



HP Write Manager Administrator Guide

SUMMARY

HP Write Manager protects the contents of and decreases wear on the flash drive of a thin client by redirecting and caching writes in an overlay. An overlay is a virtual storage space in RAM that tracks changes to a protected volume (that is, the flash drive). The user experience in Windows is unaffected because the operating system maintains the appearance of writing to the flash drive. When a system restart occurs, the overlay cache is cleared, and any changes made since the last system startup are lost permanently.

Legal information

© Copyright 2016–2019, 2022 HP
Development Company, L.P.

Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Confidential computer software. Valid license from HP required for possession, use or copying. Consistent with FAR 12.211 and 12.212, Commercial Computer Software, Computer Software Documentation, and Technical Data for Commercial Items are licensed to the U.S. Government under vendor's standard commercial license.

The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

Fourth Edition: July 2022

First Edition: October 2016

Document Part Number: 941654-004

User input syntax key

Text that you must enter into a user interface is indicated by `fixed-width font`.

User input syntax key

Item	Description
<code>Text without brackets or braces</code>	Items you must type exactly as shown
<code><Text inside angle brackets></code>	A placeholder for a value you must provide; omit the brackets
<code>[Text inside square brackets]</code>	Optional items; omit the brackets
<code>{Text inside braces}</code>	A set of items from which you must choose only one; omit the braces
<code> </code>	A separator for items from which you must choose only one; omit the vertical bar
<code>...</code>	Items that can or must repeat; omit the ellipsis

Table of contents

- 1 HP Write Manager 1
 - HP Write Manager minimum requirements for installation 1
 - HP Write Manager management overview 2
 - Notification icon..... 2
 - HP Write Manager Configuration..... 2
 - Command-line arguments 3
 - Increase the default maximum limit for overlay 3
 - Making permanent system configurations 3
 - Disabling or enabling HP Write Manager 4
 - Configuring a marker 4
 - Adding a profile..... 5
 - Adding cached items to profile 6
 - Adding files and folders to the file exclusion list 6
 - Adding a registry key to the registry exclusion list..... 7
 - Tips and limitations 7
- 2 HP Disk Cache..... 9

1 HP Write Manager

HP Write Manager protects the contents of and decreases wear on the flash drive of a thin client by redirecting and caching writes in an overlay. An overlay is a virtual storage space in RAM that tracks changes to a protected volume (that is, the flash drive). The user experience in Windows is unaffected because the operating system maintains the appearance of writing to the flash drive. When a system restart occurs, the overlay cache is cleared, and any changes made since the last system startup are lost permanently.

 **IMPORTANT:** If you are upgrading HP Write Manager to a new version by installing it on top of an existing version, you cannot install the new profiles because the installation process restores profiles from the previous version. To install the latest profiles, you will need to uninstall, and then reinstall HP Write Manager.

 **NOTE:** If it is necessary to make permanent system configuration changes, an administrator can temporarily disable the write filter. In some cases, such as when installing a Windows update, HP Write Manager must be disabled first. See [Making permanent system configurations on page 3](#) for more information.

 **NOTE:** The overlay cache is cleared only by a system restart, so users can log out or switch between user accounts without losing the cached information.

HP Write Manager allows you to exclude files, folders, and registry settings from protection so that changes are always written directly to the flash drive.

 **IMPORTANT:** HP highly recommends that you follow these suggestions:

- Ensure that the write filter is used properly for use cases similar to standard thin clients. Proper usage includes making sure the write filter is enabled during end-user (nonadministrator) operation and is disabled only temporarily by an administrator needing to make changes to the system. Enable the write filter again as soon as the changes are completed.
- Never enable the Windows Page File feature.
- For use cases that require frequent writes, such as active system logging, call center phone and video recording, and industrial logging, you should configure the thin client to write to a server. If local writes are necessary, they should be done in the overlay cache. Please contact HP for help determining an appropriate interval schedule for committing the overlay cache, or preferably log the data from the overlay cache to a server.
- Use the purge feature to define rules to remove files from the overlay.

If your use case requires nonstandard write filter usage, please contact HP to ensure that your computers are configured properly.

HP Write Manager minimum requirements for installation

The system must meet the following prerequisites for installation of HP Write Manager.

Before you install HP Write Manager, ensure that .Net Framework version 4.7.2 or later is installed. To download the required updates, please go to <https://www.microsoft.com> and type the KB number in the search box.

HP Write Manager management overview

You can use two tools to manage HP Write Manager: a notification icon and a Control Panel app. Some commands can be performed using either of the tools, but other commands might be exclusive to one or the other.

