



HPE APOLLO 2000 GEN10 SYSTEM

The enterprise bridge to scale-out architecture

Enabling you to achieve the value of density-optimized infrastructure in a cost-effective and nondisruptive manner



Whether your organization is a small to midsize enterprise conducting medical research, or a global enterprise on the cutting edge of automotive design, you use high-performance computing (HPC) to speed research and deliver new products to market faster. You also keep a watchful eye on expenses—which means using all your data center space and resources as efficiently as possible.

Organizations of all sizes have found that deploying density-optimized scale-out infrastructure helps meet both of these needs at once. Today, you can capitalize on the proven scale-out approach by choosing the HPE Apollo 2000 Gen10 System—a dense, multi-server platform that packs incredible performance and workload flexibility into a small data center space while also delivering the efficiencies of a shared infrastructure.

Offering a flexible configuration, the HPE Apollo 2000 Gen10 System supports a variety of workloads, from remote site systems to large HPC clusters and everything in between. You can deploy the HPE Apollo 2000 Gen10 cost-effectively, starting small with a single 2U shared infrastructure and scaling out up to 80 HPE ProLiant Gen10 servers in a 42U rack.

With the HPE Apollo 2000 Gen10 System, you can:

- Implement with little or no disruption, avoiding costly changes.
- Keep the same enterprise-quality system administration tools and operations practices.
- Scale quickly, without the complexity that would increase operational costs.

Leveraging the groundbreaking advancements of HPE ProLiant Gen10 servers, the HPE Apollo 2000 Gen10 System offers exceptional:

- **Agility**—To accelerate your business with double-digit boosts in performance¹
- **Security**—To provide the ultimate in IT protection by running the world's most secure industry-standard servers²
- **Economic control**—To reduce operational costs by leveraging a pay-as-you-go consumption-based model

¹ Based on internal HPE testing, May 2017.

² Based on external firm conducting cybersecurity penetration testing of a range of server products from a range of manufacturers, May 2017.

GREATER EFFICIENCY, DENSITY, AND SCALING

The HPE Apollo 2000 Gen10 System is the fourth generation, multi-server, shared-infrastructure design with shared power and cooling resources—enabling the system to drive higher levels of efficiency, compute density, and system scaling. Populated with HPE ProLiant Gen10 servers—the most secure industry-standard servers in the world³—the HPE Apollo 2000 Gen10 System provides significantly more performance than its predecessor,⁴ as well as a richer set of storage, networking, and accelerator options. These features enable the HPE Apollo 2000 to match the workload requirements of a broad set of large and small to medium-size enterprise workloads.

Designed specifically for traditional data centers, the HPE Apollo 2000 Gen10 System:

- Offers 2X the compute density of traditional 1U rack servers to maximize the use of valuable data center space
- Utilizes standard form factor racks, cabling, and serviceability to plug and play in traditional data centers without changing the infrastructure or operational practices
- Runs in a cost-effective 2U chassis for up to four servers at a comparable cost of four competitive 1U servers, but using only one-half the data center space
- Enables you to mix and match HPE ProLiant XL170r Gen10 servers and HPE ProLiant XL190r Gen10 servers of different configurations in the same 2U chassis to match any mixed application requirements
- Supports up to 12 large form factor (LFF) or 24 small form factor (SFF) disks
- Offers high-performance computing options such as Intel® Xeon® Scalable processors, large memory, optional accelerators, and high-speed/low-latency HPC clusters and I/O interconnects
- Uses “drive mapping” flexibility to optimally allocate storage to each server in the chassis

HPE APOLLO 2000 GEN10 CHASSIS FEATURES

- 2U shared infrastructure chassis, supporting up to four HPE ProLiant Gen10 hot-plug servers
- Options for two 800W/1400W 277 VAC/1600W Platinum Power Supplies, with N or N+N redundancy option (across most configurations)
- 42U rack, fitting up to 20 HPE Apollo r2000 Series Chassis and up to 80 HPE ProLiant Gen10 servers per rack

CHASSIS OPTIONS



HPE Apollo r2200



HPE Apollo r2600



HPE Apollo r2800

	HPE Apollo r2200	HPE Apollo r2600	HPE Apollo r2800
Description	Gen10 12 LFF disk or SSD chassis	Gen10 24 SFF disk or SSD chassis	Gen10 24 SFF disk or SSD chassis with drive mapping capability
Storage configuration	12 LFF hot-plug SAS/SATA HDDs/SSDs, allocated equally across server nodes	24 SFF hot-plug SAS/SATA HDDs/SSDs, or 16 SFF SAS/SATA + 8 NVMe HDD, allocated equally across server nodes	24 SFF hot-plug SAS/SATA HDDs/SSDs, or 16 SFF NVMe BP enabling custom drive allocations to match workloads
Size	2U: 17.64 in. wide x 34.62 in. deep	2U: 17.64 in. wide x 33.02 in. deep	2U: 17.64 in. wide x 33.02 in. deep
Power supplies	(2) 800W/1400W 277 VAC/1600W Platinum Power Supplies with N or N+N redundancy	(2) 800W/1400W 277 VAC/1600W Platinum Power Supplies with N or N+N redundancy	(2) 800W/1400W 277 VAC/1600W Platinum Power Supplies with N or N+N redundancy

