Abstract
This document provides information about the integration of HPE Moonshot ProLiant servers into an existing Citrix XenDesktop or XenApp environment. The intended audience for this guide includes system and network administrators who are knowledgeable in Citrix technologies. Hewlett Packard Enterprise assumes that you have a working set of virtual or physical desktops and XenApp servers, as well as the required Citrix core services pre-existing in the environment.
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Overview

What's new in this release

The following updates have been added in this release of the HPE Moonshot for Citrix Integration Guide:

Troubleshooting support for using Citrix Provisioning Services with HPE ProLiant m710x server cartridges

Client virtualization

Although most workers sit at desks using PCs, each user population has unique needs. For example, task workers need only a couple of applications to do their jobs. However, workstation-class users require CPU- and accelerated-graphics performance to handle 3D graphically intensive or rich media applications. As shown in the following figure, knowledge workers form the largest segment of the PC user population. Creating a tailored desktop environment for each group is an efficient way to meet the needs of each user.

Hosted physical desktops infrastructure using Citrix XenDesktop

Hosted physical desktops provide users the ability to access a Microsoft Windows desktop that runs on dedicated, unshared hardware. End users can access the desktop image remotely using thin clients and a desktop monitor or mobile devices, such as tablets.

Hosted physical desktops leverage the HPE Moonshot server platform to provide these dedicated desktops. The HPE Moonshot solution for XenDesktop leverages SoC technology from AMD and Intel with built-in GPU/APU hardware. This platform enables delivery of a native desktop experience with remote access capabilities, all in a low power envelope with high density. The high-density HPE Moonshot server cartridges deliver a fully functional PC desktop experience to each user because each user receives independent CPU, GPU, memory, write-cache, and networking. Workers enjoy consistent, reliable performance, and a high-quality service running varied individual workloads.

Hosted virtual desktop infrastructure using Citrix XenApp

Hosted virtual desktops provide users the ability to access a virtual Microsoft Windows server that runs on shared hardware. End users can concurrently access the same Windows server remotely using thin clients and a desktop monitor or mobile devices, such as tablets.

Hosted virtual application infrastructure using Citrix XenApp

Hosted virtual applications provide users the ability to access virtual Microsoft Windows applications that run on shared hardware. Multiple end users can concurrently access the same Windows application remotely using thin clients and a desktop monitor or mobile devices, such as tablets.
Choosing the best delivery model for your users

To choose the best solution for your users, IT administrators need to understand the benefits of each delivery model available with HPE Moonshot servers.

XenApp shared desktops and applications inherit the following characteristics due to shared hardware resources by multiple users:

- lowest cost per desktop
- lowest graphics quality
- lower isolation of users
- higher number of users

XenDesktop hosted physical desktops inherit the following characteristics due to dedicated hardware resources for each user:

- highest cost per desktop
- highest graphics quality
- highest isolation of users
- lower number of users

It is also important to classify users based on hardware required when choosing XenDesktop on hosted physical desktops. For instance, the ProLiant m700 series server cartridge provides the following benefits through XenDesktop:

- highest user per Moonshot chassis density with up to 180 XenDesktop users
- lowest graphics capability with AMD Radeon GPU and up to 16GB memory
- lowest cost per desktop with dedicated graphics, CPU, memory, and storage
- best fit for user workloads such as Microsoft Office and teleconferencing products

The ProLiant m710 series server cartridges provide the following benefits through XenDesktop:

- lowest user per Moonshot chassis density with up to 45 XenDesktop users
- highest graphics capability with Intel Iris Pro GPU and up to 64GB memory
- highest cost per desktop with dedicated graphics, CPU, memory, and storage
- best fit for graphically intense user workloads such as trading applications, Adobe Photoshop and other 3D design products*

* Most 3D Design products require the HDX 3D Pro VDA on the Iris Pro.

Citrix components and deployments

Integrating HPE Moonshot servers into a Citrix XenDesktop or into a XenApp environment is similar to the standard Citrix deployment model. HPE Moonshot servers using XenDesktop or XenApp technologies use the same brokering tools as traditional VDI environments. Differences between HPE Moonshot server integration and VDI integration into Citrix environments are that HPE Moonshot systems do not require any of the following:
Instead, HPE Moonshot hosts Windows server or client desktops and applications running on bare metal servers. See the following figure for an illustration of the components of a traditional VDI or Moonshot XenDesktop/XenApp deployment.

Citrix environments contain several compute elements that deliver a hosted physical or hosted virtual desktop experience similar to those found in enterprise environments, such as domain controllers, DNS services, and DHCP services. Citrix XenDesktop elements, such as Studio and Storefront, can run on separate servers or run on the same server. They can also be set up as VMs. See the following figure for an illustration of the components of a Citrix deployment.
Citrix Provisioning Services is an optional Citrix component that streams a complete OS image to desktops running on both virtual and physical resources. Citrix PVS is supported on all HPE Moonshot servers that are qualified for XenDesktop or XenApp use. With Citrix PVS, many desktops can share the vDisk image, which becomes a common read repository. This type of virtual disk reduces IT maintenance costs dramatically by allowing IT to maintain a single virtual disk for all devices. Citrix PVS should be considered if reduction in image management is desired for your Citrix environment.

Write cache
Streamed operating systems from Citrix PVS require a write-cache which can be located in many different locations, including local disk, memory, on the PVS server, or a combination of locations. Citrix PVS server caching and vDisk read-write modes should only be used for image maintenance. Hewlett Packard Enterprise recommends using the internal SSD disk as write-cache on each HPE Moonshot server for best performance with Citrix PVS. Reads from the Citrix PVS server are typically cached in server memory.
Citrix XenDesktop and HDX

Citrix XenDesktop uses the HDX protocol to enable thin clients to remotely access desktop PCs and servers running in a variety of environments, including bare metal remote PCs and HPE Moonshot desktops and servers. The standard HDX protocol, starting with XenDesktop version 7.1, has assimilated a key feature from HDX 3D Pro to provide higher-performance graphics from DirectX applications.

This enables thin clients to access a high-performance graphics environment as long as the hosted machine is equipped with GPU support. Built-in GPU hardware is a key feature of the HPE Moonshot servers and desktops, which enables advanced graphics computing for every XenDesktop or XenApp user.

HDX driver updates might be required to enhance the user experience within HDX on previous Citrix versions. See the hotfixes available from the following websites for Citrix XenDesktop 7.1/7.5:

- **64-Bit**—see [Hotfix ICAWS750WX64008 - For VDA Core Services 7.1/7.5 for Windows Desktop OS (64-bit)](citrixwebsite) on the [Citrix website](citrixwebsite).
- **32-Bit**—see [Hotfix ICAWS750WX86008 - For VDA Core Services 7.1/7.5 for Windows Desktop OS (32-bit)](citrixwebsite) on the [Citrix website](citrixwebsite).

**IMPORTANT:**
If you encounter a "SUPERSEDED" message when attempting to access the Hotfix URL, download the latest Hotfix by clicking the URL next to Replaced By: near the top of the page.

HDX standard versus HDX 3D Pro

Beginning with Citrix XenDesktop 7.9, HDX 3D Pro is supported on the ProLiant m710x with Intel Iris Pro GPU. The HPE ProLiant m710x is the recommended platform for HDX 3D Pro and CAD applications with Intel Iris Pro.

Due to the higher CPU usage required for HDX 3D Pro, Hewlett Packard Enterprise recommends the HDX standard VDA in most deployments of the HPE ProLiant m700 series server cartridge. HDX 3D Pro should
only be used when required, such as when supporting DirectX 11 (feature level 9_3 and higher) and OpenGL applications.

For information about HDX 3D Pro on AMD Radeon GPUs, see the [Citrix website](https://www.citrix.com).

For information about HDX 3D Pro on Intel Iris Pro GPUs, see the [Citrix website](https://www.citrix.com).

### Citrix XenApp

Citrix XenApp provides a complete delivery model for remote Windows applications and hosted shared desktops. The HPE Moonshot System Application Delivery solution uses this technology to manage Application Delivery server cartridges.

Citrix XenApp can take advantage of Citrix Provisioning Services to deploy images using non-persistent vDisks, or servers can be configured with a persistent disk image, deployed from Microsoft WDS, SCCM, or HPE Insight CMU. For a more thorough comparison between persistent and non-persistent environments, see "[Persistent versus non-persistent](https://www.citrix.com)."

Citrix Provisioning Services allows for simplified management through a single shared-disk image that is streamed to each HPE Moonshot cartridge. As with XenDesktop environments, the HPE ProLiant m710, m710p, m710x, and m510 server cartridges can use the local m.2 SSD as write-cache for the PVS image, along with a number of other options. Options include cache in memory and writing back cache to the PVS server. Hewlett Packard Enterprise recommends using the local m.2 SSD for PVS write-cache.

Citrix XenApp deployments contain the same Citrix infrastructure components as XenDesktop deployments, with the primary difference being the VDA installed on a Windows server OS (such as Windows 2012 R2) as opposed to a client OS (such as Windows 8.1).

Best practices for deploying XenApp on the ProLiant m510 and m710 server cartridges include:

- Set the Windows power mode to high performance mode from [Control Panel, Hardware, and then Power Options](https://www.citrix.com).
- Install the latest Intel graphics and network drivers for maximum performance and compatibility. These drivers can be located on the [Hewlett Packard Enterprise Support Center website](https://www.citrix.com). Under Select your HPE product, enter m710, m710p, m710x, or m510, and then click Go.
- Be sure that all required Windows updates are installed because many of these updates can improve performance.

⚠️ **IMPORTANT:**
Do not apply any driver updates through the Windows Update process for the following hardware:

- Mellanox ConnectX-3 Ethernet adapters
- Intel Graphics Adapter WDDM - Iris Pro Graphics 5200

See the HPE OS support matrix for the supported operating systems for each server.

### Enterprise manageability

HPE Moonshot supports enterprise-level provisioning and manageability through SCCM and SCOM. For more information about performing the following actions, see the [HPE Integration Guide for Microsoft System Center](https://www.citrix.com) on the [Hewlett Packard Enterprise website](https://www.citrix.com).

- Provision and manage Windows operating systems on HPE Moonshot using SCCM.
- Monitor Windows operating systems running on HPE Moonshot servers through SCOM.
HPE ProLiant m710x and m510 server cartridges also include embedded HPE Integrated Lights-Out (iLO 4) technology, which enables remote console and virtual media capabilities.
Key considerations

Deployment types

The Moonshot for Citrix Solution provides two types of deployment:

• Non-persistent, which uses Citrix Provisioning Services
• Persistent/Fully Provisioned

The following table lists some management characterizations for each type of deployment:

<table>
<thead>
<tr>
<th>Non-persistent management</th>
<th>Persistent management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple users connecting to a pool of resources allocated on demand</td>
<td>One user connecting to the same dedicated resource</td>
</tr>
<tr>
<td>Fresh desktop at each login using write-based cache</td>
<td>Same desktop for each user with a fully provisioned image. All changes are saved within the OS.</td>
</tr>
<tr>
<td>Can destroy at logoff</td>
<td>Traditional desktop management tools are used for patching and software changes</td>
</tr>
<tr>
<td>Centralized patch and scan from a single image</td>
<td>Users can customize with apps they need or want</td>
</tr>
<tr>
<td>Image is fixed and does not change when in read-only mode</td>
<td>Images grow and shrink based on applications and needs</td>
</tr>
<tr>
<td>Single locale for many services</td>
<td>I/O is balanced and fully uses the local SSD drive</td>
</tr>
<tr>
<td>Non-persistent contains a predictable image</td>
<td>Users can frequently insert apps that might not be optimized</td>
</tr>
<tr>
<td>No surprise applications</td>
<td>—</td>
</tr>
<tr>
<td>User data, some app data, and temp data are offloaded to the SAN</td>
<td>User data, some app data, and temp data are stored locally on the SSD. Alternatively, if third-party user profile management software is configured, then data might be offloaded to the SAN.</td>
</tr>
</tbody>
</table>

Non-persistent

See the following figure for the typical workflow of a non-persistent desktop.

Persistent
See the following figure for the typical workflow of a persistent desktop.

**Persistent versus non-persistent**

HPE Moonshot Servers offer both persistent and non-persistent resources to organizations.

- **Persistent**—The HPE Moonshot server configuration for persistent resources assigns a specific user a unique desktop once the user logs in for the first time. The configuration remains static through the duration of their use and future logins. Persistent resources have operating systems installed on the local SSD of the Moonshot resource to allow for application installations and configuration changes with retention of local user data.

- **Non-persistent**—In contrast, users of a non-persistent resource have permission to access a resource pool and are assigned any single non-persistent resource randomly during login. Non-persistent resources have read-only access to the virtual operating system and do not allow local application installs or locally stored user data. Non-persistent resources are refreshed to a master image state after reboot, removing all changes made during a user session. If a user profile management solution is configured, user data is offloaded to the network-based user store either during logout of the session or at run-time, depending on the user profile management solution.

When considering persistent and non-persistent deployments, first analyze the user groups to determine workload and application usage, determine which users should share a base image or have their own image, determine how to manage user data, and then allocate resource types accordingly.

While both persistent and non-persistent resources can be pooled into groups of machine catalogs, Citrix refers to the allocation types as static or random, as seen in the catalog creation screen in the following figure.

Choosing a static allocation assignment assigns users to machines as they log in (randomly) and remain persistent (static) for the duration of their use and future logins.
User data and failure management

User data management recommendations vary depending on the resource type. The following section describes the difference between non-persistent and persistent user data management.

**Desktop or Server Resource Type**

- **Non-persistent**—little or no direct administrative access to nodes, unable to store data and install applications locally. User data redirection is essential when using non-persistent deployments. This resource is optional for XenDesktop, but highly recommended for XenApp since XenApp enables sharing of hardware resources for many users.

- **Persistent**—option to store user data and install applications locally. User data redirection still has advantages in a persistent environment; however, it is not required.

**User data management**

- **Non-persistent**—select a persona management solution to redirect user profiles to network-based storage. User persona management enables users to use any non-persistent resource randomly while maintaining unique user settings.

- **Persistent**—can benefit from persona management, but able to rely on a local profile as well because user assignments to resources are static.

Persona management examples include:

- Citrix User Profile Management
- RES Software
- AppSense
- Liquidware Lab

**HPE Moonshot server cartridge failures**

HPE Moonshot server cartridge failures should be handled differently depending on the type of resource that failed and the type of failure. This section describes Hewlett Packard Enterprise recommendations for recovering from a hardware failure.

**Hardware failure of a non-persistent resource**

- A user is unable to login. The IT administrator has identified the issue and extra nodes are available for the user. The administrator reassigns the user resource to the new available resource in XenDesktop or XenApp, or the administrator can delete the hardware resource from the Delivery Group and Catalog so that the user is reassigned to a new random resource at the next login.

- At the next login, user data is restored from the network-based user profile management solution.

**Hardware failure of a persistent resource**

- A user is unable to login. The IT administrator has identified the issue and extra nodes are available for the user. The administrator reassigns the user resource to the new available resource in XenDesktop, or the
administrator can delete the hardware resource from the Delivery Group and Catalog so that the user is reassigned to a new static resource at the next login.

- At the next login, user settings are restored from a user profile management solution if in use. User data is recovered using a PC backup solution, such as HPE Connected Backup.

- While the user recovers data onto a new static resource, the administrator replaces the cartridge, if necessary, and redeploys the operating system from the organization’s operating system deployment solution. The administrator then adds the failed desktop back to the XenDesktop or XenApp catalog and Delivery Group to be made available for a new user assignment.
High availability for HPE Moonshot servers

Multi-site non-persistent desktops and servers

Hewlett Packard Enterprise recommends balancing hardware resources across multiple Citrix sites using Citrix site failover when adding high availability to HPE Moonshot non-persistent desktops. This configuration enables users to continue accessing their hosted physical and virtual desktops from the failover site if a single HPE Moonshot chassis, or even an entire site, fails. Consult the Citrix website for best practices when configuring Citrix sites for high availability.

A sufficient number of HPE Moonshot resources should be available in all sites so that a single site can sustain the complete workload during failover.

Single site design without Citrix site failover

Multi-site design with Citrix site failover
Network Interface Teaming

Network Interface Teaming is supported using persistent and non-persistent resources. See the following table for the supported Network Interface Teams with HPE Moonshot servers.

<table>
<thead>
<tr>
<th>HPE Moonshot cartridge</th>
<th>Resource type</th>
<th>NIC Teaming</th>
<th>NIC Team type</th>
<th>Multiple networks/ VLAN tagging</th>
<th>Citrix VDA</th>
<th>Operating system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistent HPE ProLiant m700 Server Cartridge</td>
<td>Yes</td>
<td>SLB Active/ Standby</td>
<td>Yes</td>
<td>XenDesktop</td>
<td>Windows 7</td>
<td>Windows 7 (x86/x64)</td>
</tr>
<tr>
<td>Non-Persistent</td>
<td>Yes</td>
<td>SLB Active/ Standby</td>
<td>No</td>
<td>XenDesktop</td>
<td>Windows 8.1</td>
<td>Windows 8.1 (x86/x64)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Windows 10</td>
<td>Windows 10</td>
</tr>
</tbody>
</table>

Table Continued
<table>
<thead>
<tr>
<th>HPE Moonshot cartridge</th>
<th>Resource type</th>
<th>NIC Teaming</th>
<th>NIC Team type</th>
<th>Multiple networks/VLAN tagging</th>
<th>Citrix VDA</th>
<th>Operating system</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPE ProLiant m710 and m710p Server Cartridges</td>
<td>Persistent</td>
<td>Yes</td>
<td>All Types</td>
<td>Yes</td>
<td>XenDesktop/XenApp</td>
<td>Windows 7 (x64), Windows 8.1 (x64), Windows 10, Windows 2008 R2, Windows 2012, Windows 2012 R2</td>
</tr>
<tr>
<td></td>
<td>Non-Persistent</td>
<td>Yes</td>
<td>Switch Independent (Active/Standy), LACP (All adapters Active)</td>
<td>No</td>
<td>XenDesktop/XenApp</td>
<td>Windows 7 (x64), Windows 8.1 (x64), Windows 10, Windows 2008 R2, Windows 2012, Windows 2012 R2</td>
</tr>
<tr>
<td>HPE ProLiant m710x Server Cartridges</td>
<td>Persistent</td>
<td>Yes</td>
<td>All Types</td>
<td>Yes</td>
<td>XenDesktop/XenApp</td>
<td>Windows 7 (x64), Windows 8.1 (x64), Windows 10, Windows 2008 R2, Windows 2012, Windows 2012 R2</td>
</tr>
<tr>
<td></td>
<td>Non-Persistent</td>
<td>Yes</td>
<td>Switch Independent (Active/Standy), LACP (All adapters Active)</td>
<td>No</td>
<td>XenDesktop/XenApp</td>
<td>Windows 2012 R2</td>
</tr>
</tbody>
</table>

Table Continued
<table>
<thead>
<tr>
<th>Resource type</th>
<th>NIC Teaming</th>
<th>NIC Team type</th>
<th>Multiple networks/VLAN tagging</th>
<th>Citrix VDA</th>
<th>Operating system</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPE ProLiant m510 Server Cartridges</td>
<td>Persistent</td>
<td>Yes</td>
<td>All Types</td>
<td>Yes</td>
<td>XenDesktop/XenApp</td>
</tr>
<tr>
<td>Non-Persistent</td>
<td>Yes</td>
<td>Switch Independent (Active/ Standby), LACP (All adapters Active)</td>
<td>No</td>
<td>XenApp</td>
<td>Windows 2012 R2</td>
</tr>
</tbody>
</table>

1 NIC teaming on the m710 and m710p requires Mellanox driver 5.10.11345 or higher and Citrix target device software v7.6.1.8, which is located at the Citrix Support Knowledge Center.

