Performance brief

HP continues two-processor performance leadership with latest ProLiant BL460c Gen8 Server Blade result on three-tier SAP® Sales and Distribution (SD) standard application benchmark running SAP ERP on Microsoft SQL Server on Windows Hyper-V

December 2013

Executive summary

Once again, the HP ProLiant BL460c Gen8 Server Blade achieved the world-record result on the three-tier SAP® Sales and Distribution (SD) standard application benchmark, extending its virtualization two-processor performance leadership. The ProLiant BL460c Gen8 Server Blade platform accomplished a result of 60,000 SAP SD benchmark users and 328,120 SAPS on the three-tier SAP SD standard application benchmark utilizing, again, the advantages of the latest Intel® Xeon® E5-2697 v2 Processors, SR-IOV, and RSS technology. *(See Appendix A)*

Featuring HP Virtual Connect-Fibre Channel software-defined networking, HP 3PAR Tier 1 storage, and HP FlexFabric bandwidth control, the corporate-scale configuration ran SAP enhancement package 5 for the SAP ERP 6.0 application on Microsoft SQL Server 2012 embedded in Microsoft Windows Server 2012 Datacenter on Windows Server 2012 Hyper-V platform for virtualizing SAP solution-based environments.

Key take aways

- **Corporate-scale architecture running SAP solutions on Microsoft Windows Server 2012 Datacenter on Windows Server 2012 Hyper-V and SQL Server 2012 software, utilizing the latest Intel processor technology, Intel Xeon E5-2697 v2 @ 2.70GHz**
- **Groundbreaking score in a Virtual Connect environment with the capabilities of SR-IOV and RSS for virtual platform optimization of the network I/O and bandwidth usage**
- **Remarkable delta of 41% greater performance compared to previous Intel Xeon technology result *(See Appendix A)***
- **Microsoft virtualization leadership in Intel two-processor performance demonstrated on the three-tier SAP SD standard application benchmark**
- **Building-block technology composed of HP 3PAR StoreServ Storage, HP Virtual Connect 8Gb 20-Port Fibre Channel Module, and Virtual Connect FlexFabric 10Gb/24-Port Module for scalable efficiency and peak performance**
- **Rock-solid proof point for HP Converged Infrastructure, ready to provide a solid foundation for cloud computing**

Only from HP

How we did it

Microsoft

For 20 years, **HP and Microsoft** have jointly developed and delivered integrated solutions, from the desktop to the data center, offering world-leading price and performance and enabling customers to make faster, smarter IT decisions in rapidly changing business environments.[1] HP and Microsoft have a rich history in developing and successfully bringing to market data management solutions based on the tight integration of Microsoft SQL Server and the HP Converged Infrastructure. HP and Microsoft also help customers' organizations accelerate their journey to the cloud with private cloud solutions based on best-in-class HP Converged Infrastructure and Microsoft Windows Server with Hyper-V and System Center.

SAP Global Partner

The partnership between **HP and SAP** has been a strong contributor to the success of both companies for 25 years.[2]

Technology and solutions from HP and SAP help customers better understand their business, marketplace, and customers in near-real-time, so they can respond immediately and maximize their benefits. Both are committed to working together on strategic "co-innovation" efforts. HP and SAP also collaborate to help ensure permanent optimization and certification of SAP solutions for the highest quality, and to provide joint engineering for optimized SAP operation of key databases.

