

Better Performance and Scale for New Analytics

Boost SAS* Analytics 9.4 throughput by up to 72 percent with the latest Intel® Xeon® processor E7 v3 family and the Intel® Solid-State Drive Data Center Family for PCIe*¹

Innovations in data analytics and business intelligence (BI) are changing the way businesses compete, enabling real-time insights to be delivered across a wide range of processes and user roles. SAS 9.4 running on the Intel® Xeon® processor E7 v3 family offers a powerful platform for integrating these new capabilities and for handling today's rapid growth in workloads and data volumes.

SAS applications provide deep insights by combining industry expertise with advanced predictive modeling, data mining, text analytics, forecasting, and more. They also offer flexible support for in-memory analytics, grid computing, big data integration, and self-service BI, so you can transition toward new analytic models on a unified and scalable platform.

Four- and eight-socket servers based on the latest Intel Xeon processor E7 v3 family provide the performance, scalability, and high availability needed to accelerate and consolidate SAS environments. In combination with the Intel® Solid-State Drive (Intel® SSD) Data Center Family for PCIe*, these servers can support massive workloads. You may be able to replace up to nine, five-year old legacy servers with a single system to simplify your infrastructure, reduce operational costs, and speed time to insight, while delivering a full return on investment in as little as 20 months.²

Up to 72 Percent Higher Throughput Versus a Previous-Generation Platform¹

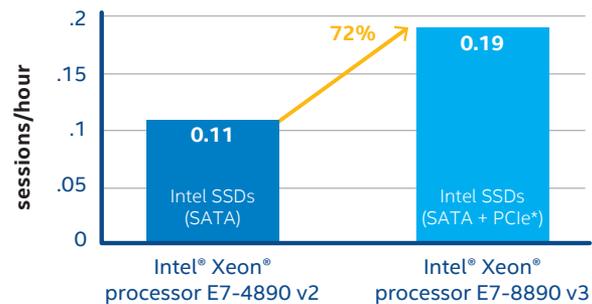
With up to 20 percent more cores, threads, cache, and system bandwidth than previous generation processors that are little more than a year old, the Intel Xeon processor E7 v3 family makes fast work of high-volume analytic workloads. A four-socket server provides up to 72 cores and 144 threads and supports up to 6 terabytes of DDR4 or DDR3 memory for high-speed analytics operating on large data sets.

Getting the most out of these powerful processors requires fast access to data, which can be provided using Intel SSDs. The Intel SSD Data Center Family for PCIe brings extreme data throughput to Intel® Xeon® processors with up to six times faster data transfer speeds than 6 Gbps SAS/SATA SSDs.³ The performance of a single drive from the Intel® SSD Data Center Family for PCIe, specifically the Intel SSD DC P3700 Series (460K IOPS), can replace the performance of seven SATA SSDs aggregated through a host bus adapter (HBA) (approximately 500K IOPS).

SAS and Intel work together to optimize SAS applications for the latest Intel® technologies. In recent tests, SAS and Intel engineers measured performance for SAS 9.4 using the SAS new mixed analytics workload, which is designed to reflect the usage models of typical SAS customers. This workload includes both single and multi-threaded queries and is designed to stress all critical server resources, including CPU, memory, and I/O.

The tests were run on two types of servers:

Up to 72 percent higher throughput for SAS* 9.4



Servers based on the Intel® Xeon® processor E7 v3 family and the Intel® SSD DC P3700 Series provide up to 72 percent higher performance than a previous-generation server platform for SAS* 9.4.

- A baseline server configured with the Intel® Xeon® processor E7 v2 family and Intel SSD DC S3700 Series SATA drives.
- A newer server based on the Intel Xeon processor E7 v3 family and a combination of Intel SSDs that included the faster Intel SSD DC P3700 Series drives for PCIe.

The newer server, based on the Intel Xeon processor E7 v3 family and the faster Intel SSDs, delivered 72 percent higher throughput (sessions per hour) than the baseline server.

An Ideal Platform for Next-Generation Analytics

As demonstrated by the performance tests, servers based on the Intel Xeon processor E7 v3 family are ideal for consolidating the traditional, disk-based workloads that comprise the bulk of most customers' current requirements. These servers are also ideal for in-memory analytics. The large memory capacity and high core counts provide faster time-to-results for heavy workloads and large data sets.

