

HPE ProLiant DL385 Gen10 Server Technologies

Using AMD EPYC 7000 Series processors



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Abstract

A digital transformation is taking place, fueled by big data, mobility, the internet of things (IoT), and cloud-native technologies. Today, every business is a digital business, with a new generation of applications and data at the center of innovation. At the same time, digital is constantly under attack by cyber criminals, creating an ever-present and growing need for advanced security measures. That puts IT at the heart of the business—and its momentum. This technical white paper describes the technologies used in the [HPE ProLiant DL385 Gen10 rack-optimized server](#), powered by AMD EPYC™ 7000 series processors, and how these innovations will change your server experience with a new formula for virtualization and memory-centric workloads with unprecedented security.

Introduction

The HPE ProLiant DL385 Gen10 Server (Figure 1) is an extension of the world's most secure, industry standard servers.¹ It is ideally suited for virtualization and memory-centric workloads like analytics, data warehousing, and databases such as SAP HANA®, Oracle, and SQL. HPE has designed these servers with the security to protect your digital assets, the agility to modernize your infrastructure, and the economic control to consume IT based upon your preferred financial model.



Figure 1. HPE ProLiant DL385 Gen10 Server

The [HPE ProLiant DL385 Gen10 Server](#) offers the following differentiating innovations:

- **Security:** Unmatched protection for VMs in any infrastructure
 - Execute only trusted software with a dedicated security processor and AMD secure root-of-trust technology
 - Encrypt data with 128-bit advanced encryption standard (AES) in main memory with cryptographic isolation from other VMs, tenants, and the hypervisor with AMD Secure Run technology
 - Execute only trusted server essential firmware with HPE silicon root of trust with runtime verification and firmware recovery
 - Securely migrate VMs with AMD Secure Move technology
- **Agility:** A low cost-per-VM that changes your established formulas
 - AMD EPYC processors deliver 14% more cores, 33% more memory capacity and bandwidth, and 33% more I/O that allows for greater VM density²
 - The HPE ProLiant DL385 Gen10 Server delivers a 25% lower cost per VM³
 - VMs can be aligned to specific NUMA domains, providing local access to memory, cores, and I/O
 - Balanced compute, memory, and I/O with 64 cores, 128 threads, and 8 memory channels with up to 4 TB of memory in a 2P configuration, and support for up to 24 NVMe SSDs;⁴ this enables a very large 2P memory and HDD footprint
 - Compatible with existing deployments, with full x86 instruction set

¹ Based on third party conducting cybersecurity penetration testing of a range of server products from a range of manufactures, May 2017.

² Based on 128 lanes versus 96 lanes in Intel® Xeon® 2P processors

³ HPE internal calculations, November 2017.

⁴ HPE ProLiant DL385 Gen10 (AMD offering only)



- **Economic control:** Innovative investment models for flexible IT consumption
 - [HPE Flexible Capacity](#) provides the simplicity and flexibility of the public cloud with the security and control of your own environment
 - HPE Capacity Care Service allows you to manage unpredictable demand, raise utilization levels, and reduce costs
 - Deferred payments allow you to purchase the HPE ProLiant DL385 Gen10 today and defer payments for up to 90 days
 - 0% financing allows you to purchase the HPE ProLiant DL385 Gen10 while preserving your cash and extending your budget
 - Trade in an HPE ProLiant Gen8 server for a Gen10 with a limited-time accelerated trade-in amount of \$400 on top of fair market value

HPE Secure Compute Lifecycle

Security is a top-of-mind concern for businesses of all sizes. HPE delivers an end-to-end security solution that addresses protection at every stage in the server's lifecycle (Figure 2). Beginning with stage one—at the very inception of the product—with our silicon root of trust, the server's essential firmware is loaded into our custom silicon with an unbreakable link that anchors it into the hardware. That immutable connection between the silicon and firmware protects the server through the production process, supply chain, shipping, and distribution, all the way to your final location.

Once the server arrives safely at your location, [HPE Secure Compute Lifecycle](#) continues to provide not only protection during operation but also unparalleled detection and recovery capabilities. As soon as the server is booted and the [iLO](#) firmware becomes active, our silicon root of trust looks for the immutable fingerprint that verifies all firmware code is valid and uncompromised. Before the operating system (OS) even starts, over a million lines of firmware code run, making it essential to confirm that all server essential firmware is free from malware or compromised code.

HPE has introduced a new technology called Runtime Firmware Verification, which checks the firmware stored in the server operation. At any point, if compromised code or malware is inserted in any of the critical firmware, an iLO audit log alert is created to notify you that a compromise has occurred. A firmware breach is highly unlikely, of course. Nevertheless, a disgruntled employee with access to the data center could insert bad code. A new HPE license called HPE iLO Advanced Premium Security Edition can detect such an event and allow you to securely recover the firmware automatically to a previous known good state.

Stage three in the lifecycle process is security—to and through the network. [Aruba ClearPass](#) creates a strong networking security clearance protocol for clearing anyone requesting access to the network. ClearPass creates a profile of potential users and clears access of users into our Aruba networks. Niara, a subsidiary of HPE, will be responsible for monitoring activity of users inside the network. Once ClearPass vets and clears users into networks, Niara takes over and, using machine learning, works to predict any nefarious behavior before any serious damage can be done. If Niara identifies abnormal activity resembling potential malicious behavior, it communicates to ClearPass, temporarily terminating the suspected user's access to the network until more thorough vetting can be conducted. In the case of a rogue employee, this predictive capability blocks potential bad actors from the network, before any damage is done.



