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## Fact Sheet

# HP Compute Platforms for Data-intensive Workloads

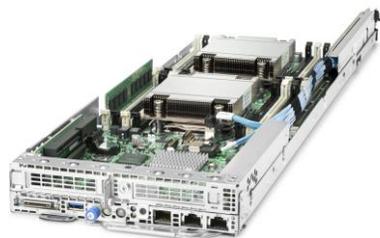
### HP Apollo 2000 System



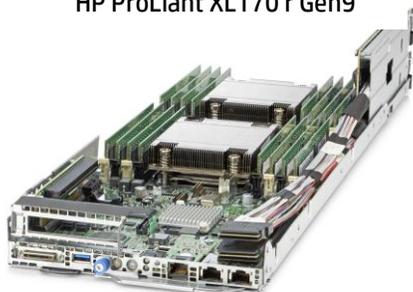
### The enterprise bridge to scale-out architecture

The HP Apollo 2000 System provides enterprises a bridge to scale-out architecture for traditional data centers so organizations can achieve the space and cost savings of density-optimized infrastructure in a non-disruptive manner.

### HP Apollo 2000 Chassis



### HP ProLiant XL170 r Gen9



### HP ProLiant XL190 r Gen9

- Up to four independent hot-pluggable servers in a standard 2U chassis – 2X the density of 1U servers
- Dual Intel® Xeon® E5-2600 v3 series processors with options for 4-18 cores, 1.6 Ghz-3.5GHz CPU speed, 85-145 Watts
- 16 x DDR4 up to 2,133 MHz (512 GB maximum)
- Up to 24 drives per node; dual SATA host-based M.2 2242 NGFF SSDs-internal
- Integrated Smart Array B140i storage controller
- Optional PCIe Host Bus Adapters and Smart Array Controllers with advanced array features like HP SmartCache and RAID10 Advanced Data Mirroring

### HP Apollo 4200 Gen9 Server



### The enterprise bridge to server solutions for big data

The HP Apollo 4200 Gen9 is the industry's densest 2U server and is ideal for smaller object storage systems, Hadoop and NoSQL based big data analytics solutions.

- Two models supporting up to 28 large form factor (LFF) drives or 50 small form factor (SFF) drives.
- Up to 224 terabytes of direct attach storage per 2U server and up to 4.48 petabytes in a 42U rack
- Dual Intel® Xeon® E5-2600 v3 series processors with options for 4-18 cores, 1.6 Ghz-3.5GHz CPU speed, 55-145 Watts
- 16 memory DIMM slots with up to 512 GB DDR4 memory at up to 2133 MHz
- Up to 5 PCIe Gen3 slots to meet networking performance needs in applications requiring higher speed I/O

### HP Apollo 4530 System



### Purpose-built for Hadoop and big data solutions

The HP Apollo 4530 System is ideal for the wide variety of big data analytics solutions ranging from large scale, parallel Hadoop based data mining to higher performance analytics for operational insight and control.

- Three servers per 4U chassis with up to 360 terabytes capacity; up to 30 servers and 3.6 petabytes per 42U rack
- Dual Intel® Xeon® E5-2600 v3 series processors with options for 4-16 cores, 1.6 Ghz-3.5GHz CPU speed, 55-135 Watts
- 16 memory DIMM slots with up to 512 GB DDR4 memory at up to 2133 MHz

- Replaces the HP ProLiant SL4540 scalable system

### HP Apollo 4510 System



#### **Purpose-built for objects storage solutions at any scale**

The HP Apollo 4510 system can be configured to support object storage solutions ranging from cost effective, high capacity content repositories that address petabyte-scale data volumes, to the tuned responsiveness required for content distribution systems.

- 4U, one server chassis with up to 68 hot-plug SAS or SATA HDDs/SSDs with up to 544 terabytes storage capacity per 4U server; up to 5.44 petabytes of storage per 42U rack
- Flexible performance and i/O options to match the variety of object storage response and throughput criteria

### HP Integrity Superdome X



#### **Record-breaking performance, breakthrough scalability and mission-critical availability**

The HP Integrity Superdome X is now certified for Microsoft Windows and is ideal to support SQL Server 2014 deployments requiring the highest levels of transactional throughput and fast response times.

- Up to 16 sockets and 12 terabyte memory
- 9x performance vs. current HP 8-socket x86 offering<sup>1</sup>
- 20 times more reliable than software-only virtualization<sup>2</sup>
- 60 percent reduction in downtime vs. scale-out<sup>3</sup>
- 1.9 scalability factor from 2-16 sockets<sup>4</sup>
- 32 percent lower total cost of ownership compared to competitive UNIX environments<sup>5</sup>

### HP ProLiant DL580 Gen9 Server



### Compute for resource and data intensive workloads

The HP ProLiant DL580 Gen9 Server is a four socket enterprise standard x86 server offering solid performance, reliability and availability as well as consolidation and virtualization efficiencies.

