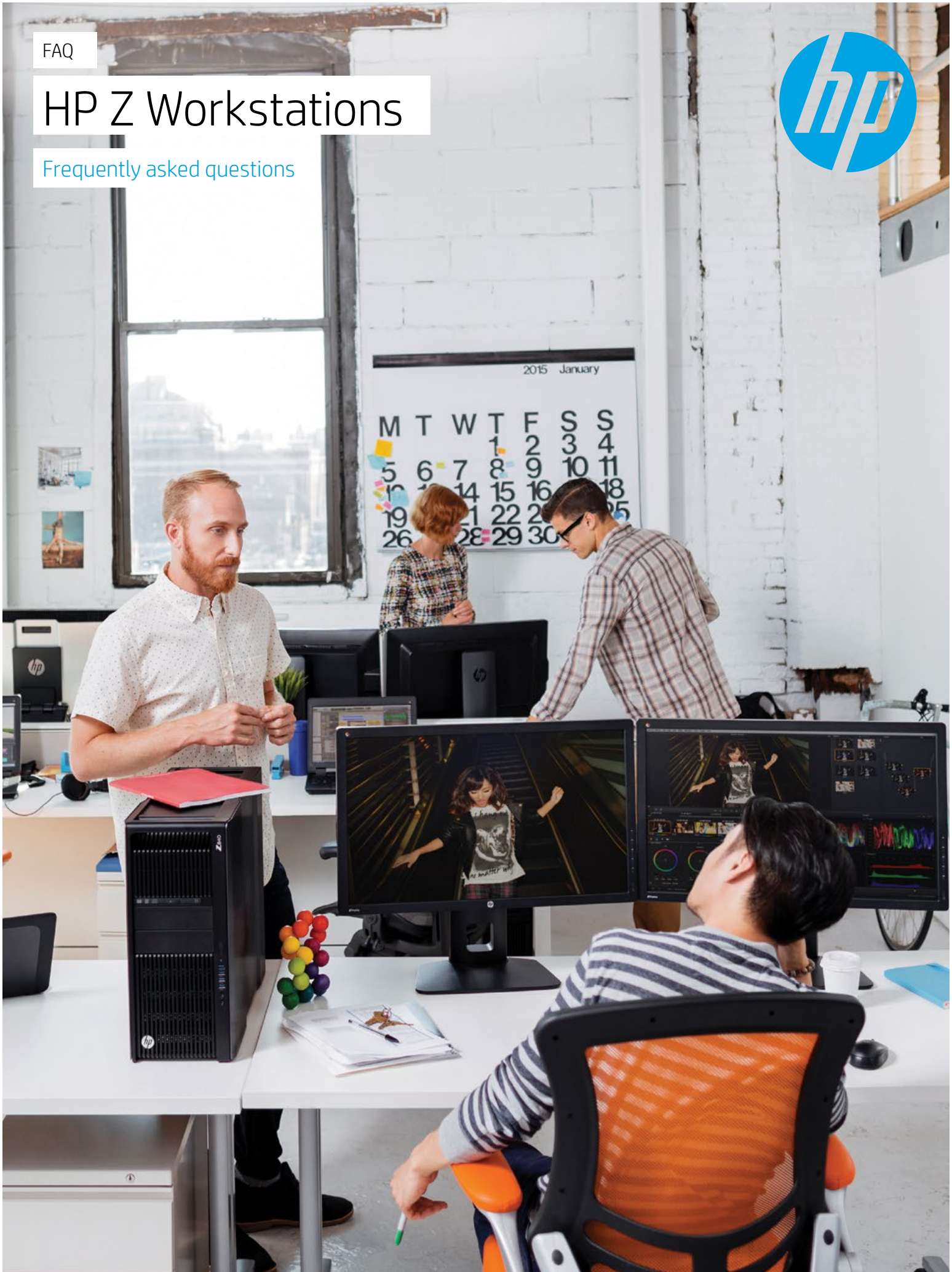
FAQ

# HP Z Workstations

## Frequently asked questions



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## Family basics

**What is a workstation and how is it different from a high-end business PC?**
Workstations are powerful computers designed for professional applications and usage, and generally offer faster performance, more expandability and more reliability choices than business PCs. The extent varies by model and individual components chosen. HP offers a wide range of workstation models to suit every need including desktop, all-in-one, and mobile workstations. HP Z Workstations are designed for always-on usage models, and are fully tested with and certified for a broad variety of professional applications in Product Development, Architecture, Engineering and Construction, Financial Services, Media and Entertainment, and many other vertical segments.

**For more details, refer to Why a Workstation.**

**What are HP Z Workstations?**
HP Z Workstations have been on the market for over 35 years. Combining bold design, world-class engineering, robust tools and visual collaboration solutions, the HP Z Workstation Family—the HP Z2 Mini, HP Z240 SFF, HP Z240 Tower, HP Z440, HP Z640, HP Z840, HP ZBook 14u, HP ZBook 15u, HP ZBook Studio, HP ZBook 15, and HP ZBook 17—takes innovation, performance, and reliability to the next level giving you and your business a competitive edge.
HP Z Workstations are engineered to optimize the way processor, memory, graphics, OS, and software components work together to deliver massive, whole-system computational power that helps you accomplish more with every minute of your time. All HP Z Workstations also come standard with advanced software such as HP Performance Advisor to help optimize your system for peak performance and HP Remote Graphics Software (HP RGS)[1] that allows you to access, share, and broadcast your Windows and Linux® workstation and virtual workstation apps from any remote PC, Mac®, MacBook®, Windows tablet or thin client.

**For more details, refer to the HP Workstations Solutions Brochure.**

**How are HP Z Workstations sold and distributed?**
HP Z Workstations are sold on hp.com, via distributor/VARs (indirect/direct channels), and HP sales force.

**For more details, visit hp.com/zworkstations.**

## HP Z2 Mini G3 Workstation

**What's special about the HP Z2 Mini G3 Workstation?**

HP has reinvented what a workstation should be with a new category: The HP Z2 Mini. Drawing inspiration from customer needs for a dramatically smaller workstation with full performance and reliability and an iconic design language, the HP Z2 Mini is truly a workstation that's built for the masses and designed for the selective. The HP Z2 Mini Workstation offers full, un-throttled performance in a footprint that is 10x smaller than the HP EliteDesk 800 G2 Tower* and 5x smaller than the HP Z240 Small Form Factor** (SFF). It is also HP's most flexible workstation ever, with the ability to be mounted behind displays, or displayed on or under desks.

**What are the at-a-glance features of the HP Z2 Mini G3 Workstation?**

- Windows 10 Pro and other editions and downgrades available[2]
- Intel® Xeon® E3-1200 v5/v6 series[3,4]
- Intel® Core™ 6th and 7th Gen series[3,4]
- Intel® C236 chipset
- Improved Intel® Hyper-Threading[5] and Intel® Turbo Boost technologies[6] (available on select processors)
- Intel® vPro™ Technology[7]
- 2 DIMM slots, up to 32 GB of total DDR4 2400 MHz system memory[8]
- 2 USB 3.0 ports on the side and 4 in the rear
- PCIe Gen 3 lanes on all slots for enhanced I/O capacity
- 135 W 89% or 200 W 89% efficient power supply
- Optional ultra-slim external DVD-RW drive[9]
- Embedded M.2 slot (for HP Z Turbo Drive G2 and enhanced flexibility with I/O slot choices)
- HP Remote Graphics Software (HP RGS)[1] included for high-end screen sharing or remote access to a workstation from home

* HP EliteDesk 800 G2 Tower = 28.1317 cubic L volume; Z2 Mini = 2.71 cubic L volume, or 10.38x smaller than the Tower
** HP Z240 SFF volume = 13 L; HP Z2 Mini volume is 2.7 L, or 1/5 the volume of the Z240 SFF

## HP Z240 Workstations

HP's best selling entry level workstations feature a choice of Tower or Small Form Factor (SFF) configurations. The HP Z240 packs the performance, features, and reliability of a workstation into the price point of a desktop PC. Powerful processors, graphics, memory and up to two ultra-fast HP Z Turbo Drive G2[2] make the HP Z240 a true workstation-class solution. Handle your growing and complex workloads with performance for any stage of your work process. HP's most affordable workstation allows you to customize your experience while still balancing your IT budget. HP's reliability, thorough testing, and ISV certifications means your HP Z240 is designed as a long-term budget-friendly solution.

**What are the key differences between the HP Z230 and the HP Z240?**
The next generation HP Z240 comes with a choice of 6th or 7th generation Intel® processors[3,4], the next generation Intel® chipset, and NVIDIA® and AMD graphics cards.

| | HP Z230 Workstations | HP Z240 Workstations |
|---|---|---|
| **Processors**[4,10,27] | Intel® Xeon® processor E3/1200 v3 product family<br>Intel® Core™ i3/i5/i7 4th Generation processor family | Intel® Xeon® processor E3-1200 v5/v6 series[3,4]<br>Intel® Core™ i3/i5/i7 6th and 7th Gen series[3,4] |
| **Chipset** | Intel® C226 | Intel® C236 |
| **Graphics** | NVIDIA® Quadro®<br>AMD FirePro™ | NVIDIA® Quadro® (latest generation)<br>AMD FirePro™ (next generation)<br>AMD Radeon™ Pro |
| **Memory**[10] | Up to 32 GB DDR3 ECC Unbuffered 1600 MHz | Up to 64 GB DDR4 ECC Unbuffered 2400 MHz |
| **USB** | **HP Z230 SFF**<br>• Front: 2 x USB 2.0, 2 x USB 3.0<br>• Rear: 4 x USB 2.0, 2 x USB 3.0<br>**HP Z230 Tower**<br>• Front: 2 x USB 2.0, 2 x USB 3.0<br>• Rear: 4 x USB 2.0, 2 x USB 3.0 | **HP Z240 SFF**<br>• Front: 2 x USB 3.0, 2 x USB 2.0 (1 charging)<br>• Rear: 6 x USB 3.0<br>• Internal: 1 x USB 3.0, 1 x USB 2.0<br>**HP Z240 Tower**<br>• Front: 2 x USB 3.0, 2 x USB 2.0 (1 charging)<br>• Rear: 4 x USB 3.0, 2 x USB 2.0<br>• Internal: 1 x USB 3.0, 2 x USB 2.0 |
| **PCI slots**[11] | **HP Z230 SFF**<br>• 1 PCIe Gen 3 x16<br>• 2 PCIe Gen 3 x1 (x1 connector)<br>• 1 PCIe Gen 3 x4 (x16 connector)<br>**HP Z230 Tower**<br>• 1 PCIe Gen 3 x16<br>• 1 PCIe Gen 2 x4 (x16 mechanically)<br>• 2 PCIe Gen 2 x1<br>• 1 PCI legacy 32-bit | **HP Z240 SFF**<br>• 1 PCIe Gen 3 x16<br>• 2 PCIe Gen 3 x1 (x1 connector)<br>• 1 PCIe Gen 3 x4 (x16 connector)<br>• 1 M.2 PCIe Gen 3 x4<br>**HP Z240 Tower**<br>• 1 PCIe Gen 3 x16<br>• 1 PCIe Gen 3 x4 (x16 connector)<br>• 1 PCIe Gen 3 x4 (x4 connector)<br>• 1 PCIe Gen 3 x1<br>• 1 PCI legacy 32-bit (optional)<br>• 1 M.2 PCIe Gen 3 x4 |
| **Chassis** | **HP Z230 SFF** (HxWxD)<br>• 13.3" x 3.95" x 15.1"<br>• 337 mm x 100 mm x 384 mm | **HP Z240 SFF** (HxWxD)<br>• 13.3" x 3.95" x 15.1"<br>• 337 mm x 100 mm x 384 mm |

| | **HP Z230 Tower** (HxWxD) | **HP Z240 Tower** (HxWxD) |
|---|---|---|
| | • 15.7" x 6.7" x 17.4"<br>• 399 mm x 170 mm x 442 mm<br>• <4U in rack<br>• Optional front handle | • 15.7" x 6.7" x 17.4"<br>• 399 mm x 170 mm x 442 mm<br>• <4U in rack<br>• Integrated front handle ledge and rear ledge<br>• Optional front handle |
| **LAN** | 2 x integrated GbE LAN | 1 x integrated GbE LAN |

**Note:** Blue text signifies a generational improvement

## HP Z240 SFF Workstation

**What's special about the HP Z240 SFF Workstation?**
Take back your workspace. At 57% smaller than the Tower, the HP Z240 SFF conserves space and maintains workstation performance. And with HP's no compromise reliability, your HP Z240 is designed to work today and well into the future.

