



Hewlett Packard
Enterprise

The HPE All-Wireless Workplace powered by HPE Moonshot, Aruba Networks, and Citrix

Any device, anytime, anywhere

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Executive summary

In a traditional office environment, the user plugs in to an Ethernet port to access the network. When an Ethernet port is unavailable, however, the wireless network serves as a temporary solution. By making wireless network availability and performance a priority, users can forego the need to tether at their desks for access. They become free to collaborate with others, attend meetings, and work from anywhere in the campus network—all without losing the high-end user experience they've come to expect while plugged in. This paper outlines a reference architecture for the HPE All-Wireless Workplace using the HPE Moonshot System, Aruba Networks, and Citrix® XenApp and XenDesktop® software. High-performance wireless access is given priority so that users can easily access their data and applications using any device, at any time, from anywhere in the campus network.

The HPE ProLiant m710p Server Cartridge provides an excellent end-user experience with Citrix XenApp and XenDesktop, including rich visual experience for graphics applications, because of the Intel® Xeon® E3 processor paired with Intel® Iris Pro Graphics. The m710p Server Cartridge also provides high-speed, low-latency 10GbE networking as a strong back-end for the Aruba wireless infrastructure. Aruba Networks' simple controller setup and access point deployment provide an 802.11ac network that works up to three times faster than 802.11n and provisions within hours. User data remains securely located in the data center.

The HPE All-Wireless Workplace provides a platform that is optimized to reduce costly square meter footprint, power, cooling, and complexity of existing data center-hosted application and desktop delivery alternatives.

Target audience: This reference architecture is intended for Hewlett Packard Enterprise and Citrix partners and customers who seek a framework for the deployment and delivery of an All-Wireless Workplace powered by the HPE Moonshot System. It is also intended for HPE technical presales and solution architects. A working knowledge of server architecture, networking architecture, and storage design is recommended.

Document purpose: The purpose of this document is to describe a recommended architecture or solution, highlighting recognizable benefits to technical audiences. This paper describes testing performed in September and October 2015.

Overview

HPE Moonshot System with HPE ProLiant m710p Server Cartridges

HPE Moonshot System is a huge leap forward in infrastructure design that delivers breakthrough efficiency and scale by aligning the right amount of compute, memory, and storage to get the work done. The Moonshot Chassis includes all of the common resources from a traditional server—power, cooling, management, fabric, switches, and network uplinks—all shared across 45 hot-pluggable server cartridges in a dense 4.3U form factor. It replaces general-purpose processors with more energy-efficient Systems-on-Chips (SoCs) containing integrated accelerators, such as a graphics processor, tailored for specific workloads. The HPE ProLiant m710p Server Cartridge was built on the lower-power Intel Broadwell processing architecture, including a powerful, integrated GPU with Iris Pro Graphics, specifically for Moonshot, and has been optimized for the best possible performance with Citrix XenApp and XenDesktop. Together, the HPE Moonshot System and the HPE ProLiant m710p Server Cartridge provide an architecture well suited to support both application delivery and high-end desktops hosted in the data center, delivering excellent processing and graphical capabilities to the end user over Citrix XenApp and XenDesktop.

Aruba Networks

Aruba Networks enterprise wireless LAN solutions are industry-leading and purpose-built for mobility first. Aruba 802.11ac wireless access points deliver superb Wi-Fi performance even in high-density environments, at speeds up to three times faster than 802.11n access points. These access points can be controlled by Aruba controllers, which optimize network traffic and secure applications while rightsizing the network infrastructure. Aruba controllers feature built-in security features such as stateful firewall, secure VPN, and content filtering. Aruba Networks AppRF makes monitoring, prioritizing, and securing network traffic easy, and ClientMatch eliminates sticky clients while roaming.

Citrix XenDesktop

Citrix XenDesktop is a complete software suite for transforming Windows® desktops and applications into on-demand services accessible from any device, and for managing those desktops, apps, and the users who access them. With XenDesktop, IT can reduce workload and costs by consolidating control and security for sensitive data and intellectual property in the data center. HDX technologies facilitate XenDesktop to deliver a rich native look-and-feel, dynamically optimized for both the type of device and network conditions. Users interact with the desktop as they would a local desktop by sending keystrokes and mouse movements, which are sent to the server. The server then sends screen updates back to the user's device. This paradigm of interaction utilizes server-side processing, which can free IT from the endless cycle of PC hardware refreshes normally necessary to support new applications and application upgrades when using traditional, user-side compute deployment techniques.

