

VMware Dynamic Environment Manager Administration Guide

VMware Dynamic Environment Manager 9.10



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Contents

1 About VMware Dynamic Environment Manager™ Administration Guide 7

2 Using Easy Start 8

3 Configuring Application and Windows Settings 9

Flex Configuration Files 10

Download Configuration Templates 10

Create a Flex Configuration File by Using Application Profiler 11

Create a Flex Configuration File by Using an Application Template 12

Create a Flex Configuration File by Using Windows Common Settings 13

Import a Flex Configuration File From Another Location or Environment 14

Export a Flex Configuration File to Another Location or Environment 15

Create a Custom Flex Configuration File 15

Configuring Settings for Storing and Retrieving Profile Information 16

Section Headers 16

Wildcard Support in Exclude Section Headers 17

Folder Tokens 18

Profile Browsing 18

Using the Advanced Tab 18

Using the User Environment Tab 19

Using the Information Tab 22

Manage Selected Windows Common Settings and Application Templates 22

Retiring, Deleting, and Disabling Flex Configuration Files 23

Retire a Flex Configuration File 23

Delete a Flex Configuration File 24

Disable a Flex Configuration File 24

Using the Profile Cleanup Editor 24

Create Profile Cleanup Content, Based on Import/Export Settings 25

Configuring Predefined Settings for Applications and Windows Settings 26

Create Predefined Settings 26

Import Predefined Settings 26

Use Multiple Predefined Settings 27

Working with Placeholders 27

Using DirectFlex 28

Configure Applications for Working with DirectFlex 29

Application Virtualization Support 29

Importing and Exporting DirectFlex Settings 29

4	Configuring User Environment Settings	30
	Processing Order	31
	Use a 32-Bit Path to Program Files on 64-Bit Systems	32
	Edit Conditions for Multiple User Environment Settings	32
	Configure ADMX-Based Settings	32
	Import ADMX Templates	33
	Create Definitions for ADMX-Based Settings	33
	Configure App Volumes Settings	34
	Configure Application Blocking	34
	Enable and Configure Application Blocking	35
	Allow and Block Additional Applications	35
	Work with Multiple Types of Application Blocking	36
	Configure a Drive Mapping	37
	Configure Environment Variables	38
	Configure File Type Associations	38
	Configure Files and Folders	39
	Configure Folder Redirection	39
	Configure Horizon Smart Policies for User Environment Settings	40
	Configure Logon and Logoff Tasks	42
	Configure Printer Mappings	43
	Configure Privilege Elevation	43
	Enable and Configure Privilege Elevation	44
	Configure Applications for Privilege Elevation	45
	Configure Registry Settings	46
	Configure Shortcuts	46
	Configure Triggered Tasks	47
	Configure Display Language	49
	Configure Hide Drives	50
	Configure Policy Settings	50
5	Configuring Computer Environment Settings	51
	Configure Horizon Smart Policies for Computer Environment Settings	51
6	Tracking Configuration File Changes	54
	Enable Configuration Changelog	54
7	Managing Conditions	56
	Adding a Name, Label, and Tag	58
	Using 32-Bit Path to Program Files on 64-Bit Systems	58
	Add Conditions to Personalization or User Environment Settings	58
	Combine Conditions	59

[Creating Condition Groups](#) 59

[Creating Condition Sets](#) 60

8 Application Migration 61

[Create an Application Migration Configuration](#) 61

[Creating Custom Migration XML Files](#) 62

9 Managing Multiple Environments 63

[Configure Environments](#) 64

[Configuring Environments Through Group Policy](#) 64

[Select an Environment](#) 64

10 Using VMware Dynamic Environment Manager in a Silo Environment 66

11 Integrating VMware Dynamic Environment Manager with Microsoft App-V 67

[App-V 4.x Integration](#) 68

[Configure App-V 4.x](#) 68

[Integrate App-V 4.x to a Flex Configuration File](#) 69

[App-V 5.x Integration](#) 69

[Configure App-V 5.x](#) 70

[Configure DirectFlex for an App-V 5.x Package](#) 70

12 Using VMware Dynamic Environment Manager Self-Support 72

[Reset an Application to Default Settings](#) 72

[Restore Application Settings From Backup](#) 73

[Collecting Logs From the Self-Support Tool](#) 73

[Configure the Self-Support Tool Language and Tray Settings](#) 73

[Customize the Self-Support Tool Logo](#) 74

13 Troubleshooting VMware Dynamic Environment Manager 75

[Working with VMware Dynamic Environment Manager Logs](#) 75

[Troubleshooting Common VMware Dynamic Environment Manager Issues](#) 80

[Troubleshoot DirectFlex Applications](#) 80

[Troubleshoot Working with Antivirus Applications](#) 81

[Troubleshoot Folder Redirection](#) 82

[Troubleshoot Cache and Temporary Files](#) 82

[Troubleshoot FlexEngine Log Files](#) 83

[Troubleshoot the Configuration Share](#) 84

[Troubleshoot Logoff Commands](#) 85

[Troubleshoot Working with Horizon](#) 85

[Troubleshoot Settings After Performing a Proof of Concept with Easy Start](#) 86

[Troubleshoot When the Configuration Share is Unavailable](#) 86

[Troubleshoot GPO Settings](#) 87

14 Lock Down Access to the Management Console 88

15 VMware Dynamic Environment Manager COM Support 89

16 Import Status Flag Details 90

17 Generating Reports About Flex Configuration Files and User Environment Settings
91

About VMware Dynamic Environment Manager™ Administration Guide

1

The VMware Dynamic Environment Manager Administration Guide provides information about administering VMware Dynamic Environment Manager on Terminal Services or Windows desktop environments.

Intended Audience

This information is intended for experienced Windows administrators that want to administer VMware Dynamic Environment Manager in their Terminal Services or Windows desktop environments to provide dynamic management of desktop, user, and application settings.

Using Easy Start

2

Use the easy start option to install a default set of VMware Dynamic Environment Manager configuration items quickly.

By using Easy Start you install a default set of VMware Dynamic Environment Manager configuration items, which helps you get familiar with the personalization, application management, user environment settings, and conditions functionality. You can use the installed items for a proof of concept or use them as a starting point for your own implementation.

You can select more than one version of Microsoft Office when installing the Flex configuration files and user environment shortcuts.

Configuring Application and Windows Settings

3

With VMware Dynamic Environment Manager, you can reconfigure the default settings of an application, if they are not appropriate for your environment. You can define which application settings can be personalized and which ones always remain at their default values. You can create any combination of policy-enforced settings and user personalization.

With VMware Dynamic Environment Manager, you can also manage certain user environment settings when an application starts, such as mapping drives and printers, applying custom file, folder, and registry settings, and running custom tasks.

Application configuration management enables IT administrators to manage end-user environments easily. Administrators can define settings and configurations for all users to guarantee compliance and provide a consistent environment.

Note Before you configure these settings, ensure that you understand the processing order described in [Processing Order](#).

This chapter includes the following topics:

- [Flex Configuration Files](#)
- [Download Configuration Templates](#)
- [Create a Flex Configuration File by Using Application Profiler](#)
- [Create a Flex Configuration File by Using an Application Template](#)
- [Create a Flex Configuration File by Using Windows Common Settings](#)
- [Import a Flex Configuration File From Another Location or Environment](#)
- [Export a Flex Configuration File to Another Location or Environment](#)
- [Create a Custom Flex Configuration File](#)
- [Configuring Settings for Storing and Retrieving Profile Information](#)
- [Retiring, Deleting, and Disabling Flex Configuration Files](#)
- [Using the Profile Cleanup Editor](#)
- [Configuring Predefined Settings for Applications and Windows Settings](#)

- [Using DirectFlex](#)

Flex Configuration Files

A Flex configuration file is a configuration file containing content specific for VMware Dynamic Environment Manager. You create and manage Flex configuration files with the Management Console.

Each application has a separate Flex configuration file that contains the locations of the settings that are managed with VMware Dynamic Environment Manager. You can either create a custom configuration file, download a configuration template, use Windows Common Settings, or use an application template.

- With a custom configuration file, you manually define the settings to manage for an application.
- Configuration templates are pre-configured Flex configuration files for popular applications. Using the Management Console, you can download the available templates directly from VMware Marketplace.
- Windows Common Settings and application templates are Flex configuration definitions for commonly used Windows settings and applications.

Download Configuration Templates

Using the Management Console, you can download configuration templates for many popular applications. Configuration templates are pre-configured Flex configuration files that are designed to facilitate the initial implementation of popular applications.

The configuration templates are starter templates that you must test in your environment and possibly modify to suit the needs of your organization.

Prerequisites

- To allow the VMware Dynamic Environment Manager Management Console to reach the configuration templates available in VMware Marketplace online, verify that the console can reach the following addresses.
 - marketplace.vmware.com
 - marketplace-download.vmware.com
 - drd6c1w7be.execute-api.us-west-1.amazonaws.com

You might need to add the preceding addresses to a whitelist for the respective proxy servers or firewalls.

- If necessary, register online for My VMware. Registration is required to access the VMware Dynamic Environment Manager configuration templates

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console and click **Download Config Template**.

The result is different the first time you select this option.

Selection	Result
First	You are prompted for your My VMware credentials.
Subsequent	The Configuration Templates Repository dialog box appears.

- 2 If this is your first time selecting the **Download Config Template** option, provide your My VMware credentials as prompted.
- 3 Select one or more templates.
- 4 Save the templates to either the General folder, which is the default folder for Flex configuration files, or a subfolder in the General folder.

You can use an existing subfolder or you can create a new subfolder. The Configuration Templates Repository dialog box displays the destination folder, the folder to which templates will be downloaded. If want to change the destination folder, click **Browse** and select a different destination folder.

Option	Description
General Folder	<ol style="list-style-type: none"> a If necessary, click Browse, select the General folder, and click OK. b Click Save and Close.
Existing Subfolder	<ol style="list-style-type: none"> a If necessary, click Browse, select the existing subfolder to save templates to, and click OK. b Click Save and Close.
New Subfolder	<ol style="list-style-type: none"> a Click Browse b Click New Folder. c Enter a name in the Folder name text box and click OK. d Click OK again. e Click Save and Close.

What to do next

Test the templates and edit them as necessary for your environment. See [Configuring Settings for Storing and Retrieving Profile Information](#).

Create a Flex Configuration File by Using Application Profiler

Application Profiler is a standalone application that simplifies the creation of Flex configuration files and predefined settings for use with VMware Dynamic Environment Manager. You can use Application Profiler to capture where an application stores its settings and automatically record this into a Flex configuration file.

Note For information on installing and configuring Application Profiler, see the *Application Profiler Administration Guide*.

Prerequisites

Install the application you want to configure on your profiling system and log in to your profiling system as an administrator.

Procedure

- 1 Start Application Profiler and click **Start Session**.
- 2 Browse to and select the application for which you want to create a Flex configuration file.
- 3 Click **OK**.

The application is opened and the Analyzing Application dialog box appears.

- 4 Change the application settings as necessary and close the application.

The locations for the application settings are saved as a Flex configuration file.

What to do next

Save the file, and import it to VMware Dynamic Environment Manager.

Create a Flex Configuration File by Using an Application Template

Use application templates to manage settings for common applications. Only a single application template can be selected for a Flex configuration file, unless you use a Microsoft Office template, which lets you select multiple application-specific templates simultaneously.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console and click **Create Config File**.
- 2 Select **Use an Application Template**.
- 3 Select the application template you want to use and click **Next**.
- 4 Browse to and select a location for the configuration file.
- 5 Enter a name for the configuration file.
- 6 (Optional) Enter a title and description.
- 7 Click **Finish**.

You successfully created a Flex configuration file from an application template.

Create a Flex Configuration File by Using Windows Common Settings

Windows Common Settings are Flex configuration definitions for standard Windows and Internet Explorer features. Instead of defining the registry or file system configuration entries manually, you can manage the user preferences by selecting one of the built-in settings in VMware Dynamic Environment Manager.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console and click **Create Config File**.
- 2 Select **Use a Windows Common Setting** and click **Next**.
- 3 Select the Windows Common Setting you want to use and click **Next**.

Option	Description
Active Setup	Active Setup configuration, as used by Internet Explorer for example.
App-V 5 User Integrations	App-V 5 publishing information.
Default applications - File type associations and protocols	File type associations and protocols. After you select this option, you can prevent messages from occasionally appearing asking users if they want to "keep using this app" when they attempt to open a file. Use the Group Policy Management Editor as follows. Navigate to the File Explorer folder, for example Computer Configuration > Policies > Administrative Templates > Windows Components > File Explorer . Next, enable the Do not show the 'new application installed' notification setting.
DPI settings	Text size (DPI) settings.
Internet Explorer – Personal Settings	Internet Explorer configuration items, such as favorites, cookies, and proxy settings.
Internet Explorer - WebCache	Internet Explorer versions 10 and 11 use the WebCache file to store cookies, history, pointers, and more. Configuring this setting has some impact on login and logout times, because the WebCache file expands in size over time.
Internet Explorer 7-11 – AutoComplete passwords	The AutoComplete passwords that Internet Explorer stores for login forms. There are two different AutoComplete password settings, depending on whether folder-redirection is configured for the Application Data folder. Select the setting that applies to your situation.
Keyboard	Keyboard-related settings, such as the keyboard layout, repeat speed, and the pointer blink rate.
Mapped network drives	Mapped network drives.
Microsoft Edge	Microsoft Edge configuration items. Note Settings are not compatible between different versions of Microsoft Edge. To support multiple versions, manage the settings through separate version-specific Flex configuration files.
Mouse	Mouse-related settings, such as pointer speed, mouse pointers, and swapping the primary and secondary buttons.

Option	Description
Multilanguage User Interface settings	The Multilanguage User Interface (MUI) language, also known as the display language.
ODBC – User DSNs	ODBC data source name configuration.
Personal Certificates	The certificates used to encrypt files (the Encrypt contents to secure data check box in the Windows Explorer file attributes). There are two different personal certificates settings, depending on whether folder redirection is configured for the Application Data folder. Select the setting that applies to your situation.
Printers	Mapped network printers.
Regional settings	Date, time, and currency formats settings.
Screensaver settings	Screensaver-related settings.
Taskbar and list of recent items	Taskbar settings, such as taskbar locking and pinning applications to the taskbar, and recently opened items.
Typed History	History of URLs entered in Internet Explorer, and paths entered in Windows Explorer.
Wallpaper	Wallpaper-related settings, including desktop slideshows on Windows 7. There are two different wallpaper settings, depending on whether folder redirection is configured for the Application Data folder. Select the setting that applies to your situation.
Windows Explorer and view settings	Explorer layout and details pane.
Windows 10 Start Menu	Start menu layout on Windows 10 Version 1703 and later.

- 4 Browse to and select a location for the configuration file.
- 5 Enter a name for the configuration file.
- 6 (Optional) Enter a title and description.
- 7 Click **Finish**.

You successfully created a Flex configuration file with a Windows Common Setting.

Import a Flex Configuration File From Another Location or Environment

A Flex configuration file can be imported from another environment or if you have silo support enabled, from another location in the current environment.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 On the **Personalization** tab, right-click **General**.
- 3 Click **Import Config File**.
- 4 Select a source environment and click **Next**.

- 5 Select the Flex configuration file you want to import.
- 6 Click **OK**.

Export a Flex Configuration File to Another Location or Environment

A Flex configuration file can be exported to another environment, to another location in the current environment, if you have silo support enabled, or to a folder.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 On the **Personalization** tab, select the Flex configuration file you want to export.
- 3 Click **Export**.
- 4 Select a destination environment or a folder and click **Next**.
- 5 Select the location where you want to export the file.
- 6 Click **OK**.

