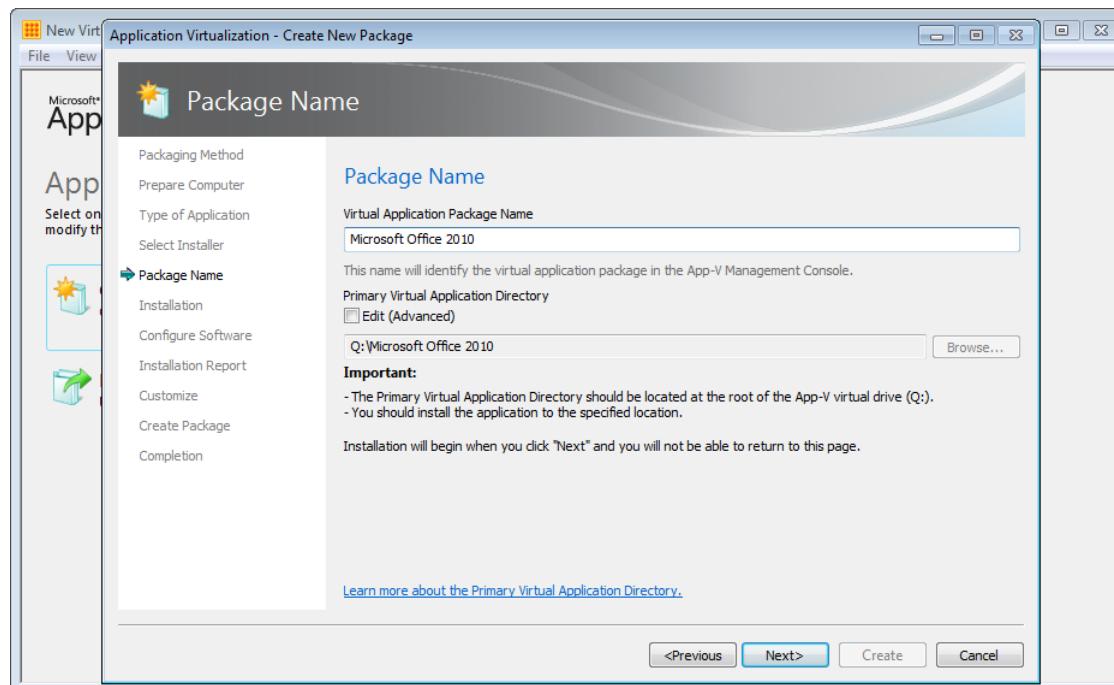


Figure 16: Enter the package name and Virtual Application Directory

8. On the **Installation** dialog page, the script will start. If you selected to launch Command Prompt, change to the directory that contains the script and start the script from there

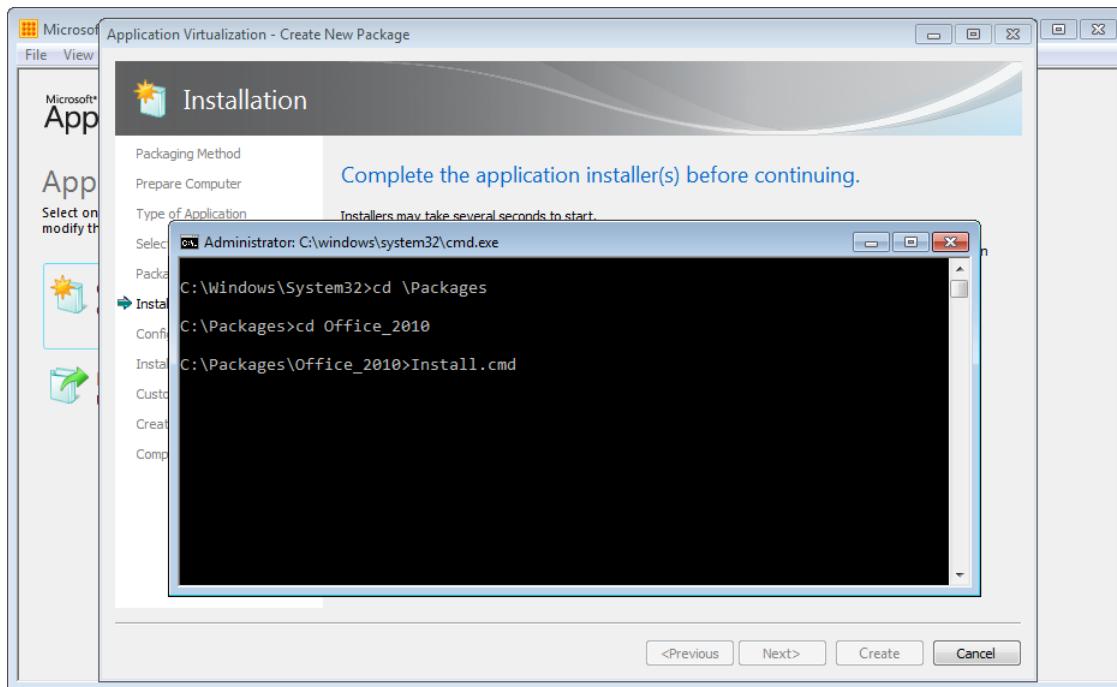


Figure 17: Running the Office install script

- After Office 2010 setup completes, the script will launch a number of the Office applications. This will allow you to complete first run tasks for each of those applications. If you are completing this step manually, browse to the path of the virtual application. For example, to configure Word:

- Click **Start** and then click **Run**
- Browse to the executable virtual file that you want to launch, for instance **Q:\Q:\MicrosoftOffice2010_x86\Office14\WINWORD.EXE**, then press **Enter**
- Configure custom ribbon settings then close Word.



Never launch Outlook, OneNote or Microsoft SharePoint Workspace 2010, since doing so may capture user-specific information, which cannot be made neutral by the App-V engine. This user specific information is often written into binary registry keys or files that cannot be translated into App-V computer system independent formats

It is recommended to start the following executables if they exist in your package:

- SETLANG.EXE
- WINWORD.EXE
- EXCEL.EXE
- POWERPNT.EXE
- MSACCESS.EXE
- VISIO.EXE
- MSPUB.EXE
- INFOPATH.EXE
- WINPROJ.EXE
- VISIO.EXE

- OIS.EXE
- MSTORE.EXE

The following steps are performed with the install script listed above and only need to be completed if you are installing Office manually.

- I. While at the **Installation** dialog, click **Run** and navigate to C:\windows\system32\regedit.exe.
- II. Once Regedit launches, we will create two TreatAs registry keys **and then delete them** so that the Sequencer records the deletion of these keys.
 - Navigate to HKEY_CLASSES_ROOT\CLSID\{9203C2CB-1DC1-482d-967E-597AFF270F0D} for 32-bit OSes, HKEY_CLASSES_ROOT\Wow6432Node\CLSID\{9203C2CB-1DC1-482d-967E-597AFF270F0D} for 64-bit OSes.
 - Create a new key under {9203C2CB-1DC1-482d-967E-597AFF270F0D} named **TreatAs**.
 - Delete the **TreatAs** key.
 - Repeat steps 1-3 under the key HKEY_CLASSES_ROOT\CLSID\{BDEADEF5-C265-11D0-BCED-00A0C90AB50F} for 32-bit OSes, HKEY_CLASSES_ROOT\Wow6432Node\CLSID\{BDEADEF5-C265-11D0-BCED-00A0C90AB50F} for 64-bit OSes.
 - Close Regedit
- III. **Use this step only if you have Office 2007 installed locally and Office 2010 virtualized.** If you do not have Office 2007 installed locally, continue to the next step.
 - While at the **Installation** dialog, click **Run** and browse to C:\windows\system32\regedit.exe.
 - Once Regedit launches, create the following virtual registry key **and then delete it** so that the sequencer monitors the deletion of the newly added key.

HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Office\Outlook\Addins\Microsoft.OMSAddin

The sequencing steps now continue here:

10. After Office setup has completed and the Office applications have been launched, the script will launch Window Update. Check for updates and Windows Update should return those updates that are applicable to Office 2010 and the associated applications in this package. Ensure that you select the Office 2010 updates only – that is, deselect any Windows updates or other optional updates that should not be a part of the Office 2010 package.

If Windows Update requests a reboot to complete the installation of updates, click **Restart Now**. The Sequencer should intercept the reboot request.

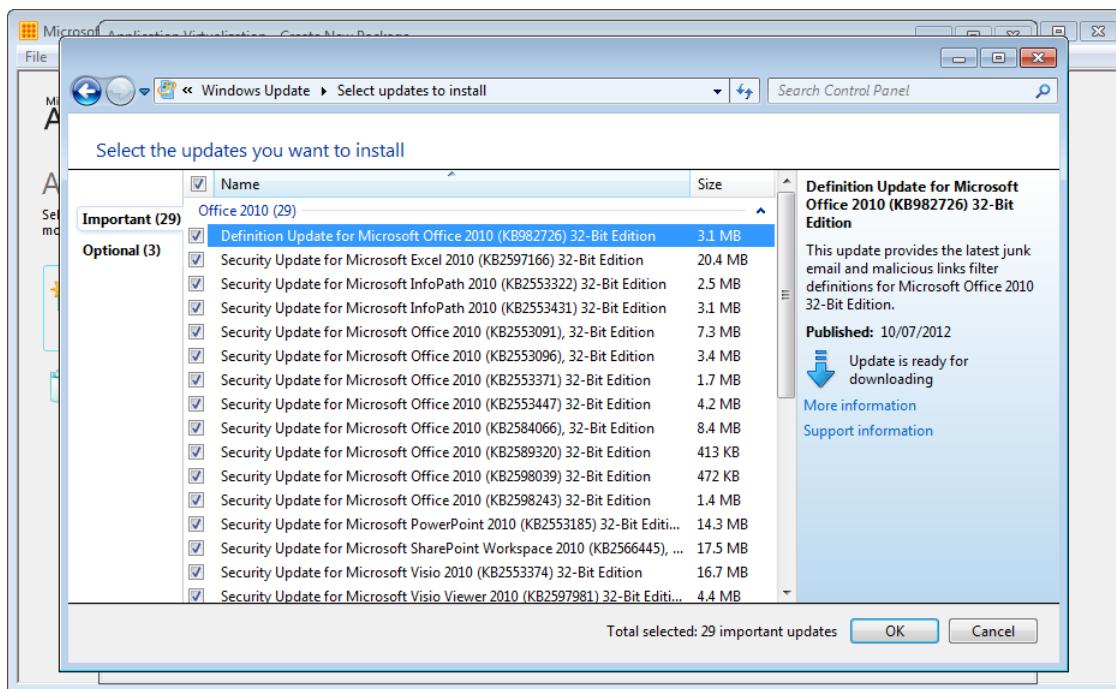


Figure 18: Select Office 2010 updates only

11. On the **Installation** dialog, check the checkbox next to **I am finished installing** and click **Next**.
12. While on the **Configure Software** dialog, select each of your *frequently used* programs and run it once. Never launch Outlook, OneNote or Microsoft SharePoint Workspace 2010. Once you are finish, click **Next**.

Note: if you have launched the Office applications during the monitoring phase, this step is **not** required – just click **Next**.

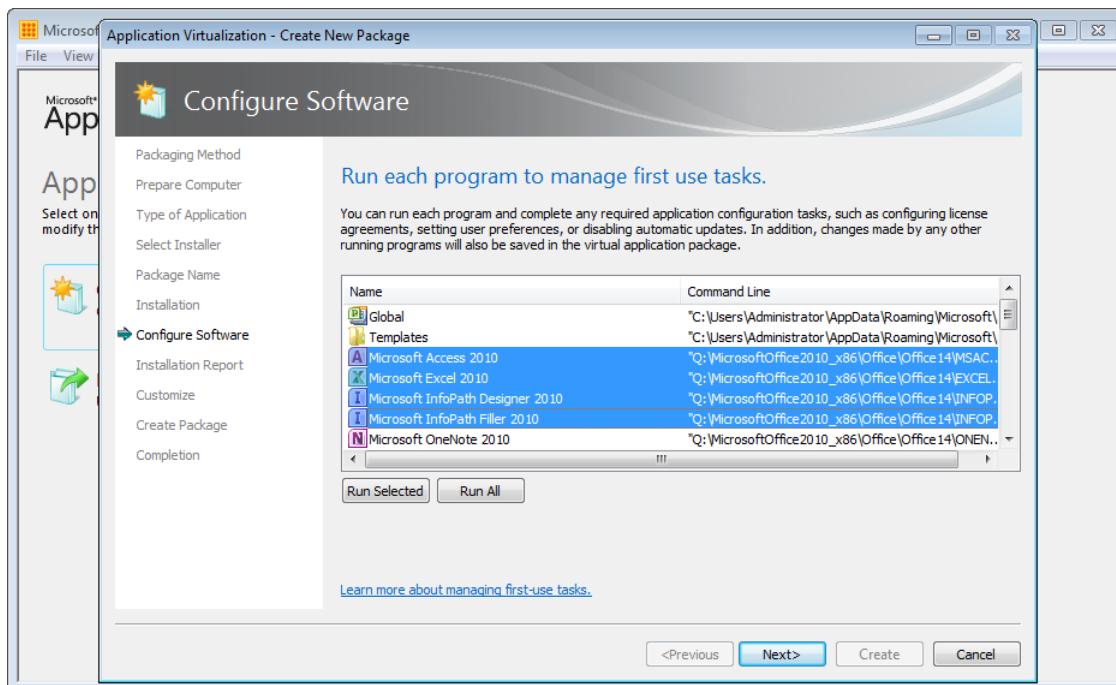


Figure 19: Configure first-run for applications in the package

13. On the **Installation Report** dialog, review the listed item and then click **Next**

14. Customize the package – at this step, do not save the package, instead choose Customize to enable editing of shortcuts and other package properties

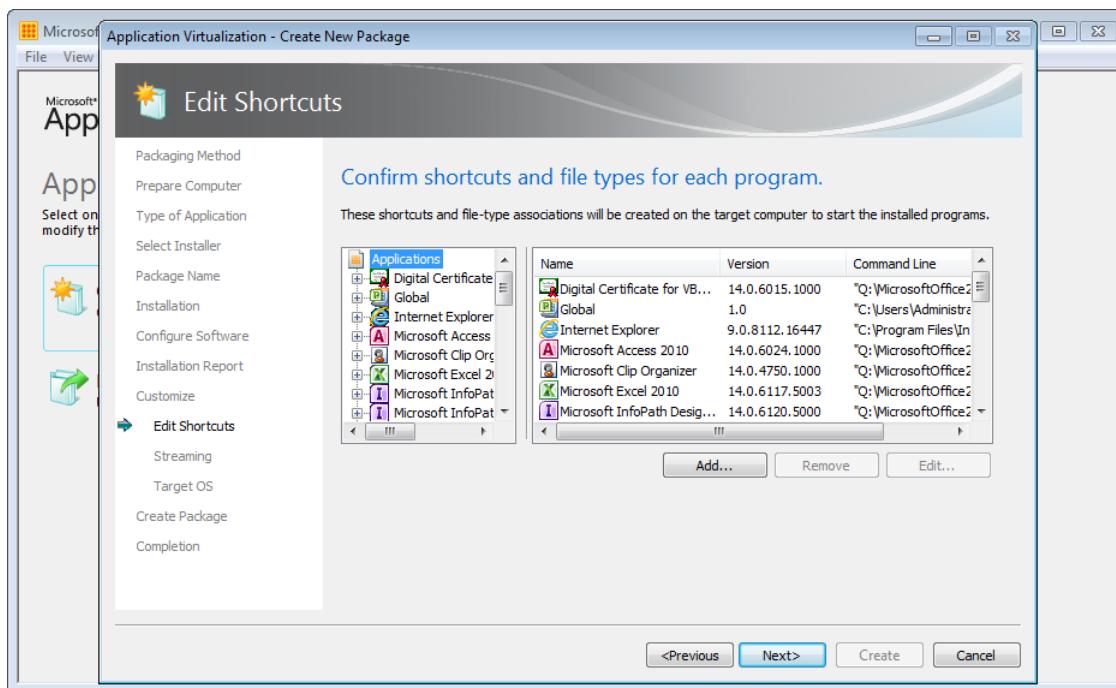


Figure 20: Edit shortcuts and file type associations

15. Some care will need to be taken at the Edit Shortcuts page, ensure this is step is completed using the information below:

6.4.1 Modify Shortcuts

Once Office has been installed and successfully captured, the Sequencer should list a number of shortcuts, some of which are not required. At this point, you should remove those shortcuts that you don't need and add a set of additional shortcuts for the proxies.

This table lists the shortcuts that have been captured in a sample Office package that includes Project, Visio and Lync. The table also lists the command for each shortcut and a recommendation for removing and keeping discovered shortcuts and lists those that need to be added for the proxies.

Shortcut	Command Line	Action	Shortcut
Global	C:\Users\Administrator\AppData\Roaming\Microsoft\MS Project\14\1033\Global.MPT	Remove	N/A
Microsoft Office 2010 component	Q:\MicrosoftOffice2010_x86\Office\Office14\MSOHTMED.EXE	Remove	N/A
Microsoft Visual Studio Version Selector	C:\Program Files\Common Files\Microsoft Shared\MSEnv\VSLauncher.exe	Remove	N/A
Notepad	C:\Windows\System32\notepad.exe	Remove	N/A
Templates	C:\Users\Administrator\AppData\Roaming\Microsoft\Templates	Remove	N/A
VSContentInstaller.exe	C:\Program Files\Common Files\Microsoft Shared\MSEnv\VSContentInstaller.exe	Remove	N/A
Windows host process (Rundll32)	C:\Windows\System32\rundll32.exe	Remove	N/A

Shortcut	Command Line	Action	Shortcut
XML Editor	C:\Program Files\Common Files\Microsoft Shared\OFFICE14\MSOXMLED.EXE	Remove	N/A
Internet Explorer	C:\Program Files\Internet Explorer\iexplore.exe	Remove*	Maybe
Digital Certificate for VBA Projects	Q:\MicrosoftOffice2010_x86\Office\Office14\SELFCERT.EXE	Keep	Yes
Microsoft Access 2010	Q:\MicrosoftOffice2010_x86\Office\Office14\MSACCESS.EXE	Keep	Yes
Microsoft Clip Organizer	Q:\MicrosoftOffice2010_x86\Office\Office14\MSTORE.EXE	Keep	Yes
Microsoft Excel 2010	Q:\MicrosoftOffice2010_x86\Office\Office14\EXCEL.EXE	Keep	Yes
Microsoft InfoPath Designer 2010	Q:\MicrosoftOffice2010_x86\Office\Office14\INFOPATH.EXE /design	Keep	Yes
Microsoft InfoPath Filler 2010	Q:\MicrosoftOffice2010_x86\Office\Office14\INFOPATH.EXE	Keep	Yes
Microsoft Lync 2010	Q:\MicrosoftOffice2010_x86\Lync\communicator.exe	Keep	Yes
Microsoft Lync 2010 Recording Player	Q:\MicrosoftOffice2010_x86\Lync\crecplayer.exe	Keep	Yes
Microsoft Lync Recording Manager	Q:\MicrosoftOffice2010_x86\Lync\ocpubmgr.exe	Keep	Yes
Microsoft Office 2010 Language Preferences	Q:\MicrosoftOffice2010_x86\Office\Office14\SETLANG.EXE	Keep	Yes
Microsoft Office 2010 Upload Center	Q:\MicrosoftOffice2010_x86\Office\Office14\MSOUC.EXE	Keep	Yes
Microsoft Office Picture Manager	Q:\MicrosoftOffice2010_x86\Office\Office14\OIS.EXE	Keep	Yes
Microsoft OneNote 2010	Q:\MicrosoftOffice2010_x86\Office\Office14\ONENOTE.EXE	Keep	Yes
Microsoft Outlook 2010	Q:\MicrosoftOffice2010_x86\Office\Office14\OUTLOOK.EXE	Keep	Yes
Microsoft PowerPoint 2010	Q:\MicrosoftOffice2010_x86\Office\Office14\POWERPNT.EXE	Keep	Yes
Microsoft Project 2010	Q:\MicrosoftOffice2010_x86\Office\Office14\WINPROJ.EXE	Keep	Yes
Microsoft Project Server 2010 Accounts	Q:\MicrosoftOffice2010_x86\Office\Office14\WINPROJ.EXE -ProjectProfiles	Keep	Yes
Microsoft Publisher 2010	Q:\MicrosoftOffice2010_x86\Office\Office14\MSPPUB.EXE	Keep	Yes
Microsoft SharePoint Workspace 2010	Q:\MicrosoftOffice2010_x86\Office\Office14\GROOVE.EXE	Keep	Yes
Microsoft Silverlight	C:\Program Files\Microsoft Silverlight\4.0.50826.0\Silverlight.Configuration.exe	Keep	Yes
Microsoft Visio 2010	Q:\MicrosoftOffice2010_x86\Office\Office14\VISIO.EXE	Keep	Yes
Microsoft Word 2010	Q:\MicrosoftOffice2010_x86\Office\Office14\WINWORD.EXE	Keep	Yes
Search MAPI Protocol Handler Host	%CommonProgramFiles%\Microsoft Shared\Virtualization Handler\VirtualSearchHost.exe	Add	No
Microsoft SharePoint Client Support Manager	%CommonProgramFiles%\Microsoft Shared\Virtualization Handler\VirtualOWSSuppManager.exe	Add	No

Shortcut	Command Line	Action	Shortcut
Microsoft Virtual Office Simple Mapi Proxy Server	%CommonProgramFiles%\Microsoft Shared\Virtualization Handler\MapiServer.exe	Add	No
Windows Control Panel	%windir%\system32\Control.exe Q:\MicrosoftOffice2010_x86\Office\Office14\mlcfg32.cpl	Add	No
Microsoft Office Document Cache	Q:\MicrosoftOffice2010_x86\Office\Office14\MSOSync.exe	Add	No

* Keeping or removing the Internet Explorer shortcut will depend on whether you want a copy of Internet Explorer to be available in the virtual environment. The SharePoint Client Support Manager proxy offers integration between Internet Explorer and a virtualized Office.

6.4.2 Application Versions

Each application will contain a version that has been detected from the version information on each executable. For example, each application will list a version that will look similar to: 14.0.6024.1000.

It is recommended that you change this version number to a format that makes sense for your environment. For example, you may use the version number to assist in keeping track of the application or Office suite version as well as the package version. Examples of custom versions might include: **2010_x86_v1**, or **2010_x64_v3**.

Whatever version number convention you choose, change all application properties to use the same version to keep the configuration of the package as simple as possible.

6.4.3 Add Proxies

In this section, we will configure the 5 proxies included in the Microsoft Office 2010 Deployment Kit for App-V and edit the shortcuts generated by the Sequencer.

A common version number will be used for all applications in this package. It is important that the version number used for all applications be the same. By default, the version number will be the version of the target executable, not the package. *The actual number is arbitrary*; in this example, we will use 14.0.6024.1000 (Office 2010 SP1) for consistency. Also note that the default OSD File Name is changed for each component.



Multiple dependencies between proxy components exist. In general, it is recommended to include all 5 proxy components in your Office package. Omission of a step or proxy component may result in unexpected behavior or failure of the component.

Add new Proxy Applications for Proxy Support

- i. At the **Edit Shortcuts** dialog, click **Add...**
- ii. Add all 5 applications listed in the table below to the Office 2010 package
- iii. Highlight and edit each application to update the **Version** and **OSD File Name** fields to include the 14.0.6024.1000 version number. Most installations will have approximately 15-20 applications.

Note: The <short path> is the 8.3 directory that you installed Office 2010 to. For example, if you installed Office 2010 to Q:\Office2010.014, the <short path> would be OFFICE~1.014. If possible, it is recommended to give the folder an

8.3 name such as OF2010.014. To determine the *<short path>* value, open a command prompt on the sequencing workstation and type **dir /x** on the root of Q:. Do not include the drive letter in the short path (in the example above, use %SFT_MNT%\OFFICE~1.014\Office14; an 8.3 name will yield a path like %SFT_MNT%\Office.014\Office 14).

Application Path	Name	Version	OSD File Name
%CommonProgramFiles%\Microsoft Shared\virtualization handler\VIRTUALSEARCHHOST.exe	Search MAPI Protocol Handler Host	14.0.6024.1000	Search MAPI Protocol 14.0.6024.1000.osd
%CommonProgramFiles%\Microsoft Shared\Virtualization Handler\VIRTUALOWSSUPPMANAGER.EXE	Microsoft SharePoint Client Support Manager	14.0.6024.1000	Microsoft SharePoint Client Support Manager 14.0.6024.1000.osd
%CommonProgramFiles%\Microsoft Shared\Virtualization Handler\MAPISERVER.EXE	Microsoft Virtual Office Simple Mapi Proxy Server	14.0.6024.1000	Microsoft Virtual Office Simple Mapi Proxy Server 14.0.6024.1000.osd
%windir%\system32\Control.exe %SFT_MNT%\<short path>\Office14\MLCFG32.CPL	Windows Control Panel	14.0.6024.1000	Windows Control Panel 14.0.6024.1000.osd
%SFT_MNT%\<short path>\Office14\MSOSYNC.EXE	Microsoft Office Document Cache	14.0.6024.1000	Microsoft Office Document Cache 14.0.6024.1000.osd

An alternate example for proxy applications, using a custom version and OSD file name is listed here:

Application Path	Name	Version	OSD File Name
%CommonProgramFiles%\Microsoft Shared\Virtualization Handler\VIRTUALSEARCHHOST.exe	Search MAPI Protocol Handler Host	2010-MNT	SearchMAPIProtocol_2010-MNT.osd
%CommonProgramFiles%\Microsoft Shared\Virtualization Handler\VIRTUALOWSSUPPMANAGER.EXE	Microsoft SharePoint Client Support Manager	2010-MNT	SharePointClientSupportManager_2010-MNT.osd
%CommonProgramFiles%\Microsoft Shared\Virtualization Handler\MAPISERVER.EXE	Microsoft Virtual Office Simple Mapi Proxy Server	2010-MNT	VirtualOfficeSimpleMapiProxyServer_2010-MNT.osd
%windir%\system32\Control.exe Q:\MicrosoftOffice2010_x86\Office\Office14\MLCFG32.CPL	Windows Control Panel	2010-MNT	WindowsControlPanel_2010-MNT.osd
Q:\MicrosoftOffice2010_x86\Office\Office14\MSOSYNC.EXE	Microsoft Office Document Cache	2010-MNT	OfficeDocumentCache_2010-MNT.osd

Set the Office Document Cache Application to Start Automatically

- I. While at the **Edit Shortcuts** screen, double-click the entry for **Microsoft Office Document Cache** on the right-hand side of the dialog.

- II. Double-click on Shortcuts under **Microsoft Office Document Cache** on the left-hand side of the dialog and click **Edit Locations...**
- III. Check **Start Menu** and type **Programs\Startup** in the text box. Click OK to return to the Edit Shortcuts dialog.
- IV. At the Edit Shortcuts dialog, click **Next**.

16. At the Prepare for Streaming page, launch your most frequently used applications once, and then close it down (Word, Excel, PowerPoint, etc.). Never launch Outlook, OneNote or SharePoint. Once complete, at the Streaming dialog, click **Next**.