Citrix also provides an excellent tool for image management and deployment, called Provisioning Services (PVS). PVS streams a complete operating system image to desktops running on both virtual and physical resources, including Moonshot. PVS can dramatically reduce IT maintenance costs by allowing IT to maintain a single image for all devices. Citrix PVS is not a requirement for this solution, but it is an option that may be implemented as desired.

Note

Citrix XenApp and XenDesktop offer access to applications and desktops from any device, a server-side deployment advantage. The device must be able to download Citrix Receiver software, which is published for all major operating systems (including Windows, Mac OS X, Linux®, Android, iOS, and Windows Phone). Though performance is somewhat dependent on client processing and graphical power, most modern laptops, smartphones, and tablets deliver an excellent Citrix experience on a single screen.

Putting it all together

Overall, the HPE All-Wireless Workplace is the best alternative to traditional “wired-first” office networks. The HPE ProLiant m710p Server Cartridge is an ideal combination of size and compute and graphics capability for both high-end desktop and application delivery use cases, providing excellent processing power, fast graphics, solid-state storage, and ample memory. Citrix XenApp and XenDesktop provide enhanced access to applications and desktops from a wide range of devices, including laptops, tablets, and smartphones. Aruba Networks’ industry-leading controllers and wireless access points extend the high-performance wireless access to all wireless-capable devices.

The hardware components driving the HPE All-Wireless Workplace are illustrated in figure 1.