Create a Custom Flex Configuration File

Manually enter the parameters for your Flex configuration file, by creating an empty Flex configuration file.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console and click **Create Config File**.
- 2 Select **Create a custom config file** and click **Next**.
- 3 Browse to and select a location for the configuration file.
- 4 Enter a name for the configuration file.
- 5 (Optional) Enter a title and description.
- 6 Click **Finish**.

You have successfully created a custom Flex configuration file.

What to do next

To configure your custom Flex configuration file, see [Configuring Settings for Storing and Retrieving Profile Information](#).

Configuring Settings for Storing and Retrieving Profile Information

The content in the **Import / Export** editor defines the profile information that is read at login and stored at logout.

You must divide the content in sections. A section starts with a section header, which defines how the lines that follow are interpreted. Start comments with a **#** character.

Section Headers

Sections are related to either the registry or the file system. Insert the sections in the editor through the **Section** button.

Sections contain references for items to include or exclude and can refer to single items or containers. By typing `[`, a drop-down appears, from which you can select a section header.

You can use the following section headers:

Table 3-1. File System-Related Import and Export Section Headers

Option	Description
<code>[IncludeFolderTrees]</code>	Includes files and subfolders in the specified folder. Each entry refers to a folder and must start with a folder token. Wildcards are not supported.
<code>[ExcludeFolderTrees]</code>	Excludes files and subfolders in the specified folder. Each entry refers to a folder and must start with a folder token. Wildcards are not supported.
<code>[IncludeIndividualFolders]</code>	Includes only files in the specified folder. Each entry refers to a folder and must start with a folder token. Wildcards are not supported.
<code>[ExcludeIndividualFolders]</code>	Excludes only files in the specified folder. Each entry refers to a folder and must start with a folder token. Wildcards are not supported. Any subfolders of the specified folder and their files are not excluded.
<code>[IncludeFiles]</code>	Includes the specified file or if the filename contains wildcards, files. Each entry refers to a file and must start with a folder token. Wildcards are supported in the filename, but not in the path.

Table 3-1. File System-Related Import and Export Section Headers (continued)

Option	Description
[IncludeFilesRecursively]	<p>Includes the files in the folder and subfolders, if they match the specified filename or pattern.</p> <p>For example, <Desktop>*.lnk, includes all shortcut files on the desktop and in the subfolders of the desktop, recursively.</p> <p>Each entry refers to a file and must start with a folder token.</p> <p>Wildcards are supported in the filename, but not in the path.</p>
[ExcludeFiles]	<p>Excludes the specified file or if the filename contains wildcards, files.</p> <p>Each entry refers to a file and can be a filename or a full file path, starting with a folder token. Wildcards are supported in the filename, but not in the file path. If just a filename is specified, the exclusion is applied to all files that are processed by one of the [Include...] sections. If a complete path is specified, the exclusion will only be applied to files in that particular folder.</p>

All entries for the registry-related import and export section headers must start with **HKCU** and do not support wildcards.

Table 3-2. Registry-Related Import and Export Section Headers

Option	Description
[IncludeRegistryTrees]	Includes the values and subkeys of the specified key.
[ExcludeRegistryTrees]	Excludes the values and subkeys of the specified key.
[IncludeIndividualRegistryKeys]	Includes only the values of the specified key.
[ExcludeIndividualRegistryKeys]	<p>Excludes only the values of the specified key.</p> <p>Any subkeys of the specified key and their values are not excluded.</p>
[IncludeIndividualRegistryValues]	<p>Includes the specified value.</p> <p>Use a trailing backslash to indicate the default value.</p>
[ExcludeIndividualRegistryValues]	Excludes the specified value.

Wildcard Support in Exclude Section Headers

Folder and registry key paths in exclude section headers can contain wildcards using the special **[MATCHALL]** and **[MATCHONE]** tokens, which correspond to the * and ? wildcards.

Wildcard tokens exclude settings for applications that use a random name for one of their folders or registry keys.

Note Do not use tokens in the filename or registry value parts of paths.

Example: Manage the Settings of an App Without Including the Caches

If you have an application that stores its settings in `<AppData>\Vendor\App` and `HKCU\Software\Vendor\App`, supports multiple configurations with randomly named subfolders and subkeys, and maintains a large cache for each configuration as a performance optimization, you must configure the sections in the following way:

```
[IncludeFolderTrees]
<AppData>\Vendor\App
[ExcludeFolderTrees]
<AppData>\Vendor\App\[MATCHALL]\Cache

[IncludeRegistryTrees]
HKCU\Software\Vendor\App
[ExcludeRegistryTrees]
HKCU\Software\Vendor\App\[MATCHALL]\Cache
```

Folder Tokens

VMware Dynamic Environment Manager uses folder tokens to refer to common profile folders.

All entries in sections that refer to folders must start with a folder token. You can insert folder tokens in the editor by using the **Folder Token** button in the ribbon. By typing a `<` character, a drop-down menu appears, from which you can also select a folder token.

You can use the following folder tokens: `<AppData>`, `<Cookies>`, `<Desktop>`, `<Favorites>`, `<LocalAppData>`, `<NetHood>`, `<Personal>`, `<PrintHood>`, `<ProgramsMenu>`, `<RecentFiles>`, `<SendTo>`, `<StartMenu>`, `<StartupMenu>`, and `<UserProfile>`.

Profile Browsing

With profile browsing you can easily navigate through registry and file system profile paths by selecting registry and file system information from drop-down menus in the **Import/Export** editor.

To enable profile browsing for the local profile, click **Browse Local Profile** in the **Personalization** ribbon. You can also browse through other user profiles by clicking **Browse Other Profile**.

Note **Browse Other Profile** is only available for administrators.

If you are using a header section to include only folders and type a `\` character, a drop-down list of subfolders located in the previously entered folder appears. You can also browse a list of subkeys and values by using a registry header section.

The editor uses different colors to distinguish different types of content. Section headers are displayed in blue, content entries in black, comments in green, and errors are indicated in red with a squiggly underline.

Using the Advanced Tab

In the Advanced tab, you can configure file processing, skipping large or old files, and OS-specific settings.

FlexEngine usually processes all configuration files in the General folder that the user has NTFS read access to at logon and logoff. To change this, turn off the **Process during logon and logoff** option. Use this option to disable processing of a Flex configuration file. The option is also automatically turned off if you enable DirectFlex or configure App-V 4.x integration for a Flex configuration file.

You can optionally specify a maximum size and a maximum age for files that are included in a profile archive. If files larger than the specified size are encountered, they are skipped and the filename and size are added to the log file, if logging is enabled. Files that were last modified more than the specified number of days ago are skipped, while logging the filenames and last modification dates.

The profile archives created by VMware Dynamic Environment Manager can be used across different Windows versions. For instance settings saved for an application on Windows XP can be imported on Windows 7. To manage certain settings per OS, click **Settings are OS-specific**. If you enable it, profile archives created on a certain Windows version will only be read back in sessions that are running on that same Windows version.

Using the User Environment Tab

If DirectFlex is enabled or App-V 4.x integration is configured, user environment settings can be defined in the **User Environment** tab.

The following user environment settings can be configured on Flex configuration files:

Option	Description
Drive Mapping	Create a drive mapping.
Files and Folders	Import file and folder information.
Printer Mapping	Create a printer mapping.
Registry Settings	Import registry settings.
Task	Run a command.

The **Add** drop-down button is used to add user environment settings, afterwards, the details can be modified with **Edit**, duplicated with **Duplicate**, and settings can be removed with **Remove**.

Within a settings type, user environment settings are evaluated in the order in which they are specified. The order can be changed using the arrow buttons.

The same actions can be performed from the context menu, which also contains options to enable and disable a user environment setting.

User environment settings must have a name and can optionally also have a label. The name cannot be modified later.

Using Conditions

User environment settings can have conditions that must be met for the setting to be processed.

By default, no conditions are applied, and the settings are processed always. You can reference condition sets, which are centrally defined collections of conditions.

Configure Drive Mapping

Associate a local drive letter with a shared storage area over the network.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Select a Flex configuration file and click the **User Environment** tab.
- 3 Click **Add** and select **Drive Mapping**.
- 4 Enter a name for the settings definition.
- 5 Configure the drive mapping settings.

Option	Description
Drive letter	The drive letter to assign.
Remote path	The UNC path of the share. Can contain environment variables.
Friendly name	(Optional) The description that appears in Windows Explorer. Only available if Run asynchronously is enabled.
Skip if drive letter is in use	(Optional) If enabled, the drive is not mapped if the specified drive letter is in use. If not enabled, the existing mapping is removed.
Run once	(Optional) If enabled, the drive mapping only occurs once.
Undo at application exit	(Optional) If enabled, the drive is unmapped when the DirectFlex or App-V application exits.
Run asynchronously	(Optional) If enabled, the drive mapping occurs in the background. If not enabled, FlexEngine waits for the drive mapping to finish before continuing.

Note You cannot select **Run once** and **Undo at application exit** at the same time.

- 6 Click **Save**.

Configure Files and Folders

Add custom files and folders to the user environment.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Select a Flex configuration file and click the **User Environment** tab.
- 3 Click **Add** and select **Files and Folders**.
- 4 Enter a name for the settings definition.
- 5 Click **Create** and copy files and folders into the provided folder structure.
- 6 Click **Done**.
- 7 Select **Run once** if you want the settings to be imported only once.
- 8 Click **Save**.

Configure a Printer Mapping

Associate a network printer.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Select a Flex configuration file and click the **User Environment** tab.
- 3 Click **Add** and select **Printer Mapping**.
- 4 Enter a name for the settings definition.
- 5 Configure the printer mapping settings.

Option	Description
Remote path	The UNC path of the share. Can contain environment variables. On Windows XP and Windows Server 2003 the Browse functionality is not available.
Default printer	(Optional) If enabled, the printer is marked as the default.
Run once	(Optional) If enabled, the printer mapping only occurs once.
Undo at application exit	(Optional) If enabled, the printer is unmapped when the DirectFlex or App-V application exits.
Run asynchronously	(Optional) If enabled, the printer mapping occurs in the background. If not enabled, FlexEngine waits for the printer mapping to finish before continuing.

Note You cannot use **Run once** and **Undo at application exit** at the same time.

- 6 Click **Save**.

Configure Registry Settings

Configure the registry settings of the user environment.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Select a Flex configuration file and click the **User Environment** tab.
- 3 Click **Add** and select **Registry Settings**.
- 4 Enter a name for the settings definition.
- 5 Click **Create** and select whether to use an empty .REG file or import a .REG file.
If you selected **Use empty .REG file**, make the necessary changes to the file.
- 6 Select **Run once** if you want the settings to be imported only once.
- 7 Click **Save**.

Configure Import Task and Export Task

You can use user environment tasks to run commands before or after a profile archive import (Pre-Import or Post-Import) and before or after a profile archive export (Pre-Export or Post-Export).

Tasks run in the background, so they cannot be used to start applications or anything else requiring user interaction.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Select a Flex configuration file and click the **User Environment** tab.
- 3 Click **Add** and select **Pre-Import Task**, **Post-Import Task**, **Pre-Export Task**, or **Post-Export Task**.
- 4 Enter a name for the settings definition.
- 5 Configure the import and export task settings.

Option	Description
Command	The command to run. It can contain environment variables. If you specify a path starting with C:\Program Files, C:\Program Files (x86) or a localized equivalent, a button appears in front of the path. If you click it, you can convert the start of the path to %ProgramFiles% and resolve that variable to the 32-bit Program Files folder on 64-bit systems.
Timeout	(Optional) The amount of time FlexEngine waits for the command to complete. If the command does not complete during this interval, FlexEngine continues. If not configured, FlexEngine waits indefinitely for the command to complete. The Timeout setting is not available if Run asynchronously is enabled.
Run once	(Optional) If enabled, the task only runs once.
Run asynchronously	(Optional) If enabled, FlexEngine runs the command in the background, without waiting for it to complete. Not available for tasks that run before profile archive import or export.

Note For export tasks you cannot select **Run once** and **Run asynchronously** at the same time.

- 6 Click **Save**.

Using the Information Tab

The Information tab shows the location of the configuration file and allows specifying a title and description.

You can also enter comments for the configuration file. This is a free-format text field that is not processed by FlexEngine. A summary is displayed of all relevant configuration options at the end.

Manage Selected Windows Common Settings and Application Templates

You can expand, edit, and remove a referenced Windows Common Setting or one or more application templates in the **Import / Export** tab.

If you expand the setting or template, the reference to the built-in definitions is removed. If these definitions are updated in a future version of the Management Console, the new settings are not reflected in this Flex configuration file.

When editing a Flex configuration file containing Microsoft Office application templates, you can select templates of additional Office applications or remove previously selected ones.

When editing a Flex configuration file containing a non-Microsoft Office application template, it is only possible to remove the selected template.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 In the **Import / Export tab** click **Manage**.
- 3 From the drop-down menu select **Expand**, **Edit**, or **Remove**, depending on your situation.

Retiring, Deleting, and Disabling Flex Configuration Files

If you want to temporarily or permanently stop managing the settings for a certain application, you can either delete, retire, or disable its Flex configuration file.

The difference between retiring and deleting a Flex configuration file is in the profile archives and profile archive backups of that file.

- By retiring a Flex configuration file, you delete the corresponding profile archive and profile archive backups when a user logs out, but you do not delete the Flex configuration file.
- By deleting a Flex configuration file, you delete the file only. The corresponding profile archive and profile archive backups remain unchanged.

To delete a Flex configuration file completely, you must retire the file, wait for the users to log in and log out, and delete the Flex configuration file.

If you want to temporarily prevent FlexEngine from processing a certain Flex configuration file, you can disable it. When FlexEngine encounters a disabled configuration file, it logs a message stating that the disabled file is skipped, without performing an import or export.

Retire a Flex Configuration File

When you retire a Flex configuration file, you mark the profile archives and profile archive backups of the file for deletion. The deletion is completed the next time the users log out. Retired Flex configuration files can be reactivated later.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Right-click on the Flex configuration file you want to retire and click **Retire**.
- 3 In the pop-up window, confirm that you want to retire the file.

The application title is grayed out, indicating it is retired. The profile archives and profile archive backups are deleted when a user logs out.

What to do next

[Delete a Flex Configuration File](#)

Delete a Flex Configuration File

When you delete a Flex configuration file, you delete only the file. To delete the corresponding profile archive and profile archive backups, you must retire the file first.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Right-click on the Flex configuration file that you want to delete and click **Delete**.
- 3 In the pop-up window, confirm that you want to delete the file.
- 4 Select the related files you also want to delete and click **Delete**.

Disable a Flex Configuration File

You can temporarily prevent FlexEngine from processing a certain Flex configuration file.

Disabling a Flex configuration file does not affect the user profile archives or profile archive backups.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Right-click on the Flex configuration file that you want to disable and click **Disable**.

The application title is grayed out, with **(DISABLED)** appearing next to it.

Using the Profile Cleanup Editor

With the Profile Cleanup editor, you can remove individual settings from roaming or local profiles when you start managing them with VMware Dynamic Environment Manager.

By using VMware Dynamic Environment Manager, you can achieve an easy transition from conventional roaming profiles to well-managed user profiles. Individual applications can be migrated from roaming profiles to VMware Dynamic Environment Manager at any time.

In addition, you can use the Profile Cleanup editor to clean profile fragments left by uninstalled applications, which increase login and logout times. When using the Profile Cleanup feature, roaming profiles are less prone to challenges created by profile growth. You can enter the registry and file system information to be deleted at logout from the **Profile Cleanup** tab.

You can use the following section headers in the Profile Cleanup editor:

Table 3-3. File System-Related Profile Cleanup Section Headers.

Option	Description
[DeleteFolderTrees]	Deletes files and subfolders in the specified folder. Each entry refers to a folder and must start with a folder token. Wildcards are not supported.
[DeleteFiles]	Deletes the specified file or if the filename contains wildcards, files in the folder. Each entry refers to a file and must start with a folder token. Wildcards are supported in the filename, but not in the path.
[DeleteFilesRecursively]	Deletes the specified file or if the filename contains wildcards, files in the folder and subfolders. Each entry refers to a file and must start with a folder token. Wildcards are supported in the filename, but not in the path.