**IMPORTANT:**
Network Interface Teaming is recommended for persistent resources because the user is assigned to a single unique hardware resource and user data is stored locally. In the event of a single network outage, the hardware resource remains available to the user through the highly available Network Interface Team.

- Network Interface Teaming requires both HPE Moonshot switches to have the same port configuration to avoid packet loss during failover scenarios.
- When configuring a Network Interface Team for non-persistent resources, the Network Interface Team must be configured prior to installing the Citrix Target Device Software and creating the Provisioning Services Virtual Disk. Any changes to the Network Interface Team require the Target Device software to be re-installed onto the physical device and the vDisk recaptured.
- Previous versions of Citrix Provisioning Services require the following Citrix hotfix for the new Target Device Software that supports Network Interface Teaming on HPE Moonshot servers on Citrix PVS 7.1:
  - 64-Bit - see Hotfix CPVS71003 (Version 7.1.3 - For Citrix Provisioning Services 7.1 on the Citrix website).
  - 32-Bit - see Hotfix CPVS71003 (Version 7.1.3 - For Citrix Provisioning Services 7.1 on the Citrix website).

**IMPORTANT:**
If you encounter a "SUPERSEDED" message when attempting to access the Hotfix URL, download the latest Hotfix by clicking the URL next to Replaced By: near the top of the page.

- HPE ProLiant m710 and m710p Network Teaming with Citrix Provisioning Services requires Mellanox driver v5.10.11345 or later, and Citrix Target Device Software v7.6.1.8, which is located at the Citrix Support Knowledge Center.

When creating a Provisioning Services Virtual Disk for non-persistent resources, select the virtual adapter of the Network Team, as shown in the following figure. The MAC address of the Network Team must match the network adapter used to PXE boot the device to Provisioning Services (typically this is the NIC1 MAC address) on the Add Target Device Software screen.
For configuring a Network Interface Team, see "Configuring a Network Team using the Broadcom BACS utility" or "Configuring a Network Team using the Mellanox ConnectX-3 Driver Utility."
HPE Moonshot system hardware

HPE Moonshot 1500 chassis

The HPE Moonshot 1500 chassis provides several shared functions that are leveraged by HPE Moonshot solutions. See the following figure for an illustration of the key components of the chassis.

The following figure shows the key components of the HPE Moonshot 1500 chassis.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fans (5)</td>
</tr>
<tr>
<td>2</td>
<td>Moonshot 1500 CM module</td>
</tr>
<tr>
<td>3</td>
<td>Uplink module A</td>
</tr>
<tr>
<td>4</td>
<td>Uplink module B</td>
</tr>
<tr>
<td>5</td>
<td>Power supplies</td>
</tr>
<tr>
<td>6</td>
<td>Power supply blank</td>
</tr>
</tbody>
</table>

The following figure shows the key components of the 4QSFP+ Uplink module.
<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Serial console port</td>
<td>For management</td>
</tr>
<tr>
<td>2</td>
<td>QSFP+ ports Q1–Q4</td>
<td>40 Gb Ethernet</td>
</tr>
</tbody>
</table>

The following figure shows the key components of the 16SFP+ Uplink module.

![Key components of the 16SFP+ Uplink module](image)

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SFP+ ports 1-16</td>
<td>10Gb Ethernet</td>
</tr>
<tr>
<td>2</td>
<td>Serial console port</td>
<td>For management</td>
</tr>
</tbody>
</table>

For more information, see the *HPE Moonshot 1500 Chassis Setup and Installation Guide* on the [HPE Moonshot System website](https://www.hpe.com/).

**Shared power and cooling**

The HPE Moonshot 1500 chassis supports up to four 1500 W hot-plug power supplies for N+1 redundancy. The chassis also supports five hot-plug fan modules, each containing two dual-rotor fans, for a total of ten. The HPE Moonshot 1500 chassis also supports advanced power management using the SL-APM and Hewlett Packard Enterprise power distribution for racks.

**Shared management**

The HPE Moonshot 1500 chassis has an integrated management network that provides a graphical web interface and command line access to view status and control resources. Additional support is enabled by using the HPE Moonshot Tools for PowerShell scripts, which enable Moonshot server integration into the Citrix environment as well as enabling a scriptable interface into the Chassis Manager using PowerShell. For sample scripts, see the "[HPE Moonshot sample scripts](https://www.hpe.com/)."

**Shared networking**

The HPE Moonshot 1500 chassis can accommodate up to two hot-plug Ethernet switches, as shown in the following figure. Each HPE ProLiant server cartridge has two embedded NICs per server node. One NIC is connected to Switch A, and one NIC is connected to Switch B. Each switch has either 45 1GbE, 45 10GbE, or 180 1GbE downlink ports, one for each node in the chassis. Be sure to select the 180G switch modules for use with the ProLiant m700 server cartridge, as it has four server nodes per cartridge. This configuration provides a maximum of 360 1GbE downlink ports for a full chassis with redundant 180G switch modules.

Both switches have a corresponding uplink module, each with four 40GbE QSFP+ or sixteen 10GbE SFP+ uplink ports. You can use these ports for switch stacking and uplinks to a ToR or network core switch.
Embedded integrated Lights-Out

Integrated Lights-Out (iLO 4) technology has been embedded in HPE Moonshot servers beginning with the HPE ProLiant m710x and m510 server cartridges. The embedded iLO 4 provides remote console and virtual media capabilities directly to the new server cartridges without the need of using an HPE mRCA cartridge.

HPE ProLiant m700 server cartridge

The HPE ProLiant m700 server cartridge is best suited for the Citrix XenDesktop solution when desktop density and cost per desktop is preferred over maximum performance per desktop. This cartridge is shown in the following figure and has four AMD Opteron class SoCs on each cartridge. Each SoC represents a complete desktop computing environment with features that are commonly found on desktop computers. An HPE Moonshot 1500 chassis holds a maximum of 45 ProLiant m700 server cartridges. Each ProLiant m700 server cartridge includes four SoCs for a total of 180 physical desktops in 4.3U of rack space. The following figure illustrates the key components of the ProLiant m700 server cartridge.
### Cartridge SoCs

Each HPE ProLiant m700 server cartridge has four AMD Opteron SoCs or nodes. Each node has the following specifications:

- 8 GB of RAM
- 32 GB or 64 GB of SATA attached iSSD disk
- Two 1 GbE network interfaces

Each node on the cartridge is resource-independent of other nodes on the cartridge. The following figure shows the components of a single AMD node.
The AMD Opteron X2150 has an 8400 Sea Islands GPU core with DCE 8.3, UVD 4.2, VCE 2.0, and SAMU 1.2. This GPU supports both OpenGL 4.1 (not supported with standard Citrix VDA) and DX11.1. The screen buffer resides in-system and is accessed remotely by protocols for transmission to user desktops. The Citrix solution uses the HDX protocol, which uses the GPU for a better user experience and DirectX support.

Starting with the m700 ROM version 5/24/2014, there is a node option to increase CPU performance from the default setting of 1.5GHz to 1.8GHz using the following command example:

```
set node options CPU1.8 CxNy
```

Example single node:
```
set node options CPU 1.8 c1n1
```

Example all nodes:
```
set node options CPU 1.8 all
```

This setting is applied at boot time. Enabling this setting on already powered on and running nodes using Windows 7 or Windows 8.1 requires a node power down and power up for the operating system to acknowledge the CPU increase. You must power down or power up the operating system when making CPU changes to running nodes because rebooting is not sufficient to apply the CPU performance change.

**New CPU setting options in A34 system ROM**

- 1.1 GHz for GPU-intensive and 3D apps
- 1.5 GHz for balanced workloads
- 1.8 GHz for CPU-intensive apps

**Storage**

Each node connects to a 32 GB or 64 GB iSSD that offers high performance storage for each desktop node. The system uses this storage in multiple ways. Persistent resources use the iSSD to store Microsoft Windows deployed as a complete OS image. If you are using a non-persistent resource, the Microsoft Windows image is added to the Citrix PVS server as a VHD. After the image is streamed from PVS to the ProLiant m700 server cartridges, the system uses iSSD storage as a local write cache.

**Networking**

Each ProLiant m700 server cartridge has a Broadcom 5720 NIC with two 1 GbE network ports. The Broadcom BACS network management utility manages advanced functionality and includes Teaming and VLAN support. Teaming and VLAN tagging is supported in Active/Active and Active/Standby modes. Special considerations are required when configuring NIC Teaming with the non-persistent use case using Citrix Provisioning Services. For more information about configuring NIC Teaming, and the supported types of NIC Teams based on the resource type, see Network Interface Teaming in "High availability for HPE Moonshot Servers."

**BIOS**

All nodes on the ProLiant m700 server cartridge share the BIOS image. The HPE Moonshot Chassis Manager sets the BIOS options before node power-on.

Starting with m700 ROM version 5/24/2014, a BSC node option is available, which enables keyboard input before the operating system has booted. This setting is useful when multiple Citrix PVS virtual disks are assigned to a single device within Citrix Provisioning Services during maintenance periods. With this setting enabled, an administrator can select the desired OS image via the Chassis Manager VSP of the hosted...
desktop once the node connects to the Citrix PVS server. Enable the BSC setting using one of the following command examples:

```
set node options BSC enable CxNy
```

**Example single node:**

```
set node options BSC enable c1n1
```

**Example all nodes:**

```
set node options BSC enable all
```

This setting is applied at boot time. Enabling this setting on already powered up and running nodes using Windows 7 or Windows 8.1 requires a node power down and power up for the operating system to acknowledge the settings change.

## HPE ProLiant m710 server cartridge

The HPE ProLiant m710 server cartridge is best suited for both XenApp and XenDesktop workloads. This cartridge has a single Intel Xeon E3 class SoC on each cartridge. An HPE Moonshot 1500 chassis holds a maximum of 45 ProLiant m710 server cartridges in 4.3U of rack space. The following figure illustrates the key components of the ProLiant m710 server cartridge.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Solid state device connector (supports 120GB to 480GB M.2 SSD connectors)</td>
</tr>
<tr>
<td>2</td>
<td>Processor heatsink</td>
</tr>
<tr>
<td>3</td>
<td>Micro-USB connector¹</td>
</tr>
<tr>
<td>4</td>
<td>HDMI connector</td>
</tr>
<tr>
<td>5</td>
<td>DIMM slots (4)</td>
</tr>
</tbody>
</table>

¹ To connect a standard USB device to the cartridge, connect a USB on-the-go adapter to the cartridge Micro-USB connector, and then connect the USB device to the adapter.
HPE ProLiant m710p server cartridge

The HPE ProLiant m710p server cartridge provides the best performance for XenApp and XenDesktop workloads. This cartridge has a single Intel Xeon E3 class SoC on each cartridge. An HPE Moonshot 1500 chassis holds a maximum of 45 ProLiant m710p server cartridges in 4.3U of rack space. The following figure illustrates the key components of the HPE ProLiant m710p server cartridge.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Solid state device connector (supports 120 GB to 960 GB M.2 SSD connectors)</td>
</tr>
<tr>
<td>2</td>
<td>Processor heatsink</td>
</tr>
<tr>
<td>3</td>
<td>Micro-USB connector¹</td>
</tr>
<tr>
<td>4</td>
<td>HDMI connector</td>
</tr>
<tr>
<td>5</td>
<td>DIMM slots (4)</td>
</tr>
</tbody>
</table>

¹ To connect a standard USB device to the cartridge, connect a USB on-the-go adapter to the cartridge Micro-USB connector, and then connect the USB device to the adapter.

HPE ProLiant m710x server cartridge

The HPE Moonshot m710x server cartridge is the successor to the current HPE Moonshot m710p (Broadwell) server. It uses the latest Intel Xeon E3 "Skylake" SoC and next generation integrated "GT4e" graphics.

The following figure illustrates the key components of the HPE ProLiant m710x server cartridge.
HPE ProLiant m510 server cartridge

HPE Moonshot System with the HPE ProLiant m510 server cartridge is a compute workhorse designed to enhance the performance of workloads such as analytics and extreme user density application delivery.

The ProLiant m510 server cartridge has:

- One Intel Xeon D-1548 (8-core) or D-1587 (16-core) CPU with up to 128GB of ECC protected memory.
- Dual 10Gb Ethernet along with up to 2 (1TB NVMe each) M.2 flash storage modules.
- Up to (1) 240GB SATA M.2 for local OS booting.

The server cartridge is available in two versions (with CPU fixed on board and not changeable): m510 (8 core SoC) and m510-16c (16 core SoC).

The following figure illustrates the key components of the HPE ProLiant m510 server cartridge.
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SATA 2242 M.2 SSD connector</td>
</tr>
<tr>
<td>2</td>
<td>DIMMs</td>
</tr>
<tr>
<td>3</td>
<td>Heatsink</td>
</tr>
<tr>
<td>4</td>
<td>Micro-USB connector</td>
</tr>
<tr>
<td>5</td>
<td>NVMe drive 1 2280 or 22110 M.2 SSD connector</td>
</tr>
<tr>
<td>6</td>
<td>NVMe drive 2 2280 or 22110 M.2 SSD connector</td>
</tr>
<tr>
<td>7</td>
<td>M.2 SSD module brackets</td>
</tr>
</tbody>
</table>
HPE Moonshot system CLIs

HPE Moonshot iLO chassis management

Management for the cartridges and the chassis is performed through the HPE Moonshot iLO Chassis Manager graphical interface or command line. This interface is accessed by administrators in the following ways:

- Locally, using a serial cable
- Remotely, using HTTPS
- Remotely, using SSH or REST interfaces

For easy access, this interface should be defined in DNS with a static IP address.

PowerShell scripts can also be used when deploying cartridge configurations.

For more information, see the HPE Moonshot iLO Chassis Management CLI User Guide on the HPE Moonshot System website.

HPE Moonshot switch CLI

Access the HPE Moonshot switch CLI using any of the following methods:

- Locally using a serial console cable
- Remotely using SSH
- Remotely using the HPE Moonshot iLO Chassis Management firmware VSP feature

For sample network configuration and maintenance scripts, see "HPE Moonshot sample scripts."

Moonshot switches support SNMP and sFLOW for management and configuration. For more information, see the switch documentation in the HPE Moonshot Information Library.
HPE Moonshot server deployment for persistent users

WDS integration

The HPE Moonshot servers support multiple imaging options including HPE CMU, Microsoft WDS, and Microsoft System Center Configuration Manager. Integrated Lights-Out (iLO 4) can also be used for deployment to a single system starting with the ProLiant m710x and m510 server cartridges.

If a graphical interface, remote media, and/or user input is needed during operating system deployment, Hewlett Packard Enterprise recommends using Moonshot Remote Console Administrator cartridge (mRCA) for m700, m710, m710p and m300 server cartridges. Hewlett Packard Enterprise recommends using Integrated Lights-Out (iLO 4) for the m710x and m510 server cartridges.

• For non-persistent deployments, image a single node in the HPE Moonshot chassis prior to adding the devices into the XenDesktop Machine Catalogs.

• For persistent deployment, image multiple server cartridges in the HPE Moonshot chassis prior to adding the devices into the XenDesktop Machine Catalogs.

For operating system deployments on HPE Moonshot servers, see the following documentation:

• For HPE CMU and Microsoft WDS deployments: Operating System Deployment on HPE ProLiant Server Cartridges User Guide

• For Microsoft SCCM deployments: HPE Moonshot Integration with Microsoft System Center

IMPORTANT:
This Integration guide describes using WDS as an example utility to deploy Microsoft Windows to a ProLiant m700 server cartridge. This guide also contains information about the installation and use of the SAC. The SAC enables serial support through the Chassis Manager VSP. It enables a direct connection to each node and is useful in debugging and monitoring OS installations and the boot process, providing runtime logging and administration of the OS running on the node.

Deploying install images to HPE Moonshot server cartridges in WDS

You can deploy Windows images to the HPE Moonshot server cartridges using either the default install.wim or the customized .wim images captured using Boot Capture technology. The Operating System Deployment on HPE ProLiant Moonshot Server Cartridges User Guide provides instructions for enabling a Windows image capture from a headless device such as the ProLiant m700 server cartridge. See the Operating System Deployment on HPE ProLiant Server Cartridges User Guide for instructions on capturing Windows images with HPE Moonshot System devices.

The WDS deployment process is the same on an HPE Moonshot server cartridge, whether the install image is a customized .wim or the default .wim included in the Microsoft Windows installation media. You can use the same boot.wim image that has already been converted to an HPE Moonshot server cartridge format to install either default or customized images to the multiple HPE Moonshot server cartridges. Some HPE Moonshot server cartridges might require specific drivers installed into the boot.wim. See the deployment documentation to determine what drivers are required for each operating system and HPE Moonshot server cartridge.

Example Windows to HPE Moonshot servers deployment using Microsoft WDS
After you have configured the WDS server for headless deployment and imported images into the WDS server, use the following procedure to deploy to multiple HPE Moonshot nodes within the HPE Moonshot chassis.

1. Verify that boot.wim and install.wim images are imported to the Microsoft WDS server.
2. Enable **bootems** and **ems** options for the default.bcd file and the boot.wim.bcd files.
3. Restart WDS services.
4. Add unattend.xml files for boot.wim and install.wim. For the suggested HPE Moonshot options to include in unattend files, see Operating System Deployment on HPE ProLiant Moonshot Server Cartridges User Guide.
5. (Optional) Associate the Client unattend.xml file with boot.wim if you are not pre-staging devices in WDS.
6. Associate the Image unattend.xml file with the install.wim using the WDS console.
7. (Optional) Pre-stage devices in Microsoft WDS using the Add-HPMoonshotNodesInWDS PowerShell function (see "HPE Moonshot System tools for PowerShell").

**IMPORTANT:**
Deploying a full HPE Moonshot chassis using unicast can require up to 10 Gbps of network bandwidth on the WDS server during portions of the deployment process. Make sure that the WDS server is equipped to perform up to 180 simultaneous unicast deployments before attempting to image an entire HPE Moonshot chassis.

8. (Optional) Enable networking to allow the HPE Moonshot cartridge to connect to a WDS network.
9. Configure the HPE Moonshot server cartridge **Boot** and **Power** states using one of the following methods:
   - Set-HPMoonshotNodeBoot and Set-HPMoonshotNodePower using the HPE Moonshot tools for PowerShell functions.
   - Modify the HPE Moonshot server cartridge boot and power options directly from the Moonshot CM module CLI or web-based graphical interface.
10. (Optional) Monitor OS deployment progress using the deployment console task monitoring (Microsoft SCCM), SAC interface (Microsoft WDS and HPE CMU), or using OS notification commands included in unattend.xml files.
11. (Optional) If the system did not automatically execute them as part of OS deployment, perform post OS configuration on HPE Moonshot server cartridges, as defined in "XenDesktop and XenApp prerequisites for the persistent desktop."

**Full HPE Moonshot chassis deployment example for persistent resources**
To deploy a full HPE Moonshot chassis for persistent resources using Microsoft WDS, perform the following procedure.

1. Import boot.wim and install.wim images to the Microsoft WDS server.
2. Enable **bootems** and **ems** options for the default.bcd file and the boot.wim.bcd files, and then restart WDS services.

