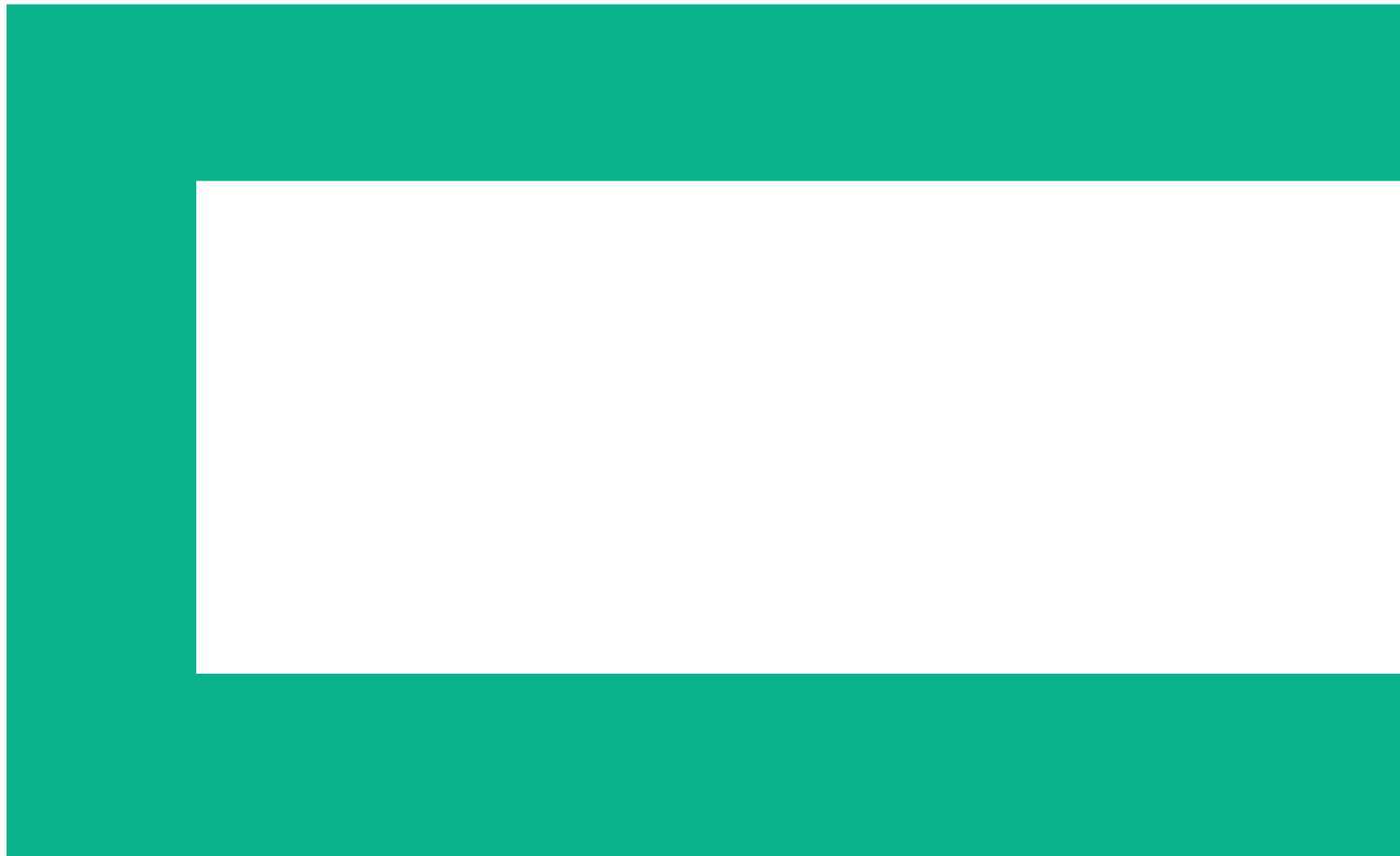




# HPE MOONSHOT SYSTEM WITH HPE PROLIANT M750 SERVER BLADES

High-performance, cost-effective platform for today's software developers

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## EXECUTIVE SUMMARY

Software developers face the challenge of delivering more code of higher quality in less time than ever before. As such, software engineers continue to search for a high-performance, feature-rich development platform that can speed their time to market, while also helping to control costs. HPE Moonshot System with HPE ProLiant m750 server blades meets—and exceeds—these user expectations.