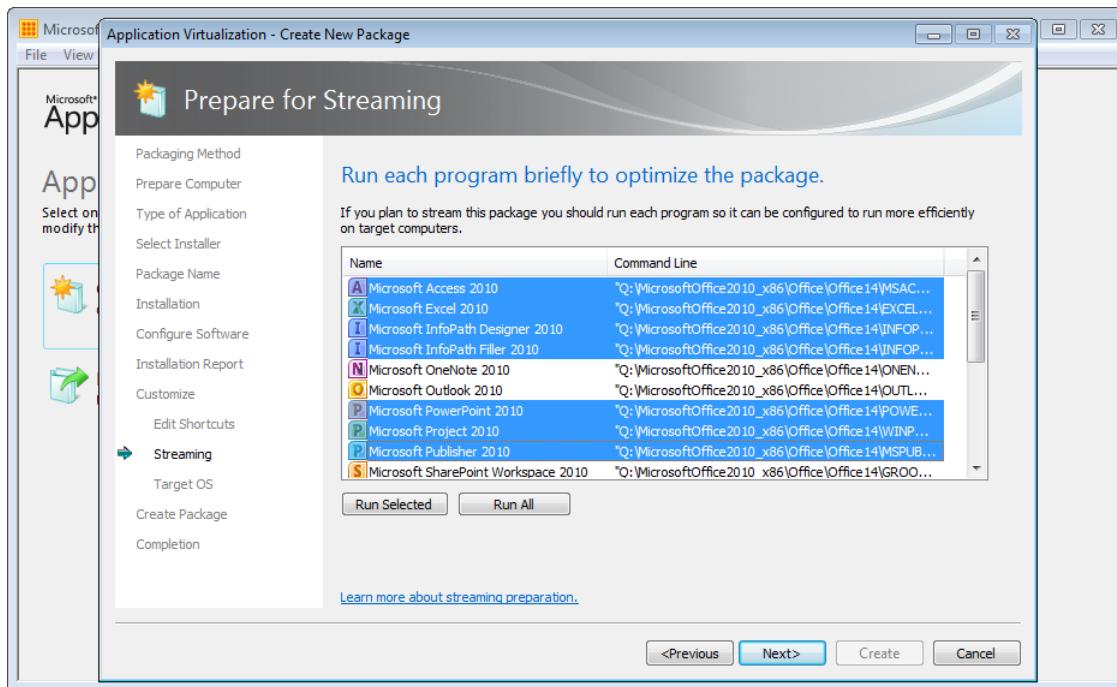


Figure 21: Creating the Primary Feature Block

17. At the Target OS page, choose the operating systems that the package will be allowed to execute on:

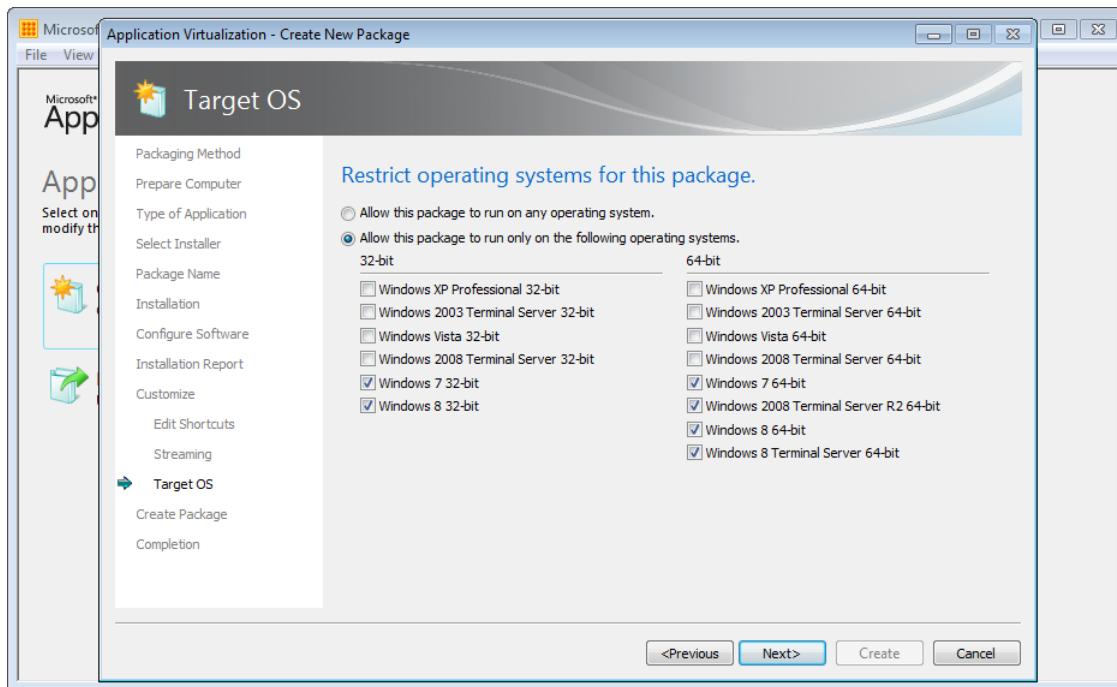


Figure 22: Selecting the target operating systems

Depending on your environment and your sequencing platform, you may wish to allow the package to execute on all operating systems. This will require sequencing on the lowest Windows version available in your environment. If a package does not then successfully execute on another operating system, re-sequence the package for that OS.

18. At this point, *do not save the package*, instead choose **Continue to modify package without saving using the package editor** and click **Next**. The Package Completed page will be shown. Click **Close** to show the package editor
19. On the Deployment tab, enter a path that adheres to your standards. The sequencing template will ensure that the Enforce Security Descriptors, Generate Microsoft Windows Installer package and Compress Package options are enabled.



If you have followed the recommendations outlined in this document for creating a Sequencer Template and scripting the steps for preparing the sequencing VM and installing and configuring the Office applications during the monitoring phase, the next steps will have largely been performed for you. Confirm that the package is configured correctly by following these next steps.

6.4.4 Registry setting for all installations

The Sequencer will display eight tabs. Select the **Virtual Registry** tab. Double-click **REGISTRY** on the left-hand side to expand the view of the registry. Verify that the following virtual registry key is set to Merge with Local.

- **MACHINE\Software\Microsoft\Office\14.0** (for 32-bit OSes)
- **MACHINE\Software\Wow6432Node\Microsoft\Office\14.0** (for 64-bit OSes)

Right-click the key, select **Key**, and check **Merge with Local Key**.

6.4.5 Registry setting for environments with Office 2007 or 2003 coexistence

If you are deploying your Office 2010 package to computers that already have Office 2007 or 2003 installed locally, use the steps in this section. Otherwise, skip this step and continue on to the next section.

Also, refer to the note on Microsoft Outlook co-existence in on [Known issues and limitations when using virtualized Office 2010 applications on App-V 4.6 and App-V 4.5 SP2 clients](#).

1. On the **Virtual Registry** tab, expand REGISTRY\USER on the left-hand side of the dialog and navigate to USER\%SFT_SID%\Software\Microsoft\Windows NT\CurrentVersion
2. Right-click **CurrentVersion**, click **Key** then click **New**.
3. Right-click the resulting **New Key 1** entry, click **Key** then click **Rename**.
4. Type **Windows Messaging Subsystem** for the new key name.
5. Select **Windows Messaging Subsystem** and repeat the steps above to create a sub-key named **Profiles** (i.e. the complete path will be REGISTRY\USER\%SFT_SID%\Software\Microsoft\Windows NT\CurrentVersion\Windows Messaging Subsystem\Profiles)
6. If you are sequencing on a 64-bit OS, create this registry key in addition:


```
REGISTRY\USER\%SFT_SID%\Software\WOW6432Node\Microsoft\Windows NT\CurrentVersion\Windows Messaging Subsystem\Profiles
```
7. Set the **Profiles** key to **Override Local Key**.

6.4.6 Configure Virtual Applications to Interact with the Local Environment

In this section, we will configure the LOCAL_INTERACTION_ALLOWED tag for all applications in the package.

Performing this step allows Office applications to share data and interact with the operating system and other applications.

1. Click on the OSD tab in the Sequencer.
2. Navigate to SOFTPKG\IMPLEMENTATION\VIRTUALENV\POLICIES\LOCAL_INTERACTION_ALLOWED
3. Highlight LOCAL_INTERACTION_ALLOWED and change the **Element Text:** to **TRUE** from the default setting of **FALSE**.
4. Click on the drop-down menu under **Select Application:** and select the next application in the list. Repeat the steps above for all applications in your Office package.



If you are using App-V to deploy Office 2010 to an existing environment with an earlier version of Office (for example, you are deploying Office 2010 as a pilot or Office 2010 is not the primary version of Office) and you want to ensure no conflicts between multiple versions of Office, ensure that LOCAL_INTERACTION_ALLOWED is set to **FALSE**. Note that this may cause Project 2010 to display a blank windows instead of the main application form – test in your environment.

6.4.7 Add Pre-Launch Scripts

If you have configured AutoRecover locations for Word, Excel and PowerPoint add the following script to the Word, Excel and PowerPoint OSD files:

```
<DEPENDENCY>
    <SCRIPT EVENT="LAUNCH" TIMING="PRE" WAIT="FALSE" PROTECT="FALSE">
        <SCRIPTBODY>
            MD "%LOCALAPPDATA%\Microsoft\PowerPoint" \n
            MD "%LOCALAPPDATA%\Microsoft\Excel" \n
            MD "%LOCALAPPDATA%\Microsoft\Word" \n
        </SCRIPTBODY>
    </SCRIPT>
</DEPENDENCY>
```

6.4.8 Save the Package

Click on **File** then **Save** to save the package. Use these guidelines for saving the Office package:

- Use the same text for the Package Name on the Properties tab and the Path on the Deployment tab (e.g. MicrosoftOffice2010_x86_v1)
- Save the package to a local disk in the Sequencer. It is recommended that you save the package to the same parent folder that contains the Office setup files (e.g. C:\Packages)
- Save the package to a sub-folder that is the same as the Package Name and Path set in the package (e.g. C:\Packages\MicrosoftOffice2010_x86_v1)
- Save the Sequencer Project with the same name as the package (e.g. MicrosoftOffice2010_x86_v1)
- Copy the package out of the sequencing VM to the Content share on your network
- Revert the sequencing virtual machine to your saved snapshot

6.5 Step 4: Configure a Client Computer to Run Virtualized Office 2010

Follow the steps in this section on the App-V client computer. To install the Microsoft Office 2010 Deployment Kit for App-V on the client, you will run OffVirt.MSI twice. The first command configures licensing mode; the second will configure Office proxies.



The OffVirt.MSI commands **must** be run separately – once for licensing and again for proxies. You cannot create a single command line to perform both operations. If you combine the commands during install, you will need to uninstall the Deployment Kit to fix.

For electronic software delivery (ESD) platforms such as Microsoft System Center Configuration Manager 2007 or 2012, add the **/quiet** switch to the MSIEXEC command line to run non-interactively. Refer to the Licensing flags under section 6.3.4 for details about the command line parameters.

6.5.1 Install the Microsoft Office 2010 Deployment Kit for App-V - Licensing

1. Download the correct version of [Microsoft Office 2010 Deployment Kit for App-V](#) for the correct target processor architecture. Extract the installer to obtain the included Windows Installer files.
2. Open an elevated command prompt by right clicking on Start\All Programs\Accessories\Command Prompt and choosing **Run as administrator**.
3. Navigate to the folder you created above in the command prompt (e.g. type **CD C:\OFFVIRT**).
4. Type the following command in the elevated command prompt:

```
MSIEXEC/i OffVirt.msi [licensing flags]
```

[licensing flags] is the same set of licensing flags that were specified during sequencing. Do not specify any feature flags at this time.

Example 1: If you will use Office 2010 Professional Plus with KMS activation, run the following command on the App-V client:

```
MSIEXEC/i OffVirt.MSI PROPLUS=1
```

Example 2: Use this command for KMS activation for an Office Professional Plus package that will also include Visio and Project:

```
MSIEXEC/i OffVirt.MSI PROPLUS=1 PROJECTPRO=1 VISIOPRO=1
```

Example 3: If you specified feature flags of PROPLUS=1 during sequencing for a MAK client that will obtain its keys via VAMT 2.0, on the App-V client run:

```
MSIEXEC/i OffVirt.MSI PROPLUS=1 USEROPERATIONS=1
```

Example 4: MAK client with VAMT 2.0 infrastructure (recommended for MAK clients):

```
MSIEXEC/i OffVirt.MSI PROPLUS=1 USEROPERATIONS=1
```

Example 5: MAK client with a product key specified for an Office suite and separate application (e.g. Project) in the same package:

```
MSIEXEC/i OffVirt.msi PIDKEYS=XXXXXX-XXXXXX-XXXXXX-XXXXXX;YYYYYY-YYYYYY-YYYYYY-YYYYYY-YYYYYY  
USEROPERATIONS=1
```

6.5.2 Mixed activation (KMS and MAK in the same environment)

If you want some client computers to use KMS activation, but other client computers to use MAK, do the following:

- Use the KMS flags to install KMS client keys (e.g. run MSIEXEC/i OffVirt.MSI PROPLUS=1)
- Use VAMT 2.0 to install the MAK key after the deployment.

6.5.3 Install the Microsoft Office 2010 Deployment Kit for App-V - Proxies

After the license flags have configured, configure Office proxies on the client workstation. This step configures the client to be able to take advantage of features such as Outlook integration, accessing SharePoint sites from Office, and enabling search in Outlook. To do this, binary components and registry key modifications must be made to the host OS.

To successfully run the command line in this section, you will need to construct a command line based on settings in your Office package. The general syntax is as follows (this is a single command line):

```
MSIEXEC/i OffVirt.msi
ADDDEFAULT=Click2runOneNoteProxy,Click2runOutlookProxies,Click2runWDSProxy,Click2runOWSSuppProxies
PACKAGEGUID={SFT package GUID} PACKAGEVERSION=versions found in OSD files for proxies,
Outlook, and OneNote OUTLOOKNAME=app name for Outlook from OSD ONENOTENAME=app name for OneNote
from OSD MAPISERVER=MAPI proxy app name VIRTUALSEARCHHOST=Search proxy app name MLCFG32CPL=app
name for virtual mail configuration OWSSUPPSERVER=app name for SharePoint proxy
```

Breaking this command down into a format that's a little easier to read:

- **ADDDEFAULT**=Click2runOneNoteProxy,Click2runOutlookProxies,Click2runWDSProxy,Click2runOWSSuppProxies
- **PACKAGEGUID**={SFT package GUID}
- **PACKAGEVERSION**={versions found in OSD files for proxies, Outlook, and OneNote}
- **OUTLOOKNAME**=(app name for Outlook from OSD)
- **ONENOTENAME**=(app name for OneNote from OSD)
- **MAPISERVER**=(MAPI proxy app name)
- **VIRTUALSEARCHHOST**=(Search proxy app name)
- **MLCFG32CPL**=(app name for virtual mail configuration)
- **OWSSUPPSERVER**=(app name for SharePoint proxy)

Individual command line settings will need to be verified in your environment:

1. **MSIEXEC/i OffVirt.msi** - this is the main command line. It assumes that you are in the working directory where OffVirt.msi is located. If not, specify the full path to OffVirt.msi.
2. **ADDDEFAULT=Click2runOneNoteProxy,Click2runOutlookProxies,Click2runWDSProxy,Click2runOWSSuppProxies** - this section does not usually need to be modified; however if you do not wish to install any or some of the integration components, remove or modify the property as required
3. **PACKAGEGUID={SFT_package_GUID}** - the package GUID is identical for all applications in the package. Open any OSD from your Office package in Notepad and located the line <SOFTPKG GUID= in the .OSD file.

Record the GUID and replace **SFT_package_GUID** with this number. Note that the OSD will record the number in quotation marks; the command line requires that you place the number in curly brackets ({}). For example:

```
<SOFTPKG GUID="7DEE47AD-B420-3488-867D-186577DA9539"
```

Becomes:

```
PACKAGEGUID={7DEE47AD-B420-3488-867D-186577DA9539}
```

4. **PACKAGEVERSION** - this is the package version you entered in the section "Step 3: Configure Applications - Add Proxies and Modify Applications" during sequencing. Verify this by opening any OSD in Notepad and locating the line that looks like this: **<SOFTPKG GUID="7DEE47AD-B420-3488-867D-186577DA9539" NAME="Microsoft Access 2010" VERSION="14.0.6024.1000">**. Copy the VERSION attribute without the quotes. In this example, you would construct the command line **PACKAGEVERSION=14.0.6024.1000**.
5. **OUTLOOKNAME, ONENOTENAME, MAPISERVER, VIRTUALSEARCHHOST, MLCFG32CPL, OWSSUPPSERVER** - These command-line variables are constructed from specific values in the application's OSD configuration file. Locate the OSD in your package that corresponds to Outlook.exe. To identify this file, search the OSDs in your package for the string **Outlook.exe**. Open the OSD file in Notepad and verify the FILENAME attribute of the CODEBASE tag. For example: **FILENAME="OFF2K10.001\Office14\OUTLOOK.EXE"**. Above this value, locate the <SOFTPKG> tag. Record the name of **NAME** field from this tag. Use the value of NAME in your command line. For example, **<SOFTPKG GUID="AB404D53-3EB3-4D2D-9EC7-4513687FFA1E" NAME="Microsoft Outlook 2010"** yields the command line variable **OUTLOOKNAME="Microsoft Outlook 2010"**. Repeat this process for all components using the following table:

Variable	Executable in FILENAME
OUTLOOKNAME	OUTLOOK.EXE
ONENOTENAME	ONENOTE.EXE
MAPISERVER	mapiserver.exe
VIRTUALSEARCHHOST	virtualsearchhost.exe
MLCFG32CPL*	control.exe
OWSSUPPSERVER	virtualowssuppmanager.exe

*verify that PARAMETERS references "mlcfg32.cpl"; for example:-

```
PARAMETERS="%SFT_MNT%\OFF2K10.001\Office14\mlcfg32.cpl" FILENAME="%windir%\system32\control.exe"
```

1. Open an elevated command prompt by right clicking on Start\All Programs\Accessories\Command Prompt and choosing **Run as administrator**.
2. Run the command line you constructed above.

For example:

```
MSIEXEC/i OffVirt.msi
ADDDEFAULT=Click2runOneNoteProxy,Click2runOutlookProxies,Click2runWDSProxy,Click2runOWSSuppProxies
PACKAGEGUID={5971AF75-7831-4AE9-906F-0F30C7DD0CA5} PACKAGEVERSION=14.0.6024.1000
```

```
OUTLOOKNAME="Microsoft Outlook 2010" ONENOTENAME="Microsoft OneNote 2010" MAPISERVER="Microsoft Virtual Office Simple Mapi Proxy Server" VIRTUALSEARCHHOST="Search MAPI Protocol Handler Host" MLCFG32CPL="Windows Control Panel" OWSSUPPSERVER="Microsoft SharePoint Client Support Manager"
```

Note Registration of each component as shown above is required due to dependencies between proxy components.



The Deployment Kit **must** be deployed to client PCs before users can use the Office 2010 package. It can be deployed manually (as shown here) or via software deployment tools such as System Center Configuration Manager, the Microsoft Deployment Toolkit or Group Policy Software Installation. Deploying the Kit via a script in the Office package is not a suitable approach, because the script will execute as the user and will thus not have administrative rights to the target workstation.

6.6 Step 5: Deploy the Office 2010 Package

The Office 2010 package is now ready to deploy via your chosen deployment method. Deploying Office 2010 via App-V can be achieved using any of the supported deployment methods. See this article on TechNet for more information on deployment options: [Planning and Deployment Guide for the Application Virtualization System](#)

To enable full functionality provided by the Deployment Kit (for example, the Print To OneNote feature), the Office 2010 package must be deployed to the machine (global) rather than targeting the user.

For Configuration Manager this means that:

- You must target your advertisement for the Office 2010 package to machines
- You cannot target your advertisement for the Office 2010 package to users

If you are using deployment via App-V Full Infrastructure (the App-V Management Server), deployment will need to be performed by other means. To deploy the Office 2010 package via a script use a command similar to this:

```
SFTMIME ADD PACKAGE:"MicrosoftOffice2010_x86_v1" /MANIFEST \\\app-v.management.server\Content\MicrosoftOffice2010_x86_v1\ MicrosoftOffice2010_x86_v1.manifest.xml /GLOBAL
```

7 Sequencing Office 2007

Building the sequencing VM has been covered in a previous section, so this section will cover the following high-level steps that need to be followed when sequencing Office 2007:

1. Create a customised Office 2007 deployment
2. Sequence and update Office 2007
3. Configure the Office 2007 package
4. Save and Deploy the package

IMPORTANT: Before starting to sequence, it strongly suggested to read this guide completely in order to understand the configuration options available.

7.1 Prerequisites

You will need the following software to use this guide:

- **Microsoft Application Virtualization version 4.6 SP1:** The [App-V 4.6 SP1](#) Sequencer is installed on the Sequencing workstation. It is strongly recommended to apply the latest App-V Sequencer updates.

For a complete list of available App-V versions (client, server and Sequencer), see [current versions of App-V 4.x](#). At the time of writing, the latest version of the App-V 4.6 SP1 Sequencer is 4.6.1.30091 as updated with App-V 4.6 SP1 Hotfix Rollup 3: <http://support.microsoft.com/kb/2571168>

- **Microsoft Office 2007 volume SKU.** This can be the entire Office 2007 suite or individual Office applications (e.g. Visio or Project). The volume SKU provides the necessary product activation options for virtualizing Office. This may be deployed to either 32 or 64-bit operating systems.
- **2007 Office Suite Service Pack 3:** Download the service pack from here:
<http://support.microsoft.com/kb/2526086>

If additional applications are to be virtualized, these should be included in the Office 2007 package. Installers for the following would be required:

- Microsoft Office Communicator 2007
- Microsoft Office Live Meeting

7.2 Step 1: Creating a customised Office 2007 deployment

7.2.1 Creating a custom installation

This section outlines the key steps for creating a customization file, however you can read about [customizing your Office 2010 deployment](#) in more detail on TechNet.

- Start the Office Customization Tool (SETUP /ADMIN) and create a new file or [open an existing file for modifying](#).

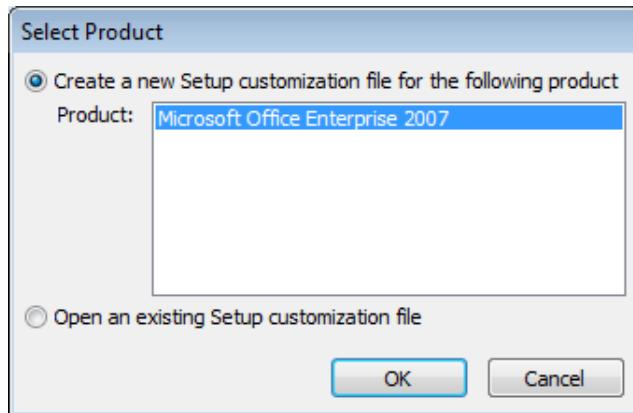


Figure 23: Creating a new or opening an existing customization file

- Change the installation path to a path on the Q: drive – the default installation path is `[ProgramFilesFolder]\Microsoft Office`, so a recommended path for virtualizing Office with App-V 4.6 SP1 might be `Q:\MicrosoftOffice2007_x86\Microsoft Office` or `Q:\MicrosoftOffice2007_x86\Office`.

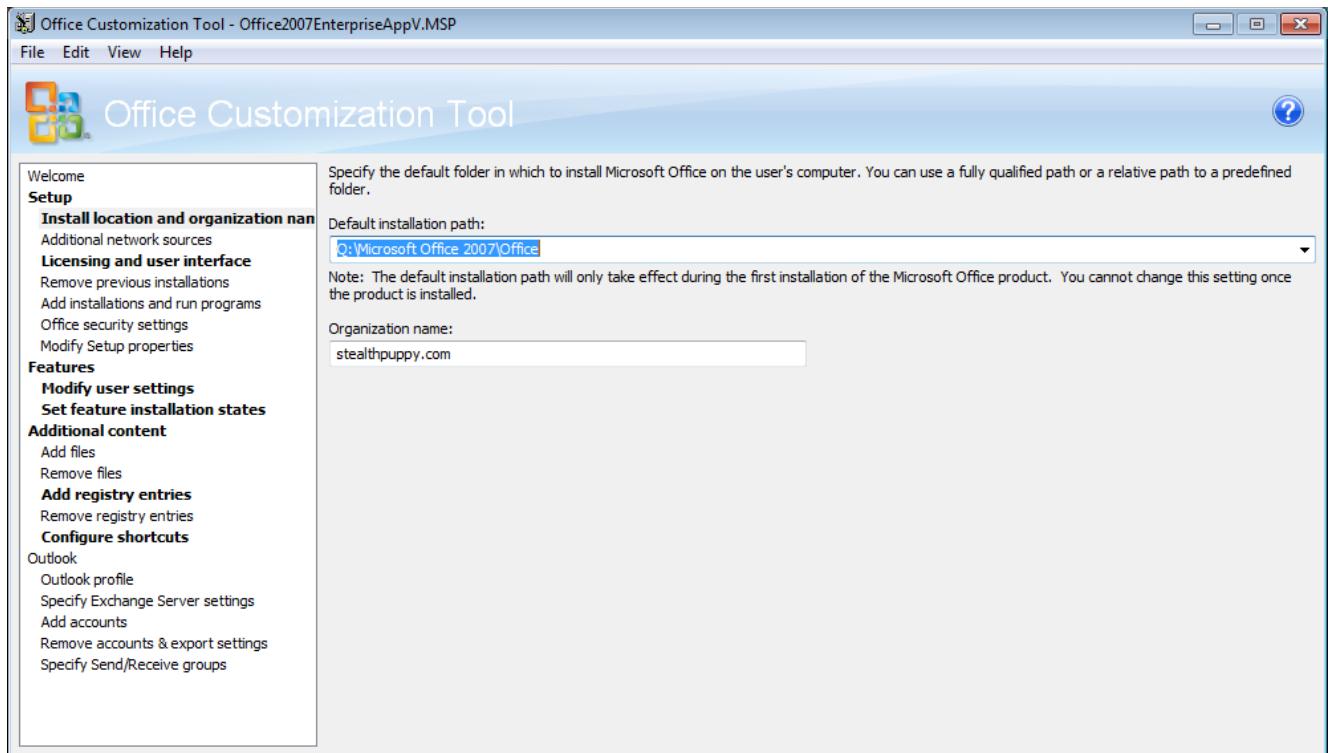


Figure 24: Change the default installation path and edit the organization name

- Accept the license agreement and choose the type of user interface that setup will display during installation and sequencing.