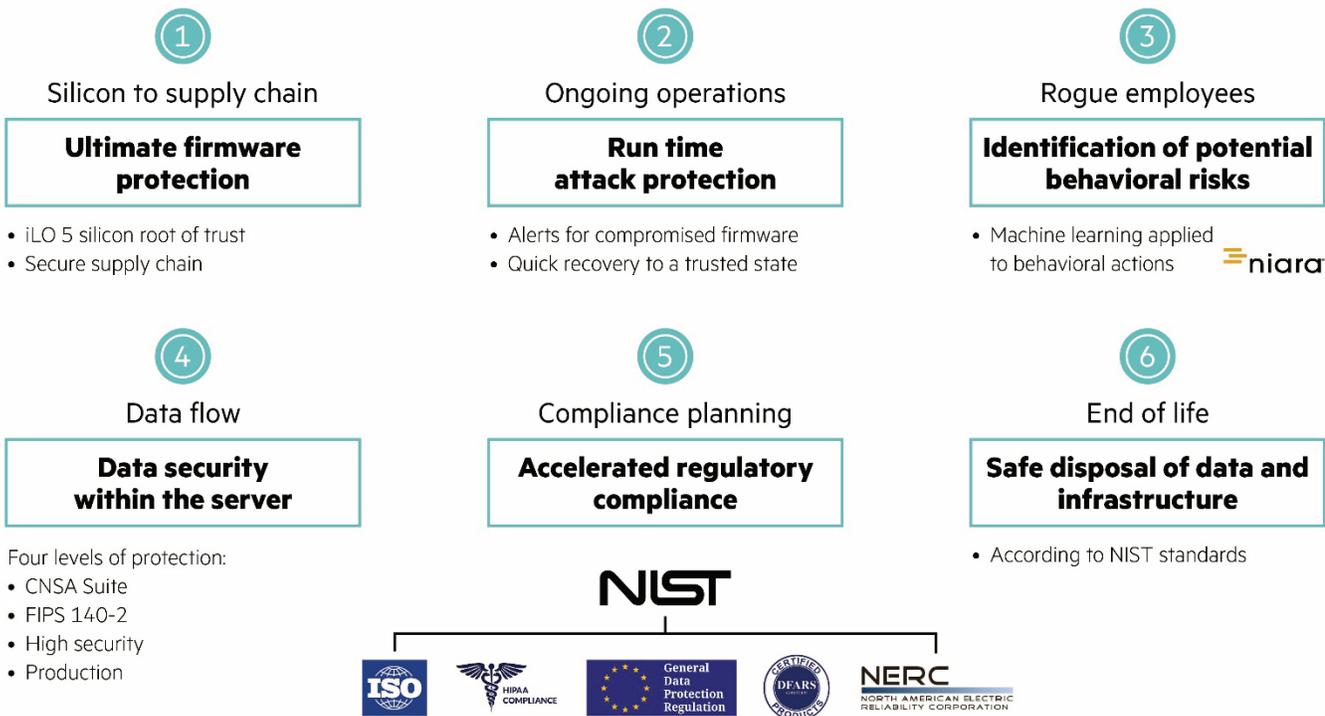


Figure 2. HPE Secure Compute Lifecycle stages

Stage four is protecting data and communication to and from the server, and inside the server. HPE is the first industry server manufacturer to provide support for the commercial national security algorithms (CNSA) suite. This is the very highest level of security, typically used for confidential and top-secret information. HPE also has FIPS validation on firmware as another level of protection during the operation phase of the server’s life.

Scalable encryption is another differentiated offering from HPE, protecting data stored in the server. Unlike other servers that use self-encrypting drives requiring management of separate keys in each and every drive, HPE offers secure encryption through our Smart Array Controller cards. These cards contain all encryption keys and enable key management at scale. Going one step further, the HPE Atalla Enterprise Secure Key Manager (ESKM) is also qualified with our controller cards, and takes key management to a higher level. Through this technology, we save you the agony of tracking—sometimes on spreadsheets—an unmanageable number of encryption keys.

Closely related to security are the numerous government regulations that businesses must comply with. HPE is applying the NIST 800-53 security controls to a solution stack of storage, networking, servers, and software to create a secure baseline. This secure baseline is a necessary step to issue an authority to operate (ATO) before putting IT infrastructure into operation. Additionally, this NIST 800-53 control set can assist you with certifications like FedRAMP, HIPAA, and ISO 207001. Just recently, the president of the United States issued an executive order mandating all federal agencies follow NIST guidelines for cybersecurity protections. The private sector is also beginning to use the same NIST controls as standards for preventing cybercrime.

The final, sixth stage of the HPE secure compute lifecycle comes after the servers and other equipment have reach their full use and entered end of life. [HPE Pointnext](#) security and protection services provide final disposal of equipment, ensuring the data is properly disposed of according to NIST standards.