**What are the at-a-glance features of the HP Z240 SFF?**
- Windows 10 Pro and other editions and downgrades available[2]
- Intel® Xeon® E3-1200 v5/v6 series[3,4]
- Intel® Core™ 6th and 7th Gen series[3,4]
- Intel® C236 chipset
- Improved Intel® Hyper-Threading[5] and Intel® Turbo Boost technologies[6] (available on select processors)
- Intel® vPro™ Technology[7]
- 4 DIMM slots, up to 64 GB of total DDR4 2400 MHz system memory[8]
- 2 USB 3.0 ports in the front and 6 in the rear
- PCIe Gen 3 lanes on all slots for enhanced I/O capacity
- 240 W 92% or 200 W 85% efficient power supply
- HP Slim DVD-ROM Drive, HP Slim SuperMulti DVD-RW Drive, or HP Slim Blu-ray Writer optical storage options[9,10]
- Embedded M.2 slot (for HP Z Turbo Drive G2 and enhanced flexibility with I/O slot choices)
- Optional dust filter (serviceable and replaceable)
- HP Remote Graphics Software (HP RGS)[1] included for high-end screen sharing or remote access to a workstation from home

**How does the HP Z240 SFF compare to the HP Z230 SFF?**
Configured with 6th or 7th generation Intel® processors[3,4] the latest NVIDIA® or AMD professional graphics, and the HP Z Turbo Drive G2, the HP Z240 SFF is faster and more capable to handle professional applications. It also offers more expansion bays, expanded memory, and up to two HP Z Turbo Drive G2 via an embedded M.2 slot on the motherboard. The new dust filter option helps to reduce ingression of dust particles into the system. In comparison, the HP Z240 SFF is more user friendly and a more powerful machine, giving the user more capabilities than the HP Z230 SFF.

**What differences do I need to be aware of (lack of, removal of, etc.)?**
- The media card reader option has been removed; this has been replaced by an optional SD card reader slot in every system.
- The HP Z240 SFF will no longer offer an external 5.25" bay (primarily used for the optical drive). This has been replaced by a slim-line ODD bay.

## HP Z240 Tower Workstation

**What's special about the HP Z240 Tower Workstation?**
Get monster-class performance with support for up to 4.5 GHz of processing power, plus the essential features of the HP Z240 Tower to easily support your workload with slots and ports to spare. When you're ready for workstation-class features like professional ISV certifications, the HP Z240 Tower is the right first step.

**What are the at-a-glance features of the HP Z240 Tower?**

- Windows 10 Pro and other editions and downgrades available[2]
- Intel® Xeon® E3-1200 v5/v6 series[3,4]
- Intel® Core™ 6th and 7th Gen series[3,4], including the Intel® Core™ i7-7700K processor with Intel® HD Graphics 630 (4.2 GHz, up to 4.5 GHz with Intel® Turbo Boost, 8 MB cache, 4 cores)[11]
- Intel® C236 chipset
- Improved Intel® Hyper-Threading[5] and Intel® Turbo Boost technologies[6]
- Intel® vPro™ Technology[7]
- 4 DIMM slots, up to 64 GB of total DDR4 2400 MHz system memory[8]
- 2 USB 3.0 ports on the front and 4 in the rear
- PCIe Gen 3 lanes on all slots for enhanced I/O capacity
- Replaced one of the x1 PCIe slots with a x4 slot for additional expandability
- Standard 400 W 92% or 280 W 90% efficient power supply
- Embedded M.2 slot (for HP Z Turbo Drive G2 and enhanced flexibility with I/O slot choices)
- Optional dust filter (serviceable and replaceable)
- HP Remote Graphics Software (HP RGS)[1] included for high-end screen sharing or remote access to a workstation from home

**How does the HP Z240 Tower compare to the HP Z230 Tower?**

The HP Z240 Tower offers Intel® 6th and 7th generation processors[3,4], NVIDIA® or AMD professionals graphics, and the availability of 2 HP Z Turbo Drive G2 via an embedded M.2 slot on the motherboard. The HP Z240 Tower offers more memory at a higher performance than the HP Z230 Tower. The new dust filter option helps to reduce ingression of dust particles into the system. In comparison, the HP Z240 Tower is more user friendly and a more powerful machine, giving the user more capabilities than the HP Z230 Tower.

## HP Z440 Tower Workstations

**What's special about the HP Z440 Workstation?**

The HP Z440 Workstation is the performance single-processor workstation platform and is positioned above the HP Z240 Workstation. It brings a higher level of performance and expandability to the mainstream workstation space with support for higher-end quad-core, six-core, and eight-core Intel® Xeon® processors[4,27], greater memory bandwidth with four-channel memory architecture, and enhancements that support up to 128 GB[7] of DDR4 memory. This is complemented by a range of new graphics cards from both AMD and NVIDIA®. The HP Z440 chassis has been slimmed down from last generation to fit in 4U rack mounting. Along with the recessed accessory tray on the top, integrated handle on the back, and slim optical drive, the HP Z440 is more versatile for a broad range of user environments.

**What are the at-a-glance features of the HP Z440 Workstation?**

- Windows 10 Pro and other editions and downgrades available[3]
- Choice of Intel® Xeon® processor E5-1600 v3/v4 and E5-2600 v3/v4 families supporting 4-8 cores of processing power
- Intel® C612 chipset
- Improved Intel® Hyper-Threading[5] and Intel® Turbo Boost Technologies[6]
- Intel® vPro™ Technology[7]
- 8 DIMM slots, up to 128 GB[7] of total DDR4 2400 MHz system memory
- Optional high-performance Thunderbolt™ 2 PCIe card for up to 4x bandwidth of USB 3.0
- 4 USB 3.0 ports on the front and 4 in the rear
- PCI Express Gen3 lanes for enhanced I/O capacity
- HP Z Turbo Drive G2 PCIe SSD for 4x the performance of SATA SSDs
- 525 W 85% or 700 W 90% efficient power supply
- 4U rack mountable
- HP Remote Graphics Software (HP RGS)[1] included for high-end screen sharing or remote access to a workstation from home

**For more information, refer to the HP Z440 QuickSpecs and FAQs.**

**What changes from the HP Z420 to the Z440 do I need to be aware of?**

- Integrated 1394a, present on HP Z420, has been removed. This functionality is provided by an optional add-in card.
- The HP Z440 uses the HP standard air cooling with incredibly low acoustics specifically measured for optimal performance, but will no longer have the option of liquid cooling. However, HP has introduced the HP Z Cooler on the Z440 and Z840 platforms. The HP Z Cooler decreases the acoustic levels by up to 25% as compared to the standard air coolers currently used.
- The HP Z420 included 3 internal 3.5" storage bays, whereas the HP Z440 includes 2 internal 3.5" storage bays. This allows for improved cooling of the new higher-power architecture.

**Why do we continue to offer two power supplies (US)?**

- Many HP Z440 configurations do not require the amount of power provided by the larger, 700 W power supply. For this reason, we offer customers the choice of a lower power, lower cost option.

## HP Z640 Tower Workstations

**What's special about the HP Z640 Workstation?**

With up to 44 discrete processor cores, the HP Z640 Workstation packs a lot of compute and visualization power into a whisper-quiet, compact design. It offers increased configurability with the option of dual processors in addition to the full range of graphics cards and memory configurations.

**What are the at-a-glance features of the HP Z640 Workstation?**

- Windows 10 Pro and other editions and downgrades available[2]
- Support for both dual Intel® Xeon® processor E5-1600 v3/v4 and E5-2600 v3/v4 processor families up to 145 W
- Intel® C612 chipset
- Improved Intel® Hyper-Threading[5] and Intel® Turbo Boost Technologies[6]
- Intel® vPro™ Technology[7]
- Optional high-performance Thunderbolt™ 2 PCIe card for up to 4x bandwidth of USB 3.0
- Up to 8 DIMM slots, up to 256 GB[7] of total DDR4 2400 MHz system memory (with 2 CPUs installed)
- 4 USB 3.0 ports on the front and 4 in the rear
- PCI Express Gen3 lanes for enhanced I/O capacity
- HP Z Turbo Drive G2 PCIe SSD for 4x the performance of SATA SSDs
- Standard 925 W 90% efficient power supply
- HP Remote Graphics Software (HP RGS)[1] included for high-end screen sharing or remote access to a workstation from home

**For more information, refer to the HP Z640 QuickSpecs and FAQs.**

**How does the HP Z640 compare to the HP Z620?**

- The HP Z640 offers all the next generation Intel® processors, up to 22 cores per processor, as well as NVIDIA® or AMD professional graphics and HP Z Turbo Drive G2 PCIe storage. The Z640 offers more USB 3.0 ports than the previous generation with an optional Thunderbolt™ 2 PCIe add-in card and six SATA 6 GB/s ports.

**What changes from the HP Z620 to the HP Z640 do I need to be aware of?**

- Integrated 1394a, present on HP Z620, has been removed. This functionality is provided by an optional add-in card.
- The HP Z620 included 3 internal 3.5" storage bays, whereas the HP Z640 includes 2 internal 3.5" storage bays. This allows for improved cooling of the new higher-power architecture.
- The HP Z620 included 2 embedded 1GbE LAN ports, whereas the HP Z640 includes 1 embedded 1GbE LAN port.
- The HP Z620 included 8 memory DIMM slots on the primary system board, whereas the HP Z640 includes 4 memory DIMM slots on the primary system board.

# HP Z840 Tower Workstations

**What's special about the HP Z840 Workstation?**
The HP Z840 is a high-end solution that provides the most configurability and highest compute capability of any HP Z Workstation. The HP Z840 Workstation offers one of the industry's most expandable, rack mountable chassis and the latest, high performing I/O technologies for ultimate performance. Easily deploy HP Z840 Workstations into your mission-critical design, analysis, and content creation environments knowing that HP is there to support you every step of the way.

**What are the at-a-glance features of the HP Z840 Workstation?**
- Windows 10 Pro and other editions and downgrades available[2]
- Intel® Xeon® processor E5-1600 v3 and E5-2600 v3/v4 families up to 160 W
- Intel® C612 chipset
- Intel® vPro™ Technology[7]
- Optional high-performance Thunderbolt™ 2 PCIe card for up to 4x bandwidth of USB 3.0
- Up to 16 DIMM slots, up to 1 TB of total DDR4 2400 MHz system memory (with 2 CPUs installed)
- 4 USB 3.0 ports on the front and 4 in the rear
- PCI Express Gen 3 lanes for enhanced I/O capacity
- HP Z Turbo Drive G2 PCIe SSD for 4x the performance of SATA SSDs
- Standard 850 W 88% or 1125 W (1450 W at 200 V Input Voltage) 90% efficient power supply
- HP Remote Graphics Software (HP RGS)[1] included for high-end screen sharing or remote access to a workstation from home

**For full product details, refer to the HP Z840 QuickSpecs and FAQs.**

**How does the HP Z840 compare to the HP Z820?**
- The HP Z840 offers all the next generation Intel® processors, NVIDIA® or AMD professional graphics and HP Z Turbo Drive.
- Additional USB 3.0 ports on the front and rear of the chassis along with the optional Thunderbolt™ 2 PCIe card allows users to transfer data with increased speed compared to the HP Z820.

