

VMWARE WINDOWS OPERATING SYSTEM OPTIMIZATION TOOL GUIDE

VMware Horizon 6, VMware Horizon 7, and
VMware Horizon Cloud-Hosted

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How This Guide Is Organized

This guide is organized into the following sections:

[Introduction](#) provides a brief description of the guide and its target audience, and summarizes the VMware Horizon® 6, VMware Horizon 7, and VMware Horizon Air™ products.

[Why Optimize](#) explains how Microsoft Windows can be optimized for virtual machines, the specific areas in the OS that you can customize, and the benefits of doing so.

[VMware OS Optimization Tool](#) presents an overview of the tool, the link to download it, and the steps to use it.

Note: The section [Road Map for Using the OSOT](#) outlines the steps to perform an optimization. It is the quickest path to get started on the process. You can use the other parts of this document as a reference when you have questions along the way.

Introduction

This guide describes how to optimize virtual and physical desktops and servers with the VMware Operating System Optimization Tool (OSOT) for View in VMware Horizon 6 and VMware Horizon 7, and VMware Horizon Air Cloud-Hosted.

This guide is accurate as of version b1057 of the OSOT.

VMware Operating System Optimization Tool

The free OSOT makes it easy to apply configuration settings to desktops and servers. It includes settings to optimize the following Windows operating systems for both desktops and servers that reside in the data center and in the cloud:

- Windows 7
- Windows 8
- Windows 8.1
- Windows 10
- Windows Server 2008 (including R2)
- Windows Server 2012 (including R2)

The OSOT optimizes RDSH servers for Horizon 6, Horizon 7, and Horizon Air.

Notes

- The OSOT does not support optimizing Windows Server 2008 or 2012 when those operating systems are used as single-session desktops.
- The optimization information in this guide does not pertain to Windows XP, which Microsoft no longer supports. For more information, see the [Windows XP Deployment Guide](#).

Audience

This guide is written for data center administrators and IT personnel who want to optimize Windows operating systems. The guide assists you in working with the OSOT, and provides an ongoing reference as you become a more proficient OSOT user. VMware will periodically update this document to reflect continuing enhancements to the OSOT and future releases of the Windows operating system.

View in Horizon 6 and Horizon 7

View in Horizon 6 and Horizon 7 is a desktop virtualization solution that enables organizations to deliver virtualized or remote desktops and applications to end users through a single platform.

All Horizon 6 and Horizon 7 editions include View as their foundation. Each edition builds successively on the others. For example, Horizon 6 Advanced Edition is based on Horizon 6 Standard Edition with additional components and products, and Horizon 7 Enterprise Edition extends the capabilities of Horizon 7 Advanced Edition.

For more information, see the [VMware Horizon Pricing, Packaging, and Licensing white paper](#).

Horizon Air Desktop and Horizon Air Apps

Horizon Air Desktop and Horizon Air Apps provide virtual desktops and hosted apps as a cloud service, deploying and managing them in the cloud. Like the user experience in Horizon 6 and Horizon 7, users can securely access their desktops and apps from any device or browser.

Why Optimize?

Windows was designed for physical hardware, specifically desktops, and for that hardware to be accessed by just one user at a time. Windows uses many resources to present a responsive desktop, but many of its settings are unnecessary or even detrimental when applied to a virtual environment. These actions include, for example, animating windows as the user opens them. Performing this animation takes significant CPU resources, which decreases the number of desktops that you can host per VMware vSphere® server. Consequently, this nonessential function in a virtual machine (VM) environment increases the amount of system hardware that you need. Even if hardware is plentiful, Windows animations do not perform well when accessed remotely, especially when connecting over a slow WAN or Internet connection. As a result, keeping animations enabled (in addition to other features unnecessary for VMs) impairs the end-user experience.

Another example of desktop optimization in a virtual machine environment is to disable Windows Update so that control of the service is isolated to administrators. Administrators can run Windows Update in batch mode for the VMs as opposed to users performing this task.

Note: You can also optimize physical machines by removing nonessential functions in a similar manner. However, the focus of this document is on the administration of master images to be deployed to end users or used as RDSH servers.

What Are You Optimizing?

Using the recommendations provided in the OSOT, you are maximizing the efficiency and performance of your virtual desktops and RDSH servers.

Optimizing virtual desktops

- Increases their performance
- Increases their density, boosting the number of virtual desktops that can be hosted per vSphere server, thereby reducing infrastructure costs
- Improves end-user experience
- Reduces end-user support incidents

Optimizing RDSH servers

- Increases hosted desktop and application performance
- Reduces the amount of system resources that each RDSH server requires
- Increases the number of RDSH servers that can be hosted virtually on Windows Server 2008 R2 or Windows Server 2012
- Increases the number of users that can be supported per RDSH server
- Improves the end-user hosted desktop and application experience
- Reduces system support incidents

When Do You Optimize?

The traditional approach to optimizing virtual desktops or RDSH servers is to use a master image. You apply optimizations to the master image, which is used to create a desktop pool. You can also use a master image to deploy multiple RDSH servers.

Another type of optimization that is frequently performed is one that is made spontaneously to remote systems. This kind of optimization is often performed to tune something that was not optimized when the system was first deployed. However, it is also performed because something has changed, and new optimizations are needed on remote systems that cannot be redeployed.

You can perform both types of optimization using the OSOT.

VMware OS Optimization Tool

The OSOT provides the easiest and most efficient way to optimize your Windows desktop and server master images. It offers many advantages over traditional scripts, including the ability to roll back changes, selectively edit optimization values, and view detailed audit information before applying optimizations.

The OSOT includes customizable built-in templates to enable or disable Windows features and system services across multiple platforms. You use the OSOT to improve Windows performance, as per VMware recommendations and best practices.

The [OSOT](#) is a free VMware Fling that you can download.

Using the OSOT

Before using the OSOT, which contains recommended configurations in the built-in OSOT templates, your IT organization should investigate and evaluate the benefits of the various optimizations. There is sometimes a trade-off between productivity and optimization. Also, test before and after using the OSOT to ensure that optimizations do not interfere with other software that might be in use within your organization.

Road Map for Using the OSOT

Using the OSOT involves the following steps:

1. Analyze a master image.
2. Verify that the list of optimizations checked in the analysis results are those that you want to apply.
3. (Optional) Export the analysis results to an **HTML** file.
4. Optimize the master image.
5. Analyze the optimization results. (Each optimization will include the status **SUCCESS** or **FAILED**.)

6. Troubleshoot **FAILED** results: Click the respective **FAILED** links to review error code and error string information.
7. Address the cause of the failure and optimize again.
8. (Optional) View the optimization history.
9. (Optional) Perform a rollback (if you want to return a master image to its pre-optimized state).
10. (Optional) Create a custom OSOT template.

Best Practices

To make the most of the OSOT, follow these best practices:

- Use the OSOT on a *base image*. Apply the tool to an unused system that has been built to match the configuration that you will deploy for virtual desktops or RDSH servers.
- Disable as many unnecessary Windows OS components as possible. Consider disabling everything and then performing user-acceptance testing (UAT) to see if there are problems. Re-enable any components that cause a problem when disabled.

OSOT Features

This section describes some of the tool's graphical features.

Tab Functions

A row of tabs provides the main functions of the OSOT:

- **Analyze** – Analyze the registry entries, services, and scheduled tasks of the virtual machines that you want to optimize.
- **History** – View optimization history, and roll back virtual machines to a pre-optimized state.
- **Remote Analysis** – Browse a list of virtual machines in a remote desktop environment to analyze them.
- **Templates** – Edit the built-in OSOT templates and save the changes to create your own OSOT templates.
- **References** – Use the links provided to
 - Download the latest version of the OSOT
 - Provide feedback or submit your questions to the OSOT development team and the community
 - Access third-party reference guides

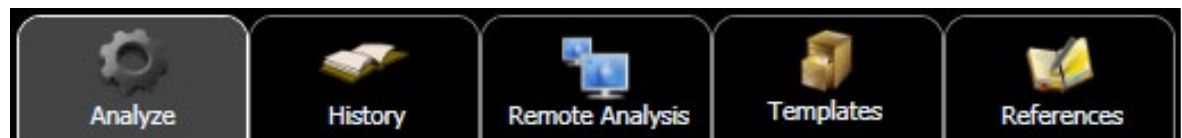


Figure 1: Tabs Available in the OSOT

Note: After performing an optimization, a new tab, Optimize, is added to the right of the Analyze tab.

OSOT Template Choices

The following built-in OSOT templates come with a list of modifications for a standard master image. Each OSOT template is an **XML** file that contains the coding for the optimizations. The default settings are the recommended values for optimizing your Windows operating system.

- Windows7 (built-in) – Optimizes Windows 7 desktops.
- Windows8 (built-in) – Optimizes all versions of Windows 8 desktops.

- Windows8_1 (built-in) – Optimizes all versions of Windows 8.1 desktops.
- Windows10_beta (built-in) – Optimizes all versions of Windows 10 desktops.
- WindowsServer2008-2012 (built-in) – Optimizes Windows Server 2008 and Windows Server 2012 servers.

Note: The OSOT does not support optimizing Windows Server 2008 or 2012 when those operating systems are used as single-session desktops.

The key to optimization is to configure services and settings specific to the operating system being used. Therefore, always use the OSOT template that matches the OS version that your virtual machine is using. For example, if the target system is running Windows 7, use the Windows7 (built-in) template to optimize it.

Note: The OSOT attempts to select the appropriate built-in OSOT template by detecting the OS of the target machine. However, verify that the correct OSOT template is selected for your VM before applying optimizations.

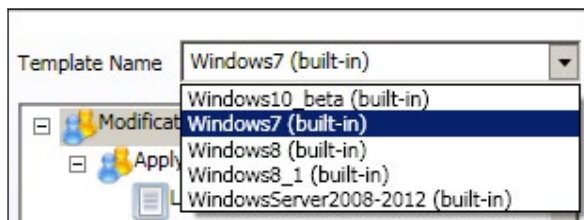


Figure 2: Selecting a Template Name in the OSOT

You can also create your own templates within the OSOT, as described in [Customizing Built-In OSOT Templates](#).