Processor technologies

The HPE ProLiant DL385 Gen10 [rack-optimized server](#) is built on AMD EPYC system on-a-chip (SoC) processors. HPE has been deeply associated with AMD’s re-entry into the x86 space by working closely with the company on the development of the EPYC processor. This included HPE and AMD jointly working throughout the design phase and even sharing technologies such as the design for our Smart Socket Guide in order to decrease bent pins. HPE also gets priority access to AMD resources to help with the test and debug of the processor revisions, which makes the HPE platforms much more stable. This close partnership helps HPE deliver the highest value to our customers and ensures that the HPE innovations pair nicely with our partner innovations. This new technology includes the following benefits:

- **Performance:** Industry-leading performance with the most cores, memory, and I/O
 - The AMD EPYC SoC brings a new balance to your data center. The highest core count in an x86-architecture server processor, largest memory capacity per processor, most memory bandwidth, and greatest I/O density are all brought together with the right ratios to help performance reach new heights.⁵
- **Flexibility:** Best balance of resources drives right sized compute for all workloads
 - You can match core count with your application needs without compromising processor features. A balanced set of resources gives you more freedom to right-size your server configuration for your workload.
- **Security:** Industry’s first embedded x86 silicon-level data security on a server chip
 - AMD has created the industry’s first hardware-based security processor embedded in an x86-architecture server SoC. The processor manages secure boot, memory encryption, and secure virtualization on the SoC itself. Encryption keys never have to leave the processor where they can be exposed to intruders.

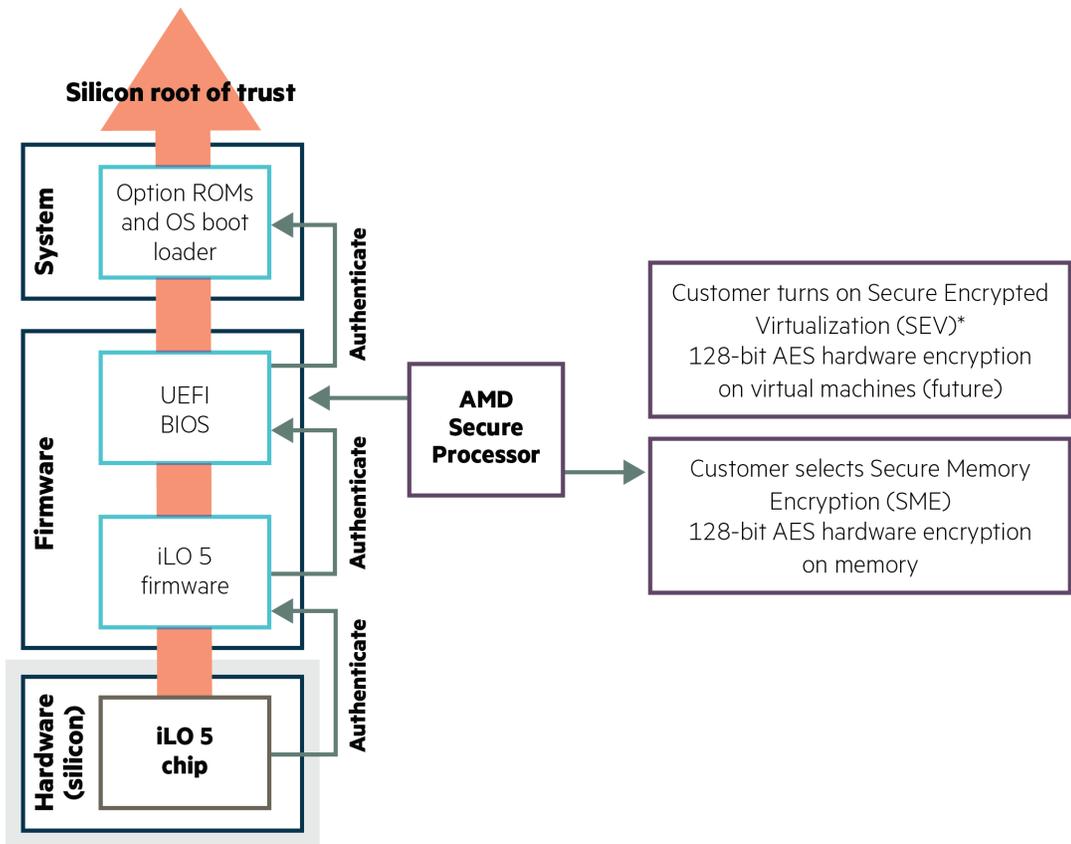
The AMD EPYC processor provides several security related features, including AMD Secure Processor, secure memory encryption (SME), and secure encrypted virtualization (SEV). These features are used to help enable key security technology categories, including secure root of trust, Secure Run, and Secure Move.

Table 1. The three basic categories of security features supported by AMD EPYC processors

Secure root of trust (AMD Secure Processor, secure boot)	Prevents the use of rootkits/bootkits that inject malicious code prior to an OS loading. Creates hardware root of trust, enabling only known and trusted software to be loaded and run—from initial boot load through BIOS load.
Secure Run (SME, SEV)	Memory scraping and cold boot attacks are both modes of attack that can be used when data running in the main system memory is not encrypted. SME encrypts system memory. SEV isolates the hypervisor and guest VMs to prevent access to data in shared guest data areas.
Secure Move (SEV-enabled servers, APIs, third-party key management)	Migrating VMs within the data center, to off-premises private cloud, or to the public cloud can be insecure. SEV-enabled servers can establish a secure channel between them and send memory encryption keys to the remote platform.