3. Create the client and install unattend.xml files for the boot.wim and install.wim. For the suggested HPE Moonshot options to include in unattend files, see the Operating System Deployment on HPE ProLiant Moonshot Server Cartridges User Guide.

4. (Optional) If you are not pre-staging devices in WDS, associate the Client unattend.xml file with boot.wim.

5. Associate the image unattend.xml file with the install.wim using the WDS console.
6. Pre-stage devices in Microsoft WDS using the `Add-HPMoonshotNodesInWDS` PowerShell function (see "HPE Moonshot System tools for PowerShell").

⚠️ IMPORTANT:
Deploying a full HPE Moonshot chassis using unicast can require up to 10 Gbps of network bandwidth on the WDS server during portions of the deployment process. Make sure that the WDS server is equipped to perform up to 180 simultaneous unicast deployments before attempting to image an entire HPE Moonshot chassis.
In WDS, the pre-staged devices appear in the following list:

<table>
<thead>
<tr>
<th>Slot ID</th>
<th>NIC 1 (Switch A)</th>
<th>NIC 2 (Switch B)</th>
<th>NIC 3 (Switch A)</th>
<th>NIC 4 (Switch B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F0:92:1C:85:2F:97</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2</td>
<td>F0:92:1C:85:2F:97</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>3</td>
<td>F0:92:1C:85:2F:97</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>4</td>
<td>F0:92:1C:85:2F:97</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>45</td>
<td>C5:12:1E:5:2A:97</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>46</td>
<td>C5:12:1E:5:2A:97</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>47</td>
<td>C5:12:1E:5:2A:97</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>48</td>
<td>C5:12:1E:5:2A:97</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Total nodes found: 180

Created device list for NIC 1 to:\WDS-prestage_172.17.0.121_all_nic1.csv

Prestaging devices in WDS server...


All devices were imported successfully using WDSUTIL.EXE

Total devices NOT ADDED due to errors: 0

List of devices imported successfully: 180

List of device parameters can be found in:\WDS-prestage_172.17.0.121_all_nic1.csv
7. (Optional) Enable networking for HPE Moonshot server cartridges to connect to WDS network.

This example shows the production network on VLAN 103 and the WDS/PXE network on VLAN 118. HPE Moonshot cartridges do not require VLANs, but Hewlett Packard Enterprise recommends VLANs when supporting multiple networks within the same HPE Moonshot chassis.

8. Configure HPE Moonshot server cartridge **Boot** and **Power** states using one of the following methods:
- Modify the HPE Moonshot server cartridge boot and power options directly from the Moonshot CM module CLI or web-based graphical interface.

- Power off all nodes
- Set node boot
- Set PXE boot
• Power on all nodes

9. (Optional) Monitor OS Deployment progress using the deployment console task monitoring (Microsoft SCCM), SAC interface (Microsoft WDS and HPE CMU), or using the OS notification commands included in the unattend.xml files.
This example uses a notification script to copy the Windows Setup Activity and Error log files, and to notify the user that the deployment has completed (see "Notification when WDS-based OS deployment has completed").

10. (Optional) If the system did not automatically execute them as part of OS deployment, perform post OS configuration on the nodes as defined in the Citrix “XenDesktop and XenApp prerequisites for the persistent desktop.”
Creating and capturing custom HPE Moonshot server cartridge install images in WDS

For the detailed process of capturing Windows images on HPE Moonshot devices, see the Operating System Deployment on HPE ProLiant Moonshot Server Cartridges User Guide.

The following high-level steps are required to capture a customized HPE Moonshot server cartridge Windows Image using WDS.

**IMPORTANT:**
Creating a capture image from an HPE Moonshot server cartridge requires 4 to 10 GB of empty space on the HPE Moonshot m700 server cartridge internal drive. The number of additional applications and patches installed on the reference HPE Moonshot server cartridge determines the size of the captured install.wim. If there is not enough space on the internal drive to store the entire captured image locally before uploading to the WDS server, the capture process fails.

To create a custom install.wim file, perform the following procedure.

1. Install a supported Windows version on the HPE Moonshot server cartridge.
2. Customize the Windows OS directly on the HPE Moonshot server cartridge. Hewlett Packard Enterprise recommends customizing the install.wim with the following software, patches, and configuration for a streamlined persistent deployment to an HPE Moonshot chassis:
   - Windows updates
   - AMD or Intel graphics software
   - Broadcom BACS or Mellanox utilities for teaming and VLAN tagging configuration
   - Citrix Virtual Desktop Agent for XenDesktop or XenApp
   - Any Citrix HDX driver Hotfixes (for known Hotfixes, see "Citrix XenDesktop and HDX")
   - Any third-party applications required for persistent desktop users
   - (For ProLiant m700 server cartridge with 32 GB iSSD configurations) Configure the Windows Page File size to 1024 MB or less to conserve space for the locally stored install.wim during the capture process
3. Create an unattend file (for example, MoonshotImageCaptureSysprep) for the Sysprep process, and then copy the file to C:\ on the HPE Moonshot server cartridge. (For a sample sysprep unattend.xml file, see the Operating System Deployment on HPE ProLiant Server Cartridges User Guide).
4. Run sysprep.exe on the HPE Moonshot server cartridge using the unattend.xml file you created. Use the following commands from an Administrator-level command prompt:
   ```
   cd c:\Windows\system32\sysprep
   sysprep.exe /oobe /generalize /shutdown /unattend:c\<path>\MoonshotImageCaptureSysprep.xml
   ```
5. Create a Capture boot.wim (for example, boot-capture.wim) from an existing boot.wim for the HPE Moonshot server cartridge.
6. Create and inject WDScapture.inf into the capture boot-capture.wim for automatic capturing of an OS image.
7. Import the boot-capture.wim into the WDS boot images.
8. Enable BOOTEMS and EMS options in the boot-capture.wim using bcdedit.exe.
9. Pre-stage the HPE Moonshot server cartridge to boot to the boot-capture.wim.

⚠️ CAUTION:
To correctly execute an image capture, do not enable a client unattend file. If the file is enabled, an image deployment will result instead of an image capture.

10. PXE boot the reference HPE Moonshot server cartridge to begin the image capture using the options defined in the WDScapture.inf file included in the capture boot-capture.wim.

11. Once the custom image is captured and imported to the WDS server, it can be used to deploy a customized instance of Windows to HPE Moonshot server cartridges.

Converting install images created from non-Moonshot server platforms to HPE Moonshot server cartridges

This section describes the process to convert an existing customized .wim image from a non- HPE Moonshot server platform to a deployable format for an HPE Moonshot server cartridge. You can easily convert existing custom install.wim images created on a different hardware platform for deployment to the HPE Moonshot server cartridge. To do so, follow the procedures defined by Microsoft to create or capture install.wim images from VMs or other platforms before converting the install.wim for the HPE Moonshot server cartridge platform.

⚠️ IMPORTANT:
To set up and use HPE MWDP when deploying and capturing install .wim images from the HPE Moonshot server cartridge see the Operating System Deployment on HPE ProLiant Server Cartridges User Guide. Each HPE Moonshot cartridge includes a unique MWDP with drivers required for the supported operating systems.

To convert any existing install.wim to support deployment to the HPE Moonshot server cartridge, perform the following procedure.

1. Copy the default boot.wim (from the Windows installation media) to the scripts directory of the HPE Moonshot Windows Deployment Pack.

2. Copy the customized install.wim from a non- HPE Moonshot server platform to the scripts directory of the HPE Moonshot Windows Deployment Pack.
IMPORTANT:
Make sure that the name of the Install image is **install.wim** as required by the hpdrvadd script contained in the HPE Moonshot Windows Deployment Pack. You can rename install.wim after you have executed the hpdrvadd script and before importing it into the WDS Install Images group.

3. Open an elevated command prompt, and then navigate to the scripts directory of the HPE Moonshot Windows Deployment Pack.

4. Execute the following command: **hpdrvadd.cmd**

Watch the screen to verify the process completes successfully.
5. (Optional) Rename `install.wim` as needed, for example `win7x64-m700.wim`.

6. Import the converted `boot.wim` and customized `install.wim` from the scripts directory of the HPE Moonshot Windows Deployment Pack to the WDS server using the steps described in "Deploying install images to HPE Moonshot server cartridges in WDS."

   **IMPORTANT:**
   Import `boot.wim` only if there is no `boot.wim` for the HPE Moonshot server cartridge already imported into the WDS console.
Special considerations for deploying HPE Moonshot servers

When deploying operating systems to HPE Moonshot servers in a headless (unattended) fashion, the following considerations may also apply. Make modifications to the Windows unattend.xml files only when deploying HPE Moonshot servers. Client and install unattend.xml files are supplied in the HPE Moonshot Windows Deployment Pack for each HPE Moonshot server. This section describes the suggested modifications to the deployment server settings, images, unattend.xml, and WDScapture.inf files when deploying HPE Moonshot server cartridges.

Deleting Active Directory pre-staged devices in WDS

**IMPORTANT:**
Be careful when removing Active Directory pre-staged devices in WDS that are mapped to machine accounts used in Citrix Machine Catalogs. Deleting an AD pre-staged device from the WDS console also deletes the domain machine account in AD. This AD account deletion causes a broken trust relationship between the desktop and AD. Once this occurs, the XenDesktop or XenApp user assigned to the desktop is unable to connect to the desktop until the domain trust is restored and the desktop is re-registered with the Citrix Delivery Group.

To re-register the affected desktops with the Citrix Delivery Group, perform the following procedure.

1. Delete the affected machines from the Citrix Machine Catalog.
2. Add the affected machines back into the Machine Catalog and the Delivery Group. If you are using a persistent desktop model, retain the previous user assignments.
3. Rejoin the affected machines to the domain in the OU designated for the Delivery Group.
4. Reboot the affected machines so that registration in the Delivery Group completes.

If you need to delete the pre-staged devices in WDS, delete the machine accounts from within the designated OU in Active Directory. Alternatively, you can use the following sample PowerShell script on the WDS server to delete pre-staged devices in bulk.

```
<######################################################
Hewlett-Packard Company - 2013
(C) Copyright 2013 Hewlett-Packard Development Company, L.P. All rights reserved.
######################################################>
```
$check = $true
Write-Host -ForegroundColor Yellow "Warning: Removing Active Directory prestaged devices from WDS will remove the machine account from AD"
while($check) {
    $temp = Read-Host "Are you sure you want to remove devices from WDS? Enter y/n"
    if ($temp -match "y") { $check = $false }
    elseif ($temp -match "n") { exit }
    else { Write-Host "Enter y|n only" }
}

$devStr = Read-Host "Enter Device string to remove from WDS including any wildcards"
$list = wdsutil /get-device /Device:$devStr
$count = 0
foreach ($obj in $list) {
    if ($obj.contains("Name")) {
        $str = $obj.split(" ")
        $devName = $str[1]
        $count += 1
        Write-Host "WDSutil.exe /remove-device /Device:`""$devName`""
        WDSutil.exe /remove-device /Device:`""$devName`""
    }
}
Write-Host "Total devices found matching $devStr`: $count"
exit

Run the script shown previously and delete multiple pre-staged devices from WDS.

1. Copy the sample PowerShell script, and then paste it into the Windows PowerShell file on the WDS server located at C:\remove-HPMoonshotNodesInWDS.ps1.

![PowerShell Shell with script file path and icon]

2. Determine device names to be deleted from WDS.
   For example, the four nodes from cartridge 1 <c1n1-4> in chassis 1 will be deleted using the device name string "chass1-c1n*" and the * wildcard at end of the string.
3. Open a Windows PowerShell session on the WDS server, and then change the directory to C:\

4. Execute the `remove-HPMoonshotNodesInWDS.ps1` command.

   a. Enter `Y` if you are sure you want to proceed with removing devices from WDS.

   b. Enter the Device Names in WDS to delete them, using wildcards (*) for multiple devices with a similar device name.

      The WDSutil /remove-device command also deletes any Active Directory machine accounts associated with the device hostname.
5. Right-click the Pre-staged Devices in the left navigation pane of the WDS console to verify correct devices have been deleted from the list of WDS Pre-staged devices.

**Defining partitions for system reserve and C**

HPE Moonshot persistent and non-persistent environments do not require the use of a system-reserved 128 MB partition. Hewlett Packard Enterprise recommends removing the system-reserved partition from the sample unattend.xml files included in the MWDP as shown in the following example.

```xml
<DiskConfiguration>
  <Disk wcm:action="add">
    <CreatePartitions>
      <CreatePartition wcm:action="add">
        <Extend>true</Extend>
        <Order>1</Order>
        <Type>Primary</Type>
      </CreatePartition>
      </CreatePartitions>
      <ModifyPartitions>
        <ModifyPartition wcm:action="add">
          <Active>false</Active>
          <Order>1</Order>
          <PartitionID>1</PartitionID>
        </ModifyPartition>
      </ModifyPartitions>
      <DiskID>0</DiskID>
      <WillWipeDisk>true</WillWipeDisk>
  </Disk>
</DiskConfiguration>
<WindowsDeploymentServices>
  <Login>
    <Credentials>
      <Domain>XXXXXX</Domain>
      <Password>XXXXXX</Password>
    </Credentials>
  </Login>
</WindowsDeploymentServices>
```
Setting the system page file size for 32 GB iSSDs

Users of the ProLiant m700 cartridge with 32 GB iSSD should reduce the Windows Page File size to 1024 MB or less to conserve iSSD disk space, especially when capturing the OS on the iSSD using the WDS Capture method.

To change the Windows System Page File on Windows 7 x64:

1. Initiate a Remote Desktop Connection to the target machine.
2. Right-click Computer from the Start Menu.
4. Select **Advanced System Settings** from the left navigation pane.

5. Select the **Advanced Tab**.

6. Click **Settings** under **Performance** on the Advanced tab.
7. Click **Change** under Virtual Memory.
8. Clear **Automatically manage paging file size for all drives**.

9. Select to highlight the **C:** drive.

10. Select **Custom size**.

11. Enter the Initial and Maximum sizes for the page file. Hewlett Packard Enterprise recommends setting an initial and maximum size of 1024 MB for persistent ProLiant m700 server cartridge desktops running on the 32 GB iSSD.

12. Click the **Set** to apply the changes, and then click **OK** to exit each of the open windows.

13. Restart the computer at the prompt.

**Preventing AutoLogon count delays during WDS deployments**

The sample unattend.xml files included in HPE Moonshot Windows Deployment Pack sets the AutoLogon count to five. The system requires AutoLogon to process FirstLogonCommands; however, only one AutoLogon is required in most HPE Moonshot desktop cases.

Including additional AutoLogons in the unattend.xml during deployment can result in delays when initially connecting the Citrix Receiver to the hosted desktop. This occurs because the user account included in the unattend.xml file is already logged onto the desktop and a different user is requesting access to the desktop. To reduce delays during the initial Citrix Receiver connection to the HPE Moonshot desktop, Hewlett Packard Enterprise recommends enabling only one AutoLogon in unattend.xml.

```
<AutoLogon>
  <Password>
    <Value>XXXXXX</Value>
  </Password>
</AutoLogon>
```
Automatically join devices to domain during OS deployment

Active Directory Pre-staging Devices in WDS enables automatic joining of the new device to the domain using the --JoinDomain option. In some cases this option alone is not sufficient to complete the domain join process and requires adding an UnattendJoin component to the Image unattend.xml file.

Use the following example to include the component in the Image unattend.xml. Replace XXXXXX with domain credentials that have sufficient privileges to join devices to the domain.

```xml
  <Identification>
    <Credentials>
      <Domain>XXXXXX</Domain>
      <Password>XXXXXX</Password>
      <Username>XXXXXX</Username>
    </Credentials>
    <JoinDomain>XXXXXX</JoinDomain>
  </Identification>
</component>
```

Configuring EMS in boot loader and disabling sleep mode in Windows 7

Hewlett Packard Enterprise recommends using Synchronous Commands in the unattend.xml file during Windows deployment in order to configure the HPE Moonshot server cartridges. Use the following Synchronous Commands to enable EMS in the boot loader settings and optimize the power settings in Windows 7 for HPE Moonshot server cartridges.

See the HPE Moonshot Deployment Pack template unattend.xml files for the recommended power settings for each operating system supported with HPE Moonshot servers.

Notice that each <CommandLine></CommandLine> and <Description></Description> text block is on a single line within the unattend.xml file.

```xml
<SynchronousCommand wcm:action="add">
  <Order>1</Order>
  <CommandLine>cmd.exe /c bcdedit.exe /set {bootloadersettings} ems on</CommandLine>
  <Description>Enable EMS globally in the BootloaderSettings</Description>
  <RequiresUserInput>false</RequiresUserInput>
</SynchronousCommand>

<SynchronousCommand wcm:action="add">
  <Order>2</Order>
  <CommandLine>cmd.exe /c powercfg.exe -setacvalueindex scheme_min sub_video videoidle 0</CommandLine>
  <Description>Disable monitor timeout to allow iLO CM - set node power off shutdown</Description>
  <RequiresUserInput>false</RequiresUserInput>
</SynchronousCommand>
```
Configuring EMS in boot loader and disabling sleep mode in Windows 8.1

Hewlett Packard Enterprise recommends using SynchronousCommands in the unattend.xml file during Windows deployment to configure the HPE Moonshot server cartridge. Use the following Synchronous Commands to enable EMS in the boot loader settings and optimize the power settings in Windows 8.1.

See the HPE Moonshot Deployment Pack template unattend.xml files for the recommended power settings for each operating system supported with HPE Moonshot servers.

Notice that each <CommandLine></CommandLine> and <Description></Description> text block is on a single line within the unattend.xml file.

<CommandLine>cmd.exe /c powercfg.exe -setacvalueindex scheme_max sub_video videoidle 0</CommandLine>
<Description>Disable monitor timeout to allow iLO CM - set node power off shutdown</Description>
<RequiresUserInput>false</RequiresUserInput>
</SynchronousCommand>

<CommandLine>cmd.exe /c powercfg.exe -setacvalueindex scheme_balanced sub_video videoidle 0</CommandLine>
<Description>Disable monitor timeout to allow iLO CM - set node power off shutdown</Description>
<RequiresUserInput>false</RequiresUserInput>
</SynchronousCommand>

<CommandLine>cmd.exe /c powercfg.exe -setactive scheme_min</CommandLine>
<Description>Enable High Performance power plan</Description>
<RequiresUserInput>false</RequiresUserInput>
</SynchronousCommand>

<Description>Enable powershell script execution</Description>
<RequiresUserInput>false</RequiresUserInput>
</SynchronousCommand>

<CommandLine>cmd.exe /c bcdedit.exe /set {bootloadersettings} ems on</CommandLine>
<Description>Enable EMS globally in the BootloaderSettings</Description>
<RequiresUserInput>false</RequiresUserInput>
</SynchronousCommand>

<CommandLine>cmd.exe /c powercfg.exe -setacvalueindex scheme_min sub_video videoidle 0</CommandLine>
<Description>Disable monitor timeout to allow iLO CM - set node power off shutdown</Description>
<RequiresUserInput>false</RequiresUserInput>
</SynchronousCommand>

<Description>Enable powershell script execution</Description>
<RequiresUserInput>false</RequiresUserInput>
</SynchronousCommand>

<CommandLine>cmd.exe /c bcdedit.exe /set {bootloadersettings} ems on</CommandLine>
<Description>Enable EMS globally in the BootloaderSettings</Description>
<RequiresUserInput>false</RequiresUserInput>
</SynchronousCommand>

<CommandLine>cmd.exe /c powercfg.exe -setacvalueindex scheme_min sub_video videoidle 0</CommandLine>
<Description>Disable monitor timeout to allow iLO CM - set node power off shutdown</Description>
<RequiresUserInput>false</RequiresUserInput>
</SynchronousCommand>
Configuring Broadcom network teaming during OS deployment

You can automatically configure teaming using a Broadcom .BCG file while processing the FirstLogonCommands from the unattend.xml. Use one Synchronous Command to copy the Broadcom Teaming Configuration File to the desktop, and use a second Synchronous Command to apply the Broadcom Teaming Configuration File to the list of available network adapters.

