Imaging with HP Device Manager 4.5

Demonstrates how to capture and deploy images

Technical white paper
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Overview

This white paper demonstrates how to capture and deploy images.

**NOTE:**

Before capturing and deploying images from and to thin clients, you need to ensure that repository configuration has been done. Please refer to the “Repository Management” chapter of the *HP Device Manager User Guide* for more information.
### Imaging support matrix

<table>
<thead>
<tr>
<th>Operating system</th>
<th>Thin client models</th>
<th>Image formats</th>
<th>Capture Image without PXE</th>
<th>Deploy Image without PXE</th>
<th>Capture Image with PXE</th>
<th>Deploy Image with PXE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WES7</td>
<td>t610, t510, t5740e, i5570e, 6360t, mt40</td>
<td>.ibr</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>.img, .hpimg, .dd.gz, .dd</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>WES09</td>
<td>t610, t510, t5740, i5570, gt7720</td>
<td>.ibr</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.dd.gz</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>6360t, t5400</td>
<td>.img, .hpimg, .dd</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.dd.gz</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.img, .hpimg, .dd</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>XPe</td>
<td>t5740</td>
<td>.dd.gz</td>
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<td>✓</td>
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<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.img, .hpimg, .dd</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.dd.gz</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.img, .hpimg, .dd</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>HP ThinPro 4</td>
<td>t610, t510, t5745, i5565</td>
<td>.dd.gz</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.img, .hpimg, .dd</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>HP ThinPro 3 (x86)</td>
<td>t5745, i5565, t5545, gt7725</td>
<td>.dd.gz</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.img, .hpimg, .dd</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>HP ThinPro 3 (ARM)</td>
<td>t5325</td>
<td>.img</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>HP Smart Zero Core (x86)</td>
<td>t610, t510, t5565</td>
<td>.dd.gz</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.img, .hpimg, .dd</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>HP Smart Zero Core (ARM)</td>
<td>t410, t5335z</td>
<td>.dd.gz</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

- When capturing an image, the operating system column refers to the OS running on the source device. When deploying an image, it refers to the OS running on the target device.
- An .ibr image can be generated by HPDM 4.5, HPDM 4.4.3, and HP ThinState, or an officially released image can be downloaded from HP.
- A .dd.gz image can be generated by HPDM 4.5, or an officially released image can be downloaded from HP.
- An .img image can be generated by older HPDM versions before HPDM 4.5 and HP ThinState.
- An .hpimg can be generated by HP Easy Tools.
- For WES09 devices, you can capture images with .ibr or .dd.gz formats. If the captured image will be used to update crashed devices, we recommend the .dd.gz format because it can be deployed with PXE, otherwise, we recommend the .ibr format because the size is usually less than .dd.gz.
- If the WES09 device flash size is more than 4 GB, we recommend that you capture an .ibr image from this device.
Capturing an image

Capturing an image with PXE

HPDM supports capturing images with PXE on WES09/XPe, HP ThinPro 3, and HP ThinPro 4, and the captured image is in the .dd.gz format.

1. Check to see if the PXE server is running, and if not, start it first. The PXE server is a service. You can check and start it using the Windows Task Manager (a), Windows Services window (b), or HPDM Gateway Configuration window (c).

a. Windows Task Manager

![Windows Task Manager](image1.png)

b. Windows Services window

![Windows Services window](image2.png)
c. HPDM Gateway Configuration window

i. Right-click the HPDM Gateway tray icon, and the following menu will appear. Click **Configure Device Management Gateway**.

ii. In the HPDM Gateway Configuration window, change **Start PXE service when Gateway is started** to **YES**, and then click **OK**.

iii. Right-click the HPDM Gateway tray icon again, and click **Restart Device Management Gateway**. The PXE server will then be started.
2. Send a **_PXE Capture_** task from HPDM Console.
   a. Select the **_PXE Capture_** template under the **Task Templates** tab, and drag it onto a device. A Task Editor dialog will appear.
b. Input values for **Image Name**, **Description**, and **Save result as template**.

![Task Editor](image)

This template is used to capture the image from a device, and generates a template to deploy that image.

- **Image Name**: `pxel22`
  - Note: You do not need to add extension (.img, .ibr, etc) to the end of image name.
- **Description**: 
- **Save result as template**: `pxel22`

![OK and Cancel buttons]

C. Click **OK**, and the **_PXE Capture** task will be sent to the device.
3. When the task is sent, a “PXE Deploy” template will be generated in the Task Templates tab using the name you specified (in this example we used “pxe122”). It is disabled with a status of **transferring**. If the task fails to finish, it will change to a status of **failed**, or if the task finishes successfully, its status will change to be enabled, like below.