³ Based on external firm conducting cybersecurity penetration testing of a range of server products from a range of manufacturers, May 2017.

⁴ Intel Xeon Scalable processors Enabled Apps Marketing Guide (EAMG)—HPC, delivers 1.65X average performance boost over prior Generation—2X Intel Xeon Processor E5-2699 v4 on Grantley-EP (Wellsburg) with 256 GB total memory on Red Hat® Enterprise Linux® 6.5 kernel 2.6.32-431 using Stream NTW avx2 measurements vs. 2 x Intel Xeon Platinum 8180 Processor on Neon City with 384 GB Total Memory on Red Hat Enterprise Linux 7.2-kernel 3.10.0-327 using STREAM AVX 512 Binaries, July 2017.



TECHNICAL SPECIFICATIONS



HPE ProLiant XL170r Gen10 Server

HPE Apollo r2000 Series Chassis accommodates four independently serviceable HPE ProLiant XL170r Gen10 servers with up to 80 servers in a 42U rack with one to four servers per chassis.



HPE ProLiant XL190r Gen10 Server

HPE Apollo r2000 Series Chassis accommodates two independently serviceable HPE ProLiant XL190r Gen10 servers with up to 40 servers and 80 integrated accelerators in a 42U rack with either one or two servers per chassis.

Maximum number	1U half-width, 2P, up to four per chassis	2U half-width, 2P, one or two per chassis
Processor	Intel Xeon Scalable processors with options for 4–26 cores, up to 3.6 GHz CPU speed, and power ratings up to 150 watts	Intel Xeon Scalable processors with options for 4–26 cores, up to 3.6 GHz CPU speed, and power ratings up to 150 watts
Chipset	Intel® C622	Intel C622
Memory	16 DIMM slots with up to 1.5 TB 2666 MT/s DDR4 SmartMemory (12 DIMMs x 128 GB per DIMM)	16 DIMM slots with up to 1.5 TB 2666 MT/s DDR4 SmartMemory (12 DIMMs x 128 GB per DIMM)
Network module	Two I/O slots for choice of networking and clustering options including: <ul style="list-style-type: none"> • 1/10/40 Gb Ethernet • 100 Gb/s EDR InfiniBand or Intel OPA • Fibre Channel 	Two I/O slots for choice of networking and clustering options including: <ul style="list-style-type: none"> • 1/10/40 Gb Ethernet • 100 Gb/s EDR InfiniBand or Intel OPA • Fibre Channel
PCIe 3.0 slots	One PCIe slot plus a FlexibleLOM Or Two PCIe slots	Up to four PCIe slots in multiple configurations to provide the additional capability of supporting: <ul style="list-style-type: none"> • Up to two integrated accelerators (NVIDIA® GPUs) per server or additional I/O options • Choice of networking and clustering options, including a variety of PCIe and FlexibleLOM combinations
Storage	Up to 24 drives per node Dual SATA host-based M.2 2280 NGFF SSDs—internal Hot-plug HDD support Internal USB port Hard drive mapping feature on r2800 chassis	Up to 24 drives per node Dual SATA host-based M.2 2280 NGFF SSDs—internal Hot-plug HDD support Internal USB port Hard drive mapping feature on r2800 chassis
Storage controller	Integrated Smart Array S100i storage controller Optional PCIe Host Bus Adapters and Smart Array controllers with advanced array features such as HPE SmartCache and RAID 10 Advanced Data Mirroring	Integrated Smart Array S100i storage controller Optional PCIe Host Bus Adapters and Smart Array controllers with advanced array features such as HPE SmartCache and RAID 10 Advanced Data Mirroring
Supported accelerators	N/A	Support for up to two per server NVIDIA, AMD, and Intel GPGPUs
Software stack	hpe.com/global/h22150/50272cbe-0563-4ed5-8f07-1ff0ecf06b88/index.html/	
Management	<ul style="list-style-type: none"> • Embedded server-level management: <ul style="list-style-type: none"> – iLO • Choice of cluster management software: <ul style="list-style-type: none"> – HPE Performance Cluster Manager OR Bright Cluster Manager • Additional HPE system management software (optional): <ul style="list-style-type: none"> – Apollo Platform Manager (APM) – HPE iLO 5 Advanced – HPE InfoSight for Servers – HPE OneView 	<ul style="list-style-type: none"> • Embedded server-level management: <ul style="list-style-type: none"> – iLO • Choice of cluster management software: <ul style="list-style-type: none"> – HPE Performance Cluster Manager OR Bright Cluster Manager • Additional HPE system management software (optional): <ul style="list-style-type: none"> – Apollo Platform Manager (APM) – HPE iLO 5 Advanced – HPE InfoSight for Servers – HPE OneView
Common workloads	High-performance computing, small to midsize HPC clusters, large HPC clusters in traditional data centers Scale-out architecture for large enterprises, small to medium size enterprises and remote locations, private cloud deployment Service providers operating traditional data centers	High-performance computing, small to midsize HPC clusters, large HPC clusters in traditional data centers Scale-out architecture for large enterprises, small to medium size enterprises and remote locations, private cloud deployment Service providers operating traditional data centers