**What changes from the HP Z820 to the Z840 do I need to be aware of?**
- Integrated 1394a, present on HP Z820, has been removed. This functionality is provided by an optional add-in card.
- The HP Z840 chassis implements an updated industrial design encompassing updated materials and finishes.

**Why do we continue to offer two power supplies (US)?**
- Many HP Z840 configurations do not require the amount of power provided by the larger, 1125 W (1450 W at 200 V Input Voltage) power supply. For this reason, we offer customers a choice of a lower power, lower cost option.

**How much power can be supplied by the larger, 1125 W (1450 W at 200 V Input Voltage) power supply?**
- Our 1125 W power supply is capable of providing 1275 W when the input voltage is greater than 105 V and capable of providing 1450 W of output power when connected to greater than 200 V.

Output power is dependent on the input voltage level as described in the table below:

| Input voltage | Rated output power |
|---|---|
| 100 V | 1125 W |
| 115-127 V | 1275 W |
| 200-240 V | 1450 W |

# HP ZBook 14u G4 Mobile Workstation

**What is special about the HP ZBook 14u G4 Mobile Workstation?**

The HP ZBook 14u G4 introduces the 14.0" diagonal screen size back into HP's Mobile Workstation line-up. This thin and light Ultrabook™[13] workstation delivers an extraordinary level of power and graphics capability in a remarkably compact design to let you take workstation-class power anywhere you go. At 22 mm thin and as little as 3.61 lb[14] you'll always be ready to innovate. And work confidently with a 3-year onsite[15] limited warranty, 120,000 hours of testing, and 35 years of HP Z DNA. This is where the fusion of innovation, performance & reliability meet.

**How does the HP ZBook 14u G4 compare to the HP ZBook 15u G4?**

| | | HP ZBook 14u G4 | HP ZBook 15u G4 |
|---|---|---|---|
| **Dimensions** | **Depth**<br>**Width**<br>**Height (front)** | 237 mm/9.3"<br>338 mm/13.3"<br>22.1 mm/.87" | 257.7 mm/10.1"<br>383.3 mm/15.09"<br>19.9 mm/.78" |
| **Weight**[14] | | 1.65 kg/3.61 lb | 1.9 kg/4.18 lb |
| **Display** | | HD SVA/AG, FHD SVA/AG, FHD UWVA/AG, Touch FHD SVA/AG | FHD SVA/AG, FHD UWVA/AG, Touch FHD SVA/AG, UHD UWVA/AG |
| **Chipset** | | Chipset integrated within processor | Chipset integrated within processor |
| **Processor**[3,4] | | 7th generation dual-core Intel® Core™ i7 and i5 CPUs | 7th generation dual-core Intel® Core™ i7 and i5 CPUs |
| **Graphics**[16] | | Intel® HD Graphics 620<br>AMD FirePro™ W4190M (2 GB GDDR5) | Intel® HD Graphics 620<br>AMD FirePro™ W4190M (2 GB GDDR5) |
| **Memory**[7] | | Up to 32 GB DDR4-2133 non-ECC SDRAM (Transfer rates up to 2133 MT/s) | Up to 32 GB DDR4-2133 non-ECC SDRAM (Transfer rates up to 2133 MT/s) |
| **Internal storage**[17] | | 1 TB SATA (5400 rpm)<br>500 GB SATA (7200 rpm)<br>500 GB SATA SED (7200 rpm)<br>500 GB SATA SED FIPS 140-2 (7200 rpm)<br>500 GB (8 GB cache) SATA SSHD (5400 rpm)<br>256 GB M.2 SATA SED SSD<br>512 GB M.2 SATA SED FIPS SSD<br>256 up to 1 TB HP Z Turbo Drive G2 (NVMe PCIe MLC SSD)<br>256 GB HP Z Turbo Drive G2 (NVMe PCIe TLC SSD)<br>512 GB HP Z Turbo Drive G2 (NVMe PCIe TLC SED SSD) | 1 TB SATA (5400 rpm)<br>500 GB SATA (7200 rpm)<br>500 GB SATA SED (7200 rpm)<br>500 GB SATA SED FIPS 140-2 (7200 rpm)<br>500 GB (8 GB cache) SATA SSHD (5400 rpm)<br>256 GB M.2 SATA SSD<br>512 GB M.2 SATA SED SSD<br>256 up to 1 TB HP Z Turbo Drive G2 (NVMe PCIe MLC SSD)<br>256 GB HP Z Turbo Drive G2 (NVMe PCIe TLC SSD)<br>512 GB HP Z Turbo Drive G2 (NVMe PCIe TLC SED SSD) |
| **Battery**[18] | | HP Long Life 3-cell 51 WHr Li-ion polymer with HP Fast Charge support | HP Long Life 3-cell 51 WHr Li-ion with HP Fast Charge support |
| **Battery life**[19] | | TBD | Up to 12:14 |
| **Adapter** | | Slim Smart AC Adapter (65 W) | Slim Smart AC Adapter (65 W) |
| **Ports** | | (1) USB 3.0 charging<br>(1) USB 3.0<br>(1) USB 3.1 Gen 1<br>(1) DisplayPort™ 1.2<br>(1) VGA<br>(1) RJ-45 (Ethernet)<br>(1) Power Connector<br>(1) Stereo microphone-in/headphone-out combo | (1) USB 3.0 charging<br>(1) USB 3.0<br>(1) USB 3.1 Gen 1<br>(1) DisplayPort™ 1.2<br>(1) VGA<br>(1) RJ-45 (Ethernet)<br>(1) Power connector<br>(1) Stereo microphone-in/headphone-out combo |

**What is the docking solution for the HP ZBook 14u G4?**
The HP ZBook 14u G4 will use the HP UltraSlim Docking Station, a side docking solution (same as HP ZBook 15u G4) due to its thin design. The HP ZBook Studio G4, HP ZBook 15 G4 and HP ZBook 17 G4 will use the HP ZBook Dock with Thunderbolt 3 which supports Intel®'s Thunderbolt™ 3 protocol.

## HP ZBook 15u G4 Mobile Workstation

**What is special about the HP ZBook 15u G4 Mobile Workstation?**
The HP ZBook 15u G4 is HP's next generation thin and light workstation sporting the same thin industrial design of the previous generation. If it's value in a lightweight design you want, look no further. This customizable workstation contains 7th generation Intel® Core™ processors[4], professional AMD FirePro™ 3D graphics (2 GB GDDR5 dedicated) with AMD Enduro™ Technology, up to 32 GB memory, and passes 14 MIL-STD[20] tests. It can handle up to 2 internal storage devices (up to 2 TB[17]), including the HP Z Turbo Drive (M.2 NVMe PCIe SSD), and has an optional FHD resolution touch display, numeric keypad, and long battery life. It also comes standard with HP Remote Graphics Software (HP RGS)[1] for high-end screen sharing or remote access to a workstation from home.

**How does the HP ZBook 15u G4 compare to the HP ZBook 15u G3?**

| | | HP ZBook 15u G3 | HP ZBook 15u G4 |
|---|---|---|---|
| **Dimensions** | **Depth**<br>**Width**<br>**Height (front)** | 257.7 mm/10.1"<br>383.3 mm/15.09"<br>19.9 mm/.78" | 257.7 mm/10.1"<br>383.3 mm/15.09"<br>19.9 mm/.78" |
| **Weight**[14] | | 1.9 kg/4.18 lb | 1.9 kg/4.18 lb |
| **Display** | | FHD SVA/AG, FHD UWVA/AG, Touch FHD SVA/AG, UHD UWVA/AG | FHD SVA/AG, FHD UWVA/AG, Touch FHD SVA/AG, UHD UWVA/AG |
| **Chipset** | | Chipset integrated within processor | Chipset integrated within processor |
| **Processor**[3,4] | | 6th generation dual-core Intel® Core™ i7 and i5 CPUs | 7th generation dual-core Intel® Core™ i7 and i5 CPUs |
| **Graphics**[16] | | Intel® HD Graphics 520<br>AMD FirePro™ W4190M (2 GB GDDR5) | Intel® HD Graphics 620<br>AMD FirePro™ W4190M (2 GB GDDR5) |
| **Memory** | | Up to 32 GB DDR4-2133 non-ECC SDRAM (Transfer rates up to 2133 MT/s) | Up to 32 GB DDR4-2133 non-ECC SDRAM (Transfer rates up to 2133 MT/s) |
| **Internal storage**[17] | | 500 GB SATA (7200 rpm)<br>1 TB SATA (5400 rpm)<br>500 GB SATA SED (7200 rpm)<br>500 GB SATA SED FIPS 140-2 (7200 rpm)<br>500 GB (8 GB cache) SATA SSHD (5400 rpm)<br>128 GB M.2 SATA SSD<br>256 GB M.2 SATA SED SSD<br>256 GB up to 512 GB HP Z Turbo Drive (NVMe PCIe SSD) | 1 TB SATA (5400 rpm)<br>500 GB SATA (7200 rpm)<br>500 GB SATA SED (7200 rpm)<br>500 GB SATA SED FIPS 140-2 (7200 rpm)<br>500 GB (8 GB cache) SATA SSHD (5400 rpm)<br>256 GB M.2 SATA SSD<br>512 GB M.2 SATA SED SSD<br>256 up to 1 TB HP Z Turbo Drive G2 (NVMe PCIe MLC SSD)<br>256 GB HP Z Turbo Drive G2 (NVMe PCIe TLC SSD)<br>512 GB HP Z Turbo Drive G2 (NVMe PCIe TLC SED SSD) |
| **Battery**[18] | | HP Long Life 3-cell 46 WHr Li-ion | HP Long Life 3-cell 51 WHr Li-ion with HP Fast Charge support |
| **Battery life**[19] | | Up to 10:00 | Up to 12:14 |
| **Adapter** | | Slim Smart AC Adapter (65 W) | Slim Smart AC Adapter (65 W) |

| | | |
|---|---|---|
| **Ports** | (1) USB 3.0 charging<br>(1) USB 3.0<br>(1) USB 3.1 Gen 1<br>(1) DisplayPort™<br>(1) VGA<br>(1) RJ-45 (Ethernet)<br>(1) Power Connector<br>(1) Stereo microphone-in/headphone-out combo | (1) USB 3.0 charging<br>(1) USB 3.0<br>(1) USB 3.1 Gen 1<br>(1) DisplayPort™ 1.2<br>(1) VGA<br>(1) RJ-45 (Ethernet)<br>(1) Power connector<br>(1) Stereo microphone-in/headphone-out combo |

**What is the docking solution for the HP ZBook 15u G4?**
The HP ZBook 15u G4 will continue to use the HP UltraSlim Docking Station, a side docking solution (same as HP ZBook 15u G3), due to its thin design. The HP ZBook Studio G4, HP ZBook 15 G4 and HP ZBook 17 G4 will use the HP ZBook Dock with Thunderbolt 3 which supports Intel®'s Thunderbolt™ 3 protocol.