All entries for the registry-related profile cleanup section headers must start with **HKCU** and do not support wildcards.

Table 3-4. Registry-Related Profile Cleanup Section Headers

Option	Description
[DeleteRegistryTrees]	Deletes the values and subkeys of the specified key.
[DeleteRegistryValues]	Deletes the specified value.
Note Use a trailing backslash to indicate the default value.	

Create Profile Cleanup Content, Based on Import/Export Settings

Configure VMware Dynamic Environment Manager to create Profile Cleanup content automatically, based on the settings for retrieving and storing profile information, that are defined in the **Import/Export** tab.

Note Windows Common Settings cannot be converted. Application templates can always be converted. In admin-specified Import/Export content only the **[IncludeFiles]**, **[IncludeFilesRecursively]**, **[IncludeFolderTrees]**, **[IncludeRegistryTrees]**, and **[IncludeIndividualRegistryValues]** sections can be converted.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Select the application that you want to configure, and open the **Profile Cleanup** tab.
- 3 Click **Copy** in the top-right corner of the tab.

The Import/Export configuration is transferred in the **Profile Cleanup** editor.

Note You can use environment variables in the registry and file system paths of the **Import / Export** and **Profile Cleanup** settings. Each line you want to expand must end with **\[EXPAND ENV VARS]**.

Configuring Predefined Settings for Applications and Windows Settings

You can install predefined settings for a Flex configuration file by adding files and registry information manually or by using an existing profile archive, created by FlexEngine.

You can also create predefined settings for a Flex configuration file, when you use the VMware Dynamic Environment Manager Application Profiler.

You can use the predefined settings to provide default settings, with optional partial or full enforcement. There are 4 types of predefined settings:

Option	Description
Default Settings	Default settings are only applied if no user profile archive exists.
Partially Enforced Settings	Partially enforced settings are applied after the user profile archive, if any, has been imported.
Default Settings with Partial Enforcement	The Default settings are applied if no user profile archive exists, then the user profile archive, if any, is imported, and finally the Partially Enforced Settings are applied.
Fully Enforced Settings	Fully enforced settings are applied always and no user profile archive is created.

Create Predefined Settings

To define the file system content for your predefined settings, copy the files you want to include into the correct locations.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Select the application you want to configure and open the **Predefined Settings** tab.
- 3 Click **Add** in the bottom right corner of the tab.
The **Create Predefined Setting** window appears.
- 4 Select the type of predefined settings.
- 5 Click **Create**.
The **Profile Archive Settings** folder opens.
- 6 Copy and paste the preconfigured files and folders into the **Profile Archive Settings** folder.
- 7 (Optional) For registry settings, edit the Flex Profiles.reg file, located in the Registry folder and add content between the *Pre* and *Post* import markers.
- 8 Click **Done** and click **Save**.

Import Predefined Settings

Import a profile archive to be used for predefined settings.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Select the application you want to configure and open the **Predefined Settings** tab.
- 3 Click **Add** in the bottom right corner of the tab.
The **Create Predefined Setting** window appears.
- 4 Select the type of predefined settings.
- 5 Click **Install**.
- 6 Select the profile archive that you want to import and click **Open**.
- 7 Click **Save**.

Use Multiple Predefined Settings

A single Flex configuration file can contain different predefined settings, for example, to provide different settings to multiple user groups.

If you want to specify multiple predefined settings, you must define conditions that control whether the entry is applicable for a certain user.

Note FlexEngine processes the predefined settings in list order, evaluating conditions. The order can be changed using the arrow buttons. If conditions match multiple predefined settings, the last one is used.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Select the application you want to configure and open the **Predefined Settings** tab.
- 3 Click **Add** in the bottom right corner of the tab.
The **Create Predefined Setting** window appears.
- 4 Create or import a predefined setting.
- 5 Open the **Conditions** tab.
- 6 Click **Add** and select a condition.
- 7 Configure the condition settings and click **OK**.
- 8 Repeat [Step 3](#) through [Step 7](#) for each additional predefined setting you want to configure.
- 9 Click **Save**.

Working with Placeholders

Predefined settings can contain placeholders that FlexEngine replaces with information from environment variables. With placeholders, you can create user-specific filenames and folder names and text file content.

Using Placeholders

Placeholders use the `[Flex##var%]` format, where *var* is the name of an environment variable. You can use placeholders in filenames and folder names, and in text files.

Note The **Flex** string in a placeholder is case-sensitive, but the name of the environment variable is not.

When importing a predefined settings file, FlexEngine automatically replaces placeholders in filenames and folder names with the environment variable to which they refer. If you use placeholders in the Registry\Flex Profiles.REG file, or in any .INI, .TXT, or .XML files in your predefined settings, FlexEngine automatically replaces those placeholders, too. If you use placeholders in any other file, the name of that file must contain `[Flex#]` to instruct FlexEngine to process the file contents. The `[Flex#]` token is removed on import and does not affect the filename.

Note

- When you use placeholders in .REG files, use the `[Flex##var##reg]` format to escape any backslashes and double quotes in the environment variable, in accordance with the .REG format.
 - For applications that refer to users through their security identifier (SID), use `[Flex##SID%]`.
 - When processing placeholders in text files, FlexEngine tries to determine the text encoding automatically. If the attempt fails, select the correct code page by using `[Flex#codepage]` in the filename.
-

Using DirectFlex

DirectFlex imports the settings of an application when the application is started.

DirectFlex improves FlexEngine efficiency. Without DirectFlex, all profile settings are read during login and saved during logout, which can slow down these processes if many settings are configured. If DirectFlex is enabled, application settings are read when an application is started rather than at login. Changes to the settings are saved when the application is closed, instead of when the user logs out. During a user session with DirectFlex enabled, only those applications that are used cause the profile settings to be read or saved.

FlexEngine starts when the user logs in. It reads the application and user environment settings from the configuration share and loads personalization information from the user profile archives share. When the user starts an application while logged in, DirectFlex directs FlexEngine to load and apply the settings related to the application. When the user closes the application, DirectFlex directs FlexEngine to save the settings to the user profile archives share. When the user logs out, FlexEngine saves remaining Windows personalization information to the user profile archives share.

Note Do not use DirectFlex for applications that are used as middleware or as plug-ins and for Flex configuration files that contain Windows settings.

Application paths or names cannot occur more than once in Flex configuration files, as FlexEngine uses them to determine which configuration file to process. To validate for conflicts use **Validate DirectFlex**.

Configure Applications for Working with DirectFlex

Configure which applications in a Flex configuration file are managed by DirectFlex. You can select one or more .exe files to manage with a Flex configuration file.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Select the application you want to configure and click the **DirectFlex** tab.
- 3 Click **Add**.
- 4 Enter the application filename or file path, and click **OK**.

Application Virtualization Support

You can enable DirectFlex support for App-V 5.x packages, if you configure support for App-V 5.x.

You can enable DirectFlex support for a VMware ThinApp 5.2 package. Only packages created using ThinApp 5.2 can be used with DirectFlex. Additionally, the configured DirectFlex executable path must be the virtual executable, not the ThinApp entry point.

Importing and Exporting DirectFlex Settings

When you start an application, settings are imported, and when you close the application, the settings are exported.

If you start an application multiple times concurrently, the settings are imported only with the first started instance, and when you close the application, the settings are exported only after the last instance is closed.

If you start different applications that are configured in a single Flex configuration file, the settings are imported only when the first application starts, and when you exit, the settings are exported only after the last application is closed.

Configuring User Environment Settings

4

You can use the User Environment tab of the Management Console for creating and managing user environment settings. The settings are applied at login and logout.

Note Before you configure these settings, ensure that you understand the processing order described in [Processing Order](#).

This chapter includes the following topics:

- [Processing Order](#)
- [Use a 32-Bit Path to Program Files on 64-Bit Systems](#)
- [Edit Conditions for Multiple User Environment Settings](#)
- [Configure ADMX-Based Settings](#)
- [Configure App Volumes Settings](#)
- [Configure Application Blocking](#)
- [Configure a Drive Mapping](#)
- [Configure Environment Variables](#)
- [Configure File Type Associations](#)
- [Configure Files and Folders](#)
- [Configure Folder Redirection](#)
- [Configure Horizon Smart Policies for User Environment Settings](#)
- [Configure Logon and Logoff Tasks](#)
- [Configure Printer Mappings](#)
- [Configure Privilege Elevation](#)
- [Configure Registry Settings](#)
- [Configure Shortcuts](#)
- [Configure Triggered Tasks](#)
- [Configure Display Language](#)

- [Configure Hide Drives](#)
- [Configure Policy Settings](#)

Processing Order

Specific features and functions provided by VMware Dynamic Environment Manager are processed in a specific order. To ensure that applications behave as you expect, familiarize yourself with the processing order.

Processing Order at Boot

VMware Dynamic Environment Manager processes the following Horizon Smart Policies for computer environment settings at boot.

- Horizon Smart Policies for computer environment settings

Processing Order at Logon

The following VMware Dynamic Environment Manager processes at logon:

- Horizon Smart Policies for user environment settings
- Folder redirection
- Application blocking
- Privilege elevation
- Logon tasks (*marked as before profile archive import*).
- Environmental variables
- Drive mappings
- Printer mappings
- Files and folders/Registry settings (*marked as before profile archive import*)
- Hide drives
- Policy settings
- ADMX-based settings
- Application migration
- Triggered tasks
- Processing INI files (that is, profile archive import, setting up the DirectFlex cache)
- Shortcuts
- File type associations
- Files and folders/Registry settings (Marked as After profile archive import) (Default setting)
- Logon tasks (marked as *After profile archive import*) (Default setting)

- Kick off async creation of shortcuts, drive mappings, and printer mappings

Processing Order at Logoff

The following VMware Dynamic Environment Manager processes at logoff:

- Logoff tasks (*marked as Before profile export*)
- Processing INI files (that is, profile archive export)
- Logoff tasks (marked as *After profile archive export*) (Default setting)
- VMware Dynamic Environment Manager undo action

Processing Order of Individual Items

Individual items within each feature are processed in alphabetical order. For example, if you have configured three drive mappings with the following names, they are processed in the following alphabetical order:

- All users: H: home drive mapping
- Financial department F: drive mapping
- Sales team S: drive mapping

Use a 32-Bit Path to Program Files on 64-Bit Systems

You can convert a 32-bit Program Files folder path to be used on a 64-bit system.

Several user environment settings refer to paths in the Program Files folder. If you specify a path starting with **C:\Program Files**, **C:\Program Files (x86)**, or a localized equivalent, a button appears in front of the path. If you click it, you can convert the start of the path to **%ProgramFiles%** and resolve that variable to the 32-bit Program Files folder on 64-bit systems.

Edit Conditions for Multiple User Environment Settings

You can edit the conditions of multiple user environment settings simultaneously.

You can only edit conditions of multiple settings if the settings have identical conditions or no conditions added. To edit multiple user environment settings, select the settings you want and click **Edit**.

For information on adding and managing conditions, see [Chapter 7 Managing Conditions](#).

Configure ADMX-Based Settings

With ADMX-based settings, you can use standard ADMX templates to configure user policies. FlexEngine applies the configured settings when the user logs in.

ADMX-based settings can also be refreshed during the session by using a triggered task or the command-line interface.

FlexEngine does not overwrite existing information in the policy registry locations. If you use VMware Dynamic Environment Manager ADMX-based settings with Active Directory group policies and configure overlapping policy settings, the Active Directory settings take effect.

Import ADMX Templates

Before you can create ADMX-based settings, you must import the ADMX templates containing the policies that you want to configure.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 On the **User Environment** tab, select **ADMX-based Settings**.
- 3 Click **Manage Templates**.
- 4 Click **Add Folder** or **Add File** and import the ADMX templates.

You can import all ADMX files and the corresponding ADML files from a folder or import only specific templates.

- 5 Click **Validate** to analyze the templates and verify that they can be used to define ADMX-based settings.

What to do next

Remove the templates that contain only unsupported settings or policies.

Note You can remove the templates if they are not used by any settings definition.

Create Definitions for ADMX-Based Settings

Create settings definitions based on the ADMX templates you imported.

Note There is no noticeable difference in performance between having a single ADMX-based settings definition containing many policy settings and having many individual ADMX-based settings definitions that each contain a small set of policy settings.

Prerequisites

Import ADMX templates containing the policies you want to configure. See [Import ADMX Templates](#).

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 On the **User Environment** tab, select **ADMX-based Settings**.
- 3 Click **Create**.
- 4 Enter a name, label, and a tag for the settings definition.
- 5 Click **Select Categories**.

- 6 Select the categories you want to manage with this definition and click **OK**.
- 7 Click **Edit Policies** and configure the necessary policies.
- 8 Click **Save**.

Configure App Volumes Settings

Create an App Volumes setting that allows you to store your offline Outlook Data File (.ost) on a writable volume. An OST file (.ost) is a file in Microsoft Outlook that is a local cache of the remote mailbox.

You might want to use this feature if you want to use App Volumes together with VMware Dynamic Environment Manager to create a non-persistent virtual desktop environment. Typically, the Outlook .ost file is stored locally on the C: drive of the virtual desktop. The virtual desktop is reset back to the default settings at each logout, removing the .ost file. By combining App Volumes and VMware Dynamic Environment Manager, the .ost file does not need to be recreated for each login.

Prerequisites

You must have App Volumes installed and configured to provide writable volumes to users.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Click the **User Environment** tab.
- 3 Select **App Volumes** and click **Create**.
- 4 Enter a name for the settings definition.
- 5 Configure the App Volumes setting:

Option	Description
Store Offline Data File (.ost) on writable volume	Configures Outlook to store the .ost file on the writable volume.

- 6 You can click the **Advanced** button to change the location of the .ost file on the writable volume; however, do not change the default setting unless necessary. Configuration errors might result in unexpected behavior.
- 7 Click **Save**.

Configure Application Blocking

Application blocking allows you to enable or block applications from launching.

By default, once you enable application blocking, only applications from the Windows folder, C:\Program Files, and C:\Program Files (x86) are allowed to run. To fine-tune application blocking, you can further specify applications to allow or block based on path, hash, or publisher.

You can configure the following types of application blocking:

- Path-based. You can specify a path to a folder. Or, you can specify a fully qualified file name (the configured path includes the full path and file name of the executable).
- Hash-based. You can specify to allow or block based on a hash that matches a particular executable.
- Publisher-based. You can specify a publisher to allow, and executables associated with that publisher can launch. You cannot block applications by publisher.

Note If you configure multiple types of application blocking, it is important to understand the order in which they are evaluated. For more details, see [Work with Multiple Types of Application Blocking](#).

Enable and Configure Application Blocking

Application blocking is disabled by default. You must enable it manually, configure conditions to control the users eligible for application blocking, and define a custom message.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 On the **User Environment** tab, select **Application Blocking**.
- 3 Click **Global Configuration**.
- 4 Select **Enable Application Blocking**.
- 5 Click **Add** in the **Conditions** section to configure conditions to control which users have application blocking enabled.
- 6 Click **Add** in the **Message** section to add a parent application that displays a custom message when it attempts to start a blocked application.

Most commonly the parent applications used are `explorer.exe`, located in `C:\Windows\` and `cmd.exe`, located in `C:\Windows\System32`. If one of the configured parent applications attempts to start a blocked application, the configured message is displayed instead of the default message.

- 7 Enter a message title, message text, and the amount of time for which the message appears.
- 8 Click **OK**.

With application blocking enabled, only applications from the Windows folder, `C:\Program Files`, and `C:\Program Files (x86)` are allowed to run.