⁵ The AMD EPYC processor includes up to 32 CPU cores versus the Intel Xeon Platinum 8180 processor with 28 CPU cores.





Secure Root of Trust: prevents the use of rootkits/bootkits that could inject malicious code prior to an OS loading. Creates hardware root of trust only known and trusted software to be loaded and run, from initial boot through BIOS load. Connects and is complimentary with the HPE Silicon Root of Trust, providing a second check of the HPE UEFI BIOS, ensuring firmware code is authentic.

* Available when supported by vendors like Microsoft®, VMware®, Red Hat®, and SUSE, on the HPE ProLiant DL385 Gen10.

Figure 3. Secure Root of Trust

Memory technologies

Server virtualization and memory-intensive applications place high demands on server memory in terms of speed, capacity, and availability. These demands define the system’s reliability, performance, and overall power consumption to a much greater extent than before—making server memory a critical component in meeting your IT solution requirements.

The HPE ProLiant DL385 Gen10 Server features HPE DDR4 SmartMemory, which supports faster memory speeds than before.

Also, HPE Advanced Memory Error Detection technology delivers enhanced reliability and memory protection on ProLiant Gen10 servers.

HPE DDR4 SmartMemory

HPE DDR4 SmartMemory offers significant improvements over previous memory generations. Unlike third-party memory, HPE SmartMemory is authenticated by the server to verify that it has passed the rigorous qualification and testing of Hewlett Packard Enterprise, ensuring you are using the highest quality server memory.

For applications that require maximum memory capacity, HPE SmartMemory load-reduced DIMMs (LRDIMMs) reduce the electrical load to the memory controller, enabling higher-capacity memory to run at maximum speed in all configurations.



HPE SmartMemory also provides the following benefits over third-party memory when used in ProLiant Gen10 servers:

- **Extended performance:** In many two-DPC or three-DPC configurations, HPE SmartMemory operates at a higher transfer rate than industry standard DDR4 DIMMs, delivering better memory performance.
- **Enhanced manageability:** HPE SmartMemory integrates with the HPE Active Health System for enhanced monitoring, reporting, and problem diagnosis.

HPE Advanced Memory Error Detection technology

Uncorrectable memory errors can cause applications and an OS to crash, which is costly in terms of downtime and repairs. The best way to prevent unnecessary DIMM replacements is to filter out superfluous errors and identify critical errors that can lead to a shutdown. You can no longer rely on simple error event counts on systems containing up to 14 trillion memory transistors. With HPE Advanced Memory Error Detection technology, we reinvented a precision system to pinpoint errors that cause downtime.

HPE Advanced Memory Error Detection technology seeks out specific defects that either cause performance degradation or significantly increase the probability of an uncorrectable (non-recoverable) memory condition. By improving the prediction of non-recoverable memory events, the technology prevents unnecessary DIMM replacements and increases server uptime.

HPE ProLiant Gen10 servers include the following advanced memory protection features:

- **Advanced ECC/SDDC:** Error checking and correcting (ECC), combined with single-device data correction (SDDC), ensures continued memory operation in the event of a single memory device failure. The server removes a DRAM from the memory map if the DRAM device exhibits a failure and recovers its data into a new device. SDDC works for both x4 and x8 DIMMs.
- **Demand/redirect scrubbing:** Writes corrected data back to memory after a correctable error is detected on a read transaction.
- **Patrol/periodic scrubbing:** Proactively searches the system memory, repairing correctable errors. Patrol and demand scrubbing work together to prevent accumulation of correctable errors and reduce the likelihood of unplanned downtime.
- **Memory thermal control:** Prevents DIMMs from overheating by slowing down the memory access rate. The temperature is monitored by a DIMM sensor.
- **DIMM address/control bus parity protection:** Detects and protects command and address errors.

HPE Server Storage

The IT landscape has changed. The amount of data you have to manage and analyze has grown at an unprecedented rate with no end in sight. As data storage requirements grow, you need solutions that can help overcome performance bottlenecks caused by demanding application workloads. Today's storage solutions should:

- Keep pace with data growth
- Enable fast access to data to keep you competitive
- Protect data integrity from outages and data loss
- Perform reliably to maximize uptime

HPE offers a broad portfolio of workload-optimized solutions for every [server storage](#) need. Our offerings provide enterprise environments a combination of the latest technologies to enable hassle-free performance, proven reliability, and security, backed by more than 3.35 million hours⁶ of the industry's most rigorous testing and qualification program. Our drives feature HPE Digitally Signed Firmware, which prevents data loss and malicious attacks by assuring that drive firmware comes from a trusted source.

⁶ Test quant derived from a combination of drive qualification test plans, specifically HDDQ spec-supplier responsibility to perform, RDT (reliability demonstration) test spec, CSI integration test spec, and pilot test requirements. Test conducted May 2017.



HPE hard disk drives

HPE hard disk drives (HDDs) deliver proven performance and reliable data integrity at the lowest cost per gigabyte. Most drives feature the HPE Smart Carrier, with intuitive icons to report drive activity at-a-glance and a “do not remove” button that prevents data loss caused by human error. There are three categories of drives to choose from: entry, midline, and enterprise.

HPE Entry Hard Disk Drives

HPE entry HDDs are suitable for environments that need reliable, cost-effective performance. These HDDs are ideal for small and midsize business (SMB) environments new to enterprise-class storage and are also suitable for boot and backup. Entry HDDs are supported on select HPE servers.