## HP ZBook Studio G4 Mobile Workstation

**What is special about the HP ZBook Studio G4 Mobile Workstation?**
The HP ZBook Studio is the industry's first true ground-up mobile device designed for commercial-class customers and delivers a thin & light user experience with full performance workstation class capabilities. The HP ZBook Studio G4 contains Intel® 7th generation quad-core processors[4], Intel® HD P630 or 630 graphics options[16], next generation professional NVIDIA® Quadro® graphics with Optimus® technology, up to 32 GB memory, dual USB Type-C™ connectors supporting Thunderbolt™ 3, DisplayPort™ 1.2, and USB 3.1, and passes 14 MIL-STD[20] tests. It can handle up to 2 internal storage devices (up to 2.0 TB[17]) including up to 2 simultaneous 1 TB HP Z Turbo Drive G2 (M.2 NVMe MLC PCIe SSD) devices. It has UHD UWVA, UHD HP DreamColor, or FHD Touch display options and comes standard with HP Remote Graphics Software (HP RGS)[1] for high-end screen sharing or remote access to a workstation from home.

**How does the HP ZBook Studio G4 compare to the HP ZBook Studio G3?**

| | | HP ZBook Studio G3 | HP ZBook Studio G4 |
|---|---|---|---|
| **Dimensions** | **Depth**<br>**Width**<br>**Height (front)** | 255 mm/10.0"<br>375 mm/14.7"<br>18.0 mm/0.7" | 255 mm/10.0"<br>375 mm/14.7"<br>18.0 mm/0.7" |
| **Weight**[14] | | 2.04 kg /4.49 lb | 2.09 kg/4.6 lb |
| **Display** | | FHD UWVA/AG, UHD UWVA/AG, UHD DreamColor UWVA/AG, Touch FHD UWVA | FHD UWVA/AG, UHD UWVA/AG, UHD DreamColor UWVA/AG, Touch FHD UWVA |
| **Chipset** | | Mobile Intel® CM236 integrated with processor | Mobile Intel® CM236 integrated with processor |
| **Processor**[3,4] | | 6th generation Intel® Xeon® processors<br>6th generation Intel® Core™ i7 processors<br>6th generation Intel® Core™ i5 processors | 7th Generation Intel® Xeon® processors<br>7th Generation Intel® Core™ i7 processors<br>7th Generation Intel® Core™ i5 processors |
| **Graphics**[16,21] | | Intel® HD Graphics 530<br>HP ZBook Studio special edition: NVIDIA® Quadro® M1000M (4 GB GDDR5 dedicated) *(Extra 2 GB of graphics memory provides enhanced application performance with larger graphics datasets)* | Intel® HD Graphics 630<br>NVIDIA® Quadro® M1200M (4 GB GDDR5 dedicated) |
| **Memory**[22] | | Up to 32 GB DDR4-2133 ECC or non-ECC SDRAM (Transfer rates up to 2133 MT/s) | Up to 32 GB DDR4-2400 ECC or non-ECC SDRAM (Transfer rates up to 2400 MT/s) |

| | | |
|---|---|---|
| **Internal storage**[17] | 128 GB up to 512 GB M.2 SATA SSD<br>256 GB up to 512 GB M.2 SATA SED SSD<br>256 GB up to 1 TB HP Z Turbo Drive G2 (NVMe PCIe SSD) | 128 GB M.2 SATA SSD<br>256 GB M.2 SATA SED SSD<br>256 GB HP Z Turbo Drive G2 (NVMe PCIe TLC SSD)<br>512 GB HP Z Turbo Drive G2 (NVMe PCIe TLC SED SSD)<br>256 GB up to 1 TB HP Z Turbo Drive G2 (NVMe PCIe MLC SSD) |
| **Battery**[18] | HP Long Life 4-cell 64 WHr Li-ion prismatic | HP Long Life 4-cell, 64 Wh Li-ion prismatic (with HP Fast Charge support)<br>HP Long Life 8-cell, 92 Wh Li-ion polymer (with HP Fast Charge support) |
| **Battery life**[19] | Up to 9:30 | Up to 16:47 |
| **Adapter** | Slim Smart AC Adapter (150 w) | Slim Smart AC Adapter (150 w) |
| **Ports** | (2) USB Type-C™ (Thunderbolt™ 3, DisplayPort™ 1.2, USB 3.1)<br>(2) USB 3.01<br>(1) USB 3.0 (charging)<br>(1) RJ-45<br>(1) HDMI 1.4<br>(1) Power connector<br>(1) Stereo microphone-in/headphone-out combo | (2) USB Type-C™ (Thunderbolt™ 3, DisplayPort™ 1.2, USB 3.1)<br>(2) USB 3.01<br>(1) USB 3.0 (charging)<br>(1) RJ-45<br>(1) HDMI 1.4<br>(1) Power connector<br>(1) Stereo microphone-in/headphone-out combo |

**What are the UHD/4K display panel and UHD/4K HP DreamColor display panel choices on the HP ZBook Studio G4?**
UHD/4K panels offer extremely high resolutions (3840 x 2160) for maximum screen real estate and vibrant, clear pictures. Two versions of the UHD panel will be offered on the HP ZBook Studio: UHD UWVA display and UHD UWVA with HP DreamColor technology. HP DreamColor technology is ideal for customers who desire color accuracy for their workflows. The panel will be color calibrated out of the factory and come outfitted with the HP Mobile Display assistant software application.

## HP ZBook 15 G4 Mobile Workstation

**What is special about the HP ZBook 15 G4 Mobile Workstation?**
We built desktop workstation power, performance and expandability into a device designed for the road. Made for mobile creative and design professionals with the most demanding projects, where compromise is simply not an option, the HP ZBook 15 is made for the most demanding workloads and is used by NASA to help push the boundaries of science and discovery on the International Space Station. Engineered with the latest 7th generation Intel® Xeon® or Core™ processors[4], NVIDIA® Quadro® or AMD Radeon™ Pro graphics, up to 3 TB of storage[17], and dual USB Type-C™ ports supporting Thunderbolt™ 3, DisplayPort™ 1.2, USB 3.1 imagine what it could do for you.

**How does the HP ZBook 15 G3 compare to the HP ZBook 15 G4?**

| | | HP ZBook 15 G3 | HP ZBook 15 G4 |
|---|---|---|---|
| **Dimensions** | **Depth**<br>**Width**<br>**Height** | 264 mm/10.4”<br>386 mm/15.2”<br>26 mm/1.0” | 264 mm/10.4”<br>386 mm/15.2”<br>26 mm/1.0” |
| **Weight**[14] | | 2.63 kg/5.8 lb | 2.59 kg/5.7 lb |
| **Display** | | FHD SVA/AG, FHD UWVA/AG, Touch FHD UWVA, UHD DreamColor UWVA/AG+PSR | FHD SVA/AG, FHD UWVA/AG, Touch FHD UWVA, UHD DreamColor UWVA/AG+PSR |

| | | |
|---|---|---|
| **Chipset** | Mobile Intel® CM236 integrated with processor | Mobile Intel® CM236 integrated with processor |
| **Processor**[3,4] | 6th generation Intel® Xeon® processors<br>6th generation Intel® Core™ i7 processors | 7th Generation Intel® Xeon® processors<br>7th Generation Intel® Core™ i7 processors<br>7th Generation Intel® Core™ i5 processors |
| **Graphics**[16,21] | Intel® HD graphics 530<br>Intel® HD graphics P530<br>Intel® Iris™ Pro Graphics P580<br>AMD FirePro™ W5170M<br>NVIDIA® Quadro® M600M<br>NVIDIA® Quadro® M1000M<br>NVIDIA® Quadro® M2000M | Intel® HD Graphics P630<br>Intel® HD Graphics 630<br>AMD Radeon™ Pro WX 4150<br>NVIDIA® Quadro® M620<br>NVIDIA® Quadro® M1200<br>NVIDIA® Quadro® M2200 |
| **Memory**[22] | Up to 64 GB DDR4-2133 ECC or non-ECC SDRAM (Transfer rates up to 2133 MT/s) | Up to 64 GB DDR4-2400 ECC or non-ECC SDRAM (Transfer rates up to 2400 MT/s for systems with less than 32 GB. Transfer rates up to 2133 MT/s for systems with greater than 32 GB) |
| **Internal storage**[17] | 500 GB SATA (7200 rpm)<br>1 TB SATA (5400 rpm)<br>500 GB SATA SED (7200 rpm)<br>500 GB SATA SED FIPS 140-2 (7200 rpm)<br>500 GB (8 GB cache) SATA SSHD<br>256 GB up to 512 GB M.2 SATA SED SSD<br>256 GB up to 1 TB HP Z Turbo Drive G2 (NVMe PCIe SSD) | 500 GB SATA (7200 rpm)<br>1 TB SATA (5400 rpm)<br>500 GB SATA SED (7200 rpm)<br>500 GB SATA SED FIPS 140-2 (7200 rpm)<br>500 GB (8 GB cache) SATA SSHD<br>256 GB up to 1 TB SATA SSD<br>256 GB M.2 SATA SED SSD<br>512 GB M.2 SATA FIPS SSD<br>256 GB HP Z Turbo Drive G2 (NVMe PCIe TLC SSD)<br>512 GB HP Z Turbo Drive G2 (NVMe PCIe TLC SED SSD)<br>256 GB up to 1 TB HP Z Turbo Drive G2 (NVMe PCIe MLC SSD) |
| **Battery**[18] | HP Long Life 9-cell 90 WHr Li-ion polymer | HP Long Life 9-cell, 90 WHr Li-ion polymer with HP Fast Charge support |
| **Battery life**[19] | Up to 15:45 | Up to 17:30 |
| **Adapter** | Slim Smart AC Adapter (150 w) | Slim Smart AC Adapter (150 w) |
| **Ports** | (2) USB Type-C™ (Thunderbolt™ 3, DisplayPort™ 1.2, USB 3.1)<br>(3) USB 3.0<br>(1) USB 3.0 (charging)<br>(1) HDMI 1.4<br>(1) VGA<br>(1) RJ-45<br>(1) Power connector<br>(1) Stereo microphone-in/headphone-out combo | (2) USB Type-C™ (Thunderbolt™ 3, DisplayPort™ 1.2, USB 3.1)<br>(3) USB 3.0<br>(1) USB 3.0 (charging)<br>(1) HDMI 1.4<br>(1) VGA<br>(1) RJ-45<br>(1) Power connector<br>(1) Stereo microphone-in/headphone-out combo |

**What is the UHD/4K HP DreamColor display panel choice on the HP ZBook 15 G3?**
UHD/4K panels offer extremely high resolution (3840 x 2160) for maximum screen real estate and vibrant, clear pictures. HP DreamColor technology has been added to this screen resolution for our customers who desire color accuracy for their workflows. The panel will be color calibrated out of the factory and come outfitted with the HP Mobile Display assistant software application.

**Are the batteries and other accessories from the HP ZBook 15 G3 compatible with the new HP ZBook 15 G4?**
Although the internal batteries are similar, they are not forward or backward compatible between HP ZBook and HP EliteBook Mobile Workstations.

The common docking stations used on the HP ZBook 15 G3 will work with the HP ZBook 15 G4, 17 G4, or Studio G4 systems which use the HP ZBook Dock with Thunderbolt 3.

## HP ZBook 17 G4 Mobile Workstation

**What is special about the HP ZBook 17 G4 Mobile Workstation?**
HP's largest screen size and most powerful mobile workstation contains Intel® 7th generation quad-core processors[4] and a choice of graphics options: from Intel® HD Graphics to AMD Radeon™ Pro with AMD Enduro™ Technology to NVIDIA® Quadro® options with Optimux® technology and include HP VR Ready configurations. Be confident you can configure the HP ZBook 17 G4 to meet your most demanding needs. Get the ultimate in mobile performance by rounding out your system with up to 64 GB memory, dual USB Type-C™ supporting Thunderbolt™ 3, DisplayPort™ 1.2, and USB 3.1, HP DreamColor display option, and up to 4 internal storage devices (up to 4.0 TB[17]) including up to 2 simultaneous HP Z Turbo Drive G2 (M.2 NVMe MLC PCIe SSD). It also comes standard with HP Remote Graphics Software (HP RGS)[1] for high-end screen sharing or remote access to a workstation from home, a tool-less access chassis, and passes 14 MIL-STD tests[20] for the ultimate in reliability.