OSOT Templates and Groups

Each OSOT template has a list of modifications, called *Steps*, which are organized into *Groups*.

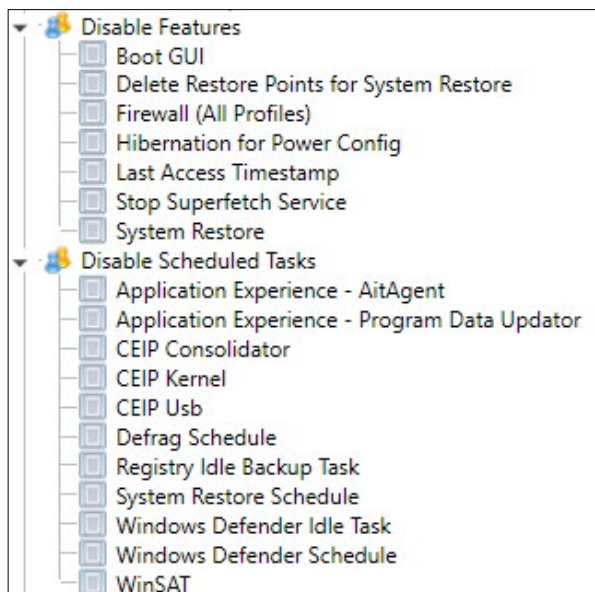


Figure 3: Disable Features and Disable Schedule Tasks Groups and Their Steps

There are five built-in OSOT templates with their own set of *Groups*.

TEMPLATE NAME	GROUPS
Windows7 (built-in)	Apply HKCU Settings to Registry Apply HKLM Settings Disable Features Disable Scheduled Tasks Disable Services Improving Login Times Visual Effects VMware Components
Windows8 (built-in)	Apply HKCU Settings to Registry Apply HKLM Settings Disable Features Disable Scheduled Tasks Disable Services Improving Login Times Visual Effects VMware Components
Windows8_1 (built-in)	Apply HKCU Settings to Registry Apply HKLM Settings Disable Features Disable Scheduled Tasks Disable Services Improving Login Times Visual Effects VMware Components
Windows10_beta (built-in)	Apply HKCU Settings to Registry Apply HKLM Settings Disable Features Disable Scheduled Tasks Disable Services Disable Startup Run Improving Login Times Remove Apps Visual Effects
WindowsServer2008-2012 (built-in)	Apply HKCU Settings to Registry Apply HKLM Settings Disable Scheduled Tasks Disable Services Improving Login Times

Table 1: OSOT Templates and Groups

System Information

The System Information pane, below the five main tabs, has details about the machine (local or remote) that you are targeting.

System Information details include

- **OS** – Operating system on machine being viewed
- **User Name** – Current logged-in user
- **Physical Memory** – Installed physical memory
- **Windows Locale** – OS setting that identifies, by geographical location, the language used by the targeted machine

System Information			
OS	Microsoft Windows 7 Enterprise	System Name	HWS-L03-119
Version	Service Pack 1	User Name	sblau
Processor	AMD Opteron(TM) Processor 6276	Windows Directory	C:\Windows
System Type	32-bit	System Directory	C:\Windows\system32
Physical Memory	3.00 GB	Windows Locale	United States

Figure 4: System Information Pane of the Main OSOT Window

Analyze a Master Image

OSOT Optimization

You view the OSOT Optimization pane by selecting the Analyze tab. To the right of the Template Name drop-down menu in the VMware OS Optimization Tool window, you see that the area is largely blank. The only elements shown are a check box and four columns: Optimizations, Description, Expected Result, and Actual Result.

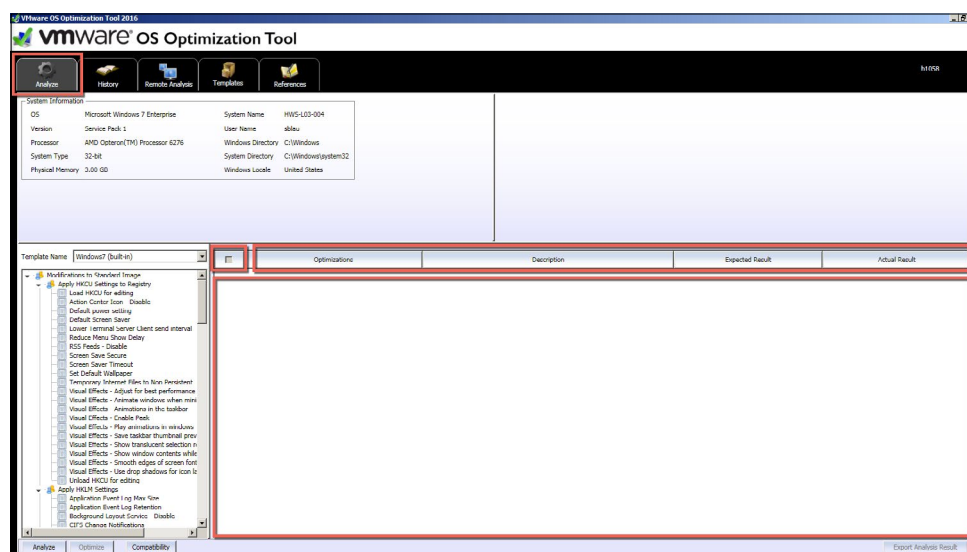


Figure 5: Main OSOT Pane Before You Analyze

After you select a template from the Template Name menu and perform an analysis by clicking the Analyze button, the columns populate with the optimizations that you can perform.

You see a check box before each optimization item, with some check boxes selected and others unselected.

The selected items indicate those that are included for optimization. Some items are not selected for optimization by default because they can cause unexpected results.

Note: If you create your own template, you can configure an optimization item to be selected by default. For more information, see [Customizing Built-In OSOT Templates](#).

First, you analyze the current state of a desktop master image, and later (when you optimize), you apply the template's optimizations according to your choices.

To analyze a master image:

1. Run the OSOT from the master image that you want to optimize.
Apply the tool to an unused system that has been built to match the configuration that you will deploy as virtual desktops or RDSH servers.
2. From the Template Name drop-down menu in the left pane, select a built-in or custom OSOT template that matches the OS of the system you are optimizing.

The optimizations for your selected template are listed in the left pane.

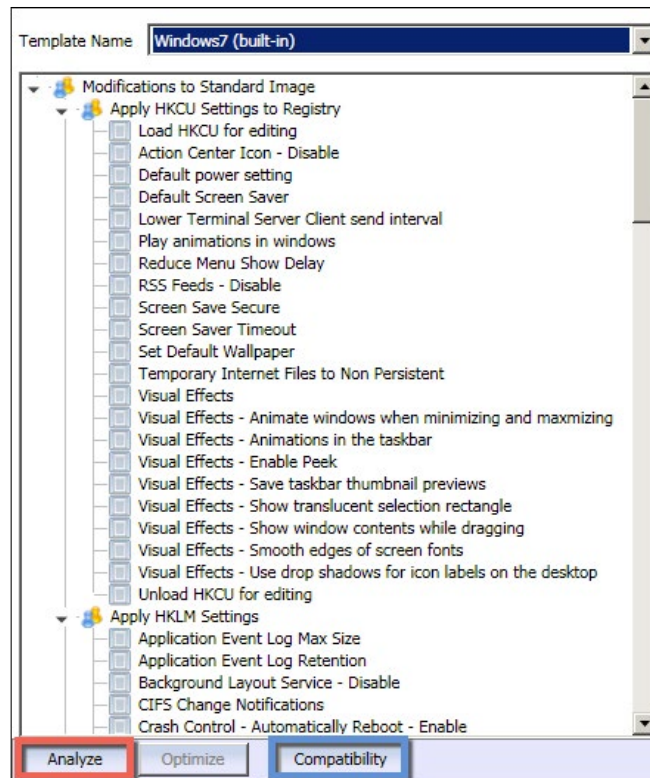
Note: Use a template that matches the OS of the target machine. This step is critical because each OS has different optimizations. If you see an element in the template that is marked with a red **x**, it is not available in the targeted image that you are optimizing, and the OSOT cannot perform that optimization.



3. Click **Analyze** or **Compatibility** to produce a list of optimizations for the selected template:

- Click **Analyze** if you are not using Persona Management.

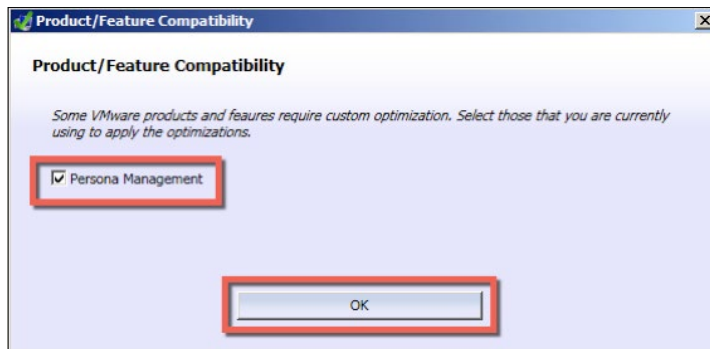
Note: For more information on Persona Management, see the [VMware View Persona Management Deployment Guide](#).



- Click **Compatibility** if you are using Persona Management (you will see the feature is selected by default). This excludes the Volume Shadow Copy Service from optimization, and ensures that Persona Management continues to function.

Note: In the Product/Feature Compatibility dialog, you can also deselect the Persona Management check box, click **OK**, and the OSOT will analyze the master image without the feature. (The results are the same as clicking the **Analyze** button.)

- In the Product/Feature Compatibility dialog, if you want the Persona Management feature box selected, leave the default.
- Click **OK**.



- The lower-right pane shows detailed optimization information for the targeted system.
- The Optimizations column shows a list of selected and unselected items.
- The Expected Result column can be compared to the Actual Result column. If an item in the two columns is different, it means that item's setting is not optimized.
- Most items have an icon indicating how important it is to optimize it.

Note: Those items without an icon are not settings that will be configured, but actions that will be performed when optimization is run. The action that will be performed is shown in the Description column.