What to do next

To allow and block additional paths, see [Allow and Block Additional Applications](#).

Allow and Block Additional Applications

Create additional settings for allowing and blocking applications.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 On the **User Environment** tab, select **Application Blocking**.
- 3 Click **Create**.
- 4 Enter a name for the settings definition.
- 5 Select the blocking type from the **Type** drop-down menu under **Application Blocking Settings**.

If you are configuring path-based settings that reference network paths, specify UNC paths instead of drive letters. When users launch these applications, they should access them from the UNC path.

- 6 Click **Add** in the **Allow** section to add folders, applications, or publishers to the allowed list.

You can allow specific applications in blocked folders. You can also allow specific applications to run only if they are located in a certain folder by clicking the **Path-specific** check-box.

Note You can use the publisher-based configuration only when allowing an application.

- 7 Click **Add** in the **Block** section to add folders or applications for path-based or applications for hash-based to the blocked list.
- 8 Click **Save**.

Work with Multiple Types of Application Blocking

When you use multiple types of application blocking, it is important to understand the order in which the blocking is evaluated.

You may need to configure different types of application blocking together to achieve your goals. For example, suppose you want to allow applications to launch only from C:\Program Files (the default behavior of application blocking), but you want to allow only a particular version of Excel. You can enable application blocking and then create a path-specific hash-based allow for your preferred version of Excel. If more than one version of Excel exists in the C:\Program Files folder, only the version you allowed will launch.

When you configure multiple types of application blocking, the configuration is evaluated as follows to determine whether an executable is allowed to launch.

Scenario	Result
There is matching hash-based block setting.	<p>The launch is blocked.</p> <p>By configuring one or more hashes, the launch of executables can be prevented regardless of their location, even if they are in a location that is allowed by the path-based logic.</p>
There is a matching hash-based global (i.e. not path-specific) allow setting.	<p>The launch is allowed.</p> <p>By configuring one or more hashes, the launch of executables can be allowed regardless of their location, even if they are in a location that is blocked by the path-based logic.</p>

Scenario	Result
There is a matching path-based allow setting for a fully qualified file name (the configured path includes the full path and file name of the executable).	The launch is allowed.
There is a matching path-based allow setting for the folder (the configured path includes the folder name only).	If there is a hash-based path-specific allow setting for the file name and the hash does not match, the launch is blocked. Otherwise, the launch is allowed.
There is a publisher-based allow setting matching the executable's publisher.	The launch is allowed.
None of the above scenarios apply.	The launch is blocked.

Configure a Drive Mapping

Associate a local drive letter with a shared storage area over the network.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Click the **User Environment** tab.
- 3 Select **Drive Mapping** and click **Create**.
- 4 Enter a name for the settings definition.
- 5 Configure the drive mapping settings.

Option	Description
Drive letter	The drive letter to assign.
Remote path	The UNC path of the share. Can contain environment variables.
Friendly name	(Optional) The description that appears in Windows Explorer. Only available if Run asynchronously is enabled.
Skip if drive letter is in use	(Optional) If enabled, the drive is not mapped if the specified drive letter is in use. If not enabled, the existing mapping is removed.
Run once	(Optional) If enabled, the drive mapping only occurs once.
Undo at logoff and refresh during drive mapping refresh	(Optional) If enabled, the drive is unmapped when a user logs off and it is processed again during a user environment refresh.
Run asynchronously	(Optional) If enabled the drive mapping occurs in the background. If not enabled, FlexEngine waits for the drive mapping to finish before continuing.

Note You cannot select **Run once** and **Undo at logoff** at the same time.

- 6 Click **Save**.

Configure Environment Variables

Define the variables to use with VMware Dynamic Environment Manager.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Click the **User Environment** tab.
- 3 Select **Environment Variables** and click **Create**.
- 4 Enter a name for the settings definition.
- 5 Configure the environment variable settings.

Option	Description
Variable name	The name of the environment variable to set.
Value	The value that the variable is set to. It can contain environment variables.
Run once	If enabled, the environment variable is only set once.

- 6 Click **Save**.

Configure File Type Associations

Associate a file type with a particular application.

Note In Windows 8 and Windows 10, file type associations set by VMware Dynamic Environment Manager might not automatically become default.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Click the **User Environment** tab.
- 3 Select **File Type Associations** and click **Create**.
- 4 Enter a name for the settings definition.
- 5 Configure the file type association settings.

Option	Description
Extension	The file extension to be associated with an application.
Import file type association settings from shortcut	Select a shortcut from the list that is displayed. The settings for the file type association are copied from the corresponding fields of the selected shortcut, and if conditions are configured for the shortcut, they can optionally be copied as well.
Command	The command to start when a file with the specified extension is double-clicked. It can contain environment variables. Browsing to App-V 4.x OSD files and App-V 5.0 packages is also supported.

Option	Description
Arguments	(Optional) The arguments with which the command is run. When a command is selected, this text box is automatically set to "%1", representing the full path of the file that was double-clicked.
Icon path	(Optional) The path to a file containing the icon to use. When a command is selected, this text box is automatically set to its path. It can contain environment variables.
Icon index	The index of the icon in the configured icon path.
Description	(Optional) The description that appears in Windows Explorer for this file type.
Run once	(Optional) If enabled, the file type is only associated once.
Undo at logoff and refresh during file type associations refresh	(Optional) If enabled, the file type association is removed when a user logs off and it is processed again during a user environment refresh.

Note You cannot use **Run once** and **Undo at logoff** at the same time.

- 6 Click **Save**.

Configure Files and Folders

Add custom files and folders to the user environment.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Click the **User Environment** tab.
- 3 Select **Files and Folders** and click **Create**.
- 4 Enter a name for the settings definition.
- 5 Configure the files and folders settings.

Option	Description
Create	Use Windows Explorer to add the necessary files and folders.
Apply settings Before/After	Import the settings before or after profile archive import.
Run once	(Optional) If enabled, the files and folders settings are only imported once.

- 6 Click **Save**.

Configure Folder Redirection

Redirect folders to any of the following locations: a default subfolder of the specified remote path, a specific subfolder of that path, or a completely specified location. Existing folder content is not moved during redirection.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Click the **User Environment** tab.
- 3 Select **Folder Redirection** and click **Create**.
- 4 Enter a name for the settings definition.
- 5 Configure the folder redirection settings.

Option	Description
Remote path	The base folder to which subfolders are redirected by default. This path must be user-specific, and can contain environment variables.
Folders to redirect	<p>The profile folders that must be redirected. When you select a profile folder, by default the folder is redirected to a default subfolder of the location specified in Remote path. To redirect a profile folder to an alternate location, click Edit for the specific profile folder, change the selection from Use default sub folder to a non-default option, and enter the appropriate folder information in the applicable text box.</p> <ul style="list-style-type: none"> ■ Use default sub folder. The default option, which redirects the profile folder to a default sub folder of the location specified in Remote path. ■ Use sub folder. Specify the name for a subfolder in Remote path. ■ Use fully-qualified path. Specify the fully qualified path for a folder.

Note Redirecting **Desktop**, **Favorites**, **Programs Menu**, or **Roaming AppData** might lead to performance problems in the user environment.

- 6 Click **Save**.

Configure Horizon Smart Policies for User Environment Settings

Create policies for user environment settings that control the behavior of the USB redirection, virtual printing, clipboard redirection, client drive redirection, Web and Chrome file transfer features, and bandwidth profiles in a published desktop or application Horizon session.

Horizon Smart Policies for user environment settings are applied during login and can be refreshed during reconnect of a session. To reapply Horizon Smart Policies when a user reconnects to a session, configure a triggered task. For more information on creating Horizon Smart Policies for user environment settings, see the *Using Smart Policies* section in *Configuring Remote Desktop Features* from the Horizon 7 documentation.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Click the **User Environment** tab.
- 3 Select **Horizon Smart Policies** and click **Create**.

- 4 Enter a name for the settings definition.
- 5 Configure the Horizon Smart Policy settings.

Option	Description
Audio playback	Specifies whether audio playback is enabled for remote desktops. This setting is to enable audio playback and applies to both PCoIP and Blast Extreme sessions.
Bandwidth profile	Configures a bandwidth profile for PCoIP and Blast Extreme sessions on the remote desktop.
Blast Extreme Protocol	<ul style="list-style-type: none"> ■ H.264 Specifies whether to use H.264 encoding or JPEG/PNG encoding. The default is to use H.264 encoding. ■ H.264 high color accuracy Increases color accuracy when using H.264 encoding by using the YUV 4:4:4 colorspace instead of 4:2:0. This setting might result in degraded performance at very high resolutions or with multiple monitors. ■ H.264 minimum quality Specifies the image quality for the remote display configured to use H.264 encoding. ■ HEVC/H.265 Enables High Efficiency Video Decoding (HEVC) if the client machine has a GPU that supports HEVC decoding. ■ JPG When you select Enable for JPG, JPEG encoding is used for encoding in JPEG/PNG mode. When you select Disable for JPG, PNG encoding is used for encoding in JPEG/PNG mode. This policy does not apply when the H.264 encoder is active. ■ Max frame rate Specifies the maximum rate of screen updates. Use this setting to manage the average bandwidth that users consume. The default is 30 updates per second.
Drag and drop	<p>Enables drag and drop between agent and client.</p> <p>You can allow drag and drop in both directions or in one direction, from agent to client or from client to agent.</p>
Printing	Enables virtual printing on the remote desktop.

Option	Description
Redirection	<ul style="list-style-type: none"> ■ Client drive Enables the client drive redirection on the remote desktop and whether shared drives and folders are writable. ■ Clipboard Sets the direction in which clipboard redirection is allowed. ■ USB Enables USB redirection on the remote desktop. Use Horizon Agent 7.6 or later to ensure the best performance of the USB redirection option.
Web and Chrome file transfer	Enables and disables file transfer between agent and client.

6 Click **Save**.

Configure Logon and Logoff Tasks

Configure the commands that run when users log in and log out.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Open the **User Environment** tab.
- 3 Select **Logon Tasks** or **Logoff Tasks** and click **Create**.
- 4 Enter a name for the settings definition.
- 5 Configure the logon and logoff task settings.

Note Logon and Logoff tasks run "invisibly" so they cannot be used to start applications and do not support user interaction.

Option	Description
Command	The command to run. Can contain environment variables.
Timeout	(Optional) The amount of time FlexEngine waits for the command to complete. If the command does not complete during this interval, FlexEngine continues. If not configured, FlexEngine waits indefinitely for the command to complete. The Timeout setting is not available if Run asynchronously is enabled.
Run task Before/After	Specifies whether the task runs before or after profile archive import, for logon tasks or export, for logoff tasks.
Run once	If enabled, the command only runs once.
Run asynchronously	If enabled, the FlexEngine runs the command in the background, without waiting for it to complete. This option is not available for tasks that run before profile archive import or export.

Note For logoff tasks, you cannot combine **Run once** and **Run asynchronously**.

- 6 Click **Save**.

Configure Printer Mappings

Associate a network printer to the user environment.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Click the **User Environment** tab.
- 3 Select **Printer Mappings** and click **Create**.
- 4 Enter a name for the settings definition.
- 5 Configure the printer mapping settings.

Option	Description
Remote path	The UNC path of the printer. Can contain environment variables.
Default printer	(Optional) If enabled, the printer is marked as the default.
Run once	(Optional) If enabled, the printer mapping only occurs once.
Undo at logoff and refresh during printer mapping refresh	(Optional) If enabled, the printer is unmapped when a user logs off and it is processed again during a user environment refresh.
Run asynchronously	(Optional) If enabled, the printer mapping occurs in the background. If not enabled, FlexEngine waits for the printer mapping to finish before continuing.

Note You cannot use **Run once** and **Undo at logoff** at the same time.

- 6 Click **Save**.

Configure Privilege Elevation

You can remove the administrator privilege from domain users and still allow users to start certain applications as administrators.

With privilege elevation, a user can start certain pre-configured applications, which the VMware Dynamic Environment Manager agent runs elevated on the local desktop, as if the user is a member of the administrators group.

Note Privilege elevation is not supported for members of the Network Configuration Operators group.

Important The Privilege Elevation feature grants temporary administrator privileges to a user. The feature must be used only for specific use cases by administrators. It is not intended as a security feature. Use additional security measures to prevent malicious use.

You can configure elevated applications and user-installed applications.

Mode	Description
Elevated applications	<p>Select the applications you want to elevate.</p> <p>You can elevate applications based on a particular hash, path, or publisher, or on command-line arguments.</p> <ul style="list-style-type: none"> ■ With hash-based elevation, you can configure one or more hashes, allowing VMware Dynamic Environment Manager to elevate the executable file regardless of the file's location. VMware Dynamic Environment Manager elevates an executable file only if its SHA256 hash is identical to one of the configured hashes. ■ With path-based elevation, you can configure specific file or folder paths to be elevated. VMware Dynamic Environment Manager only elevates an executable file when a user runs the file from one of the configured file or folder paths. ■ With publisher-based elevation, you can enable VMware Dynamic Environment Manager to elevate applications from certain publishers. VMware Dynamic Environment Manager only elevates an executable file if the file's Authenticode signature matches one of the configured publishers. ■ With argument-based elevation, you can configure specific combinations of file paths and command-line arguments to be elevated. VMware Dynamic Environment Manager only elevates an executable file when a user runs the file from one of the configured file paths using a corresponding command-line argument. Users must use the fully qualified path to run the targeted executable files. <p>To avoid conflicts with path-based elevation, VMware Dynamic Environment Manager silently ignores argument-based privilege elevation for executable files residing in a folder for which path-based elevation is currently configured, or in a corresponding subfolder. VMware Dynamic Environment Manager runs such executable files with elevation regardless of the specified arguments.</p> <p>You can only elevate .EXE files. By default, child processes are not elevated, but you can configure this setting manually.</p>
User-installed applications	<p>Select a folder, from which the user installs elevated applications. You can only use path-based configuration for the user-installed applications.</p> <p>Child processes are not elevated, unless they are located in the same folder as the elevated applications, the temporary folder of the user, or the temporary folder of the system.</p> <p>User-installed applications support .MSI and .EXE files.</p>

Note If you use application blocking, by default only applications in Program Files and Windows are allowed to run. You might need to create an allow setting to enable the application to run.

Enable and Configure Privilege Elevation

Privilege elevation is disabled by default. You must enable it manually, configure conditions to control the elevated applications, and define an elevation message.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 On the **User Environment** tab, select **Privilege Elevation**.
- 3 Click **Global Configuration**.
- 4 Select **Enable Privilege Elevation**.
- 5 Click **Add** in the **Conditions** section to configure conditions to control the elevated applications.
- 6 (Optional) Select **Also elevate all child processes** to elevate child processes on a global level.
If you select this option, all processes of a user-installed application run elevated.
- 7 (Optional) Select **Ask user to elevate** in the **Message** section to display a message when a user launches an application that is configured for elevation.
The user is presented with the option to run the application elevated or with the normal privileges of the user.
- 8 If you selected **Ask user to elevate** enter a message title and message text.
- 9 Click **OK**.

What to do next

To configure specific applications for elevation, see [Configure Applications for Privilege Elevation](#).

Configure Applications for Privilege Elevation

Configure certain applications to be started with administrator privileges, when a user is not a member of the administrator group.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 On the **User Environment** tab, select **Privilege Elevation**.
- 3 Click **Create**.
- 4 Enter a name for the setting definition.
- 5 Select the privilege elevation type from the **Type** drop-down under **Privilege Elevation Settings**.
 - You can only use folders for user-installed applications.
 - If you are configuring path-based settings that reference network paths, specify UNC paths instead of drive letters. When users launch these applications, they should access them from the UNC path.
- 6 Click **Add** in the **Elevate** section and select the folders or applications to add to the list.
- 7 (Optional) If you are elevating an application, select whether to elevate child processes as well.
- 8 Click **Save**.