**How does the HP ZBook 17 G4 compare to the HP ZBook 17 G3?**

| | | HP ZBook 17 G3 | HP ZBook 17 G4 |
|---|---|---|---|
| **Dimensions** | **Depth**<br>**Width**<br>**Height** | 280 mm/11.0"<br>420 mm/16.5"<br>30 mm/1.2" | 280 mm/11.0"<br>420 mm/16.5"<br>33 mm/1.3" |
| **Weight**[14] | | 3.0 kg/6.62 lb | 3.14 kg/6.9 lb |
| **Display** | | HD+ SVA/AG, FHD UWVA/AG, Touch FHD UWVA, UHD HP DreamColor UWVA/AG+PSR | HD+ SVA/AG, FHD UWVA/AG, Touch FHD UWVA, UHD HP DreamColor UWVA/AG+PSR |
| **Chipset** | | Mobile Intel® CM236 integrated with processor | Mobile Intel® CM236 integrated with processor |
| **Processor**[3,4] | | 6th generation Intel® Xeon® processors<br>6th generation Intel® Core™ i7 processors<br>6th generation Intel® Core™ i5 processors | 7th Generation Intel® Xeon® processors<br>7th Generation Intel® Core™ i7 processors<br>7th Generation Intel® Core™ i5 processors |
| **Graphics**[16,21] | | Intel® Iris™ Pro Graphics P580<br>Intel® HD graphics P530<br>Intel® HD graphics 530<br>AMD FirePro™ W6150M<br>NVIDIA® Quadro® M1000M<br>NVIDIA® Quadro® M2000M<br>NVIDIA® Quadro® M3000M<br>NVIDIA® Quadro® M4000M<br>NVIDIA® Quadro® M5000M | Intel® HD Graphics P630<br>Intel® HD Graphics 630<br>AMD Radeon™ Pro WX 4170<br>NVIDIA® Quadro® M1200<br>NVIDIA® Quadro® M2200<br>NVIDIA® Quadro® P3000<br>NVIDIA® Quadro® P4000<br>NVIDIA® Quadro® P5000<br>HP VR Ready Configurations available |
| **Memory**[22] | | Up to 64 GB DDR4-2133 ECC or non-ECC SDRAM (Transfer rates up to 2133 MT/s) | Up to 64 GB DDR4-2133 ECC or non-ECC SDRAM (Transfer rates up to 2400 MT/s for systems with less than 32 GB. Transfer rates up to 2133 MT/s for systems with greater than 32 GB) |
| **Internal storage**[17] | | 500 GB up to 1 TB SATA (7200 rpm)<br>500 GB SATA SED (7200 rpm)<br>500 GB SATA SED FIPS 140-2 (7200 rpm)<br>500 GB (8 GB cache) SATA SSHD<br>256 GB up to 512 GB M.2 SATA SED SSD<br>256 GB up to 1 TB HP Z Turbo Drive G2 (NVMe PCIe SSD) | 1 TB SATA (7200 rpm)<br>500 GB up to 1 TB SATA (7200 rpm)<br>500 GB SATA SED (7200 rpm)<br>500 GB SATA SED FIPS 140-2 (7200 rpm)<br>500 GB (8 GB cache) SATA SSHD<br>256 GB up to 1 TB SATA SSD<br>256 GB M.2 SATA SED SSD<br>256 GB HP Z Turbo Drive G2 (NVMe PCIe TLC SSD)<br>512 GB HP Z Turbo Drive G2 (NVMe PCIe TLC SED SSD)<br>256 GB up to 1 TB HP Z Turbo Drive G2 (NVMe PCIe MLC SSD) |

| | | |
|---|---|---|
| **Battery**[18] | HP Long Life 6-cell 96 WHr Li-ion prismatic | HP Long Life 9-cell, 96 Wh Li-ion polymer with HP Fast Charge support |
| **Battery life**[19] | Up to 16:45 | Up to 17:07 |
| **Adapter** | Slim Smart AC Adapter (200 w) | Slim Smart AC Adapter (200 w) |
| **Ports** | (2) USB Type-C™ (Thunderbolt™ 3, DisplayPort™ 1.2, USB 3.1)<br>(5) USB 3.0<br>(1) USB 3.0 (charging)<br>(1) HDMI 1.4<br>(1) VGA<br>(1) RJ-45<br>(1) Power connector<br>(1) Stereo microphone-in/headphone-out combo | (2) USB Type-C™ (Thunderbolt™ 3, DisplayPort™ 1.2, USB 3.1)<br>(5) USB 3.0<br>(1) USB 3.0 (charging)<br>(1) HDMI 1.4<br>(1) VGA<br>(1) RJ-45<br>(1) Power connector<br>(1) Stereo microphone-in/headphone-out combo |

**What is the UHD/4K DreamColor display panel choice on the HP ZBook 17 G4?**

UHD/4K panels offer extremely high resolution (3840 x 2160) for maximum screen real estate and vibrant, clear pictures. HP DreamColor technology has been added to this screen resolution for customers who desire color accuracy for their workflows. The panel will be color calibrated out of the factory and come outfitted with the HP Mobile Display assistant software application.

## HP Z Displays

**What's special about HP Z Displays?**
HP Z Displays provide outstanding image accuracy, exceptional adjustability, and mission-critical reliability optimized for commercial environments. Built with IPS Gen 2 panels, HP Z Displays deliver power savings over first-generation IPS technology and extra-wide viewing angles that foster collaboration.

**What display size options do I have?**
Choose from 22- to 34-inch diagonal IPS displays.

**What resolutions can I get?**
Depending on the HP Z Display, you can get a range of resolutions from 1920 x 1080 all the way up to ultra-high definition at 5120 x 2880.

**What connectivity choices do I have?**
Depending on the HP Z Display, you can get a range of inputs that include DisplayPort™ 1.2, DVI, VGA, HDMI 1.4, MHL, and USB 3.0 ports.

**For full product details, please reference the HP Z Displays Quick Reference Guide.**

## HP Specialty Displays

**What specialty displays does HP offer?**
HP offers two unique specialty displays: the HP Z34c Curved Display and the HP Zvr Virtual Reality Display.

**What value does HP's curved display bring?**
The HP Z34c Curved Display brings 34 diagonal inches of an immersive, curved visual and audio experience in a thin, ultra-high resolution display that boasts a 21:9 aspect ratio to enhance your visual perception.

**What is HP's Virtual Reality display?**
HP's Virtual Reality display delivers a virtual-holographic 3D image[18] that allows you to enjoy real-time, natural interaction with your 3D[23] objects. The display's full-motion parallax sensors track the movement of your head and responds to exactly where you look. The stylus manipulates objects in the 3D atmosphere, providing haptic feedback so you know exactly where you are interacting.

# HP DreamColor Displays

**What's special about the HP DreamColor Displays?**
Enjoy pure, consistent 10-bit color accuracy from design to production with push-button color space selection and easy color calibration. The HP DreamColor Professional Displays produce up to 1.07 billion colors from a massive color gamut covering 99% of Adobe® RGB.

**What are the at-a-glance features of the HP DreamColor Z24x G2 Display?**
- Pro-class color quality with 100% coverage of sRGB, BT.709 and 99% of Adobe® RGB. Crisp and clear from 1000:1 contrast ratio[24] and high brightness on a 1920 x 1200 resolution wide-angle IPS panel.
- Create your own custom color space and calibrate any of the five color space presets—sRGB, Adobe® RGB, BT.709, User and Native—with the optional HP DreamColor Calibration Solution.
- Connect to a PC, workstation, and several digital video devices with DVI, DisplayPort™, and HDMI inputs. A DisplayPort™ output supports daisy chaining of multiple displays[12].

**What are the at-a-glance features of the HP DreamColor Z27x Studio Display?**
- Consistently deliver rich, accurate colors and ultra-deep blacks with HP's custom-engineered 27-inch diagonal DreamColor panel. Get massive 2560 x 1440 resolution and crisp, clear presentation from 1000:1 typical, 800: minimum contrast ratio and high brightness[25].
- Experience up to 1.07 billion colors with 1,024 tones per channel as the HP DreamColor Engine[25] powers through your 4K content[26] with 10-bit color accuracy and easily handles today's most demanding professional workflows.
- Deep, rich CRT-class blacks at any angle with custom-engineered, advanced Off-Axis Black and second-generation IPS technologies. 99% coverage of DCI-P3 and 100% coverage of sRGB and Adobe® RGB.
- Instant push-button color accuracy with seven color space presets. The integrated calibration engine recalibrates with a professional color measurement device or the HP DreamColor Calibration Solution[12].

**What are the at-a-glance features of the HP DreamColor Z31x Studio Cinema 4K Display?**
- Watch your vision come to life in riveting Cinema 4K resolution with an expansive color gamut that produces remarkably vivid colors, sleek automation, and high performance tools.
- Experience our widest color gamut yet, with inky blacks, and rich shadow details.
- Enjoy superb off-axis viewing you retain depth from any angle.
- Create with the confidence that comes from meticulous and trusted color accuracy.
- Maintain perfect color with the advanced built-in colorimeter capable of measuring and adjusting on-screen performance at scheduled intervals or on demand.

**What are the at-a-glance features of the HP DreamColor Z32x Display?**
- Get exceptional, consistent 10-bit color precision, out-of-the-box color calibration, and sRGB, BT709, and Adobe® RGB coverage from HP DreamColor technology.
- Explore your creativity and get expansive views of your projects, documents and media with 8 million pixels and 4K (3840 x 2160) resolution[20]—four times that of a traditional Full HD display—on a massive 31.5-inch diagonal screen whether in landscape or portrait mode.
- Connect to an array of everyday devices right at the display with HDMI, mDP, MHL, and USB 3.0 ports. View simultaneous feeds in Full HD with picture-in-picture or picture-by-picture[27].

# HP Z Workstations innovations

## HP Z Turbo Drive

**What is the HP Z Turbo Drive SSD?**
The HP Z Turbo Drive PCIe SSD is the family name for an M.2 PCIe connected SSD. The M.2 PCIe card used in the HP Z Turbo Drive requires a PCIe x4 slot for maximum performance. These storage components are compatible with many HP Z Workstations. Please refer to our datasheets for the specific compatibility.

**What is the HP Z Turbo Drive G2 PCIe SSD?**
The HP Z Turbo Drive G2 PCIe SSD incorporates SSD technology that uses PCIe Gen3 x4 for added bandwidth and provides roughly a 2x improvement in sequential performance. In addition, the SSD uses NVMe controller technology which provides a 3x improvement in random read performance. It features capacities from 256 GB to 1 TB on one card[17].

**How does the performance of a PCIe SSD compare to a SATA SSD?**
The HP Z Turbo Drive G2 PCIe SSD significantly outperforms a standard SATA SSD. All SATA SSDs are limited by the 6 GB/s SATA bandwidth. The sequential performance of the new HP Z Turbo Drive G2 PCIe SSD is up to 4x faster than a standard SATA SSD[28].