	Mandatory – You must apply the optimization to the item in the target system because of problems or issues that the OSOT has identified.
	Recommended – Even if the OSOT recommends an optimization, there can be valid reasons to not apply it. Determine if the recommended setting is applicable to your organization's use cases.
	Optional – The OSOT has no recommendation regarding applying the optimization to the item in the target system. Determine if the setting is applicable to your organization's use cases.
	OK – The item already has the proper value or setting and does not require any optimization.

Table 2: Optimization Importance

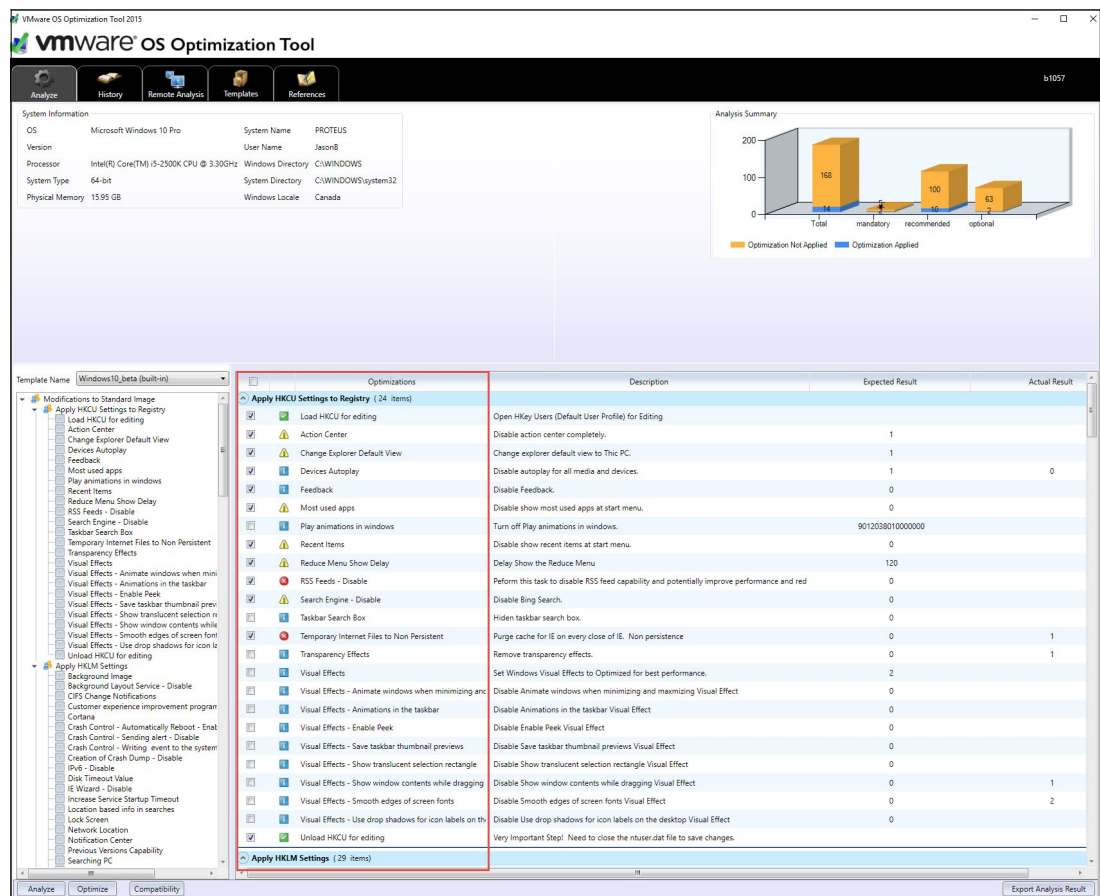


Figure 6: Main OSOT Window After You Analyze

4. The Analysis Summary pane in the upper-right of the main OSOT window provides a graphical representation of the current optimization of the targeted system.

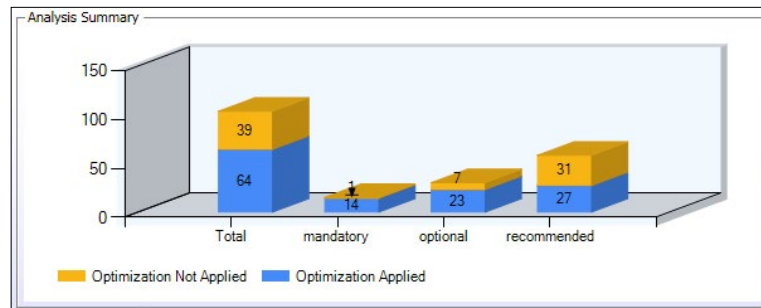


Figure 7: Analysis Summary Pane of the Main OSOT Window

The graphical chart makes it easy to review how close the analyzed system is to being optimally configured for best performance in terms of the optimization importance.

Within each severity level, the number of items in which settings do not match the expected values (orange) or which they do match expected values (blue) is shown.

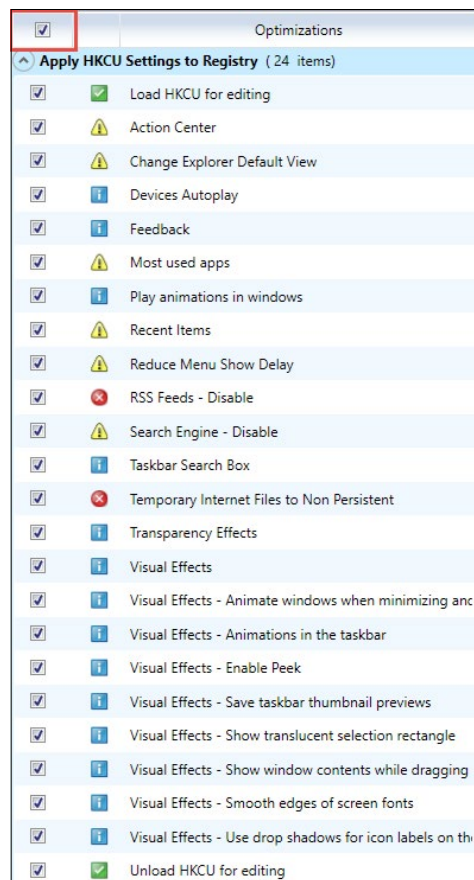
In Figure 7, the mandatory column shows 15 Mandatory items. There is 1 mismatch (orange) and 14 matches (blue). Your next step might be to identify the one mismatch in the list of optimizations and apply the optimization.

5. Review the list of selected and deselected items to be optimized.
6. Select additional items that you want to optimize or deselect those you do not want to optimize.

Caution

- Do not deselect **Load HKCU for editing**. Doing so can cause the optimization of some items to fail.
- If the icon next to an item is a blue **i**, and it has been deselected by the OSOT, selecting it for optimization can cause instability. Test the optimization of this item before putting it into a production environment.

To select or deselect all items, select the check box in the title bar.



Note: If the icon next to an item is a green check mark, selecting or deselecting the item will make no difference.

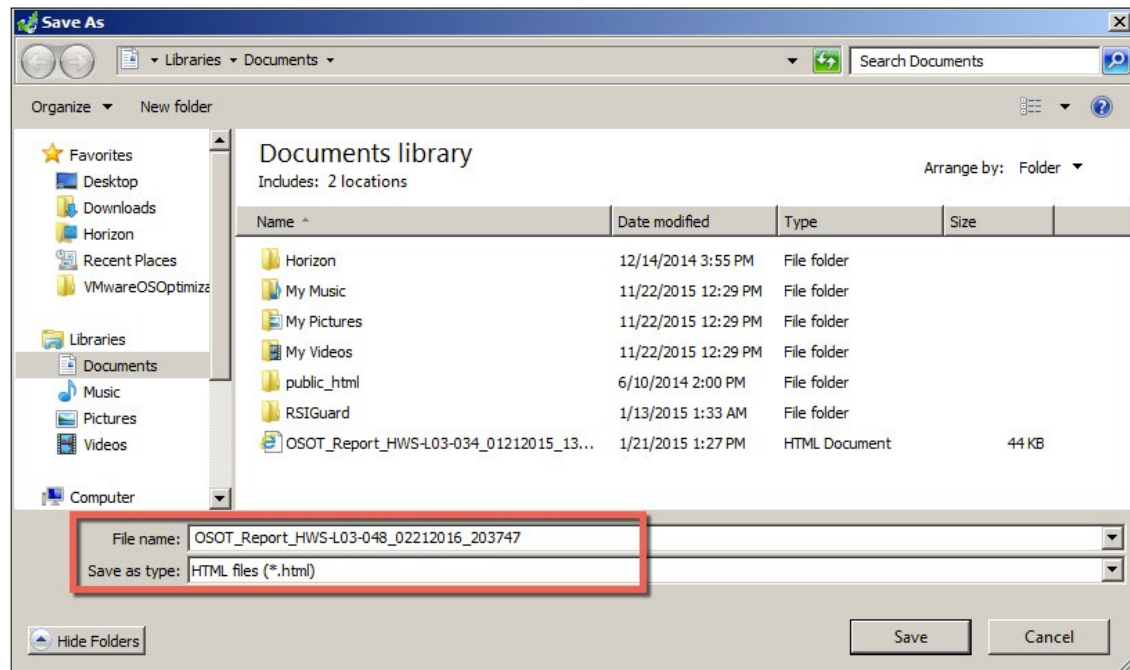
Export Results

Before you optimize the master image, you can export the analysis results to an **HTML** file for record keeping and to share with other personnel. You can also compare the analysis results with the post-optimization results.

1. In the lower-right corner of the main OSOT window, click **Export Analysis Result**.



2. Save the **HTML** file in your preferred location.



Optimize the Master Image

When you are satisfied with the optimizations that you have selected in the Optimizations column during the Analyze step, you are ready to perform the optimization.

You can see that the Analyze tab is still active and that the Optimize button is now accessible.