As more organizations adopt agile and DevOps methodologies for software development, exponential growth in the volume of code commits along with the ability to iterate faster have become mission-critical requirements. HPE Moonshot can meet these and other specialized requirements of today's typical software developers.

For example, when compiling large projects, HPE Moonshot System with HPE ProLiant m750 server blades can save developers significant time, compared to other popular platforms such as laptops or cloud-hosted virtual machines (VMs). Tests prove that compiling a large project on HPE Moonshot with HPE ProLiant m750 server blades can save developers 136 minutes per compilation, compared to compiling on a laptop. Assuming a developer completes only one compilation per day, HPE Moonshot with ProLiant m750 servers can **save more than 11 hours each week—more than one working day.**

Tests prove that compilation performance of HPE Moonshot with HPE ProLiant m750 servers—compared to a scalable on-demand cloud solution, such as Microsoft Azure VMs—is significantly faster, and therefore more cost-effective. For larger development teams, however, moving compilation activities to back-end continuous integration/continuous delivery (CI/CD) pipeline processing becomes more cost-effective than compiling code on an end-user platform such as HPE Moonshot with ProLiant m750 servers.

## WHAT IS HPE MOONSHOT?

Delivering exceptional performance with unmatched density and power efficiency, HPE Moonshot is a converged bladed system ideal for delivering secure desktops and virtual apps to the financial services industry and beyond. HPE Moonshot lowers IT costs through its unparalleled combination of high performance, extreme server density, and energy efficiency.

Traditional servers rely on dedicated components, including management, networking, storage, power cords, and cooling fans in a single chassis. In contrast, the HPE Moonshot System shares these chassis components and is capable of supporting 45 hot-plug high-performance server blades per 4.3U chassis.<sup>1</sup> Each blade includes Intel® Xeon® compute, memory, integrated networking, and integrated high-speed solid state disk (SSD) storage—all on a single compact blade. In addition, each blade has dedicated HPE Integrated Lights Out (iLO) for management. And because each blade is independent, it can provide dedicated and uncompromised performance for each individual user. This architecture enables your organization to generate greater revenue from a smaller system footprint, while also driving down operational costs.

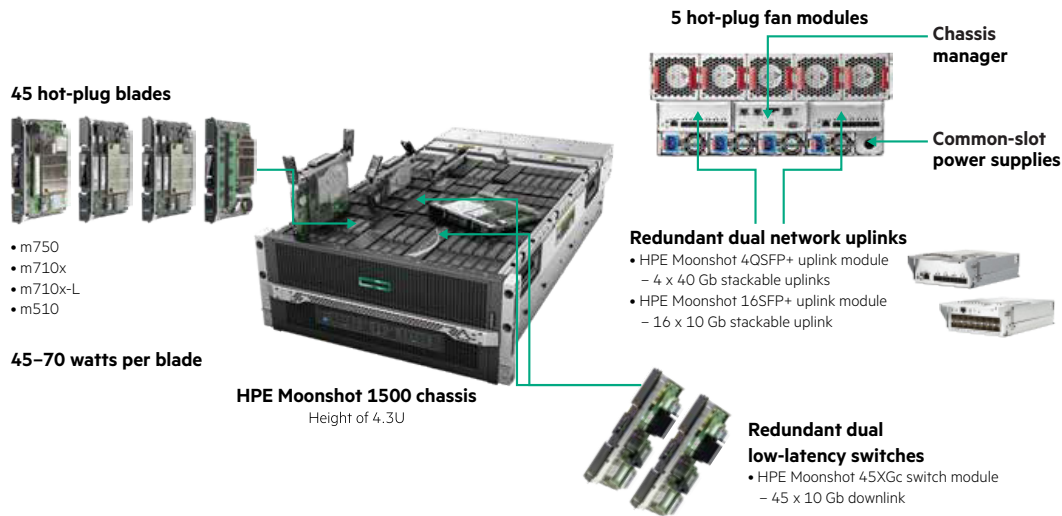
The innovation behind HPE Moonshot is simple—replace traditional, power-hungry, general-purpose processors with more efficient Intel Xeon systems-on-a-chip (SoCs) tailored for specific workloads. With integrated fabrics and a dense compute form factor, this solution-focused system delivers the:

- **Best performance per dollar**—Compared to 1P servers, HPE Moonshot offers a 79% reduction in acquisition costs<sup>2</sup>
- **Best performance per watt**—Compared to 1P servers, HPE Moonshot consumes 88% less power<sup>3</sup>
- **Most users per rack**—Compared to 1P servers, HPE Moonshot is 8.7x denser, allowing for an up to 877% increase in the number of users per rack<sup>4</sup>

<sup>1</sup> Depending on user needs, you can populate HPE Moonshot with a mix-and-match combination of high-performance Intel Xeon-based HPE ProLiant m750, m510, m710x, and m710x-L server blades.