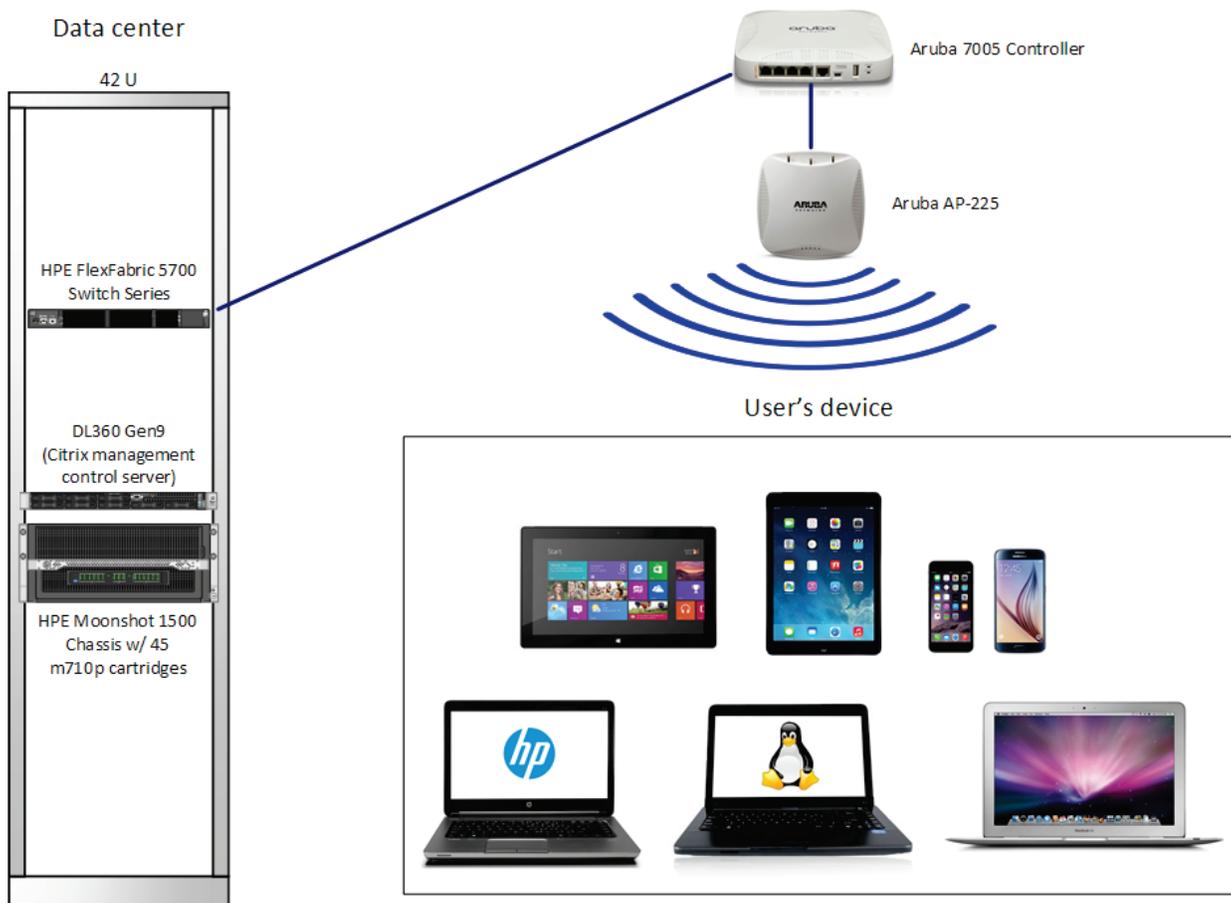


Figure 1. Solution diagram for the All-Wireless Workplace

Solution components

This section describes the hardware and software used during testing. These components form a building block that scales simply with minimal alterations to the overall infrastructure. This reference architecture assumes that Active Directory, DNS, Citrix Delivery Controller, and other supporting infrastructure for Citrix XenApp and XenDesktop already exist.

HPE Moonshot System

In the HPE Moonshot 1500 System, a 4.3U chassis houses dual, fully-redundant, 45-port 1GbE or 10GbE switches, two uplink modules (16x10GbE or 4x40GbE connectors each), fans, power supplies, an HPE Moonshot 1500 Chassis Management Module, and up to 45 server cartridges.

HPE ProLiant m710p Server Cartridges

Table 1 lists specifications of the HPE ProLiant m710p Server Cartridge.

Table 1. HPE ProLiant m710p Server Cartridge technical specifications

COMPONENT	DESCRIPTION
CPU	Intel Xeon E3-1284Lv4, 2.9 GHz (3.8 GHz Turbo), 4-core
Memory	32 GB of DDR3 PC3L-12800 (1600 MHz) SODIMM Low Voltage Memory
Network	Mellanox Connect-X3 Dual 10GbE NIC
Storage	120 GB, 240 GB, 480 GB, or 960 GB of M.2 solid state storage
Graphics	Intel Iris Pro Graphics P6300
Operating System	
XenDesktop	Windows 7 Enterprise 64-bit or Windows 8.1 Pro 64-bit
XenApp	Windows 2008 R2 or Windows 2012 or Windows 2012 R2

Networking

To connect the HPE Moonshot 1500 Chassis to the main network, an HPE 5700-series switch is recommended. For this testing, one 10GbE SFP port was connected from the Moonshot uplink module to the HPE 5700 switch.

Aruba Networks

The Aruba Networks components in this solution consist of an Aruba 7005 Controller and Aruba AP-225 access points.

Table 2 lists Aruba Networks components and their corresponding software versions.

Table 2. Aruba Networks components software versions

COMPONENT	DESCRIPTION
Aruba 7005	Compact form factor controller, max. 1,024 concurrent users/device, ArubaOS 6.4.2.3
Aruba AP-225	Access point, boot version 15.4.10

Citrix XenDesktop

Citrix XenApp and XenDesktop version 7.6 was used for testing. XenApp and XenDesktop 7.6 have a number of feature additions and enhancements over previous versions, including generic USB redirection, and is recommended as the latest Citrix XenDesktop release.

Table 3 describes the software versions of each Citrix component.

Table 3. Citrix XenApp and XenDesktop software versions

SOFTWARE	VERSION
XenDesktop Controller	7.6.0.5026
Virtual Desktop Agent	7.6.0.5026
StoreFront	2.6.0.5031
Citrix Receiver	
Windows	14.1200.13
Mac OS X	12.0.0
iOS	6.0.1
Android	3.7.3
HDX Protocol	
Windows/Mac OS X	Desktop Composition Redirection
iOS/Android	H.264 Enhanced SuperCodec

Client hardware

The client-side hardware consists of nearly any wireless-capable device, including laptops, tablets, and smartphones.

Table 4 describes the different client hardware used during testing.