**How does the HP Z Turbo Drive G2 compare to a commercial-grade HDD?**
The HP Z Turbo Drive is incredibly faster than a commercial-grade HDD demonstrating sequential read performance that is more than 14 times faster. Some specific performance data follows:

| | HP Z Turbo Drive G2 | SATA SSD | SATA 7200 HDD |
|---|---|---|---|
| **Sequential read** | 2150 MB/s | 550 MB/s | 150 MB/s |
| **Sequential write** | 1550 MB/s | 500 MB/s | 150 MB/s |
| **Random read** | 300K IOPS | 100K IOPS | 0.46K IOPS |

**Which HP Z Workstations support the HP Z Turbo Drive G2?**
The HP Z Turbo Drive G2 is supported on our complete HP Z Workstation line-up including the HP ZBook 14u G4, HP ZBook 15u G4, HP ZBook Studio G4, HP ZBook 15 G4, HP ZBook 17 G4, HP Z2 Mini G3, HP Z240, HP Z440, HP Z640, and HP Z840 Workstations.

**Do the platforms support both HP Z Turbo Drive G2 and other SATA/SAS drives?**
Yes. We support many other storage components and controllers to enable various storage solutions. Most of these combinations are technically supported, yet not all of these component configurations and RAID support options are available from the factory.

**Can I use the HP Z Turbo Drive in other HP systems?**
The HP Z Turbo Drive has been developed exclusively for support in the stated HP Z Workstation platforms. Other HP platforms may provide support at a later date.

**For full product details, refer to the HP Z Turbo Drive G2 FAQ.**

## HP Z Turbo Drive Quad Pro

**What is the HP Z Turbo Drive Quad Pro?**
The HP Z Turbo Drive Quad Pro is a solution that supports four M.2 PCIe connected SSD modules. Each M.2 PCIe module used in the HP Z Turbo Drive Quad Pro requires 4 PCIe Gen3 lanes for maximum performance, thus the HP Z Turbo Drive Quad Pro requires a PCIe Gen3 x16 slot in order to support the four M.2 modules at full performance.
The HP Z Turbo Drive Quad Pro is supported on the HP Z440, HP Z640, and HP Z840.

**How is the HP Z Turbo Drive Quad Pro different from the HP Z Turbo Drive G2?**
The HP Z Turbo Drive Quad Pro uses the same PCIe NVMe modules as the HP Z Turbo Drive G2, but has several distinguishing features:

- It will support four PCIe NVMe M.2 modules on a single card
- For full performance, the HP Z Turbo Drive Quad Pro requires a PCIe Gen3 x16 slot, instead of a PCIe Gen3 x4 slot
- Sudden power loss protection is supported

**What storage capacities are available with the new HP Z Turbo Drive Quad Pro?**
The new HP Z Turbo Drive Quad Pro uses NVMe SSD modules available in 256 GB, 512 GB, and 1 TB[17] capacities. Thus, the maximum total capacity is 4 TB[17]. It is possible to order the card with less than four SSD modules and then add additional SSD modules later. HP expects to offer higher capacity devices in the future as they become available in the industry.

**How does the performance of a PCIe SSD compare to a SATA SSD?**
The HP Z Turbo Drive G2 and HP Z Turbo Drive Quad Pro PCIe SSDs significantly outperform standard SATA SSDs. All SATA SSDs are limited by the 6 Gb/s SATA bandwidth. The sequential performance of the new HP Z Turbo Drive G2 and HP Z Turbo Drive Quad Pro PCIe SSDs are 4x faster than standard SATA SSDs[28].

| | HP Z Turbo Drive Quad Pro* (4 SSD modules in RAID 0) | HP Z Turbo Drive G2 | SATA SSD | SATA 7200 HDD |
|---|---|---|---|---|
| **Sequential read** | 9000 MB/s | 2150 MB/s | 550 MB/s | 150 MB/s |
| **Sequential write** | 5800 MB/s | 1550 MB/s | 500 MB/s | 150 MB/s |
| **Random read** | 1200K IOPS | 300K IOPS | 100K IOPS | 0.46K IOPS |

* Sequential read performance tested with Iometer 1.1.0 with 12 workers, queue depth of 128, file size of 128K.

## HP Z Cooler

**What is the HP Z Cooler?**
The HP Z Cooler uses 3D Vapor Chamber technology and HP's innovative staggered Hex Fin Heat Exchanger to dissipate processor heat faster and more efficiently than ever before on the HP Z440 and HP Z840 Workstations. This increased efficiency translates into uncompromised system acoustics with full processor performance.

**Why did HP choose to develop the HP Z Cooler?**
Many industry and ergonomic studies have shown that high acoustic levels have a negative effect on worker productivity. The HP Z Cooler works to provide extremely efficient removal of heat from the Central Processing Unit (CPU) using new HP innovations and available cooling technology. Efficient heat removal translates to lower acoustic levels associated with the cooling of the CPU. Over time, CPUs have increased in performance and have also increased the amount of heat they generate. CPUs have progressively become more difficult to cool while maintaining a low acoustic output. HP focuses on providing high levels of user productivity during the workstation design process. Low acoustic noise output is a key factor in enabling high user productivity. The HP Z Cooler is an example of HP's commitment to user productivity.

In addition, studies have shown certain kinds of acoustic noise are more distracting than others, especially higher frequencies and irregular modulations. When a workstation executes a heavy cyclic processor workload, the fan(s) may ramp up and down rapidly with the workload, creating these irregular modulations. The improved ability of the HP Z Coolers to efficiently remove CPU heat helps to reduce these bothersome changes in fan speed, delivering a pleasant user experience even under the most demanding processor use.

**What are the benefits of the HP Z Cooler?**
The primary value of the HP Z Cooler is in the reduction of acoustic levels associated with cooling the CPU, the typical primary source of system acoustic noise. Lowering system acoustic levels enhances end-user productivity. The HP Z Cooler employs a single hermetically-sealed 3D Vapor Chamber unit with no pumps or hoses, so it has the simplicity and reliability of traditional heat pipes with better thermal performance than a liquid cooling system.

**How does the HP Z Cooler acoustics compare to the standard cooler of the HP Z440/ HP Z840 and the solutions provided by previous platforms?**
The superior thermal efficiency of the HP Z Coolers helps deliver lower processor-induced acoustic noise at high frequency, high power processor operating states. The HP Z Cooler provides a significant reduction in system noise. These reductions in system noise create a more comfortable and productive work environment without sacrificing application performance.

## HP Remote Graphics Software (HP RGS)[1]

**What is HP RGS[1]?**
HP RGS[1] or HP Remote Graphics Software is software that allows you to access, share, and broadcast your Windows and Linux® workstation and virtual workstation apps in amazing, high-speed clarity from any remote PC, Mac®, MacBook®, Windows tablet or thin client. The application has been built from the ground up with HP's workstation expertise[24] and gives you workstation-class performance everywhere you work, with transfer speeds up to 60 fps for your most demanding apps, to allow you to work like you're local. HP RGS[24] looks fantastic even at 4K. And with integrated HP Velocity and advanced video compression you get a premium experience regardless of connectivity strength.

**Does HP RGS[1] work on non-HP hardware?**
HP RGS[1] should work on any hardware/software combo that meets the system requirements and support matrix in the QuickSpecs. For support purposes, customers must be able to reproduce any issue on an HP system listed in the support matrix with an HP factory installed image.

**Who uses HP RGS[1]?**
HP RGS[1] has been used as the gold standard for remote workstations and collaboration in many industries including architecture, engineering and construction, education, financial services, geospatial, media and entertainment, oil and gas, product development, and more.

**What is the sender or receiver for HP RGS[1]?**
There are two parts to HP RGS[1]. The sender software, which gets installed on the workstation that is running your professional applications, and the receiver part, which gets installed on the thin client, tablet or PC you will be connecting from. The receiver is a free download for Windows, Linux®, and Mac® OS.

**How does HP RGS[1] work?**
HP RGS[1] works by analyzing the image of the remote workstation and sending an encrypted and encoded stream to the client devices. The keyboard, mouse and USB devices on the client devices are sent back to the remote workstation.

The end result is complete control of a remote workstation that looks and feels as though you were physically working from your workstation, with all of its applications, data, graphics and processing power.

This allows you to collaborate across the room, across town, or around the world. Stream your local workstation screen across the cloud to your team's individual devices for live, interactive edits and reviews or pull multiple remote feeds to a single PC.

And you can ensure your files are secure with 256-bit encryption that only sends an image and leaves your intellectual property in the data center. Add more security with login credentials, USB blocking, and local smart cards.[12]

**What's new in HP RGS 7[1]?**
HP RGS 7[1] brings the workstation productivity to Window 8 or Windows 10 tablets. Features like gesture to hot-key mapping, zoom, virtual mouse, HP Velocity and touch controls give you touch controls to Windows 7 and Linux® applications that are not programmed for touch. Advanced touch recognition features even "teach" Windows 7 applications to recognize Windows 8 or Windows 10 gestures.

HP RGS 7.1 and later versions also comes the largest performance boost yet. Remote sessions can now perform at up to twice the frame rate of HP RGS 7.0 resulting in a more real-time interactive experience for even the most graphics rich applications.

**How can I know if I will benefit from a new version of HP RGS[1]?**
HP posts the release notes for each version at hp.com/go/rgs. HP also offers a trial license on the same web page so you can test out new versions of HP RGS[1] in your environment. HP offers Care Pack Services[29] to help you set up HP RGS in your environment. Also remember that patch and minor updates are available for free.

**For more details, refer to the HP RGS[1] Datasheet and QuickSpecs.**

# Thunderbolt™ 3

**Why did HP decide to include Thunderbolt™ 3 port on the USB Type-C™ connector on the HP ZBook Studio/15/17 G4 Mobile Workstations?**

Thunderbolt™ 3 —the industry's fastest and most versatile connection—currently runs over this USB-C connector. Thunderbolt™ 3 provides the highest speed I/O and is required by the most demanding users to maximize the overall performance of the workstation. The HP Workstation team decided to outfit the HP ZBook Studio/15/17 Mobile Workstations with dual Thunderbolt™ 3 capabilities. This would allow unique differentiation in the market but also allow for added capabilities by connecting to the new HP ZBook Dock with Thunderbolt 3 and still supporting native Thunderbolt™ 3 on the system.

**What is the difference between Thunderbolt™ 3 and USB Type-C™?**

Thunderbolt™ 2 was previously the fastest I/O port available and standardized on the mini-DisplayPort™ 1.2 (mDP). Thunderbolt™ 3 is the next generation I/O port and Intel® has chosen to standardize this technology on the new USB-C connector. The HP ZBook Studio/15/17 will feature (2) USB Type-C™ ports supporting Thunderbolt™ 3.
The HP ZBook 14u, HP ZBook 15u, and other HP EliteBook products will feature a standard USB-C port that does not support Thunderbolt™ 3. Specifically, the difference is a standard USB-C port is based on the USB 3.1 Gen 1 interface with data transfer speeds equivalent to that of a USB 3.0 port at 5 Gb/s. Thunderbolt™ 3 via USB Type-C™ allows for transfer speeds of up to 40 Gb/s. See below for comparison matrix.

| Port | USB 3.0 | USB 3.1 (Gen 1) | USB 3.1 (Gen 2) | Thunderbolt™ 2 | USB Type-C™ (supporting Thunderbolt™ 3, DisplayPort™ 1.2, USB 3.1) |
|---|---|---|---|---|---|
| **Port connector** | USB Type A | USB -C | USB -C | Mini DisplayPort™ | USB-C |
| **Transfer speeds** | 5 Gb/s | 5 Gb/s | 10 Gb/s | 20 Gb/s | 40 Gb/s |
| **Protocols supported** | USB 3.0 | USB 3.1 Gen 1 | USB 3.1 Gen 2 (SuperSpeed USB) | PCIe, DisplayPort™ | PCIe, DisplayPort™, USB 3.1 Gen 2 |
| **Platforms supported** | All HP ZBooks | HP ZBook 14u G4<br>HP ZBook 15u G3/G4 | HP ZBook Studio G3/G4<br>HP ZBook 15 G3/G4<br>HP ZBook 17 G3/G4 | HP ZBook 15 G2<br>HP ZBook 17 G2 | HP ZBook Studio G3/G4<br>HP ZBook 15 G3/G4<br>HP ZBook 17 G3/G4 |
| **Notes** | | USB-C port on HP ZBook 14u G4, HP ZBook 15u G3/G4 and EliteBook G3 series is specified as USB 3.1 Gen 1 | Thunderbolt™ 3 port integrates a USB 3.1 host controller | (1) Thunderbolt™ 2 port supported on the HP ZBook 15 G2 and HP ZBook 17 G2 | (2) USB Type-C™ ports supported on the HP ZBook Studio G3/G4, HP ZBook 15 G3/G4, and HP ZBook 17 G3/G4 |

**What are the unique features of USB Type-C™ available on the HP ZBook Studio/15/17 G3/G4 Mobile Workstations?**

- USB Type-C™ is a super-set port supporting multiple protocols over a single connection simultaneously: Thunderbolt™ 3, DisplayPort™ 1.2, SuperSpeed USB (USB 3.1 Gen 2), and PCI Express.
- Industry leading I/O speeds at 40 Gb/s.
- Support for 2 x 4K displays @ 60 Hz through a single port.
- Power – 15 W to bus-powered devices.
- Daisy chain up to 6 Thunderbolt™ devices.
- Connectivity with the new HP ZBook Dock with Thunderbolt 3.