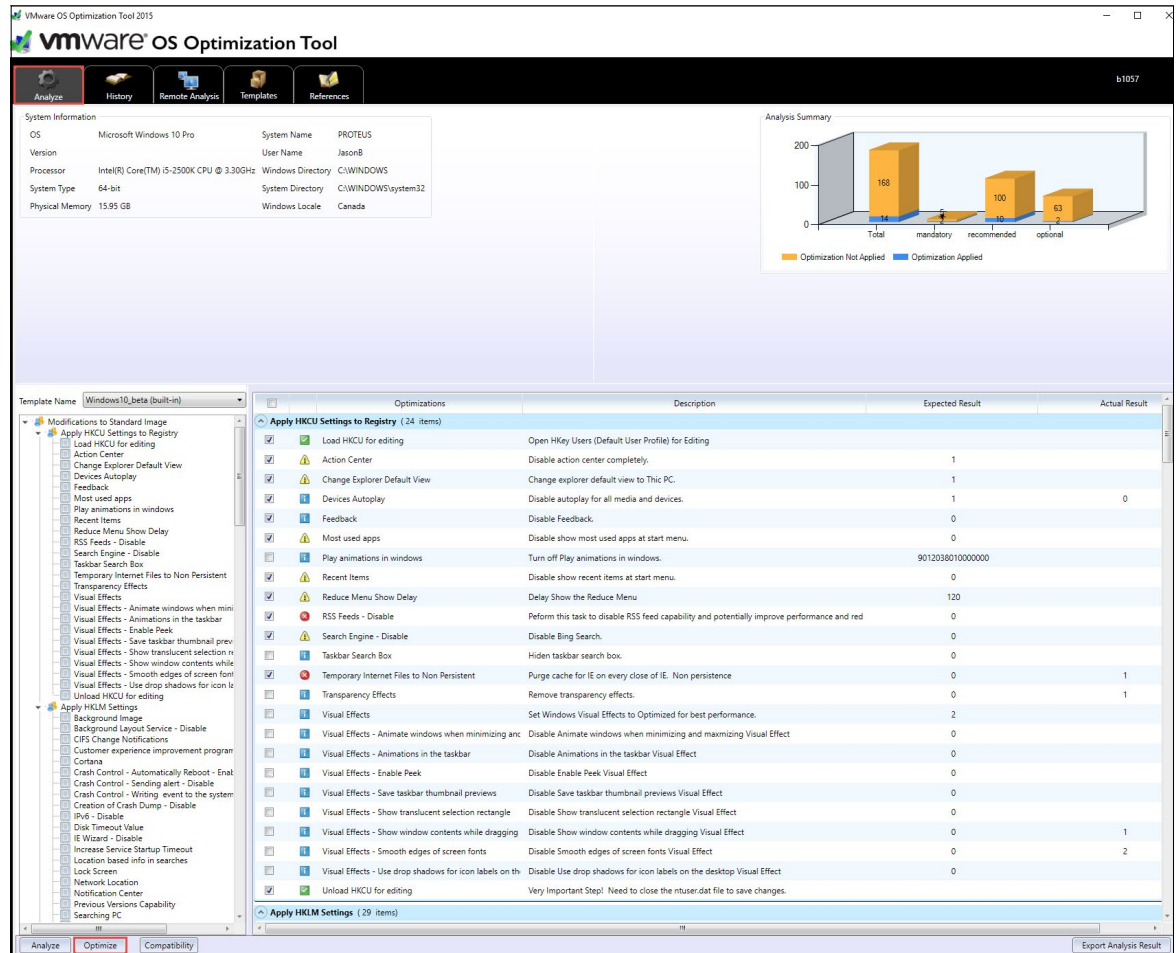


Figure 8: Main OSOT Window Ready to Optimize

1. Click the **Optimize** button.
2. Wait for the optimization to complete, as indicated by the progress bar showing **100%** and a new page being displayed.

The new page shows

- A new Optimize tab (active) in the row of OSOT tabs
- A new Optimization Result column in the OSOT pane, which appears before the Steps column
- Colored icons that indicate the importance of each optimization
- In the Optimization Results column, some optimization items have a **FAILED** or **SUCCESS** status

Optimization Result	Steps	Description	Expected Result	Actual Result
SUCCESS	Apply HKCU Settings to Registry (11 items)			
✓	Load HKCU for editing	Open HKCU Users (Default User Profile) for Editing		
✓	Action Center Icon - Disable	The Action Center Icon notifies the user of the firewall, anti virus, security related things, etc. that	1	1
✓	Default power setting	Set Start button > Power to log off as the default.	1	1
✓	Default Screen Saver	Set the default screen saver to "Blank" - any graphics screensaver will put extra load on the virtua	%windir%\system32\scrsave.scr	%windir%\system32\scrsave.scr
✓	Lower Terminal Server Client send interval	Lower Terminal Server Client send interval	1	1
✓	Reduce Menu Show Delay	Delay Show the Reduce Menu	120	120
✓	RSS Feeds - Disable	Perform this task to disable RSS feed capability and potentially improve performance and reduce r	0	0
✓	Screen Save Secure	Secures the VM in case a user walks away	1	1
✓	Screen Saver Timeout	Timeout set to 10 mins	600	600
✓	Temporary Internet Files to Non Persistent	Purge cache for IE on every close of IE. Non persistence	0	0
✓	Unload HKCU for editing	Very Important Step! Need to close the ntuser.dat file to save changes.		
SUCCESS	Apply HKLM Settings (33 items)			
⚠	Application Event Log Max Size	Set max size on Event Log to 1 MB	1048576	4194304
✓	Application Event Log Retention	Set no retention	0	0
✓	Background Layout Service - Disable	Disable Background Layout Service	0	0
✓	CIFS Change Notifications	Disable CIFS Change Notifications	1	1
✓	Crash Control - Automatically Reboot - Enable	Enable Automatically Reboot for the Crash Control	1	1
✓	Crash Control - Sending alert - Disable	Disable sending alert for the Crash Control	0	0
✓	Crash Control - Writing event to the system log - C	Disable writing event to the system log for the Crash Control	0	0
✓	Creation of Crash Dump - Disable	Removes the creation of a Crash Dump file	0	0
⚠	Customer experience improvement program - Disal	Disable customer experience improvement program	0	0
ⓘ	Disk Timeout Value	How long the OS will wait for a disk write or read to take place on the SAN without throwing an e	200	60
✓	Do not buffer UDP packets less than 1500 Bytes	Improves high bandwidth video performance	1500	1500
✓	Enable Remote Desktop	Enables RDP	0	0

If the Expected Result is different than the Actual Result, this means that the current setting is not optimized. You can review the items according to their icons and the meaning of those icons to see how important it is to address a setting that is not optimized.

Review the Optimization Results

In the Optimization Result column, **SUCCESS** means that the item has been successfully optimized. From the OSOT perspective, this value has been corrected.

SUCCESS	✗	System Event Log Max Size
	✓	System Event Log Retention
	✓	System Restore - Disable
SUCCESS	⚠	TCP/IP Task Offload - Disable
	✓	UAC - Disable
	✓	Windows Sideshow - Disable
	✓	Windows Update - Disable

Figure 9: Optimization Result Column

If you see **SUCCESS**, you do not have to be concerned about the Expected Result or Actual Result values in their respective columns because the item has been optimized.

For those items that show a **FAILED** result, click the **FAILED** link to review the error code and error string, and troubleshoot the issue as needed.

^ Disable Features (7 items)		
SUCCESS	Boot GUI	Disable the graphic for the Windows 7 boot
FAILED	Delete Restore Points for System Restore	Removes all restore points if they exist

Error Code	Error String
1	[Error-> Registry Optimizer Module] The command vssadmin delete shadows /All /Quiet executed but returns an error.

Figure 10: Addressing FAILED Results

A failure can occur for numerous reasons. Permissions, an incorrect configuration, or a group policy are just some of the possibilities. For example, if the system is in a domain and the system administrator prevents users from changing their desktop settings, the optimization can fail.

After troubleshooting, click **Analyze** again to see whether the optimizations are now successful.

View Optimization History

You can view the details of the optimization operations that you have performed.

1. Click the **History** tab.



2. Review the information for the optimization operations that you have performed.

	Template Name	Machine Name	Date	Time	Type
<input type="checkbox"/>	Windows7 (built-in)	HWS-L03-048	02/21/2016	20:50:54	Optimization
	Windows7 (built-in)	HWS-L03-048	02/21/2016	20:51:09	Rollback

The following table defines the elements that you can view in the optimization history.

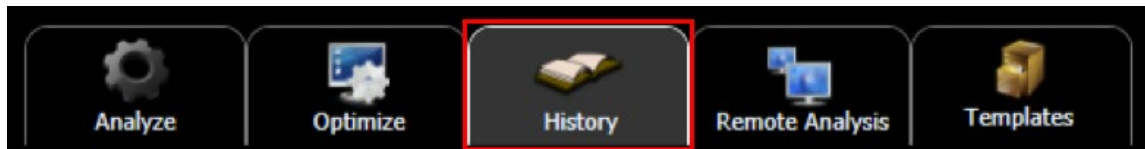
SCREEN ITEM	DESCRIPTION
Template Name	Name of the template used for an operation
Machine Name	Name of the machine on which an operation was performed
Date	Date when the operation was completed
Time	Time when the operation was completed
Type	Operation type, either Optimization or Rollback

Table 3: Optimization History Elements

Roll Back to the Pre-Optimized State of the Master Image

A **Rollback** returns the master image to its pre-optimized state. You can roll back any master image that you have optimized and reverse all optimizations that you made with the OSOT.

1. Click the **History** tab.



2. In the Template Name column, select the check box for the optimized entry that you want to roll back and click **Rollback**.

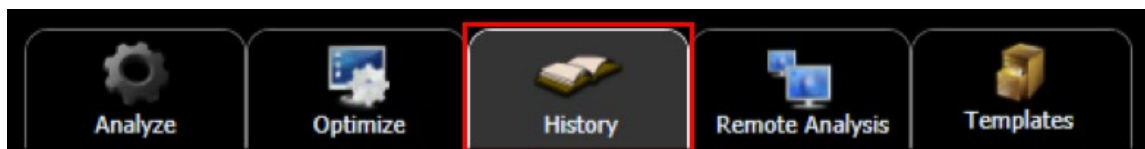
	Template Name	Machine Name	Date	Time	Type	
<input type="checkbox"/>	Windows7 (built-in)	HWS-L03-119	04/30/2015	10:30:00	Optimization	
<input type="checkbox"/>	Windows7 (built-in)	HWS-L03-119	04/30/2015	10:40:33	Rollback	
<input checked="" type="checkbox"/>	Windows7 (built-in)	HWS-L03-119	04/30/2015	10:49:36	Optimization	

3. When the **Rollback** operation is complete, click **OK** in the dialog box.



View Rollback History

You can view the details of the **Rollback** operations that you have performed.