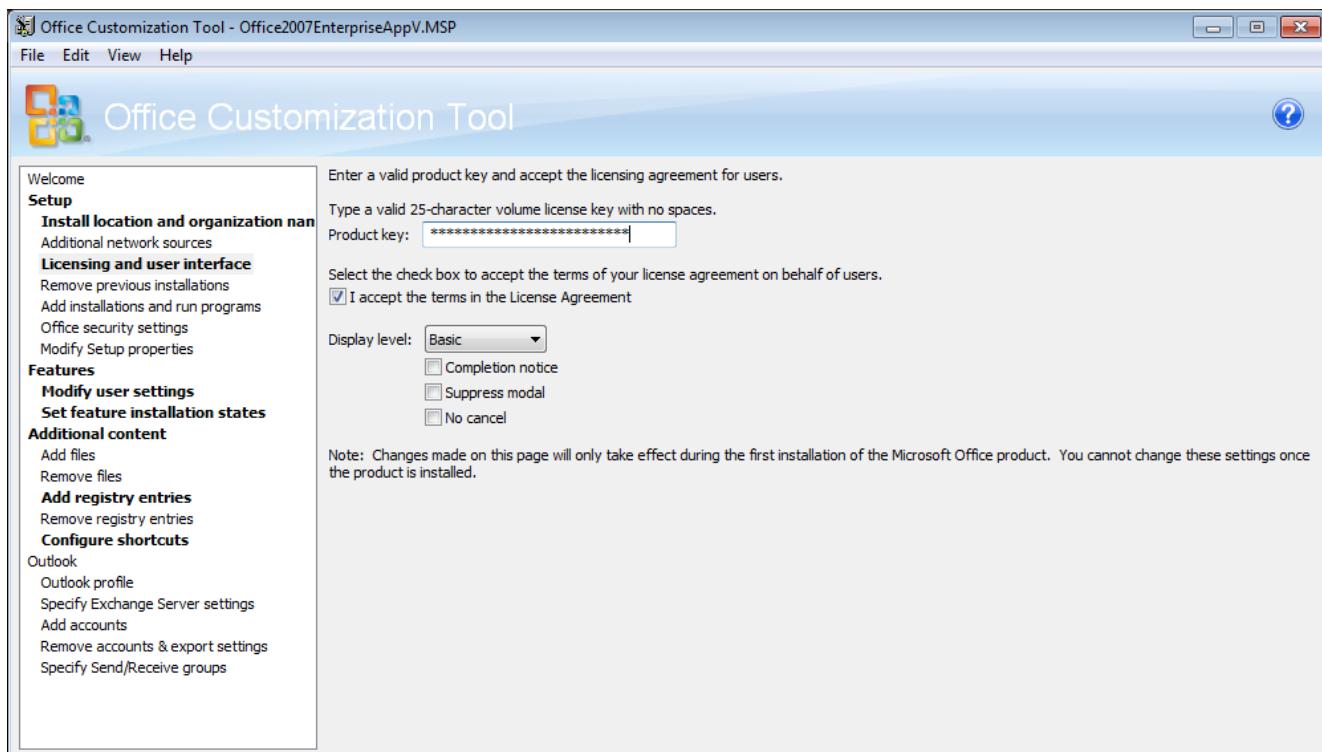


Figure 25: Configure licensing and user interface options during install

4. One of the most important (and time consuming) aspects of the customization file is modifying the default user settings. What you set here will depend on the environment you are deploying to, but it's worth investing in some time to get these default settings correct.

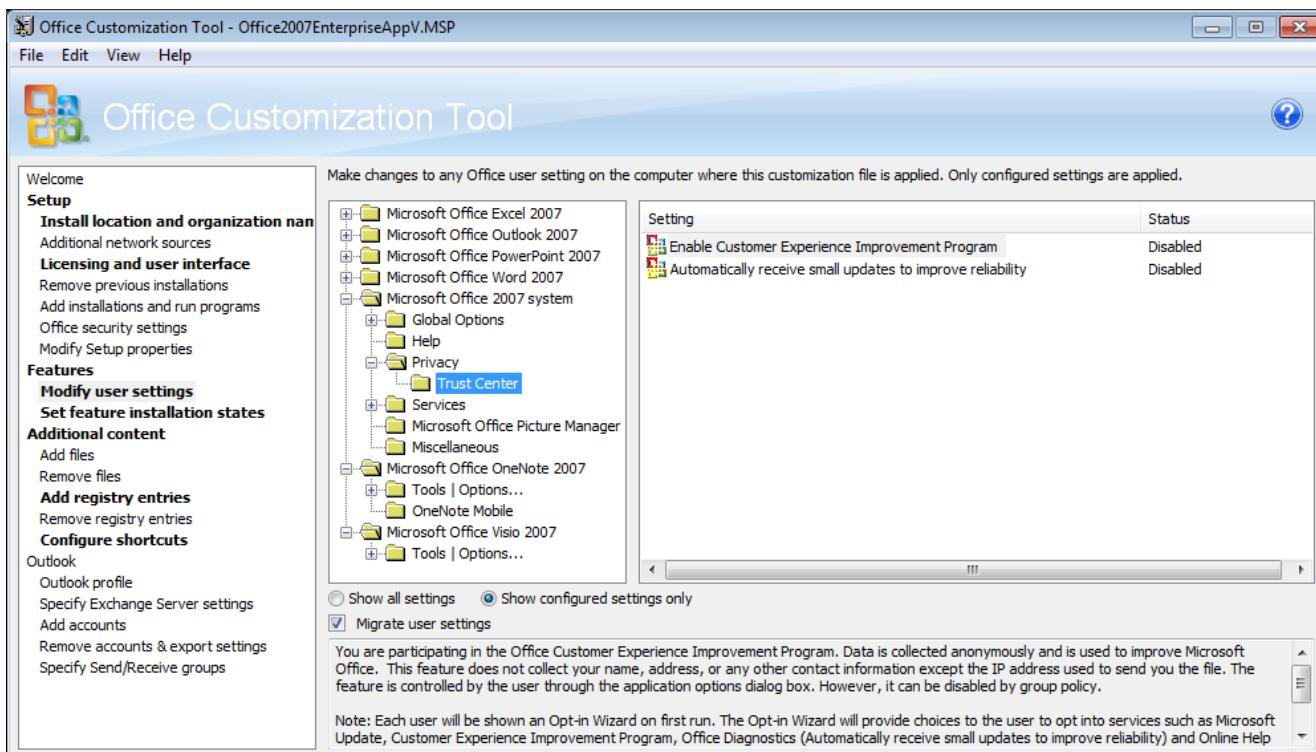


Figure 26: Add important user settings

By modifying these settings in the customization file, users can get up and running with Office 2007 applications sooner; however treat these as default preferences. Group Policy should be used to enforce settings, not set defaults – the less settings you have in Group Policy the better (less time spent processing policies at logon).

Recommended user customisations to set via the Office Customization Wizard, with important settings for virtual environments highlighted:

Product	Path	Setting	Value
Excel	Excel Options - Save	Save Excel files as	Enabled, Excel Workbook (*.xlsx)
Excel	Excel Options - Save	AutoRecover save location	Enabled %LOCALAPPDATA%\Microsoft\Excel
Outlook	Outlook Options - Other – AutoArchive	Disable File Archive	Disabled
Outlook	Outlook Options - Other – AutoArchive	AutoArchive Settings	Disabled
PowerPoint	PowerPoint Options - Save	Save files in this format	Enabled, PowerPoint Presentation (*.pptx)
Word	Word Options - Save	Save files in this format	Enabled, Word Document (*.docx)
Office	Global Options - Customize	Always show full menus	Enabled
Office	Help	Microsoft Office Online	Enabled (can leave URL blank)
Office	Privacy - Trust Center	Enable Customer Experience Improvement Program	Disabled
Office	Privacy - Trust Center	Automatically receive small updates to improve reliability	Disabled
Office	Services - Fax	Disable Internet Fax feature	Enabled
Office	Microsoft Office Picture Manager	Disable File Types association dialog box on first launch	Enabled
Office	Miscellaneous	Block updates from the Office Update Site from applying	Enabled
OneNote	OneNote Options - Other	Add OneNote icon to the notification area	Disabled
OneNote	OneNote Mobile	Disable OneNote Mobile install notifications	Enabled
Project	Project Options - Save	Save Microsoft Office Project files as	Enable, Project (*.mpp)
Visio	Visio Options - Advanced - Advanced Options	Put all settings in Windows registry	Enabled

- Like user settings, feature installation states will impact the default Office experience, so you will need to know in advance which features you are deploying. All features must be set to 'Run from My Computer' or 'Not Available' only.

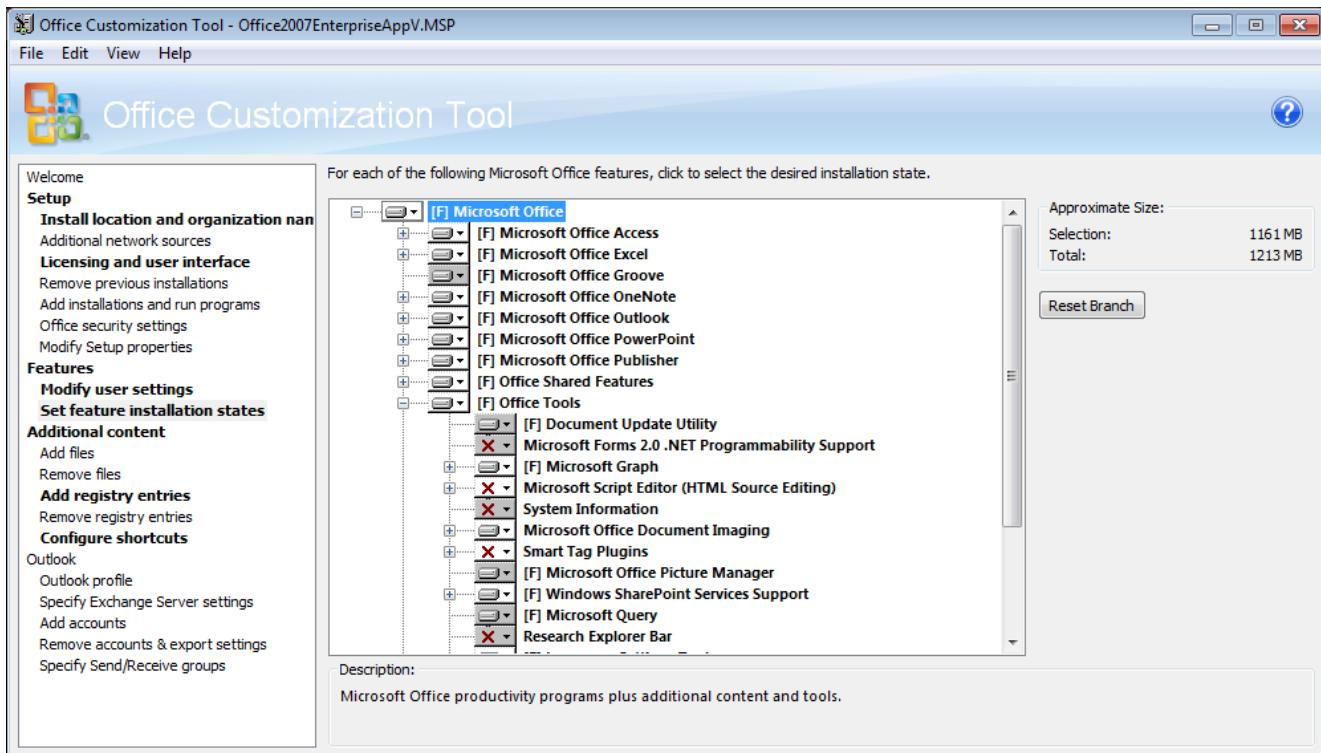


Figure 27: Configure the feature installation states

Like user settings, feature installation states will impact the default Office experience, so you will need to know in advance which features you are deploying. For various reasons, there are a number of features that you might consider disabling when virtualizing Office:

- Microsoft Outlook – only a single copy of Outlook is supported on an end-point
- .NET Programmability Support – this may be required by Office add-ins, which can be delivered via DSC; however an external, custom application will not have access to this support, unless it is run within the Office package
- Microsoft OneNote / Send to OneNote Add-ins / Internet Explorer Integration – this feature will not be available from Internet Explorer unless it runs from within the Office package
- Microsoft OneNote / OneNote Mobile – synchronization components will need to exist outside of the App-V package. Note this component is for Windows Mobile devices only
- Office Shared Features / Microsoft Office Download Control – this feature will not be available from Internet Explorer unless it runs from within the Office package
- Microsoft Office Visio Viewer – this feature will not be available from Internet Explorer unless it runs from within the Office package
- Office Tools / Microsoft Office Document Imaging – this includes a filter and a virtual printer that cannot be virtualized

- Office Tools / Research Explorer Bar – this feature will not be available from Internet Explorer unless it runs from within the Office package
6. To avoid manual registry updates during sequencing, add the following registry entries to the 'Add registry entries' page:

Root	Key	Value name	Value data
HKCU	Software\Classes\{AB968F1E-E20B-403A-9EB8-72EB0EB6797E}	DisableDetection	1
HKCU	Software\Microsoft\Office\Common\OfficeUpdate	BlockUpdates	1
HKCU	Software\Microsoft\Office\12.0\General	ShownOptIn	1
HKCU	Software\Microsoft\Office\12.0\Toolbars	QuickAccessToolbarRoaming	1
HKCU	Software\Microsoft\Windows\Windows Search\Preferences	PreventIndexingOutlook	1

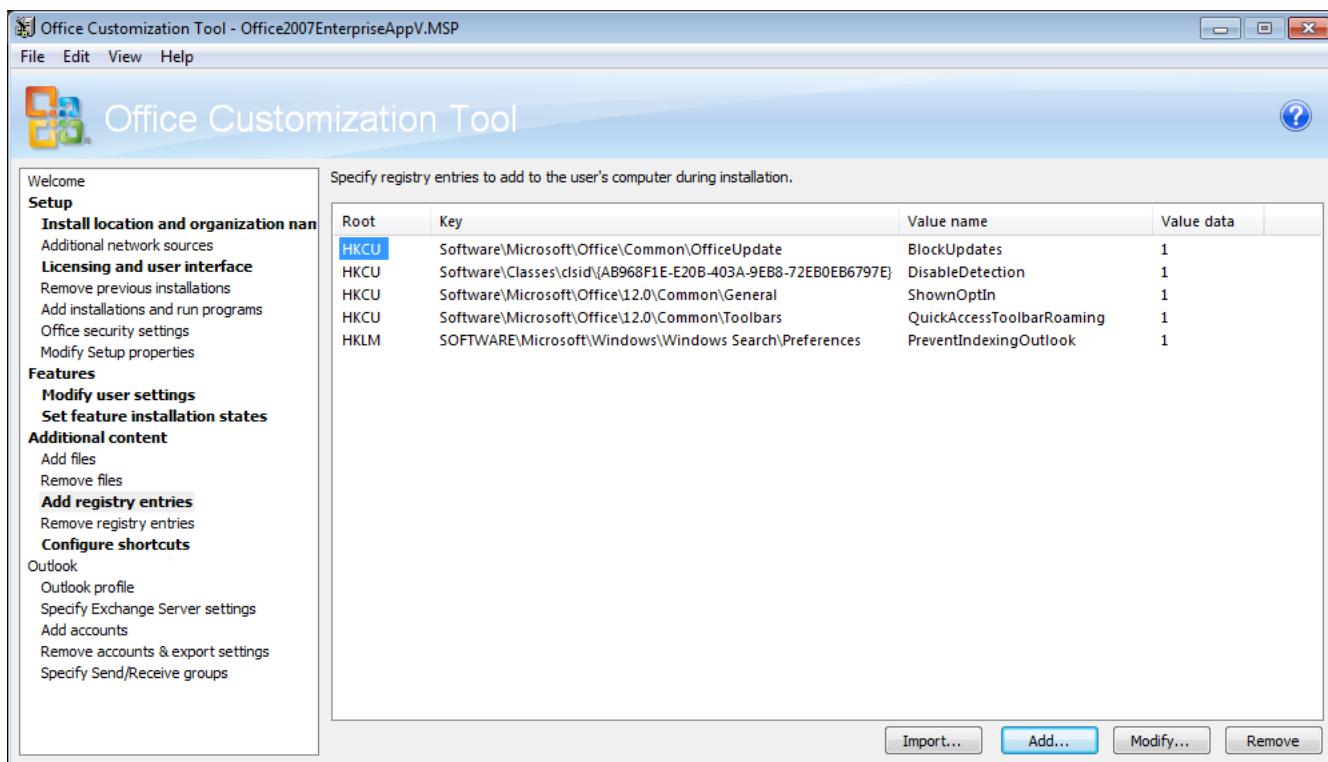


Figure 28: Add required registry entries

These entries will disable user prompts and update options that are not suitable for Office when virtualized.

7. Configure the Office shortcuts as you would like them to appear on the client. Ensure no conflicts between local shortcuts or shortcuts from other Office packages. For example, set the path to
<StartMenu\Programs>\Microsoft Office 2007

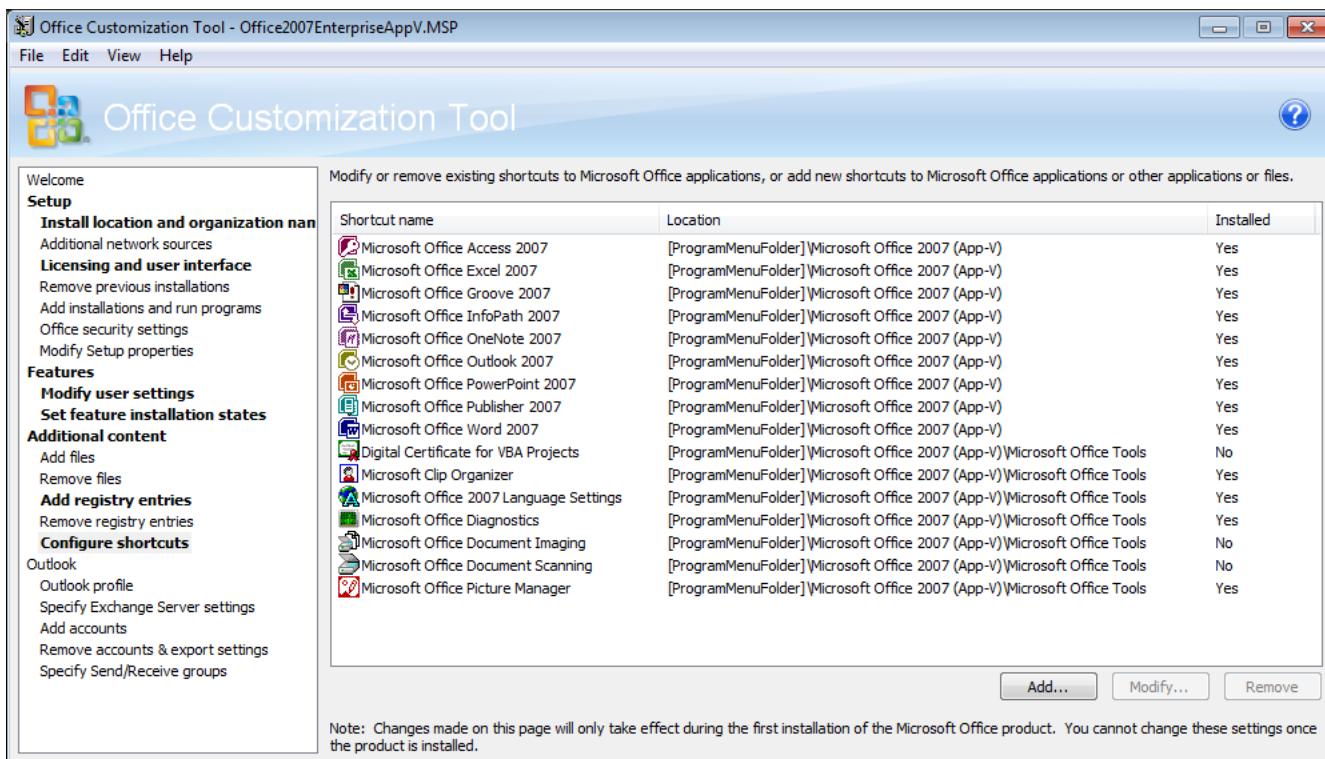


Figure 29: Configure shortcuts and locations

8. Complete any other customisations required for your environment and save the customisation file along with the Office 2007 setup files.

7.2.2 Automating Office Setup during Sequencing

Now that you have an automated Office 2007 deployment, we can go a step further and automate the entire installation and configuration process of Office 2007 during sequencing. This can be done with a simple batch file that will complete many of the manual steps automatically.

The script below will perform the following tasks:

- Install the Office 2007 suite along with Visio 2007
- Create the Office user profile folders to ensure they are captured in the virtual environment
- Make some required registry changes
- Start each Office application to complete first run tasks
- Start Windows Update to allow the sequencing engineer to install Office updates

```

1  @ECHO OFF
2  SET SOURCE=%CD%
3
4  REM Install Office 2007
5  PUSHD %CD%\Office2007.Ent
6  START /WAIT SETUP.EXE /ADMINFILE %SOURCE%\Office2007EnterpriseAppV.MSP
7  POPD
8
9  REM Install Visio 2007
10 PUSHD %CD%\Visio2007.Pro

```

```
11 START /WAIT SETUP.EXE /ADMINFILE %SOURCE%\Visio2007ProAppV.MSP
12 POPD
13
14 REM Create the Office folders in the user profile
15 MD "%APPDATA%\Microsoft\AddIns"
16 MD "%APPDATA%\Microsoft\Bibliography"
17 MD "%APPDATA%\Microsoft\Clip Organizer"
18 MD "%APPDATA%\Microsoft\CLView"
19 MD "%APPDATA%\Microsoft\Document Building Blocks"
20 MD "%APPDATA%\Microsoft\Excel"
21 MD "%APPDATA%\Microsoft\Forms"
22 MD "%APPDATA%\Microsoft\InterConnect"
23 MD "%APPDATA%\Microsoft\MS Project"
24 MD "%APPDATA%\Microsoft\Office"
25 MD "%APPDATA%\Microsoft\OneNote"
26 MD "%APPDATA%\Microsoft\Outlook"
27 MD "%APPDATA%\Microsoft\PowerPoint"
28 MD "%APPDATA%\Microsoft\Proof"
29 MD "%APPDATA%\Microsoft\Publisher"
30 MD "%APPDATA%\Microsoft\Publisher Building Blocks"
31 MD "%APPDATA%\Microsoft\Queries"
32 MD "%APPDATA%\Microsoft\QuickStyles"
33 MD "%APPDATA%\Microsoft\SharePoint Designer"
34 MD "%APPDATA%\Microsoft\Signatures"
35 MD "%APPDATA%\Microsoft\Stationery"
36 MD "%APPDATA%\Microsoft\Templates"
37 MD "%APPDATA%\Microsoft\UProof"
38 MD "%APPDATA%\Microsoft\Word"
39 MD "%APPDATA%\Microsoft\Media Catalog"
40 MD "%APPDATA%\Microsoft\Graph"
41 MD "%APPDATA%\Microsoft\InfoPath"
42 MD "%APPDATA%\Microsoft\Themes"
43 MD "%APPDATA%\Microsoft\OIS"
44 MD "%APPDATA%\Microsoft\VSTAHost"
45 MD "%APPDATA%\Microsoft\VSCommon"
46 MD "%APPDATA%\Microsoft\VSTA"
47 MD "%APPDATA%\Microsoft\Web Server Extensions"
48 MD "%APPDATA%\Microsoft\IMJP10"
49 MD "%APPDATA%\Microsoft\IME12"
50 MD "%APPDATA%\Microsoft\IMJP8_1"
51 MD "%APPDATA%\Microsoft\IMJP9_0"
52 MD "%APPDATA%\Microsoft\IMJP12"
53
54 REM Set AutoRecover locations to the local AppData folder
55 MD "%LOCALAPPDATA%\Microsoft\PowerPoint"
56 REG ADD "HKCU\Software\Microsoft\Office\12.0\PowerPoint\Options" /v PathToAutoRecoveryInfo /d "%LOCALAPPDATA%\Microsoft\PowerPoint\\\" /f
57 MD "%LOCALAPPDATA%\Microsoft\Excel"
58 REG ADD "HKCU\Software\Microsoft\Office\12.0\Excel\Options" /v AutoRecoverPath /d "%LOCALAPPDATA%\Microsoft\Excel\\\" /f
59 MD "%LOCALAPPDATA%\Microsoft\Word"
```

```

60 REG ADD "HKCU\Software\Microsoft\Office\12.0\Word\Options" /v AUTOSAVE-PATH /d
  "%LOCALAPPDATA%\Microsoft\Word\\\" /f
61
62 REM Create the Outlook profile key inside the package
63 REG ADD "HKCU\Software\Microsoft\Windows NT\CurrentVersion\Windows Messaging
  Subsystem\Profiles" /f
64
65 REM Start the Office applications for first-run tasks
66 PUSHD "Q:\Microsoft Office 2007\Office\OFFICE12"
67 IF EXIST SETLANG.EXE START /WAIT SETLANG.EXE
68 IF EXIST WINWORD.EXE START /WAIT WINWORD.EXE
69 IF EXIST EXCEL.EXE START /WAIT EXCEL.EXE
70 IF EXIST POWERPNT.EXE START /WAIT POWERPNT.EXE
71 IF EXIST MSACCESS.EXE START /WAIT MSACCESS.EXE
72 IF EXIST MSPUB.EXE START /WAIT MSPUB.EXE
73 IF EXIST INFOPATH.EXE START /WAIT INFOPATH.EXE
74 IF EXIST WINPROJ.EXE START /WAIT WINPROJ.EXE
75 IF EXIST VISIO.EXE START /WAIT VISIO.EXE
76 IF EXIST OIS.EXE START /WAIT OIS.EXE
77 IF EXIST MSTORE.EXE START /WAIT MSTORE.EXE
78 POPD
79
80 REM Run Windows Update to update Office
81 %windir%\system32\wuapp.exe startmenu

```

Save this script as **Install-Office2007.CMD** into the same folder as the Office 2007 setup files. Once saved into the sequencing VM, the source folder will look something like this:

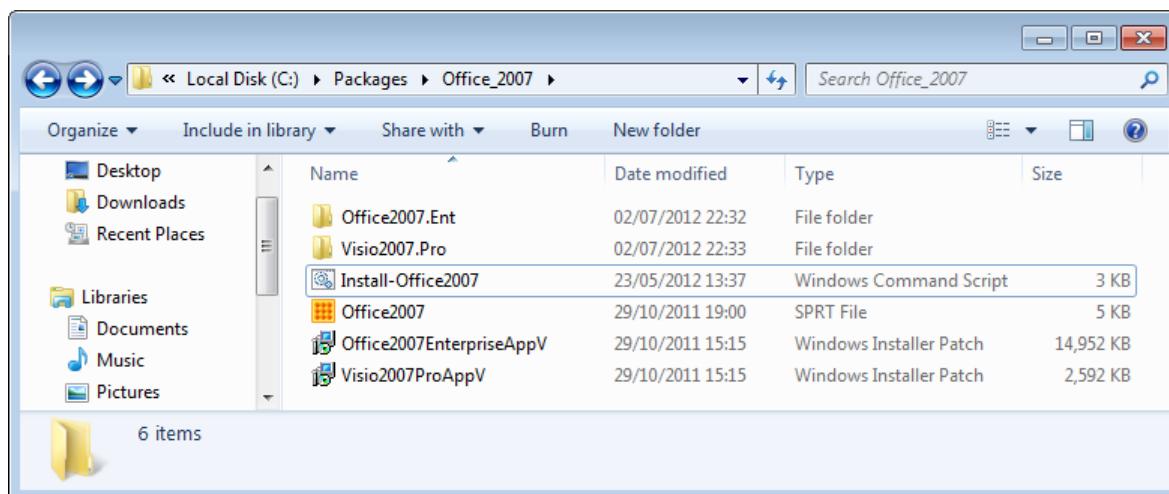


Figure 30: Office setup files, customisation files and scripts in the sequencing VM

7.3 Step 2: Sequence and Update Microsoft Office 2007

After copying the Office 2007 setup files into the sequencing VM, shutdown the virtual machine and create a snapshot. This will allow you to revert to a clean state if you need to restart the sequencing process.