<sup>2</sup>, <sup>3</sup>, <sup>4</sup> Based upon HPE independent testing using industry average pricing, power draw, and rack density.





**FIGURE 1.** HPE Moonshot at a glance; supports 45 users

### Providing the performance developers need

The HPE ProLiant m750 server blade is the compute engine for HPE Moonshot—delivering an unparalleled combination of high performance, user density, and security in an energy-efficient server blade. The m750 is designed for low power consumption, at a mere 70W per blade. Additional features of the m750 include:

- 1 x Intel Xeon E-2286M eight-core processor with integrated Intel® UHD P630 GPU
- Up to 128 GB of ECC-protected memory
- Dual 10 Gb Ethernet
- Up to 4 x 3.84 TB NVMe M.2 SSD storage modules
- 1 x 240 GB M.2 SSD for local operating system (OS) booting
- HPE iLO 5 for monitoring servers for ongoing management, service alerting, reporting, and remote management
- UEFI for securely configuring and booting your servers
- RESTful API for iLO 5 (Redfish 1.0 conformant) for simplified server management such as configuration and maintenance tasks
- HPE Intelligent Provisioning for hassle-free server and OS provisioning for one or multiple servers
- Mellanox Connect X-4 Pro networking
- Security features including:
  - Serial interface control
  - Administrator's password
  - Power-on password
  - HPE Trusted Platform Module (TPM 2.0)
  - UEFI
  - HPE iLO 5 with SSL encryption





**FIGURE 2.** HPE ProLiant m750 server blade

## MEETING DEVELOPER REQUIREMENTS

To do their jobs quickly, accurately, and effectively, software developers must use a platform that meets a wide variety of special requirements. HPE Moonshot is designed to meet developers’ needs for the following.

**TABLE 1.** How HPE Moonshot meets software developers’ requirements

Requirement	Description	How HPE Moonshot helps
Fast storage	Large development projects consist of many thousands—sometimes hundreds of thousands—of small files. These files must be accessed quickly when running through compilation, check-out, and source code management tools such as GitHub.	The HPE ProLiant m710x and m750 family of server blades has up to 16 TB of ultra-fast NVMe-attached SSD storage—providing high I/O and low-latency access to the file system.
Fast clock frequency and multicore CPU to reduce compilation times	Faster clock-speed CPUs help reduce the overall time required to compile large projects, as they are largely driven by core frequency. Modern integrated development environments (IDEs) and compilers are multithreaded, so they can also take advantage of multicore processors to parallelize the compilation process. The combination of both high turbo frequency and multicore provides class-leading compilation speeds.	HPE ProLiant m710x and m750 use Intel multicore Intel Xeon CPUs with advanced power management and burst capabilities. Utilizing the multithreaded nature of modern OSs and build toolsets saves developers a significant amount of time while performing everyday compilation tasks.
Secure environment to prevent data loss/code theft	Source code is a valuable commodity and must be protected. In addition to standard source code repositories, the physical security of the developer device must be considered.	The HPE Moonshot System is rack mounted and designed to be installed in secure data center environments. Using remote access technologies such as Microsoft Remote Desktop, HPE Moonshot Systems can be accessed from any client device, ensuring no data leaves the data center or is left on client devices such as laptops, which are vulnerable to misplacement or theft. The Intel chipset used on HPE ProLiant m710x and m750 server blades also supports the Intel SGX Security Extensions, which can be utilized for in-memory secret protection, code attestation, and cryptographic functions.
Fast networking	Source code repositories are based in either cloud or on-premises source code repositories. Fast access to these repositories for performing check-outs and code compilations is critically important.	HPE Moonshot can provide 2 x 10 GB/s network connections from each blade, with two built-in high-capacity switches, each providing 4 x 40 GB/s uplinks to the data center network infrastructure. The built-in networking components (Mellanox chipset and built-in HPE switches) support RDMA over Converged Ethernet (RoCE), providing high throughput, low-latency networking with very low CPU overhead.
Fast web browsing	Developers spend much of their time in web browser environments, either writing code for the web, managing source code repositories, working in software-as-a-service (SaaS) and cloud environments, or running CD pipelines.	HPE ProLiant high-frequency multicore CPUs, built-in GPU, and fast SSD storage provide the optimal platform for running demanding web-based applications.