**NOTE:**
A _PXE Capture_ task can’t be done for a shutdown device or when using a wireless connection.

**Capturing an image without PXE**

HPDM supports two modes to capture an image without PXE. One is a cached mode, and the other is a non-cached mode. The cached mode is a new feature added in HPDM 4.5. If the thin client uses an advanced network, such as wireless, 802.1x, etc., please use the **Cached Imaging** mode to capture an image.

The following table shows which formats are supported when capturing images from thin clients.

<table>
<thead>
<tr>
<th>Operating system</th>
<th>Imaging method</th>
<th>Captured image format</th>
</tr>
</thead>
<tbody>
<tr>
<td>WES7</td>
<td>File-Based Image</td>
<td>.ibr</td>
</tr>
<tr>
<td>WES09</td>
<td>File-Based Image</td>
<td>.ibr</td>
</tr>
<tr>
<td>HP ThinPro 3</td>
<td>Disk-Based Image</td>
<td>.dd.gz</td>
</tr>
<tr>
<td>HP ThinPro 4</td>
<td>Disk-Based Image</td>
<td>.dd.gz</td>
</tr>
<tr>
<td>HP Smart Zero Core</td>
<td>Disk-Based Image</td>
<td>.dd.gz</td>
</tr>
</tbody>
</table>
Capturing an image using the non-cached mode

**NOTES:**

If you want to capture images from WES thin clients using the non-cached mode, Share Folders are required.

Capturing images using the non-cached mode cannot be done when using a wireless connection.

There must be at least 300 MB of free disk space on the thin client when capturing an image from a WES7 device.

There must be at least 200 MB of free disk space on the thin client when capturing an image from a WES09 device.

1. Select the **Task Templates** tab in the Task pane, and then drag the **Capture Image** template onto the device in the Device pane whose image you wish to capture. The Task Editor dialog will appear.
2. In the Task Editor dialog box, enter a name in the **Image Name** field for the captured image that will be stored in the Master Repository, and enter description information in the **Description** field for the captured image.

   ![Task Editor dialog box](image)

   **NOTE:**
   Do not select the option **Cached Imaging** when capturing an image using the non-cached mode.

3. If you want to preserve settings when capturing a **WES7** image, select **Preserve Settings**. This option only takes effect on **WES7**. For other operating systems, please ignore this option. For more detail about preserving settings, please refer to the **Appendix**.
4. In the **Save result as template** field, enter a name for the resulting template that will be automatically created to enable you to apply the captured image to other clients.

5. Click **OK** to apply the task to the device immediately. The Tasks pane in the HPDM Console will continue to indicate that the task is processing. The captured image is being compressed. When the task is sent, a new template will appear in the Task pane with the name you specified for the resulting template. It is disabled with a status of **transferring**. If the task fails to finish, it will change to a status of **failed**, or if the task finishes successfully, its status will change to be enabled, like below.

6. You can now use this template to apply the captured image to other devices by dragging and dropping it onto devices in the Device pane or folders in the Device tree.
Capturing an image using the cached mode

NOTE:
If the Cached Imaging option is selected, it requires enough free disk space and enough RAM (for ThinPro) on the thin client to cache the captured image.
— For WES devices, the free disk space should be at least 70% of the total file system size.
— For ThinPro devices, the free disk space should be at least 50% of the total disk size and the RAM should be at least 1 GB.

1. Select the Task Templates tab in the Task pane, and then drag the _Capture Image_ template onto the device in the Device pane whose image you wish to capture. The Task Editor dialog will appear.
2. In the Task Editor dialog box, enter a name in the **Image Name** field for the captured image that will be stored in the Master Repository, and enter description information in the **Description** field for the captured image.
3. Select the option **Cached Imaging** to capture an image using the cached mode. If the thin client uses an advanced network, such as wireless, 802.1x, etc., this option is necessary.

4. If you want to preserve settings when capturing a **WES7** image, select **Preserve Settings**. This option only takes effect on **WES7**. For other operating systems, please ignore this option. For more detail about preserving settings, please refer to the Appendix.
5. In the **Save result as template** field, enter a name for the resulting template that will be automatically created to enable you to apply the captured image to other clients.

![Image](https://example.com/image.png)

- **Image Name**: ImageV279
  - **Note**: You do not need to add extension (.img, .vir, etc.) to the end of image name
- **Description**: This image is captured from one device which its image version is 279.