Configure Registry Settings

Configure the registry settings of the user environment.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Open the **User Environment** tab.
- 3 Select **Registry Settings** and click **Create**.
- 4 Enter a name for the settings definition.
- 5 Configure the registry settings.

Option	Description
Create	Manually create a registry file or import one.
Apply settings Before/After	Import the settings before or after profile archive import.
Run once	(Optional) If enabled, the registry settings are only imported once.

- 6 Click **Save**.

Configure Shortcuts

Configure application shortcuts for the user environment.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Open the **User Environment** tab.
- 3 Select **Shortcuts** and click **Create**.
- 4 Enter a name for the settings definition.
- 5 Configure the shortcut settings.

Option	Description
Shortcut name	The name of the shortcut.
Target	The item pointed to by the shortcut. Can contain environment variables. If you browse to a shortcut on disk, the fields are filled with the shortcut properties. Browsing to App-V 4.x OSD files and App-V 5.0 packages is also supported.
Arguments	(Optional) The arguments with which the shortcut is invoked.
Start in	(Optional) The directory in which the shortcut is started.
Run	How the target window is displayed: normal, minimized, or maximized.
Comment	(Optional) The shortcut tooltip text.

Option	Description
Icon path	(Optional) The path to a file containing the icon to use. When a target is selected in the browse dialog box, this text box is automatically set to its path. Can contain environment variables.
Icon index	The index of the icon in the configured icon path. Must be specified if icon path is configured.
Destination	Specifies where the shortcut is created. If Programs folder is selected, an optional subfolder can be entered or selected from a drop-down menu containing the subfolders specified in other shortcuts.
Skip if shortcut already exists	(Optional) If enabled, the shortcut is not saved if it already exists. If not enabled, an existing shortcut is overwritten. This logic is applied separately for each selected destination.
Run once	(Optional) If enabled, the shortcut is only created once.
Undo at logoff and refresh during a shortcut refresh	(Optional) If enabled, the shortcut is removed when a user logs off and it is created again during a user environment refresh.
Run asynchronously	(Optional) If enabled, the shortcut creation occurs in the background. If not enabled, FlexEngine waits for the shortcut creation to finish before continuing.

Note You cannot use **Run once** and **Undo at logoff** at the same time.

6 Click **Save**.

Configure Triggered Tasks

Select tasks that are triggered when certain actions are performed in the user environment.

With triggers, a user can unplug a laptop, move it to another location, plug it in again, and maintain their current session while using more appropriate infrastructure resources. Triggers also provide a seamless experience for users who log in to the same virtual desktop session from different devices.

When running in a remote session, the following special environment variables are available for use in custom commands or messages:

- **%CURRENT_CLIENTIP%**

The endpoint IP address.

- **%PREVIOUS_CLIENTIP%**

The previous endpoint IP address. This variable only exists for the **Session reconnected** trigger and if the user is connecting from a different client.

- **%CURRENT_CLIENTNAME%**

The endpoint name.

Note VMware Dynamic Environment Manager evaluates conditions on triggered task settings when it processes the settings themselves, not when it performs the resulting actions after the triggers occur.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Open the **User Environment** tab.
- 3 Select **Triggered Tasks** and click **Create**.
- 4 Enter a name for the settings definition.
- 5 Configure the triggered task settings.

Option	Description
Trigger	<p>Select the event that is used to trigger this task.</p> <ul style="list-style-type: none"> ■ Workstation locked ■ Workstation unlocked ■ Session disconnected ■ Session reconnected ■ All AppStacks attached <p>Once App Volumes attaches all AppStacks, it initiates the All AppStacks attached event. This event is useful when VMware Dynamic Environment Manager performs actions during logon with conditions that rely on an AppStack not yet attached.</p>
Only applies if (endpoint) IP has changed	<p>(Optional) If Workstation unlocked or Session reconnected is selected, this additional setting controls whether the task is performed always, or only if the IP address for Workstation unlocked and endpoint IP address for Session reconnected changed since the session was disconnected. This option can be used to perform tasks when the user network location has changed.</p>

Option	Description
Action	<ul style="list-style-type: none"> ■ DirectFlex refresh DirectFlex configuration is normally only processed during logon, and any changes made while a user is logged in are not picked up during the session. To re-read the DirectFlex configuration while a user is logged in, configure a triggered task to perform a DirectFlex refresh. ■ User Environment refresh Certain user environment settings can be refreshed during the session. The Refresh setting controls which types of settings are refreshed: ADMX-based Settings, Application Blocking Settings, Drive Mappings, Environment Variables, File Type Associations, Horizon Smart Policies, Printer Mappings, Privilege Elevation Settings, Shortcuts, and Triggered Task Settings. Note Refreshing Horizon Smart Policies is best performed at the Reconnect session trigger, to ensure that the Horizon remote desktop experience components pick up the new policies. ■ Computer Environment refresh Computer environment settings can be refreshed during the session. Note Refreshing computer environment settings is best performed at the Reconnect session trigger, to ensure that the Horizon remote desktop experience components pick up the new policies. ■ Run custom command To start a custom command, select this action . The Command setting can contain environment variables. You can enter arguments to the command through the Arguments setting. ■ Display message To display a message, select this action .
Show message	Controls whether a message is displayed when the selected action is performed.
Caption	Specifies the caption of the message dialog box. Can contain environment variables.
Message	Specifies the message text. Can consist of multiple lines and can contain environment variables.
Close automatically after	(Optional) If this setting is configured, the message will automatically disappear after the specified number of seconds, otherwise the message remains on the screen until the user closes it.
Also allow user to dismiss message	(Optional) If Close automatically after is configured, this setting controls whether the user can close the message before the timeout has expired.

6 Click **Save**.

Configure Display Language

Configure the display language of the user environment.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Open the **User Environment** tab.
- 3 Right click **Display Language** and click **Create**.
- 4 Enter a name for the settings definition.
- 5 From the **Language** drop-down under **Display Language Settings**, select the language that you want to use.

Note The language is not changed if the language pack is not installed on the user environment.

- 6 Select **Run once** to set the display language only once.
- 7 Click **Save**.

Configure Hide Drives

Select the drive letters that should be hidden in Windows Explorer.

Configure Policy Settings

Policy Settings are only available for backwards compatibility. If you want to configure these policy settings, use ADMX-based settings.

Configuring Computer Environment Settings

5

You can use the Computer Environment tab of the Management Console to create and manage computer environment settings. The settings are applied while the computer starts.

This chapter includes the following topics:

- [Configure Horizon Smart Policies for Computer Environment Settings](#)

Configure Horizon Smart Policies for Computer Environment Settings

Create policies for computer environment settings that VMware Dynamic Environment Manager applies while end users' computers boot. These Horizon Smart Policies control the behavior of Flash multi-media redirection, integrated printing, and USB redirection.

Horizon Smart Policies for computer environment settings are applied during computer boot and can be refreshed during the reconnection of a session. To reapply Horizon Smart Policies when a user reconnects to a session, configure a triggered task.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Click the **Computer Environment** tab.
- 3 Click **Create**.
- 4 Enter a name for the settings definition.

5 Configure the Horizon Smart Policy settings.

Option	Description
Flash multi-media redirection	<ul style="list-style-type: none"> Flash multi-media redirection <p>Specifies whether Flash Redirection is enabled on the agent.</p> <ul style="list-style-type: none"> Minimum rect size <p>Specifies the minimum rect size to enable Flash Redirection, entered as <i>width,height</i>. The default width is 320 pixels and the default height is 200 pixels..</p>
Integrated printing	<ul style="list-style-type: none"> Printer driver <p>Specifies which printer driver to use for redirected client printers: the universal printer driver (UPD) or the native printer driver (NPD)</p> <ul style="list-style-type: none"> Always use NPD uses the native printer driver. Always use UPD uses the universal printer driver. Use NPD first, then UPD uses the native printer driver if the native printer driver exists. Otherwise, it uses the universal printer driver. Use UPD first, then NPD uses the universal printer driver if the universal printer driver exists. Otherwise, it uses the native printer driver. <p>When this setting is not configured, the default value is Use NPD first, then UPD.</p> <ul style="list-style-type: none"> Printer filter <p>Specifies a filter to exclude printers from being redirected. Any printer that does not match the filtering rule is redirected. By default, the filtering rule is empty, the result of which is that all client printers are redirected. The filter supports regular expressions.</p> <ul style="list-style-type: none"> Attributes: DriverName, VendorName, and PrinterName Operators: AND, OR, and NOT <p>Examples of filtering rules:</p> <pre>(DriverName="DrName1" OR VendorName="VeName1") AND NOT PrinterName="PrNa.?e" PrinterName=".*HP.*" OR PrinterName=".*EPSON.*" AND DriverName="PDF" PrinterName!=".*PDFCreator.*"</pre>
USB redirection	<ul style="list-style-type: none"> Exclude all devices <p>Excludes all USB devices from being forwarded. If set to Enable, you can use other policy settings to allow specific devices or families of devices to be forwarded. If set to Disable, you can use other policy settings to prevent specific devices or families of devices from being forwarded.</p> <ul style="list-style-type: none"> Exclude device family <p>Excludes families of devices from being forwarded. The format of the setting is {m o}:family_name_1[;family_name_2]...</p> <ul style="list-style-type: none"> Include device family <p>Includes families of devices that can be forwarded. The format of the setting is {m o}:family_name_1[;family_name_2]...</p>

Option	Description
	<ul style="list-style-type: none">■ Include VID/PID device <p>Includes devices with specified vendor and product IDs that can be forwarded.</p> <p>The format of the setting is {m o}:vid-xxx1_pid-yyy1[;vid-xxx2_pid-yyy2]...</p> <p>For information about the proper formatting of the preceding USB redirection settings, see the applicable Horizon documentation, such as the version of the Configuring Filter Policy Settings for USB Devices topic that corresponds to your deployment.</p>

Tracking Configuration File Changes

6

You can track the change history of configuration files for both personalization and user environment settings by enabling Configuration Changelog.

When you make changes to configuration files, end-user settings might no longer work correctly. With Configuration Changelog enabled, you can view the changelogs to review the history of the configuration file for that application or desktop setting. The history can help you identify if a change to the configuration settings caused the issue.

This chapter includes the following topics:

- [Enable Configuration Changelog](#)

Enable Configuration Changelog

To track the change history of configuration files, use one of the available methods to enable Configuration Changelog and to select a changelog destination. You can use the VMware Dynamic Environment Manager Console method or, if you provide Management Console configuration by using a policy, you can use the Group Policy Object (GPO) method.

By default, configuration-file change information is not saved. To save change information, enable Configuration Changelog and select one or both of the following changelog options.

- **Log changes to disk.** When you select this option, VMware Dynamic Environment Manager logs configuration-file change information to the VMware Dynamic Environment Manager configuration share. You can view the change information using the VMware Dynamic Environment Manager Console on the **Changelog** tab of the respective Flex configuration file or user environment settings configuration file.
- **Log changes to Windows event log.** When you select this option, VMware Dynamic Environment Manager logs configuration-file change information to the local event log. You can view this information in Event Viewer.

Prerequisites

To perform this procedure using the Group Policy Object (GPO) method, configure a GPO for VMware Dynamic Environment Manager Management Console settings and assign that GPO to your VMware Dynamic Environment Manager administrators or help-desk staff. To get a sense of how to configure a policy that contains VMware Dynamic Environment Manager Console settings for administrators, see [Chapter 14 Lock Down Access to the Management Console](#).

Procedure

- ◆ Enable Configuration Changelog using the configuration option that best suits your deployment.

Option	Description
Use the VMware Dynamic Environment Manager Management Console	<ol style="list-style-type: none"> a Start the VMware Dynamic Environment Manager Management Console. b Click Configure, and then click the Configuration Changelog tab. c Select one or both of the changelog destinations. <ul style="list-style-type: none"> ■ Log Changes to disk ■ Log changes to Windows event log
Edit the GPO	<ol style="list-style-type: none"> a Open the Group Policy Management Editor and access the VMware DEM Management Console folder. b Click a changelog type to open. <ul style="list-style-type: none"> ■ Changelog: Log changes to disk. ■ Changelog: Log changes to the Windows event log. c In the changelog dialog box, click Enabled. d To set a maximum number of log changes to disk for a given configuration file, edit the Maximum number of changes per configuration file value.

When you enable Configuration Changelog, the VMware Dynamic Environment Manager Management Console adds an entry consisting of a timestamp and a user name to a changelog destination every time a change is made to a configuration file. Each changelog entry also contains the type of change, such as created, enabled, disabled, or exported.

What to do next

Edit the setting for which you want to see the changelog, and select the **Changelog** tab.

Managing Conditions

7

Use conditions to control when and whether VMware Dynamic Environment Manager performs certain actions.

Conditions can be applied to Flex configuration files, user environment settings, and application migration. You can use multiple conditions in various combinations, create condition groups, and import and export condition sets.

Note

- Regarding conditions on triggered tasks, VMware Dynamic Environment Manager evaluates conditions on triggered task settings when it processes the settings themselves, not when it performs the resulting actions after the triggers occur.
- Regarding conditions that provide regular-expression support, use the **Matches regex** option to configure regular expressions. Regular expressions are matched case-insensitively using the ECMAScript regular expression grammar and are not implicitly anchored.

You can use the following conditions:

Option	Description
Active Directory Attribute	Checks if a specified Active Directory attribute matches the specified criterion.
Active Directory Site Name	Checks if the computer's Active Directory site name matches the specified value.
Battery	Checks whether the computer has a battery or is running on battery.
Day of the Week	Checks which day of the week it is.
Endpoint IP Address	Checks whether the endpoint IP address is in the specified range. Empty text boxes at the start of the range are interpreted as 0, and the ones at the end as 255.
Endpoint Name	Checks if the endpoint name matches the specified criterion.
Environment Variable	Checks whether the specified environment variable matches the specified criterion. The comparison is not case-sensitive.

Option	Description
Endpoint Platform	<p>Checks whether the endpoint platform matches the specified platform.</p> <ul style="list-style-type: none"> ■ Blast/PCoIP: The available platforms are Android, Chrome ARC++, Chrome Native, iOS, Linux, Mac, Web, Windows, and Windows Store. ■ ICA: The available platforms are Android, Blackberry, Blackberry Playbook, iOS, Java, Mac, UNIX/Linux, Web, Windows, Windows CE, Windows Phone, and Windows Store.
Exit Code	<p>Runs the specified command, and compares the exit code with the specified value. The command can contain environment variables and supports the 32-bit path logic.</p> <p>The command does not display any UI, as there is no way for the user to interact with it. If no timeout is specified, FlexEngine waits indefinitely for the command to finish. If the command never finishes, FlexEngine stops responding.</p>
File or Folder	<p>Checks if the specified file or folder exists. The specified path can be a directory or filename, and the last component of the path can contain wildcards. The path can contain environment variables, and supports the 32-bit path logic. When creating a File or Folder condition for a file type association or shortcut, the path is automatically set to the corresponding text box of the user environment setting.</p>
File Version	<p>Checks the file version or product version of the specified file. This is usually a .EXE file, but any file with a version resource can be used. The filename can contain environment variables, and supports the 32-bit path logic. When creating a File Version condition for a file type association or shortcut, the filename is automatically set to the corresponding text box of the user environment setting. To perform an exact version comparison, specify all four components of the version number. For a partial comparison, leave out the less significant ones.</p>
Group Membership	<p>Checks if the computer or the user is a member of the specified group. The browse functionality is only available on domain-joined computers. Using Browse to select a group also stores the group SID in the condition, which FlexEngine can use for certain fallback scenarios, such as working offline.</p>
Horizon Client Property	<p>Checks whether the specified Horizon Client property matches the specified criterion. The comparison is not case-sensitive. The Property drop-down menu contains three common properties. You can also enter the property name. The property name must be specified without the ViewClient_ prefix. These property names correspond with the names of ViewClient_ registry settings.</p> <p>Note The Horizon Client Property condition can only be used for PCoIP or VMware Blast Extreme connections.</p>
IP Address	<p>Checks whether one of the network adapters has an IP address in the specified range. Empty text boxes at the start of the range are interpreted as 0, and the ones at the end as 255.</p>
Operating System	<p>Checks the operating system of the system on which FlexEngine is running.</p> <p>The Linux entry in the Operating System condition is for Horizon Smart Policies on Linux desktops. See the information about using smart policies in the corresponding documentation, such as <i>Setting Up Horizon 7 for Linux Desktops</i>.</p>
Operating System Architecture	<p>Checks the architecture of the operating system FlexEngine is running on.</p>
Organizational Unit	<p>Checks if the computer or user is a direct or indirect member of the specified organizational unit. The browse functionality is only available on domain-joined computers. The Ignore domain option can be useful in DTAP scenarios, where you create your configuration in one domain and deploy it in another domain, while maintaining the same OU structure.</p>
Registry Key	<p>Checks if the specified registry key exists in the selected registry hive.</p>
Registry Value	<p>Checks if the specified registry value matches the specified criterion. If the name is empty, the default value is selected.</p>

Option	Description
Remote Display Protocol	Checks the remote display protocol for the current session.
Time Range	Checks if the current time fits in the selected time range.