HPE Midline Hard Disk Drives

HPE midline HDDs are suitable for business-critical applications when you need high capacity and high availability, such as for bulk storage, backup, archive, and reference.

HPE Server Enterprise Hard Disk Drives

HPE enterprise HDDs are suitable for mission-critical storage environments with I/O intensive workloads requiring the highest levels of performance, reliability, and data integrity such as email, CRM, and database applications.

HPE solid state drives

HPE solid state drives (SSDs) remove performance bottlenecks, enabling faster access to data with consistent low latency, all while using less power. These drives are best suited for enterprise environments where highly random data is accessed by a variety of write-workload applications such as online transaction processing (OLTP) or big data analytics. HPE SSDs offer improved random read and write input/output operations per second (IOPS) and are available in both SAS and SATA to fit your needs.

HPE NVMe PCIe SSDs

HPE NVMe PCIe SSDs utilize the NVMe interface to talk directly to your applications via the PCIe bus. By hosting your entire database on one or more HPE NVMe PCIe SSDs, you boost I/O performance, leverage in-memory access, reduce latency, and scale performance in-line with your processing requirements. These features create a flexible and dependable solution to proactively address your storage needs. HPE NVMe PCIe SSDs are available in 2.5-inch and in add-in card form factors.

HPE M.2 Solid State Enablement Kit

As the most recent addition to our read-intensive SSD family, HPE M.2 SSDs are best suitable for boot/swap. This flexible form factor saves hot pluggable bays for removable SSDs. The DL385 is the only HPE ProLiant Gen10 server to support two embedded M.2 SATA connectors.

HPE Flash Media devices

HPE's high-performance enterprise flash media kits can meet your boot-from-flash requirements for integrated hypervisors and Tier 1 OSs. With high data retention and read/write cycles, HPE flash media devices are available in secure digital (SD) and microSD form factors.

HPE Optical Drives

HPE Optical Drives—both DVD-ROM and DVD-RW solutions—are available in half-height, slim, and super-slim models to fit any HPE system in your data center.

HPE Smart Array Controllers

HPE's newest line of enterprise-class RAID controllers help maximize performance, data availability, and storage capacity. They deliver up to 1.6M IOPS—a 65% improvement in performance⁷—while using up to 45% less power⁸ than previous generation controllers. Additionally, you get enterprise-class data-at-rest encryption to help you comply with regulations like HIPAA and Sarbanes-Oxley. New mixed mode allows you to use both HBA and RAID modes simultaneously on one controller, freeing up a PCIe slot for other uses, for additional flexibility. You can choose from Smart Array S-Class software RAID, and Smart Array E-Class or P-Class controllers—each delivering a broad feature set and related benefits.

⁷ HPE Internal lab testing comparing HPE Gen9 to Gen10 Smart Array Controllers, January 2017.

⁸ HPE Internal lab testing comparing HPE Gen9 to Gen10 Smart Array Controllers, October 2016.



Ideal for entry-level solutions that use SATA drives in basic RAID configurations, HPE Smart Array Software RAID delivers the reliability and efficiency needed to address evolving data storage needs. Features include RAID levels 0/1/5, support for 6G SATA, and access to the unified extensible firmware interface (UEFI) configuration tool.

Cost-effective HPE Smart Array E-class controllers provide simple RAID storage with enterprise-class reliability and security. Key features include ROC (RAID on Chip) and RAID levels 0/1/5/10. These controllers also offer flexibility with mixed mode capabilities, security with HPE Smart Array SR Secure Encryption, and simplicity with the UEFI configuration tool. HPE Smart Array P-class controllers maximize the performance of enterprise-class server storage. Key features include ROC, support for flash back write cache (FBWC), and advanced RAID levels 0/1/5/6/10/50/60/ADM. Mixed mode capability HPE Smart Array SR Secure Encryption and the UEFI configuration tool are also included. Note that these controllers are also supported on HPE BladeSystem, HPE Apollo servers, and HPE Synergy compute modules for cross-platform flexibility.

HPE Smart Array SR Secure Encryption

HPE Smart Array SR Secure Encryption provides broad encryption coverage and complies with sensitive data regulations including HIPAA and Sarbanes-Oxley. Validated as a FIPS 140-2 Level 1 enterprise class controller solution for data-at-rest on all SAS/SATA drives, this solution is available for both local and remote deployments.

HPE Smart Array SR SmartCache

HPE Smart Array SR SmartCache is an HPE Smart Array controller-based read and write caching solution for HPE ProLiant servers in direct-attached storage (DAS) environments. HPE SmartCache caches the most frequently accessed (“hot”) data onto lower-latency SSDs to dynamically accelerate application workloads. HPE SmartCache operates transparently to host applications, which means you do not have to change the application and can realize better performance with a minimal number of SSDs in your configuration.

The HPE Server Storage portfolio helps you manage your growing data needs. Whether you need large capacity, fast data access, or reliable data integrity, we have a solution to empower any workload.

Networking

For ProLiant Gen10 servers, HPE provides next-generation [networking](#) adapters designed to meet the needs of converged IT infrastructure with higher performance and support for key Ethernet features. HPE ProLiant Gen10 servers come with embedded multi-port 1GbE networks interface cards (NICs) on the system board, but can utilize the new dual- and quad-port stand-up NICs at speeds up to, but not limited to 25Gb/s and beyond.