The following example copies a network-based shared directory to the desktop and applies the included Broadcom Teaming Configuration File. Hewlett Packard Enterprise recommends applying the Broadcom Teaming Configuration File last in the set of FirstLogonCommands because it causes network interruption on the desktop.

Be careful to edit the Order value to continue numbering from previous FirstLogonCommands in your unattend.xml file.

```xml
<Command wcm:action="add" order="7">
  <Command>
    cmd.exe /c robocopy \172.25.0.18\hptools/ c:\hptools /e
  </Command>
  <Description>Copy Files to Node</Description>
  <RequiresUserInput>false</RequiresUserInput>
</Command>
```
Configuring XenDesktop and XenApp Delivery Controllers (ListofDDCs) during OS deployment

You can configure the VDA in multiple ways so that it automatically registers with the XenDesktop Delivery Controller.

The recommended process is to configure the ListOfDDCs registry key while processing the FirstLogonCommands from the unattend.xml. This requires a reboot of the desktop after you have edited the ListOfDDCs registry key. Use the following Synchronous Command to configure the ListOfDDCs registry key.

Be careful to edit the Order value to continue numbering from previous FirstLogonCommands in your unattend.xml file.

Notification when WDS-based OS deployment has completed

Microsoft SCCM provides built-in monitoring of task sequence deployments and does not require additional scripts to monitor OS deployments. Because WDS does not include job completion status, you can execute a notification script while processing the FirstLogonCommands from the unattend.xml. The notification script copies the Windows Setup Activity and Error log files and notifies the user that deployment is complete.

The following example copies a network-based shared directory to the desktop and then executes the script.

Be careful to edit the Order value to continue numbering from previous FirstLogonCommands in your unattend.xml file.
The MoonshotPostInstall.cmd file includes the following commands. Use these commands to copy the Windows Setup Activity and Error log files and to notify the user that deployment is complete.

```
@echo off
rem This script performs post-installation tasks by copying setupact.log to
rem %share%, creating a log file indicating when Windows installation
rem completes, and copying it to %share%

rem This Share must be configured on the destination server prior to
rem executing this script
set share=\172.25.0.18\DeployLogs
set destFolder=moonshot\deploy.logs

rem set local folder to the folder from which script is run
set srcDir=%~dp0

rem make directory if it doesn't exist
mkdir %share%\moonshot\deploy.logs
call :Main
goto :eof

:Main
rem Get the hostname
for /f %%i in ('hostname') do (
rem get the current time
for /f %%j in ('time /t') do (
rem get the date
for /f %%k in ('date /t') do (
rem Write logging info to text file and copy files to %share%
    echo Finished installing Windows to %%i on %%k at %%j >%%i.txt
    copy %%i.txt %share%\%destFolder%
    copy %windir%\panther\setupact.log %share%\%destFolder%\setupact_%
    copy %windir%\panther\setuperr.log %share%\%destFolder%\setuperr_%
)
)
goto :eof
:eof
```

Selecting the correct partition in WDScapture.inf for an image capture

Before capturing the partition you must add the proper partition letter to the WDScapture.inf file, and then add the WDScapture.inf file to boot.wim. Include the correct partition drive letter in the WDScapture.inf file, based on the number of partitions created on Disk 0.

The number of partitions on Disk 0 determines the correct mapping for the Windows partition in WinPE. If there is no System Reserved 128 MB partition on Disk 0, the Windows partition to capture is mapped to C:\. If a System Reserved 128MB partition also exists on Disk 0, the Windows partition to capture is mapped to D:\.

Use the following example to create a captured install image from Disk 0 with a single Windows partition and no System Reserved partition.

```
[Capture]
Unattended=Yes
VolumeToCapture=C:\
```
Configuring a Network Team using the Broadcom BACS Utility

HPE Moonshot servers support Network Teaming and VLAN tagging for high availability of persistent desktops. For more information about configuring NIC Teaming, and the supported types of NIC Teams based on the resource type, see "Network Interface Teaming."

To configure NIC Teams using the Broadcom BACS Utility for the ProLiant m700 server cartridge:

1. Click Start, and then select All Programs.
2. Select Broadcom Advanced Control Suite, and then select Team View from the BACS console.
4. Click Next at the Welcome screen. Do not click Expert Mode.
5. Enter a Team name in the textbox provided, and then click Next.
6. Select Smart Load Balancing (TM) and Failover (SLB), and then click Next. Do not enable HyperV mode.
7. Select a NIC under Available Adapters, and then click Add to include it under Team Members.
8. Add the appropriate NICs, and then click Next.
9. Select **Do not configure a standby member** if configuring an Active/Active NIC Team, and then click **Next**.

**IMPORTANT:**
Special considerations are required when configuring NIC Teaming and VLAN tagging with the non-persistent use case using Citrix Provisioning Services. For more information on configuring NIC Teaming, see "Network Interface Teaming."

10. Select **Use the following member as a standby member**, and then select an available adapter for standby from the list if configuring an Active/Standby NIC Team.

If the primary network interface fails, the standby member becomes active.

For non-persistent desktops, be sure that the physical adapter PXE booting to Citrix Provisioning Services is selected as the active adapter.

11. For an Active/Standby configuration, select **Enable Auto-Fallback Disable mode**, and then click **Next**.

With the Enable Auto-Fallback Disable mode feature selected, the standby member remains active and does not fall back when the primary member is restored. Enabling this feature decreases XenDesktop session disconnects if a primary member fails.
12. Select **No** under Configure LiveLink?, and then click **Next**.

13. Select **Skip Manage VLAN**, and then click **Next**.

   - To add and manage VLANs, click **Add** at this step and follow the wizard instructions to assign VLAN names and numbers. When adding VLANs here, you must also configure the Moonshot switch and ports to support VLAN tagging.
   - For more information about switch port tagging, see "Moonshot switch script examples."

   **IMPORTANT:**
   For restrictions on using multiple network configurations/VLAN tagging on non-persistent resources within Network Interface Teams, see the NIC Teaming section in "Known Issues."

14. Select **Commit changes to system and Exit the wizard**, and then click **Finish**.

15. Click **Yes** at the warning prompt to confirm the changes and accept the network interruption. Wait for the teaming operation to complete and for the network connection to resume.

16. From the Explorer view, verify creation of your team.

17. In a command window, execute the `ipconfig` command. Verify that the output displays only one IP address and one NIC.

   Multiple IP addresses appear if VLAN tagged networks were also added.

18. From a remote terminal such as PuTTY, access the SAC and verify that the output displays only one IP address.

   Multiple IP addresses appear if VLAN tagging networks were also added.
Saving and restoring a network team configuration using BACSCLI

The Broadcom BACS Utility for the ProLiant m700 server cartridge supports a method for saving and restoring network configurations using .BCG files. This method of capturing Teamed configurations is useful when deploying a persistent desktop and configuring the network configurations automatically during OS deployment. You can reapply the Teamed configuration in the .BCG file to any set of ProLiant m700 server cartridge network adapters.

1. Open a command window, and then execute following command including the quotes:
   "c:\Program Files\Broadcom\BACS\BACScli.exe" -t team "save -f BDF c:\SLBteam.bcg"

2. Navigate to the location where you chose to save the .BCG file.

3. Copy the .bcg file to a persistent desktop.

4. Open a command window on the persistent desktop, and then execute the following command including the quotes:
   "c:\Program Files\Broadcom\BACS\BACScli.exe" -t "restore c:\SLBteam.bcg"

Configuring a Network Team using the Mellanox ConnectX-3 Driver Utility

Network teaming using the Mellanox ConnectX-3 Pro driver utilities is supported on the ProLiant m710 series server cartridges. For more information about configuring NIC Teaming and the supported types of NIC Teams based on the resource type, see "Network Interface Teaming."

Windows 2012 versions use the built-in Windows NIC teaming functionality to configure Mellanox NIC teams, which can be configured from Server Manager, Local Server, and then NIC Teaming.
IMPORTANT:
When configuring the network team for use with Citrix Provisioning Services, be sure to set the standby adapter to the adapter that will NOT be used to PXE boot to Citrix PVS, as shown in the previous screenshot.

To configure Windows 7, 8.1, and Windows Server 2008 R2 NIC Teams using the Mellanox Driver Utility for the ProLiant m710 series server cartridges, perform the following procedure.

Procedure

1. Download and install the latest Mellanox WinOF driver for the ProLiant m710 series server cartridges from the Hewlett Packard Enterprise website.
2. Connect to the m710 server using Microsoft Remote Desktop.
3. Launch Device Manager from the m710 server Windows 7 operating system.
4. Navigate to Network Adapters, Mellanox ConnectX-3 Ethernet Adapter, and then select Properties.
5. Open the LBFO tab within the adapter properties, and then click **Create**.

6. Configure all teaming options required for the network team such as:
   - **Bundle Name:** Team 1
   - **Bundle Type:** Fault Tolerant
   - **Primary:** Select the desired primary adapter
   - **Failback to Primary:** Yes or No
   - **Adapters in the bundle:** Select both network adapters

7. Click **Commit** to enable the network team.

8. In a command window, execute the `ipconfig` command. Verify that the output displays only one IP address and one NIC.

   🚨 **IMPORTANT:**
   When configuring the network team for use with Citrix Provisioning Services, be sure to set the primary adapter to the adapter that will PXE boot to Citrix PVS and enable the "Use primary adapter MAC address" setting.

9. From a remote terminal such as PuTTY, access the SAC, and then verify that the output displays only one IP address.
HPE Moonshot server integration with Citrix provisioning services

Integration overview

PVS scales with the desktop environment. As additional desktops are added to the environment, additional PVS support servers might be required. PVS servers should be located near the HPE Moonshot 1500 chassis to keep PVS traffic from the core network.

Assuming that PVS is deployed with the HPE Moonshot System, this section describes the integration of new HPE Moonshot servers into the Citrix environment. Customers using XenDesktop and/or XenApp should be familiar with this process. Some tasks might be specific to HPE Moonshot integration, such as HPE Moonshot node import as devices and node power control and monitoring.

IMPORTANT:
Use the procedures in this section only after you have installed and configured the Citrix environment with all of the required Microsoft components onto the network. You must have a functional Citrix environment, existing database servers, and a licensed server before completing these procedures.

Citrix Provisioning Services setup and configuration

The following section includes a PVS server setup and configuration example. This example might be helpful if you are installing a new Citrix PVS server within the environment for use with HPE Moonshot server cartridges.

PVS server

When configuring the PVS server, be sure the network interface connecting to the PVS network is assigned an available static IP address to support PXE boots and PVS streaming.

DHCP server

(Optional) Apply these if you choose to have the DHCP services forward PXE clients to the Citrix PVS server. Forwarding PXE clients is useful if you forward requests across subnets within the domain. When configuring the DHCP server with scope options for the PVS subnet, use the following options to configure the DHCP scope:

- Option 66: Boot Server Host Name
  String value: IP address of the PVS server
- Option 67: Bootfile Name
  String value: ARDBP32.BIN

Preparing a VM for PVS installation

Prepare a virtual machine to deliver provisioning services:

1. Assign at least 500 GB of virtual hard disk space for the PVS server. Configure the vDisk store using Independent and Persistent options (do not use dynamic disk).
3. Assign a static IP address to the VM. Verify that the IP address is available for use on the PVS network.
4. Join the VM to the domain where provisioning services are required.
5. Verify that the FQDN is in use.
6. Log on to the VM using the \Administrator account.

Installing Citrix PVS

The following steps describe an example PVS installation and configuration and do not encompass all supported PVS configurations. For more information on installing and configuring Citrix PVS, see Installing and Configuring Provisioning Services on the Citrix website.

1. Download the Citrix XenDesktop and Provisioning Services software from the Citrix website.
2. Launch Autorun.exe.
3. Start the Console Installation and install the PVS console using the default settings.
4. To install the PVS server, start the Server Installation, and then select Install Server.
5. Start the Provisioning Services Configuration Wizard, and then click Next.

6. When prompted by the DHCP Services screen, select one of the following options that matches your DHCP configuration and then click Next:
   - If DHCP services are running on the PVS server, select The service that runs on this computer along with the appropriate DHCP service.
   - If DHCP services are running on a different system, select The service that runs on another computer.
   - In the example, the DHCP service is running on this PVS server.
7. Select the appropriate DHCP option from the PXE Services screen based on the current configuration, and then click **Next**.

8. Select **Create farm** from the Farm Configuration screen, and then click **Next**.
9. Enter the FQDN of the SQL server in the Server name field on the Database Server screen, and then click **Next**.

   - Do not enter information into the **Instance name** or **Optional TCP port** fields.
   - If you are configuring mirroring for the PVS database, select **Specify database mirror failover partner**, and then enter the FQDN of the partner SQL server. This option requires that you have previously configured SQL mirroring.
10. Enter data for the first four fields on the New Farm screen.
11. Select **Use Active Directory groups for security**, and then click **Next**.
12. Enter the vDisk Store name and Default path for vDisks storage on the New Store screen, and then click Next.

13. Verify that the vDisk location has sufficient disk space for vDisk storage.

14. Enter the FQDN of the license server on the License Server screen, whether local on this system or remote on another system.

15. Select Validate license server version and communication, and then click Next.
16. Select **Specified user account** on the User Account screen.

17. Enter the domain administrator credentials, and then click **Next**.

18. Click **Next** to accept the default settings on the Active Directory Computer Account Password screen.
19. Select the network interfaces on the Network Communications screen that will be used for streaming vDisks and accessing the PVS console, and then click Next.

The following example uses the 172.25.0.17 adapter for streaming vDisks, Active Directory, PVS management, and for accessing the PVS console.
20. Select **Use the Provisioning Services TFTP service** on the TFTP Option and Bootstrap Location screen, and then click **Next**.

21. Select the PVS server that responds to the PXE boot requests.

   **IMPORTANT:**
   Using multiple PVS servers and NetScaler for load balancing requires additional configuration of NetScaler and Load Balancing.

22. Select the PVS server, and then click **Edit**.
23. Verify that the subnet mask is correct in the Device section of the Network Address screen, and then click **OK**.

24. Click **Advanced**, and then enable Verbose Mode.
25. Click **OK**, and then click **Next**. This provides output text on the client during the PXE boot process for debugging purposes.

26. Verify the settings on the Finish screen, and then click **Finish**.

27. Click **Done** on the Finish screen.
Configuring the PVS console

The PVS console is installed as part of the PVS Server installation. You can install the PVS console on other systems, however, that is outside the scope of this documentation. If installed on other servers, administrators can manage multiple farms from a desktop without directly logging into the PVS servers.

1. From the Start Menu, open the Provisioning Services Console.
2. Right-click **Provisioning Services Console**, and then select **Connect to Farm**.
3. On the Connect to Farm screen, enter the FQDN of the PVS server in the Name field, and then click **Connect**.
After the connection is made, the previously configured Sites, Device Collections, and Stores views display within the left navigation window.

![Provisioning Services Console](image)

The PVS server is ready for streaming vDisks to device clients.

**Citrix Moonshot Wizard for XenDesktop/XenApp**

Citrix has created a set of tools that can also be used to automate the integration of HPE Moonshot servers into Citrix Provisioning Services. This tool is called the Moonshot Wizard for XenDesktop/XenApp. The Moonshot Wizard is a GUI-based option to add HPE Moonshot servers into Citrix PVS Device Collections and join the HPE Moonshot servers into the domain through a single utility. For downloads and documentation, see [Moonshot Wizard](Moonshot_Wizard). For limited support of this tool, see the Citrix documentation.

**Creating a virtual image within PVS**

Each server platform, used to host either physical or virtual desktops within Citrix PVS require a virtual disk built off of the same hardware architecture. This concept holds true for the HPE Moonshot Server cartridges as well. Thus, a virtual disk should be created for each HPE Moonshot server cartridge as well as every operating system to be supported on the server cartridge. The same process to create virtual disks within Citrix PVS can be used for all HPE Moonshot server cartridges.

To create and import a deployable image on the Citrix PVS server:

1. Configure the switch port VLANs for the deployment network, if needed.
2. Configure the following node boot order using the HPE Chassis Manager CLI or GUI.
a. Boot: HDD or M.2
b. BootOnce: PXE

3. Install Microsoft Windows using a supported method, such as HPE CMU, Microsoft WDS, or Microsoft SCCM, as described in "WDS integration."

4. Restore the switch port VLANs for the Citrix PVS network, if needed.

5. Automatically or manually join the HPE Moonshot server to the active directory domain used by Citrix PVS.

6. Using RDP, remote in to the OS and install the following:
   - Standard network and graphics drivers
   - Additional applications
   - Network teaming utilities (for example, the Broadcom BACS utility)
   - Citrix VDA
   - Citrix PVS Target Device software

7. Capture the image using the Citrix PVS Target Device software on the PVS server.

8. Change the virtual disk properties to standard-image (read-only access) and stream to multiple HPE Moonshot servers.

Device driver installation

After the base image is loaded on the internal SSD drive, you must install additional device and/or graphics drivers to enable full hardware functionality.

AMD and Intel Graphics Drivers

Install the AMD Radeon or Intel Iris Pro Graphics drivers to support high performance video on the HPE Moonshot cartridges. These driver packages come in two forms, one with the complete management suite, and one with only the basic drivers. The full package enables detailed control of the graphics environment. Hewlett Packard Enterprise recommends that you install the supported graphics driver suite for your HPE Moonshot servers.

Broadcom BACS and Mellanox utilities

The ProLiant m700 server cartridge includes embedded Broadcom 1GbE network adapters. The ProLiant m710 series server cartridges include embedded Mellanox 10GbE network adapters. These adapter NIC drivers are installed during the operating system deployment. If advanced networking features are necessary, such as for network teaming and VLAN tagging, install the BACS management utility for Broadcom network adapters or the Mellanox VPI advanced drivers for Mellanox network adapters.

Citrix XenDesktop VDA installation

Hewlett Packard Enterprise recommends installing Citrix HDX to support high performance graphics on the user desktop. For more information about the installation of this software package, see the Citrix eDocs website.

Install the HDX standard version of the VDA unless a specific application requires the HDX 3D Pro version such as DirectX 11 (feature level 9_3 or higher), OpenGL, OpenCL, and WebGL applications.
Citrix XenApp VDA installation

The VDA preparation and installation steps can be found on the [Citrix eDocs website](Citrix eDocs website).

Citrix XenApp releases 7.5 and up also provide an option for standalone VDA installation, by manually extracting certain folders and files. This makes it possible to install the VDA without access to the entire ISO image file.

