



Support for Windows Embedded 8.1 Industry on the HP t520, HP t620, and HP t620 PLUS Thin Clients

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Overview

The purpose of this whitepaper is to outline HP support for Windows® Embedded 8.1 Industry on the HP t520, HP t620, and HP t620 PLUS thin clients.

Windows Embedded 8.1 Industry Pro is not offered on the HP t520, HP t620, or HP t620 PLUS out of the factory. HP does support Windows Embedded 8.1 Industry on these platforms if you upgrade to this operating system on these thin clients. This configuration receives the standard 90 days of HP software support.

Therefore, you can purchase an operating system upgrade from Microsoft® or an authorized Microsoft reseller and enroll the device in Volume Licensing and Software Assurance programs. Customers running a qualified Windows operating system can purchase either the Windows Embedded 8.1 Industry Pro upgrade or the Windows Embedded 8.1 Industry Enterprise upgrade. These upgrades give you access to the base operating system image so you can create your own custom image. There are a number of changes required when transitioning from OEM to Volume Licensing, so it is important to discuss these with the appropriate Microsoft representative or reseller before upgrading your operating system.

HP support for Windows Embedded 8.1 Industry

HP will support customers running either Windows Embedded 8.1 Industry Pro or Windows Embedded 8.1 Industry Enterprise on their HP t520, t620, or t620 PLUS under the following conditions:

- The operating system must be the latest 64-bit version.
- The desired language is English, Norwegian, Spanish, French, German, Dutch, Arabic, Russian, Simplified Chinese, Traditional Chinese, Korean, or Japanese.
- The upgrade was purchased from Microsoft or an authorized Microsoft reseller.
- The hardware-enabling drivers that were tested by HP are installed and used on the device.
- The flash and SDRAM memory minimum requirements are met. See [Flash storage and memory](#).

Note

If the flash or SDRAM memory are not genuine HP parts, HP will not support or warranty issues with the third-party parts.

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- Unified Write Filter (UWF) is enabled at all times, except when the Administrator is configuring the system or the system has been configured with an appropriate-size flash memory device to support large amounts of write/erase actions.
 - No Windows Page File exists on the system.

Note

If the above conditions are not met, HP cannot provide support and your system could experience symptoms such as slow performance, premature wear on the flash module, or other system integrity issues.

To help expedite your support process if your Windows Embedded 8.1 Industry installation has been customized in any way, HP recommends that you duplicate the symptoms using the standard Windows Embedded 8.1 Industry image with only the HP driver pack installed (no customizations) and then contact support.

Hardware-enabling drivers

The HP hardware-enabling drivers for Windows Embedded 8.1 Industry can be found on the HP t520, HP t620, and HP t620 PLUS product support pages bundled as a single driver pack. The driver pack contains all the necessary hardware-enabling drivers along with two other software components: HP RAMDisk Manager and the HP Unified Write Filter Configuration utility. This software is fundamental to delivering the HP thin client experience.

HP RAMDisk Manager enables the easy configuration of the RAM drive (by default, drive Z:). The RAM drive is volatile memory, or a virtual drive created from the system's physical RAM. This drive looks and behaves like a standard fixed disk drive, but is created at system startup and eliminated at system shutdown. HP recommends that you do not store information or data on this virtual disk drive.

The following items are stored on the Z: drive during the operation of the thin client:

- Browser web page cache
- Browser history
- Browser cookies
- Browser cache
- Temporary Internet files
- Print spooling
- User/system temporary files

The HP Unified Write Filter Configuration utility is a customized graphical user interface (GUI) enabling the management and monitoring of the Unified Write Filter (UWF) included with Windows Embedded 8.1 Industry.

Flash storage and memory

Windows Embedded 8.1 Industry requires a minimum flash memory capacity of 32 GB and a minimum of 4 GB SDRAM memory. HP recommends a 64 GB capacity flash memory module for optimal performance. If upgrading an existing system configured with a 16 GB or smaller flash memory device, contact your HP representative regarding available HP options.

Note

If the flash or SDRAM memory are not genuine HP parts, HP will not support or warranty issues with the third-party parts.

Operating system support

After a customer enters a Volume Licensing agreement with Microsoft and creates a custom image, the support for that image changes hands. Traditionally, support for Windows Embedded operating systems has only been available through the OEM. The creation and support of Windows images handled through a Volume License Agreement are the responsibility of the customer, the third-party ISVs, and Microsoft.

Before creating and deploying a custom Windows Embedded 8.1 Industry image, the customer should complete a thorough review of the Windows services, user setup, and applications to understand what might be writing to the flash drive (by default, drive C:). While UWF is enabled, writes that would normally be made to the flash drive are redirected to the write filter cache, which is set to a maximum size of 2048 MB by default. This space can be filled up quickly if any services or applications are attempting to regularly write data (such as log files) to the flash drive.