Gen10 networking adapters also feature several capabilities such as NIC partitioning (NPAR), data plane development kit (DPDK), tunnel offload (NVGRE/VXLAN), and RDMA over converged Ethernet (RoCE), which deliver improved network performance and efficiency in specific environments.

Gen10 networking adapters come with security features that help protect, detect, and recover from malicious attacks to the firmware. It all starts with digitally signing the firmware. HPE sends firmware and security requirements to the adapter manufacturer, who then creates a public and private key pair through a secure code signing process. The public key is embedded in the NIC silicon. The network adapter’s “chain of trust” is created from a true hardware root of trust. Firmware encrypted with a private key must be decrypted by the public key in the NIC silicon in order to be validated. In addition to root of trust, HPE’s adapters offer additional key security features such as UEFI secure boot, authenticated updates, audit logs, device-level firewall, and sanitization.

LAN-on-motherboard (LOM) technology provides essential network connectivity without requiring a network card to be installed in an expansion slot. While standard LOM design leaves expansion slots available for expansion functions, it also limits your connectivity options. We developed FlexibleLOM technology, which uses a FlexibleLOM module that attaches to a dedicated edge connector on the system board. FlexibleLOM technology maintains the close-coupled interface of a LOM while allowing you to select the connectivity you need now—and adapt to network changes in the future without using a standard PCIe slot.

Three families of HPE network adapters are available:

- Standard
- Advanced
- Performance



HPE standard adapters

HPE standard series networking adapters offer a cost-effective Ethernet solution for ProLiant networking needs. These adapters meet the price/performance goals for core enterprise workloads. HPE standard series adapters are available at 1 Gb/s speed in both dual-port and quad-port configurations and as 10GbE dual-port adapters. Standard series adapters also support both single root I/O virtualization (SR-IOV) and NPAR functionality.

Single root I/O virtualization

SR-IOV is a technology created primarily to benefit the performance of NICs when they are used in virtualized environments. SR-IOV allows a PCIe network adapter to appear to be multiple separate physical devices—or virtual network functions—that can be assigned to individual VMs within a virtualized server environment. By allowing individual VMs to access a portion of the physical NIC, SR-IOV reduces the server processor overhead for network I/O and decreases I/O latencies.

NIC Partitioning

NIC Partitioning (NPAR) allows a single port to be presented to the OS as four separate adapters, or partitions, per port (Figure 4). Each partition is an actual PCIe function that appears to the system ROM, OS, or virtualization OS as a discrete physical NIC with its own software driver, and each partition behaves as an independent NIC port. With NPAR, you must configure the partitions in a pre-boot environment, which you must also manage locally on each server.



Figure 4. NPAR

Standard adapters also support the following security features:

- **Authenticated Updates:** Protects user and configuration data from unauthorized access and validates digitally signed firmware.
- **Secure Boot:** Safeguards the system and ensures no rogue drivers are executed on startup.

HPE advanced adapters

HPE advanced [network adapters](#) help simplify the networking and networking storage topology to build a hybrid server networking infrastructure. HPE FlexFabric architecture gives the flexibility to configure the network ports on advanced adapters as any of the following:

- Standard Ethernet adapter
- Fibre Channel over Ethernet (FCoE) adapter
- iSCSI adapter

When configured as either FCoE or iSCSI, the network port is made to look like either a Fibre Channel adapter or a SAS host bus adapter (HBA), respectively, to the server host OS. In these configurations, the HPE advanced adapter delivers additional performance benefits because the processing of the storage part of the stack occurs on the adapter and not on the host CPU. This is sometimes referred to as “storage offloading.”

As a result of this flexibility, FlexFabric adapters allow you to connect to different types of storage and data networks without requiring additional NICs, thereby reducing cabling and switch requirements.

On ProLiant Gen10 rack and tower servers, HPE offers [FlexFabric](#) as dual-port 10GbE adapters. Advanced adapters also support the following security features on top of the features supported on standard series adapters:

- **Device-level firewall:** Blocks any unmanaged access to memory or storage. This ensures that on-device firmware and configuration data can only be accessed by authorized agents.
- **Audit logs:** A forensics capability that provides traceability into authenticated firmware updates by capturing changes in standard system logs.



HPE performance adapters

Data center network traffic is continuing to increase significantly, driven in part by the rise in the volume of mobile data and video, and the frequency at which they are accessed. Current approaches to managing this increase in traffic (for example, using a 4-port 10GbE NIC to aggregate 40GbE of bandwidth) are both expensive and require extra infrastructure.

HPE 25GbE Ethernet adapters deliver significantly increased networking throughput to and from the server using fewer networking resources. The new 25GbE adapters are available for HPE ProLiant DL385 servers and deliver the following benefits:

- 2.5 times the bandwidth of 10GbE adapters
- Compatibility with the current copper or fiber cabling used for 10GbE
- Lower CAPEX and OPEX costs compared to 40GbE solutions using more ports/switches to achieve required throughput
- Easier scalability to 100GbE standards

Performance adapters also support other advanced networking capabilities, including RoCE and tunnel offload capability.