Table 4. Tested client hardware technical specifications

CLIENT	DESCRIPTION
HP EliteBook 840 G1	Windows 7 64-bit, Intel® Core™ i5-4300U, 8 GB RAM, screen resolution 1600x900
HP Mobile Thin Client	Windows Embedded Standard 7E 32-bit, AMD Elite A4-4300M, 8 GB RAM, screen resolution 1366x768
MacBook Pro with Retina Display	OS X Yosemite, Intel Core i7-4750HQ, 8 GB RAM, screen resolution 2880x1800 (native) 1440x900 (effective)
iPhone® 5S	iOS 9.0.1, Apple A7, 1 GB RAM, screen resolution 1136x640
iPad® Air	iOS 9.0.1, Apple A7, 1 GB RAM, screen resolution 2048x1536
HTC Desire EYE	Android 4.4.4, Qualcomm® Snapdragon 801, 2 GB RAM, screen resolution 1920x1080

For devices with USB ports, common USB devices such as Flash drives, webcams, microphones, and other USB devices are supported with Citrix XenApp and XenDesktop.

Capacity and sizing

Test hardware setup

HPE ProLiant m710p Server Cartridges inside an HPE Moonshot 1500 Chassis function as the server compute. An Aruba 7005 Controller and an Aruba AP-225 access point connect to the same network as the HPE ProLiant m710p Server Cartridges to deliver the internal network wirelessly.

The devices tested are described in table 4.

Test workload description

The workload used for XenDesktop performance and end-user experience monitoring was built around the 3D graphics benchmark tool, 3D Glaze. This tool generates over 30 frames per second at the server, and therefore it becomes simple to identify if any part of the infrastructure, including wireless networking or a client device, is unable to deliver acceptable performance. The workload runs the 3D Glaze benchmark and monitoring tools simultaneously.

In addition to XenDesktop performance evaluation, XenApp performance was tested and evaluated. Applications tested ranged from general office applications to more demanding graphics-heavy applications, including:

- Microsoft® Office—create and edit documents in Word, Excel, and PowerPoint
- Microsoft Paint—draw onscreen to easily highlight any input lag problems
- SOLIDWORKS eDrawings Viewer—view and manipulate 3D objects
- Unigine Heaven benchmark—run a graphics benchmark to stress GPU and generate frame movement

On devices with an Ethernet port, tests were run both in wired and wireless configurations, to determine any difference in end-user experience, resource requirement, and performance.

In addition to the workload applications, the m710p server is also running performance collection tools, including Citrix HDX Monitor, Windows Performance Monitor, and TechPowerUp GPU-Z. The given workloads are tested across a wide variety of end-point devices with varying capabilities and screen resolutions. Depending on the end-point device, different protocols within the HDX standard are used to send screen data from the m710p server to the client device. For Windows and Mac OS X, the default is Desktop Composition Redirection, while for iOS and Android the default is H.264 Enhanced SuperCodec.

For desktop delivery with XenDesktop, one high-end desktop user maps to one cartridge with independent compute, GPU, memory, and disk. Therefore, sizing is pre-determined at one user per cartridge. The purpose of the desktop workload testing is to determine end-user experience. End-user experience is measured objectively through frames per second delivered and round-trip latency metrics, and system performance metrics are captured to characterize any degradation in end-user experience. For example, if the frame rate drops below 24 frames per second (the standard used for films in movie theaters), there must be some limiting factor in the environment: CPU on the client or server, GPU on either device, network, etc.

For application delivery with XenApp, sizing is not pre-determined as many more than just one user can operate on a single cartridge. Depending on the application(s), up to 50 users per cartridge are supported. Please refer to the [Performance evaluation of mobile application delivery](#) technical white paper.