Note When a Horizon session disconnects, the Endpoint IP Address, Endpoint Name, Endpoint Platform, Horizon Client Property, and Remote Display Protocol conditions might not work. When a Citrix ICA session disconnects, the Endpoint IP Address, Endpoint Name, and Endpoint Platform conditions might not work.

This chapter includes the following topics:

- [Adding a Name, Label, and Tag](#)
- [Using 32-Bit Path to Program Files on 64-Bit Systems](#)
- [Add Conditions to Personalization or User Environment Settings](#)
- [Combine Conditions](#)
- [Creating Condition Groups](#)
- [Creating Condition Sets](#)

Adding a Name, Label, and Tag

User environment settings must have a name and can optionally have a label and a tag.

As the name is used for the **Run once** logic, changing the name of an existing setting may cause the setting to apply once again. The label and tag fields can be used to describe or organize the settings. The **Group By Tag** ribbon button uses this tag field for grouping the list items. When editing a user environment setting, the **Previous** and **Next** buttons can be used to open the previous or next setting for editing, based on the current sort order of the list.

Using 32-Bit Path to Program Files on 64-Bit Systems

You can convert a 32-bit Program Files folder path to be used on a 64-bit system.

Several conditions refer to paths in the Program Files folder. If you specify a path starting with **C:\Program Files**, **C:\Program Files (x86)**, or a localized equivalent, a button appears in front of the path. If you click it, you can convert the start of the path to **%ProgramFiles%** and resolve that variable to the 32-bit Program Files folder on 64-bit systems.

Add Conditions to Personalization or User Environment Settings

Conditions can be added and edited using the condition set dialog box, or the **Conditions** tab of Flex configuration files and user environment settings.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Click **Conditions**.

Option	Description
Personalization Settings	Click the Personalization tab, select a Flex configuration file, and click the Conditions subtab.
User Environment Settings	Click the User Environment tab, create a settings definition, and click the Conditions subtab.

- 3 Click **Add** and select the conditions that you want to apply.
- 4 Click **OK**.

What to do next

Use multiple conditions in combinations. See [Combine Conditions](#)

Combine Conditions

By default, multiple conditions are considered a match only if all of them are met. You can change that requirement by specifying a different operator for each additional condition.

Each condition is bound directly to the one above it. Use the arrow buttons to change the position of the conditions. You can use the following operators to define the type of combination for the conditions.

Option	Description
AND	The condition and the one above it must be met for the configuration to be applied.
OR	The condition or the one above it must be met for the configuration to be applied.
AND NOT	Not this condition, but the one above it must be met for the configuration to be applied.
OR NOT	Either this condition must not be met or the one above it must be met for the configuration to be applied.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Click the **Conditions** tab of a Flex configuration file or a user environment setting and add multiple conditions.

Every additional condition is added with an **AND** operator by default.

- 3 Right-click all conditions to edit and select an operator.
- 4 Click **Save**.

Creating Condition Groups

You can group conditions together to build manageable combinations.

To create a condition group, click **Add** in the **Conditions** tab and select **Condition Group**. After the group is created, add conditions by right-clicking the group, clicking **Add**, and selecting the condition that you want to use. You can apply the same operators to condition groups as to individual conditions.

Creating Condition Sets

Condition sets can contain one or more predefined conditions and can be imported from or exported to different VMware Dynamic Environment Manager environments.

You can access the condition sets on the **Condition Sets** tab in the VMware Dynamic Environment Manager Management Console and use them to create certain condition configurations for reuse.

If you are putting the same combination of conditions on multiple items, you must create a condition set and reference that condition set from those items. If you have to change the conditions afterwards, you only have to modify the condition set, instead of going through all individual items.

Application Migration

8

For each application for which you want to migrate the personal user settings, you must create a settings definition in the **Application Migration** tab of the VMware Dynamic Environment Manager Management Console. With application migration, you can specify the previous and new application versions for the Flex configuration files and the migration XML file that describes the migration steps.

Application migration settings can contain multiple conditions and can be imported from or exported to different VMware Dynamic Environment Manager environments.

This chapter includes the following topics:

- [Create an Application Migration Configuration](#)
- [Creating Custom Migration XML Files](#)

Create an Application Migration Configuration

Create migration settings for a single application.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 On the **Application Migration** tab, click **Create**.
- 3 Enter a name for the settings definition.
- 4 In the **Source** section, select the Flex configuration file corresponding to the previous version of the application.
- 5 In the **Target** section, select the Flex configuration file corresponding to the new version of the application.
- 6 (Optional) Select **Overwrite target profile archive if it already exists**.
- 7 In the **Migration XML** section, select the XML configuration file that defines the migration steps.

The selected file is copied to the application migration settings folder.

- 8 (Optional) In the **Log file** section, enter the name of the migration log file.

If you enter a relative path, it is resolved relative to the user profile archive folder. The path can contain environment variables.

- 9 (Optional) Select **Verbose logging** to increase the level of detail in the log file.

- 10 (Optional) Select **Run once** if you want the settings to be migrated only once.

- 11 Click **Save**.

Creating Custom Migration XML Files

The VMware Dynamic Environment Manager download package contains `Application Migration.pdf`, documenting the migration XML file format and `Migrate10.xsd`, an XML schema definition for the migration XML vocabulary. Use this file to validate your migration XML file or to provide context-sensitive help.

The download package also contains `Application Migration Sample.xml` and `Application Migration Office 2007 to Office 2010.xml` files. `Application Migration Sample.xml` is a sample migration XML file, containing examples for each migration action and a description. You can use the `Application Migration Office 2007 to Office 2010.xml` for converting settings between Microsoft Office versions or as a baseline for your custom migration XML file.

Managing Multiple Environments

9

VMware Dynamic Environment Manager supports scenarios with multiple environments, such as different customers, development, testing, acceptance, production, and separately managed organizational divisions.

You can use the traditional mechanisms like Active Directory group policies and file services to make a design that accommodates the needs of your organization. If you are managing multiple VMware Dynamic Environment Manager environments with a team of administrators, you can also configure these environments through a group policy, by using the VMware DEM Management Console.admx template, available in the VMware Dynamic Environment Manager download package. If environments are configured through a policy, the **Configure Environments** menu option and the **Configure** button in the ribbon are not available. If only a single environment is configured through a policy, the **Switch Environment** menu option is not available either.

For each environment that you define, a VMware Dynamic Environment Manager configuration share needs to be created, as well as a group policy with the environment-specific paths configured. After that, you target the VMware Dynamic Environment Manager group policies to the appropriate users, depending on which environment they belong to. For example, you can target the group policies based on an Active Directory organizational unit. You can use a single instance of the VMware Dynamic Environment Manager Management Console to manage these environments. For information on configuring group policies, see *Installing and Configuring VMware Dynamic Environment Manager*.

When multiple environments are configured in the VMware Dynamic Environment Manager Management Console, you can import and export VMware Dynamic Environment Manager configuration items between environments.

This chapter includes the following topics:

- [Configure Environments](#)
- [Configuring Environments Through Group Policy](#)
- [Select an Environment](#)

Configure Environments

Create different environments that can be used for different customers, and for development, testing, acceptance, production, and separately managed organizational divisions.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Click **File > Configure Environments**.
- 3 If there are other configured environments, click **Add**.
- 4 Enter a unique name for your new environment.
- 5 Browse to and select a location for the VMware Dynamic Environment Manager configuration share, and click **OK**.

The location must be specified as a UNC path.

- 6 Click **OK**.

What to do next

Select the environment you want use.

Configuring Environments Through Group Policy

If you are managing multiple VMware Dynamic Environment Manager environments with a team of administrators, you can configure these environments through Group Policy using the VMware DEM Management Console ADMX template available in the VMware Dynamic Environment Manager download package.

If environments are configured through Group Policy, the **Configure Environments** menu option and the **Configure** button on the ribbon of the VMware Dynamic Environment Manager Management Console are not available. If only a single environment is configured through Group Policy, the **Switch Environment** menu option is also not available.

Select an Environment

If multiple environments are configured and none is marked as a default one, the VMware Dynamic Environment Manager Management Console asks you to select one at startup.

You can manually change the environment that you are using and make it the default at any time.

Prerequisites

Configure multiple VMware Dynamic Environment Manager environments.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.

- 2 Click **File > Switch Environment**.
- 3 Select the environment that you want to use and select whether it becomes the default environment.
- 4 Click **OK**.

Using VMware Dynamic Environment Manager in a Silo Environment

10

In many environments that use Terminal Servers and Citrix XenApp, applications are pooled in application silos, which are separate sets of servers hosting different applications. In a silo environment, users simultaneously log in to different servers to use their applications.

When using a single roaming profile, profile corruption or loss of personal settings is likely to happen. When a roaming profile is updated and loaded on different servers at the same time, the risk of profile-related problems increases. Windows Server 2003 and later allow a separate profile path for Terminal Servers to be configured through a group policy. Separate profile paths for each silo might have a big impact on the number of profiles you need to manage.

Through its integration into group policy, VMware Dynamic Environment Manager allows separate configuration settings for application silos. You can do this by using the appropriate VMware Dynamic Environment Manager administrative template settings, and combining them with the Microsoft Loopback processing of Group Policy solution.

For an easier to manage group policy configuration, create a separate organizational unit in Active Directory for each silo. After enabling silo support in the Management Console configuration, you can create a silo tree similar to the organizational unit structure for the silos.

For each silo you need to create a separate Group Policy Object containing the silo-specific VMware Dynamic Environment Manager configuration. Clicking on the relevant silo in the VMware Dynamic Environment Manager Management Console displays the silo-specific settings that you need to configure in the VMware DEM Group Policy Object.

For each silo group policy object, you must configure the silo-specific Flex configuration files setting to point to the corresponding configuration file path. Flex configuration files from the Flex configuration file path and the silo-specific path are processed. All other VMware Dynamic Environment Manager features, such as user environment settings and condition sets are used generally and are not silo-specific.

Integrating VMware Dynamic Environment Manager with Microsoft App-V

11

You can manage the profile information for App-V-enabled applications with VMware Dynamic Environment Manager.

You can decouple personal application settings from the App-V 4.x App-V delta files and from the App-V 5.x redirected storage locations.

With App-V 4.x, you do not control what is stored into the user delta .PKG files. With VMware Dynamic Environment Manager you can explicitly configure the settings to be restored and saved when an application starts and exits, which removes the need to use .PKG files.

Using App-V 5.x, all personalization changes are stored in redirected locations in the user profile. With VMware Dynamic Environment Manager you can restore and save the personalization when an application starts and closes, which removes the need to use redirected storage locations and provides roaming capabilities without depending on traditional roaming profiles.

When using VMware Dynamic Environment Manager with Microsoft App-V, you can migrate user application settings from an installed instance to a virtual instance. When moving from traditional installations, such as .MSI to App-V-enabled, sequenced applications, users lose their personal application settings because the settings are stored in the native location of their Windows user profile. If you are using VMware Dynamic Environment Manager in this situation, you can migrate the settings you specify to the App-V-enabled applications. You can also run Windows XP with .MSI installations and migrate to Windows 7 with App-V-enabled applications.

You can also enable VMware ThinApp 5.2 support. When you are using ThinApp, only the packages created using ThinApp 5.2 can be used with DirectFlex. The configured DirectFlex executable path must be the virtual executable, not the ThinApp entry point.

Using a single, transparent approach to manage all user and application settings is efficient in situations where you use different deployment solutions and users work on different Windows platforms, for example, when users are connecting to remote desktops on terminal servers or VDI and are also working on traditional desktops. With VMware Dynamic Environment Manager, you can also manage user settings for both virtual and installed applications in the same way.

You can migrate user application settings from App-V 4.x to App-V 5.x. When migrating from App-V 4.x to App-V 5.x, only the application sequence is migrated and users lose their personal application settings. With VMware Dynamic Environment Manager, you can migrate the personalization from App-V 4.x to App-V 5.x. You can also roam personalization back and forth between App-V 4.x and App-V 5.x applications.

When managing user settings for App-V-enabled applications, it is necessary to restore and save these settings at application start and exit, as registry and file information does not apply for the virtual environment these applications run in.

This chapter includes the following topics:

- [App-V 4.x Integration](#)
- [App-V 5.x Integration](#)

App-V 4.x Integration

With App-V 4.x integration, you can decouple personal application settings from the App-V delta files.

Microsoft App-V 4.x supports running custom commands and scripts at application start and exit from the App-V 4.x application configuration .OSD file, which exists for each application. VMware Dynamic Environment Manager can run in the virtual application environment of App-V 4.x applications by launching FlexEngine with the appropriate arguments. For the very specific scenario where the path to the VMware Dynamic Environment Manager configuration share depends on the user location, you can configure the App-V 4.x integration to use an environment variable. You can define the environment variable name in the advanced App-V 4.x settings, located in **Configure > App-V**. You must define the configured environment variable in Windows for all users, or the App-V 4.x application fails.

By default, you cannot enable App-V 4.x integration for a Flex configuration file that is configured to use DirectFlex. To allow combining DirectFlex and App-V 4.x for Flex configuration files, access the advanced App-V 4.x settings at **Configure > App-V**, and select **Allow combining DirectFlex and App-V 4.x for Flex config files**.

Configure App-V 4.x

You must configure App-V 4.x support, before you integrate App-V 4.x applications with VMware Dynamic Environment Manager.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Click **Configure** and open the **App-V** tab.

- 3 Select **App-V 4.x support** and configure the App-V 4.x settings.

Option	Description
OSD files path	Browse to and select the default root location for your App-V 4.x OSD files. This path is used as the starting location when browsing for an OSD file in which you want to integrate a Flex configuration file.
FlexEngine path	Enter the location of FlexEngine.exe on the computers that are using the App-V applications that you have integrated with VMware Dynamic Environment Manager. The standard installation location is used as a default for this setting, but it might not be applicable in your environment.
Profile archives path	Enter the directory where the user profile archives are stored and read from.
Backup path	Enter the user profile archives backups directory.

- 4 Click **OK**.

What to do next

Integrate App-V 4.x to a Flex configuration file, see [Integrate App-V 4.x to a Flex Configuration File](#).

Integrate App-V 4.x to a Flex Configuration File

To manage settings for an App-V 4.x application with VMware Dynamic Environment Manager, you must integrate the application OSD file with a Flex configuration file.

Prerequisites

Configure App-V 4.x support. For information on configuring App-V 4.x support, see [Configure App-V 4.x](#)

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Select a Flex configuration file and open the **App-V 4.x** tab.
- 3 Click **Integrate**.
- 4 Browse to and select the OSD file that you want to integrate with the Flex configuration file.
- 5 Click **Integrate**.