- **RoCE:** Allows applications to access memory directly on other nodes across a fabric for very low latency communications. RoCE works well for endpoints that communicate frequently, such as storage functions, database environments, or VM migrations.
- **Tunnel offload for overlay networks:** Tunnel offload minimizes the impact of overlay networking on host performance for virtual extensible LAN (VXLAN) and network virtualization using generic routing encapsulation (NVGRE). By offloading packet processing to adapters, overlay networking can be used to increase VM migration flexibility and network scale with minimal impact to performance. HPE tunnel offloading increases I/O throughput, reduces CPU utilization, and lowers power consumption.

Performance adapters also support the following security features on top of the features supported on advanced series adapters:

- **Silicon (hardware) root of trust:** Enables a chain of trust for authenticating updates to firmware. This blocks installation of rogue or corrupted firmware and ensures that the executing firmware is trusted.
- **Sanitization:** Renders user and configuration data on the network interface card irretrievable so that they can be safely repurposed or disposed.

Managing HPE ProLiant Gen10 servers

HPE offers a set of [server management](#) capabilities that give you complete control of your IT infrastructure. For HPE ProLiant Gen10 servers, we have introduced a number of management innovations, all working together to help you monitor and manage all of the servers and infrastructure in your data center.

Embedded management with HPE iLO 5

[HPE Integrated Lights-Out \(iLO\)](#) allows you to configure, monitor, and update your HPE servers seamlessly from anywhere in the world. Featuring the latest innovations in simplified operations, performance, and security, HPE iLO allows you to manage your entire server environment with ease. For HPE ProLiant Gen10 servers, iLO 5 provides several new improvements in security, speed, and simplicity. Note that some features require an optional iLO Advanced or iLO Advanced Premium Security Edition license.

Security

- **Protect:** HPE Secure Start uniquely ensures that only HPE-signed firmware will boot by validating through HPE's silicon root of trust so you can be confident that the server's essential firmware stack (UEFI BIOS, iLO, and so on) is safe. New secure access controls like Commercial National Security Algorithm (CNSA) and Common Access Card (CAC)-factor authentication are also available with iLO 5.
- **Detect:** Runtime firmware verification is a new feature in iLO 5 that ensures that your firmware is checked at regular intervals to identify any potential intrusions that may occur post-boot.
- **Recover:** Avoid lasting damage to your business by quickly restoring firmware to the factory settings or the last known authenticated safe setting in the unlikely event of a breach with automatic and manual firmware recovery capabilities.



Speed

- **Twice as fast:** With 2X the CPU MHz in iLO 5, virtual media performance is twice as fast versus iLO 4.⁹
- **iLO service port:** Available on Gen10 servers, the new iLO service port is a USB port for integrated remote console and active health system (AHS) downloads that gives you direct, front-of-server access to iLO. This new feature also allows you to get iLO access without the need to connect and authenticate on your network, making it simpler to access the information you need quickly.

Simplicity

- **Agentless management:** With iLO 5, we're moving to full agentless management. Freedom from the hassle of inventorying and updating various management agents, agentless management allows for a more simplified and streamlined way to monitor your servers.
- **IPMI:** Gen10 enhancements allow for increased interoperability with industry IPMI tools.

Smart Update Technology

The Service Pack for ProLiant (SPP) and Smart Update Manager (SUM) utilities combine to create Smart Update Technology, solving the problem of time-consuming, expensive, and error-prone updates. SPP is a comprehensive collection of firmware, drivers, and system software tested together as a single-solution stack used for updating your [HPE ProLiant servers](#), [HPE Synergy](#), and [HPE BladeSystem infrastructures](#). SUM is an innovative tool for keeping the firmware, drivers, and system software of HPE ProLiant, HPE Synergy, HPE BladeSystem, and [HPE Moonshot infrastructures](#) and associated options up to date and secure. SUM provides an innovative update process that applies updates in an efficient order to reduce impact on operations.

For [Gen10 servers](#), Smart Update has been enhanced to provide secure, tamper-free updates. HPE firmware, driver, and software updates now include a digital signature that prevents unauthorized or modified updates from being applied. Through integrations with iLO Amplifier Pack and [HPE OneView](#), Smart Update Technology has been extended to provide simple and secure server updates at scale from a few servers to thousands of servers.

Firmware and driver updates are also smarter than ever with Smart Update in Gen10 servers. HPE iLO with Integrated Smart Update utilizes the iLO Repository to reduce maintenance widows, overall downtime, and the number of personnel required to execute firmware updates. Enhanced rollback capabilities also ensure peace of mind by enabling IT administrators to revert to a "known good" update so you can be confident and in control of your environment. Staging and scheduling of updates is also a new feature executed through the RESTful API.

Intelligent Provisioning

Intelligent Provisioning is an embedded server assistance tool that streamlines deployment through an easy-to-use wizard. For HPE ProLiant Gen10 servers, Intelligent Provisioning delivers a number of new enhancements, including:

- 3X faster deployment on Gen10 servers and up to 22% faster initial setup over previous generations
- Always On Intelligent Provisioning, now accessible from the iLO browser user interface anytime without rebooting the server with the same capabilities as accessing from F10 from the POST screen
- Management of your advanced BIOS settings on Intelligent Provisioning

UEFI

[HPE ProLiant Gen10 servers](#) use UEFI as the default system firmware. UEFI offers functionality, performance, and configuration management capabilities beyond those of legacy BIOS firmware. In addition, UEFI connects to the AMD Secure Processor to enable Hardware Validated Boot (HVB) for added security. For HPE ProLiant Gen10 servers, UEFI delivers new improvements, including the ability to select from 13 preconfigured workload profiles that tune server resources to match your workload needs and improve performance.