1. Click the **History** tab.



2. Review the information for the **Rollback** operations that you have performed.

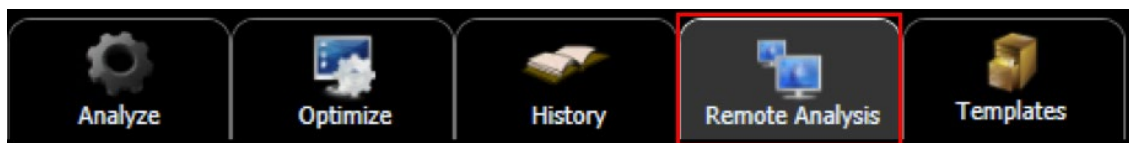
	Template Name	Machine Name	Date	Time	Type
<input type="checkbox"/>	Windows7 (built-in)	HWS-L03-119	04/30/2015	10:30:00	Optimization
	Windows7 (built-in)	HWS-L03-119	04/30/2015	10:40:33	Rollback
<input type="checkbox"/>	Windows7 (built-in)	HWS-L03-119	04/30/2015	10:49:36	Optimization
	Windows7 (built-in)	HWS-L03-119	04/30/2015	11:36:10	Rollback

Perform Remote Analysis of View Desktops

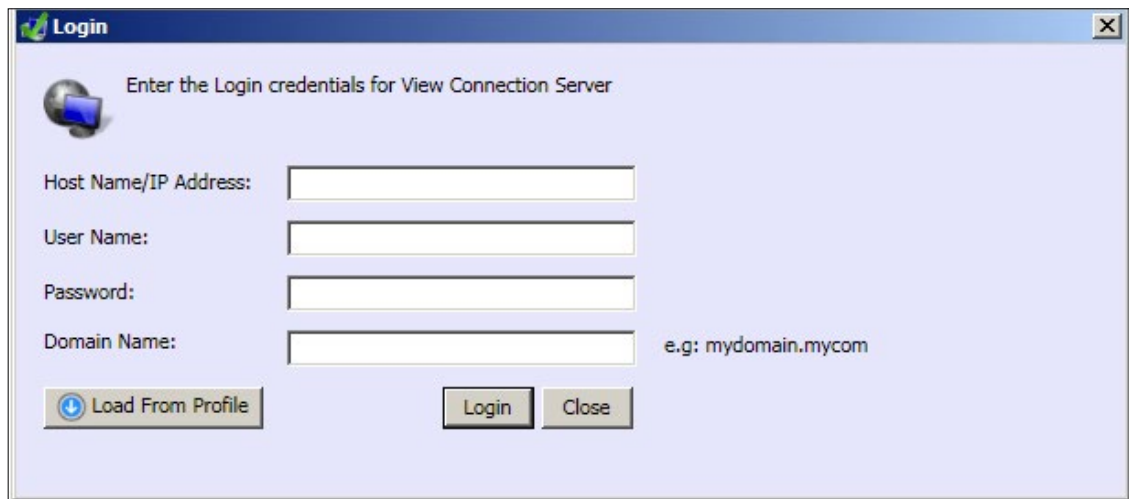
Remote analysis enables you to analyze desktops in your environment that are managed by a Connection Server. You can determine which optimizations have or have not been applied.

Note: You cannot remotely optimize these desktops this way. However, you can optimize the desktops if the OSOT is run from them locally.

1. Click the **Remote Analysis** tab.



2. In the Login window, enter your View Connection Server information to browse a list of desktops it manages.



3. Click **Login**.
4. When connected, perform an analysis just as you would on a local machine.

For more information, see the [VMware Remote Analysis Tool User Guide](#).

Customizing Built-In OSOT Templates

Beyond its built-in optimization capabilities, the OSOT enables you to create custom templates. Using the OSOT template editor, you can apply your own optimizations. There is no limit to the number of custom templates that you can produce.

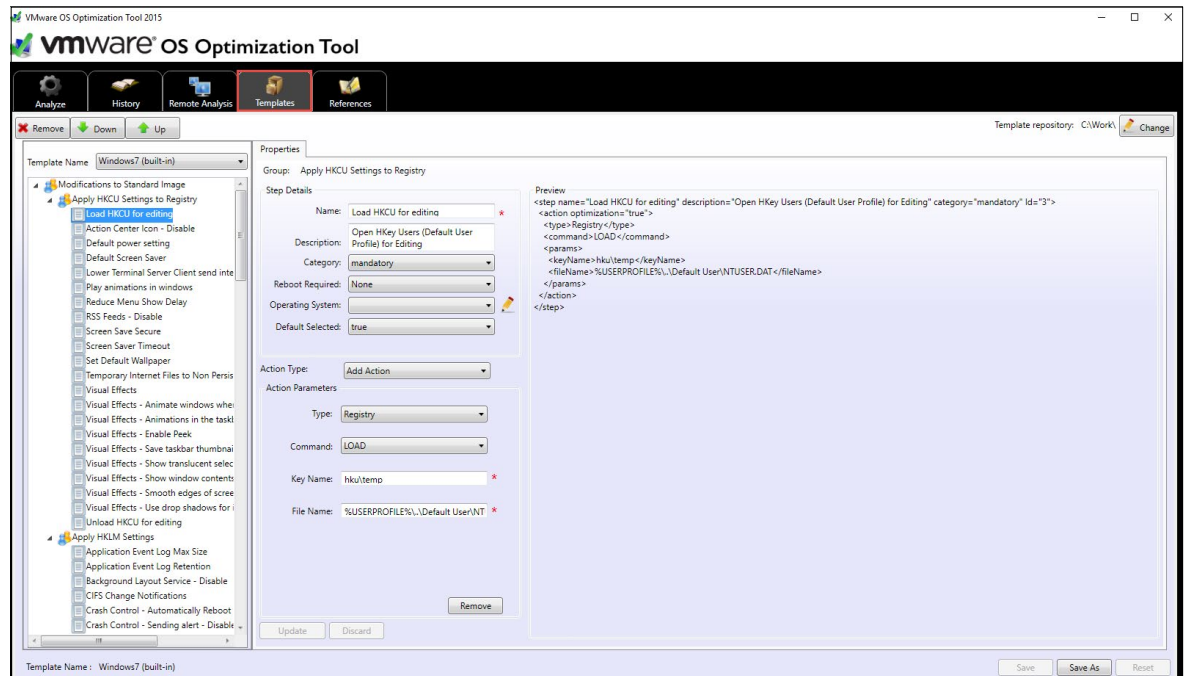


Figure 11: OSOT Template Editor

The built-in OSOT templates are read-only, so you do not have to worry about accidentally changing them. However, you can edit any built-in OSOT template and save the modified version as a new template. You can customize the built-in OSOT templates in these ways:

- Add or remove a **Group** or **Step**
- Change the order of the **Steps**
- Edit the properties of **Steps** and their action types
- Execute particular **Steps** on different operating systems

Note: If you have not saved your changes, you can remove all your changes by clicking the **Reset** button.