The manual installation of VDA can also be done with the following steps:

1. Log into the Citrix application server as a user with administrative privileges
   
   From the installation media, start the XenApp installation

2. Click on Virtual Delivery Agent for Windows Server OS to start the VDA installation
3. If the machine the VDA is being installed on will act as a master image for a Provisioning Services farm, select **Create a Master Image**, and then click **Next**. For bare-metal installs, select **Enable Connections to a Server Machine**, and then click **Next**.
4. Click **Next**.
5. From the Delivery Controller screen, complete the following:

   a. Select the **Do it Manually** option
   
   b. From the Controllers Address field, enter the FQDN of a Citrix Delivery Controller
   
   c. Click **Test Connection**, and then click **Add**.
   
   d. Click **Next**.
6. Be sure that all options are selected, and then click **Next**.
7. Select the **Automatically** option on the Firewall screen, and then click **Next**.
8. Click Install from the summary screen.
9. The Citrix VDA commences installation.
   Note that during the installation, the server will need to reboot.
10. Click **Close** to reboot the server.
11. Once the server has rebooted, log in again as the same admin user.

12. The installation will continue once you have logged in successfully.

**IMPORTANT:**
After logging in to the HPE Moonshot server, a message to connect to the installation media might display to continue with the install process. Browse to the installation media or restart the installation to continue.

13. Once completed, click **Finish**.
Finish Installation

The installation completed successfully.

Prerequisites
- Microsoft Remote Desktop Session Host: Installed
- Microsoft Desktop Experience: Installed
- Windows Remote Assistance Feature: Installed
- Microsoft Visual x64 C++ 2005 Runtime: Installed
- Microsoft Visual x64 C++ 2005 Runtime: Installed
- Microsoft Visual x64 C++ 2008 Runtime: Installed
- Microsoft Visual x64 C++ 2010 Runtime: Installed
- Microsoft Visual x64 C++ 2010 Runtime: Installed

Core Components
- Virtual Delivery Agent: Installed
- Citrix Receiver: Installed

Post Install
- Component Initialization: Initialized

☑ Restart machine
IMPORTANT:
Windows Server 2012 on HPE Moonshot servers require additional settings to be applied after installing the VDA to enable the full capability of the embedded GPU by changing the following options on the HPE Moonshot server cartridge:

- Enable the **Use the hardware default graphics adapter for all Remote Desktop Services sessions** setting in the group policy **Local Computer Policy > Computer Configuration > Administrative Templates > Windows Components > Remote Desktop Services > Remote Desktop Session Host > Remote Session Environment**

- Enable DirectX and OpenGL/OpenCL support by creating the following Windows Registry keys:

[HKEY_LOCAL_MACHINE\SOFTWARE\Citrix\CtxHook\AppInit_Dlls\Graphics Helper]
"DirectX"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Citrix\CtxHook\AppInit_Dlls\Graphics Helper]
"DirectX"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Citrix\CtxHook\AppInit_Dlls\Multiple Monitor Hook]
"EnableWPFHook"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Citrix\CtxHook\AppInit_Dlls\Multiple Monitor Hook]
"EnableWPFHook"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Citrix\CtxHook\AppInit_Dlls\Graphics Helper]
"OpenCL"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Citrix\CtxHook\AppInit_Dlls\Graphics Helper]
"OpenCL"=dword:00000001

---

**PVS target device installation**

The Citrix Provisioning Services target device software is installed on the HPE Moonshot server cartridge after operating system deployment in preparation for creating a virtual disk image copy of the persistent device. Use this procedure to install the Citrix PVS software for non-persistent resources. You can find the PVS client software in the XenDesktop distribution from Citrix. Before continuing ensure that all pre-requisites are met as defined in "[Creating a virtual image within PVS](#)".

1. Using RDP, log in to the node used for image creation.
2. Run autorun.exe.
3. On the Provisioning Services screen, select **Target Device Installation**.
4. Select **Target Device Installation** again.

5. On the Welcome screen, click **Next**.
6. On the License Agreement screen, select I accept the terms in the license agreement, and then click Next.

7. Select Anyone who uses this computer (all users), and then click Next.
8. On the Destination Folder screen, accept the default installation location or change it to your preferred location, and then click **Next**.

9. On the Ready to Install the Program screen, click **Install**.
10. On the Installation Wizard Completed screen, clear the **Launch Imaging Wizard** check box, and then click **Finish**.

11. On the Restart screen, click **Yes**.
    The HPE Moonshot node reboots.
Provisioning Services Imaging Wizard

1. After the PVS target device software install reboot, use RDP to log in to the HPE Moonshot server as the domain administrator.

2. Click **Imaging Wizard** from the Windows Start menu.

3. Click **Next** on the Welcome to the Imaging Wizard screen.

4. Enter the PVS server details in the Server information section, and then click **Next**.

5. Select the **Create new vDisk** option, and then click **Next**.
6. On the New vDisk screen:

   a. Enter the vDisk name you want to assign.
   b. In the Store field, select the PVS Store to save the disk image.
   c. Change the vDisk type to Static.
   d. Click Next.
7. Select the licensing model used by your organization, and then click **Next**.

8. On the Configure Image Volumes screen:
a. In the Source Volume column in row 1, select C: (Windows) Boot.
b. In the Source Volume column in rows 2, 3, and 4, select None.
c. If needed, in the Free Space column, increase the size of free space for the C: (Windows) Boot drive, and then click **Next**. The sum of used and free space equals the total capacity of the c:\ drive.

To resize the vDisk after converting the image to a .VHD, see "Expanding vDisks in PVS."

9. Enter the target device name for this ProLiant m700 server cartridge, such as MS02_c3n1.

1. **IMPORTANT:**
   You can use the virtual serial port to view the boot process and the connection to the Provisioning Services.
10. On the Add Target Device screen:
   a. Select the even-numbered MAC address for NIC1 in the MAC field.
   b. Select the PVS collection name.
   c. Click Next.

11. On the Summary of Farm Changes screen:
a. Click **Optimize for Provisioning Services**, and then verify that all items are selected.

- Optimize removes the selected features from the OS to reduce the vDisk file size and to improve runtime characteristics.
- If you are familiar with this part of Citrix image optimization, you can clear selections as necessary.

b. Click **OK**, and then click **Finish**.

This optimization creates the vDisk on the PVS vDisks store.

**IMPORTANT:**
Click **No** when prompted to Reboot.
12. To shut down the HPE Moonshot server cartridge through the OS, click **Start**, **Windows_Security**, **Power_Menu**, and then **Shut down**.

13. Set the imaging node to boot once using PXE, and then power on the server cartridge using the HPE Chassis Manager CLI or GUI.

    **IMPORTANT:**
    You can use the virtual serial port to view the boot process and the connection to the Provisioning Services.

14. Connect to the VSP to set the boot source, and then enter the following from the HPE Moonshot Chassis Manager CLI:

    ```
    SET NODE BOOTONCE PXE <node>
    SET NODE POWER ON <node>
    CONNECT NODE VSP <node>
    ```

    where `<node>` is the HPE Moonshot Chassis Manager CLI notation for the node that is being used for image creation. These steps allow the node to connect to Provisioning Services and set up communication with PVS to save the disk image.

    ![Screenshot of PuTTY](image)

    The imaging node reboots to the internal HDD after PXE booting to PVS.

15. Log in as the domain administrator to view the image capture progress.

    This process automatically starts after you log in and takes 10 to 30 minutes depending on the overall size of the internal hard drive.
16. After the disk is created, click **Finish**.

![Image of Citrix XenConvert 2.6](image)

17. Click **Start**, **Windows_Security**, **Power_Menu**, and then **Shut_down** to shut down the imaging node through the OS.

![Image of Citrix XenConvert 2.6 Preview](image)

PVS virtual disk image publication

After vDisk creation, the default behavior for a Citrix PVS virtual disk is private/read-write mode and assigned to the master device.

To make the new image public and assign the image to multiple HPE Moonshot server cartridges, the virtual disk properties should be changed from private to shared mode using the following procedure:

**Procedure**

1. Be sure that no devices are currently connected to the virtual disk by shutting down all of the associated HPE Moonshot nodes.

2. Allow the image to be publicly shared:
   
   a. From the PVS console, select **Sites**, **PVSSite1**, and then **vDisk_Pool**.
   
   b. Right-click the appropriate vDisk, and then select **Properties**.
3. On the vDisk Properties screen, change the attributes of the image captured:
   
a. Select **Standard Image** for the Access mode.

   b. Select **Cache on device hard drive** for the cache type.

   c. Click **OK**.

   **IMPORTANT:**
   For cache on the device hard drive to function properly, the internal SSD must be initialized and formatted on the HPE Moonshot server cartridges. In some cases with the ProLiant m710 series server cartridges, the M.2 received from the factory might not be pre-initialized. In this case, write-cache falls back to the PVS server and can result in higher latency of the vDisk. If this occurs, see the methods to automatically wipe and reformat the internal SSD on HPE Moonshot servers in Citrix PVS write-cache defaults to server-side caching in *Known issues.*

   **IMPORTANT:**
   In some cases, the virtual disk properties might be disabled due to the virtual disk being locked by a device.

If the virtual disk is locked, complete the following steps:

1. Verify all devices assigned to the vDisk are properly shut down.

2. Right-click the vDisk in the PVS console, and then select **Manage Locks**, and then **Remove Locks** to clear all locks before changing the vDisk properties.
Application installation

During maintenance windows, you might want to customize the vDisk further by installing additional applications or Windows updates before making the image public and booting on a large collection of nodes.

To edit the virtual disk properties from standard to private mode, complete the following steps:

1. Set the newly captured image to private mode (read-write access).
2. Assign the vDisk to any node.
3. PXE boot the node to the vDisk.
4. Make any additional changes to the OS, such as installing OS patches and additional software.
5. Power down the node when customization is complete and change the image back to public mode (read-only access) and change the cache-type to cache on device hard drive.

Image maintenance

Use standard PVS facilities to create snapshots of images over time. You can also mount virtual hard drive disks as local drives on the PVS server so they can be altered. Virtual hard drive image files can also be modified with virtual hard drive tools provided with installations of Microsoft Windows Server 2012 with Hyper-V. For example, you can use Resize-VHD to increase the size of the image virtual hard drive.

Expanding vDisks in PVS

You can increase the vDisk size in two ways:

- During vDisk creation by increasing the amount of free space on the disk.
- After the vDisk creation and during an Image Maintenance period, expand the amount of free space on the vDisk.
To expand the vDisk after it is created:

1. Power down the HPE Moonshot server cartridges assigned to the disk or make a copy of the vDisk to make sure that the target vDisk is not in use.

2. Open an elevated administrator CMD prompt, and then enter the following commands:

   ```
   diskpart
   Select vdisk file="<vDisk file path>.vhd"
   list vdisk
   expand vdisk maximum=50000
   attach vdisk
   list disk
   ```

3. Extend the volume space on the VHD using server manager. For detailed instructions, see *How to Expand a Boot To VHD Disk or other Virtual Hard Drive Using Windows Tool–Diskpart Windows 8, Windows 2012 and earlier OS* on the Technet website.

4. Unmount the VHD using the following diskpart command from an elevated administrator CMD prompt:

   ```
   detach vdisk
   ```

5. If you used a copy of the VHD, assign the new VHD to the HPE Moonshot server cartridge from private to shared (if in private mode).

6. Power up the nodes, and then confirm that the disk manager shows the expanded disk space.

**PVS console integration**

After you have created and customized the HPE Moonshot server cartridge vDisk, you can add the server cartridges into PVS and PXE boot to the vDisk.

**Moonshot specific device node creation**

If you configured PVS using the auto-add mode, the system automatically assigns a default image to the nodes as they are discovered and booted by the PVS PXE service. The system also assigns the nodes a generic device number in sequence as they are recognized. Because the mapping between generic device numbers and actual physical node locations can be difficult, Hewlett Packard Enterprise recommends that the administrator use the import feature for PVS devices defined in a local .csv file.

The following procedure describes the process for creating and importing a list of nodes with well-formed names that are meaningful to the administrator. This method preserves the correlation between the device name in PVS and the cartridge-node location in the Moonshot 1500 chassis.

Use the Get-HPMoonshotMACs PowerShell function located in the HPMoonshotTools.psm1 file to create the .csv file. For more information about using HPMoonshotTools.psm1, see "HPE Moonshot System tools for PowerShell."

---

**IMPORTANT:**

If importing nodes into a predefined device collection in PVS, the PVS Site Name and Collection Name must match the site and collection name that you previously created.
Importing a list of devices from .csv into PVS_Generic

1. On the PVS console, navigate to **Farm**, **Sites**, **SiteName**, **Device_Collections**, **CollectionName**, and then **Target_Device Import Devices**.

2. On the Import File screen, navigate to the directory where you created the .csv files, and then click **Next**.
3. Select **Apply template device of device collection to imported device** to add unique devices to the PVS Device Collection.

4. Click **Next**.

5. Click **Finish** on the New Target Device Selection screen.
6. On the Import Target Devices screen, click **Done**.

- Imported devices appear under Device Collections in the PVS console.
- This adds only unique devices into the PVS Device Collection and skips any non-unique devices.
- The node used to create the vDisk might already be added into PVS.
7. Select all devices listed under Device Collections to create the machine accounts in the PVS console.

8. Right-click the highlighted devices, and then select Active_Directory, and then Create_Machine_Account.

9. Select the Domain and Organizational unit on the Create Machine Accounts in Active Directory screen, and then click Create Account.
10. After you have created machine accounts in Active Directory, you can power up the nodes. Boot the HPE Moonshot server cartridges from the HPE Moonshot Chassis Manager CLI by entering the following command:

```
SET NODE POWER ON <node_list>
```

where `<node_list>` is a collection of nodes powered up. Hewlett Packard Enterprise recommends booting one node and viewing its boot progress using the VSP connection from the Chassis Manager CLI. After one node boots successfully, you can power up each remaining node one time using the value `ALL` for the `<node_list>` variable.

When the nodes are fully booted, each node appears in the PVS console with its status and IP address on the PVS network.
HPE Moonshot integration with Citrix XenDesktop

XenDesktop and XenApp prerequisites for the persistent desktop

If you are using the persistent model, you must meet the following prerequisites for seamless integration into a XenDesktop Machine Catalog. Be sure you have met these prerequisites during the OS deployment and configuration phase of the persistent desktops.

1. Install Citrix VDA.
2. Install any Citrix HDX driver Hotfixes. For known hotfixes, see "Citrix XenDesktop and HDX."
3. Join the persistent desktop to the XenDesktop domain.
4. Configure VDA to communicate with a list of XenDesktop DDCs.
5. (Optional) Reconfigure networking on the persistent desktop to communicate with XenDesktop using Chassis 180 GbE switches (if WDS network is isolated from XenDesktop DDC).
6. Reboot the persistent desktop.

Creating a Machine Catalog for persistent resources

Machine catalogs are used to pool HPE Moonshot servers into the same group for delivery using Citrix StoreFront services.

To allocate persistent resources within a Machine Catalog:

1. Right-click Machine Catalog, and then select Add New Catalog.
2. Click Next from Getting Started with Machine Catalogs.
3. Select Windows Desktop OS, and then click **Next**.
4. Select **Another service or technology**, and then click **Next**.
5. Select **I want users to connect to the same (static) desktop each time they log on.**, and then click **Next.**
6. Click **Add Computers**, and then enter a computer name prefix to search.

7. Select the computers to add, and then click **OK**. HPE Moonshot servers are ready to be added to a new Machine Catalog.
8. Click **Add Computers**.

9. Search, and then select **Computer AD account**. Leave the User names column blank.
10. Enter the Machine Catalog name, Machine Catalog description for administrators, and then click Finish.
Creating a Machine Catalog for non-persistent resources

Machine catalogs are used to pool HPE Moonshot servers into the same group for delivery using Citrix StoreFront services.

These steps are unique to non-persistent desktops using Citrix PVS.

To allocate non-persistent resources within a Machine Catalog:

1. Right click **Machine Catalog** from the Citrix Studio, and then select **Add New Catalog**.
2. Select **Windows Desktop OS**, and then click **Next**.
3. Select **Provisioning Services (PVS)**, and then click **Next**.
4. Select **I want users to connect to a random desktop each time they log on**, and then click **Next**.
5. Enter the PVS server IP address, and then click **Connect**.

6. Select a Provisioning Services device collection option from the **PVS Site** list, and then click **Next**.
7. Enter the Machine Catalog name and description, and then click **Finish**.
Creating and configuring a Delivery Group

After creating the Machine Catalog for either persistent or non-persistent HPE Moonshot resources, create a Delivery Group. The Delivery Group maps users to the machine accounts when users launch a desktop session with Citrix Receiver.

To create a Delivery Group:
1. Right-click **Delivery Group** from Citrix Studio, and then click **Add a new Delivery Group**.
2. Click **Next** from the Getting Started with Creating Delivery Groups window.

![Create Delivery Group](image)

3. Select **Machine Catalog**, confirm the number of machines to add, and then click **Next**.
4. For XenDesktop, select **Desktops** as the Delivery Type, and then click **Next**. For XenApp, select one of the following, and then click **Next**.

- **Applications** as the Delivery Type if hosting shared applications
- **Desktops** as the delivery Type if hosting shared desktops
5. Click **Add users**, search and select the preferred Active Directory security group, and then click **Next**.
You can either add users using an Active Directory security group as shown in this example or individually. The machine resource assignment to a specific user is random during login, but will remain static until the user logs out. If a persistent resource is used, the user remains assigned to the same resource. If a non-persistent resource is used, the user receives a different resource during subsequent logins.
6. For XenApp only, select the desired applications to deliver, and then click **Next**.
7. Select **Automatically, using the StoreFront servers selected below**. Select the desired StoreFront server, and then click **Next**.
8. Enter the Delivery Group name, display name, and then Delivery Group description, and then click Finish. The system adds the new Delivery Group to the console.
Citrix Moonshot Power Management plugin for XenDesktop

Citrix has created a set of tools that can be used to automate the integration of Moonshot servers into Citrix Studio. This tool is called the HPE Moonshot Power Management plugin for XenDesktop. The HPE Moonshot Power Management tool is a Citrix Studio plugin to add HPE Moonshot servers into Citrix Studio Machine Catalogs and dynamically manage power of HPE Moonshot servers through PowerShell.

For downloads and documentation, see the following Power Management plugins:

- **Provisioning Services 7.6**
- **Provisioning Services 7.7**
The HPE Moonshot solution for Citrix includes an HPE Moonshot Tools for PowerShell bundle that can be used to integrate Moonshot nodes into persistent and non-persistent environments. These PowerShell functions simplify the following administrative tasks and are described in more detail in this section.

- Create Moonshot node device lists in .CSV format for easy import into Citrix PVS and Microsoft SCCM.
- Automatic pre-staging of Moonshot nodes into Windows Deployment Services using PowerShell commands.
- Get and set node boot and power settings using Windows PowerShell.
- Automate Chassis Manager and Chassis Switch configuration using Windows PowerShell and command input files.
- Launch Moonshot Chassis and Switch Putty SSH sessions using PowerShell.
- Storage of Moonshot Chassis and Switch SSH credentials into an encrypted database for quick SSH logins.

Installing HPE Moonshot System tools for PowerShell

After downloading the HPE Moonshot System tools bundle, install the PowerShell tools.