To sequence Office 2007, follow these steps:

20. Launch the App-V 4.6 SP1 Sequencer
21. Select **File / New from Template** from the drop down menu, and choose your Sequencer Template file
22. Select **Create Package (default)** then click **Next**

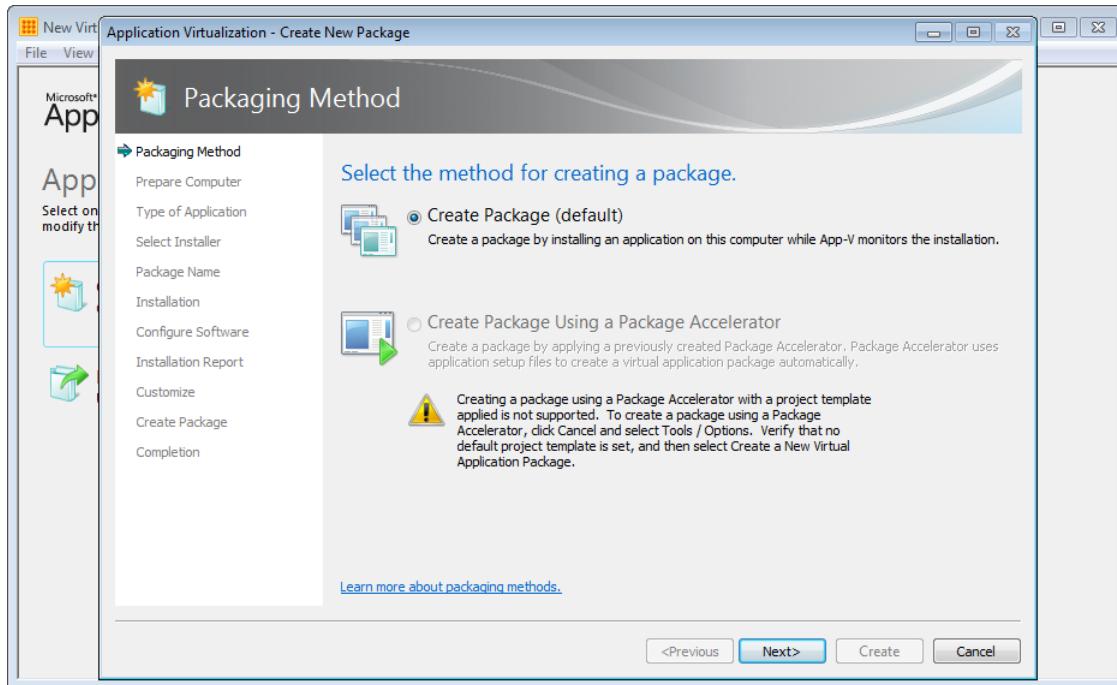


Figure 31: Select the packaging method

23. On the **Prepare the computer for creating a virtual package** dialog, follow the instructions to correct any warning messages and then click **Next**
24. On the **Describe the type of application you want to package** dialog, select **Standard Application (default)**, then click **Next**.

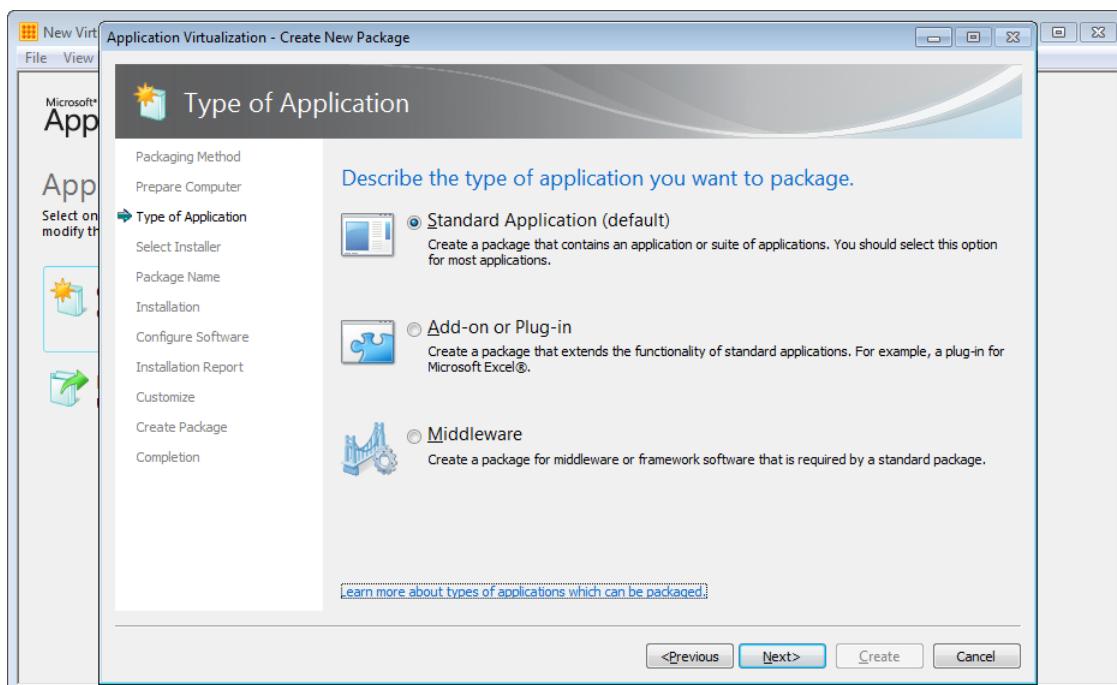


Figure 32: Application types - choose Standard Application

25. On the **Select Installer** dialog, select **Browse** and locate the script that will automate the installation and configuration steps for Office. Alternatively, choose C:\Windows\System32\CMD.EXE to launch a Command Prompt during the monitoring phase to launch the script from there. Then click **Next**.

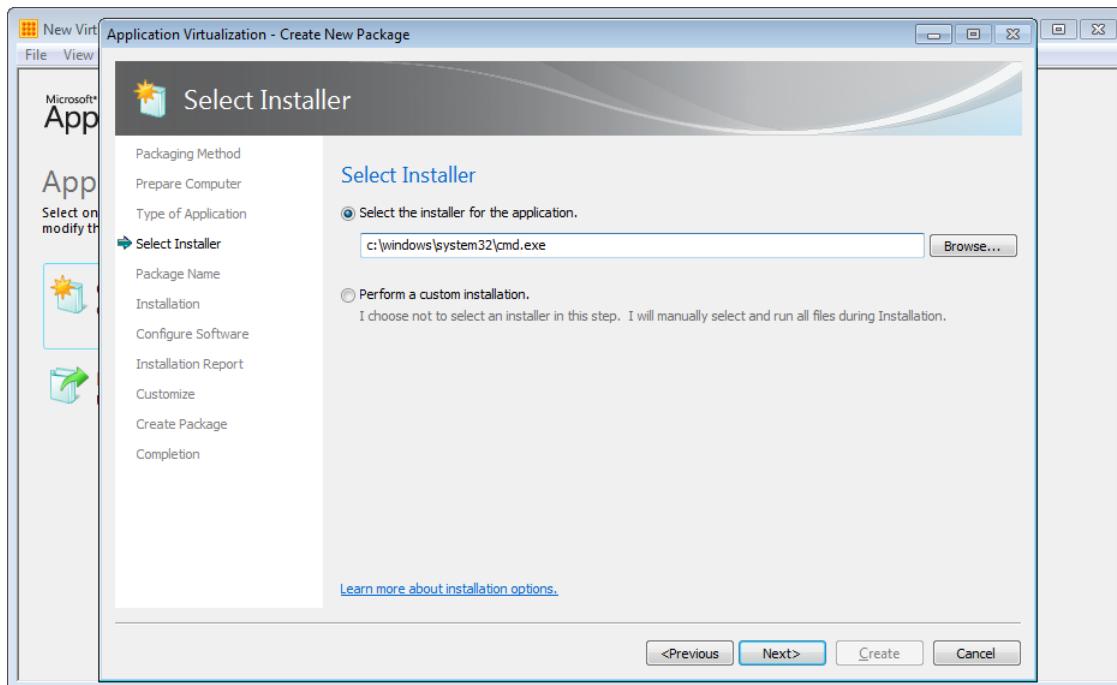


Figure 33: Select the installer - use a script or Command Prompt

26. On the **Package Name** dialog, give the package a descriptive name. Notice that the folder on Q:\ that will serve as the application root is automatically filled in. If you need to change it, select *Edit (advanced)* and enter a different path. Click **Next**.

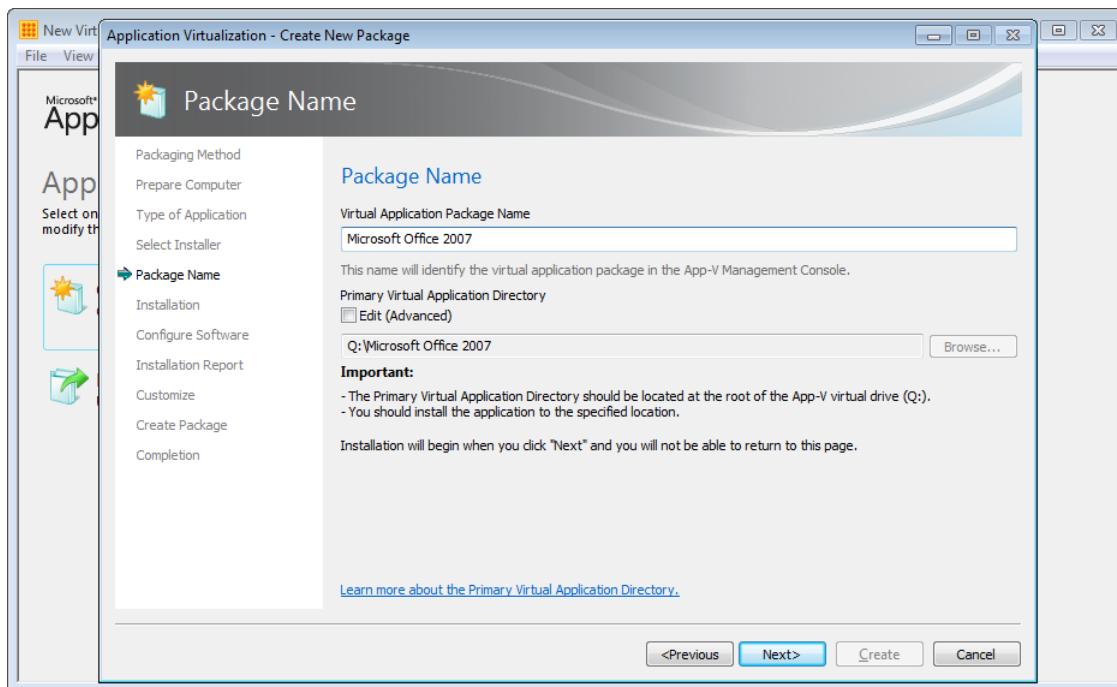


Figure 34: Enter the package name and Virtual Application Directory

27. On the **Installation** dialog page, the script will start. If you selected to launch Command Prompt, change to the directory that contains the script and start the script from there.

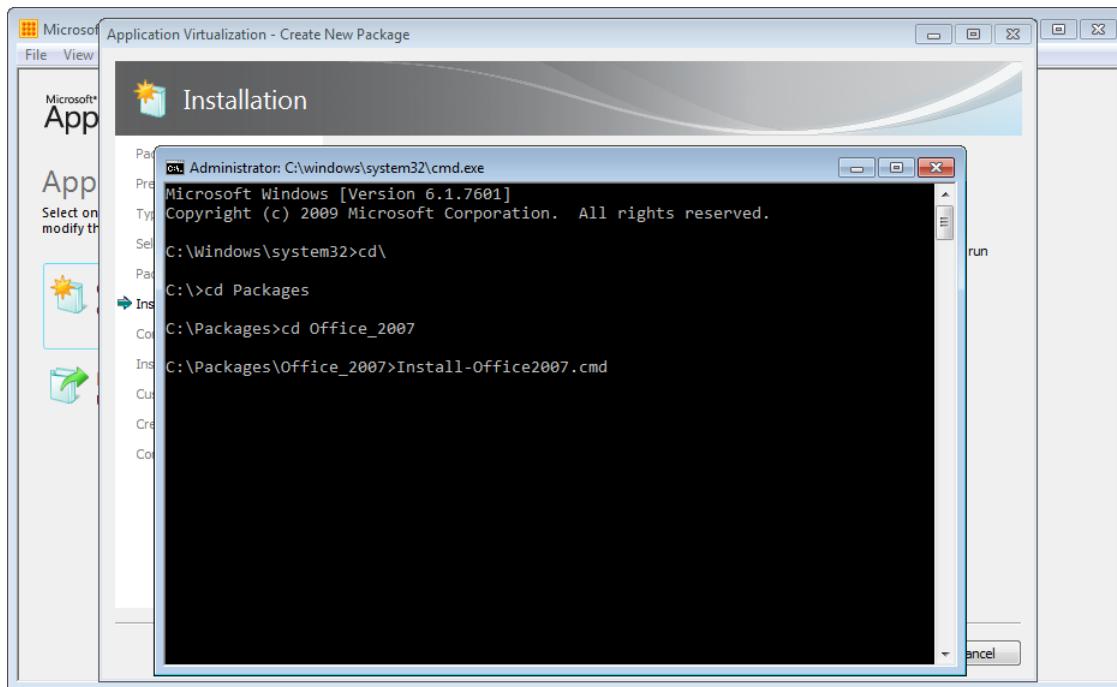


Figure 35: Running the Office install script

28. After Office 2007 setup completes, the script will launch a number of the Office applications. This will allow you to complete first run tasks for each of those applications. If you are completing this step manually, browse to the path of the virtual application. For example, to configure Word:

- Click **Start** and then click **Run** (or navigate to the Office install folder in Command Prompt)
- Browse to the executable virtual file that you want to launch, for instance **Q:\Q:\MicrosoftOffice2007\Office\Office12\WINWORD.EXE**, then press **Enter**
- Configure custom settings then close Word.



Never launch Outlook, OneNote or Groove 2007, since doing so may capture user-specific information that would then be deployed to all users who launch applications in this package. This information is saved in binary format, which the Sequencer cannot variablize.

It is recommended to start the following executables if they exist in your package:

- SETLANG.EXE
- WINWORD.EXE
- EXCEL.EXE
- POWERPNT.EXE
- MSACCESS.EXE
- VISIO.EXE
- MSPUB.EXE
- INFOPATH.EXE
- WINPROJ.EXE
- VISIO.EXE

- OIS.EXE
- MSTORE.EXE

29. At this point, the installation script should launch Windows Update. Windows update should return the updates that are applicable to Office 2007 and the associated applications in this package. Ensure that you select the Office 2007 updates only – that is, deselect any Windows updates or other optional updates that should not be a part of the Office 2007 package.

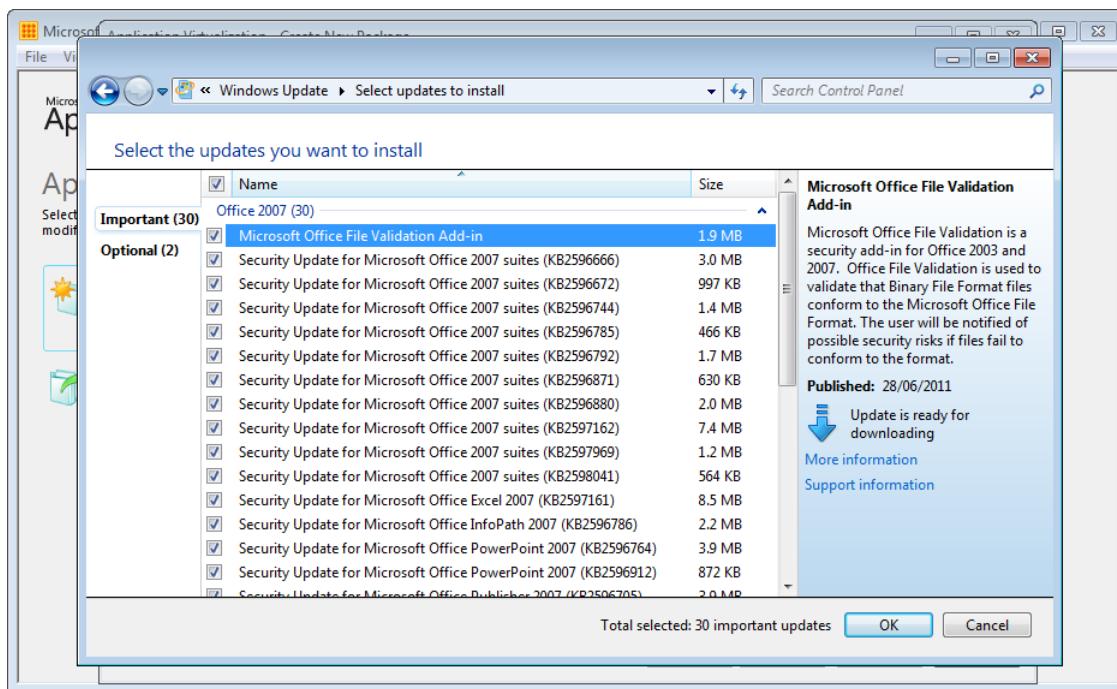


Figure 36: Select the Office 2007 updates only

30. If a Command Prompt is open, close it now. On the **Installation** dialog, check the checkbox next to **I am finished installing** and click **Next**.
31. The **Configure Software** step can be skipped, because the applications have been run during sequencing. If this has *not* been the case, select each of your *frequently used* programs and run it once in order to build the Primary Feature Block. **Never launch Outlook, OneNote or Groove**. Once you are finished, click **Next**.

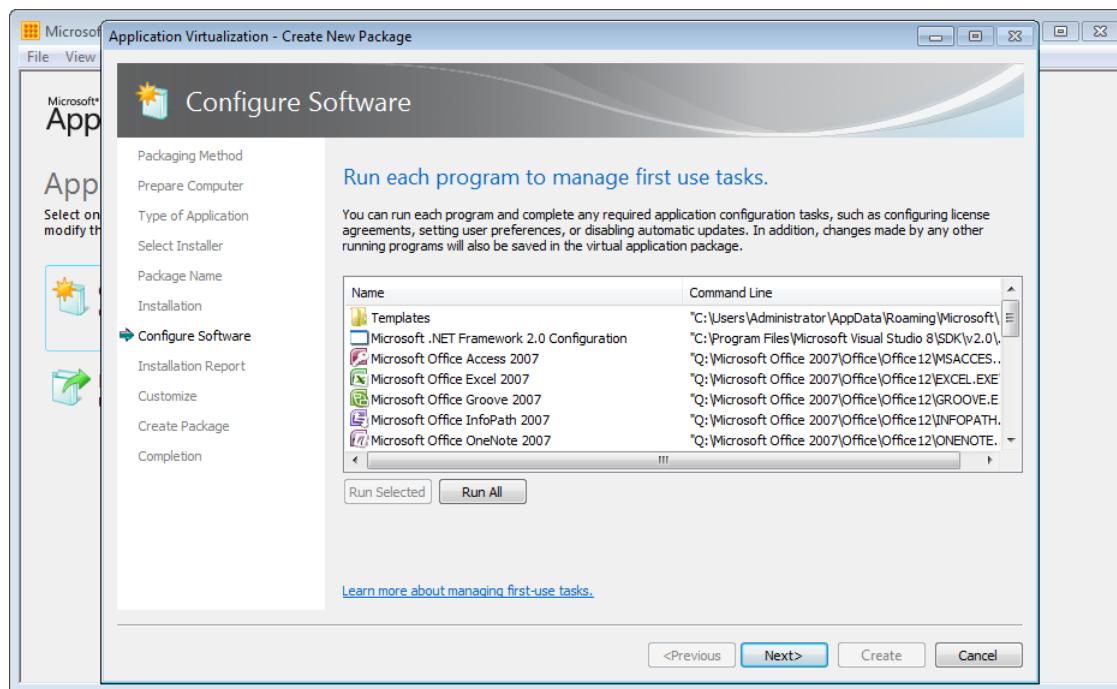


Figure 37: Configure first-run for applications in the package

32. On the **Installation Report** dialog, review any listed items so that you can understand any potential issues with the package and then click **Next**.

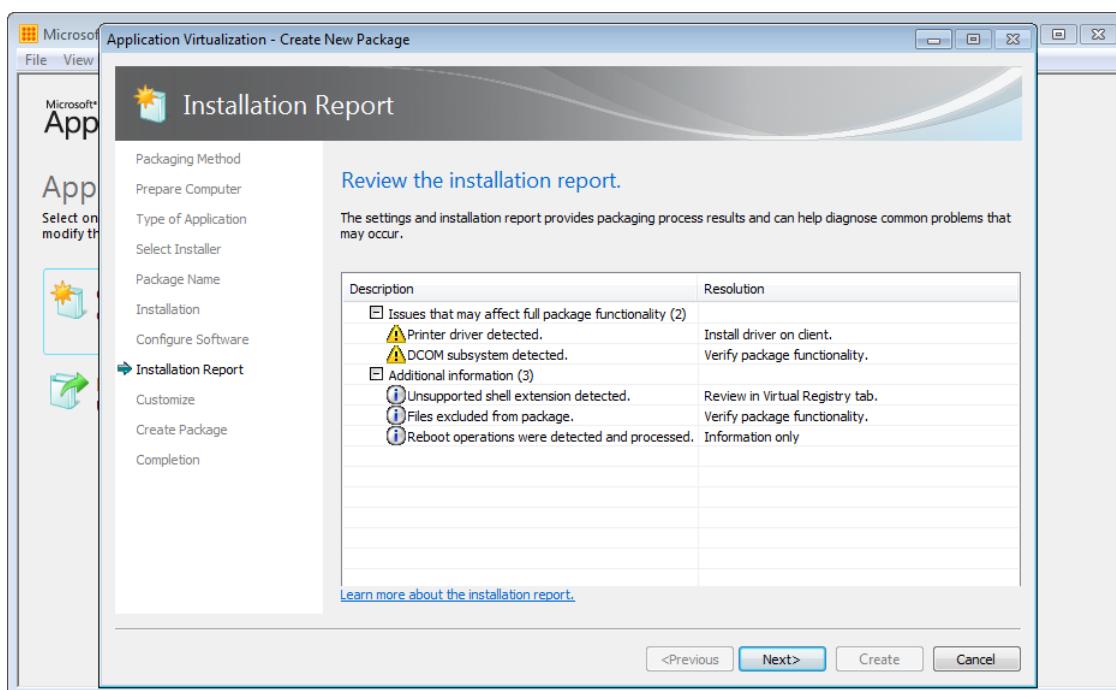


Figure 38: Review installation issues

33. On the Customize page, choose to customize the package so that we can make some important post-sequencing changes to the package:

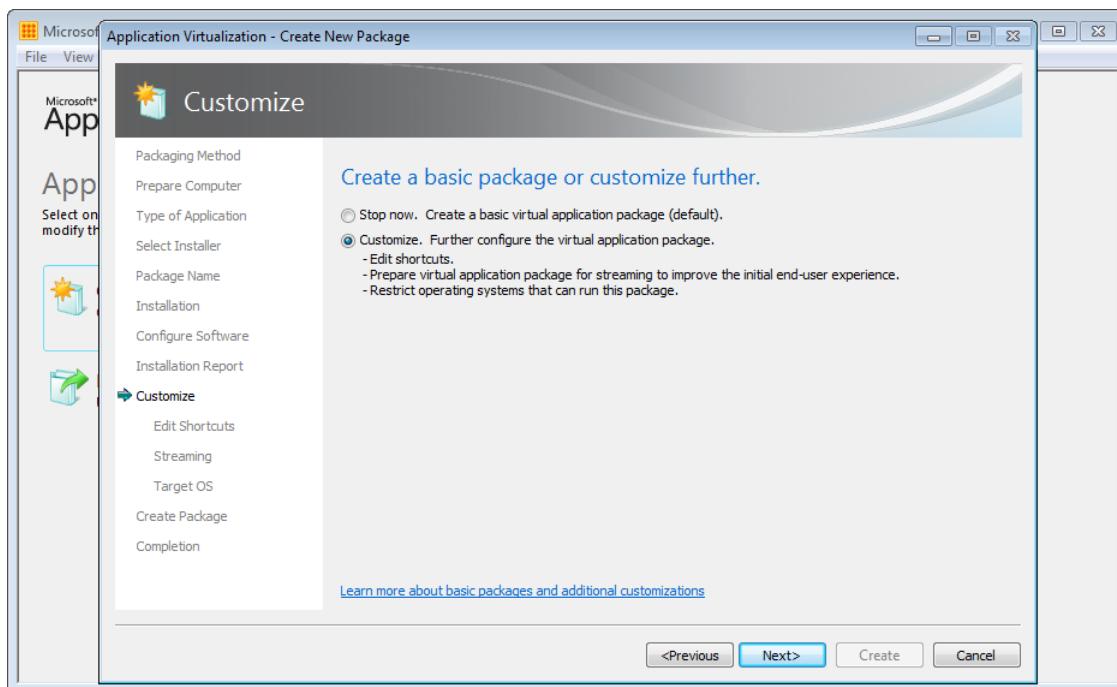


Figure 39: Customise the package

34. The Sequencer will list a number of shortcuts for the detected applications in the package. We now need to customize these:

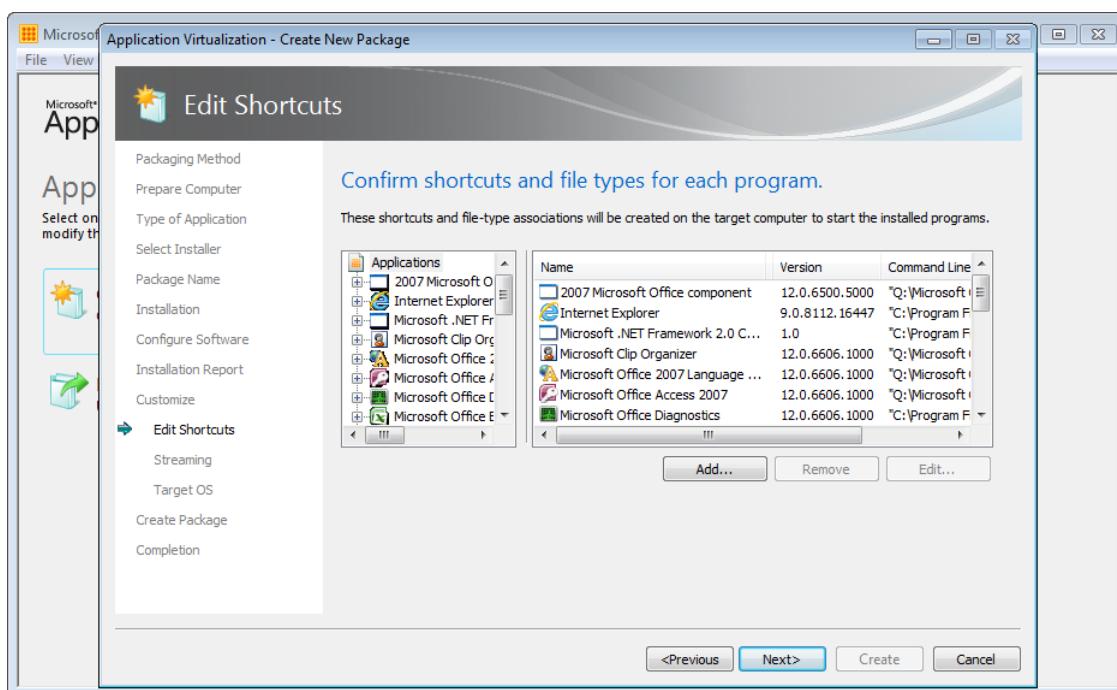


Figure 40: Edit shortcuts and file types associations

Confirm that each shortcut is required for your environment; however most deployments should remove the following:

- 2007 Microsoft Office component
- Internet Explorer (unless you wish to provide users with a way to launch Internet Explorer within the Office 2007 package)
- Microsoft .NET Framework 2.0 Configuration

- Microsoft Visual Studio Version Selector
- Notepad
- Templates
- Visual Studio 2005 Remote Debugger
- Visual Studio 2005 Remote Debugger Configuration Wizard
- VSContentInstaller.exe
- XML Editor

Make the following changes to the remaining shortcuts:

- **Version:** many organizations will have a package versioning standard in place. The recommended approach will be to enter the same package version or identifying number in each shortcut
- **Shortcut location:** if you have configured the Office 2003 unattended setup correctly, the correct shortcut locations for your package will have been captured, otherwise change the locations here. It is important that this location is unique if you plan to deliver multiple versions of Office
- **File type associations:** If Office 2003 is not the primary version of Office, remove the file type associations from this package to prevent FTAs from other versions of Office being overwritten. Alternatively, edit the OSD files post sequencing to remove the FTAs.
- **OSD file name:** the default OSD file name will consist of the application shortcut name and the file version. It is recommended to simplify these and make them unique across all packages

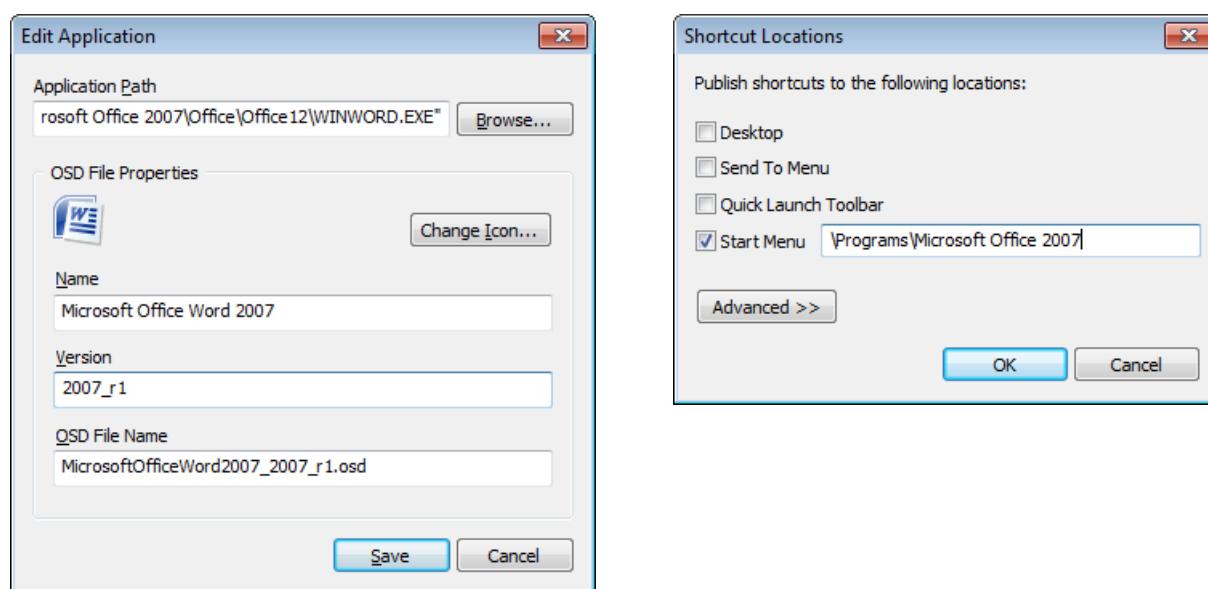


Figure 41: Application properties

35. To configure the Primary Feature Block, start the most common applications. This step is completely optional and should be used if you intend stream the application on demand (usually when targeting users instead of computers for deployment). Do **not** launch Outlook or OneNote during this step:

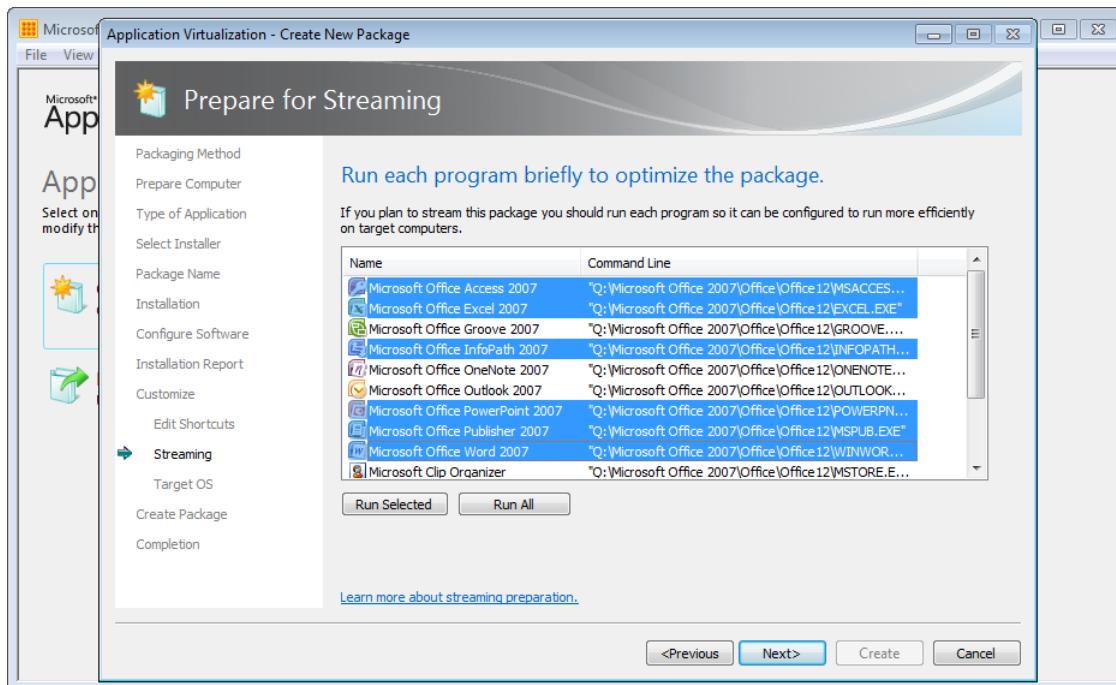


Figure 42: Creating the Primary Feature Block

36. Choose the operating systems that the package will be allowed to execute on:

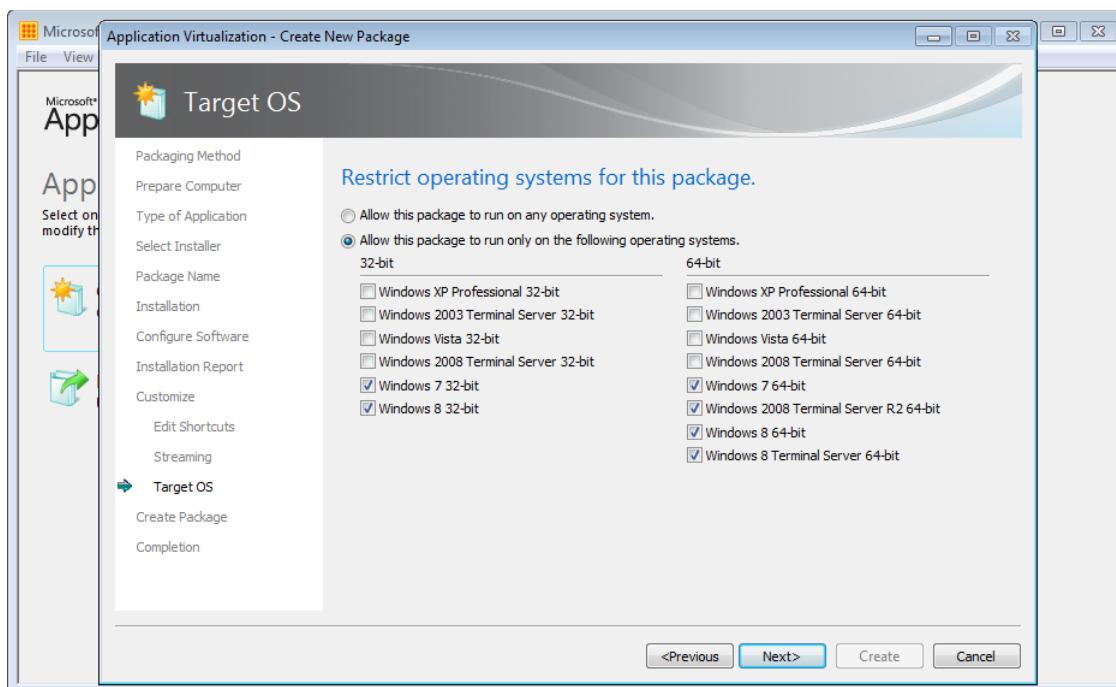


Figure 43: Selecting the target operating systems

Depending on your environment and your sequencing platform, you may wish to allow the package to execute on all operating systems. This will require sequencing on the lowest Windows version available in your environment. If a package does not then successfully execute on another operating system, re-sequence the package for that OS.

37. Do not save the package at this point, instead continue to modify the package in the package editor before saving:

7.4 Step3: Configure the Office 2007 package

- On the Deployment tab, enter a path that adheres to your standards. The sequencing template will ensure that the Enforce Security Descriptors, Generate Microsoft Windows Installer package and Compress Package options are enabled.

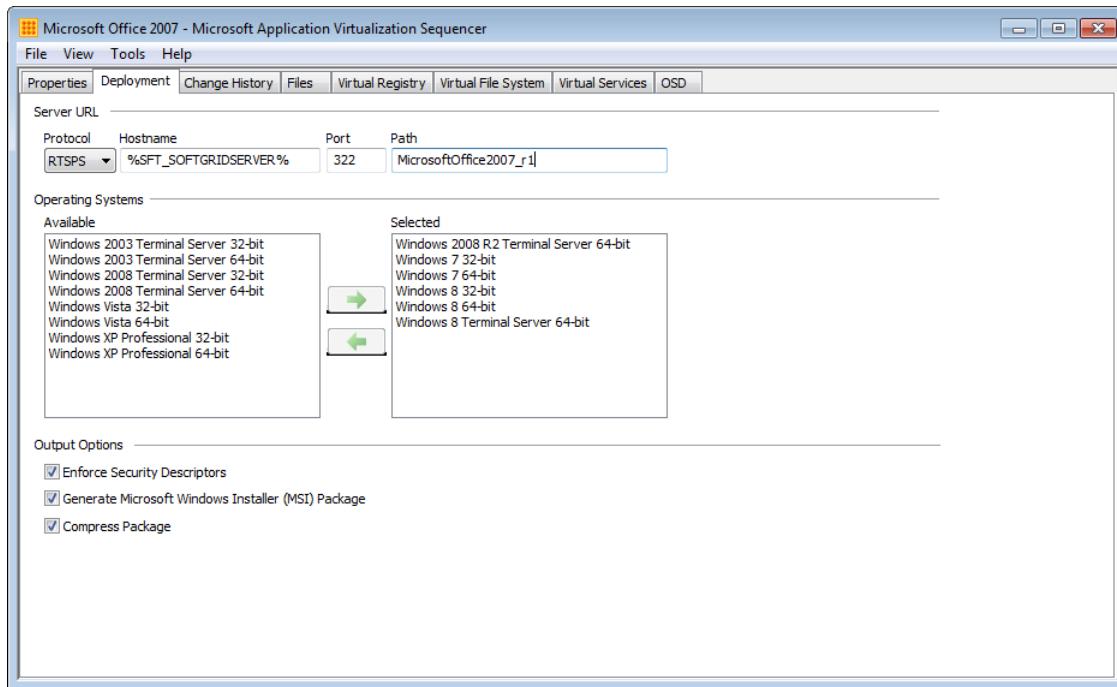


Figure 44: The Deployment Tab

- Select the Virtual Registry tab in the Sequencer and expand the following virtual registry location:

USER%\%SFT_SID%\Software\Microsoft\Office\Common\UserInfo. Delete the following values if they exist:

- CompanyName
- UserInfo
- UserInitials
- UserName

If these values are not deleted the same user details will be stored for all users in all new documents.

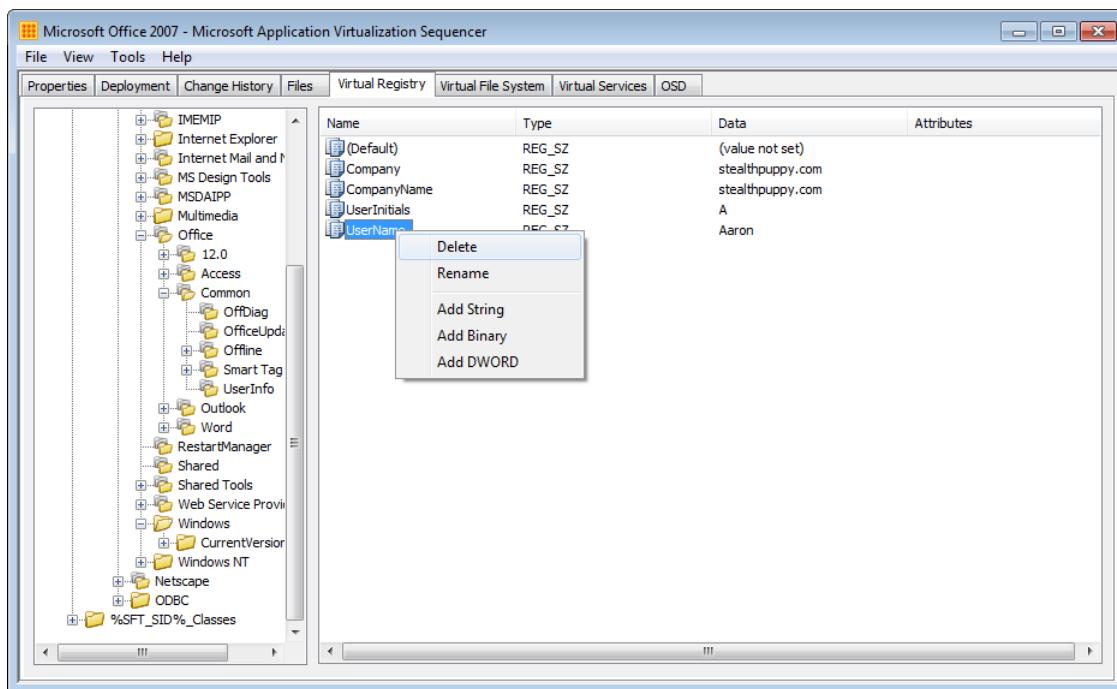


Figure 45: Editing the Virtual Registry

7.4.1 Additional Steps

Depending on your environment and requirements there are a number of additional steps to complete:

1. If you include the Live Meeting add-ins in the package, follow these steps:
 - On the **Virtual Registry** tab in the Sequencer, expand the following virtual registry location: **USER\%SFT_SID%\Software\Microsoft\Office\12.0\Word\Data**. Then delete the **Settings** value and the **Toolbars** value.
 - On the **Virtual File System** tab, expand **CSIDL_APPDATA\Microsoft\Templates**, and then right-click this entry and select **Delete**. This action lets the 2007 Office Online templates function correctly.
2. If you perform the sequencing operation on a Windows XP-based computer, follow these steps:
 - On the **Virtual File System** tab, expand the following location: **CSIDL_PROGRAM_FILES_COMMON\Microsoft Shared\ink**
 - Right-click this entry and select **Merge with Local Directory**. This action lets Tablet PC computers function correctly.
3. If Office 2007 is the primary version of Office deployed to client PCs, verify that local interaction is enabled. To do this, modify each OSD file to add the following entry to the **<VIRTUALENV>** section that appears after the **<ENVLIST/>** tag.

```
<POLICIES>
  <LOCAL_INTERACTION_ALLOWED>TRUE</LOCAL_INTERACTION_ALLOWED>
</POLICIES>
```

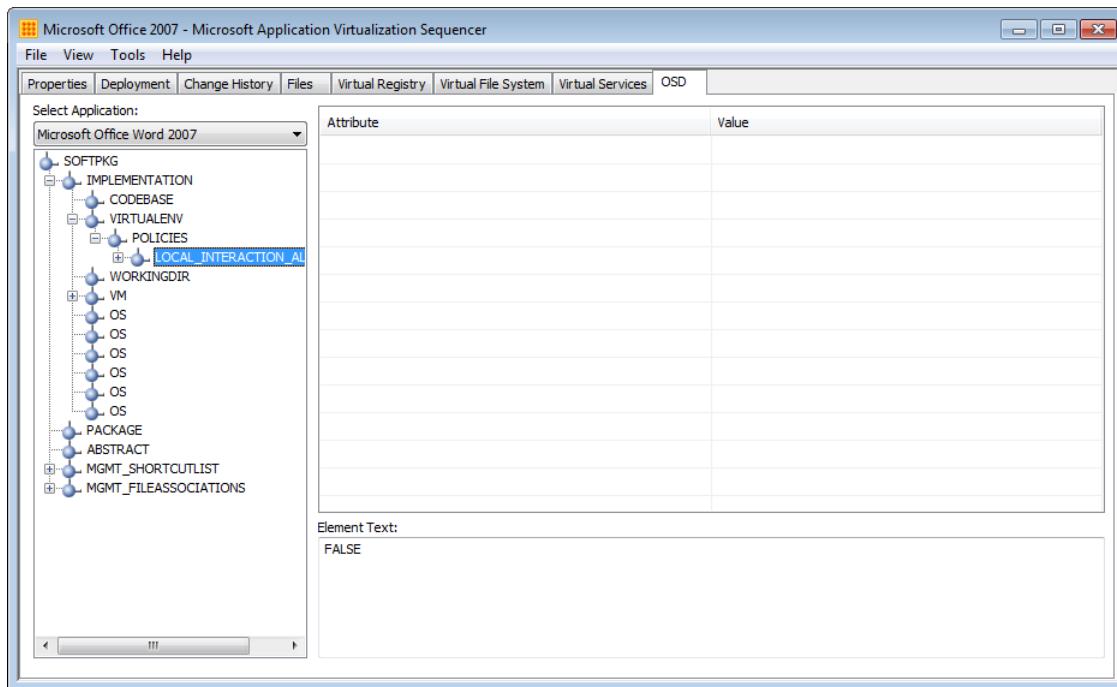


Figure 46: Configuring LOCAL_INTERACTION_ALLOWED

When you enable local interaction; Windows Internet Explorer interaction is improved.



If you are using App-V to deploy Office 2007 to an environment along with another version of Office and you want to ensure no conflicts between multiple versions of Office, ensure that LOCAL_INTERACTION_ALLOWED is set to FALSE.

7.4.2 Add Pre-Launch Scripts

If you have configured AutoRecover locations for Word, Excel and PowerPoint add the following script to the Word, Excel and PowerPoint OSD files:

```
<DEPENDENCY>
    <SCRIPT EVENT="LAUNCH" TIMING="PRE" WAIT="FALSE" PROTECT="FALSE">
        <SCRIPTBODY>
            MD "%LOCALAPPDATA%\Microsoft\PowerPoint" \n
            MD "%LOCALAPPDATA%\Microsoft\Excel" \n
            MD "%LOCALAPPDATA%\Microsoft\Word" \n
        </SCRIPTBODY>
    </SCRIPT>
</DEPENDENCY>
```

7.5 Step 4: Save and Deploy the package

Now save the package and copy it to a network location, ready for deployment.

Click on **File** then **Save** to save the package. Use these guidelines for saving the Office package:

1. Use the same text for the Package Name on the Properties tab and the Path on the Deployment tab (e.g. MicrosoftOffice2007_x86_v1)

2. Save the package to a local disk in the Sequencer. It is recommended that you save the package to the same parent folder that contains the Office setup files (e.g. C:\Packages)
3. Save the package to a sub-folder that is the same as the Package Name and Path set in the package (e.g. C:\Packages\MicrosoftOffice2007_x86_v1). This will ensure that the package will stream correctly if you are using the native App-V Management Server for publishing and streaming.
4. Save the Sequencer Project with the same name as the package (e.g. MicrosoftOffice2007_x86_v1)
5. Copy the package out of the sequencing VM to the Content share on your network
6. Revert the sequencing virtual machine to your saved snapshot

The Office 2007 package is now ready to deploy via your chosen deployment method. Deploying Office 2007 via App-V can be achieved using any of the supported deployment methods. See this article on TechNet for more information on deployment options: [Planning and Deployment Guide for the Application Virtualization System](#)

8 Sequencing Office 2003

Building the sequencing VM has been covered in a previous section, so this section will cover the following high-level steps that need to be followed when sequencing Office 2010:

1. Create a customised Office 2003 deployment
2. Prepare the VM for sequencing Office 2003
3. Sequence and update Office 2003
4. Save and Deploy the Office 2003 package

8.1 Prerequisites

You will need the following software to use this guide:

- **Microsoft Application Virtualization version 4.6 SP1:** The [App-V 4.6 SP1](#) Sequencer is installed on the Sequencing workstation. It is strongly recommended to apply the latest App-V Sequencer updates.

For a complete list of available App-V versions (client, server and Sequencer), see [current versions of App-V 4.x](#). At the time of writing, the latest version of the App-V 4.6 SP1 Sequencer is 4.6.1.30091 as updated with App-V 4.6 SP1 Hotfix Rollup 3: <http://support.microsoft.com/kb/2571168>

- **Microsoft Office 2003 volume SKU.** This may be deployed to either 32 or 64-bit operating systems. We recommend sequencing on the same operating system as that of the operating system to which you will deploy the package.
- **Microsoft Office Compatibility Pack for Word, Excel, and PowerPoint File Formats.** By installing the Compatibility Pack in addition to Microsoft Office 2000, Office XP, or Office 2003, you will be able to open, edit, and save files using the [file formats in newer versions of Word, Excel, and PowerPoint](#).
- **Microsoft Office 2003 Service Pack 3 and Microsoft Office Compatibility Pack Service Pack 3.**

8.2 Step 1: Creating a customised Office 2003 deployment

8.2.1 Creating a custom installation

In this section, I've outlined the key steps for creating a customization file; however you can read more about custom Office deployment in this document: [Methods of customizing Office 2003](#).

Before customizing Office 2003 setup, you will need to Office 2003 Resource Kit Tools. Download the tools from the [Microsoft Office Resource Kit site](#).

Follow these steps to create custom Office 2003 deployment:

1. Install the Office 2003 Resource Kit Tools

2. Start the **Office 2003 Custom Installation Wizard** and select the Office 2003 Windows Installer (MSI) file from the edition of Office 2003 suite or application that you will be virtualizing. For example, the MSI file for Office 2003 Professional is PRO11.MSI.

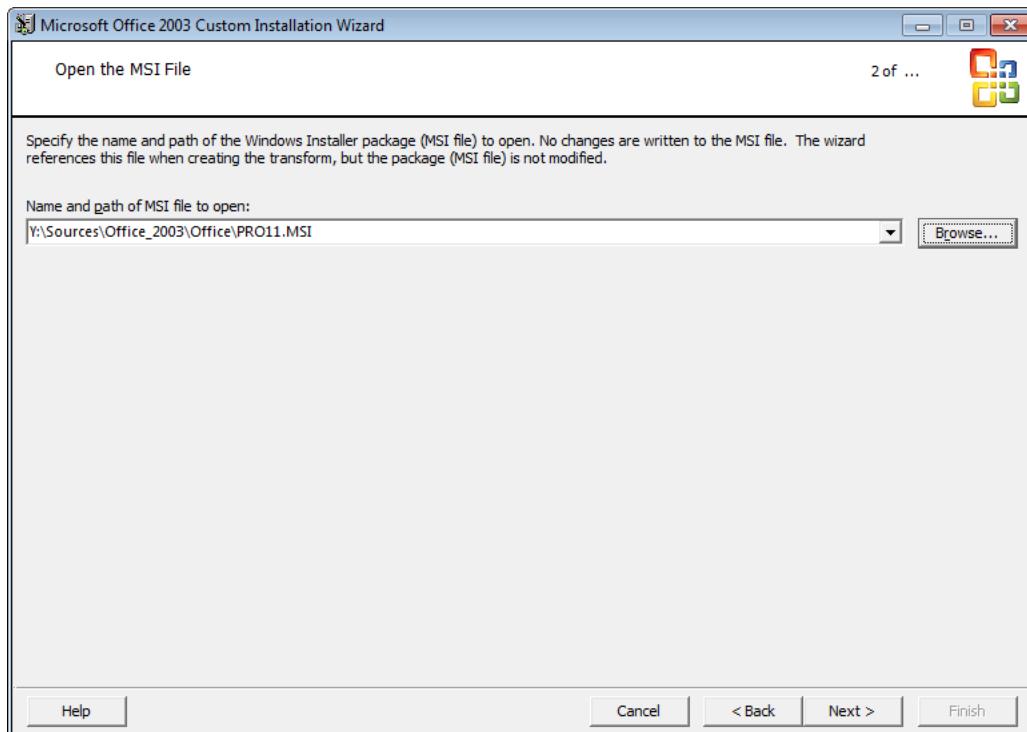


Figure 47: Select the Office 2003 Windows Installer file

3. Create a new Windows Installer Transform (MST) file – enter a path to the MST file. Save the MST file into the same folder as your Office 2003 package and give the file a name that reflects its use.