**How does Thunderbolt™ 3 compare to USB 3.0?**

Thunderbolt™ 3 provides 8x the throughput of USB 3.0.

## HP ZBook Dock with Thunderbolt 3

**Why did HP make the decision to transition to the new HP ZBook Dock with Thunderbolt 3?**
Thunderbolt™ 3 offers a significant leap forward in transfer speeds (40 Gb/s), presenting an opportunity to leverage connectivity over an existing port rather than needing to design a docking connector into the mobile workstation. This allowed for a thinner, lighter, and overall optimized chassis to add other expandability features that customers value. Additionally, with the continued shift towards mobility, a traditional bottom docking solution adds thickness, weight, and overall clutter to the workspace. The extremely compact and travel friendly HP ZBook Dock with Thunderbolt 3 streamlines and frees up the workspace.

**What are the key features of the HP ZBook Dock with Thunderbolt 3?**
- Link up to 10 devices at once through ports that include USB Type-C™ (which also supports Thunderbolt™ 3, DisplayPort™ 1.2, and USB 3.1 Gen 2), four USB 3.0, RJ-45, VGA, combo audio, and two additional DisplayPort™ ports.
- Simple, single cable connection delivering both power/charging and connectivity.
- Small, lightweight portable ID allows for optimized cable management.

**Will the legacy standard and advanced docking solutions used for the HP ZBook 15/17 G2 work with the new HP ZBook Studio, 15, 17 G3/G4 Mobile Workstations?**
The HP standard and advanced docking station solutions used for the HP ZBook 15/17 G2 will not work on any of the HP ZBook Studio, 15, 17 G3/G4 Mobile Workstations. The previous docking connector was located on the bottom of the chassis. The HP ZBook Studio/15/17 G3/G4 Mobile Workstations no longer have this bottom connector and will leverage the Thunderbolt™ 3 port on the HP ZBook Dock with Thunderbolt 3. The HP ZBook 14u G4 and HP ZBook 15u G3/G4 will continue to utilize the existing ultra-slim side-docking station.

## Intel® processors

**What can I expect from Intel® Xeon® processors?**
Intel® Xeon® processors are purposely built for workstations and servers. They support Error Checking and Correcting (ECC) memory logic, and are the logical choice for environments where professionals need the performance to work efficiently and accurately by avoiding data corruption and/or computer crashes. This processor series provides PCI Express connections directly from the processor. The processor series also provides dual QuickPath Interconnects (QPI) between processors increasing the processor-to-processor communication speeds for dual processor systems.

**What features does the Intel® Xeon® processor E5-2600 v3/v4 series support?**
- 40 lanes of PCIe Gen 3 I/O (for each processor).
- For the HP Z840, the 1st processor will provide two PCIe3 x16 slots and one PCIe3 x4 slot. The 2nd HP Z840 processor will provide one PCIe3 x16 slot and two PCIe3 x8 slots.
- Intel® Turbo[6] Mode (allows processor to run faster under certain conditions).
- Intel® Hyper-Threading Technology[5].
- 22m (v3) or 14nm (v4) Silicon Process Technology.
- From 10 MB to 55 MB of processor cache. The size of the processor cache is dependent on processor model.
- 6.4GT/s, 8.0GT/s and 9.6GT/s QPI links.
- The speed of the QPI is dependent on processor frequency.
- 85 W, 90 W, 105 W, 120 W, 135 W, 145 W and 160 W parts.
- Integrated DDR4 memory controller.
- 4 channel 2400 MHz DDR4 memory subsystem with v4 processors.
- Memory frequency is dependent on processor frequency. Please refer to the HP Workstation Intel® Xeon® Haswell to Broadwell processor and memory transition FAQ.

**Do I have to recompile my applications to see the performance advantages of the new Intel® Xeon® processors?**
No, testing and Intel® data indicate that technical applications show immediate performance increases due to the new processor and memory architecture.

**What are the benefits of multi-core processors[11]?**
Intel® multi-core processors[11] provide greater processing resources. Multi-core processors are ideal for usage models requiring multi-tasking (running many applications or simulations at once); working on spread sheets while listening to music with virus checkers and system backups running (power office); or using applications that can split a task across processors (multi-threaded), like animation/rendering in Digital Content Creation.

**Multi-core. Dual-socket. Dual-core. Quad-core. Six-core. Eight-core? What do these terms mean?**

| | |
|---|---|
| **Dual-socket** | Two physical CPU sockets |
| **Dual-core** | Each CPU package has exactly two processor cores |
| **Quad-core** | Each CPU package has exactly four processor cores |
| **Six-core** | Each CPU package has exactly six processor cores |
| **Eight-core** | Each CPU package has exactly eight processor cores |
| **Multi-core** | Each CPU package has multiple (2, 4, 6…) processors cores |
| **Dual-processor** | A system with two processors in two sockets |

**What is Intel® Turbo Boost Technology 2.0[6]?**
Intel® Turbo Boost Technology 2.0[6] is a way to automatically run the processor core faster than the marked frequency if the part is operating under power, temperature, and current specifications limits of the Thermal Design Power (TDP). This results in increased performance of both single and multi-threaded applications.

**How much faster will my processor run with Intel® Turbo Boost 2.0 Technology[6]?**
The maximum frequency of Intel® Turbo Boost Technology 2.0[6] is dependent on the number of active cores. The amount of time the processor spends in the Intel® Turbo Boost Technology 2.0 state depends on the workload and operating environment. Any of the following can set the upper limit of Intel® Turbo Boost Technology 2.0 on a given workload:

Number of active cores
Estimated current consumption
Estimated power consumption
Processor temperature

When the processor is operating below these limits and the user's workload demands additional performance, the processor frequency will dynamically increase until the upper limit of frequency is reached. Intel® Turbo Boost Technology 2.0 has multiple algorithms operating in parallel to manage current, power, and temperature to maximize performance and energy efficiency. Note: Intel® Turbo Boost Technology 2.0 allows the processor to operate at a power level that is higher than its rated upper power limit (TDP) for short durations to maximize performance.

As an independent and complementary feature, Intel® Hyper-Threading Technology[5] (Intel® HT Technology) increases performance of both multi-threaded and single-threaded workloads.

## DDR4 memory

**What is DDR4 memory?**
The 4th generation double data rate memory is called DDR4.

**Which HP Z Workstations offer DDR4 memory?**
The HP ZBook 14u G4, HP ZBook 15u G3/G4, HP ZBook Studio G3/G4, HP ZBook 15 G3/G4, HP ZBook 17 G3/G4, HP Z2 Mini G3, HP Z240 SFF, HP Z240 Tower, HP Z440, HP Z640, and HP Z840 Workstations all only support DDR4 memory.

**Will DDR3 memory work in the HP ZBook G3 or G4, HP Z240, HP Z440, HP Z640, and HP Z840 systems?**
No, users will have to transition to DDR4 for the HP ZBook G3 and G4 systems, HP Z240, HP Z440, Z640, and Z840 Workstations. DDR3 and DDR4 memory types cannot be intermixed or installed into systems in which they are not supported.

**What are the advantages of DDR4 memory?**
DDR4 memory is moving at 2400 MHz, up from 1866 MHz on DDR3, so potentially, when the system is running at max capacity, the user could see an increase of up to 28% in speed and higher performance.

## Graphics

**Graphically, what is special with the HP Z Workstations?**
HP Z Workstations support one of the widest ranges of Professional 2D up to Ultra High-End 3D graphics from Intel®, AMD, and NVIDIA® for your most visually demanding applications. Depending on the HP Workstation you choose, you can drive up to twelve displays and take advantage of PCI Express Gen3 expansion slots. Please refer to the specific workstation for the I/O slot arrangements.

And with HP RGS[1], included with every HP Workstation, you can access the full graphics performance of the workstation even when working remotely or from lower powered machines.

**What size of graphics memory should I use?**
Graphics performance is dependent upon many factors, including the amount of video memory. Higher performing cards also include bigger and faster GPUs, more memory bandwidth, and tend to have more scalable features like higher processing unit counts, larger video memory, video sync, and better multi-GPU support. The higher performance graphics cards will also have more memory (and a higher price). A dual display configuration at 1920 x 1200 pixels will allocate about 70 MB for the frame buffer. The remaining graphics memory will be used to store textures, display lists (graphics data sent by your applications), and other data specific to graphics. If your application would benefit from more storage space for these items, then you should purchase a graphics card with more memory.

**For details on which graphics cards are supported on HP Z Workstations, refer to the HP Workstation Graphics Cards Quick Reference Guide.**

## Storage and optical drives

**Do HP Z Workstations offer and support SATA-III 6.0 GB/s hard drives?**
Yes, we offer SATA III 7200 rpm drives. Most of the 7200 rpm drives are 3.5-inch. HP does offer a 500 GB SED and 500 GB and 1 TB SATA options[17] for the 2.5-inch form factor. Storage capacities for the 7200 rpm drives range up to a massive 3 TB[17].

**Do HP Z Workstations support Serial ATA (SATA) and serial attached SCSI (SAS) RAID?[33]**
Yes. The chipset used on the HP Z Workstations has an integrated 6-channel SATA controller with RAID support for RAID 0 (striped), RAID 1 (mirrored), RAID 5 (parity), and RAID 10 (striped and mirrored). You can choose to have a high performance RAID 0 array of hard drives where data is striped across multiple hard drives (this RAID method greatly improves data access times and system performance). You can choose to have a highly reliable RAID 1 array of hard drives, where data is duplicated to multiple hard drives at once (this RAID method creates a backup copy of all your data in real time). You can choose to implement a RAID 5 array, which protects against data loss and provides faster throughput. Data is distributed across at least two hard disks, with error correction information stored on an additional disk. Finally, you can choose to implement a RAID 10 array, which offers the advantages of RAID 0 and RAID 1 by utilizing four hard disks.

**What SAS hard drives and controllers are offered?**
We offer a wide selection of SAS disk drives and controllers on the HP Z440, HP Z640 and HP Z840 Workstations. The faster spindle speeds (15K rpm, 10K rpm) and the high bandwidth controllers (6 GB/s) result in very fast access to your data. We offer two different PCIe Gen3 SAS controllers: an entry 4-channel SAS controller with basic hard drive connectivity/control and RAID functionality, and a full-featured 8-channel SAS RAID-on-Chip (ROC) controller with an external connector and comprehensive RAID functionality.

