

SCALE UP FOR FASTER RESPONSE TO BUSINESS QUESTIONS

Intel does business in more than 63 countries—with more than 600 facilities and 19,000 suppliers—fulfilling one million orders and shipping one billion units each year. To support this vast and growing supply chain, Intel IT uses SAP HANA* 2 to operate, optimize, and innovate within its global supply chain.

When Intel wanted to transform its complex global supply chain environment with faster analytics capabilities, IT tested its existing three-server SAP HANA 2 cluster with 6 TBs of memory against a single server based on 2nd Gen Intel® Xeon® Scalable processors and new Intel® Optane™ DC persistent memory with 4.5 TBs of memory. The new technology resulted in tremendous performance gains.

**2.4x BETTER
PERFORMANCE¹**

**52% INCREASED
CAPACITY²**

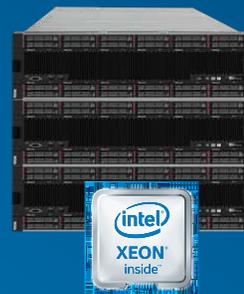
SCALE UP TO IMPROVE PERFORMANCE

Like many companies, Intel is being transformed by next-gen analytics and the data that fuels them. The analytics engines required at scale are a major investment, and architectural decisions have multi-year, multi-million-dollar implications. Intel is digitally transforming from a PC-centric to a data-centric company so increasing the speed to insights is imperative to maintain a competitive advantage. For Intel, the ability to make rapid, data-driven decisions to optimize order taking, resource procurement, manufacturing, testing, and final product delivery across our complex supply chain is essential.

One scale-up server with 2nd Gen Intel Xeon Scalable processors and Intel Optane DC persistent memory can provide **2.4x faster time to insight¹**. This scale-up system performance gives Intel IT's SAP analysts faster responses to their business questions, leading to faster business decisions.

PREVIOUS SCALE-OUT

3 Servers (4-socket)



Intel® Xeon® Processor
E7-8880 v3



6 TB Total Memory
3 x 2 TB DRAM

**2.81 SEC
AVG RUN TIME**

CURRENT SCALE-UP

1 Server (4-socket)



2nd Gen Intel® Xeon®
Platinum 8260 Processor



4.5 TB Total Memory
3 TB Intel® Optane™ DC Persistent Memory
+ 1.5 TB DRAM

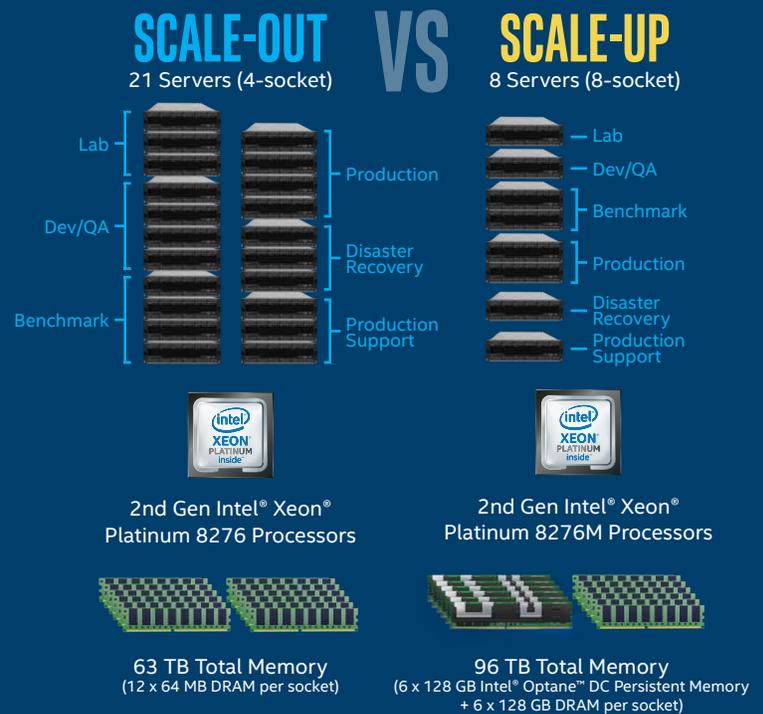
**1.13 SEC
AVG RUN TIME**

VS

SCALE UP TO INCREASE MEMORY CAPACITY

To increase memory capacity for the future, Intel IT looked at our SAP HANA 2 landscape, our path to production. We evaluated two scenarios. The first was a scale-out cluster with 21 four-socket servers and 63 TBs of memory. The second was a scale-up cluster with eight 8-socket servers and 96 TBs of memory.