- Up to 39 percent<sup>6</sup> increased performance with support up to four Intel® Xeon® E7-4800/8800 v3 series processors with options for 4-18 cores
- HP Smart Memory (96) DDR4, up to 1866 MHz (6 TB maximum)<sup>7</sup> and up to 16 percent<sup>8</sup> performance gain; ideal for large-scale in-memory computing and virtualization
- Adapt and grow to changing business needs with greater IO flexibility of networking bandwidths with 9 FL/FH PCIe 3.0 slots for GPGUs and choice of HP FlexibleOM or PCIe standup 1GbE, 10GbE or Infiniband Adapters
- HP OneView and HP iLO Advanced, agile infrastructure management for accelerating IT service delivery

### HP ProLiant DL560 Gen9 Server



### Multiple workload compute

The HP ProLiant DL560 server is a high-density four-socket server for multi-workload computing, virtualization, databases and business processing where data center space and price / performance is paramount.

- Using up to four of the latest processors in a dense 2U form factor
- Achieve greater capacity with a redesigned chassis including up to 24 Small Form Factor (SFF) HP SmartDrives drive options; along

with an optional HP Universal Media Bay delivering optimal performance, capacity, and reliability to meet various customer workload requirements

- Greater IO bandwidth and expandability with up to seven (7) PCIe 3.0 expansion slots, slots to support a GPU and networking cards
- Choice of HP Flexible Smart Array P440ar or HP Smart HBA Controllers for performance or additional features
- HP OneView and HP iLO Advanced, agile infrastructure management for accelerating IT service delivery

### HP ProLiant BL 660c Gen9 Server



### Increase the speed of business

The HP ProLiant BL660c Gen9, 4-socket compute blade server transforms legacy converged infrastructures to increase the speed of business.

- Up to four of the latest processors in a dense blade form factor
- 2x the internal storage capacity with up to four SFF drives
- Flexible storage options for right-sized solutions and lower TCO
- 32 DIMM sockets for up to 2TB of memory capacity with 64GB DDR4 DIMMs
- 10/20Gb FlexFabric adapter support removes network bottlenecks
- 66 times faster service delivery for a competitive advantage, improving service level agreement performance<sup>9</sup>

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<sup>1</sup> Based on HP internal comparison to HP ProLiant DL 980 G7 server, July 2014

<sup>2</sup> Claim: Hard partitions are 20x more reliable than soft partitions alone. Details: nPartitions have ~5% the number of SPOFs – (Single Points of Failure) thus are ~20x more reliable than soft partitions. Resiliency is a prerequisite for true hard partitions. Each hard partition has its own independent CPUs, memory, and I/O resources consisting of resources of the blades that make up the partition. These are tied together through a fault tolerant crossbar. Other high reliability, mission-critical resiliency features of HP Integrity Superdome, included in the Superdome X server, include: custom chipset, link retry, and robust error detection. Source: HP Labs. Based on HA and field data modeling, August 2013. Peter Piet and Bruce Edson, using Markov chain high availability modeling, running applications on separate nPars vs. running them together on the same nPar using virtual machines. HP, California. August 2013. HA modeling and field data supports these claims. Doug Davies, HA modeling of Superdome X vs. SD2 and DL980. Date – 8/30/2013. HA modeling and field data supports these claims

<sup>3</sup> 60% reduction primarily driven by: SD Analysis engine – adapted to Superdome 2 x86; Self-heals by driving response to failures; Proactive error and failure detection; Systems are constantly, proactively checking for errors; Prescriptive service recommendations; Not just for detection and correction, but for feedback and corrective support as well; Intelligence and recommendations designed into the system... from the collective wisdom of the HP designers and our experience with 10 years of SD, mission-critical environments; Examples of SD2 self-healing actions which are directed by the Analysis Engine: If there is a bad DIMM, system admin may not even know. SD would detect, check resolution options and then correct. Overheating: CPU overheating by itself is not a crash but could present itself first as an excessive number of corrected errors. This overheating could temporarily be solved with more cooling i.e., fan speed will automatically go up. But if it continues to get hotter, you take successive action: slow the CPU down, then take the OS down, then shut everything down. Most modern servers including x86 systems can automatically take simple thermal actions such as speeding up fans, but they may also send you a long list of alerts for everything they do, including seemingly unrelated alert messages. What the EAE is doing is correlating the data, taking the action, and reducing the operator alerts to only one necessary alert should the system performance degrade.

<sup>4</sup> Internal benchmark: Superdome X Gen8 15-cores/socket scaling with SPECjbb13-MultiJVM, HP, August 2014

<sup>5</sup> Based on HP internal analysis and results using publicly available competitive data, November 2014

<sup>6</sup> Intel internal measurements. Up to 39% top-bin performance increase based on OLTP Warehouse Oracle 11gR2 database workload comparing 4x Intel Xeon processor E7-8890 v3 (18C, 2.5 GHz) with 2TB to similarly configured E7-4890 v2 (15C, 2.8 GHz) with 1TB. 20% more cores comparing E7-8800/4800 (15 cores) v2 vs v3 (18 cores). Jan. 2015.

<sup>7</sup> 6 TB support with 64GB DIMMs to be available mid-2015.

<sup>8</sup> Based on HP internal calculations. Based on comparing the difference of DDR4 DIMMs of 1866 vs 1600 MHz on Gen to Gen HP Servers, May 2015.

<sup>9</sup> 66X faster to build and deploy infrastructure – Anonymous customer results. Customer was able to reduce the time to build and deploy infrastructure for 12 call centers from 66 days to 1. Total of 2000 servers were deployed. IDC whitepaper sponsored by HP, Achieving Organizational Transformation with HP Converged Infrastructure Solutions for SDDC, January 2014, IDC #246385.

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