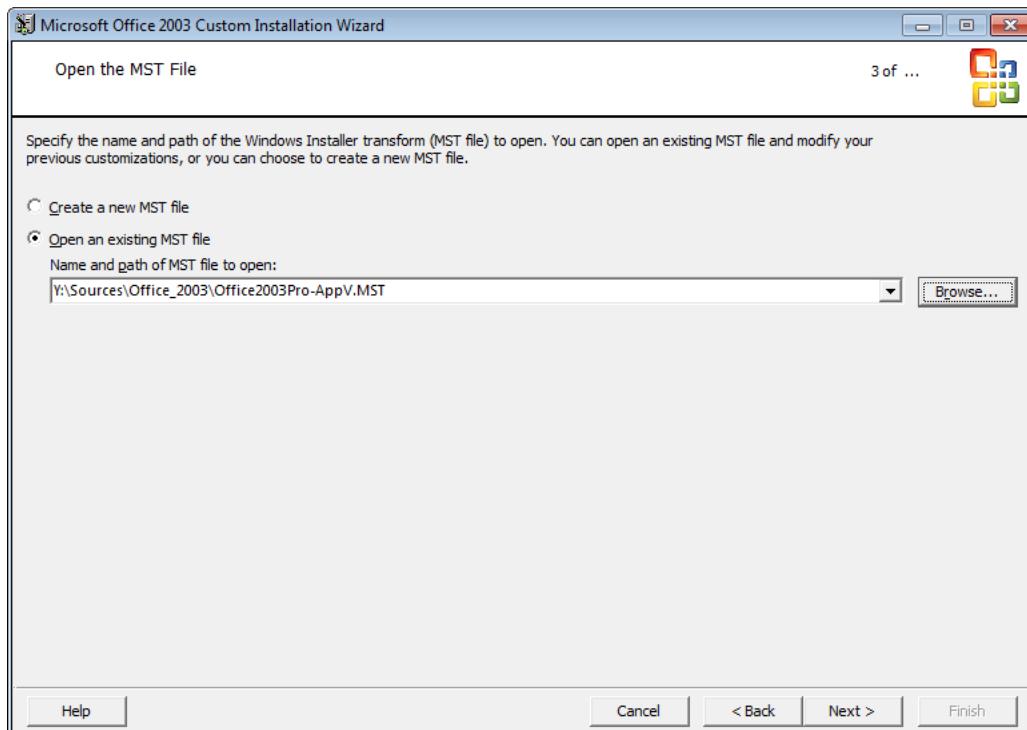


Figure 48: Create a new Transform file

4. Set the default installation path and organization name. Ensure the installation path is a folder on the Q: drive – this folder should match any paths used in scripts during the sequencing process.

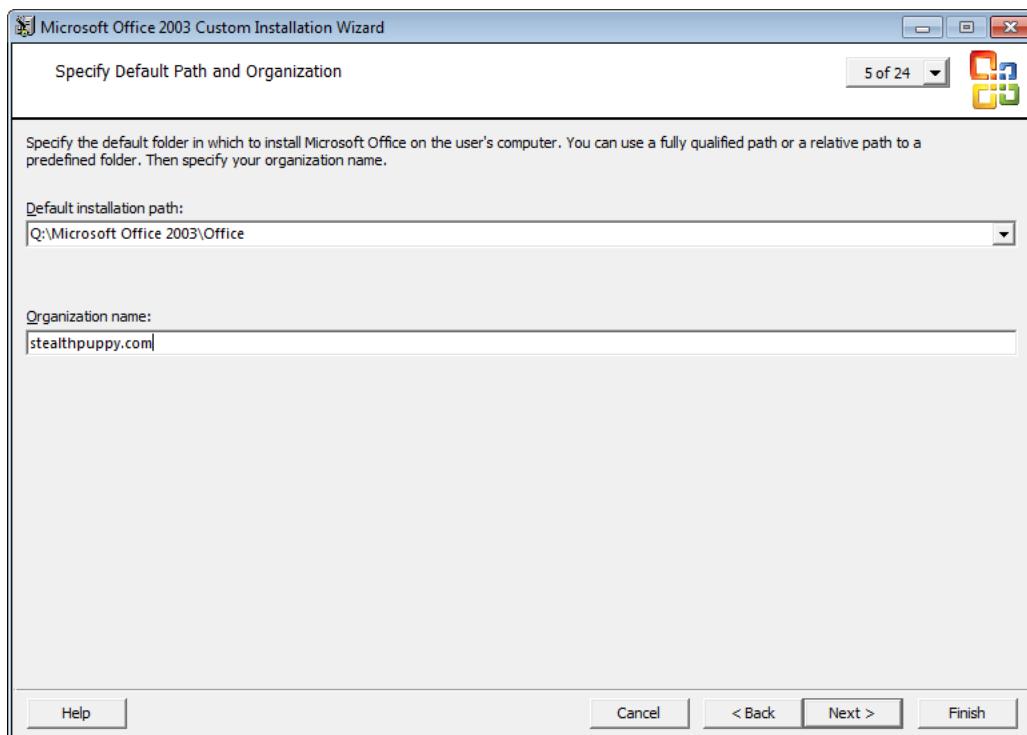


Figure 49: Configure the default installation path and Organization name

5. Set feature installation states – there are a number of features that should be disabled when virtualizing Office.

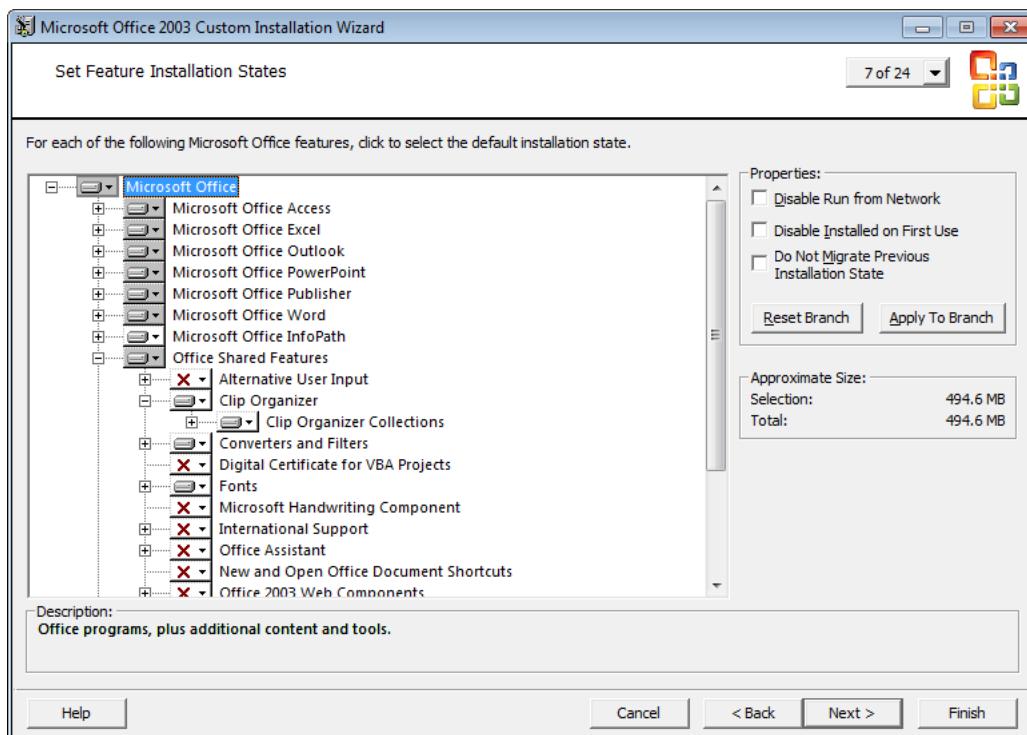


Figure 50: Select feature installation states for virtualization

Like user settings, feature installation states will impact the default Office experience, so you will need to know in advance which features you are deploying. For various reasons, there are a number of features that you might consider disabling when virtualizing Office:

- Microsoft Outlook – only a single copy of Outlook is supported on an end-point
 - .NET Programmability Support – this may be required by Office add-ins, which can be delivered via DSC; however an external, custom application will not have access to this support, unless it is run within the Office package
 - Office Shared Features / Microsoft Office Download Control – this feature will not be available from Internet Explorer unless it runs from within the Office package
 - Office Tools / Research Explorer Bar – this feature will not be available from Internet Explorer unless it runs from within the Office package
 - Office Tools / Microsoft Office Document Imaging / Microsoft Office Document Image Writer – this is a virtual printer that cannot be virtualized
6. Do not configure a local installation source as none will be required once Office has been virtualized and a local installation source will increase the size of the resultant package
 7. Set recommended Office User Settings.

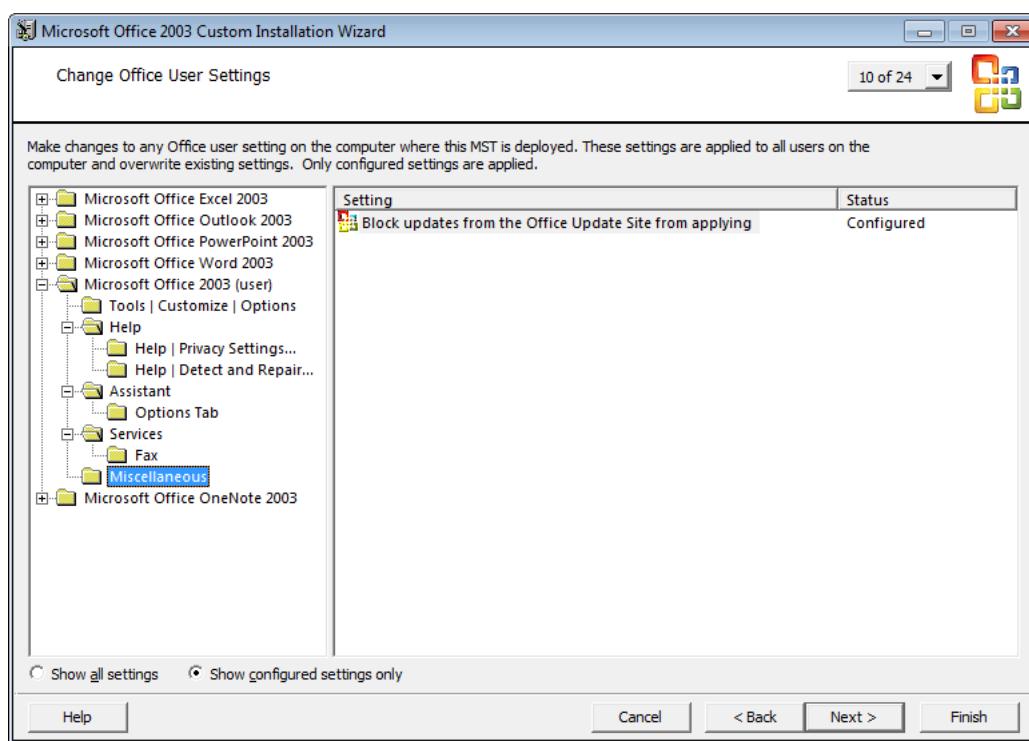


Figure 51: Select user settings to control the default user experience

This table below lists recommended user customisations to set via the Office Customization Wizard, with important settings for virtual environments highlighted:

Product	Path	Setting	Value
Excel	Excel Options - Save	AutoRecover save location	Enabled %LOCALAPPDATA%\Microsoft\Excel
Outlook	Outlook Options - Other - AutoArchive	Disable File Archive	Disabled
Outlook	Outlook Options - Other - AutoArchive	AutoArchive Settings	Disabled
Office	Global Options - Customize	Always show full menus	Enabled
Office	Help	Microsoft Office Online	Enabled (can leave URL blank)
Office	Privacy - Trust Center	Enable Customer Experience Improvement Program	Disabled
Office	Privacy - Trust Center	Automatically receive small updates to improve reliability	Disabled
Office	Services - Fax	Disable Internet Fax feature	Enabled
Office	Microsoft Office Picture Manager	Disable File Types association dialog box on first launch	Enabled
Office	Miscellaneous	Block updates from the Office Update Site from applying	Enabled
OneNote	OneNote Options - Other	Add OneNote icon to the notification area	Disabled
OneNote	OneNote Mobile	Disable OneNote Mobile install notifications	Enabled

8. Add additional registry entries required for a virtualized deployment of Microsoft Office:

Root	Key	Value name	Value data	Type
HKCU	Software\Classes\clsid\{AB968F1E-E20B-403A-9EB8-72EB0EB6797E}	DisableDetection	1	REG_DWORD
HKCU	Software\Microsoft\Office\Common\OfficeUpdate	BlockUpdates	1	REG_DWORD
HKCU	Software\Microsoft\Office\11.0\Word\Options	NoRereg	1	REG_DWORD

These entries will disable user prompts and update options that are not suitable for Office when virtualized.

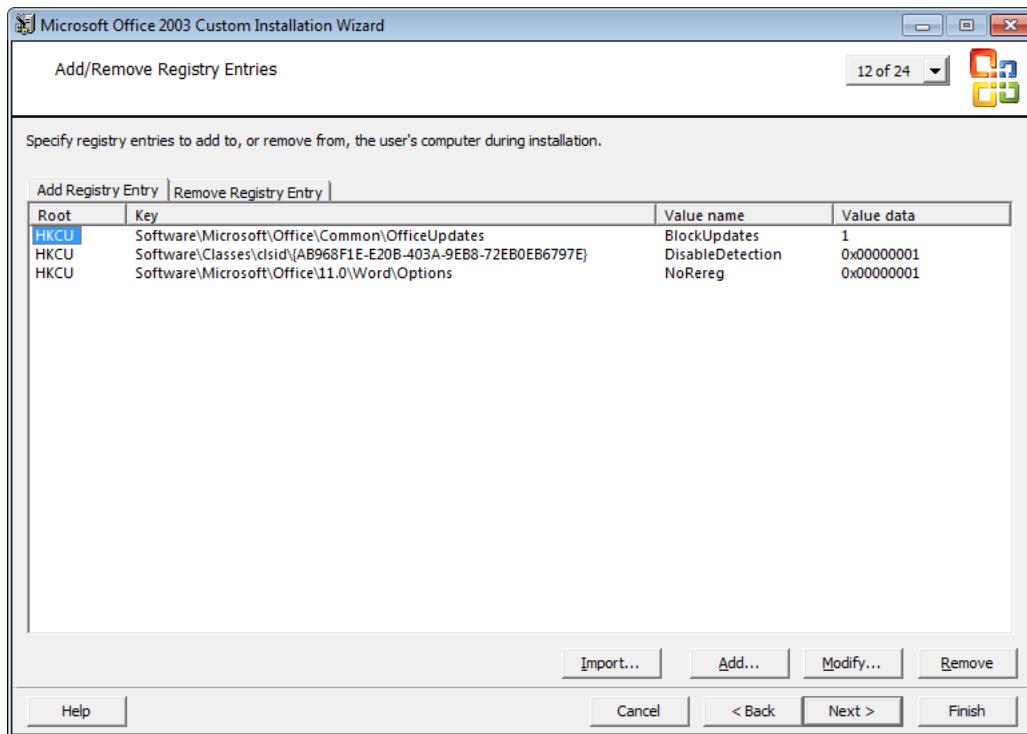


Figure 52: Additional registry entries

- Configure the Office shortcuts as you would like them to appear on the client. Ensure no conflicts between local shortcuts or shortcuts from other Office packages. For example, set the path to <StartMenu\Programs>\Microsoft Office 2003

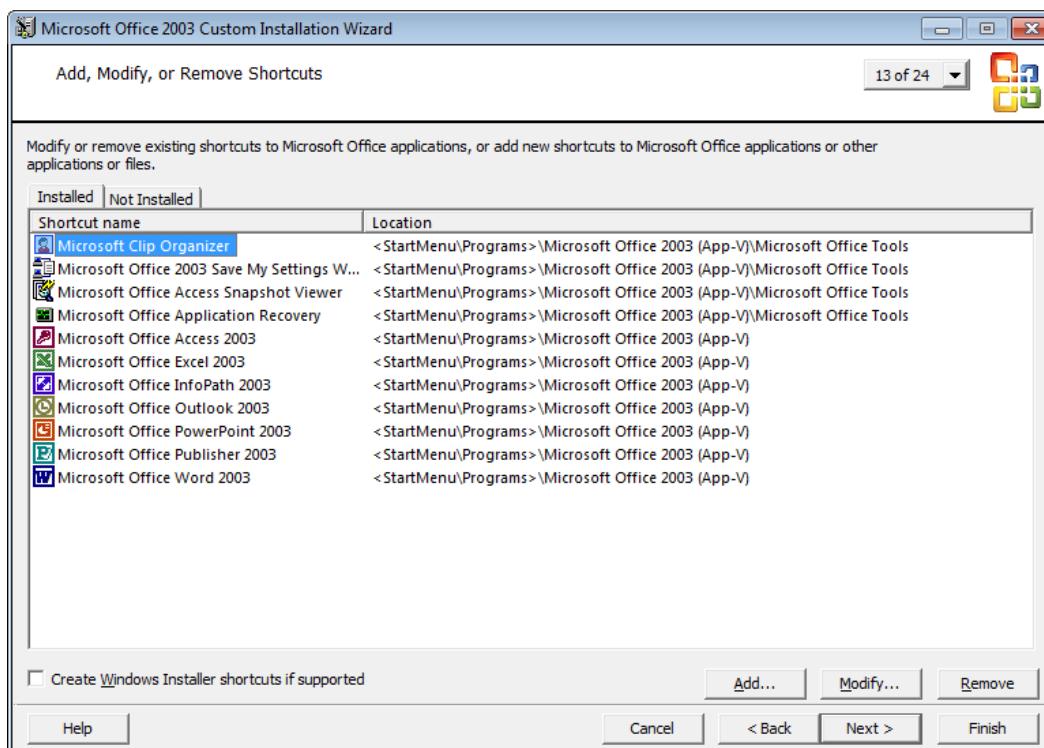


Figure 53: Configure shortcuts and locations

8.2.2 Automating Office Setup during Sequencing

Although you now that you have an automated Office 2003 deployment, we can go a step further and automate the entire installation and configuration process of Office 2003 during sequencing. This can be done by writing a script to perform those steps that would need to be completed manually.

The script below will perform the following tasks:

- Install Office 2003 and the Microsoft Office Compatibility Pack for Word, Excel, and PowerPoint File Formats
- Install the latest Service Pack and updates for Office 2003
- Make some required registry changes
- Create the Office user profile folders to ensure they are captured in the virtual environment
- Start each Office application to complete first run tasks

```
1  @ECHO OFF
2  REM Q:\MicrosoftOffice2003_x86\Office
3
4  REM Install Microsoft Office and Applications
5  SET SOURCE=%CD%
6  PUSHD %CD%\Office2003
7  START /WAIT MSIEXEC/I PRO11.MSI TRANSFORMS=Office2003Pro-AppV.MST ALLUSERS=TRUE
REBOOT=SUPPRESS /QB-
8  POPD
9
10 REM Keep MAPI profile inside the bubble
11 REG ADD HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Office\Outlook\Addins\Microsoft.OMSAddin /f
12 REG DELETE HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Office\Outlook\Addins\Microsoft.OMSAddin /f
13 REG ADD "HKEY_CURRENT_USER\Software\Microsoft\Windows NT\CurrentVersion\Windows Messaging Subsystem\Profiles" /f
14 REG ADD "HKEY_CURRENT_USER\Software\WOW6432Node\Microsoft\Windows NT\CurrentVersion\Windows Messaging Subsystem\Profiles" /f
15
16 REM Create user profile folders
17 MD "%APPDATA%\Microsoft\AddIns"
18 MD "%APPDATA%\Microsoft\Clip Organizer"
19 MD "%APPDATA%\Microsoft\CLView"
20 MD "%APPDATA%\Microsoft\Document Building Blocks"
21 MD "%APPDATA%\Microsoft\Excel"
22 MD "%APPDATA%\Microsoft\Forms"
23 MD "%APPDATA%\Microsoft\MS Project"
24 MD "%APPDATA%\Microsoft\Office"
25 MD "%APPDATA%\Microsoft\OneNote"
26 MD "%APPDATA%\Microsoft\Outlook"
27 MD "%APPDATA%\Microsoft\PowerPoint"
28 MD "%APPDATA%\Microsoft\Proof"
29 MD "%APPDATA%\Microsoft\Publisher"
30 MD "%APPDATA%\Microsoft\Publisher Building Blocks"
31 MD "%APPDATA%\Microsoft\QuickStyles"
```

```

32 MD "%APPDATA%\Microsoft\SharePoint Designer"
33 MD "%APPDATA%\Microsoft\Signatures"
34 MD "%APPDATA%\Microsoft\Stationery"
35 MD "%APPDATA%\Microsoft\Templates"
36 MD "%APPDATA%\Microsoft\UProof"
37 MD "%APPDATA%\Microsoft\Word"
38 MD "%APPDATA%\Microsoft\Media Catalog"
39 MD "%APPDATA%\Microsoft\Queries"
40 MD "%APPDATA%\Microsoft\Graph"
41 MD "%APPDATA%\Microsoft\InfoPath"
42 MD "%APPDATA%\Microsoft\Themes"
43 MD "%APPDATA%\Microsoft\OIS"
44 MD "%APPDATA%\Microsoft\VSTAHost"
45 MD "%APPDATA%\Microsoft\VSCommon"
46 MD "%APPDATA%\Microsoft\Web Server Extensions"
47 MD "%APPDATA%\Microsoft\AttendeeCommunicator"
48 MD "%APPDATA%\Microsoft\Communicator"
49 MD "%APPDATA%\Microsoft\MSDN"

50
51 REM Move AutoSave locations away from AppData
52 MD "%LOCALAPPDATA%\Microsoft\PowerPoint"
53 REG ADD "HKCU\Software\Microsoft\Office\11.0\PowerPoint\Options" /v PathToAutoRecoveryInfo
/d "%LOCALAPPDATA%\Microsoft\PowerPoint\\\" /f
54 MD "%LOCALAPPDATA%\Microsoft\Excel"
55 REG ADD "HKCU\Software\Microsoft\Office\11.0\Excel\Options" /v AutoRecoverPath /d
"%LOCALAPPDATA%\Microsoft\Excel\\\" /f
56 MD "%LOCALAPPDATA%\Microsoft\Word"
57 REG ADD "HKCU\Software\Microsoft\Office\11.0\Word\Options" /v AUTOSAVE-PATH /d
"%LOCALAPPDATA%\Microsoft\Word\\\" /f

58
59 REM Load Office application to manage first-run actions
60 PUSHD "Q:\MicrosoftOffice2003_x86\Office\OFFICE11"
61 IF EXIST SETLANG.EXE START /WAIT SETLANG.EXE
62 IF EXIST WINWORD.EXE START /WAIT WINWORD.EXE
63 IF EXIST EXCEL.EXE START /WAIT EXCEL.EXE
64 IF EXIST POWERPNT.EXE START /WAIT POWERPNT.EXE
65 IF EXIST MSACCESS.EXE START /WAIT MSACCESS.EXE
66 IF EXIST MSPUB.EXE START /WAIT MSPUB.EXE
67 IF EXIST INFOPATH.EXE START /WAIT INFOPATH.EXE
68 IF EXIST WINPROJ.EXE START /WAIT WINPROJ.EXE
69 IF EXIST VISIO.EXE START /WAIT VISIO.EXE
70 IF EXIST OIS.EXE START /WAIT OIS.EXE
71 IF EXIST MSTORE.EXE START /WAIT MSTORE.EXE
72 POPD
73
74 REM Run Windows Update to update Office
75 %windir%\system32\wuapp.exe startmenu

```

Save this script as **Install-Office2003.CMD** into the same folder as the Office 2003 setup files. With all files saved into the sequencing VM, you should have a folder structure that looks similar to the following screenshot:

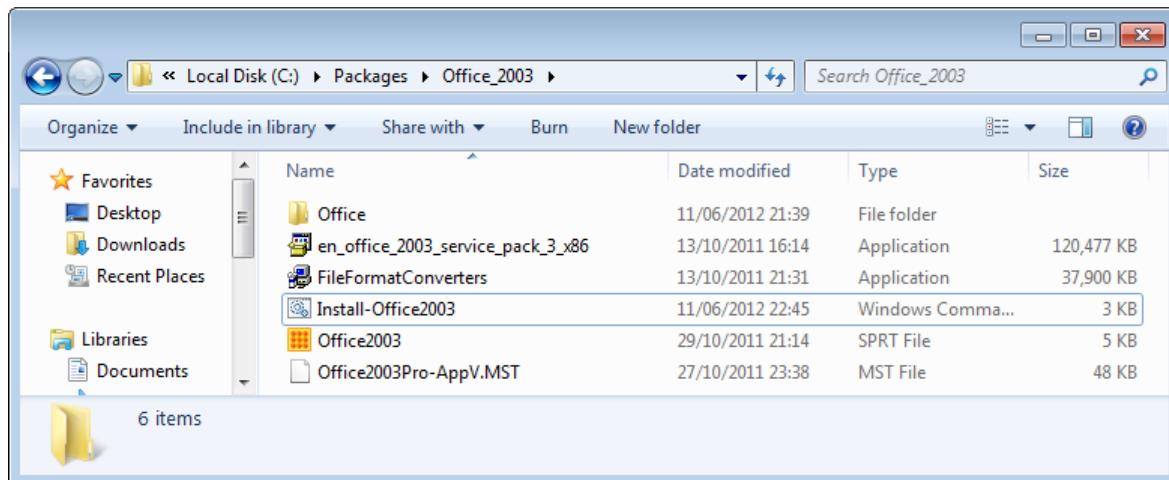


Figure 54: Office setup files, customisation files and scripts in the sequencing VM

8.3 Step 2: Prepare the VM for sequencing Office 2003

1. Copy the all of the Office 2003 setup and other required files into a folder in the sequencing VM
2. Configure Windows Installer – open the Registry Editor and add the following registry values:

HKEY_LOCAL_MACHINE\SOFTWARE\Policies\Microsoft\Windows\Installer

- DisableRollback - DWORD - Value=1
- MaxPatchCacheSize - DWORD - Value = 0

To automate the required registry changes, use the following commands

```

1 REG ADD HKLM\SOFTWARE\Policies\Microsoft\Windows\Installer /v DisableRollback /d 0 /t
REG_DWORD /f
2 REG ADD HKLM\SOFTWARE\Policies\Microsoft\Windows\Installer /v MaxPatchCacheSize /d 0 /t
REG_DWORD /f

```

3. At this point, you could create a snapshot of the virtual machine to allow for rolling back to this point if your sequencing process fails or does not work as expected

8.4 Step 3: Sequence and Update Office 2003

Before you begin ensure you have created a sequencer template for Office 2003 using the recommendations outlined in the section Sequencer Template. This should include an exclusion for %CSIDL_WINDOWS%\Debug, as outlined in [KB931914](#).

1. Start the App-V Sequencer and choose File / New from Template... browse for the App-V Office 2003 template that will be used for this package. The following screen will be displayed – you'll only be able to choose Create Package. Click Next.