Results

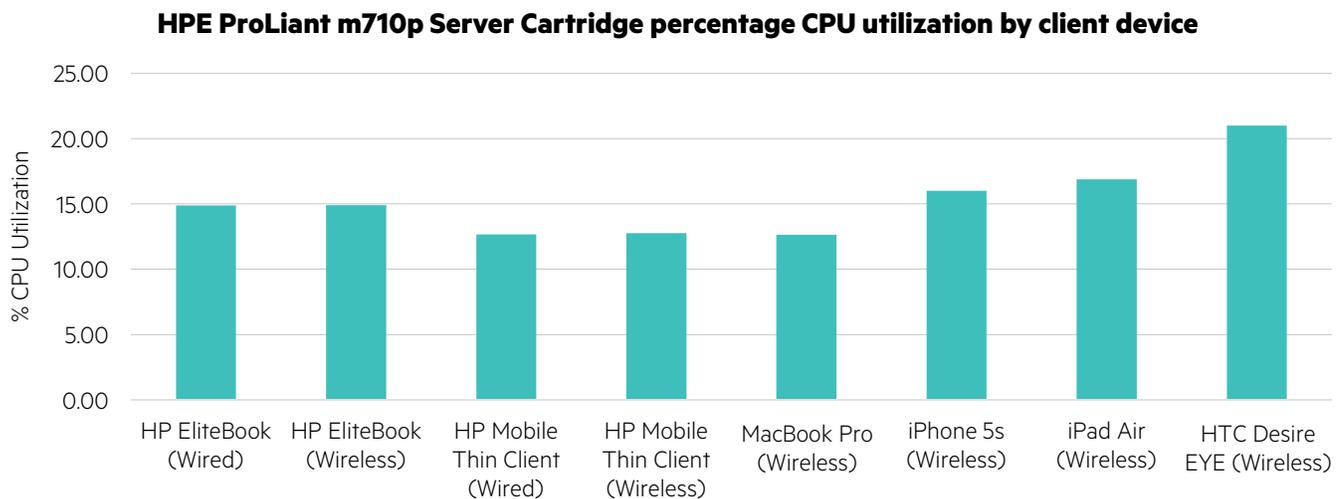
The HPE ProLiant m710p Server Cartridge and Aruba Networks wireless infrastructure testing verifies the capability of both components to deliver desktops and applications with a native look-and-feel, whether the client is wired or wireless. It is very clear that for the XenDesktop and XenApp workloads tested, wireless connectivity is not a performance bottleneck. Table 5 shows the delivered frames per second and round-trip latency (ICA RTT, or Independent Computing Architecture round trip time) for the desktop delivered from an m710p Server Cartridge to each of the different clients. ICA RTT is not calculated by Citrix when delivering to certain mobile devices, such as iOS or Android devices. Notice that ICA RTT stays extremely low throughout the tests, right on the line of human perception. Switching from a wired to wireless connection adds less than five milliseconds to the total latency, a value too small to perceive. Also, the frame rate stays within 5 percent of 30 frames per second across all devices and connection methods.

Table 5. End-user experience data for high-end desktop, HPE ProLiant m710p (Windows 8.1 Pro)

		HP EliteBook	HP Mobile Thin Client	MacBook Pro	iPhone 5S	iPad Air	HTC Desire EYE
Average ICA RTT (ms)	Wired	13.7	22.7	-	-	-	-
	Wireless	18.0	25.4	18.6	-	-	-
Average FPS	Wired	30.0	30.0	-	-	-	-
	Wireless	29.9	30.0	30.0	29.2	30.0	28.7

Delivering desktops to smartphones and tablets uses slightly more server-side CPU than to devices running Windows or Mac OS X, because XenDesktop must use H.264 Enhanced SuperCodec instead of Desktop Composition Redirection in these cases. H.264 Enhanced SuperCodec utilizes more server-side compression than Desktop Composition Redirection, which offloads some of the window processing to the client device. It is also notable that switching from wired to wireless delivery to the client device has virtually no effect on server-side CPU utilization. Average CPU utilization on the HPE ProLiant m710p is still relatively low for this workload regardless of end-point device. The m710p more than comfortably accommodates the tested workload with additional CPU capacity to tackle even more demanding workloads.

Figure 2 shows the average CPU utilization on the m710p Server Cartridge while delivering the same desktop workload to each client device.

**Figure 2.** HPE ProLiant m710p Server Cartridge percentage CPU utilization by client device

Analysis and recommendations

There are multiple ways to configure the Moonshot System depending on whether desktop delivery, application delivery, or both are desired. For desktop delivery, one m710p Server Cartridge supports one high-end desktop user with XenDesktop. For application delivery, one m710p Server Cartridge supports up to 50 applications users with XenApp, depending on the resource demands of the given application(s). These two configurations—separately or in combination—deliver an excellent end-user experience even for media and processor-heavy workloads. This configuration is also easily scalable, as adding new users is as simple as adding additional m710p cartridges. As mentioned, a single Moonshot Chassis can hold up to 45 cartridges, corresponding to 45 high-end desktop users or up to 2,250 application users. At 4.3U for a Moonshot Chassis, this is a density of over 10 high-end desktop users per rack unit or up to over 520 application users per rack unit. Multiple Moonshot Chassis can communicate with the same domain and Citrix XenDesktop infrastructure, so scaling is very straightforward.