SAS 9.4 and the Intel Xeon processor E7 v3 family provide a number of additional advantages.

- **Grid computing.** Scale your SAS environment across multiple Intel Xeon processor-based servers to support virtually unlimited growth, while maintaining a unified analytics platform.
- **SAS* High-Performance Analytics procedures (HP PROCs).** Highly optimized SAS algorithms take advantage of the advanced, multi-core parallelism of the Intel Xeon processor E7 v3 family to further reduce time to results for complex queries in both single-server and grid environments.
- **Big data integration.** You can use Apache Hadoop* to cost-effectively store and process massive volumes of unstructured data. Close integration with SAS 9.4 and high-performance Intel® architecture can help you make better use of all your data.
- **High availability with Intel® Run Sure Technology.** Servers based on the Intel Xeon processor E7 family have been delivering uptime levels on a par with best-in-class RISC-based platforms for several years.⁴ The Intel Xeon processor E7 v3 family adds new error recovery and memory mirroring features for even higher resilience with better cost models. This support is valuable as organizations begin to integrate analytics into real-time business processes.

Test Configurations

	BASELINE SERVER	NEWER SERVER
HARDWARE		
Processors	4 x Intel® Xeon® processor E7 v2 family	4 x Intel® Xeon® processor E7 v3 family
Memory	512 GB (DDR3 ^a 1067 MHz)	512 GB (DDR4 1600 MHz)
Storage	Intel® Solid-State Drive (Intel® SSD) DC S3700 Series (16 x 800 GB)	- Intel SSD DC S3700 Series (8 x 800 GB) - Intel SSD DC P3700 Series (4 x 2 TB)
SOFTWARE		
Application	SAS* 9.4 M2	
Operating System	Red Hat Enterprise Linux* 7	
Workload	SAS new mixed analytics	

^a DDR4 memory is supported on the Intel® Xeon® processor E7 v3 family but not on the Intel® Xeon® processor E7 v2 family.

Learn More

Take your analytics environment to the next level with SAS 9.4 running on the latest Intel Xeon processor E7 v3 family. This advanced platform can help you increase performance and headroom, while dramatically reducing the cost and complexity of your infrastructure and providing optimized support for new, transformative analytics capabilities. See the following resources for more information.

- SAS 9.4: sas.com/en_us/software/sas9.html
- Intel Xeon processor E7 v3 family: www.intel.com/XeonE7
- Intel Solid-State Drive Data Center Family: www.intel.com/ssd

¹ Up to 1.72x generational claim based on SAS* Mixed Analytics workload measuring sessions per hour using SAS* Business Analytics 9.4 M2 on Red Hat Enterprise Linux* 7. Configurations: 1) Baseline: 4S Intel® Xeon® processor E7-4890 v2, 512 GB DDR3-1066 memory, 16x 800 GB Intel® Solid-State Drive Data Center S3700, scoring 0.11 sessions/hour. 2) Up to 1.72x more sessions per hour: 4S Intel® Xeon® processor E7-8890 v3, 512 GB DDR4-1600 memory, 4x 2.0 TB Intel® Solid-State Drive Data Center P3700 + 8x 800 GB Intel® Solid-State Drive Data Center S3700, scoring 0.19 sessions/hour.

² Up to 9:1 consolidation with a 20-month ROI payback claim based on estimated SPECint_rate_base2006* results assuming a scenario of 100 each 5-year old 4-socket servers using Intel® Xeon® processor X7460 scoring 274 each compared to 11 each comparable Intel® Xeon® processor E7-8890 v3-based servers scoring 2650 each. The 20-month ROI payback is based on an initial investment of \$577,553 with a net savings of \$833,049 for a 144% ROI and 49% IRR when purchasing each server at an estimated street price of \$50,025 with \$1505 installation and disposal cost per server providing 81% savings of power/cooling and lower management costs with 89 fewer deployed servers in this scenario.

³ Based on the Intel® Solid-State Drive Data Center P3700 and the Intel® Solid-State Drive Data Center S3700 Series Product Specifications. For more information, visit <http://www.intel.com/content/www/us/en/solid-state-drives/intel-ssd-dc-family-for-pcie.html>. For more complete information visit <http://www.intel.com/performance/datacenter>.

⁴ ITIC 2014-2015 Global Server Hardware, Server OS Reliability Report; Information Technology Intelligence Consulting (ITIC) Corp

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products.

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