1. Close all open PowerShell sessions.
2. Save the self-extracting HPMoonshotTools.exe to a local directory.
4. Select a folder location to unzip the files and click Unzip.
5. Browse to the extracted files using Windows Explorer.
6. Right-click the importHPMoonshotTools.ps1 script file, and then select Run with PowerShell.
7. If this is a new installation, agree to the Hewlett Packard Enterprise terms of use.
8. If this is a new installation, agree to the SSH-Net terms of use.
9. If this is an upgrade or a reinstall, enter Y to begin the upgrade. SSH credentials that are stored in the HPE Moonshot Credentials database will remain after the upgrade.
10. (Optional) Press Y to review the ReadMe.txt file.
11. Press Enter to exit.
12. To execute Moonshot-specific functions using PowerShell, launch a PowerShell session.

The HPMoonshotTools.psm1 file is imported and all required files are copied to the C:\Users\<current_user>\Documents\WindowsPowerShell\Modules\HPMoonshotTools directory.

The installation edits the PowerShell profile by adding the install directory to the PSModulePath variable. The profile is located in C:\Users\<current_user>\Documents\WindowsPowerShell\Microsoft.PowerShell_profile.ps1

If a PowerShell profile already exists at this location, it is backed up prior to installation to the following folder:
This backup file is restored during the uninstall process.

For limitations regarding the Moonshot Tools for Powershell, see "Known Issues."

HPE Moonshot tools set up

The following information can also be found in the readme file included with the Moonshot Tools for PowerShell bundle. The bundle can be downloaded from the HPE ConvergedSystem 100 for Hosted Desktops Support page.

The PowerShell script module included with the bundle requires SSH access to the Moonshot Chassis Management CLI and the Moonshot Switch CLI. Review all prerequisites listed in the readme file included in the bundle before proceeding.

HPE Moonshot System tools functions

Add-HPMoonshotNodesInWDS

PowerShell Alias: ahpnwds

Description: The Add-HPMoonshotNodesInWDS function creates a .CSV file in the current directory with <chassis><cXnY> notation for device hostname, MAC for target NIC, and other WDS-required parameters for unattended installations. This file is used to pre-stage Moonshot nodes into WDS. A remove-WDS-devices*.ps1 file is also created for removal of added devices from WDS.

This function requires SSH access to the Moonshot Chassis Manager and is only supported when the Moonshot Tools for PowerShell are installed on the Microsoft WDS server and executed locally. Remote PowerShell to the WDS server is not supported at this time.

Extended Help within Windows PowerShell

To see examples, enter:

get-help Add-HPMoonshotNodesInWDS -examples

For more information, enter:

get-help Add-HPMoonshotNodesInWDS -detailed

For technical information, enter:

get-help Add-HPMoonshotNodesInWDS -full

For online help, enter:

get-help Add-HPMoonshotNodesInWDS -online

Get-HPMoonshotCreds

PowerShell Alias: ghpc

Description: If the HPE Moonshot Credentials database exists, the Get-HPMoonshotCreds function displays the alias, username, device name, and SSH Port for all devices stored in the Moonshot Credentials database. Passwords are excluded from the displayed results.

To initialize the Moonshot Credentials database, see "Set-HPMoonshotCreds."

The database is stored in the following directory:

C:\Users\<current_user>\AppData\Local\HP\MoonshotTools\db

This database file is local to the system and user on which it is generated.

Extended Help within Windows PowerShell

To see examples, enter:
get-help Get-HPMoonshotCreds -examples

For more information, enter:
get-help Get-HPMoonshotCreds -detailed

For technical information, enter:
get-help Get-HPMoonshotCreds -full

For online help, enter:
get-help Get-HPMoonshotCreds -online

**Get-HPMoonshotMACs**

PowerShell Alias: ghpm

Description: The Get-HPMoonshotMACs function generates a .csv file with well-formed host names that are meaningful to the administrator. This .csv file is useful for importing HPE Moonshot nodes into Citrix PVS and Microsoft SCCM when the node `<cXnY>` notation should be included in the device hostname. This is useful for long-term management of HPE Moonshot in lieu of auto-generated hostnames within Citrix PVS and Microsoft SCCM.

This function requires SSH access to the HPE Moonshot Chassis Manager.

**Extended Help within Windows PowerShell**

To see the examples, enter:
get-help Get-HPMoonshotMACs -examples

For more information, enter:
get-help Get-HPMoonshotMACs -detailed

For technical information, enter:
get-help Get-HPMoonshotMACs -full

For online help, enter:
get-help Get-HPMoonshotMACs -online

**Get-HPMoonshotNodePower**

PowerShell Alias: ghpnp

Description: The Get-HPMoonshotNodePower function displays power states for the given Moonshot node range.

The Power State options are as follows:
- PowerState all option - Displays all device power states within node range
- PowerState on option - Displays all powered on devices within node range
- PowerState off option - Displays all powered off devices within node range

This function requires SSH access to the HPE Moonshot Chassis Manager.

**Extended Help within Windows PowerShell**

To see examples, enter:
get-help Get-HPMoonshotNodePower -examples

For more information, enter:
get-help Get-HPMoonshotNodePower -detailed

For technical information, enter:
get-help Get-HPMoonshotNodePower -full
For online help, enter:
get-help Get-HPMoonshotNodePower -online

Open-HPMoonshotConsole
PowerShell Alias: chpc
Description: The Open-HPMoonshotConsole function starts an SSH session using putty.exe to a given username@IP. Be sure that putty.exe is installed in the default directory C:\Program Files (x86)\PuTTY\. This function requires SSH access to the HPE Moonshot Chassis Manager.

Extended Help within Windows PowerShell
To see examples, enter:
get-help Open-HPMoonshotConsole -examples
For more information, enter:
get-help Open-HPMoonshotConsole -detailed
For technical information, enter:
get-help Open-HPMoonshotConsole -full
For online help, enter:
get-help Open-HPMoonshotConsole -online

Remove-HPMoonshotCreds
PowerShell Alias: rhpc
Description: The Remove-HPMoonshotCreds function deletes either the entire Moonshot Credentials database or a set of credentials from the database.
The database is stored in the C:\Users\<current_user>\AppData\Local\HP\MoonshotTools\db directory. This database file is local to the system and user on which it is generated.

Extended Help within Windows PowerShell
To see examples, enter:
get-help Remove-HPMoonshotCreds -examples
For more information, enter:
get-help Remove-HPMoonshotCreds -detailed
For technical information, enter:
get-help Remove-HPMoonshotCreds -full
For online help, enter:
get-help Remove-HPMoonshotCreds -online

Send-HPMoonshotCMCommands
PowerShell Alias: shpcmc
Description: The Send-HPMoonshotCMCommands function executes a list of commands from the specified remote file or from a single command onto the specified HPE Moonshot Chassis Manager.
This function requires SSH access to the HPE Moonshot Chassis Manager, and is not recommended for vsp commands within the CM. To start a vsp session within the CM, use the Open-HPMoonshotConsole function and execute the following CM command using PuTTY:
connect <node|switch> vsp <cXnY|sa|sb> CM command

**Extended Help within Windows PowerShell**
To see examples, enter:
get-help Send-HPMoonshotCMCommands -examples
For more information, enter:
get-help Send-HPMoonshotCMCommands -detailed
For technical information, enter:
get-help Send-HPMoonshotCMCommands -full
For online help, enter:
get-help Send-HPMoonshotCMCommands -online

**Send-HPMoonshotSwitchCommands**

PowerShell Alias: shpswc

Description: The Send-HPMoonshotSwitchCommands function executes a list of commands from the specified remote file onto the specified Moonshot or Top of Rack switch.

This function requires SSH access to the HPE Moonshot Chassis Manager, and uses Plink.exe, which must be installed in the default directory C:\Program Files (x86)\PuTTY.

**Extended Help within Windows PowerShell**
To see examples, enter:
get-help Send-HPMoonshotSwitchCommands -examples
For more information, enter:
get-help Send-HPMoonshotSwitchCommands -detailed
For technical information, enter:
get-help Send-HPMoonshotSwitchCommands -full
For online help, enter:
get-help Send-HPMoonshotSwitchCommands -online

**Set-HPMoonshotCreds**

PowerShell Alias: shpc

Description: The Set-HPMoonshotCreds function saves device SSH credentials into the Moonshot Credentials database once credentials and network connectivity have been verified. This enables the HPMoonshot functions to execute with less user interaction to the given Moonshot chassis by use of the Alias option.

This function requires SSH access to the HPE Moonshot Chassis Manager.

The database is stored in the C:\Users\<current_user>\AppData\Local\HP\MoonshotTools\db directory. This database file is local to the system and user on which it is generated.

**Extended Help within Windows PowerShell**
To see examples, enter:
get-help Set-HPMoonshotCreds -examples
For more information, enter:
get-help Set-HPMoonshotCreds -detailed
For technical information, enter:
get-help Set-HPMoonshotCreds -full
For online help, enter:
get-help Set-HPMoonshotCreds -online

**Set-HPMoonshotNodeBoot**

**PowerShell Alias:** shpnb

**Description:** The `Set-HPMoonshotNodeBoot` function executes the HPE Moonshot Chassis Manager command `set node <boot|bootonce> <pxe|hdd|m.2> <range>` for the given HPE Moonshot node range. This function requires SSH access to the HPE Moonshot Chassis Manager.

**Extended Help within Windows PowerShell**
To see examples, enter:
get-help Set-HPMoonshotNodeBoot -examples
For more information, enter:
get-help Set-HPMoonshotNodeBoot -detailed
For technical information, enter:
get-help Set-HPMoonshotNodeBoot -full
For online help, enter:
get-help Set-HPMoonshotNodeBoot -online

**Set-HPMoonshotNodePower**

**PowerShell Alias:** shpnp

**Description:** The `Set-HPMoonshotNodePower` function executes the HPE Moonshot Chassis Manager command `set node power <on|off force|off shutdown>` for the given Moonshot node range. This function requires SSH access to the HPE Moonshot Chassis Manager.

**Extended Help within Windows PowerShell**
To see examples, enter:
get-help Set-HPMoonshotNodePower -examples
For more information, enter:
get-help Set-HPMoonshotNodePower -detailed
For technical information, enter:
get-help Set-HPMoonshotNodePower -full
For online help, enter:
get-help Set-HPMoonshotNodePower -online

**Uninstalling HPE Moonshot System tools**

1. Open a browser window and browse to the following path:
   C:\Users\<current_user>\Documents\WindowsPowerShell\Modules\HPMoonshotTools
2. Right-click the uninstallHPMoonshotTools.ps1 script, and then select Run With PowerShell.
3. Enter [A] (Yes to all) to remove current PowerShell profile. [Press Y? or A?]
4. Enter [A] (Yes to all) to remove the Moonshot Credentials database, if it exists.

5. Enter [A] (Yes to all) to remove the Moonshot Tools files located in the C:\Users\<current_user>\Documents\WindowsPowerShell\Modules\HPMoonshotTools directory.

6. Press Enter to exit.

The uninstall process removes the PowerShell profile that was created during installation. The PowerShell profile is located in the following directory:
C:\Users\<current_user>\Documents\WindowsPowerShell\Microsoft.PowerShell_profile.ps1.

The user can restore a previously used PowerShell profile by renaming the file:

- Old name: C:\Users\<current_user>\Documents\WindowsPowerShell\Microsoft.PowerShell_profile.ps1_backup
- New name: C:\Users\<current_user>\Documents\WindowsPowerShell\Microsoft.PowerShell_profile.ps1

Moonshot CM script examples

Setting all nodes to PXE boot

! CM Node configuration for PVS
!
Insure all nodes are off. Set all nodes to boot from PXE.
!
set node power shutdown all
set node boot pxe all
!
! CM Boot All Nodes
!
set node power on all

Preparing nodes for WDS imaging

! CM Configuration for WDS
!
! Set up all nodes on a cartridge for WDS Imaging
! (cartridge 45, nodes 1-4)
!
! WDS requires that a node boot normally from HDD, with the first
! boot being from PXE to start the installation process. In the
! case of the m700, the HDD is a 32GB or 64GB iSSD disk attached to the
! SATA port of the Kyoto CPU/APU. The following commands handle
! this node boot configuration. A node shutdown is forced to
! insure the node is powered off, ready for WDS installation.
!
! The following commands should be pasted into an SSH session
! connected to the Chassis Manager (aka CM).
!
set node power shutdown c45n1-4
set node boot hdd c45n1-4
set node bootonce pxe c45n1-4

! In the case of the ProLiant m710 series server cartridges use the
! following command to boot to the internal m.2:
! set node boot m.2 c45n1
! set node bootonce pxe c45n1
!
! CM Start WDS Install
!
! Turn the nodes on that are to be installed by WDS and connect
! to the console of one of them to track its progress.
!
set node power on c45n1-4
connect node vsp c45n1

Moonshot switch script examples

This guide includes a few of the most common switch configuration examples for Citrix Integration with the HPE Moonshot 180Gb switch module running FastPath firmware.

For a complete list of configuration examples and command references, see the HPE Moonshot Networking Cookbook and applicable reference guides for HPE Moonshot switches located in the Hewlett Packard Enterprise Servers Information Library.

Sample factory reset commands for switch modules

See the review comments documented in the switch module sample files. VLAN names and numbers vary and you might need to make changes depending on POC requirements.

!!! Use these commands to reset to factory defaults
!enable
!clear config
!y
!write memory
!y
!reload
!y
POC – Non-persistent example switch A configuration without NIC teaming

!!! Use these commands to disable MVRP a VLAN detection feature
enable
config
no mvrp
exit

!!! Use these commands to create and name VLANs
vlan database
vlan 101
vlan name 101 PVS
exit

!!! Use these commands to assign downlinks to PVS VLAN.
config
interface 1/0/1-1/0/180
vlan pvid 101
vlan participation include 101
exit

!!! Use these commands to assign uplink ports to VLANs
!!! Notice only uplink port is configured and rest will be shut down
interface 1/1/1
vlan pvid 101
vlan participation include 101
exit

!!! Notice these commands will shut down uplink ports 2-20
!!! This is a precautionary measure to avoid unintended traffic
interface 1/1/2-1/1/20
shutdown
exit

!!! Use these commands to configure uplink ports as 10Gbit or 40Gbit
interface 1/1/1
hardware profile portmode 1x40g
interface 1/1/6
hardware profile portmode 1x40g
interface 1/1/11
hardware profile portmode 1x40g
!!! Notice port 1/1/16 is configured 4x10Gbit as example
interface 1/1/16
hardware profile portmode 4x10g
exit
exit
write memory
y
reload
y

IMPORTANT:
To aggregate multiple uplink ports using the 4x10G mode and multiple connections with a 4x10G SFP splitter cable, configure the top-of-rack switch uplink ports and Moonshot switch uplink ports in a trunked mode. To prevent network loops, an administrator can also shut down unused uplink ports as shown in the example.

POC – Non-persistent example switch B configuration without NIC teaming

!!! Use these commands to disable MVRP a VLAN detection feature
enable
config
no mvrp
exit

!!! Use these commands to create and name VLANs
vlan database
vlan 102
vlan name 102 Prod
exit

!!! Use these commands to assign downlinks to Production VLAN.
config
interface 1/0/1-1/0/180
vlan pvid 102
vlan participation include 102
exit

!!! Use these commands to assign uplink ports to VLANs
!!! Notice only uplink port is configured and rest will be shut down
interface 1/1/1
vlan pvid 102
vlan participation include 102
exit

!!! Notice these commands will shut down uplink ports 2-20
!!! This is a precautionary measure to avoid unintended
interface 1/1/2-1/1/20
shutdown
exit

!!! Use these commands to configure uplink ports as 10Gbit or 40Gbit

interface 1/1/1
hardware profile portmode 1x40g

interface 1/1/6
hardware profile portmode 1x40g

interface 1/1/11
hardware profile portmode 1x40g

!!! Notice port 1/1/16 is configured 4x10Gbit as example

interface 1/1/16
hardware profile portmode 4x10g
exit
exit
write memory
y
reload
y

IMPORTANT:
To aggregate multiple uplink ports using the 4x10G mode and multiple connections with a 4x10G SFP splitter cable, configure the top-of-rack switch uplink ports and Moonshot switch uplink ports in a trunked mode. To prevent network loops, an administrator can also shut down unused uplink ports as shown in the example.

POC – Non-persistent example switch A and B configuration with NIC Teaming without VLAN tagging

!Non-persistent example switch A or B configuration with NIC teaming
!and NO vlan tagging. PVS and Production network is the untagged vlan 101

!!! Use these commands to disable MVRP a VLAN detection feature
enable
config
no mvrp
exit

!!! Use these commands to create and name VLANs
vlan database
vlan 101
vlan name 101 Prod
exit
!!! Use these commands to configure the native VLAN for the Prod network.
config
interface 1/0/1-1/0/180
vlan participation exclude 1
vlan participation include 101
vlan pvid 101
exit
!!! Use these commands to assign uplink ports to VLANs
!!! Notice only uplink port is configured and rest will be shut down
interface 1/1/1
vlan acceptframe vlanonly
vlan ingressfilter
vlan participation exclude 1
vlan participation include 101
vlan tagging 101
exit
!!! Notice these commands will shut down uplink ports 2-20
!!! This is a precautionary measure to avoid unintended traffic
interface 1/1/2-1/1/20
shutdown
exit
!!! Use these commands to configure uplink ports as 10Gbit or 40Gbit
interface 1/1/1
hardware profile portmode 1x40g
interface 1/1/6
hardware profile portmode 1x40g
interface 1/1/11
hardware profile portmode 1x40g
!!! Notice port 1/1/16 is configured 4x10Gbit as example
interface 1/1/16
hardware profile portmode 4x10g
exit
exit
write memory
y
reload
y
IMPORTANT:
To aggregate multiple uplink ports using the 4x10G mode and multiple connections with a 4x10G SFP splitter cable, configure the top-of-rack switch uplink ports and Moonshot switch uplink ports in a trunked mode. To prevent network loops, an administrator can also shut down unused uplink ports as shown in the example.

Persistent example switch A and B configuration with NIC teaming and VLAN tagging

!!! Persistent example switch A or B configuration with NIC
!!! Use these commands to disable MVRP a VLAN detection feature
enable
cfg
no mvrp
exit
!!! Use these commands to create and name VLANs
vlan database
vlan 103
vlan name 103 Prod
vlan 104
vlan name 104 Data
exit
!!! Use these commands to tag downlink ports to VLANs 103 and 104.
cfg
interface 1/0/1-1/0/180
vlan acceptframe vlanonly
vlan participation exclude 1
vlan participation include 103,104
vlan tagging 103,104
exit
!!! Use these commands to assign uplink ports to VLANs
!!! Notice only uplink port is configured and rest will be shut down
interface 1/1/1
vlan acceptframe vlanonly
vlan ingressfilter
vlan participation exclude 1
vlan participation include 103,104
vlan tagging 103,104
exit
!!! Notice these commands will shut down uplink ports 2-20
!!! This is a precautionary measure to avoid unintended traffic
interface 1/1/2-1/1/20
shutdown
exit
!!! Use these commands to configure uplink ports as 10Gbit or 40Gbit
interface 1/1/1
hardware profile portmode 1x40g
interface 1/1/6
hardware profile portmode 1x40g
interface 1/1/11
hardware profile portmode 1x40g
!!! Notice port 1/1/16 is configured 4x10Gbit as example
interface 1/1/16
hardware profile portmode 4x10g
exit
exit
write memory
y
reload
y

IMPORTANT:
To aggregate multiple uplink ports using the 4x10G mode and multiple connections with a 4x10G SFP splitter cable, configure the top-of-rack switch uplink ports and Moonshot switch uplink ports in a trunked mode. To prevent network loops, an administrator can also shut down unused uplink ports as shown in the example.