Configuration guidance

For information on setting up the HPE Moonshot System and provisioning the HPE ProLiant m710p Server Cartridge, refer to the [HPE Moonshot for Citrix Integration Guide](#). Specific network implementations and considerations are addressed in the [HPE Moonshot Networking Cookbook](#). For more information regarding OS deployment, including special cases and alternative methods such as Microsoft System Center Configuration Manager, refer to [Operating System Deployment on HPE ProLiant Moonshot Server Cartridges](#) and [HPE Moonshot Integration with Microsoft System Center Configuration Manager](#).

Best practices and tuning parameters

This section will cover best practices and tuning parameters that are specific to this All-Wireless Workplace XenDesktop and XenApp implementation on Moonshot.

General

It is important to ensure that Windows is up to date through Windows Update. This is especially true when running Windows 7, as there have been significant performance improvement in Windows 7 since its release. However, be sure that the Windows-suggested Intel graphics and Mellanox network drivers are not installed through Windows Update. Download the latest graphics and network drivers from hpe.com/us/en/support.html instead.

As shown in figure 3, ensure that Windows is running in “High performance” mode under Power Options to avoid unnecessary throttling of the CPU. With 32 GB of RAM present, by default Windows 7 creates a page file of 32 GB. It is recommended to decrease the page file size to 1 GB, because a page file this large is not needed. Although Windows 8.1 creates a more reasonable page file size by default, it can also be reduced to 1 GB. Page file size adjustments can be accessed through the Control Panel > System and Security > System > Advanced system settings > Performance Settings > Advanced > Virtual Memory.

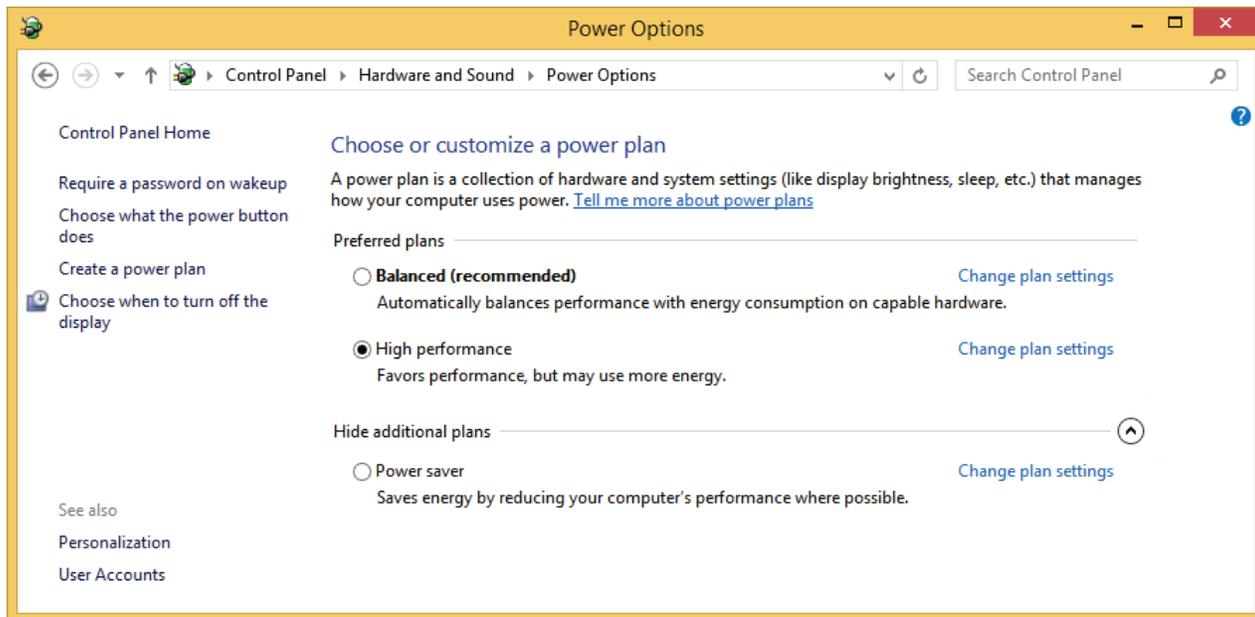


Figure 3. Windows power options

Citrix policies

Within Citrix Studio, there are policies that can be set to optimize performance and security, and to tune the system for the specifics of any given environment. The settings in table 6 reflect the Citrix policy configurations used during testing, and represent a good starting point for customizing Citrix policies for most All-Wireless Workplace deployments.