## PROVEN IN THE LAB AND BEYOND

To prove the performance and cost-efficiency of HPE Moonshot, the HPE engineering team completed a wide variety of tests that compared HPE Moonshot System with a typical high-end laptop and an Azure virtual desktop machine.

**TABLE 2.** Test platforms

Platform	CPU	Base clock	Turbo clock	CPU cores	CPU threads	Hard disk	BIOS
HPE ProLiant m750	Intel Xeon E-2286M	2.4	5	8	16	1 TB NVMe SSD	H09 v1.00
HPE ProLiant m710x	Intel Xeon E3-1585L v5	3	3.7	4	8	1 TB NVMe SSD	H07 1.76
Dell XPS 15 9570 laptop	Intel® Core™ i7-8750H	2.2	4.1	6	12	512 GB SATA SSD	N/A
Azure VM	Intel Xeon E5-2673 v4	2.3	3.6	8	8	Premium SSD storage	N/A

The tests included:<sup>5</sup>

- Typical developer workloads
- Compiler performance
- Raw system benchmarks on storage, CPU, and RAM
- Web browser performance

## IMPRESSIVE TEST RESULTS

While the HPE tests set out to prove that HPE Moonshot with m750 and m710x server blades performed on par with high-end laptops and cloud-based VMs, they in fact illustrated HPE Moonshot’s ability to outperform those traditional platforms by a significant amount in all test categories except one. In all, eight tests were conducted. The results for three of the tests are shown below.

**TABLE 3.** Google™ Chrome compilation time (lower time is better)

System	BIOS/OS power profile	Results	Ranking
HPE Moonshot with m750	High performance/Ultimate	168 minutes	1
HPE Moonshot with m710x	Balanced/Balanced	274 minutes	2
Dell XPS 15 laptop	Balanced/Balanced	304 minutes	3
Microsoft Azure VM	High performance	446 minutes	4

<sup>5</sup> Windows provides various performance settings when the underlying hardware supports them. We performed tests using both “Balanced” and “Ultimate” OS power configurations. The HPE ProLiant BIOS provides various BIOS performance settings that optimizes the CPU for either power or performance. Our tests were performed under both “Balanced power and performance” and “High performance” settings.



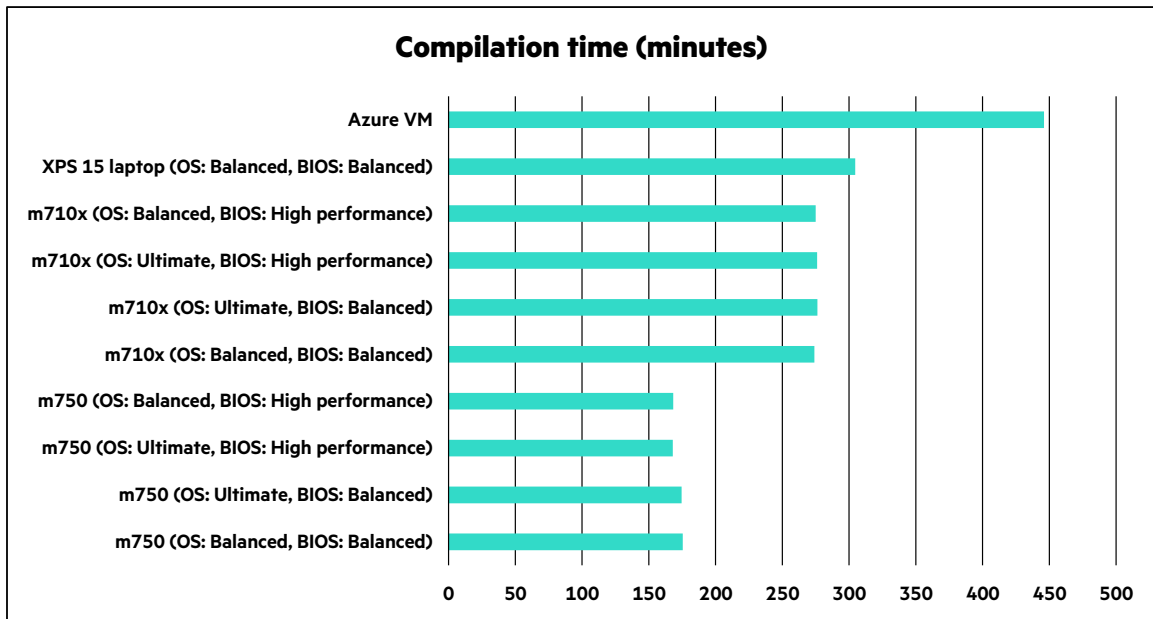


FIGURE 3. Google Chrome compilation time (lower time is better)