Notification icon

The HP Write Manager notification icon is located in the Windows notification area. Execute the following commands by right-clicking the notification icon and selecting the desired option.

- **Enable HPWF**—Enables HP Write Manager (requires a system restart)
- **Disable write filter**—Disables HP Write Manager (requires a system restart)

The following table describes the possible states of the HP Write Manager notification icon.

Table 1-1 Identifying HP Write Manager notification icons

Icon	Description
	HP Write Manager is enabled, and no boot command is set.
	HP Write Manager will be disabled (requires a system restart).
	HP Write Manager is disabled, and no boot command is set.
	HP Write Manager will be enabled (requires a system restart).
	The memory usage of the HP Write Manager overlay cache has reached a warning level.
	The memory usage of the HP Write Manager overlay cache has reached a warning level, and HP Write Manager will be disabled (requires a system restart).
	The memory usage of the HP Write Manager overlay cache has reached a critical level.
	The memory usage of the HP Write Manager overlay cache has reached a critical level, and HP Write Manager will be disabled (requires a system restart).
	HP Write Manager is corrupted.

HP Write Manager Configuration

HP Write Manager Configuration is a Control Panel app for managing HP Write Manager. When used with a thin client operating system, HP Write Manager Configuration can also configure Unified Write Filter.

To open this app:

- Double-click the notification icon.
- or –
- In Control Panel, select **HP Write Manager Configuration**.

The tasks you can perform in this app include the following:

- Disable or enable HP Write Manager (requires a system restart)
- View information about HP Write Manager and the overlay cache
- Configure file and registry exclusion settings
- Enable or disable HP Disk Cache settings

 **NOTE:** For more information about HP Disk Cache settings, go to [HP Disk Cache on page 9](#).

- Edit the exclusion list to add or remove files and folders (requires a system restart)
- Set the overlay cache size (requires a system restart)
- Set the cache usage in MB at which warning and critical messages each display

Command-line arguments

You can use command-line arguments to manage HP Write Filter. For more information about the commandline arguments, see the *HP Write Manager WMI Scripts* white paper.

 **NOTE:** This white paper is available only in English.

Increase the default maximum limit for overlay

Use this procedure to enable HP True Graphics on HP ThinPro.

 **IMPORTANT:** By default, the maximum overlay is based on how much memory is available on the system that HP Write Manager is installed onto. Changing the maximum limit for an overlay should only be performed by administrators with experience and knowledge of the specifications and configuration of the system being used. Before making any changes, it is recommended to test image performance to determine the appropriate memory required. Do not increase the maximum overlay limit to a number higher than available system memory.

Follow the procedure below to increase the maximum size allowed for overlay.

1. In the HP Write Manager configuration menu, select **More Settings**.
2. Select the **Advanced** tab.
3. Input the desired maximum overlay size (in MB) in the entry field. Select **OK** to save the change.
4. Restart your system for the change to take effect.

Making permanent system configurations

The following table describes the possible methods for making permanent system configurations.

 **IMPORTANT:** HP strongly recommends using method 1 in most situations.

Table 1-2 Methods for making permanent systems configurations

Method 1	Method 2
1. Disable HP Write Manager (requires a system restart). 2. Make the desired system changes. 3. Enable HP Write Manager (requires a system restart).	Use the HP Write Manager Configuration app to add files or folders to the exclusion list, and then restart the thin client.
See the following sections for more information about performing these tasks:	
• Disabling or enabling HP Write Manager on page 4 • Configuring a marker on page 4 • Adding a profile on page 5 • Adding files and folders to the file exclusion list on page 6 • Adding a registry key to the registry exclusion list on page 7	

Disabling or enabling HP Write Manager

The following table describes the possible methods for disabling or enabling HP Write Manager.

Table 1-3 Methods for disabling or enabling HP Write Manager

Method 1	Method 2
1. Right-click the notification icon and select the desired state. 2. Restart the thin client.	1. Open the HP Write Manager Configuration app. 2. Select an option to set the desired state. 3. Restart the thin client.
TIP: Method 1 is the quickest way to disable or enable HP Write Manager.	

Configuring a marker

Markers can be used to trigger a purge, which removes files from the overlay.



NOTE: The event is triggered when the available overlay size is equal to or more than the specified marker size.

When the Warning marker is reached, a warning message is displayed. When the Critical marker is reached, a countdown to a Windows restart is displayed.