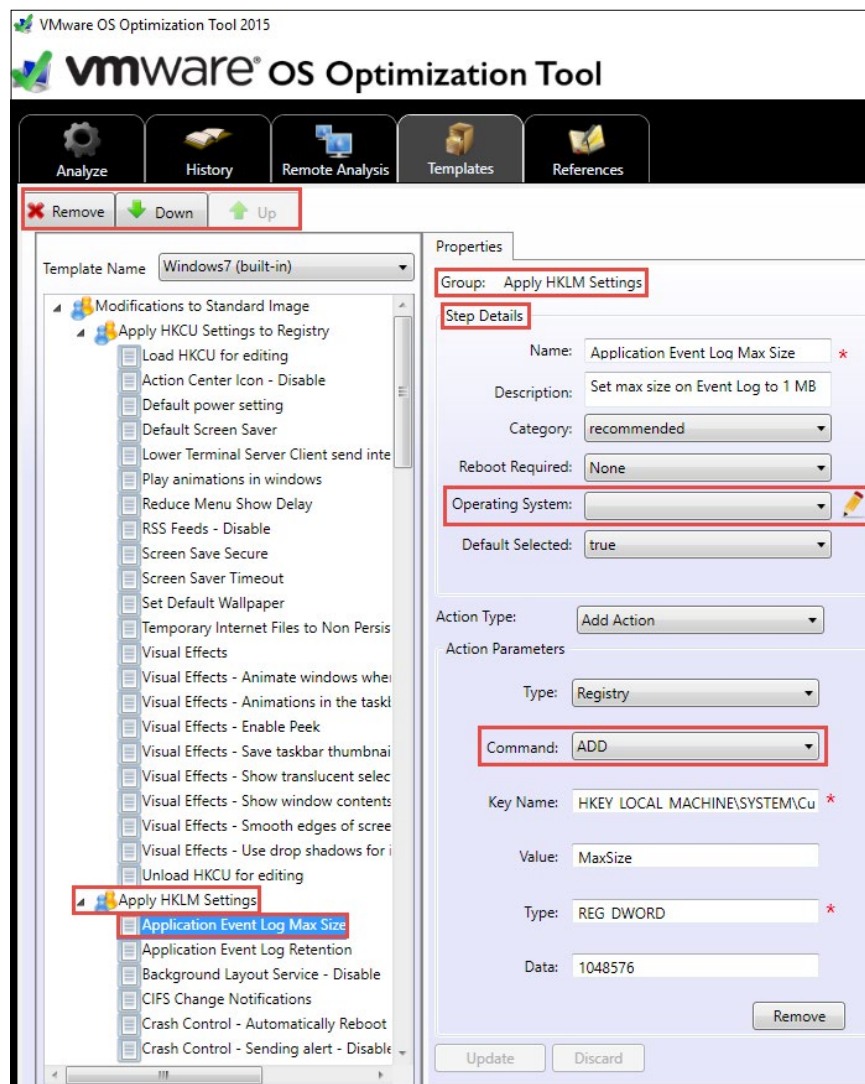


Figure 12: Overview of the Key UI Items for Creating a Customized Template

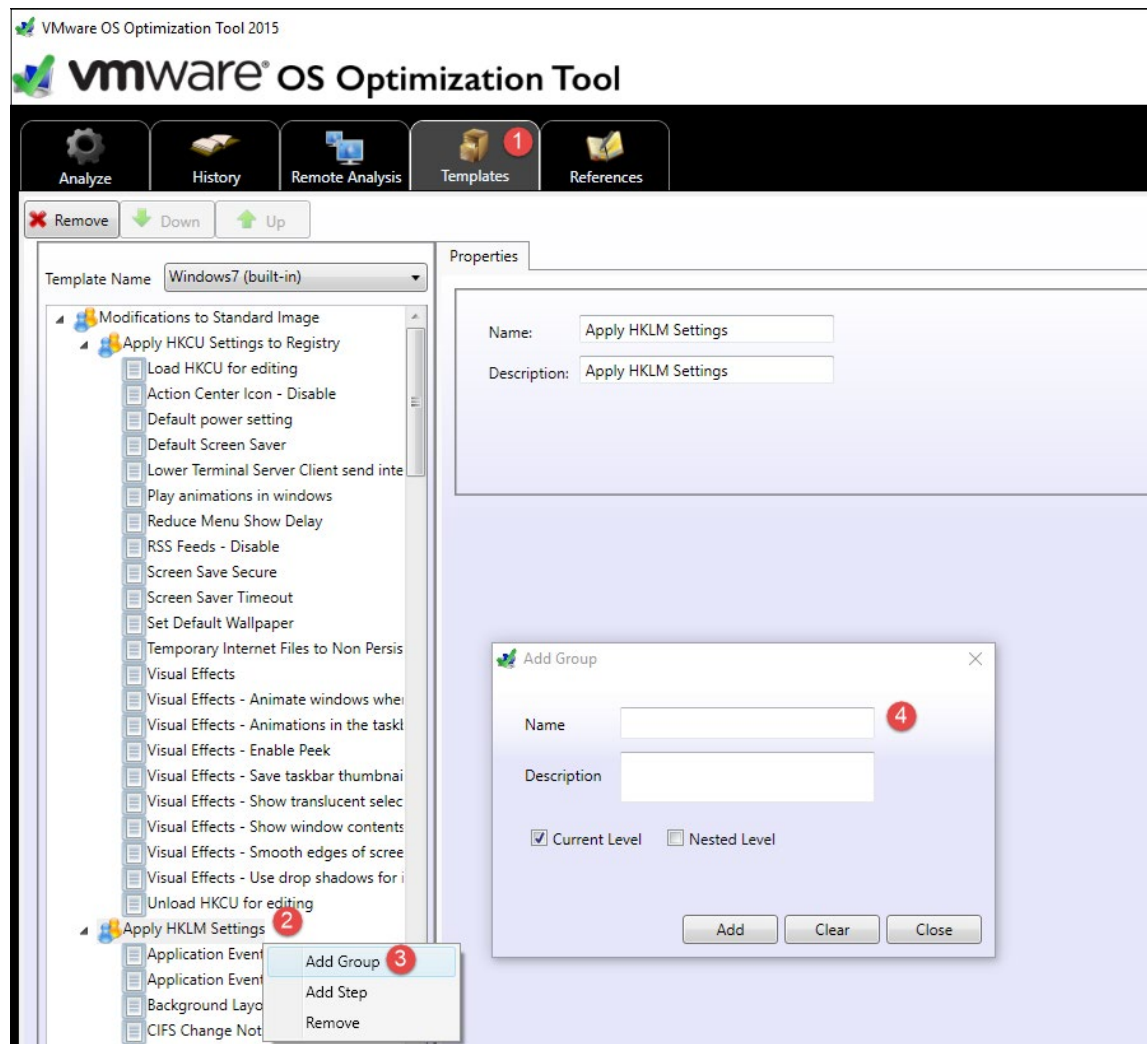
Groups

A **Group** is a set of optimization settings that are organized as a category, such as Apply HKLM Settings. You can add, edit, or remove a **Group** to customize an OSOT template.

Add Groups

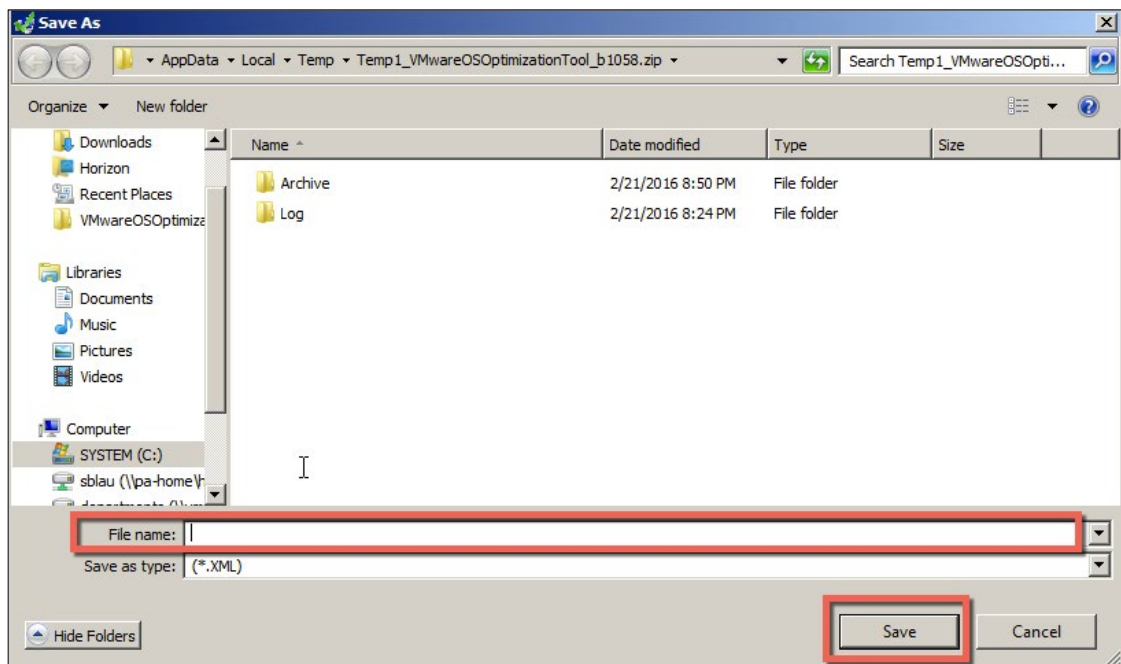
You can add a **Group** to an existing or new OSOT template.

1. Click the **Templates** tab, and from the **Template Name** drop-down menu, select the template.
2. Right-click an existing group.
3. Select **Add Group** from the context menu.



4. In the Add Group dialog box:
 - a. Enter the Name of the **Group**.
 - b. Enter a Description of the **Group**.

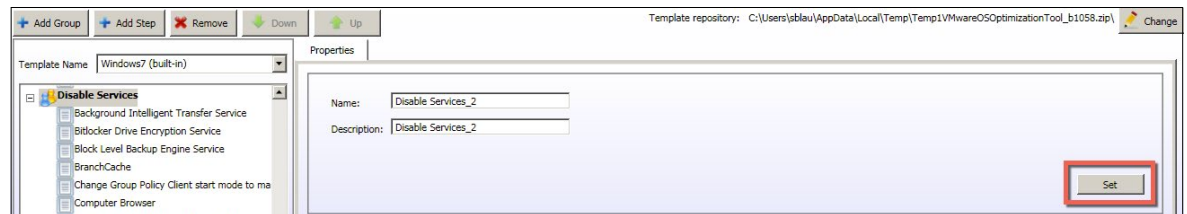
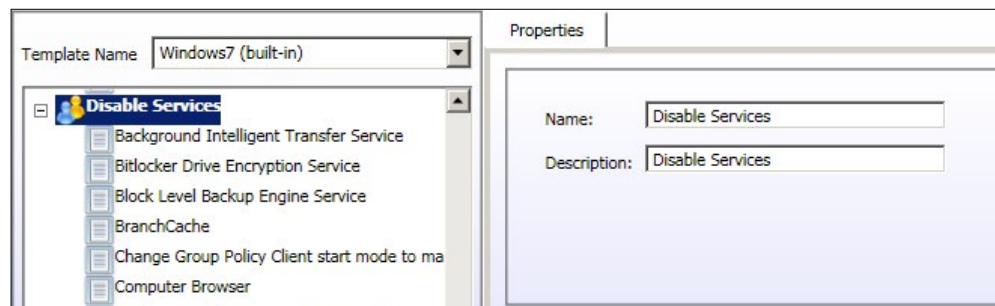
- c. Select either Current Level or Nested Level. The current level option adds the *Group* to the same level as the selected *Group*. The nested level option adds the *Group* as a subgroup of the selected *Group*.
5. Click **Add**.
6. If this is an existing custom template that you want to update, click **Save**. Otherwise:
 - a. Click **Save As**.
 - b. Enter the file name.
 - c. Click **Save**.



Edit Groups

You can make changes to an existing *Group*.

1. Click the **Templates** tab, and from the **Template Name** drop-down menu, select the template.
2. Select the *Group* to edit.
3. Change the name and description of the *Group*.



4. Click **Set**.
5. If this is an existing custom template that you want to update, click **Save**. Otherwise:
 - f. Click **Save As** to save the changes made to the *Group*.
 - g. In the Save As dialog box, enter the new template's name and click **Save**.
 - h. In the Save Template dialog box, click **OK**.

Remove Groups

You can remove a *Group* from a template. You can also remove a *Group* that is nested in another *Group*.

1. Click the **Templates** tab, and from the **Template Name** drop-down menu, select the template.
2. Right-click the *Group* to remove and click **Remove**.
3. If this is an existing custom template that you want to update, click **Save**. Otherwise, click **Save As**, enter the name of the new template in the Save As dialog box, and click **Save**.

Steps

A **Step** is an optimization setting within a **Group**. You can create and add **Steps** and edit, reorder, or remove them to customize an OSOT template.