HPE Pointnext Services

Providing a comprehensive portfolio of services to help accelerate digital transformation. Focusing on creative configurations with flawless on-time implementation and on-budget execution. Following innovative new approaches including HPE Flexible Capacity and HPE Datacenter Care to keep businesses at peak performance. Offering deep HPC expertise in key verticals such as government, manufacturing, oil and gas, research and higher education, and life sciences.

- Advisory Services to plan, design, migrate, and modernize your HPC infrastructure to enable innovation, growth, and competitive advantage
- Professional Services that get the most out of your software and hardware investment
- Operational Support Services to deliver the exact support for meeting your IT and business demands

HIGH-PERFORMANCE FABRIC INTERCONNECTS

All HPE Apollo 2000 Gen10 Systems support the latest high-bandwidth, low-latency interconnect technologies. You can choose between InfiniBand, which provides the performance and scalability required by HPC clusters and data center applications, or Intel OPA, which delivers HPC workloads and scales to tens of thousands of servers.

SOFTWARE PORTFOLIO

Hewlett Packard Enterprise offers customers complete software portfolio for their HPE Apollo 2000 so they can choose the right mix of software to fit their needs—from system software to application and software development tools:

Operating systems	SUSE Enterprise Linux Server 12 & up Red Hat Enterprise Linux 7 & up CentOS 7 & up
Fabric software	Mellanox UFM Intel Omni-Path Fabric Software
System management	Embedded server-level management: iLO-embedded, in-depth server-level monitoring and management technology. Choice of cluster management software: HPE Performance Cluster Manager —complete integrated cluster management software for all HPE HPC clusters offering: system setup, hardware monitoring, and management (aggregating system metrics + remote management from iLO) and cluster health management, image management, and software updates as well as power management. Or Bright Cluster Manager —automates process of building cluster in the data center and in the cloud. Ideal for heterogeneous systems. Additional HPE system management software (optional): Apollo Platform Manager (APM) —rack-level power and system management. HPE iLO 5 Advanced —additional enhanced security and power management features for Apollo servers. HPE InfoSight for Servers—AI-driven proactive data center care. HPE OneView—integration of Apollo systems into overall enterprise data center structure.
Workload management and orchestration	Altair® PBS Professional Adaptive Computing Moab® HPC Suite Slurm Workload Manager Containers: Singularity & Docker Kubernetes
Software development tools (Programming languages, debuggers, libraries)	HPE Message Passing Interface (MPI) Open MPI PGI Compilers Intel Parallel Studio XE, Intel VTune Amplifier XE PGI® Professional Edition GNU Compiler Collection Rogue Wave Software® TotalView® Arm® Forge Professional Arm Alinea Studio Mellanox HPC-X OpenHPC NVIDIA CUDA Toolkit, OpenCL, OpenACC
Remote visualization	NICE DCV & EnginFrame
For more information visit:	hpe.com/global/h22150/50272cbe-0563-4ed5-8f07-1ff0ecf06b88/index.html/



HPE FINANCING FOR HPE APOLLO 2000 GEN10 SYSTEM

A critical component of success is having access to technology on terms that align to your business requirements. [HPE Financial Services](#) is uniquely positioned to deliver a broad portfolio of flexible investment and transition solutions, designed to accelerate your move to the data center of the future.

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Solving complex scientific, engineering, and data analysis problems starts by partnering with Hewlett Packard Enterprise. Contact your HPE representative today. Find out how we, together, can design the right solution for resolving your most complex business challenges.

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