The OSD file is backed up before it is modified.

What to do next

Integrate additional OSD files with the Flex configuration file by clicking **Add**.

App-V 5.x Integration

Due to the architectural changes in App-V 5.x, the personalization support in VMware Dynamic Environment Manager for App-V 5.x is less complex than for App-V 4.0. You can use DirectFlex with App-V 5.x.

App-V 5 User Integrations

With the release of Hotfix Package 4 for App-V 5 SP2, changes were made to improve the user experience of application publishing and refresh in conjunction with 3rd party profile management solutions, such as VMware Dynamic Environment Manager. All personal settings that encapsulate the App-V 5 publishing state can be roamed with VMware Dynamic Environment Manager personalization independent of the underlying Windows user profile. This way the App-V 5 publishing refresh is much faster in subsequent sessions. For best configuration, create a Flex configuration file with the built-in **App-V 5 User Integrations** Windows Common Setting.

User Environment File Type Associations and Shortcuts

You can create user environment file type associations and shortcuts, that reference items in an App-V 5.x package file. VMware Dynamic Environment Manager only supports creating file type associations and shortcuts for App-V 5 applications that are already available on the client system, which are applications that have been published using standard App-V 5 functionality.

Note When creating a user environment file type association and shortcut, set the App-V 5.x publishing model to the model that you have used when publishing the corresponding App-V 5 package.

Configure App-V 5.x

You must configure App-V 5.x support before you integrate App-V 5.x packages with VMware Dynamic Environment Manager.

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.
- 2 Click **Configure**, and then click the **App-V** tab.
- 3 Select **App-V 5.x** support.
- 4 Browse to and select the default root location for your App-V 5.x package APPV files.
- 5 Click **OK**.

What to do next

Configure DirectFlex for an App-V 5.x Package.

Configure DirectFlex for an App-V 5.x Package

DirectFlex executables support importing information from an App-V 5.x package.

Prerequisites

Configure App-V 5.x support. For information on configuring App-V 5.x support, see [Configure App-V 5.x](#)

Procedure

- 1 Start the VMware Dynamic Environment Manager Management Console.

2 Select a Flex configuration file and click the **DirectFlex** tab.

3 Select **Enable App-V 5.x** support.

The **DirectFlex executable** dialog box appears.

4 Click **Import from .APPV file** and select an App-V 5.x package.

A list displays the executables that the package contains.

5 Select the executable that you want to configure for DirectFlex.

6 Click **OK**.

Using VMware Dynamic Environment Manager Self-Support

12

With VMware Dynamic Environment Manager Self-Support, end users can restore application settings from a backup or reset the settings to their defaults.

When you start VMware Dynamic Environment Manager Self-Support, it displays a list of the applications that are managed with VMware Dynamic Environment Manager and can have their settings reset or restored.

Note Some applications might not be displayed in VMware Dynamic Environment Manager Self-Support. This might occur if the Flex configuration file of the application is configured to be hidden from the Self-Support tool, if the Flex configuration file has been retired, or if a profile archive and profile archive backup do not exist.

This chapter includes the following topics:

- [Reset an Application to Default Settings](#)
- [Restore Application Settings From Backup](#)
- [Collecting Logs From the Self-Support Tool](#)
- [Configure the Self-Support Tool Language and Tray Settings](#)
- [Customize the Self-Support Tool Logo](#)

Reset an Application to Default Settings

You can use the VMware Dynamic Environment Manager Self-Support tool to reset an application to its default settings.

When using a mandatory profile as a base profile, no further configuration is required to support resetting to the default settings. When using a local or roaming profile as a base profile, one of the following configuration settings must be applied for each application you manage with VMware Dynamic Environment Manager to support resetting to the default settings: Use the Profile Cleanup feature to delete the application-specific profile information at each logout or use the Predefined Settings feature to configure the default settings.

Procedure

- 1 Start VMware Dynamic Environment Manager Self-Support.
- 2 Select the application that you want to reset.
- 3 Click **Reset**.

The profile archive of the selected application is deleted. The settings are reset at the next login. If the application is configured with DirectFlex, the settings are reset when the application restarts.

What to do next

Log out and log in to your Windows machine or restart the application, depending on the way it is configured in VMware Dynamic Environment Manager.

Restore Application Settings From Backup

You can use VMware Dynamic Environment Manager to restore the settings of an application back to an earlier state.

Procedure

- 1 Start VMware Dynamic Environment Manager Self-Support.
- 2 Select the application for which you want to restore settings.
- 3 Click **Restore** and select the backup you want to use to restore the application settings.

The settings are restored to the selected point in time at the next login. If the application is configured with DirectFlex, the settings are restored when the application restarts.

What to do next

Log out and log in to your Windows machine or restart the application, depending on the way it is configured in VMware Dynamic Environment Manager.

Collecting Logs From the Self-Support Tool

If the **FlexEngine logging** group policy setting is configured, VMware Dynamic Environment Manager Self-Support logs reset and restore actions to the specified log file. The messages are logged at log level INFO.

Configure the Self-Support Tool Language and Tray Settings

You can change the language and system tray configuration of VMware Dynamic Environment Manager Self-Support.

Change the Self-Support Tool Language

VMware Dynamic Environment Manager Self-Support can display its user interface in English, German, or Dutch, based on the **Display Language** setting in Windows. If the configured language is not supported, the UI defaults to English. If you wish to override the language detection mechanism, you can use the `/lang` argument. For example, if you want to change the language to German, use:

```
"Flex+ Self-Support.exe" /lang=de
```

Use `/lang=en` for English and `/lang=nl` for Dutch.

Configure System Tray Support

VMware Dynamic Environment Manager Self-Support can be configured to appear in the taskbar notification area, also known as the system tray, with the `/tray` argument:

```
"Flex+ Self-Support.exe" /tray
```

Note On Windows 7 and later, the icon might be hidden. In that case, select **Show hidden icons** in the notification area and change the configuration for VMware Dynamic Environment Manager Self-Support to **Show icon and notifications**.

Customize the Self-Support Tool Logo

You can change the logo of VMware Dynamic Environment Manager Self-Support.

Prerequisites

Create or obtain a replacement logo and name the file `Flex+ Self-Support.png`. For best results, use a PNG file of 369 x 83 pixels.

Procedure

- 1 Open the installation folder of VMware Dynamic Environment Manager Self-Support.
- 2 Add the `Flex+ Self-Support.png` file to the folder.

To change the logo in the future, replace the file but continue to use the `Flex+ Self-Support.png` name.

- 3 Restart VMware Dynamic Environment Manager Self-Support.

Troubleshooting VMware Dynamic Environment Manager

13

This chapter includes the following topics:

- [Working with VMware Dynamic Environment Manager Logs](#)
- [Troubleshooting Common VMware Dynamic Environment Manager Issues](#)

Working with VMware Dynamic Environment Manager Logs

VMware Dynamic Environment Manager provides debug logging to help you to identify and troubleshoot issues. This topic explains how to work with log files to troubleshoot your environment.

Procedure

- 1 Configure FlexEngine logging settings or verify the configuration if already configured.

Table 13-1. Steps to Configure FlexEngine Logging

Option	Description
Path and name of log file	Enter a location that is unique for each user, and include the file name FlexEngine.log. For example: <code>\\Filesrv\DemUsers\$\%username%\Logs\FlexEngine.log</code>
Log level	For the purpose of debugging, set the log level to Debug. Note Do not use Debug or Info in production environments, because the amount of logging information might slow down the login and logout process.
Maximum log file size in kB	Set the maximum size of the log file. If you set a maximum log file size, the log file is created again after that size is reached. If you set the maximum size to 0, the log file expands indefinitely.
Log total size of profile archive and profile archive backups folders	FlexEngine logs the number of profile archives and profile archives backups, and their file sizes at the end of a path-based export.

- 2 Log into your target machine and then log out to allow VMware Dynamic Environment Manager to generate a log file with an "import" (login) and "export" (logout) section.
- 3 Open a FlexEngine.log file that contains at least one import and one export action.

4 Search for the line "Performing path-based import", and scroll up to view the line, "Starting FlexEngine...".

- a Check the version number to determine which version of FlexEngine is installed. Check the release notes for your FlexEngine version to see if any known issues apply to your installation.

```
[INFO ] Starting FlexEngine v9.2.0.701 [IFP#bf65d9d3-T5>>]
```

- b Check to see how the VMware Dynamic Environment Manager agent is started at login. VMware Dynamic Environment Manager is configured to run as a Group Policy client-side extension, a logon script, or directly from FlexService. Use a Group Policy client-side extension or NoAD mode unless a logon script is specifically required by your environment limitations. The following example shows the login mode.

```
[INFO ] Running as Group Policy client-side extension
```

- c Check to see if the login occurred without incident. If the user could log on, the log files show the following line.

```
[DEBUG] Performing path-based import
```

- d Check the log for other information, such as user name, computer name, and Windows version.

```
[DEBUG] User: DEMO\uem5, Computer: H-W101, OS: x64-win10 (Version 1607, BuildNumber 14393.0, SuiteMask 100, ProductType 1/7d, Lang 0409, IE 11.0.14393.0, App-V 5.2.0.0, VMware VDM 7.2.0.5748532, UEM 9.2.0.701, ProcInfo 1/2/2/2, UTC+02:00D), PTS: 1132/4324/1CT
```

- e Note the type of profile being used (local, roaming, or mandatory). Do not use roaming profiles with VMware Dynamic Environment Manager because it causes the profile to be stored twice, causing a delay.

```
[DEBUG] Profile state: local (0x00000204)
```

- 5 Search for the term, "Done (N ms)" where N represents the number of milliseconds. Then scroll up to view the following sections.

- a Check to see the overview of how many VMware Dynamic Environment Manager configuration files were processed. These files manage the personalization functionality of VMware Dynamic Environment Manager.

```
[DEBUG] Processed 58 Flex config files (30 successful, 12 skipped, 12 added to DirectFlex cache, 4 disabled)
```

- b View the overview of all the user environment actions that have been processed and check whether or not they have been processed successfully.

```
[DEBUG] Processed 2 UEM drive mappings (1 scheduled, 1 skipped)
[DEBUG] Processed 1 UEM settings import (1 disabled)
[DEBUG] Processed 3 UEM ADMX-based settings (3 successful)
[DEBUG] Processed 21 UEM shortcuts (3 successful, 6 skipped, 12 disabled)
[DEBUG] Processed 2 UEM folder redirection settings (1 successful, 1 disabled)
[DEBUG] Processed 1 UEM Horizon Smart Policies setting (1 skipped)
[DEBUG] Processed 1 UEM application blocking setting (1 disabled)
[DEBUG] Processed 1 UEM privilege elevation setting (1 disabled)
```

- c Check for indications that DirectFlex launched successfully. For example:

```
[DEBUG] Started injection
[DEBUG] Launched FlexEngine in DirectFlex mode
```

- d Check to see how much time it took for the FlexEngine to process all actions at login. For example, VMware Dynamic Environment Manager ran for 2391 milliseconds during the user login.

```
[INFO ] Done (2391 ms) [<<IFP#bf65d9d3-T5]
```

- e Check to see if a separate asynchronous FlexEngine has started to handle asynchronous drive mappings, printer mappings, and shortcuts. You can see this action logged as Triggering scheduled UEM actions. If a separate asynchronous FlexEngine has started, check the FlexEngine-async.log to see if asynchronous actions have correctly completed.

- 6 Search for the following section of the log.

```
[DEBUG] Performing path-based export
```

7 Review the contents of this section of the log.

- a Check to see if the Group Policy setting, Always wait for the network at computer startup and logon is enabled. If FlexEngine is configured to start as Group Policy client-side extension, this setting is required. For example, see the following log.

```
[DEBUG] Policy "Always wait for the network at computer startup and logon" is enabled
```

- b Check to see if the GPO setting, Run logon scripts synchronously is enabled. This setting should be enabled if FlexEngine is configured to start as a logon script. For example:

```
[DEBUG] Policy "Run logon scripts synchronously" is enabled for the user
```

- c Check to see which folders are redirected. Use VMware Dynamic Environment Manager config files to manage AppData and Favorites rather than redirecting them. Redirecting these folders can cause performance issues. For example, you use the VMware Dynamic Environment Manager config file, *Internet Explorer-Personal Settings* to manage your Internet Explorer settings. If you also redirect the Favorites folder, the Favorites files will be copied to and from the network multiple times, causing delays and slowing login times. Similarly, the AppData folder should never be redirected (regardless of VMware Dynamic Environment Manager configuration settings).

```
[DEBUG] Redirected folders: AppData, Desktop, Favorites, Personal
```

- d Check for Group Policy print restrictions. These restrictions can cause conflicts with VMware Dynamic Environment Manager if you are using VMware Dynamic Environment Manager to map printers.

```
[DEBUG] Policy "Point and Print Restrictions" is configured for the computer (1/2)
```

- e Check the time it took to process the user's Group Policy settings during login. If FlexEngine is configured to start as a Group Policy client-side extension, this time includes the amount of time VMware Dynamic Environment Manager was busy at login. For example:

```
[DEBUG] User policy last applied at 2017-10-13 11:09:52.687 (took 3.960 s)
```

- f Check to see if profile archives are configured for compression. Performance can be slow if compression is disabled. For example:

```
[DEBUG] Profile archives will be compressed
```

- g Check to see how VMware Dynamic Environment Manager is configured to handle shares that are not available at login. You can configure how VMware Dynamic Environment Manager handles unavailable Flex configuration files or user profile archives in the VMware Dynamic Environment Manager GPO Or in the NoAD.xml file if you configured NoAD mode. See "Configure Paths Unavailable at Logon Settings" in *Installing and Configuring VMware Dynamic Environment Manager* for more details. For example:

```
[DEBUG] If Flex config files path is not available at logon, log off automatically
[DEBUG] If profile archive path is not available at logon, skip import but apply user
environment settings
```

- h Check the import status. If the import status is successful, the export is performed as normal. If the import encountered an issue, VMware Dynamic Environment Manager skips the export to prevent overwriting the user profile with incorrect information. For example:

```
[DEBUG] Import status flag indicates success, so performing export
```

8 Review the information at the end of the log.

- a Search for the term "triggered" to see if triggered tasks have been performed during the session. Note that triggered tasks are not logged until logout. For example:

```
[DEBUG] No UEM triggered tasks have been performed
```

- b You can also see if undo-at-logoff actions are performed.

```
[DEBUG] Deleted application blocking and privilege elevation configuration
[DEBUG] Processed 5 UEM shortcut undo actions (5 successful)
[DEBUG] Processed 2 UEM export tasks (2 disabled)
[DEBUG] Processed 8 UEM folder redirection setting undo actions (8 successful)
```

- c Check for an overview of the configuration files that are processed at logout. This can help you understand what user profile information is exported. For example:

```
[DEBUG] Processed 58 Flex config files (30 successful, 24 skipped, 4 disabled)
```

- d Check to see an overview of the size of the user profile. If the size of the files is large, it can cause delays. For example:

```
[DEBUG] Profile archive folder contains 15 files (231 kilobytes); profile archive backup
folder contains no files
```

- e Check to see the time it took for FlexEngine to process all actions at logout. In this example, it took 1804 milliseconds to process logout actions.

```
[INFO ] Done (1804 ms) [<<IFP#05388090-24749e4]
```

- 9 Perform a search for the terms, "WARN," "ERROR," and "FATAL" to find warning and error messages. For example, the following note indicates that DirectFlex is not configured optimally to work with Firefox.

```
[WARN ] DirectFlex executable configuration: Generic config file 'Applications\Mozilla Firefox.ini' refers to both fully-qualified path 'C:\Program Files (x86)\Mozilla Firefox\firefox.exe' and to 'firefox.exe'. Configuring just 'firefox.exe' would be sufficient.
```

Troubleshooting Common VMware Dynamic Environment Manager Issues

This topic describes common issues, their symptoms, and solutions.