Once the review is completed, an action plan should be developed to deal with these items, if found. Possible actions include:

- Disabling unneeded services
- Redirecting temp files and logs to the RAM drive (Z:) instead

Following these guidelines will help ensure that your HP thin client remains stable and in working condition. See [Unified Write Filter](#) for more information.

Service

In the event that a thin client system comes to HP for service, all aftermarket options (flash and memory) should be removed from the thin client, because these aftermarket options might not be returned with the system. When the system is returned, it ships as initially configured in the factory, including the original operating system. You can reinstall the aftermarket options and your custom image after the thin client is returned.

HP software support

HP offers several software programs designed to enhance the thin client experience. The software supported for thin clients based on Windows Embedded 8.1 Industry includes the following:

- HP Device Manager
- HP Velocity
- HP Easy Shell
- HP Hotkey Filter

This software is supported as long as the HP driver pack is installed first on the thin client. The driver pack can be downloaded from the appropriate product support page (t520, t620, or t620 PLUS) at <http://www.hp.com/support>. In the case of HP Device Manager, the HPDM Agent installation files can be found on the HPDM Repository server in the **HPDM > Repository > Agents** folder.

Unified Write Filter

One of the most important features of a Windows Embedded operating system is its ability to restrict write activities and the storage of data to the local client. Unified Write Filter (UWF) is a critical security and function feature designed to prevent data from being written to the thin client flash memory module. Because nothing is written directly to the non-volatile memory, restarting the thin client returns the system to its original state. UWF helps to preserve the flash memory module from excessive write/erase activity and to protect the system from damaging viruses and malware.

For information about UWF on HP thin clients, see the *Administrator Guide for Windows Embedded 8.1 Industry Pro on HP Thin Clients*.

For general information about the architecture of UWF, go to [https://msdn.microsoft.com/en-us/library/dn449332\(v=winembedded.82\).aspx](https://msdn.microsoft.com/en-us/library/dn449332(v=winembedded.82).aspx).

Caution

HP recommends and encourages proper write filter usage for all thin client operations. Proper usage includes making sure that the write filter is enabled during standard user (non-administrator) operation for thin client systems configured with relatively small flash memory devices. In these use cases, UWF should only be disabled temporarily by administrators to make necessary changes and updates to the system, and should be re-enabled as soon as the updates are completed.

If an administrator determines that UWF must be disabled to properly support the thin client's necessary operation and tasks, care must be taken to ensure that the system's flash memory module has sufficient capacity or technology to support a large amount of write/erase operations. In most cases, 64 GB is the minimum capacity for operations with UWF disabled; however, HP recommends at least 128 GB to ensure the performance and longevity of the system.

If your operation requires using thin clients with UWF disabled, contact your HP representative to ensure that your thin client assets are properly configured to support your usage requirements.

HP further recommends that you never enable the Windows Page File feature due to the high volume of write/erase actions this feature produces. This Windows feature is designed for PC operations involving computers configured with high-capacity storage drives. The use of the Windows Page File feature on a thin client results in the premature wear on the relatively small capacity of a thin client flash memory module and decreased system performance. If the flash memory module is sufficiently worn, you must replace it to continue operating the system.

Creating an image

To create a Windows Embedded 8.1 Industry image for an HP t520, t620, or t620 PLUS:

Note

The procedure below assumes you will log on to Windows as an administrator each time a Windows logon is required. For more information about logon, software installation, and enabling or disabling UWF as required in this procedure, see the *Administrator Guide for Windows Embedded 8.1 Industry Pro on HP Thin Clients*.

1. Install the base operating system on the thin client.
 2. Install the HP driver pack (see [Hardware-enabling drivers](#)).
 3. Disable UWF, which requires a restart of the thin client.
 4. After the restart, install the desired software programs, and then restart the thin client again.
 5. Run each of the following commands in Command Prompt (Admin):
 - `C:\Windows\Microsoft.NET\Framework\v4.0.30319\ngen.exe executequeueditems`
 - `C:\Windows\Microsoft.NET\Framework64\v4.0.30319\ngen.exe executeQueuedItems`
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Important

The Ngen.exe process must complete before you proceed to the next step. If the process does not complete, newly-installed .NET programs, such as HP Easy Shell, will always have a delayed startup time due to .NET elements being recompiled every time the program starts.

6. Enable UWF, which requires a restart of the thin client.

To install additional software in the future, repeat steps 3–6 above.

For more information

For more information about Windows on HP thin clients, go to the following resources:

- <http://www.hp.com/support> (Search for your thin client model. For documentation, select **Manuals.**)
- <http://www8.hp.com/us/en/thin-clients/software-and-os.html>

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