Caution: In the **Group** Apply HKCU Settings to Registry, do not change any settings in the **Steps** for

- Load HKCU for editing
- Unload HKCU for editing

Changes to these settings can cause the **Steps** to fail.

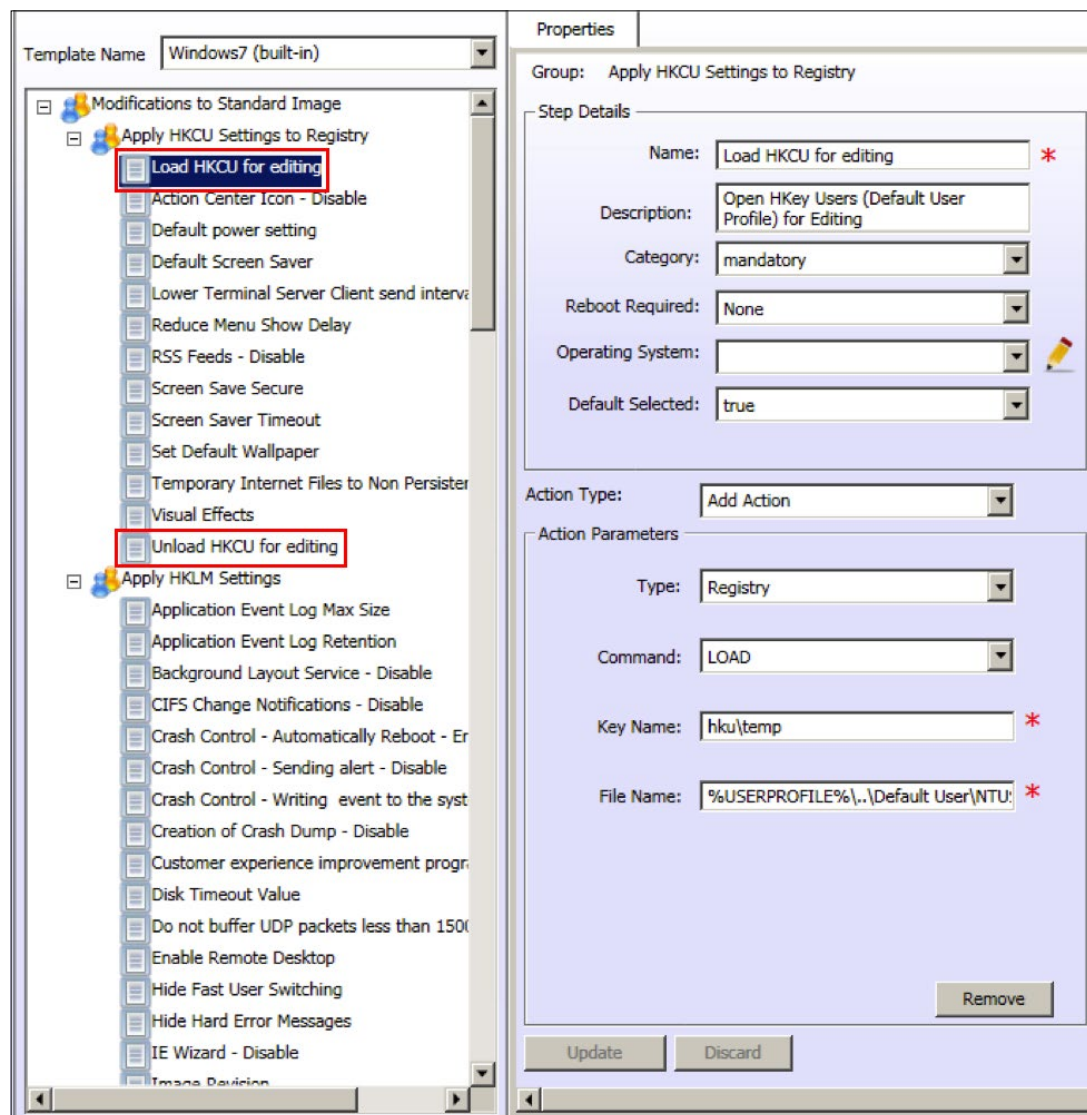
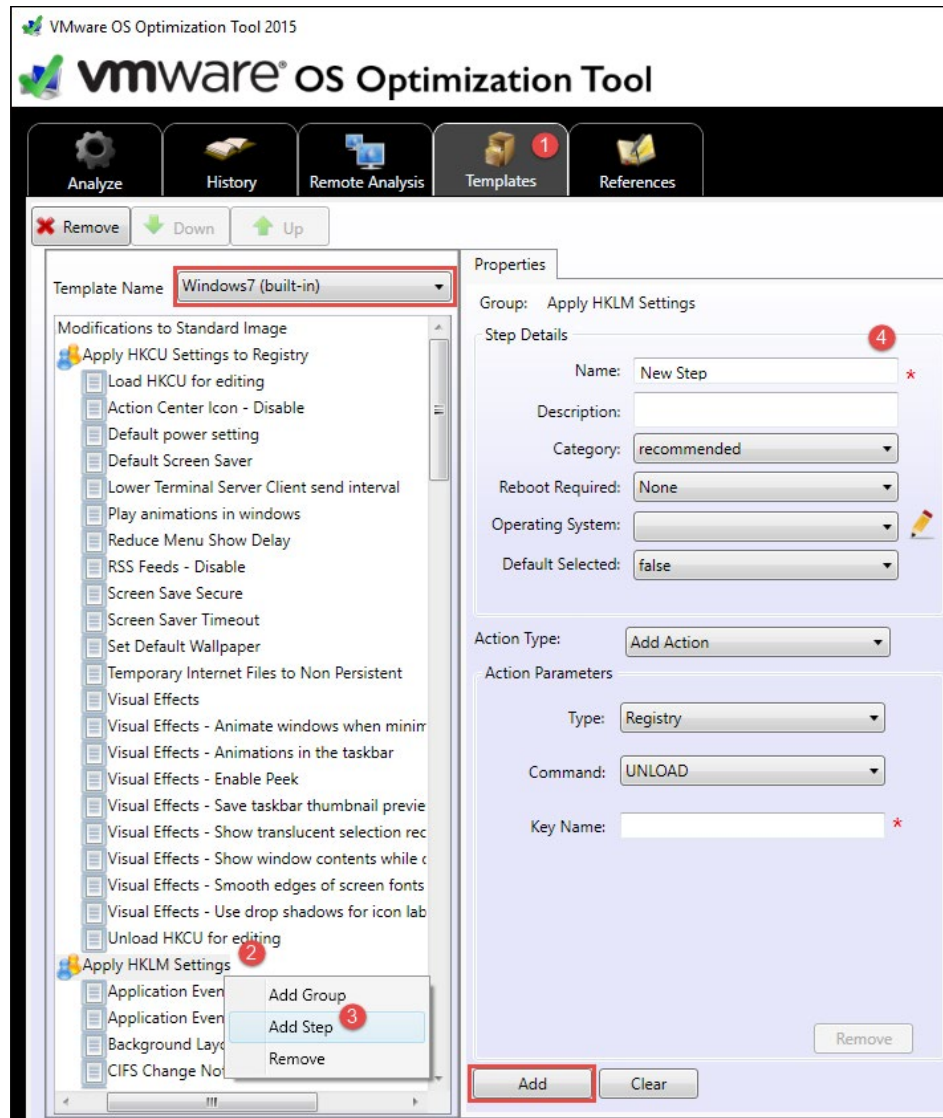


Figure 13: Do Not Change Settings for Load HKCU for editing or Unload HKCU for editing

Add Steps

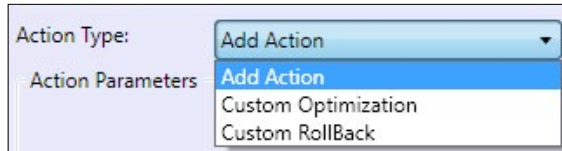
You can add a new *Step* under a *Group*.

1. Click the **Templates** tab, and from the **Template Name** drop-down menu, select the template to edit.
2. Right-click the *Group* to which you want to add a *Step* and click **Add Step**.



3. In the Step Details section, add information about the *Step*.
4. Provide a name and optional description for the *Step*.
5. Select the values for Category, Reboot Required, Operating System, and Default Selected.

6. Select what you want to do from the **Action Type** drop-down menu:

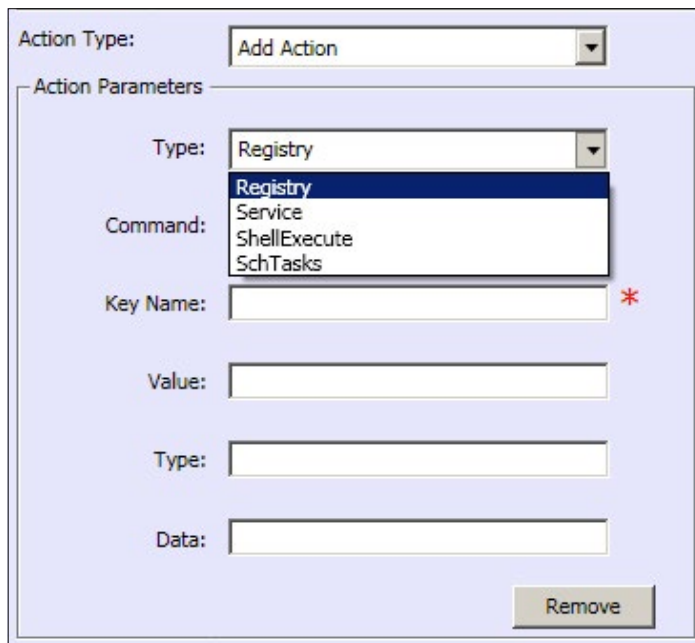


A screenshot of a software interface showing a drop-down menu. The label 'Action Type:' is to the left of the menu. The menu is open, showing three options: 'Add Action' (highlighted in blue), 'Custom Optimization', and 'Custom RollBack'.

Note: In most cases, this can be left as the default Add Action. Custom Optimization is used to add an additional operation during optimization, and Custom RollBack is used to add an additional operation during rollback. Entering information for one Action Type does not negate any information already entered for another Action Type. These operations are additive.