Note

Due to the processing and graphic capabilities of the HPE ProLiant m710p Server Cartridge, this section does not focus on reducing desktop appearance and visuals to improve performance. The m710p cartridge, Citrix HDX, and Aruba Networks deliver a great visual experience even when desktops and applications are accessed wirelessly.

For increased security, client USB device redirection should only be enabled when it is necessary to fulfill a user requirement, as Citrix has optimized channels for most USB devices that don't require generic USB redirection. Disabling Flash acceleration (Flash redirection) and Windows Media redirection will also improve security, and the HPE ProLiant m710p Server Cartridge is capable of rendering streamed video content server-side. To avoid delays in session brokering time, it is recommended to only auto-create the client's default printer.

Citrix HDX is a broad umbrella that contains a number of different protocols that will be used to actually deliver the user session depending on operating system, user preferences, and other factors. The default setting for Windows and Mac OS X with Citrix XenDesktop 7.6 is Desktop Composition Redirection (DCR), which is recommended for smooth performance. For devices that don't support Desktop Composition Redirection, such as iOS and Android devices, the protocol automatically switches to H.264 Enhanced SuperCodec, with no policy change required. Therefore, it is best to enable Desktop Composition Redirection for best performance on devices that support it.

Table 6. Citrix policies

POLICY	SETTING
Client audio redirection	Allowed
Client microphone redirection	Allowed
Multimedia conferencing	Allowed
Client drive redirection	Allowed
Client USB device redirection	Disabled
Flash acceleration	Disabled
Windows Media redirection	Prohibited
Auto-create client printers	Auto-create the client's default printer only
Desktop Composition Redirection	Enabled
Target frame rate	60 fps
Desktop wallpaper	Allowed
Menu animation	Allowed
View window contents while dragging	Allowed

Network

Aruba Networks controllers come pre-loaded with system defaults that provide a good starting point for provisioning a high-performance wireless network. Changes to the default settings should be made as they apply to a specific installation or network environment. For this solution, changes included prioritizing Citrix traffic over the network, as the primary focus of this network is delivering desktops and applications.

To prioritize Citrix traffic using the controller WebUI:

1. Navigate to **Configuration, Security, Access Control**, and select the **Policies** tab.
2. Under **IPv4 Sessions**, locate the policy name **allowall**, and select **Edit**.
3. Click **Add**.
4. Create a policy using the settings listed in table 7. By setting the Queue to “High,” Citrix services will always receive high priority, even if they are the only traffic in the air.

Table 7. Aruba Citrix prioritization policy settings

FIELD	SETTING
IP Version	IPv4
Source	user
Destination	any
Service/Application	Service
Service	svc-citrix (tcp 2598)
Action	permit
Queue	High

Bill of materials

The bills of materials (BOMs) presented here are sized for up to 45 high-end XenDesktop users or 2,250 XenApp users, or one Moonshot Chassis. This can easily be scaled either up or down by taking away some Moonshot Server Cartridges, or by adding additional chassis, with switches and power, and additional Moonshot Server Cartridges. The solution is also configurable in terms of the size of the M.2 SSD (up to 960 GB) on each cartridge.

Table 8 contains the Moonshot Server compute that comprises this solution, and table 9 contains the Aruba Networks wireless networking components. Tables 10 and 11 contain a Citrix Management Control Server and top-of-rack (ToR) switching and cabling, respectively. Depending on the level of high availability and redundancy required, consider doubling the infrastructure and compute components as necessary.

The following BOMs contain electronic license to use (E-LTU) parts. Electronic software license delivery is now available in most countries. Hewlett Packard Enterprise recommends purchasing electronic products over physical products (when available) for faster delivery and for the convenience of not tracking and managing confidential paper licenses. For more information, contact your reseller or an HPE representative.

Note

Part numbers are at the time of publication and subject to change. The bill of materials does not include complete support options or other rack and power requirements. If you have questions regarding ordering, consult with your HPE Reseller or HPE Sales Representative for more details. hpe.com/us/en/services/consulting.html.