Figure 1. HP Converged Infrastructure for SAP ERP on MS SQL Server on MS Hyper-V

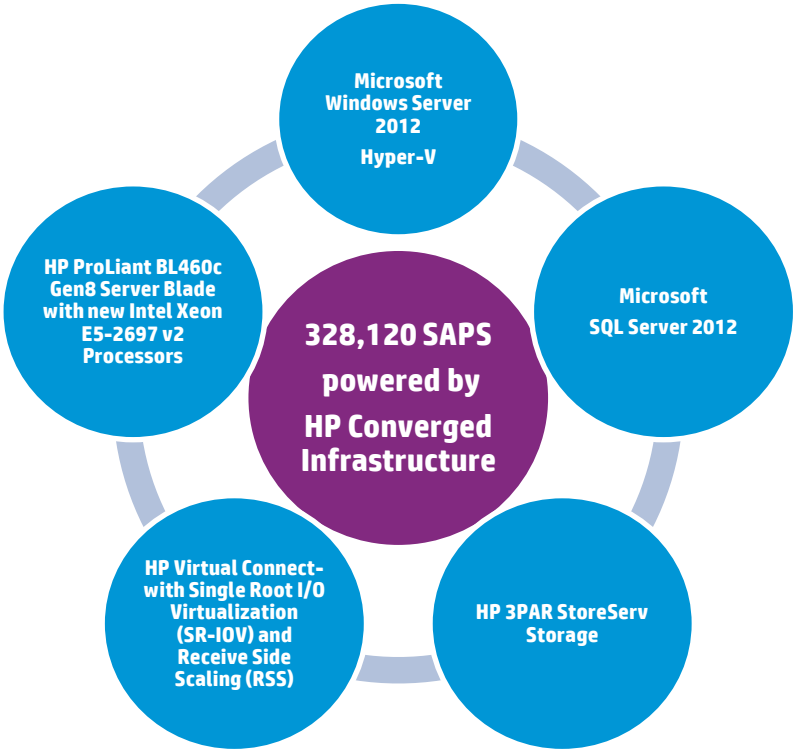
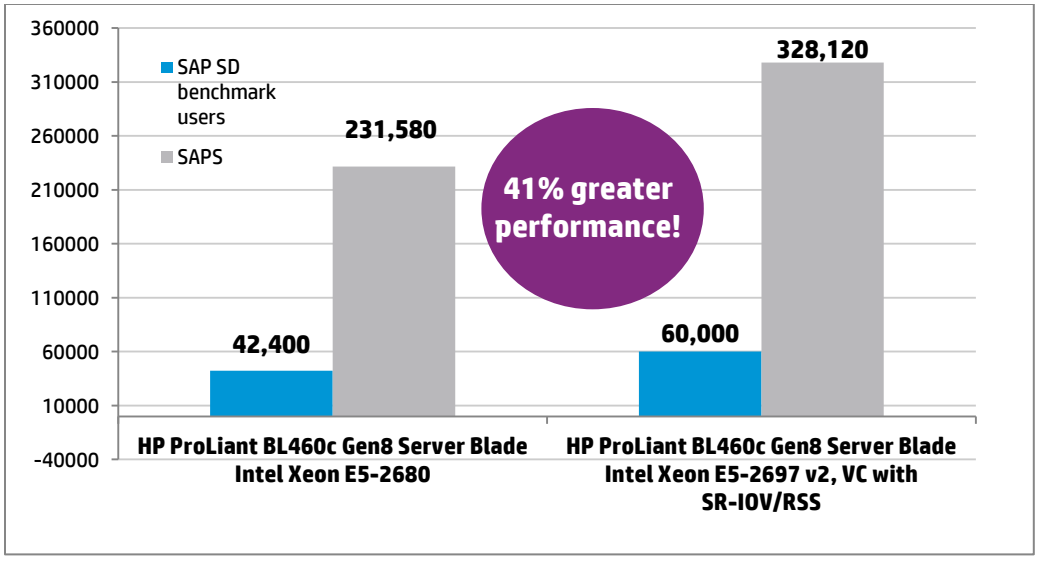


Figure 2. Together, the latest Intel processor technology and HP Virtual Connect with SR-IOV and RSS, the HP ProLiant BL460c Gen8 achieved 41% greater performance compared to its previous result on the three-tier SAP SD standard application benchmark *(See Appendix A)*.



HP customer value: what others can't offer

HP ProLiant BL460c Gen8 Server Blade: The ProLiant BL460c Gen8 Server Blade packs in more performance with a 33% increase in memory DIMM count than its previous generation, added support for the Intel Xeon E5-2600 v2 Series Processors, faster I/O slots, and an enhanced Smart Array Controller that now ships with 512MB flash-backed write cache standard. To learn more, see http://hp.com/servers/proliant/bl460cgen8

HP Virtual Connect FlexFabric modules: the simplest, most flexible way to connect virtualized server blades to data or storage networks. Virtual Connect FlexFabric supports any standards-based networking infrastructure and can reduce Fibre Channel SAN costs up to 50%[3] with the world's only direct connect to HP 3PAR storage without a dedicated Fibre Channel switch. To learn more, see http://h18004.www1.hp.com/products/blades/components/vc-interconnects.html and Virtual Connect

SR-IOV and RSS extend HP's I/O virtualization leadership: The Single Root I/O Virtualization and Sharing Specification (SR-IOV) defines extensions to the PCI Express to enable multiple System Images (SI) to share PCI hardware resources. Its benefits in a virtualized environment include near native performance for I/O; scalability for multiple virtual machines per port; and isolation/security with physical network connections. And with FlexFabric, it provides the greatest flexibility in a virtual environment.

Receive Side Scaling (RSS) is targeted at the host network traffic, while the SR-IOV is targeted at the virtual machine network traffic but they both are used to reduce the CPU load/bottleneck on the host and to allow optimization of the network I/O and bandwidth usage of the NICs.[4] RSS is a mechanism to balance the DPC offload across multiple logical processors.