To configure the markers:

1. Open the HP Write Manager Configuration app, and select **More Settings**.
2. In the **Markers** tab, set the size (in MB) of the **Warning** and **Critical** markers. **Overlay size** is also displayed, but size cannot be modified while in the **Markers** tab. To modify overlay size, see [Increase the default maximum limit for overlay on page 3](#).
3. Select **OK**.
4. Restart the thin client.

Adding a profile

A profile is a set of file exclusions, registry exclusions, and options to purge files to ensure that the overlay's limited space is not overloaded with data.

Profile setting options include the following:

- **File Exclusion:** Files specified in this category will be excluded from the overlay.
- **Registry Exclusion:** Registries specified in this category will be excluded from the overlay.
- **Purge on Marker:** HP Write Filter will delete files specified in this category from the overlay when overlay usage reaches defined marker settings.
- **Purge on App Exit:** HP Write Filter will delete files specified in this category from the overlay when the specified app is exited.
- **Purge Exclusion:** HP Write Filter will exclude files listed in this category from being deleted.

To add a profile:

1. Open the HP Write Manager Configuration app, and select **More Settings**.
2. In the **Profiles** tab, select **Add**.
3. Enter a name in the **Profile name** box.
4. In the **File Exclusion** tab, select the **Add folder** button or the **Add file** button to add an item to the exclusion list. Repeat as necessary.



NOTE: When a folder is added for exclusion, all files in that folder, including every subfolder under that folder, will also be excluded.

5. In the **Registry Exclusion** tab, select the **Add** button to add an item to the exclusion list. Repeat as necessary.
6. In the **Purge on Marker** tab, select the **Add** button to add an item to be purged when a marker is reached. Repeat as necessary.
7. In the window that opens, follow these steps:
 - a. Enter the path to the file to be purged in the **File path** box.
 - b. Under **Start On**, select which marker determines when HP Write Manager starts to purge the files.
 - c. Under **Stop On**, select which marker must be reached to stop the purge.
 - d. Optionally, edit the **Application path** to specify which application is associated with the files listed under **File path**. This limits the files purged within the **File path** to those associated with the application.
 - e. Select **OK**.
8. In the **Purge on App Exit** tab, select the **Add** button to add an item to be purged when an app is closed. Repeat as necessary.
9. In the window that opens, enter the **File path** for the file to be purged, select the **Application path** for application that starts a purge when closed, and then select **OK**.

10. In the **Purge Exclusion** tab, select the **Add** button to add an item to excluded from a purge. Repeat as necessary.
11. In the window that opens, enter the **File path**, and then select **OK**.
12. Select **OK**.
13. Restart the thin client.

To enable or disable an existing profile, select the desired state next to the **Profile name**.

To edit an existing profile, select the **Edit** icon.



NOTE: HP Write Manager comes with various default profiles named after their suggested usage scenario. These profiles can be further customized by following the procedures outlined above.

Adding cached items to profile

You can add any cached item in the overlay to existing and new profiles or file exclusion.

1. In the HP Write Manager Configuration menu, select **More Settings**.
2. Select the **Overlay** tab.
3. If no items are listed, select **Refresh**.



TIP: HP Write Manager must be enabled to refresh this tab.

4. Select the item. To select multiple items, press **ctrl** while selecting.
5. Select **Add** to add the selected items.



TIP: Overlay features can be sorted by application, file path, file size, or username. Select the content categories from the top of the dialog box.

The content categories **File path**, **Process**, **User**, and **Profile name** can be sorted in either ascending or descending alphabetical order.

You can determine how much memory a new application uses by viewing the application files in the overlay. Items listed in green are items that have been added to a profile since the computer was last started.

Adding files and folders to the file exclusion list

Use the instructions in this section to add files and folders to the file exclusion list.



IMPORTANT: Because changes to items in the exclusion list are always written directly to the flash drive, keep the exclusion list to a minimum.

1. Open the HP Write Manager Configuration app, and select **More Settings**.
2. On the **File Exclusion** tab, select the **Add folder** button or the **Add file** button to add an item to the exclusion list. Repeat as necessary.



NOTE: Items can be removed from the exclusion list using the **Delete** button.

3. Select **OK**.
4. Restart the thin client.

The following table describes the highlight colors used for the exclusion list in the HP Write Manager Configuration app.

Table 1-4 Identifying exclusion list highlight colors for the HP Write Manager Configuration app

Color	Description
None	The item is excluded.
Green	The item will be added to the exclusion list (requires a system restart).
Red	The item will be removed from the exclusion list (requires a system restart).