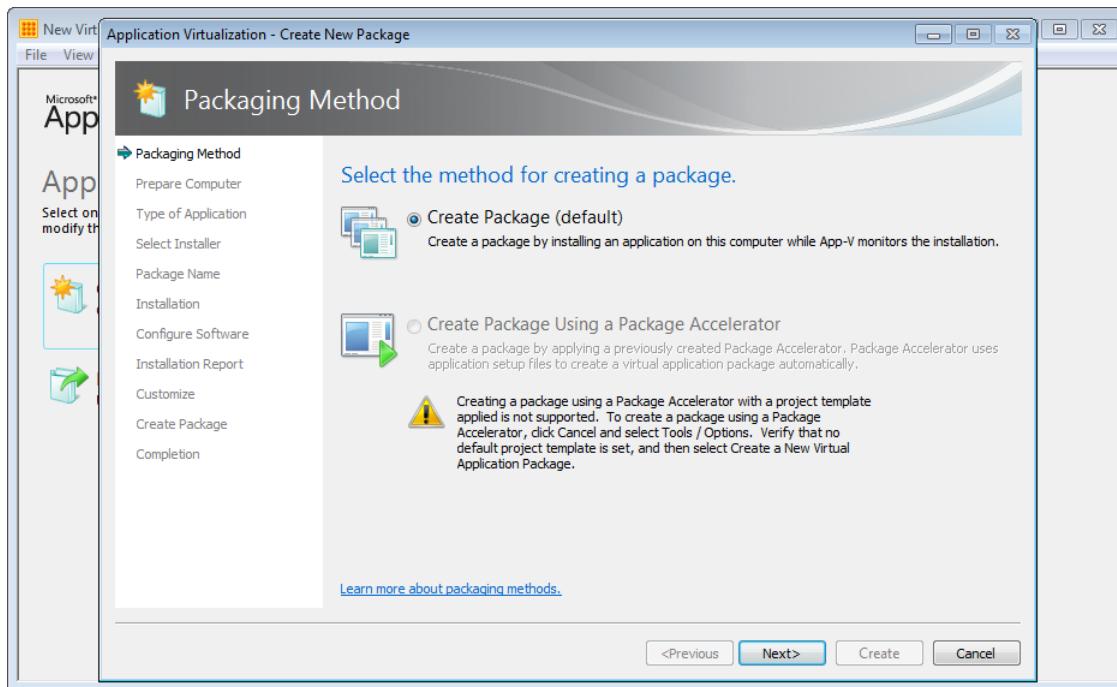


Figure 55: Select the packaging method

- At the Prepare Computer page, resolve any highlighted issues before continuing.

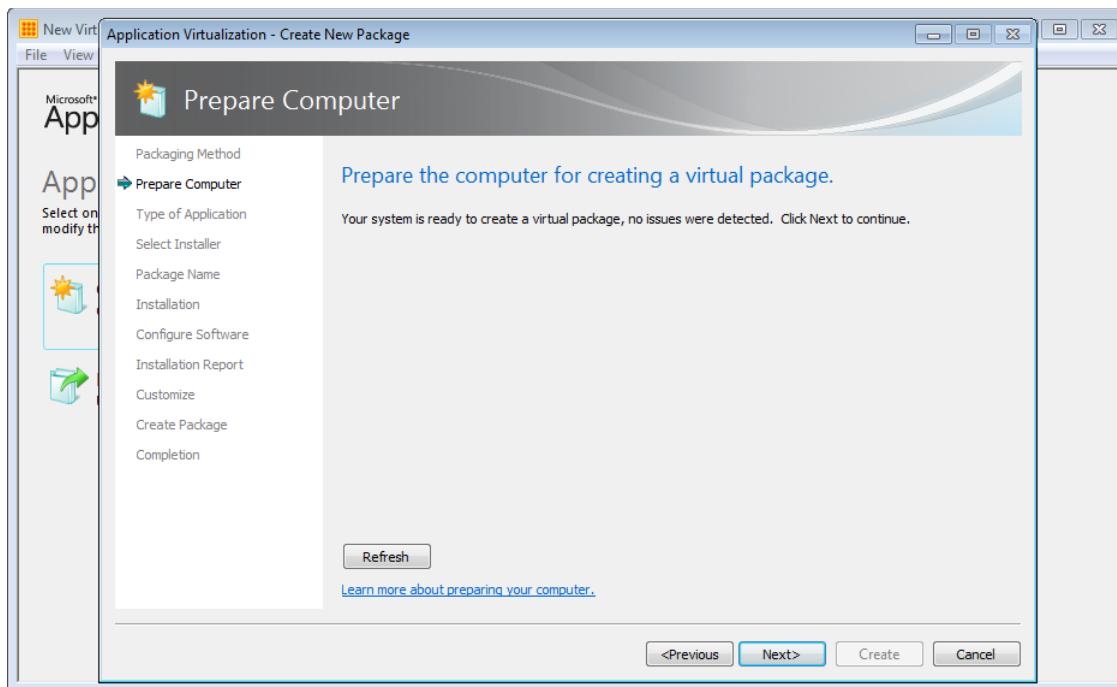


Figure 56: Resolve any issues before continuing

- On the Type of Application page, choose Standard Application:

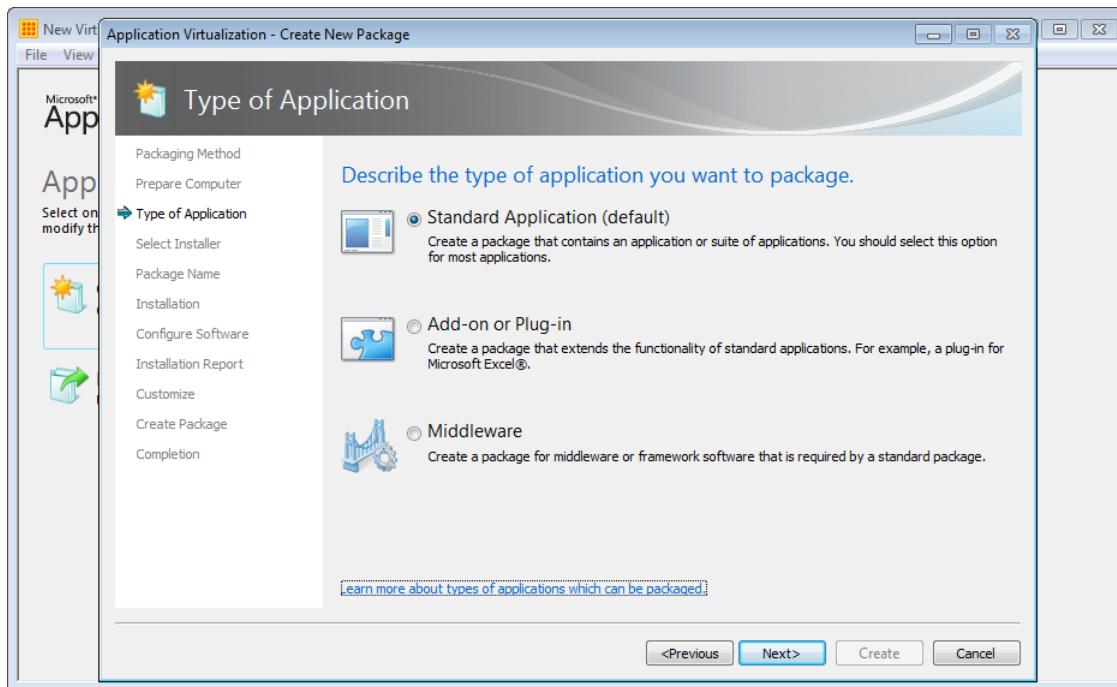


Figure 57: Application types - choose Standard Application

- On the Select Installer page, choose the installer for your custom Office 2003 package. This can be done a couple of ways – choose the script that will install and configure Office or run a command prompt and then manually launch the script from there.

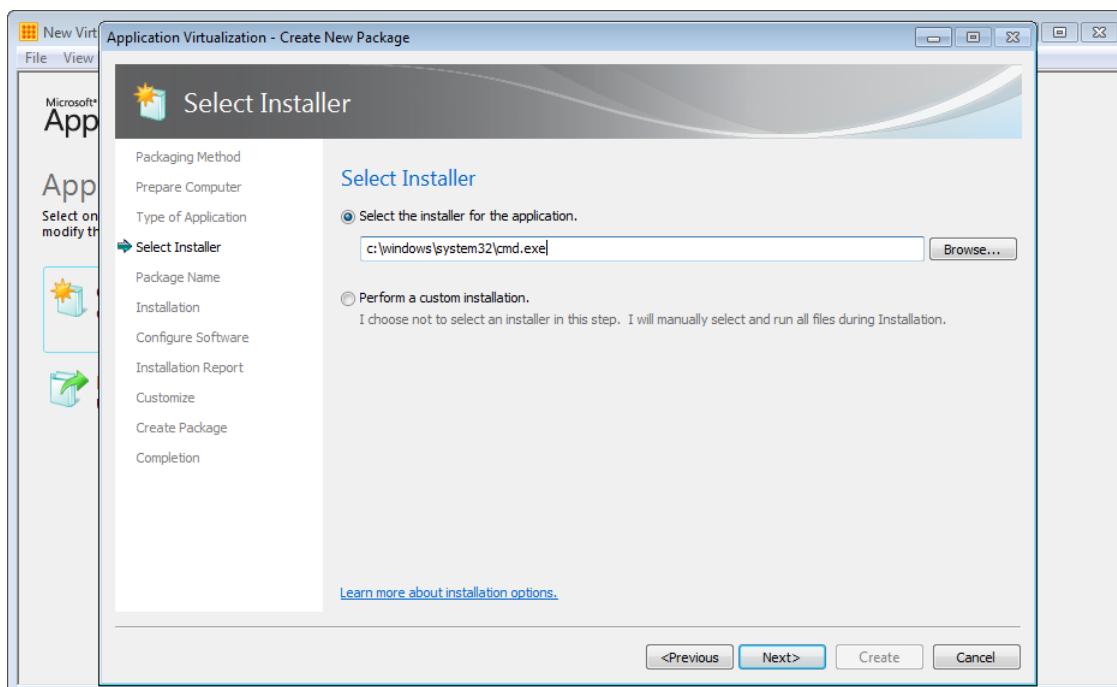


Figure 58: Select the installer - use a script or Command Prompt

- Give the package a name, adhering to your App-V package naming conventions and pay attention to the Primary Virtual Application Directory. Ensure the directory matches the folder you've configured in your automated Office setup – this should be folder on the Q drive.

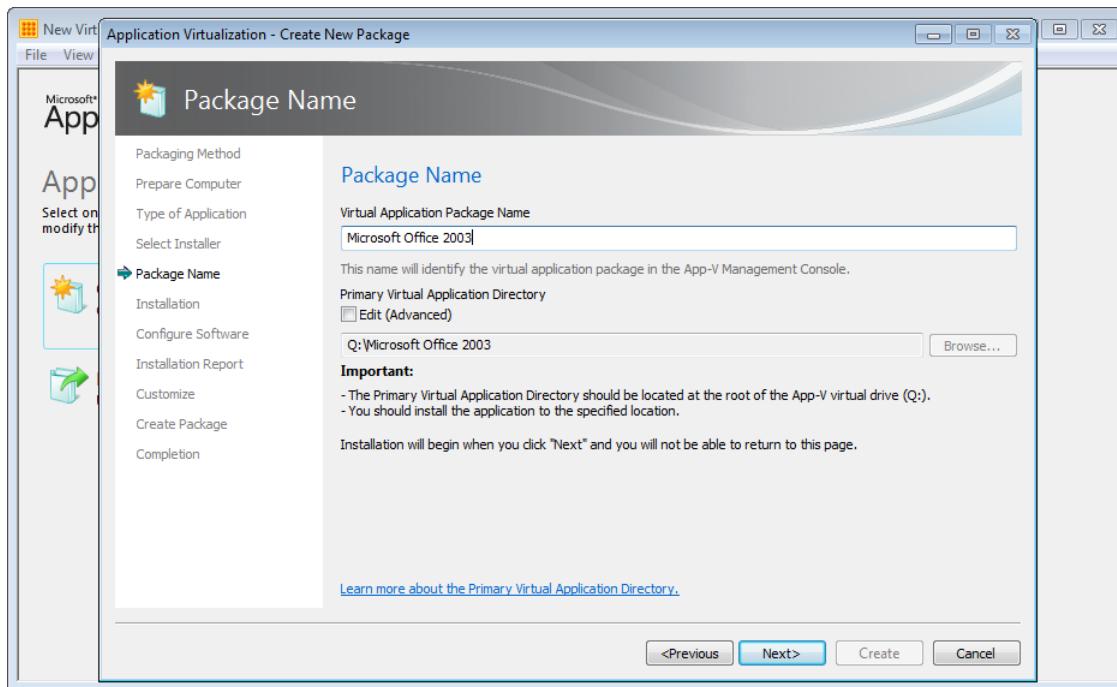


Figure 59: Enter the package name and Virtual Application Directory

6. If you've selected the install script, the Sequencer will start the script, otherwise a command prompt will appear. If so, start the script manually.

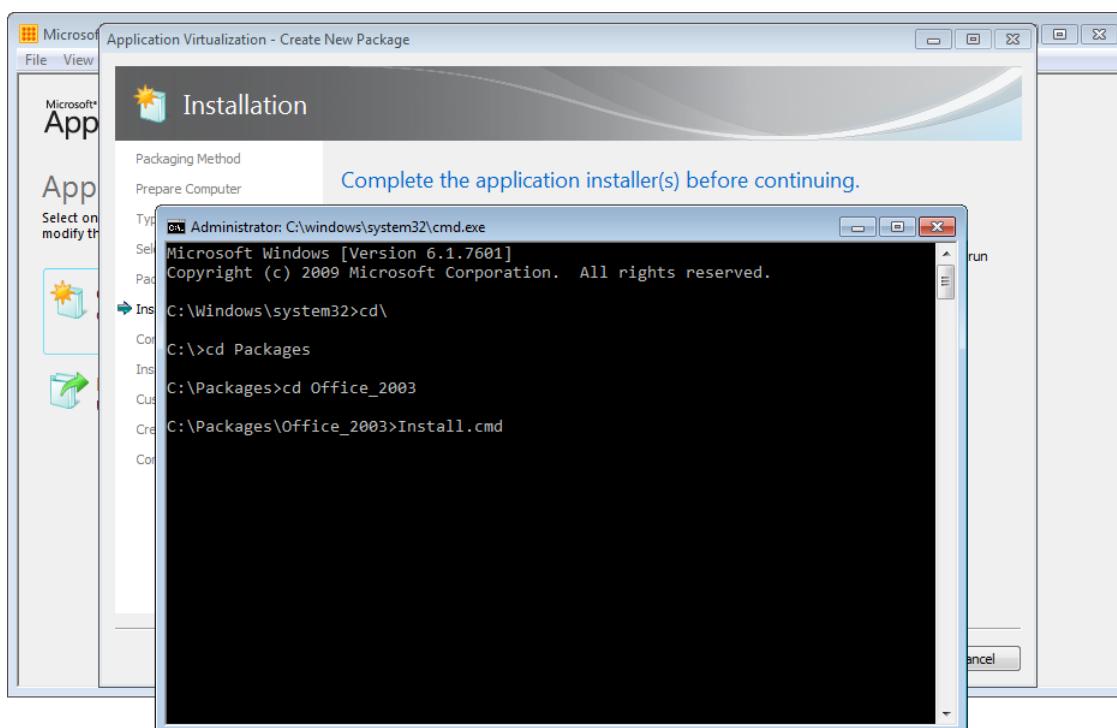


Figure 60: Running the Office install script

If you've setup everything correctly, the script will install Office, the Office Compatibility Pack and Office 2003 Service Pack 3

At this point, the install and update of the Office 2003 suite should be complete and the script will launch some of the Office applications.

7. It is recommended to start the following executables if they exist in your package:

- SETLANG.EXE
- WINWORD.EXE
- EXCEL.EXE
- POWERPNT.EXE
- MSACCESS.EXE
- VISIO.EXE
- MSPUB.EXE
- INFOPATH.EXE
- WINPROJ.EXE
- VISIO.EXE
- OIS.EXE
- MSTORE.EXE

8. Once the first run tasks have been completed, Windows Update will appear. Click Check for Updates and Windows Update should return the updates that are applicable to Office 2003 and the associated applications in this package. Ensure that you select the Office 2003 updates only – that is, deselect any Windows updates or other optional updates that should not be a part of the Office 2003 package:

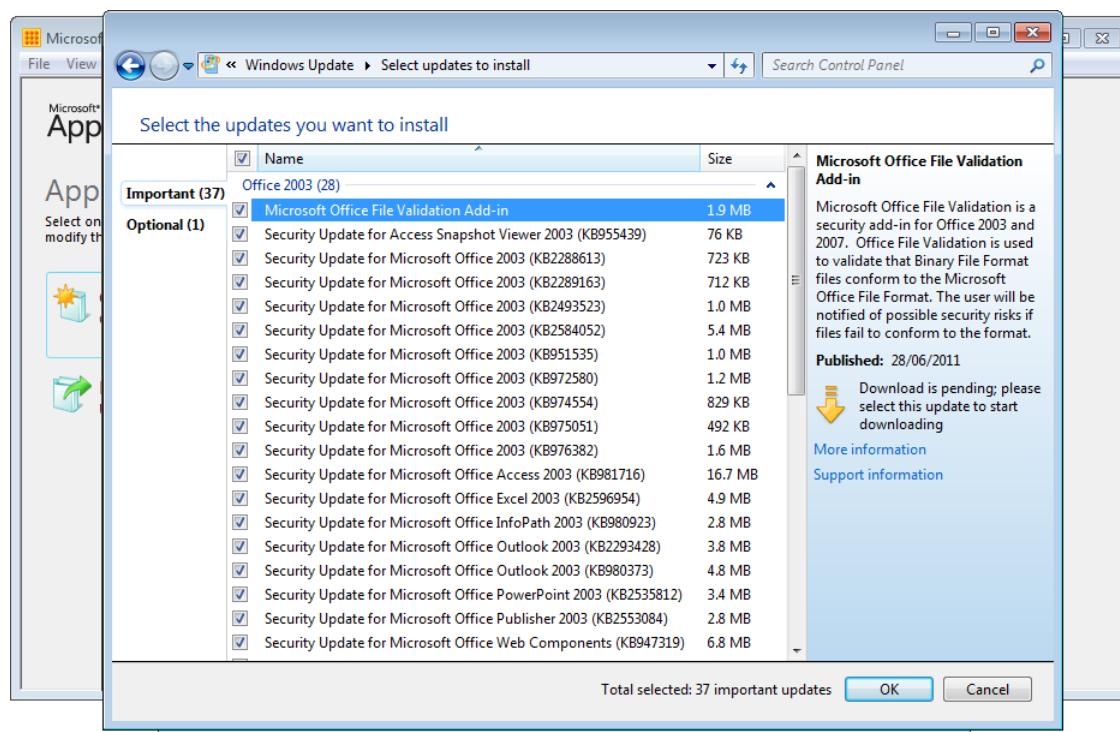


Figure 61: Select the Office 2003 updates only

9. Once you have finished installing updates, close the command prompt, if one exists, then click ‘I am finished installing’ and click Next:
10. The Sequencer will collect changes to the system and then display the Configure Software page for you to manage first run tasks. If you’ve already launched the Office applications, launching these applications again is not required. If you still need to perform this step, do **not** launch Outlook or OneNote:

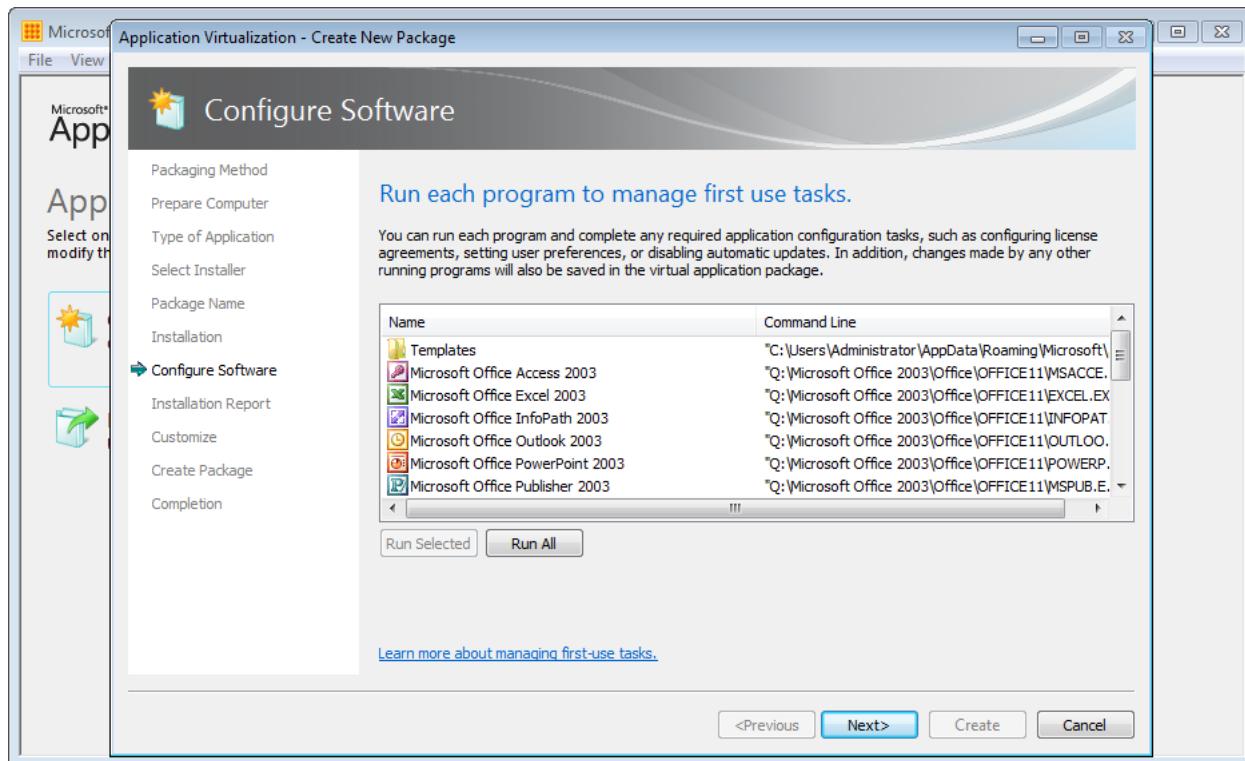


Figure 62: Configure first-run tasks for applications in the package

11. The Sequencer will now display the Installation Report so that you can view any potential issues with the package:

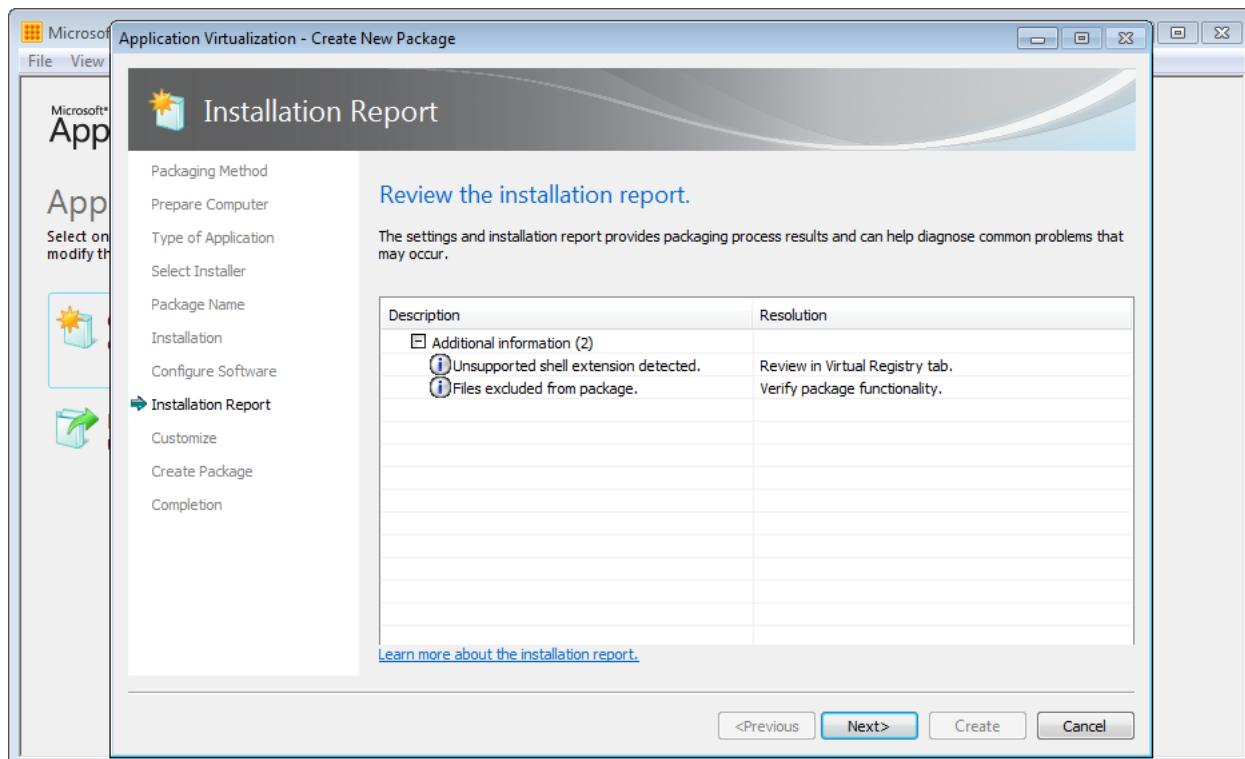


Figure 63: Review any issues discovered during sequencing

12. On the Customize page, choose to customize the package so that we can make some important post-sequencing changes to the package

13. The Sequencer will list a number of shortcuts for the detected applications in the package. We now need to customize these:

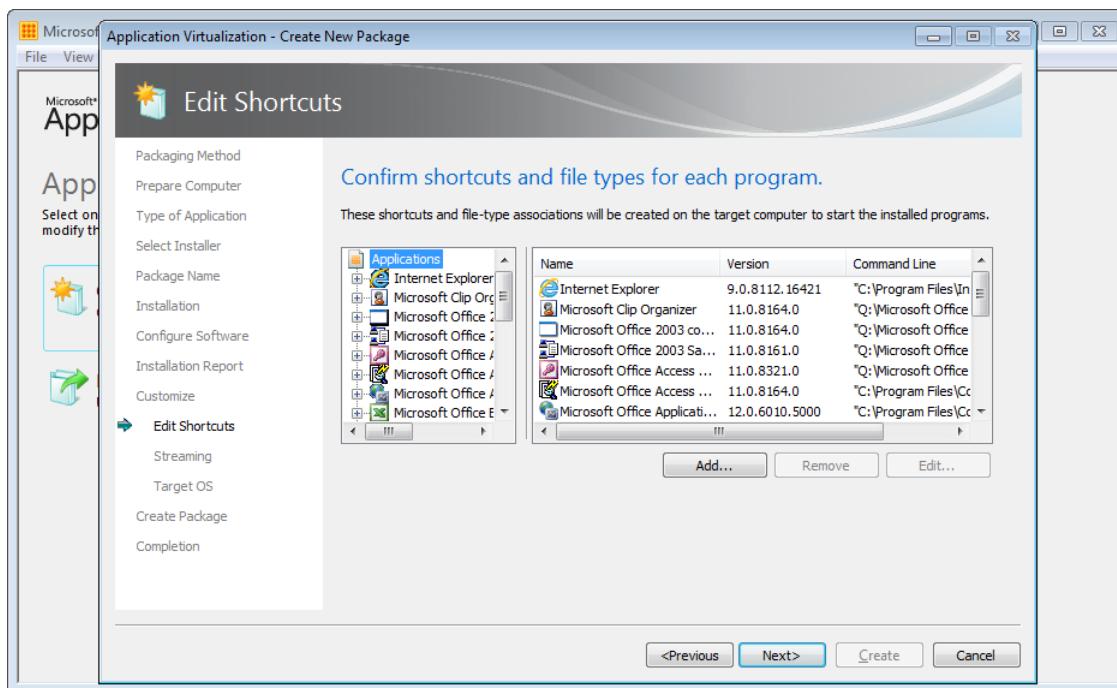


Figure 64: Edit shortcuts and file type associations

Confirm that none of the following shortcuts are required for your environment; however most deployments will need to remove the following shortcuts:

- Internet Explorer (unless you wish to provide users with a way to launch Internet Explorer within the Office 2003 package)
- Microsoft Office 2003 component
- Microsoft Open XML Converter
- Microsoft Query
- Notepad
- Outlook Item Finder
- Templates
- XML Editor

Make the following changes to the remaining shortcuts:

- **Version:** many organizations will have a package versioning standard in place. The recommended approach will be to enter the same package version or identifying number in each shortcut
- **Shortcut location:** if you have configured the Office 2003 unattended setup correctly, the correct shortcut locations for your package will have been captured, otherwise change the locations here. It is important that this location is unique if you plan to delivery multiple versions of Office
- **File type associations:** If Office 2003 is not the primary version of Office, remove the file type associations from this package to prevent FTAs from other versions of Office being overwritten. Alternatively, edit the OSD files post sequencing to remove the FTAs.