**Do HP Z Workstations offer and support solid-state and self-encrypting drives? What about PCIe SSD drives?**
Yes, we offer and support a variety of both branded (Intel®, Samsung Enterprise) and unbranded solid state drives (SSDs), self-encrypting drives (SED SSDs), mSATA SSDs, and PCIe SSDs.

You can choose from 2.5-inch SATA SSDs up to 512 GB[17]; 2.5 SATA SED SSDs up to 256 GB[17]; 3.5-inch SATA SED hard drives up to 500 GB[17]; and mSATA SSDs up to 256 GB[17].

We also offer our PCIe SSD, the HP Z Turbo Drive G2, up to 1 TB[17] on all our desktop workstations.

**What optical drives are available with HP Z Workstations?**
HP offers a variety of optical drives including DVD-ROM, DVD +/-RW DL Super Multi, Blu-ray, and 15-in-1 Media Card Readers.

See the HP Z Workstations Quick Reference Guide for storage and optical drives options on both desktop and mobile workstations.

## Operating systems

**What operating systems are available on HP Z Workstations?**
A variety of operating systems (OS) are available, including the following: (Please note that the exact OS carried by each workstation varies by product. For more information, see individual product QuickSpecs).

**Which Windows[2] solutions are supported?**
HP Z Workstations support the following Windows operating systems:

- Microsoft Windows 10 Professional 64-Bit
- Windows 10 Home 64
- Microsoft Windows 7 Professional 64-bit (available through downgrade rights from Windows 10 Pro 64-bit)

**Which Linux® solutions are supported?**
- Red Hat® Enterprise Linux® Desktop 6 and 7

**Which Linux® solutions are available?**
- Linux® Ready system install option (FreeDOS). Optional HP Installer Kit for Linux® media is available or download the Kit from HP Support. Check the individual system QuickSpecs for availability
- HP Installer Kit for Linux® (includes drivers for 64-bit OS versions of RHEL 6/7, SUSE Linux® Enterprise Desktop 11, and SUSE Linux® Enterprise Desktop 12). Check the individual system QuickSpecs for availability.
- Red Hat® Enterprise Linux® Desktop (Paper license with 1 year support; no pre-installed OS)

**Is dual OS preload an option?**
Dual OS preload is only available through Custom Integration Services.

**What is the HP Installer Kit for Linux®?**
The HP Installer Kit for Linux® is FreeDOS with our driver discs included. FreeDOS is a bare-bones OS, intended for those who want to load their own Linux® version. This kit is also available from the HP Support web site.

**What value does HP bring to Linux® on Personal Workstations?**
- HP has a dedicated Linux® R&D team with 25+ years of experience in OS and driver development
- HP has close relationship with multiple third-parties to enable the complete Linux® workstation solution
- HP engineering provides extensive pre-sales technical support
- HP publishes detailed documents, drivers, and white papers on the support website regarding Linux® on HP Z Workstations

## Manageability

**What manageability features are available on HP Z Workstations?**
HP Z Workstations meet the industry standard specifications for DASH 1.1 and support Intel® Active Management Technology (AMT) 9.1 and Intel® vPro™ Technology[6]. Through these programs, IT administrators can remotely control features such as: power management, hardware inventory/alerting (including BIOS and firmware revisions), system defense filters, remote scheduled maintenance, and much more. HP Z Workstations also support software such as optional LANDesk Management Suite, Microsoft System Center Configurations Manager, and HP Client Automation Enterprise. HP Client Security Suite Gen3[30] is available on the HP ZBook G4 Mobile Workstations.

# Security

**What security features are available on HP Desktop Workstations?**

| Security feature | HP Z240 SFF | HP Z240 Tower | HP Z440 | HP Z640 | HP Z840 |
|---|---|---|---|---|---|
| Padlock support (padlock optional) | • | • | • | | |
| Cable Lock support (cable optional) | • | • | • | • | |
| Serial, parallel, USB enable/disable | • | • | • | • | • |
| Removable media write/boot control | • | • | • | • | • |
| Power-on password | • | • | • | • | • |
| Setup password | • | • | • | • | • |
| Universal chassis clamp lock (optional) | • | • | • | • | |
| Kensington cable lock (optional) | • | • | • | • | • |
| Smart cover solenoid lock (optional) | • | • | • | • | |
| Chassis intrusion sensor (optional) | • | • | • | • | • |

**What security features are available on the HP ZBook Mobile Workstations?**
The HP ZBook G4 Mobile Workstation family are the most secure and manageable mobile workstations on the planet![31]

| Security feature | HP ZBook 14u G4 | HP ZBook 15u G4 | HP ZBook Studio G4 | HP ZBook 15 G4 | HP ZBook 17 G4 |
|---|---|---|---|---|---|
| HP Sure Start Gen3[32] | • | • | • | • | • |
| Integrated Smart Card Reader | • | • | • | • | • |
| HP Spare Key (requires initial user setup) | • | • | • | • | • |
| One-Step Logon | • | • | • | • | • |
| Common Criteria EAL4+ Augmented Certified Discrete TPM 1.2 Embedded Security Chip | • | • | • | • | • |
| Security lock slot | • | • | • | • | • |
| Support for Intel® AT | • | • | • | • | • |
| HP Fingerprint Sensor (optional) | • | • | • | • | • |
| Computrace* | • | • | • | • | • |

*The Computrace agent is shipped turned off, and must be activated by customers when they purchase a subscription. Subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S.

Please see product QuickSpecs for more information on security features.

# Options and modules

**What options are available for HP Z Workstations?**
For a complete list of all options for the HP Z Workstations, please visit hp.com/zworkstations.

## Warranty and support

**What is the warranty and support for HP Z Workstations with Windows?**
The standard warranty for HP Z Workstations is 3-3-3 limited warranty (three years parts, three years labor, and three years next business day on-site).

HP Care Packs[29] extend service contracts beyond the standard warranties. Service starts from date of hardware purchase. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at hp.com/go/lookuptool. Additional HP Care Pack Services information by product is available at hp.com/go/carepack.

Service levels and response times for HP Care Packs may vary depending on your geographic location.

**What is the warranty and support for HP Z Workstations with Linux®?**
The warranty for HP Z Workstations with Linux® is the standard 3-3-3 limited warranty with 90 days of OS configuration and installation assistance.

**Will HP stand behind Linux® when I have problems?**
HP is the first place for support. Hardware and software warranties for the workstations with Linux® will be the same as that of the Windows workstations. Extended hardware warranties and software support options will also be available for purchase for if you need extended coverage.

### Additional resources

hp.com/zworkstations
hp.com/go/whitepapers
HP Z Workstations Quick Reference Guide

[1] HP RGS requires a Windows, Linux®, or Mac OS X 10.10 and newer operating system and network access.

[2] Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See microsoft.com.

[3] The following applies to HP systems with Intel® 6th Gen and other future-generation processors on systems shipping with Windows 7, Windows 8, Windows 8.1 or Windows 10 Pro systems downgraded to Windows 7 Professional, Windows 8 Pro, or Windows 8.1: This version of Windows running with the processor or chipsets used in this system has limited support from Microsoft. For more information about Microsoft's support, please see Microsoft's Support Lifecycle FAQ at support.microsoft.com/lifecycle.

[4] In accordance with Microsoft's support policy, HP does not support the Windows 8 or Windows 7 operating system on products configured with Intel® and AMD 7th generation and forward processors or provide any Windows 8 or Windows 7 drivers on http://www.support.hp.com.

[5] Intel® Hyper-Threading Technology (HT) is designed to improve performance of multi-threaded software products and requires a computer system with a processor supporting HT and an HT-enabled chipset, BIOS and OS. Please contact your software provider to determine compatibility. Not all customers or software applications will benefit from the use of HT. See intel.com/info/hyperthreading for more information.

[6] Intel® Turbo Boost technology requires a PC with a processor with In Intel® Turbo Boost capability. Intel® Turbo Boost performance varies depending on hardware, software, and overall system configuration. See intel.com/technology/turboboost for more information.

[7] Some vPro functionality, such as Intel® Active management technology and Intel® Virtualization technology, requires additional 3rd party software in order to run. Availability of future "virtual appliances" applications for Intel® vPro technology is dependent on 3rd party software providers. Microsoft Windows required.

[8] Each processor supports up to 4 channels of DDR4 memory. To realize full performance at least 1 DIMM must be inserted into each channel. Actual memory speeds dependent on processor capability.

[9] Duplication of copyrighted material is strictly prohibited. Actual speeds may vary. Double Layer media compatibility will widely vary with some home DVD players and DVD-ROM drives. Note that DVD-RAM cannot read or write to 2.6 GB Single Sided/5.2 Double Sided-Version 1.0 Media.

[10] With Blu-Ray, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-ray titles to play, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this Desktop PC.

[11] Multi-Core is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel®'s numbering is not a measurement of higher performance.

[12] Sold separately or as an optional feature.

[13] Not all configurations will qualify as an UltrabooK™.

[14] Weight varies by configuration and component.

[15] Onsite service may require an optional HP Care Pack. Availability may vary.

[16] HD content required to view HD images.

[17] For storage drives GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 10) is reserved for system recovery software.

[18] Recharges your battery up to 50% within 30 minutes when the system is off or in standby mode. Power adapter with a minimum capacity of 65 watts is required. After charging has reached 50% capacity, charging will return to normal. Charging time may vary +/-10% due to System tolerance.

[19] Battery life results based on MobileMark benchmark measured in hours:minutes. HP ZBook G3 and G4 configurations were measured with Mobilemark14, Windows 10 64 bit.

[20] All HP ZBooks pass MIL-STD 810G testing. Testing was not intended to demonstrate fitness for U.S. Department of Defense contract requirements or for military use. Test results are not a guarantee of future performance under these test conditions. Damage under the MIL STD test conditions or any accidental damage requires an optional HP Accidental Damage Protection Care Pack.

[21] Intel® HD graphics 630 is configurable as a standalone graphics option; Intel® HD graphics P630 is only used when NVIDIA® Optimus™ Technology is enabled.

[22] Non-ECC memory only available with Intel® Core™ processors.

[23] 3D content is required for 3D performance.

[24] 1.07 billion viewable colors through A-FRC technology. All specifications represent the typical specifications provided by HP's component manufacturers; actual performance may vary either higher or lower.

[25] All specifications represent the typical specifications provided by HP's component manufacturers; actual performance may vary either higher or lower.

[26] 4K content required to view 4K resolution.

[27] MHL 2.0 port will charge an MHL-compatible smartphone and tablet battery. Requires the smartphone or tablet to be enabled for MHL or have an HDMI dongle (sold separately) to connect to the monitor. See your mobile device specifications. Max display resolution of content from a smart phone or tablet is dependent on the max resolution of those devices.

[28] Performance measurements tested with Iometer 1.1.0 with 12 workers, queue depth of 128, file size of 128 KB used for sequential measurements, file size of 4KB used for random measurements.

[29] Care Packs are optional. Service levels and response times for HP Care Packs may vary depending on your geographic location. Service starts on date of hardware purchase. Restrictions and limitations apply. For details, visit hp.com/go/cpc.

[30] Requires Windows and Intel® or AMD 7th generation processors.

[31] Based on HP's unique and comprehensive security capabilities at no additional cost among mobile workstation vendors as of Jan. 2017 on HP Mobile Workstations with 7th Gen Intel® processors.

[32] Available on HP ZBook products equipped with Intel® 7th generation processors.

[33] SATA hardware RAID is not supported on Linux® systems.The Linux® kernel, with built-in software RAID, provides excellent functionality and performance.It is a good alternative to hardware based RAID.Please visit h10032.www1.hp.com/ctg/Manual/c00060684.pdf for RAID capabilities with Linux®.

## Learn more

hp.com/zworkstations
hp.com/go/whitepapers

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