Other useful switch command examples

Review the switch module command examples before you apply them. Specific settings, such as the IP address, should be customized for the local environment.

!!! How to enable switch IP address
enable
serviceport protocol none
y
serviceport ip 172.23.0.100 255.255.0.0

!!! How to enable ssh authentication
config
username Administrator password password level 15
line ssh
enable authentication default
exit
exit
write memory
y
Manually configuring the VLAN database requires MVRP to be disabled. MVRP is a VLAN detection feature used in networking products.

!!! Use these commands to disable MVRP a VLAN detection feature
enable
config
no mvrp
exit

!!! Use these commands to create and name VLANs
vlan database
vlan 102
vlan name 102 Prod
exit

Use this configuration when placing untagged packets on a non-default VLAN. In this example, the native VLAN is changed from 1 to the specified VLAN ID for both downlink and uplink ports.

!!! Use these commands to assign downlinks to pvs VLAN.
config
interface 1/0/1-1/0/180
vlan pvid 102
vlan participation include 102
exit

!!! Use these commands to assign uplink ports to VLANs
!!! Notice only uplink port is configured and rest will be shut down
interface 1/1/1
vlan pvid 102
vlan participation include 102
exit

!!! Notice these commands will shut down uplink ports 2-20
!!! This is a precautionary measure to avoid unintended
interface 1/1/2-1/1/20
shutdown
exit

Various HPE Moonshot network cables require different port modes. The following highlights the commands required to configure the port mode for both 40GbE to 40GbE QSFP+ network cables and 40GbE QSFP+ to 10GbE SFP+ network cables. Port mode configuration changes do not take effect until the next Moonshot switch reboot.

!!! Use these commands to configure uplink ports as 10Gbit or 40Gbit
interface 1/1/1
hardware profile portmode 1x40g
interface 1/1/6
hardware profile portmode 1x40g
interface 1/1/11
hardware profile portmode 1x40g
!!! Notice port 1/1/16 is configured 4x10Gbit as example
interface 1/1/16
hardware profile portmode 4x10g
exit
exit
write memory
y
reload
y
IMPORTANT:
To aggregate multiple uplink ports using the 4x10G mode and multiple connections with a 4x10G SFP splitter cable, configure the top-of-rack switch uplink ports and Moonshot switch uplink ports in a trunked mode. To prevent network loops, an administrator can also shut down unused uplink ports as shown in the example.
## Support and other resources

### HPE Moonshot compatibility matrices

<table>
<thead>
<tr>
<th>Citrix release</th>
<th>ProLiant m700 server support</th>
<th>ProLiant m710 and m710p server support</th>
<th>ProLiant m710x and m510 server support</th>
<th>Persistent Resources</th>
<th>Non-Persistent Resources</th>
<th>HPE Moonshot firmware</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provisioning Services 7.1</td>
<td>X</td>
<td>—</td>
<td>—</td>
<td>X</td>
<td>MCP 2014.12</td>
<td></td>
</tr>
<tr>
<td>Provisioning Services 7.6</td>
<td>X</td>
<td>X</td>
<td>—</td>
<td>X</td>
<td>MCP 2015.11</td>
<td></td>
</tr>
<tr>
<td>Provisioning Services 7.9</td>
<td>X</td>
<td>X</td>
<td>X²</td>
<td>—</td>
<td>X</td>
<td>MCP 2016.07</td>
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<tr>
<td>XenDesktop 7.1</td>
<td>X</td>
<td>—</td>
<td>X</td>
<td>X</td>
<td>MCP 2014.12</td>
<td></td>
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<tr>
<td>XenDesktop 7.5</td>
<td>X</td>
<td>—</td>
<td>X</td>
<td>X</td>
<td>MCP 2014.12</td>
<td></td>
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<tr>
<td>XenDesktop 7.6</td>
<td>X</td>
<td>X</td>
<td>X³</td>
<td>X</td>
<td>X</td>
<td>MCP 2015.11</td>
</tr>
<tr>
<td>XenDesktop 7.9</td>
<td>X</td>
<td>X</td>
<td>X³</td>
<td>X</td>
<td>X</td>
<td>MCP 2016.07</td>
</tr>
<tr>
<td>XenApp 7.6</td>
<td>—</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>MCP 2015.11</td>
</tr>
<tr>
<td>XenApp 7.9</td>
<td>—</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>MCP 2016.07</td>
</tr>
</tbody>
</table>

¹ MCP 2015.11 firmware required for ProLiant m710 and m710p server cartridges.

² Provisioning Services 7.9 required for UEFI-based systems.

³ XenDesktop is not supported on ProLiant m510 server cartridges.

The Citrix XenDesktop versions that support HPE Moonshot hosted desktops are Enterprise and Platinum.

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>X</td>
<td>X</td>
<td>—</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

| XenApp published apps (server-based hosted apps)¹ | X | X | X | — | X | X |

Table Continued
<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
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<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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<tbody>
<tr>
<td>VDI with Personal vDisk</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Server VDI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Hosted physical desktops</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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<td>X</td>
</tr>
<tr>
<td>Remote PC Access (with Wake On LAN)</td>
<td></td>
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<td>X</td>
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<td></td>
<td>X</td>
</tr>
<tr>
<td>Offline client virtualization (XenClient Enterprise)</td>
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<td></td>
<td></td>
<td></td>
<td>X</td>
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<td>X</td>
</tr>
<tr>
<td>Desktop Player for Mac (optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>VM hosted apps</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

1 XenApp published apps are deployable on five generations of Windows operating systems, which enables secure access to Windows apps on any type of device including, iOS, Android, Mac, and Windows devices for on-demand access from anywhere. Allows users to focus on their work.

2 XenApp published desktops are low-cost, locked-down virtual desktops that provide the flexibility and mobility benefits of desktop virtualization while maximizing IT control through enhanced security and simplified management.

3 VDI desktops offer maximum user personalization of a persistent Windows virtual desktop that can be fully customized to meet the needs of your most demanding users.

4 VDI with Personal vDisk pairs the maximum user personalization benefits of VDI with the storage optimizations and administrative efficiencies of single image management to deliver a desktop virtualization solution that meets the needs of both users and IT administrators.

5 Server VDI enables multi-tenant, virtual desktop environments for service providers, which makes it easy to provide a single, server-based desktop in a multi-tenant environment.

6 Hosted physical desktops enable high performance remote access to physical desktops that are securely protected in the datacenter for optimal data protection, which is especially beneficial for graphically intensive applications that run best on a native OS that has direct access to the physical desktop hardware.

7 Remote PC Access (with Wake On LAN) instantly delivers desktop virtualization benefits without the need to migrate desktops to the datacenter by providing users with secure high-definition, direct connections to their office PCs.

8 Office client virtualization (XenClient Enterprise) extends the benefits of desktop virtualization to people who need to work from anywhere, including offline, by enabling them to work in a disconnected state thereby extending use case flexibility.

9 Desktop Player for Mac extends the benefits of XenDesktop to MacBook users, which enables them to run Windows desktops on a Mac whether they are online or offline; or even if they are experiencing slow or intermittent network connections. End users gain freedom while IT gains control by centrally managing Windows virtual desktops that are deployed to corporate and BYO MacBooks.

10 VM hosted apps ease Windows OS transitions and overcome application compatibility challenges in a multi-user, server environment.
# HPE Moonshot System software

The HPE Moonshot System requires the following software for successful installation and deployment.

<table>
<thead>
<tr>
<th>Software</th>
<th>Description</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPE Moonshot Component Pack</td>
<td>Contains all of the component files needed to update a Moonshot System.</td>
<td>For more information, see the Hewlett Packard Enterprise website.</td>
</tr>
<tr>
<td>Windows client editions (XenDesktop)</td>
<td>MSDN or VL ISO from Microsoft containing the Windows installation media.</td>
<td>—</td>
</tr>
<tr>
<td>Windows server editions (XenApp)</td>
<td>See the HPE OS support matrix for a complete list of supported operating systems for HPE Moonshot servers.</td>
<td>—</td>
</tr>
<tr>
<td>Citrix Provisioning Services</td>
<td>PVS distributed by Citrix.</td>
<td>7.1 or later</td>
</tr>
<tr>
<td>Citrix XenDesktop</td>
<td>XenDesktop distributed by Citrix.</td>
<td>7.1 or later(^1,2)</td>
</tr>
<tr>
<td>Citrix XenApp</td>
<td>XenApp distributed by Citrix.</td>
<td>7.6(^1)</td>
</tr>
<tr>
<td>Moonshot PowerShell Tools</td>
<td>Tools to aid in management of Moonshot chassis and integration with Citrix XenDesktop.</td>
<td>1.2.4 or later</td>
</tr>
<tr>
<td>ProLiant m700 Server Cartridge NIC Driver</td>
<td>Broadcom network device driver for the BCM5720.</td>
<td>16.2.0.4</td>
</tr>
<tr>
<td>ProLiant m710 and m710p Server</td>
<td>Mellanox network device driver for the Mellanox ConnectX-3 Pro.</td>
<td>4.95.50000 or later(^3)</td>
</tr>
<tr>
<td>ProLiant m710x and m510 Server</td>
<td>Mellanox network device driver for the Mellanox ConnectX-3 Pro</td>
<td>5.22.51000 or later(^4)</td>
</tr>
<tr>
<td>Cartridges NIC Driver</td>
<td>BACS Utility</td>
<td>16.3.1.0 or later</td>
</tr>
<tr>
<td></td>
<td>Broadcom administration utility for the device driver software stack.</td>
<td></td>
</tr>
<tr>
<td>AMD GPU Driver</td>
<td>AMD Radeon graphics device driver to enable high-performance video.</td>
<td>14.301.0.0</td>
</tr>
<tr>
<td>Intel GPU Driver</td>
<td>Intel Iris Pro graphics device driver to enable high-performance video.</td>
<td>10.18.14.4222 (client) or later</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10.18.14.4223 (server) or later</td>
</tr>
<tr>
<td>Windows Emergency Management Services</td>
<td>Remote management and system recovery options when other server administrative options are not available; it is also necessary for headless systems where there is no keyboard, video, mouse, or iLO Remote Console available. EMS capability is supported on Moonshot and implemented through the iLO VSP of each node.</td>
<td>—</td>
</tr>
</tbody>
</table>

*Table Continued*
<table>
<thead>
<tr>
<th>Software</th>
<th>Description</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPE Moonshot 180G Switch firmware</td>
<td>This firmware file is included outside of the firmware zip file. If needed, update the switch from the switch or iLO CM firmware command line, or by using the Moonshot iLO Chassis Management web interface. HP SUM does not support switch module firmware updates at this time. Support is planned for future HP SUM updates.</td>
<td>2.0.3.0 or later</td>
</tr>
<tr>
<td>HPE Moonshot 45XGc Switch firmware</td>
<td>This firmware file is included outside of the firmware zip file. If needed, update the switch from the switch or iLO CM firmware command line, or by using the Moonshot iLO Chassis Management web interface. HP SUM does not support switch module firmware updates at this time. Support is planned for future HP SUM updates</td>
<td>D2420 or later</td>
</tr>
</tbody>
</table>

1 Citrix Provisioning Services, XenDesktop, and XenApp 7.6 minimum required for the ProLiant m710 and m710p server cartridges.
2 Citrix Provisioning Services 7.9 minimum required for the ProLiant m710x and m510 server cartridges.
3 Mellanox driver v5.10.11345 or later and minimum Citrix target device software v7.6.1.8 required for Network Teaming with Citrix Provisioning Services.
4 Windows KB update 3033929 and SP1 must be installed first before installing the Mellanox driver v5.22.50000 or later in Windows 7 and Windows Server 2008 R2.

**Microsoft licensing information for HPE Moonshot server cartridges**

Microsoft requires licenses for the HPE Moonshot cartridges and client devices such as PC, laptop, thin client, and so on. Microsoft volume licensing provides the Windows 7 Enterprise OS licensing.

- If client devices are covered under Microsoft Software Assurance, then you do not need anything else (includes VDA rights).
- If client devices are not covered under Microsoft Software Assurance, obtain a VDA license for each device.

**Known issues**

The following items are known issues and pointers to information for possible resolution.

**Order of installation**

Install the ATI video driver prior to installing the Citrix VDA. Failure to install these in the correct order can cause issues.
Windows imaging

- Imaging with WinPE version later than 3.0 has Microsoft 8.3 naming disabled. For more information, see [Cannot Open Applications Published When 8dot3 Creation File is Disabled before XenApp 6.5 Installation](https://citrix.com) from the [Citrix website](https://citrix.com).

- For information on better graphics performance, see the Citrix VDA update for better graphics performance for Citrix XenDesktop 7.1/7.5:
  - **64-bit**—See [Hotfix ICAWS750WX64008 - For VDA Core Services 7.1/7.5 for Windows Desktop OS (64-bit)](https://citrix.com) on the [Citrix website](https://citrix.com).
  - **32-bit**—See [Hotfix ICAWS750WX86008 - For VDA Core Services 7.1/7.5 for Windows Desktop OS (32-bit)](https://citrix.com) on the [Citrix website](https://citrix.com).

**IMPORTANT:**
If you encounter a "SUPERSEDED" message when attempting to access the Hotfix URL, download the latest Hotfix by clicking the URL next to Replaced By: near the top of the page.

NIC teaming

Unsupported Network Team types or multiple VLAN tagged networks that are configured from the BACS might cause hangs when creating vDisks for non-persistent desktops. For this reason, the only supported Network Team type for non-persistent desktops is Active/Standby of a single untagged network. If either an unsupported Network Team type or VLAN tagging is configured on a master node, then during the PXE boot phase of the vDisk creation, the master node might hang after connecting to the vDisk. In other cases, the vDisk conversion might be successful, but a BSOD occurs on non-persistent desktops with different MAC addresses. If either of these issues occur, perform the following steps to resolve the issue:

1. Shut down the master node.
2. Delete the vDisk and target device from PVS.
3. Boot the master node back to the iSSD.
4. Uninstall the Target Device software.
5. Using BACS, correct the Network Team configuration of the master node and be sure that only an Active/Standby Network Team with no VLAN management is configured.

6. Install the Target Device software that is included in the following Citrix release (only required for PVS 7.1):
   - **64-Bit** - see [Hotfix CPVS71003 (Version 7.1.3 - For Citrix Provisioning Services 7.1 on the Citrix website)](https://www.citrix.com).
   - **32-Bit** - see [Hotfix CPVS71003 (Version 7.1.3 - For Citrix Provisioning Services 7.1 on the Citrix website)](https://www.citrix.com).

7. Create a new vDisk and be sure to select the Network Team interface that maps to the PVS PXE network within the Provisioning Services Imaging Wizard.

The HPE Moonshot desktop should no longer hang during the PXE boot phase of the vDisk creation.

**Moonshot System Tools for PowerShell**

- **Add-HPMoonshotNodesInWDS**: When adding nodes, if you do not enter an Organizational Unit for the domain when prestaging the device, it causes unexpected PXE prompt policy settings.

  The unexpected result is that the PXEPromptPolicy is set to OptOut instead of No Prompt or the PXEPromptPolicy is set to No Prompt instead of OptOut.

  The workaround for this situation is to set the Organizational Unit and PXE Prompt policy when prestaging the device.

- **Add-HPMoonshotNodesInWDS**:
  - Interactive mode of the function does not prompt the user for the Domain Join Rights in some cases.

    If you use interactive mode for Add-HPMoonshotNodesInWDS and the user joins the computer to the domain after deployment, the initial execution of Add-HPMoonshotNodesInWDS prompts the user for the Join Rights. However, on subsequent executions of Add-HPMoonshotNodesInWDS using interactive mode, the user might not be prompted to select the JoinRights. This is because the PowerShell session remembers the JoinRights setting selected in the previous execution of Add-HPMoonshotNodesInWDS.

    To correct this issue, close and re-open a new PowerShell session, and then execute Add-HPMoonshotNodesInWDS in interactive mode. You can also supply the Add-HPMoonshotNodesInWDS -JoinRightsOnly or Add-HPMoonshotNodesInWDS -JoinRightsFull options at run-time to override the interactive mode for this parameter.

- **Installing or Uninstalling HPE Moonshot Tools for PowerShell**: In some cases the Moonshot Tools for PowerShell might not install or uninstall properly when you right-click the importHPMoonshotTools.ps1 or uninstallHPMoonshotTools.ps1 and select Run with PowerShell. If this occurs, instead install or uninstall the Moonshot Tools for PowerShell by performing the following steps:

  1. Open a PowerShell session.
  2. Navigate to the HPMoonshotTools directory.
  3. Execute the following command in PowerShell and follow the install or uninstall prompts:

     ```
     .\importHPMoonshotTools.ps1
     OR
     ```
\uninstallHPMoonshotTools.ps1

4. Close the PowerShell session to unload the old PowerShell profile.

- Be careful when installing the Moonshot Tools for PowerShell using a username or install directory that includes the $ character. This character is reserved as a special character in PowerShell scripts and results in installation failures of the Moonshot Tools for PowerShell. Use an installation directory and username that does not include the $ character to avoid installation failures.

Creating non-persistent catalogs using Citrix Studio 7.5

You must create machine catalogs for non-persistent resources in Citrix XenDesktop 7.5 using Windows PowerShell due to a known issue with Citrix Studio 7.5. If non-persistent resource machine catalogs are created using Citrix Studio, then the Machine Allocation type is incorrectly set to Static. To correct this issue, use the following two commands from Windows PowerShell to create non-persistent machine catalogs with a random allocation type:

```
Add-PSSnapin *broker*
New-BrokerCatalog -AdminAddress "XenDesktopController Name" -Name "Moonshot catalog Name" -MachinesArePhysical $true -SessionSupport SingleSession -AllocationType Random -ProvisioningType PVS -PvsAddress "PVSServerName" -PvsDomain "PVSServerDomain" -PersistUserChanges Discard
```

After the machine catalog with random allocation type is created using Windows PowerShell, then the non-persistent machines can be added and Delivery Group created within Citrix Studio.

vDisk creation within Citrix PVS on m710 and m710p is slow with a high amount of retries

Hewlett Packard Enterprise recommends creating fixed vDisks for optimal performance within Citrix PVS. For this reason, creating a fixed vDisk from an m710 and m710p server cartridge requires free space within the vDisk store equal to the size of the internal M.2 SSD on the m710 and m710p. Hewlett Packard Enterprise recommends using smaller M.2 storage sizes for non-persistent ProLiant m710 and m710p server cartridges, such as the 120GB M.2 storage option.

Hewlett Packard Enterprise also recommends configuring the IosRequestThreads option after installing the Citrix PVS target device software. See the article about setting the IOSRequestThreads registry key within the vDisk on the Citrix website.

Citrix PVS write-cache defaults to server-side caching

In cases where the HPE Moonshot internal disk is not initialized from the factory, write-caching to the internal HDD will fail resulting in the write-cache for each affected device to be created on the Citrix PVS server. In cases where this occurs, the administrator can format and initialize the internal disk using the Microsoft Disk Management utility within Windows.

Hewlett Packard Enterprise also recommends using a Windows startup script within a Citrix PVS vDisk in order to automatically format and initialize the internal disk when working with multiple HPE Moonshot server cartridges. For the procedure to format and initialize an internal HPE Moonshot disk using Citrix PVS and a Windows startup script see How to convert a persistent VM to a persistent HPE Moonshot desktop.
BSOD occurs when booting a ProLiant m510 server cartridge to a Citrix Provisioning Services virtual disk using the cache type of ‘Cache in device memory’ and default cache size of ‘4096 MB’.