7. Select the action parameters.

After you select the action parameter type from the **Type** drop-down menu, the text box names change according to your selection.



A screenshot of a software interface showing the 'Action Parameters' section. The 'Action Type:' drop-down menu is set to 'Add Action'. Below it, the 'Action Parameters' section is expanded. It contains a 'Type:' drop-down menu with 'Registry' selected. Below 'Type' is a 'Command:' drop-down menu with options 'Registry', 'Service', 'ShellExecute', and 'SchTasks'. Below 'Command' are four text input fields labeled 'Key Name:', 'Value:', 'Type:', and 'Data:'. A red asterisk is next to the 'Key Name:' field. A 'Remove' button is at the bottom right of the section.

The text box names and values for each action parameter type are described in the following substeps and tables.

a. Provide the following information for the Registry action parameter type.

TEXT BOX	DESCRIPTION AND VALUES
Command	Command to execute. The options are <ul style="list-style-type: none"> • ADD – Add a registry key and value to the host that you are optimizing • DELETEKEY – Delete a Registry Editor folder • DELETEVALUE – Delete a value or item in that Registry Editor folder • LOAD – Open the HKCU registry hive for editing • UNLOAD – Close the HKCU registry hive after editing is completed to save the changes
Key Name	The registry path where the registry key is located.
Value	The name of the registry key being edited.
Type	Data type of the specified value. The supported data types are: <ul style="list-style-type: none"> • REG_SZ • REG_BINARY • REG_DWORDREG_QWORD
Data	The value of the registry key.

Table 4: Parameters for the Registry Type

Caution: Do not use a **DELETEKEY** or **DELETEVALUE** command unless you are certain of the effect it will have.

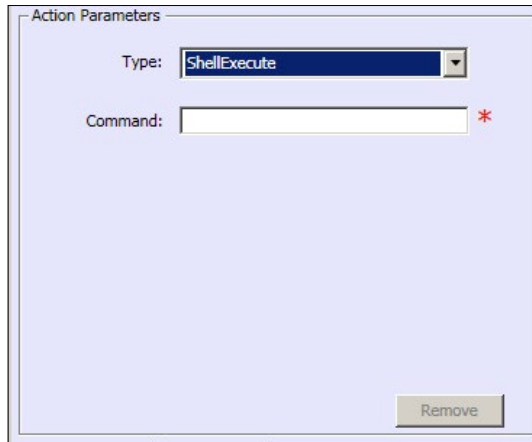
b. Provide the following information for the Service action parameter type.

The screenshot shows a dialog box titled "Action Parameters". It contains three fields: "Type" with a dropdown menu set to "Service", "Service Name" with a text input field and a red asterisk indicating it is required, and "Start Mode" with a dropdown menu set to "AUTO". A "Remove" button is located at the bottom right of the dialog.

TEXT BOX	DESCRIPTION AND VALUES
Service Name	Name of a service.
Start Mode	Startup mode for the service. The options are: <ul style="list-style-type: none">• AUTO• BOOT• DISABLED• MANUAL• SYSTEM

Table 5: Parameters for the Service Type

c. Provide the following information for the ShellExecute action parameter type.

The screenshot shows a dialog box titled "Action Parameters". Inside, there is a "Type:" label followed by a dropdown menu currently showing "ShellExecute". Below this is a "Command:" label followed by a text input field. A red asterisk is positioned to the right of the text input field, indicating a required field. At the bottom right of the dialog box is a "Remove" button.

TEXT BOX	DESCRIPTION AND VALUES
Command	The command to execute.

Table 6: Parameters for the ShellExecute Type

d. Provide the following information for the SchTasks action parameter type.

TEXT BOX	DESCRIPTION AND VALUES
Command	In version b1057 of the OSOT, this can be left blank. Any value entered is ignored.
Task Name	The full path of the task as it appears in Task Scheduler. For example: Microsoft\Office\Office Automatic Updates
Status	The supported status values are <ul style="list-style-type: none"> • ENABLED • DISABLED

Table 7: Parameters for the SchTasks Type

7. Click **Add** to save the new *Step*.
8. If this is an existing custom template that you want to update, click **Save**. Otherwise:
 - i. Click **Save As**.
 - j. Enter the file name.
 - k. Click **Save**.

Edit Steps

You can edit an existing *Step* under a *Group*.

1. Click the **Templates** tab, and from the **Template Name** drop-down menu, select the template to edit.
2. Click the *Step* to edit.
3. Edit the *Step* information.
4. Click **Update**.

5. If this is an existing custom template that you want to update, click **Save**. Otherwise, click **Save As**, enter the name of the new template in the Save As dialog box, and click **Save**.

Caution: For the *Steps* in the *Group* Apply HKCU Settings to Registry, do not change the `hku\temp\` part of the path in the **Key Name** text box. Changes to `hku\temp\` can cause the *Steps* in the custom template to fail. However, you can change any other elements in the path name.

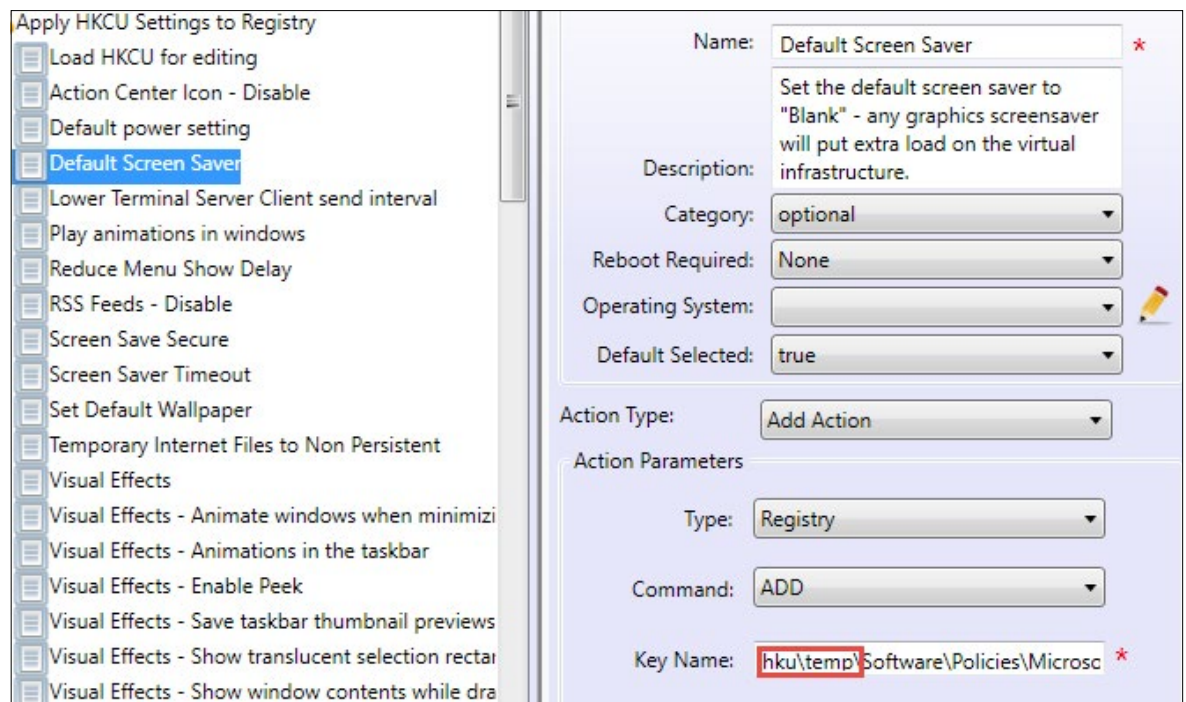


Figure 14: Changes to `hku\temp\` Can Cause Steps in the Custom Template to Fail

Remove Steps

You can remove a step from an OSOT template.

1. Click the **Templates** tab, and from the **Template Name** drop-down menu, select the template to edit.
2. Click the **Step** to remove and click **Remove**.
3. If this is an existing custom template that you want to update, click **Save**. Otherwise, click **Save As**, enter the name of the new template in the Save As dialog box, and click **Save**.

Change the Order of Steps

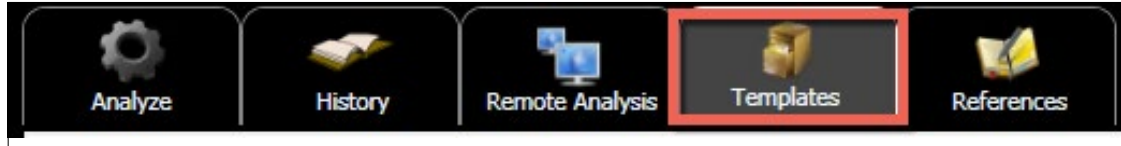
You can change the order of the *Steps* within an OSOT template.

1. Click the **Templates** tab, and from the **Template Name** drop-down menu, select the template to edit.
2. Click a **Step** to move, and click **Up** or **Down** to move it.
3. If this is an existing custom template that you want to update, click **Save**. Otherwise, click **Save As**, enter the name of the new template in the Save As dialog box, and click **Save**.

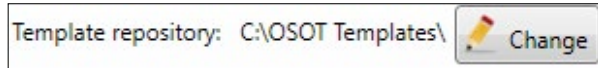
Add Custom Templates to the Repository

You can add your custom OSOT templates to the **Template Name** drop-down menu, so they appear with the built-in templates, by adding them to the OSOT template repository.

1. Click the **Templates** tab.



2. On the Templates page, note the path of the OSOT template repository.



3. Save the custom OSOT template to the template repository folder.

Delete Custom Templates from the Repository

You can delete custom OSOT templates that you no longer need. You cannot delete the built-in templates.

1. Locate your OSOT template directory.
2. Manually delete the file in the directory.

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Susan Blau, Technical Writer in Technical Marketing, End-User Computing, VMware, updated this version of the Windows optimization guide, which is a companion piece to the VMware Operating System Optimization Tool (OSOT). She worked in collaboration with Jason Bassford, Nan Wang, and Tina de Benedictis. The contributors for previous versions of this guide are listed below the current contributors.

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Danny Allan, Senior Director, Technical Marketing, VMware, furnished the optimization details for VMware Horizon Air Desktops and Horizon Air Apps.

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