Adding a registry key to the registry exclusion list

Use this procedure to add a registry key to the registry exclusion list.

 **IMPORTANT:** Because changes to items in the exclusion list are always written directly to the flash drive, keep the exclusion list to a minimum.

1. Open the HP Write Manager Configuration app, and select **More Settings**.
2. In the **Registry Exclusion** tab, select the **Add** button to add an item to the exclusion list. Repeat as necessary.

 **NOTE:** Items can be removed from the exclusion list using the **Delete** button.

3. Select **OK**.
4. Restart the thin client.

The following table describes the highlight colors used for the exclusion list in the HP Write Manager Configuration app.

Table 1-5 Identifying exclusion list highlight colors for the HP Write Manager Configuration app

Color	Description
None	The item is excluded.
Green	The item will be added to the exclusion list (requires a system restart).
Red	The item will be removed from the exclusion list (requires a system restart).

Tips and limitations

Use the following tips for optimal performance of HP Write Manager.

- When HP Write Manager is enabled on an HP computer, the RAM drive is disabled. All temporary files are stored in the `c:\HPWMTemp` folder. Any variables originally pointing to drive Z are redirected to the `c:\HPWMTemp` folder.



NOTE: When HP Write Manager is enabled, the disabled RAM drive appears as a disabled device in Device Manager. This is expected behavior.

- Do not add the disk C root directory (that is, `C:\`) to a file path in the file exclusion list.
- The following characters cannot be used in the file path for the file exclusion list:
`~!@#%$%^&*()_+ = - ` [] ; ' , . / { } | : " < > ? "`
- If there is a space in the file path of a key to be added to a registry exclusion list, be sure to enclose the path in straight quotes (that is, `"`).
- `HKEY_LOCAL_MACHINE\HARDWARE` cannot be added to the registry exclusion list.
- If you are adding registry keys to the registry exclusion list, HP Write Manager can translate some input to the proper form, such as `- HKLM` to `\REGISTRY\MACHINE`. If you are using WMI, the explicit name of the registry key must be used.
- HP Write Manager cannot exclude registry keys under `HKEY_CURRENT_USER`. To exclude registry keys under `HKEY_CURRENT_USER`, you must use the HP User State Tool available through HP Thin Update.
- The asterisk wildcard (`*`) is allowed in registry paths and represents any folder or no folder in the previous directory element in the path. It can only represent a single directory element. Wildcards cannot be used for File/Folder exceptions.
- If the overlay cache reaches a critical level, the system might become unstable. You can change the critical level setting or create a profile to help limit the size of the cache by purging unnecessary files.



TIP: If the Start menu is not responding properly, use `ctrl+alt+delete` to restart the computer.

- You must disable the write filter (which requires a system restart) before switching to a different write filter.
- If you enable the write filter and then enable Global Bypass Mode, only those registry keys created after Global Bypass Mode is enabled will persist. If you rename a registry key created when only the write filter was enabled, it will not persist. You must create it again.
- Windows 365 and Azure Virtual Desktop (AVD) profile limitations
 - Passwords do not persist between reboots. This is expected behavior.
 - Exceptions are included for the User and Admin accounts built into the HP Windows Image. For newly added user accounts, you must add an exception for each user. For example, `C\Users\<new user>\AppData\Local\rdclientwpf`.

2 HP Disk Cache

HP Disk Cache consolidates the write requests from the operating system to reduce the number of writes made to the flash drive. This extends the usable life of the flash drive.



NOTE: HP Disk Cache works independently from the write filter. You can still enable Disk Cache even when no write filter is enabled.

To enable HP Disk Cache:

1. In the HP Write Manager Configuration app, select **Advanced Cache Settings**.
2. Set **HP Disk Cache** to **On**.
3. Enter values for the **Cache size**, **Flush count**, and **Flush interval**.

– or –

Select **Reset to Defaults**.



NOTE: HP has optimized these settings to provide the maximum benefit in terms of system performance and disk longevity.

- **Flush count**—Sets the number of disk write requests from the operating system to be consolidated by HP Disk Cache before completing the requests (unless the flush interval is reached first). This reduces the number of writes to the flash drive, but it might cause issues if a sudden power loss occurs when a high number of requests have been stored.
- **Flush interval**—Sets the amount of time during which HP Disk Cache consolidates disk write requests from the operating system before completing the requests (unless the flush count is reached first). This reduces the number of writes to the flash drive, but it might cause issues if a sudden power loss occurs when a high number of requests have been stored.