In some cases on UEFI systems, a BSOD can occur when using a specific cache type and size. If this issue occurs, please increase the cache size to 8192 MB or another suitable size.

Windows 10 does not support network teaming

In order to enable network teaming within Windows 10 you must install KB3163017 and the latest network and teaming drivers.

Mellanox network drivers are unavailable after installing or upgrading to 5.22.50000

Upgrading or installing Mellanox driver version 5.22.50000 or higher requires the following updates for Windows 7 and 2008 R2 prior to updating the network driver:

• Service pack 1
• Security update for Windows 2008 R2 x64 Edition (30339229)
• Security update for Windows 7 for x64-based Systems (3033929)

System hangs after installing the Citrix VDA on m710x

In some cases, having multiple display adapters enabled at the same time can cause issues with Citrix WDDM display drivers. If system hangs are observed after installing the Citrix VDA, then disabling the embedded Integrated Lights-Out (iLO4) device should resolve the issue. Enable the following option in BIOS under System Configuration > BIOS/Platform Configuration (RBSU) > Advanced Options > Video Options > [Add-in Video Enabled, Embedded Video Disabled].

System hangs when Citrix PVS streaming of Windows 7 vDisk to m710x server cartridges

A known Microsoft hotfix is required on the Windows 7 vDisk in order to successfully stream to multiple nodes in read-only node. If system hangs occur when streaming to multiple m710x server cartridges, the issue can be resolved by applying the following hotfix to the master device before creating the PVS vDisk:

Microsoft KB2550978

(https://support.microsoft.com/en-us/help/2550978/-0x0000007b-stop-error-after-you-replace-an-identical-iscsi-network-adapter-in-windows-server-2008-r2-sp1-or-in-windows-7-sp1)

Alternatively, the hotfix can be installed on an affected vDisk. Do this by booting the master device that created the vDisk to the vDisk in read-write mode and installing the hotfix.

Additional information

• HPE Moonshot System documentation on the Hewlett Packard Enterprise website
• Citrix documentation on the Citrix website
• Citrix XenApp 7.5 and XenDesktop 7.5 Planning for High Availability on the Citrix website
• Windows Deployment Services documentation on the Microsoft website

BSOD occurs when booting a ProLiant m510 server cartridge to a Citrix Provisioning Services virtual disk using the cache type of ‘Cache in device memory’ and default cache size of ‘4096 MB’.
• Windows Server Administration Console documentation on the Microsoft website
• Operating System Deployment on HPE ProLiant Moonshot Server Cartridges User Guide
• HPE Moonshot Integration with Microsoft System Center
• Broadcom Advanced Control Suite for NetXtreme I Server on the Broadcom website—download the "NetXtreme I Server Broadcom Management Applications Installer" bundle

**Accessing Hewlett Packard Enterprise Support**

• For live assistance, go to the Contact Hewlett Packard Enterprise Worldwide website.
• To access documentation and support services, go to the Hewlett Packard Enterprise Support Center website.
• Technical support: For questions or issues using the Moonshot for Citrix Plug-in solution, please send an email to moonshot.citrix.plugin.support@hpe.com

**Information to collect**

Be sure to have the following information available before you call Hewlett Packard Enterprise:

• Technical support registration number (if applicable)
• Product name
• Chassis serial number
• Product identification number
• Applicable error messages
• Operating system type and revision level

To obtain product information, log in to iLO CM firmware and use the Show Chassis Info command. For more information, see the HPE Moonshot iLO Chassis Management CLI User Guide in the Hewlett Packard Enterprise Information Library.

**Accessing updates**

• Some software products provide a mechanism for accessing software updates through the product interface. Review your product documentation to identify the recommended software update method.

• To download product updates:
  - Hewlett Packard Enterprise Support Center
    www.hpe.com/support/hpesc
  - Hewlett Packard Enterprise Support Center: Software downloads
    www.hpe.com/support/downloads
  - Software Depot
    www.hpe.com/support/softwaredepot
• To subscribe to eNewsletters and alerts:
To view and update your entitlements, and to link your contracts and warranties with your profile, go to the Hewlett Packard Enterprise Support Center More Information on Access to Support Materials page:
www.hpe.com/support/AccessToSupportMaterials

IMPORTANT:
Access to some updates might require product entitlement when accessed through the Hewlett Packard Enterprise Support Center. You must have an HPE Passport set up with relevant entitlements.

Websites

- Hewlett Packard Enterprise Information Library
- Hewlett Packard Enterprise Support Center
- Contact Hewlett Packard Enterprise Worldwide
- Subscription Service/Support Alerts
- Software Depot
- Customer Self Repair
- Insight Remote Support
- Serviceguard Solutions for HP-UX
- Single Point of Connectivity Knowledge (SPOCK) Storage compatibility matrix
- Storage white papers and analyst reports

Remote support

Remote support is available with supported devices as part of your warranty or contractual support agreement. It provides intelligent event diagnosis, and automatic, secure submission of hardware event notifications to Hewlett Packard Enterprise, which will initiate a fast and accurate resolution based on your product's service level. Hewlett Packard Enterprise strongly recommends that you register your device for remote support.

If your product includes additional remote support details, use search to locate that information.

Remote support and Proactive Care information
HPE Get Connected
www.hpe.com/services/getconnected
HPE Proactive Care services
www.hpe.com/services/proactivecare
HPE Proactive Care service: Supported products list
www.hpe.com/services/proactivecaresupportedproducts
HPE Proactive Care advanced service: Supported products list
www.hpe.com/services/proactivecareadvancedsupportedproducts
Proactive Care customer information
Proactive Care central
  www.hpe.com/services/proactivecarecentral
Proactive Care service activation
  www.hpe.com/services/proactivecarecentralgetstarted
Appendix

Automated iSSD Format/Wipe Task on HPE Moonshot Cartridges

HPE Moonshot iSSD and M.2 Mezzanine cards are used to store various files for an HPE Moonshot server, such as Windows system, temporary, or user data files. IT administrators might periodically need a disk cleanup (reformat) on the iSSD or an initial setup of an unformatted iSSD. For this reason, a VHD which includes an automated Windows PowerShell script is a highly efficient method of simultaneously wiping many iSSD/M.2 mezzanine disks. PowerShell scripts can be automatically executed at system startup (via Group Policy settings) with no user intervention necessary. Results of the PowerShell script execution can also be streamed to a remote share for easy verification of results. The below procedure describes how to set up a Windows VHD with a system startup script enforced by the Local Group Policy.

Virtual Hard Disk Selection using Citrix PVS

A Windows 7 image will be streamed from a Citrix PVS server for this example. Changes to the Windows 7 .vhd are saved after creating the PowerShell script and enabling the Local Group Policy to execute the script at system startup. Once the .vhd is created it should be set to read-only access for simultaneous streaming to many HPE Moonshot cartridges.

1. Open the Citrix PVS Console.

2. Select a Windows 7 VHD for the desired HPE Moonshot platform and change the vDisk Properties Access mode to Read-Write (Private Mode).

Enable Remote Desktop on the selected Windows 7 image.
3. Assign the Windows 7 VHD to a single Moonshot node in a PVS Device Collection.

4. PXE boot the node to the PVS streamed Windows 7 VHD.

Once this is complete, the Windows 7 image is in read-write access mode and system changes are written to the Windows 7 VHD file.

Create iSSD Disk Wipe PowerShell Script

This section includes the PowerShell script and DiskPart.exe commands used to format an HPE Moonshot iSSD/M.2 mezzanine. The latest PowerShell script to wipe the iSSD/M.2 can be modified for use in any Windows environment. Save the following text as a PowerShell script *.ps1 file. Change the $pvs, $user, and $password values to match your PVS environment:

```powershell
$computerName = $env:ComputerName
$date = Get-Date
$pvs = "192.168.3.6"
$user = "/USER:moonshot\Administrator"
$password = "DomainPassword!"
try {
    $dir = "\$pvs\c$\iSSD_format_results"
    net use \$pvs\c$ $password $user /persistent:NO | Out-Null
    mkdir $dir -ErrorAction SilentlyContinue | Out-Null
    $script:file = "$dir\issdFormat_results\_$computerName.txt"
    $date | Out-File $script:file
} catch {
    $script:file = "C:\Windows\System32\GroupPolicy\Machine\Scripts\Startup\issdFormat_results.txt"
    Write-Host "Network share could not be reached, saving results in $script:file instead"
    $date | Out-File $script:file
}

#get disk list
$commands=@(
    "list disk",
    "list disk | findstr /C:"Moonshot"
)
```
"list volume"
)
$result = $commands | diskpart
$result | Out-File $script:file -Append

#Select internal disk to be formatted
$diskindex = 0

#partition/label disk at $diskindex
#########################################################################
# Important - The Clean All operation will delete and overwrite the entire HDD #
# and may take up to 1 hour to complete. If a quicker method is desired then #
# use the Clean command instead. Clean is less secure than Clean All         #
#########################################################################
$commands=@(
   "Select disk $diskindex",
   "Clean",
   "Create Partition Primary",
   "Format FS=NTFS Quick Label=`"iSSD`""
)
$result = $commands | diskpart
$result | Out-File $script:file -Append

#find iSSD volume
$commands=@(
   "list volume"
)
$result = $commands | diskpart
$volumeindex = -2 #start at -2 because header is also counted, need volume
index without header starting with Volume 0
$volumefound = "false"
foreach ($line in $result) {
   if ($line.Contains("Volume ")) {
      $volumeindex++
      if ($line.Contains("iSSD")) {
         $volumefound = "true"
         Write-Output "#############################" | Out-File $script:file -Append
         Write-Output "iSSD Volume index = " $volumeindex | Out-File $script:file -Append
         Write-Output "iSSD Volume info:" $line | Out-File $script:file -Append
         Write-Output "#############################" | Out-File $script:file -Append
         break #found iSSD disk and is stored in $diskindex
      }
   }
}
if ($volumefound -eq "false") {
   Write-Output "#############################" | Out-File $script:file -Append
   Write-Output "Error: Could not find volume on iSSD disk"| Out-File $script:file -Append
   Write-Output "#############################" | Out-File $script:file -Append
   exit 1
}
Group Policy Settings in Windows 7

1. The Windows 7 Local Group Policy settings can be edited using `gpedit.msc`.
2. Open a Remote Desktop session to the Windows 7 system booted in the previous section.
3. Log in using a Local Administrator account.
4. Create the needed *.ps1 scripts to the following directory on the Windows 7 system: `C:\Windows\System32\GroupPolicy\Machine\Scripts\Startup`
5. Open a command prompt and execute `gpedit.msc` to start the Local Group Policy Editor.
6. Navigate to **Local Computer Policy, Computer Configuration, Windows Settings, Scripts (Startup/Shutdown)**.

7. Select **Startup Properties**.

8. To enable a *.*.ps1 script at system startup:
   
   a. Select the PowerShell Scripts tab (this will list any currently enabled *.*.ps1 files).

   b. Click **Add**.

   c. Browse to the *.*.ps1 file you want to add in the Startup folder (for example, C:\Windows \System32\GroupPolicy\Machine\Scripts\Startup\issdFormat-wipe-quick.ps1).

You can disable startup scripts by removing them from the system startup GPO settings when the Windows 7 image vDisk is in Read-Write (Private Mode).

10. Gracefully shut down the HPE Moonshot server by selecting **Start, Windows Security, Power Menu**, and then **Shut down**.

![PowerShell Startup Scripts](image)

**Streaming Virtual Hard Disk in Bulk using Citrix PVS**

Once the automated PowerShell script is enabled in the Windows 7 .VHD, the VHD should be set to read-only access for simultaneous streaming to many HPE Moonshot servers.

1. Open the Citrix PVS Console.

2. Select the edited Windows 7 VHD, and then change vDisk Properties to:
   a. Access mode from Private Image to Standard Image (multi-device read-only access)
   b. Cache type to Cache in device RAM

**IMPORTANT:**
All client locks must be removed from VHD before editing properties.
IMPORTANT:
"Cache on device hard drive" is not supported on unformatted iSSD/M.2 disks. The iSSD/M.2 disk must be initially formatted before enabling Cache on the device hard drive for an HPE Moonshot server cartridge.

3. Assign the Windows 7 vDisk, including the system startup script to any number of HPE Moonshot server cartridges.
4. PXE boot all nodes to the PVS streamed Windows 7 VHD to automatically format or reformat the HPE Moonshot iSSD/M.2 mezzanine disks at the next system startup.

5. Review the results saved in one of the following locations (depending on PowerShell script file location):
   a. Remotely stored:
      (for example,
How to convert a persistent VM to a persistent HPE Moonshot desktop

Prepare VM and begin WDS Capture

Microsoft Windows Deployment Services enables the capturing of a customized Windows image into a WIM-installable file. This WIM can then be used to redeploy the customized Windows image to any number of other computers. This section describes the steps required to convert a persistent VM hard disk to a customized WIM. This process leverages the HPE OS Deployment Guide and the WDS capture processes. The WIM can then be used in the deployment process of the same customized Windows image to an HPE Moonshot server cartridge.

1. Move persistent VM to WDS network.
2. Download the latest HPE MWDP for the target HPE Moonshot server cartridge.
3. Extract the bundle onto the WDS server.
4. Copy the default Windows 7 boot.wim from the Windows 7 Installation Media into the .\scripts folder within the extracted MWDP folder.
5. Also import the default `boot.wim` into the WDS console (for use in creating a `capture-boot.wim`).

6. Follow the steps to create a WinPE capture image in the *HPE OS Deployment Guide* using the default `boot.wim` above as the reference for the `capture-boot.wim` for the VM.

   a. Skip the mounting the boot.wim and adding the WDScapture.inf file step the first time through because it is easier from a Hypervisor console to the capture the VM manually. Use the WDScapture.inf method when automating the capture process or for headless captures.

   b. Once the capture image is created, select the **Add this image to WDS now** option.

   c. Skip the steps to edit BCD settings since the VM is not a headless Moonshot platform.

7. Execute `Sysprep.exe` on the persistent VM as defined in the *HPE OS Deployment Guide*.

8. Follow the steps to capture the golden image and upload it to the WDS store in the HPE OS Deployment Guide.

   a. If the device ID already exists in WDS prestaging (that is, if the device name is already added to Active Directory), and then use a unique device name when prestaging the VM in WDS.

   b. Reference the following procedure for using the GUI method of capturing the VM image from the [Microsoft TechNet website](https://techcommunity.microsoft.com).

   c. Edit the VM settings by moving the Network adapter above the HDD in the boot order.

   d. PXE boot the VM to the WDS server.

   e. Once VM PXE boots, click **Next** to begin the WDS Capture Wizard.
f. Enter the drive, filename, and description, and then click **Next**.
g. Enter the image location details, and then select to upload the image to an existing image group in WDS.

After the capture process is complete, it is still necessary to inject the HPE Moonshot drivers into this image before it can be used on HPE Moonshot deployments.
h. Monitor the progress of the image capture.
i. Click **Finish** when the capture process is complete.

j. Once the process completes, the VM completes the sysprep and reboots back to HDD (if previously configured for a single PXE boot).

**Prepare custom WIM for deployment to HPE Moonshot server**

This section describes the process to prepare a WIM image for deployment to an HPE Moonshot server cartridge. Once the WIM is prepped for HPE Moonshot deployments, then the image can be uploaded into the Microsoft WDS console and deployment started. This process leverages the HPE OS Deployment Guide and the WDS deployment processes.

1. Copy the captured WIM image to the WDS server `MWDP .\scripts\` directory from the VM `c:\` drive if the image was not automatically uploaded to WDS during the capture process. Alternatively, copy the captured WIM image to the WDS server `MWDP .\scripts\` directory from the \RemoteInstall \Images\<image_group>\ directory if the image was automatically uploaded to the WDS server during the capture process.

2. Rename the WIM to `install.wim`. 
3. Follow the process to use MWDP to customize a Windows image for HPE Moonshot server cartridge nodes to inject the HPE Moonshot drivers to both the `boot.wim` and `install.wim` in the MWDP `\scripts` directory, as described in the HPE OS Deployment Guide.

The customized HPE Moonshot WIM image can now be uploaded into WDS and deployed to an HPE Moonshot server cartridge. Follow the procedure for "Example deployment using Microsoft Windows Deployment Services (WDS)" in the HPE OS Deployment Guide.
IMPORTANT:
If the image was previously uploaded to WDS, delete the previous image from WDS before uploading the newly converted `install.wim` for the HPE Moonshot server cartridge.

IMPORTANT:
If the expanded size value is greater than the size of the iSSD, deployment to the HPE Moonshot server cartridge fails.

4. Once deployment completes, the persistent m700 desktop with the same user login should be similar in comparison to the persistent VM.
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>APU</td>
<td>accelerated processing unit</td>
</tr>
<tr>
<td>BACS</td>
<td>Broadcom Advanced Control Suite</td>
</tr>
<tr>
<td>BSC</td>
<td>boot system control</td>
</tr>
<tr>
<td>CIFS</td>
<td>Common Internet File System</td>
</tr>
<tr>
<td>CM</td>
<td>chassis management</td>
</tr>
<tr>
<td>CMU</td>
<td>Chassis Management Utility</td>
</tr>
<tr>
<td>DCE</td>
<td>Distributed Computing Environment</td>
</tr>
<tr>
<td>DDR3</td>
<td>double data rate-3</td>
</tr>
<tr>
<td>DHCP</td>
<td>Dynamic Host Configuration Protocol</td>
</tr>
<tr>
<td>DNS</td>
<td>domain name system</td>
</tr>
<tr>
<td>FQDN</td>
<td>Fully Qualified Domain Name</td>
</tr>
<tr>
<td>GPU</td>
<td>graphics processing unit</td>
</tr>
<tr>
<td>HDD</td>
<td>hard disk drive or hard drive</td>
</tr>
<tr>
<td>HDX</td>
<td>High definition experience</td>
</tr>
<tr>
<td>ID</td>
<td>identification</td>
</tr>
<tr>
<td>iLO</td>
<td>Integrated Lights-Out</td>
</tr>
<tr>
<td>iSSD</td>
<td>integrated solid state drive</td>
</tr>
</tbody>
</table>
MAC
   Media Access Control

MWDP
   Moonshot Windows Deployment Pack

PoC
   proof of concept

PVS
   Provisioning Server

PXE
   preboot execution environment

QSFP+
   enhanced quad small form-factor pluggable

RDP
   Remote Desktop Protocol

SAC
   Special Administration Console

SAMU
   Security Asset Management Unit

SATA
   serial ATA

SCCM
   System Center Configuration Manager

SLAPM
   SL Advanced Power Manager

SLB
   smart load balancing

SoC
   system on chip

SODIMM
   Small Outline Dual In-line Memory Module

SORDIMM
   Small Outline Registered Dual In-line Memory Module

SPI
   system peripheral interface

SSD
   solid-state drive
SSH
  Secure Shell
SSL
  Secure Sockets Layer
TDP
  Thermal Design Power
TFTP
  Trivial File Transfer Protocol
ToR
  top of rack
UDIMM
  unregistered dual in-line memory module
USB
  universal serial bus
UVD
  Unified Video Decoder
VCE
  Video Codec Engine
VDA
  Virtual Desktop Agent
VDI
  virtual desktop infrastructure
VHD
  Virtual Hard Disk
VLAN
  virtual local-area network
VM
  Virtual Machine
VSP
  virtual serial port
WDS
  Windows deployment services
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