Converged management using HPE OneView

[HPE OneView](#) is an infrastructure automation engine built with software-defined intelligence and a template-based approach to management that makes Hybrid IT simple. HPE OneView provides faster and simpler lifecycle operations across compute, storage, and fabric resources. Productivity is increased via a unified API that connects infrastructure with applications, and places you firmly on the path toward composable infrastructure.

⁹ iLO 5 has double the CPU MHz as iLO 4. iLO 5 Virtual Media is 1.9964X faster than iLO 4. Comparison: DL360 Gen10 about 5 MB+/s (catch point 5.53 MB/s; note: encrypted) versus DL360 Gen9 about 2.5 MB+/s (catch point 2.77 MB/s; note: not encrypted), April 2017.



HPE OneView continues to evolve and grow, incorporating the following new features:

- **Common approach to storage management**—Simplifies provisioning of storage volumes and removes inefficiencies with support for HPE's leading composable, software-defined StoreVirtual VSA storage.
- **Extended platform support**—Gives you the ability to easily manage HPE platforms with one comprehensive management tool. HPE OneView now provides support for HPE Synergy; ProLiant BL, DL, and ML; HPE Apollo; and HPE Superdome X servers.
- **Simplified firmware management**—Enables updates to occur faster and easier with minimal disruption to production workloads.
- **Enhanced remote support**—Allows planning service contracts more efficiently. Contract and warranty display is available for each device, so you can easily see in advance what is going to be out of contract and warranty.
- **Global dashboard**—Extends functionality to even more HPE platforms, adding support for up to 12,800 servers and 20 HPE OneView appliances. Also added is the ability to backup and restore the global dashboard in the event of a disaster and easy access to data using customized reports with built-in filtering, sorting, and saving.
- **New HPE Composable Ecosystem additions**—Offer more choices to take advantage of the unified API to automate their solutions. The latest include Mesosphere for provisioning and extending clusters, ServiceNow for improving service levels with immediate event visibility, Densify.com by Cirba for intelligent capacity optimization, and Red Hat OpenShift for bare-metal containers as a service.

HPE Pointnext

HPE Pointnext leverages our strength in infrastructure, partner ecosystems, and end-to-end lifecycle support to offer you powerful, scalable IT solutions for faster time to value. HPE Pointnext provides a comprehensive portfolio including advisory and transformational, professional, and operational services to accelerate your digital transformation.

HPE Pointnext services include:

- **Flexible Capacity:** An infrastructure service that offers on-demand capacity, combining the agility and economics of public cloud with the security and performance of on-premises IT.
- **Datacenter Care:** HPE's most comprehensive support solution tailored to meet your specific data center support requirements. It offers a wide choice of proactive and reactive service levels to cover requirements ranging from the most basic to the most business-critical environments. HPE Datacenter Care Service is designed to scale to any size and type of data center environment while providing a single point of contact for all your support needs for HPE as well as selected multivendor products.
- **Proactive Care:** An integrated set of reactive and proactive services designed to help you improve the stability and operation of your device.
- **Foundation Care:** Support for HPE servers, storage, networking hardware, and software to meet your availability requirements with a variety of coverage levels and response times.
- **Advisory and Transformation Services:** Designs the transformation and builds a roadmap tuned to your unique challenges including Hybrid IT, workload and application migration, big data, and the Intelligent Edge. HPE leverages proven architectures and blueprints, integrates HPE Enterprise Group and partner products and solutions, and engages HPE Pointnext Professional and Operational services teams as needed.
- **Professional Services:** Creates and integrates configurations that get the most out of software and hardware, and works with your preferred technologies to deliver the optimal solution. Services provided by the HPE Pointnext team, certified channel partners, or specialist delivery partners include installation and deployment services, mission-critical and technical services, and education services.

Conclusion

Integrating HPE's leading-edge security, memory, storage, networking, and management technologies with AMD EPYC processors makes HPE ProLiant DL385 Gen10 Servers the ideal platform to support virtualized and memory-centric workloads. For enterprises looking for a new server experience, the HPE ProLiant DL385 Gen10 Server delivers a low cost per VM and leadership price/performance with unprecedented security.



Additional resources

HPE ProLiant Gen10 server options: hpe.com/info/serveroptions

HPE ProLiant DL385 Gen10: hpe.com/servers/dl385-gen10

HPE QuickSpecs main page: hpe.com/info/quickspecs

HPE Memory Configurator: hpe.com/info/ddr4memoryconfig

Server Management: HPE OneView webpage: hpe.com/info/oneview

Server remote management with HPE Integrated Lights Out (iLO): hpe.com/info/ilo

HPE Infrastructure Security Solutions: hpe.com/info/security

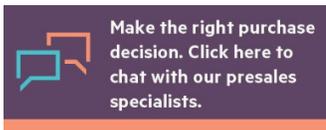
HPE Pointnext: hpe.com/info/pointnext

HPE Power Advisor: hpe.com/info/poweradvisor

[HPE Rack and Tower Family Guide](#)

Learn more at

hpe.com/info/proliant-dl-servers



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