- **Advanced Options**
  - **Cached Imaging**
    - Selecting this option will cause the captured image file to be cached on the client before uploading to the Master Repository.
    - **Note**: It is necessary for environments where advanced networks are used, such as wireless, VDC, etc.; it requires enough free space on the client to cache the captured image.
  - **Preserve Settings**
    - Selecting this option will cause the agent to back up settings prior to capturing the image and restore those settings after the image is captured.
    - **Note**: It only takes effect on VES 7. For other operating systems, no settings will be preserved. It will take longer (5-10 minutes) depending on CPU and disk speed. This is enabled for VES 7

- **Save result as template**: ImageV279

6. Click **OK** to apply the task to the device immediately.

   The Tasks pane in the HPDM Console will continue to indicate that the task is processing. The captured image is being compressed. When the task is sent, a new template will appear in the Task pane with the name you specified for the resulting template. It is disabled with a status of **transferring**. If the task fails to finish, it will change to a status of **failed**, or if the task finishes successfully, its status will change to be enabled, like below.

![Task Templates](https://example.com/task-templates.png)

7. You can now use this template to apply the captured image to other devices by dragging and dropping it onto devices in the Device pane or folders in the Device tree.
Deploying images

There is no “Deploy Image” or “PXE Deploy Image” base template. However, they can be created by capturing and importing an image. Therefore, if you want to deploy an image to a thin client, you need to capture an image from a thin client or import an image file from the local file system. In this section, we introduce how to import image files.

Importing image files

1. In the HPDM Console, from the Template menu, click Import > Image Files > to deploy without PXE. The Import Image File dialog box will appear.

   ![Import Image File dialog box]

   **NOTE:**
   This step is only used to import an image file to generate a Deploy Image template. If you want to generate a PXE Deploy Image template, select Import > Image Files > to deploy using PXE. The other steps are the same.

2. In the Import Image File dialog box, click Browse to select the image file that you want to import.
3. After selecting the image file, click **Import** to begin importing the file.

4. In the Package Description Editor, enter the necessary information about this image file.
   a. **Modify the Title** of this package.

   ![Package Description Editor](image1)

   b. **Input the Installation Space** in bytes. This is the minimum disk size required to install this image. For example, installing the image file `W0CH8983.ibr` on a device requires at least 2 GB of free space. You would need to enter “2000000000”.

   ![Package Description Editor](image2)
c. Select the **Architecture**.

d. Select the **OS Type**. This is the image file’s operating system. For example, W0CH8983.ibr is a WES09 image file. You can select the operating system using the following steps:

i. Click the OS Type edit box, and the OS Type dialog will appear.

ii. Select the desired operating system in the left pane, such as WES09.
iii. Click **Select**.

iv. Click **OK**, and you will return to the Package Description Editor.
e. Select the **Thin Client Models** that the image supports. For example, W0CH8983.ibr supports t510, t610, t5740, etc. You can select the thin client models using the following steps.
   
i. Click the Thin Client Models edit box, and the Thin Client Models dialog will appear.

   ![Thin Client Models dialog](image1)

   [Click to enlarge]

   ii. Select the desired thin client model from the left pane, such as t5570.

   ![Thin Client Models dialog](image2)

   [Click to enlarge]

   iii. Click **Select**.

   ![Thin Client Models dialog](image3)

   [Click to enlarge]
iv. Click **OK**, and you will return to the Package Description Editor.

5. Click **Generate** to begin uploading the image file to the repository.
6. After the upload is complete, a confirmation message will appear. Click OK to finish this operation.

If the image file imported successfully, a new “Deploy Image” template will appear in the Task pane with the name you specified.

Deploying images with PXE

HPDM supports deploying images with PXE on WES09/XPe, HP ThinPro 3, and HP ThinPro 4. The deployed image format can be .dd.gz, .img, .hpimg, or .dd.

1. Check to see if the PXE server is running, and if not, start it first. The PXE server is a service. You can check and start it using the Windows Task Manager (a), Windows Services window (b), or HPDM Gateway Configuration window (c).

   a. Windows Task Manager
b. Windows Services window

![Windows Services window](image)

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c. HPDM Gateway Configuration window

i. Right-click the HPDM Gateway tray icon ⚙️, and the following menu will appear. Click **Configure Device Management Gateway**.

![HPDM Gateway tray icon menu](image)
ii. In the HPDM Gateway Configuration window, change **Start PXE service when Gateway is started** to **YES**, and then click **OK**.

![Device Management Gateway Configuration](image)

iii. Right-click the HPDM Gateway tray icon again, and click **Restart Device Management Gateway**. The PXE server will then be started.