HP 3PAR Storage: HP 3PAR Storage is designed to be highly efficient in every way, consolidating hundreds or thousands of virtual machines on a single storage system. This allows enterprises to meet their business needs with at least 50% less capacity guaranteed.[5] It can also reduce storage administration time by as much as 90%.[6] With fewer disks to power and cool, less equipment to house, and less hardware to downcycle at end of life, HP 3PAR Storage is an excellent foundation for energy-efficient data initiatives. To learn more, see http://www8.hp.com/us/en/hp-information/environment/hp-3par-storage.html?jumpid=reg_r1002_usen_c-001_title_r0001

HP Converged Infrastructure: Infrastructure convergence was first pioneered by HP over three years ago. HP Converged Infrastructure enables the future of data center computing by delivering extreme automation, agility, and seamlessness to dramatically simplify the user experience delivered through a common, modern architectural foundation across server, storage, and networking. To learn more, see http://h17007.www1.hp.com/us/en/converged-infrastructure/?jumpid=hpr_r1002_usen_link1

Microsoft Windows 2012 Hyper-V: Virtualization of SAP solution-based environments becomes state-of-the-art in the industry. Since HP and Microsoft embarked on application virtualization of SAP solutions in 2008, HP has made great strides to bring Microsoft Hyper-V on HP ProLiant into its customers' production environments running SAP solutions. The results of this three-tier SAP SD standard application benchmark stress the enterprise-grade data center readiness for running SAP solutions on Microsoft Hyper-V on HP ProLiant. Close to every second installation of SAP solutions in the world today runs on Microsoft Windows. And Microsoft Hyper-V on HP ProLiant helps take operations of SAP solutions to a superior level.

For more information on ProLiant results on leading benchmarks, see www.hp.com/servers/benchmarks

[1] www.hp.com/go/microsoft www.hp.com/go/SAP
[2] http://www.youtube.com/watch?v=W5GqCZGCkNY
[3] http://h18004.www1.hp.com/products/blades/components/vc-interconnects.html
[4] http://workinghardinit.wordpress.com/tag/sr-iov/
[5] Based on HP internal calculations as of Jan 2013. DAC cable to ToR ILP vs. Fiber Channel ILP
[6] http://www8.hp.com/us/en/hp-information/environment/hp-3par-storage.html?jumpid=reg_r1002_usen_c-001_title_r0001#footnotes

Benchmark configurations

HP received certification from SAP AG of the results of the ProLiant BL460c Gen8 Server on the three-tier SAP SD standard application benchmark (certification 2013036), performed in Houston, TX, USA on December 6, 2013. The server achieved 60,000 SAP SD benchmark users, 328,120 SAPS, and a response time of 0.97 seconds. The platform ran Microsoft Windows Server 2012 Datacenter x64 on Windows Server 2012 Hyper-V operating system, Microsoft SQL Server 2012 database, and SAP enhancement package 5 for SAP ERP 6.0.

The HP ProLiant BL460c Gen8 Server Blade setup was configured with the following:

Application tier: 11 x ProLiant BL460c Gen8 Server Blades running 2 VMs each. Each VM is composed of 16 virtual processors.

- Intel Xeon E5-2680 @ 2.70GHz (2 processors/16 cores/32 threads)
- HP Smart Memory 16GB 2Rx4 PC3-12800R 1066MHz (256GB), 1 x Onboard Smart Array P410i Controller with 1GB FBWC to 2 x internal drives (2 x 300GB 10K 6G SAS SFF)
- 1 x HP Ethernet 10Gb 2-port 560FLB Adapter

Database tier: 1 x BL460c Gen8 Server with 1 VM composed of 48 virtual processors

- Intel Xeon E5-2697 v2 @ 2.70GHz (2 processors/24 cores/48 threads)
- HP Smart Memory 16GB 2Rx4 PC3-12800R 1066MHz (256GB), 1 x Onboard Smart Array P410i Controller with 1GB FBWC to 2 x internal drives (2 x 300GB 10K 6G SAS SFF)
- 1 x HP Flex10 10Gb 2-port 530FLB Adapter
- 1 x QLogic QMH2572 8Gb FC HBA for HP BladeSystem c-Class to 3PAR V400 with 240 x 600GB FC disks (15K RPM) and 48 x 200GB SSDs

Results as of December 6, 2013; details can be found at www.sap.com/benchmark.

Appendix A

Table 1. Results for the HP ProLiant BL460c Gen8 Server Blade on the three-tier SAP SD standard application benchmark

System description, processer type, total (processor/cores/threads), memory	Certification number	SAP SD benchmark users	SAPS	OS, database, SAP software
HP ProLiant BL460c Gen8 Server Blade Intel Xeon Processor E5-2697 v2 2.70GHz, (2/24/48), 256GB main memory	2013036	60,000	328,120	Microsoft Windows Server 2012 Datacenter x64 on Windows Server 2012 Hyper-V Microsoft SQL Server 2012 SAP enhancement package 5 for SAP ERP 6.0
HP ProLiant BL460c Gen8 Server Blade Intel Xeon Processor E5-2680 2.70GHz, (2/16/32), 256GB main memory	2013016	42,400	231,580	Microsoft Windows Server 2012 Datacenter on Windows Server 2012 Hyper-V Microsoft SQL Server 2012 SAP enhancement package 5 for SAP ERP 6.0