Troubleshoot DirectFlex Applications

Applications configured to use DirectFlex can sometimes cause conflicts with other programs, which can cause the application to stop unexpectedly.

Problem

An application was configured to launch using DirectFlex, and the program stopped unexpectedly.

Cause

DirectFlex uses "hooks" to be notified of processes launching and exiting, and this technique sometimes conflicts with other software, particularly security and antimalware products.

Solution

- 1 VMware Dynamic Environment Manager provides advanced policy settings to resolve conflicts with specific third-party applications. Check [Knowledge Base article 2145286](#) for the policies you can use with specific vendors.
- 2 Or, you can blacklist one or more executables, so that they are not affected by the hooking mechanism by creating a `Blacklist.xml` file (this file does not exist by default).
 - a Create a new folder called DirectFlex within the `\\Server\FlexConfigShare\General\FlexRepository` folder.
 - b Create a new `Blacklist.xml` file with the following lines.

```
<?xml version="1.0" encoding="utf-8"?>
<userEnvironmentSettings>
  <setting type="blacklist" list="" />
</userEnvironmentSettings>
```


- c Add the executables you want to exclude in the field, `list`.

For example, `list="notepad.exe|calc.exe|regedit.exe"`.

Note Use `|` to specify more than one executable.

- d Save the `Blacklist.xml` file with UTF8 encoding.

Solution

Depending on the solution you chose, the conflicts are resolved, or the hooking mechanism is disabled for specific applications. If you chose to blacklist the application hooking, you will need to configure the VMware Dynamic Environment Manager configuration file for the application to import and export at login and logout.

Troubleshoot Working with Antivirus Applications

Antivirus applications can sometimes scan a large number of files, which can slow login and logout processes.

Problem

Login and logout processes are significantly slowed. If you check the logs, you can see delays in the import and export sections of the log file.

Cause

FlexEngine reads and writes numerous files, locally and to the network. If an antivirus application scans every file that is accessed at the server and workstation level, it can significantly slow login and logouts. To fix this issue, you can configure your system to exclude VMware Dynamic Environment Manager files from antivirus scans.

Solution

- 1 Add an exclusion for the VMware Dynamic Environment Manager configuration share path to your antivirus software. For example:

```
\\server\FlexConfigShare\general
```

- 2 Add an exclusion for your profile archive path to your antivirus software. For example:

```
\\server\FlexArchiveShare\%username%\Archives
```

- 3 Add an exclusion for your profile archive backup path to your antivirus software. For example:

```
\\server\FlexArchiveShare\%username%\Backups
```

- 4 Add an exclusion for your FlexEngine log path to your antivirus software. For example:

```
\\server\FlexArchiveShare\%username%\Logs
```

- 5 You may be able to exclude the entire profile archive share (including profile archives, profile archive backups, and log files for all users) if the share is exclusively used for these VMware Dynamic Environment Manager-related subfolders. However, this should be done *only* if the profile archive share contains only VMware Dynamic Environment Manager subfolders. Otherwise, you may unintentionally exclude files that may contain viruses.
- 6 In addition, you might also want to exclude the following local paths:
 - C:\Users
 - C:\Temp (or %temp%)
 - LocalSyncPath when VMware Dynamic Environment Manager SyncTool is used. For example, %LocalAppdata%\VMware DEM\FlexSync
- 7 Additionally, you may want to exclude the following executables:
 - FlexEngine.exe
 - FlexService.exe
 - FlexSyncTool.exe when VMware Dynamic Environment Manager SyncTool is used

Troubleshoot Folder Redirection

Login can run slowly when you configure VMware Dynamic Environment Manager to manage files in folders while also configuring those folders for redirection.

Problem

Login runs slowly, and logout might also run slowly.

Cause

If you configure VMware Dynamic Environment Manager to manage files in folders while simultaneously configuring these folders for redirection, the files are copied to and from the network multiple times, causing delays and slow login times. This happens most commonly with the AppData and Favorites folders. An indication that you have encountered this problem is if you see these folders redirected in the export at logoff section of the log files. For example:

```
[DEBUG]    Redirected folders: AppData, Desktop, Favorites, Personal
```

Solution

- ◆ Ensure that you have not configured folder redirection for folders managed by VMware Dynamic Environment Manager, or, ensure that you do not use VMware Dynamic Environment Manager to manage files in these folders.

Troubleshoot Cache and Temporary Files

When VMware Dynamic Environment Manager manages folders that contain a large number of cache and temporary files, this can slow login times or create long start times for specific applications.

Problem

Login times are slow, or certain applications start slowly. The user profile archive zip files appear to be very large. You can see the large zip files in the user's profile directory and in the FlexEngine log files.

For example, you can see in the following log file that the zip file is large, and it takes three seconds to export. These are indicators that the files are excessively large:

```
2017-10-27 16:16:48.728 [DEBUG] ExportFiles: Recursively processing folder '<LocalAppData>\Google
\Chrome'
2017-10-27 16:16:51.927 [INFO ] Exported file information successfully
2017-10-27 16:16:51.931 [DEBUG] Stored 25 entries in profile archive (size: 28557620; compressed:
25412570)
```

You can also see the total size of the profile by looking at the last line in the log file after an export at logout:

```
2017-10-27 16:16:53.732 [DEBUG] Profile archive folder contains 20 files (25082 kilobytes); profile
archive backup folder contains 57 files (3631 kilobytes)
```

Cause

When VMware Dynamic Environment Manager manages folders that contain a large number of cache and temporary files, login times are slow or long start times can occur for specific applications. Because these temporary cache files do not contain important user settings, it isn't necessary to manage them through VMware Dynamic Environment Manager. Instead, modify the configuration file to exclude temporary and cache files.

Solution

- 1 Review the log files to determine the location of the large files.
- 2 Once you determine which folders or files are oversized, open the .zip archive file and look for large files that can be excluded without losing personal settings. Typically, these have filenames or extensions such as cache, temp, or .tmp.
- 3 Follow the instructions in [Section Headers](#) to exclude folders and files that are not needed.

Solution

Once the cache and temporary files are excluded, the size of files in the profile directory is reduced, and login and logout time improves.

Troubleshoot FlexEngine Log Files

Windows does not recognize FlexEngine log files if you do not configure a filename with a filename extension.

Problem

FlexEngine log files do not appear to open if you double-click them.

Cause

If you configure a FlexEngine log file without entering a name and filename extension for the log, VMware Dynamic Environment Manager creates the log file using a structure that Windows does not recognize. As a result, Windows does not open the log file, and it appears to be missing or unreadable.

Solution

- ◆ When you configure the log files, you need to enter a unique path for each user, and you need to enter a log filename with a filename extension: `\\Filesrv\DemUsers$\%username%\Logs\FlexEngine.log`. If you do not enter a log filename or omit the filename extension, Windows is unable to recognize the log file, and you will need to take additional steps to read it. For instructions on configuring FlexEngine logging, see "Configure FlexEngine Logging Settings" in *Installing and Configuring VMware Dynamic Environment Manager*.

Solution

When correctly configured, Windows can open the FlexEngine log files.

Troubleshoot the Configuration Share

If you enter the file path for the configuration share incorrectly, user environment settings are not created, and settings such as drive mappings are not applied.

Problem

User environment settings do not appear to be created. User settings, such as drive mappings, are not applied. This problem is related to the initial configuration, so it is apparent immediately after installation and configuration.

Cause

When entering the location of the configuration share in the Group Policy Object (or when using the NOADCONFIGFILEPATH MSI property), if you do not configure the path to the folder correctly, issues can occur. The path must end with `\General`.

If the location of the configuration share is incorrect, text similar to the following appears in the log files:

```
2017-10-27 17:11:23.294 [WARN ] Found 'General' subfolder in configured
'Flex Config Files path' '\\server\DEMConfig'.
It is generally advised to change this setting to '\\server\DEMConfig\General'.
```

Solution

- 1 Follow the instructions in "Configure the Flex Configuration Files Setting" in *Installing and Configuring VMware Dynamic Environment Manager* to update the GPO with the configuration share location. Or, reinstall in NoAD mode with the correct file path.
- 2 Verify that you have entered the full path to the `\General` folder.

- 3 Verify that you use a UNC path for the file path. UNC paths always begin with \\ preceding the computer name.

For example: \\Filesrv\DemConfig\$\General

Solution

User environment settings, such as drive mappings, are correctly applied.

Troubleshoot Logoff Commands

If you do not configure the FlexEngine logoff command to run from a logoff script when VMware Dynamic Environment Manager is configured to work with a Group Policy Object (GPO), FlexEngine is not run when the user logs out.

Problem

DirectFlex settings can be saved, but Windows settings are not saved. Windows settings do not load.

Cause

If the FlexEngine logoff command is not configured to run from a logoff script, the export does not occur. This means that any settings dependent on logout will not be saved. Settings configured for DirectFlex might load, but other Windows settings cannot load.

Note This issue only occurs when VMware Dynamic Environment Manager is configured to work with a GPO. VMware Dynamic Environment Manager configured in NoAD mode does not require a logoff script.

Solution

- ◆ Configure the FlexEngine logoff command to run from a logoff script. The command reads the setting through the VMware Dynamic Environment Manager GPO. For instructions on configuring the logoff script, see "Configure FlexEngine to Run from a Logoff Script" in *Installing and Configuring VMware Dynamic Environment Manager*.

Troubleshoot Working with Horizon

Using the Environment Variable condition, Registry Key, or the Registry Value condition to check whether a specified Horizon 7 client property matches a criterion fails.

Problem

Using the Environment Variable, Registry Key, or Registry Value conditions to check whether a specified Horizon property matches a criterion fails.

Cause

Because Horizon starts after VMware Dynamic Environment Manager, the Horizon registry information and environment variables are not created or set at the time that VMware Dynamic Environment Manager checks for them, which causes the checks to fail.

Solution

- ◆ Instead, use the Horizon Client Property condition. This is a special condition designed to allow VMware Dynamic Environment Manager to check for the properties of the Horizon session. For information on configuring the Horizon Client Property condition, see [Managing Conditions](#).

Troubleshoot Settings After Performing a Proof of Concept with Easy Start

Installations configured with Easy Start can have extraneous files, making it difficult to read the log files.

Problem

Log files contain unnecessary information and are difficult to read, and VMware Dynamic Environment Manager performs unnecessary actions.

Cause

Easy Start allows you to install a default set of VMware Dynamic Environment Manager configuration items; however, these items are not specific to your environment, so you might have a number of disabled files and extraneous items. For example, you might have a number of unused shortcuts.

Solution

- ◆ From the VMware Dynamic Environment Manager Management Console, delete the items that are not required in your environment.

Note Where possible, you should *remove* items rather than disabling them.

Troubleshoot When the Configuration Share is Unavailable

When the configuration share is unavailable, VMware Dynamic Environment Manager immediately logs users out of Windows when they attempt to log in.

Problem

After users log in to Windows, they are immediately logged out.

Cause

If the configuration share is unavailable, the default behavior is to log users out immediately to prevent a non-secure session. The configuration share might be unavailable due to network connectivity issues or issues with server availability. Or, there may be a configuration error.

Solution

- ◆ You can override the default behavior to allow users to log in and skip the import instead of logging users out. In the GPO, you can change the setting for the `Paths unavailable at logon` policy. By default, the setting `If Flex config files path is not available` is set to `Logoff`. You can select `Skip import`, instead.

Note Be aware that changing this setting can result in a non-secure session and can be a security risk.

Troubleshoot GPO Settings

If you configured FlexEngine to start as a Group Policy client-side extension, but you did not configure the GPO setting, `Always wait for the network at computer startup and logon`, VMware Dynamic Environment Manager cannot run at login, or it may run every second login.

Problem

VMware Dynamic Environment Manager does not run at login, or it runs every second login when FlexEngine is configured to start as a Group Policy client-side extension.

Cause

You configured FlexEngine to start as a Group Policy client-side extension, but you did not also configure the GPO setting, `Always wait for the network at computer startup and logon`.

Solution

- ◆ Enable the `Always wait for the network at computer startup and logon` Computer Group Policy setting to ensure that the FlexEngine Group Policy client-side extension runs during each logon. Apply this setting to an OU in Active Directory where all the Windows clients that are managed with VMware Dynamic Environment Manager are located.

Lock Down Access to the Management Console

14

If you provide environment configuration by using a policy, you can lock down access to the VMware Dynamic Environment Manager Management Console.

Enabling the **Lock down access to VMware DEM Management Console** policy setting from the VMware DEM Management Console.admx template locks down access to the VMware Dynamic Environment Manager Management Console. By using the policy options, you can allow access to certain features only.

Note If you use this policy, the **Configure** button, **Easy Start** button, **Configure Helpdesk Support Tool** menu option, **Manage Templates** button in **ADMX-based Settings**, **Global Configuration** button in **Application Blocking** and **Privilege Elevation**, and **Explore** and **Properties** menu items in **Personalization** are not available. Locking down access to the Management Console does not lock down file system access to the DEM configuration share.

Prerequisites

Configure an environment by using Group Policy.

Procedure

- 1 Open the Group Policy Management Editor and access the **Management Console** folder, located in **User Configuration > Policies > Administrative Templates: Policy definitions (ADMX files) retrieved from the local computer. > VMware DEM**.
- 2 Double-click the **Lock down access to VMware DEM Management Console** policy and click **Enabled**.
- 3 Enable the policy options you want to use.
- 4 Click **OK**.

VMware Dynamic Environment Manager COM Support

15

In addition to using the FlexEngine as an application or Group Policy extension, you can use it as a Component Object Model (COM) server.

FlexEngine is available as a COM server with `ImmidioFlexProfiles.Engine` as a ProgID, exposing a single method: `Process()`. This method requires a string argument that is interpreted in the same way as the FlexEngine command-line arguments.

Example: Call FlexEngine From Custom Code By Using the COM Interface

```
Function OnFirstSandboxOwner
    ' Read settings
    Set flexEngine = CreateObject("ImmidioFlexProfiles.Engine")
    Call flexEngine.Process("-r H:\VMwareDEM\ThinApp\appSettings.zip")
End Function

Function OnLastProcessExit
    ' Store settings
    Set flexEngine = CreateObject("ImmidioFlexProfiles.Engine")
    Call flexEngine.Process("-i \\srv\Flex$\ThinApp\appSettings.ini " & _
        "-s H:\VMwareDEM\ThinApp\appSettings.zip")
End Function
```

Import Status Flag Details

16

If FlexEngine cannot access the profile archive directory at login or is for some reason not invoked, FlexEngine does not run at logout, as that overwrites the personalized user settings. You can change this functionality by using the `-F` switch from the command line arguments.

Generating Reports About Flex Configuration Files and User Environment Settings

17

VMware Dynamic Environment Manager can generate a report containing information about all the Flex configuration files and user environment settings that have been processed.

Use the reporting feature only to perform troubleshooting and other diagnostics. To enable report generation, create a folder called `UEMResult` in the same location as the FlexEngine log file. While the folder exists, FlexEngine stores intermediate processing results in the temporary folder of the user. When FlexEngine runs at logout, it uses the intermediate files to generate the report as an XML file in the `UEMResult` folder.

FlexEngine continues to generate the reports until the `UEMResult` folder is deleted.

To manually review the intermediate results without logging out, you can use the `UEMResult.exe` console application located in the VMware Dynamic Environment Manager installation directory.

`UEMResult.exe` supports two arguments.

Argument	Description
<code>-keep</code>	The intermediate files are not deleted. If you do not use the <code>-keep</code> argument, all intermediate files are deleted after processing.
<code>-quiet</code>	No output appears in the console window. If you do not use the <code>-quiet</code> argument, some information is output to the console window.