2. From HPDM Console, click the Task Templates tab, and drag a “PXE Deploy” template onto a device. A “PXE Deploy” template can be created two different ways.
   a. A “PXE Deploy” template can be generated by doing a **PXE Capture** task. For example, the pxe122 template shown below.
b. A “PXE Deploy” template can also be generated by importing an image from the Template menu and clicking Import > Image Files > to deploy using PXE.

In the example below, we are importing a pxe128.dd.gz image.

NOTE: For more information, refer to Importing image files.

After importing the image, a “PXE Deploy” template will be generated in the Task Templates tab.
3. After dragging a “PXE Deploy” template onto a device, the Task Editor will appear.

Click **OK**, and the “PXE Deploy” task will be sent to the device.

**NOTES:**
The following settings are preserved on the target device:
— WES09/XPe: **Hostname**, **Network**, and **Write Filter status**
— HP ThinPro 3/4: **Hostname** and **Network**

When deploying an image to a shutdown device, the device should support “Network boot first” so it can be woken up. However, the operation will not preserve any settings on the target device, which is usually used to deploy an image to a crashed device. You can deploy an image with PXE to a shutdown WES7 device.

A “PXE Deploy” task will fail when using a wireless connection.
Deploying images without PXE

HPDM supports two modes to deploy an image without PXE. One is a cached mode, and the other is a non-cached mode. The cached mode is a new feature added in HPDM 4.5. If the thin client uses an advanced network, such as wireless, 802.1x, etc., please use the **Cached Imaging** mode to capture an image.

The following table shows which formats are supported when deploying images to thin clients.

<table>
<thead>
<tr>
<th>Operating system</th>
<th>Image format (non-cached mode)</th>
<th>Image format (cached mode)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WES7</td>
<td>.ibr, .img, .dd, .dd.gz, .hpimg</td>
<td>.ibr</td>
</tr>
<tr>
<td>WES09</td>
<td>.ibr, .img, .dd, .dd.gz, .hpimg</td>
<td>.ibr</td>
</tr>
<tr>
<td>HP ThinPro 3</td>
<td>.img, .dd, .dd.gz, .hpimg</td>
<td>.dd.gz</td>
</tr>
<tr>
<td>HP ThinPro 4</td>
<td>.img, .dd, .dd.gz, .hpimg</td>
<td>.dd.gz</td>
</tr>
<tr>
<td>HP Smart Zero Core</td>
<td>.img, .dd, .dd.gz</td>
<td>.dd.gz</td>
</tr>
</tbody>
</table>

**Deploying images using the non-cached mode**

**NOTES:**

If you want to deploy the .ibr image format to WES thin clients using the non-cached mode, Share Folders are required.

Deployment of images using the non-cached mode cannot be done when using a wireless connection.

There must be at least 200 MB of free disk space on the thin client when deploying an .ibr image to a WES09 device.

1. In the HPDM Console, display the operating system tab containing the names of the clients to which you want to deploy an image.
2. Select the Task Templates tab in the Task pane, and then select the “Deploy Image” template that you created by capturing or importing an image.
3. Drag and drop the template onto the devices to which you want to deploy the image. The Task Editor dialog box will appear.
4. Click View Details, and detailed information of the image will appear.

**NOTE:**

Do not select **Cached Imaging** when deploying an image using the non-cached mode.
5. If you want to deploy the image to a device that is a different hardware platform from the source device, select **Allow Cross-Platform Imaging**. This option only takes effect when deploying an image to a device with a WES operating system.

**NOTE:**

For example, if you captured a WES image from a t510 Thin Client and want to deploy it to a t610 Thin Client, you need to select this option. Otherwise, this “Deploy Image” task will fail. If you select this option, you need to ensure the captured image will work well on the target device.

6. Click **OK** to apply the “Image Deploy” task to the devices.
Deploying an image using the cached mode

**NOTES:**
If the Cached Imaging option is selected, it requires enough free disk space and enough RAM (for ThinPro) on the thin client to cache the image file.
— For WES devices, the free disk space must be greater than the image file size.
— For ThinPro devices, the free disk space must be greater than the image file size and the RAM size must be at least 1 GB.
If you want to deploy an image to a thin client that uses a wireless network, you need to ensure the image file contains wireless network credentials and can connect to the wireless network after the image is deployed.