TABLE 4. Mozilla Firefox compilation time (lower time is better)

System	BIOS/OS power profile	Results	Ranking
HPE Moonshot with m750	Dynamic/Ultimate	33.04 minutes	1
HPE Moonshot with m710x	Balanced/Balanced	33.27 minutes	2
Dell XPS 15 laptop	Balanced/Balanced	73 minutes	3
Microsoft Azure VM	N/A	97.35 minutes	4

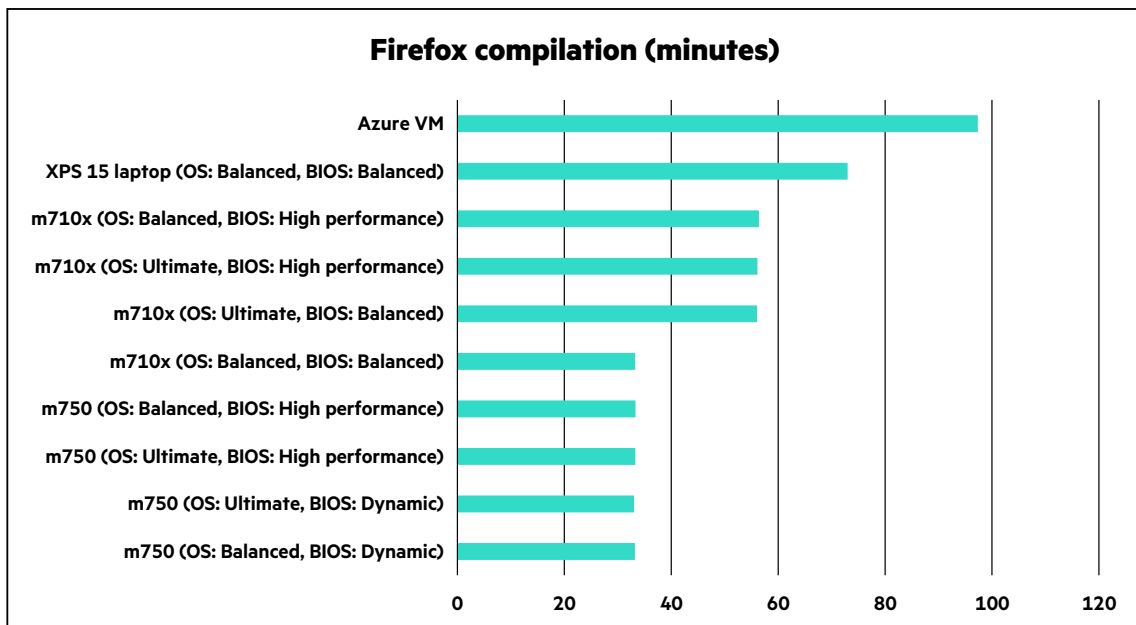


FIGURE 4. Mozilla Firefox compilation time (lower time is better)



**TABLE 5.** Web browsing benchmarking<sup>6</sup> (higher score is better)

System	BIOS/OS power profile	Results	Ranking
HPE Moonshot with m750	High performance/Ultimate	102.17 minutes	1
HPE Moonshot with m710x	High performance/Ultimate	78 minutes	2
Dell XPS 15 laptop	Balanced/Balanced	76.15 minutes	3
Microsoft Azure VM	N/A	45.9 minutes	4

## ABOUT THE AUTHOR



Neil Spellings is a VDI, virtualization, and server-based computing consultant with more than 20 years' experience in the industry. He has worked with Citrix products since the early days of WinFrame and MetaFrame. Neil was instrumental in the initial deployments of these server-based computing technologies into numerous large financial institutions. Today, he adds his expertise to the continued development and expansion of the deployments into the enterprise environment. Neil was awarded the status of Citrix Technology Professional in 2013.

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[hpe.com/moonshot](http://hpe.com/moonshot)

<sup>6</sup> Web browser used: Firefox nightly build v74.0.1 (64-bit) as compiled on each system being tested in the compilation tests.

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