A scale-up SAP HANA 2 landscape with 2nd Gen Intel Xeon Scalable processors, DRAM, and Intel Optane DC persistent memory can provide **52 percent more total system memory²** at a lower cost, compared with a scale-out landscape with 2nd Gen Intel Xeon Scalable processors and DRAM only.



52% more memory capacity with **SCALE-UP**, for approximately the same cost.²

Implementing scale-up servers with 2nd Gen Intel Xeon Scalable processors and Intel Optane DC persistent memory will provide Intel with fast and reliable insights from our supply chain data, positioning the company for future growth and success.



¹ **2.4x better runtime performance.** Performance results are based on testing by Intel IT as of March 12, 2019 and may not reflect the publicly available security updates. No system can be absolutely secure. **Baseline:** three-node (1-master + 2-slave) SAP HANA* 2 scale-out configuration. Per Node: 4x Intel® Xeon® processor E7-8880 v3 (2.3 GHz, 150 W, 18 cores), CPU sockets: 4; Microcode:0x400001c; RAM capacity: 64 x 32 GB DIMM, RAM model: DDR4 2133 Mbps; storage: GPFS, approximately 21.8 TB of formatted local storage per node, SAN storage for backup space only; network: redundant 10GbE network for storage and access, redundant 10G network for node-to-node; OS: SUSE 12 SP2, SAP HANA: 2.00.035, GPFS: 4.2.3.10. **Average time of 50 individual test queries executed 30-50 times each, for a total of approximately 25,000 steps: 2.81 seconds.** **New configuration:** one master node SAP HANA 2 scale-up configuration: CPU: 4 x 2nd Generation Intel® Xeon® Platinum 8260 processor (2.2 GHz, 165 W, 24 cores), CPU sockets: 4; Microcode: 0x400001c, RAM capacity: 24 x 64 GB DIMM, RAM model: DDR4 2133 Mbps; Intel Optane DC persistent memory: 24 x 128 GB PMM; storage: XFS, 21 TB; network: redundant 10GbE network; OS: SUSE 15, SAP HANA: 2.00.035, Intel BKC: WW06. **Average time of 50 individual test queries executed 30-50 times each, for a total of approximately 25,000 steps: 1.13 seconds.**

² **52% more data capacity at same or lower cost.** Scale-up configuration: eight-node SAP HANA* 2 landscape. Per node: 8-socket 2nd Generation Intel® Xeon® Platinum 8276M processors. Memory capacity per socket: 6x 128 GB DDR4 2133 MHz. and 6x 128 GB Intel® Optane™ DC persistent memory. Estimated total cost is \$2,369,496. Estimated cost per server is \$296,187 (CPU=\$93,776; memory=\$119,808; storage=\$45,000; other=\$37,603). Scale-out configuration: twenty-one node SAP HANA 2 landscape. Per node: 4-socket 2nd Generation Intel® Xeon® Platinum 8276 processor. Memory capacity per socket: 12x 64 GB DDR4 2133 MHz. Estimated total cost is \$2,834,433. Estimated cost per server is \$134,973 (CPU=\$34,876; memory=\$33,994; storage=\$21,000; other=\$45,103).

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. For more information go to [intel.com/benchmarks](https://www.intel.com/benchmarks).

Results have been estimated by Intel IT as of 3/4/2019 using internal Intel analysis or architecture simulation or modeling, and provided to you for informational purposes and may not reflect all publicly available security updates. No product or component can be absolutely secure. Any differences in your system hardware, software or configuration may affect your actual results. Cost reduction scenarios described are intended as examples of how a given Intel-based product, in the specified circumstances and configurations, may affect future costs and provide cost savings. Circumstances will vary. Intel does not guarantee any costs or cost reduction.

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