1. In the HPDM Console, display the operating system tab containing the names of the clients to which you want to deploy an image.
2. Select the Task Templates tab in the Task pane, and then select the “Deploy Image” template that you created by capturing or importing an image.
3. Drag and drop the template onto the devices to which you want to deploy the image. The Task Editor dialog box will appear.
4. Click **View Details**, and detailed information of the image will appear.
5. Select **Cached Imaging** when deploying an image using the cached mode. If the thin client uses an advanced network, such as wireless, 802.1x, etc., this option is necessary.

![Task Editor](image)

6. If you want to deploy the image to a device that is a different hardware platform from the source device, select **Allow Cross-Platform Imaging**. This option only takes effect when deploying an image to a device with a WES operating system.

**NOTE:**

For example, if you captured a WES image from a t510 Thin Client and want to deploy it to a t610 Thin Client, you need to select this option. Otherwise, this “Deploy Image” task will fail. If you select this option, you need to ensure the captured image will work well on the target device.
7. Click **OK** to apply the “Image Deploy” task to the devices.
Appendix

Preserved settings during imaging

Source device—The device from which the image will be captured.
Target device—The device to which the captured image will be deployed.

Settings preserved when capturing an image

WES7:
For WES7, WES7E, and WES7P thin clients, the following settings and connections are preserved on both
the source device and the captured image when capturing an image. These settings and connections will
then be migrated when deploying the image to other devices.

- Settings
  - Auto Logon setting
  - IE Homepage setting
  - Local user accounts, including the Administrator account, default user account, and other
    accounts
  - System Locale
  - User Locale
  - Input Locale
  - UI Language Locale
  - Time Zone
  - Region Format
  - Location
  - Keyboard Layout
  - Notification Area setting
  - Taskbar setting
  - Desktop Wallpaper setting

- Connections
  - Citrix ICA
  - RDP
  - TeemTalk

WES09:
All settings from the source device are preserved on both the source device and the captured image, except
the hostname, network settings, domain settings, and Write Filter status.
**ThinPro:**
All settings from the source device are preserved on both the source device and the captured image, except the hostname and network settings.

**Settings preserved when deploying an image**
When deploying an image, the following settings on the target device will be preserved and restored after the image deployment.

**WES7/WES09:**
- Writer Filter status
- Hostname
- Network
- Terminal Service License

**ThinPro:**
- Hostname
- Network
Imaging task performance

This section introduces the time spent for imaging tasks. We gathered this data from our test environment, but it is for reference only. The time spent on imaging tasks depends on the network environment, protocol, and hardware. Our data was retrieved using the following environment:
- Network bandwidth: 100 MB bandwidth
- File Transfer Protocol: FTP and Shared Folder

### WES7

<table>
<thead>
<tr>
<th>Operating system</th>
<th>Connection type</th>
<th>Mode</th>
<th>Device model</th>
<th>Disk size (GB)</th>
<th>Image clone duration (minutes)</th>
<th>Image deployment duration for image cloned via HPDM (minutes)</th>
<th>Image deployment duration for image downloaded from HP.com (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wireless</td>
<td>Cached</td>
<td>t510</td>
<td>16</td>
<td>59</td>
<td>73</td>
<td>N/A</td>
</tr>
<tr>
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<th>Image deployment duration for image cloned via HPDM (minutes)</th>
<th>Image deployment duration for image downloaded from HP.com (minutes)</th>
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Known issues

- **Deploying an image using PXE**: If a device is shut down and not set to “Network boot first”, the device will receive the reboot task circularly.
  
  Workaround:
  1. Go into the BIOS and enable “Network boot first”.
  2. Cancel the task from HPDM Console.

- **For WES7E, WES7P, and WES09**: if the source thin client was joined to a domain prior to a Capture Image task, then domain membership will be lost after cloning the image. It is recommended to remove the source device from any domain prior to a Capture Image task.

- **There is a known issue where the group policy that controls the domain password complexity will affect local user accounts, resulting in the user requirement to change the password to meet a more strict criteria.**

- **HPDM doesn’t support deploying a WES7P image downloaded from HP.com.**
  
  Workaround:
  1. Deploy this image to a device using a local image tool, such as HP ThinState or Ghost by Symantec.
  2. Capture the image from this device via HPDM.
  3. Deploy the newly captured image to other devices.

- **HPDM doesn’t support deploying an image file downloaded from HP.com to a thin client that uses a wireless network.**
  
  Workaround:
  1. Deploy this image to a device using a local image tool, such as HP ThinState or Ghost by Symantec.
  2. Configure the wireless network settings after deploying the image.
  3. Capture the image from this device via HPDM.
  4. Deploy the newly captured image to other devices that use a wireless network.