- **OSD file name:** the default OSD file name will consist of the application shortcut name and the file version. It is recommended to simplify these and make them unique across all packages

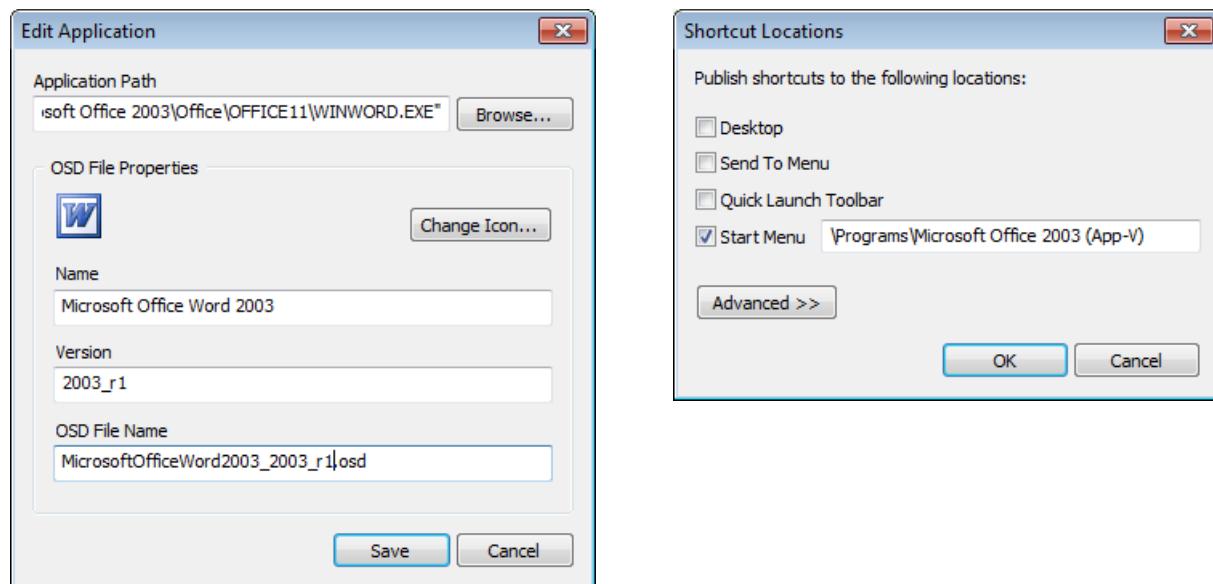


Figure 65: Application properties

14. To configure the Primary Feature Block, start the most common applications. This step is completely optional and should be used if you intend stream the application on demand (usually when targeting users instead of computers for deployment). Do **not** launch Outlook or OneNote during this step:

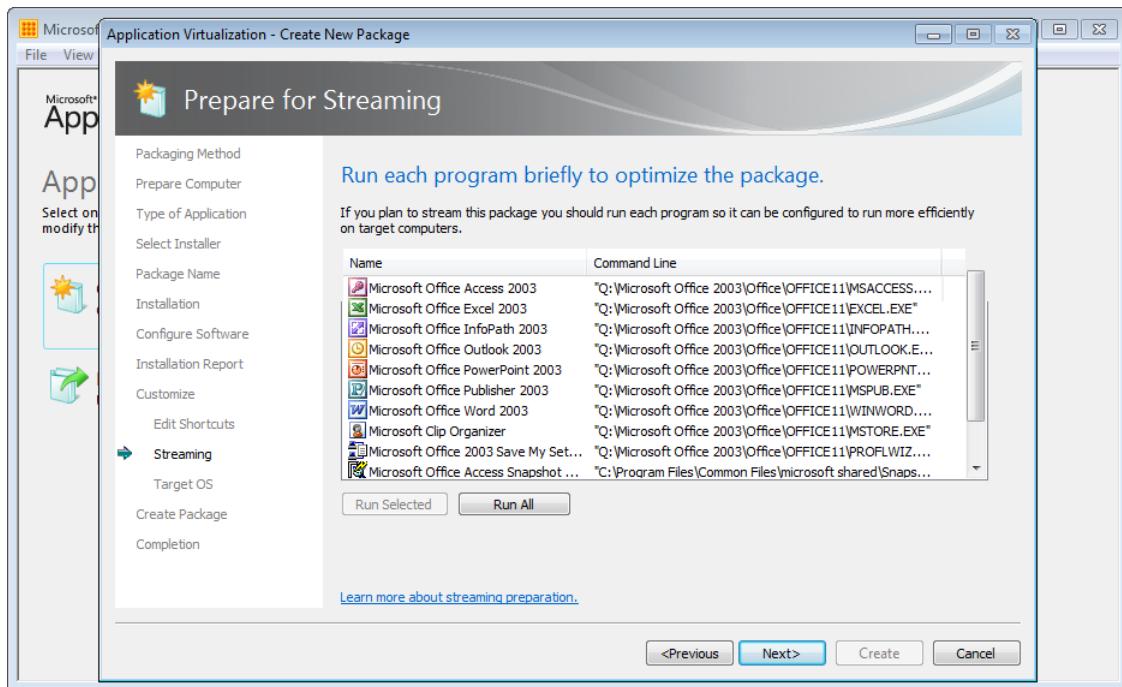


Figure 66: Creating the Primary Feature Block

15. Depending on your environment and your sequencing platform, you may wish to allow the package to execute on all operating systems. For example, if you are targeting Windows XP, Windows 7 and Windows Server 2008 R2 Remote Desktop Services, you should be able to choose to allow the package to run on all operating systems:

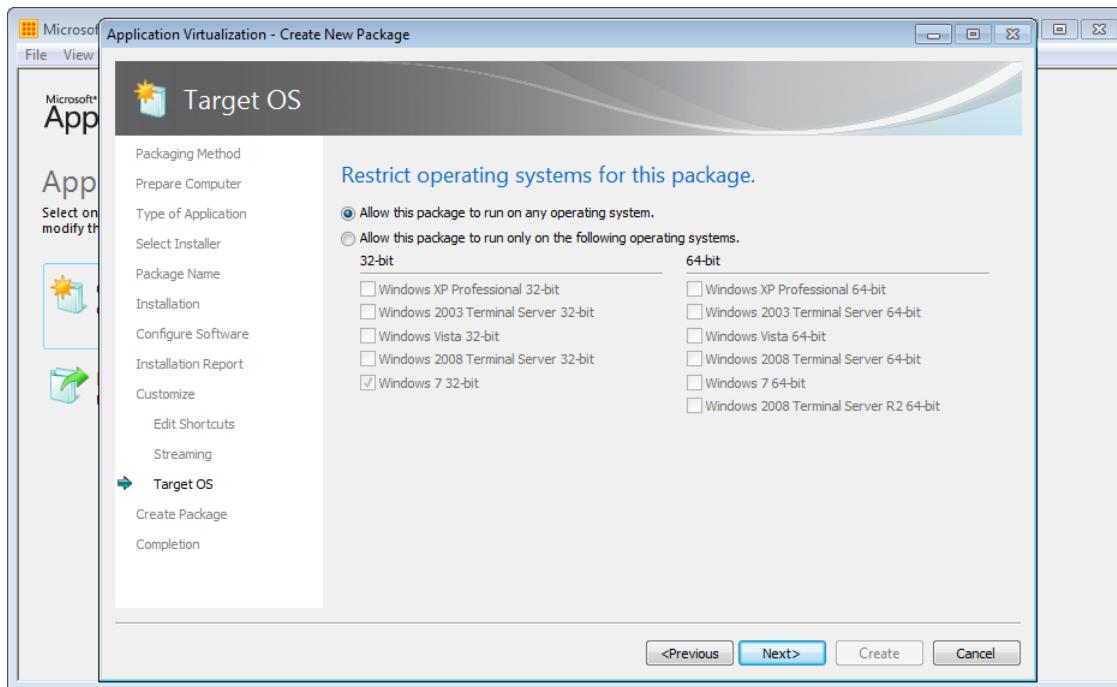


Figure 67: Selecting the target operating systems

16. Do not save the package at this point, instead continue to modify the package in the package editor before saving.
17. On the Deployment tab, enter a path that adheres to your standards. The sequencing template will ensure that the Enforce Security Descriptors, Generate Microsoft Windows Installer package and Compress Package options are enabled.

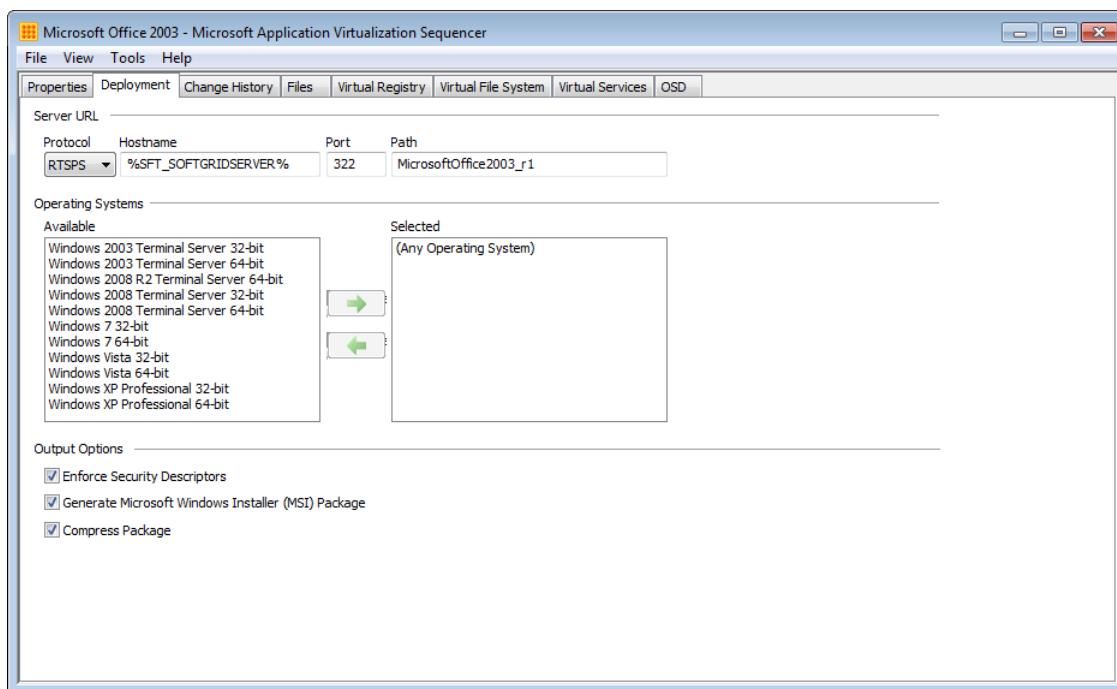


Figure 68: The Deployment tab

18. Select the Virtual Registry tab in the Sequencer and expand the following virtual registry location:

`USER\%SFT_SID%\Software\Microsoft\Office\11.0\Common\UserInfo`. Delete the following values if they exist:

- CompanyName
- UserInfo
- UserInitials
- UserName

If these values are not deleted the same user details will be stored for all users in all new documents.

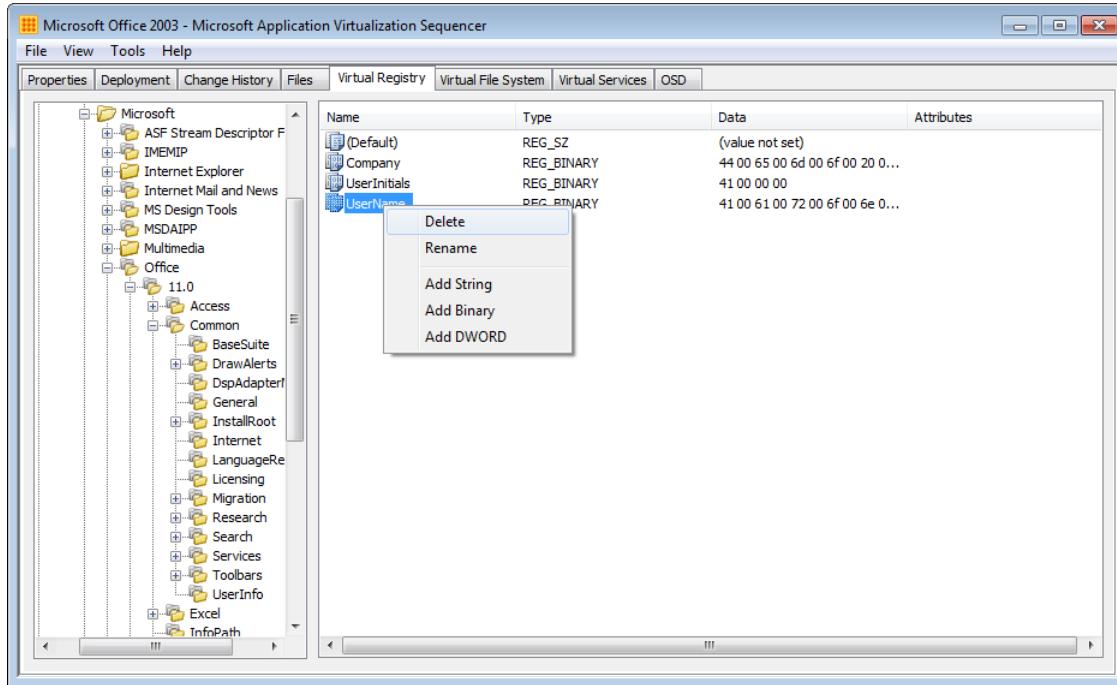


Figure 69:Editing the Virtual Registry

19. On the Virtual Services tab, set the **Machine Debug Manager** service to Disabled.

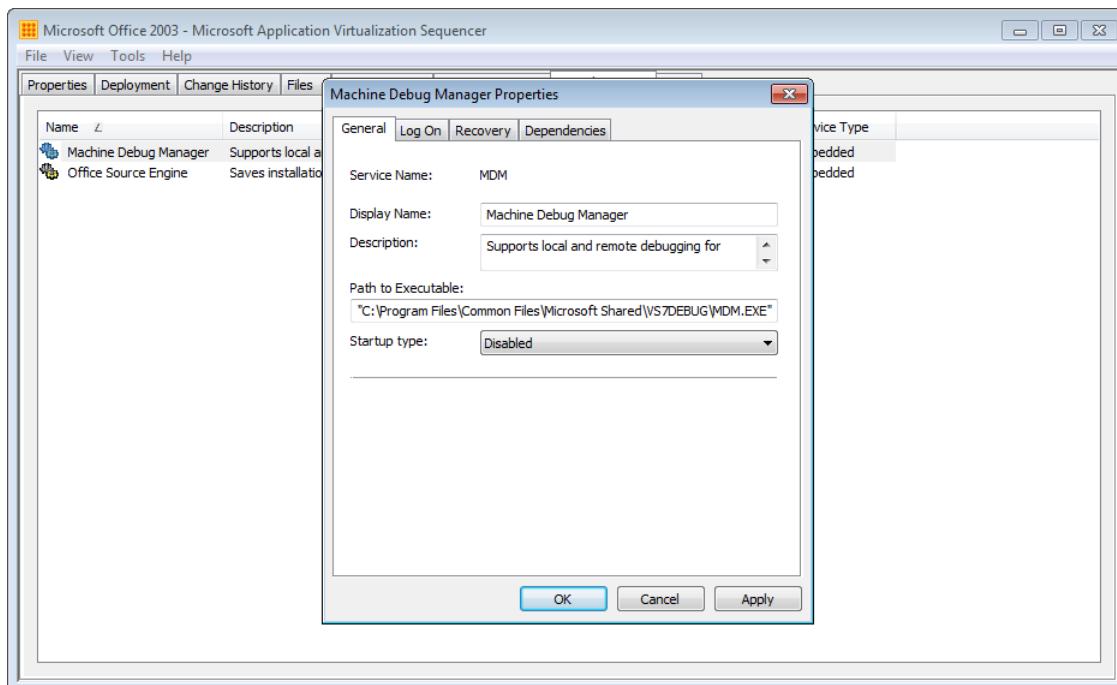


Figure 70: Disable the Machine Debug Manager service

8.4.1 Add Pre-Launch Scripts

If you have configured AutoRecover locations for Word, Excel and PowerPoint add the following script to the Word, Excel and PowerPoint OSD files:

```
<DEPENDENCY>
    <SCRIPT EVENT="LAUNCH" TIMING="PRE" WAIT="FALSE" PROTECT="FALSE">
        <SCRIPTBODY>
            MD "%LOCALAPPDATA%\Microsoft\PowerPoint" \n
            MD "%LOCALAPPDATA%\Microsoft\Excel" \n
            MD "%LOCALAPPDATA%\Microsoft\Word" \n
        </SCRIPTBODY>
    </SCRIPT>
</DEPENDENCY>
```

8.5 Step 4: Save and Deploy the Office 2003 Package

Now save the package and copy it to a network location, ready for deployment.

Click on **File** then **Save** to save the package. Use these guidelines for saving the Office package:

- Use the same text for the Package Name on the Properties tab and the Path on the Deployment tab (e.g. MicrosoftOffice2003_x86_v1)
- Save the package to a local disk in the Sequencer. It is recommended that you save the package to the same parent folder that contains the Office setup files (e.g. C:\Packages)
- Save the package to a sub-folder that is the same as the Package Name and Path set in the package (e.g. C:\Packages\MicrosoftOffice2003_x86_v1). This will ensure that the package will stream correctly if you are using the native App-V Management Server for publishing and streaming.
- Save the Sequencer Project with the same name as the package (e.g. MicrosoftOffice2003_x86_v1)
- Copy the package out of the sequencing VM to the Content share on your network
- Revert the sequencing virtual machine to your saved snapshot

The Office 2003 package is now ready to deploy via your chosen deployment method. Deploying and Office 2003 via App-V can be achieved using any of the supported deployment methods. See this article on TechNet for more information on deployment options: [Planning and Deployment Guide for the Application Virtualization System](#)

9 Tips, Tricks and Frequently Asked Questions

9.1 Deliver Office Suites and Applications via the same method

Whilst it may be less common to virtualize the full Office suite, the Office applications such as Visio and Project are sometimes virtualized and delivered with App-V. Some environments may virtualize an Office suite and the Office applications in separate packages.

An approach where the suites and applications are delivered by separate mechanisms or separate App-V packages will result in a loss of some functionality. This is because of the isolation introduced by application virtualization – the Office applications expect a level integration that won't be possible.

This can be illustrated with the following scenario:

1. Word 2010 is installed (or even virtualized) along with Office 2010 Professional Plus
2. Visio 2010 is delivered via App-V
3. The user creates a Visio document, selects objects in the document and copies them to the clipboard
4. Pasting from the clipboard into Word, results in the following error:

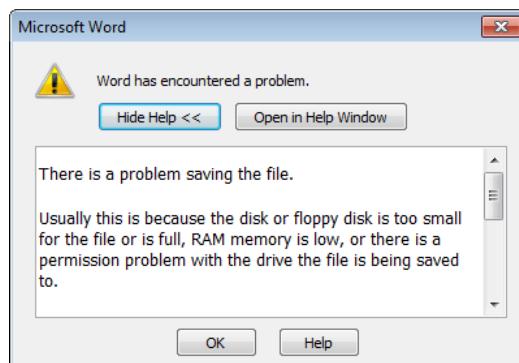


Figure 71: Error when pasting from virtualized Visio into installed Word

5. After clicking OK results in the objects being pasted into Word as a picture instead of an embedded Visio object, as would be normally expected

This obviously affects the user experience and might result in a help desk call. It is highly recommended that unless you can manage user expectations; deliver Office suits and applications using the same method.

9.2 Juggling multiple versions of Office

File Type Associations

If you are delivering multiple versions of Office (either all virtualized or mixed with installed) file type associations will need to be managed. Windows can only handle one default application per file type.

When sequencing Office suites and applications, modify or remove file type associations from the packages, ensuring that the primary version of Office (whether virtualized or installed) does not have file type associations overwritten by another package.

The SFTMIME command can be used to manage file type associations on the client. See [SFTMIME ADD TYPE](#) and [SFTMIME DELETE TYPE](#) for more information.

LOCAL_INTERACTION_ALLOWED

Additionally you should consider the use of LOCAL_INTERACTION_ALLOWED (LIA) carefully. Enabling LIA is generally a requirement when virtualizing your primary version of Office; however when mixing multiple versions of Office via App-V, the additional isolation provided by leaving LIA set to FALSE will reduce conflicts. Ensure you test the effect of LIA enabled and disabled in your environment.

Outlook

Although each of the Office applications can be virtualized, only a single version of Outlook is supported on Windows at a time. Isolation can be improved by fully virtualizing file system and registry locations for each package; however running multiple versions of Outlook at the same time will produce inconsistent results. It is recommended to only deliver one copy of Outlook to an end-point at a time, regardless of how it is delivered.

9.3 Sequence Suites and Applications in the same package

Dynamic Suite Composition is not supported when mixing Office packages. For example if you were to sequence Office 2010 Professional Plus in one package and Visio or Project 2010 in another package, it would be unsupported to link those packages together with DSC.

This is because DSC supports linking support applications (e.g. middleware) to a primary application, because the support application is not launched directly by the user. An Office 2010 suite package and a separate Office application package (Visio or Project) are both primary applications.

The recommended approach is to sequence Office suites and applications into the same package. Control access to the applications in the package with an application control solution that works with App-V, such as AppLocker.

9.4 Pre-cache Packages in Desktop Virtualization environments

An App-V package containing an Office suite or application can be quite large. Streaming these packages into desktop virtualization environments (Citrix XenDesktop, Citrix XenApp, VMware View etc.) at runtime can potentially be disk IO intensive.

Streaming applications can create a large amount of write IO, therefore it is highly recommended that you pre-cache packages to avoid disk performance issues and thereby adversely affect the user experience when virtualizing Office. Details on the Read-Only Cache feature of App-V 4.6 that can assist in pre-caching package can be found at the following links:

- [How to Configure a Read-only Cache on the App-V Client \(VDI\)](#)
- [How to Configure a Read-only Cache on the App-V Client \(RDS\)](#)

9.5 Reducing Package Sizes

A Microsoft Office package will contain two large folders that will never be used at runtime and are only required when updating Office:

- MSOCACHE ([Local Install Source](#))
- C:\Windows\Installer ([Windows Installer Cache](#))

To reduce the size of the Office package, these folders can be excluded from the package and instead saved for future use if the package is patched. Use the following steps during sequencing:

1. Add an exclusion to your package for %CSIDL_WINDOWS%\Installer and C:\MSOCache or %SFT_MNT%\MSOCache if you are sequencing Office
2. Sequence your application and save the package with compression enabled
3. Save the package to the Content share along with a copy of C:\Windows\Installer and MSOCache, if you are sequencing Office
4. When it comes time to update the package, copy the folders back into the sequencing machine before starting the sequencing process
5. Repeat the process once you've saved the updated package

Along with compression, this approach has a potential to reduce package sizes significantly. For example an uncompressed Office 2010 Professional Plus package can be reduced from 2.8GB to 606MB with compression and the above folders excluded.

10 Resources

This appendix lists the articles and blog posts referenced in this document.

Microsoft has a number of resources on virtualizing Office with App-V. This includes knowledgebase and TechNet articles and blog posts, written both by Microsoft and 3rd parties. These resources cover most of what is required to virtualize Office applications; however an administrator should still plan any virtualized Office deployment using the standard deployment documentation.

10.1 Deployment Resources

The following documents and articles are recommended reading for planning your Office deployments before attempting to virtualize Office:

- [Office 2010, 2007 Technical Resources, Tools, Guidance](#)
- [For IT professionals: Getting started with Microsoft Office 2010](#)
- [Pilot and Deploy Microsoft Office 2010](#)
- [Deployment guide for Microsoft Office 2010](#)
- [Pilot and Deploy Microsoft Office 2007](#)
- [Office 2003 Resource Kit: Customizing Office 2003](#)

10.2 Application Virtualization Resources

This document has been built upon the hard work of the authors of the following articles.

10.2.1 Microsoft Support Articles

The following articles are available on Microsoft Support (support.microsoft.com):

- [Information about how to use Office 2010 suites and programs on a computer that is running another version of Office](#)
- [Prescriptive Guidance for Sequencing Office 2010 in App-V 4.6 SP1](#)
- [Prescriptive guidance for sequencing Office 2010 using Microsoft App-V 4.5 or 4.6](#)
- [Known issues and limitations when using virtualized Office 2010 applications on App-V 4.6 and App-V 4.5 SP2 clients](#)
- [Client virtualization support for the Lync 2010 client and the Lync 2010 Group Chat client](#)

- [Client Virtualization in Microsoft Lync 2010](#)
- [Prescriptive guidance for sequencing 2007 Office programs in Microsoft App-V](#)
- [Problems that you may experience when you try to use Microsoft App-V to sequence Microsoft Office programs in Microsoft Windows 2000, Windows XP, or Windows Server 2003](#)
- [Office documents may not open in the expected version when using multiple versions of Office with Microsoft App-V](#)

10.2.2 Microsoft Blog Articles

The following articles are available on various Microsoft blogs:

- [Sequencing Office 2010 for App-V - Part 1: Considerations](#)
- [Sequencing Office 2010 for App-V, Part 2 – Preparing the Sequencing Workstation](#)
- [Sequencing Office 2010 for App-V, Part 3 – The Actual Sequencing Part](#)
- [Sequencing Office 2010 for App-V, Part 4 – Getting it to your users](#)
- [Sequencing Office Professional 2007 in 30 easy steps](#)