Table 8. Bill of materials [data center]

QUANTITY	PART NUMBER	DESCRIPTION
1	755371-B21	HPE Moonshot 1500 Chassis
45	808915-B21	HPE Moonshot m710p Server Cartridge (Intel Xeon Processor E3-1284L v4, 2.9 GHz)
45	765479-B21	HPE Moonshot 120G SATA VE M.2 2280 FIO Kit
4	684532-B21	HPE 1500W Hot Plug Power Supply Kit
4	AF556A	HPE 1.83m 10A C13-UL US Power Cord
1*	704654-B21	HPE Moonshot-45XGc Switch Module Kit
1*	704652-B21	HPE Moonshot-4QSFP+ Uplink Module Kit
1	681254-B21	HPE 4.3U Rail Kit
1	681677-B21	HPE 13U FIO Rack Adapter Kit for 3X4.3U Chassis (optional)

* If switch redundancy is desired, add one more of both 704654-B21 and 704652-B21.

Table 9. Bill of materials [wireless networking]

QUANTITY	PART NUMBER	DESCRIPTION
1	7005-US	Aruba 7005 Cloud Services Controller
1**	AP-225	Aruba Access Point 225
N/A	N/A	Power supplies

** Number of access points determined by physical size of the covered area and number of users. Refer to Aruba Networks [VisualRF Plan](#).

Table 10. Bill of materials [Citrix Management Control Servers]

QUANTITY	PART NUMBER	DESCRIPTION
1	755258-B21	HPE ProLiant DL360 Gen9 8SFF CTO Server
1	755394-L21	HPE ProLiant DL360 Gen9 E5-2680v3 FIO Kit
1	755394-B21	HPE ProLiant DL360 Gen9 E5-2680v3 Kit
8	726719-B21	HPE 16GB 2Rx4 PC4-2133P-R Kit
4	691866-B21	HPE 400GB 6G SATA ME 2.5in SC EM SSD
1	665243-B21	HPE Ethernet 10Gb 2P 560FLR-SFP+ Adapter
1	749974-B21	HPE Smart Array P440ar/2G FIO Controller
4	734807-B21	HPE 1U SFF Easy Install Rail Kit
2	720620-B21	HPE 1400W FS Plat Plt Ht Plg Pwr Supply Kit
1	339777-B21	HPE RAID 0 Drive 1 FIO Setting

Table 11. Bill of materials [switching and cabling]

QUANTITY	PART NUMBER	DESCRIPTION
1	JG896A	HPE FF 5700-40XG-2QSFP+ Switch
2	JC680A	HPE A58x0AF 650W AC Power Supply
2	JC682A	HPE 58x0AF Bck(pwr)-Frt(ports) Fan Tray
2	JG330A	HPE X240 QSFP+ 4x10G SFP+ 3m DAC Cable
2	JD097C	HPE X240 10G SFP+ SFP+ 3m DAC Cable

Summary

With the HPE All-Wireless Workplace, HPE ProLiant m710p Server Cartridges with Intel graphics can drive rich and fluid Citrix HDX desktops and applications, delivered wirelessly by Aruba Networks wireless access points. These desktops and applications can be securely accessed from any device, at any time, from anywhere within the campus network. Allowing users more access to their desktops and applications can increase productivity and open up collaboration between employees, who used to be tethered to their desks. This all-wireless infrastructure can give users an experience that is virtually identical to a native experience, without the cumbersome wired connection.

Implementing a proof-of-concept

As a matter of best practice for all deployments, Hewlett Packard Enterprise recommends implementing a proof-of-concept using a test environment that matches as closely as possible with the planned production environment. In this way, appropriate performance and scalability characterizations can be obtained.

For help with a proof-of-concept, contact an HPE Services representative (hpe.com/us/en/services/consulting.html) or your HPE partner.

For more information

[HPE Moonshot for Citrix Integration Guide](#)

[HPE Moonshot Networking Cookbook](#)

[Operating System Deployment on HPE ProLiant Moonshot Server Cartridges](#)

[HPE Moonshot Integration with Microsoft System Center Configuration Manager](#)

[HPE Sizer for Citrix Mobile Workspace](#)

[Aruba 7000 Series Cloud Services Controller Data Sheet](#)

[ArubaOS Data Sheet](#)

[Aruba 220 Series Access Points Data Sheet](#)

[Aruba VisualRF Plan](#)

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