

GigaSpaces InsightEdge Platform*, Powered by Intel® Architecture

Enterprises can access and act on insights the instant data is available with the combined power of InsightEdge Platform, Intel® Xeon® Scalable processors, and Intel® Optane™ SSDs.



It's old news that data is growing exponentially, potentially with an estimated 50-fold increase from 2010 to 2020, and that data has to be used to make it valuable.¹

What is newsworthy is how to best harness all that data—to ingest it, make decisions on it, and act upon those decisions in real time. Just how to do that can be elusive, especially with advancements in artificial intelligence (AI), the Internet of Things (IoT), machine learning (ML), and deep learning (DL) that require action today and agility and scalability into the future. And advancing technologies aren't the only hurdle. Businesses need a way to serve applications at the same time that data is being analyzed—a way that will not impact performance or require maintaining multiple infrastructures.

The answer is GigaSpaces InsightEdge Platform*, powered by Intel® architecture. InsightEdge Platform is an open source, in-memory insight platform. It does not just unify fast data analytics and transactional processing for instant business insights and actions, it does so with low latency, enabling businesses to quickly access and act on time-sensitive data. Combining InsightEdge Platform, Intel® Xeon® Scalable processors, and Intel® Optane™ solid state drives (SSDs) with integrated BigDL* makes it easy to innovate real-time analytics and AI apps with low risk, low total cost of ownership (TCO), and high agility—now and into the future.

To see how InsightEdge Platform powered by Intel Xeon Scalable processors and Intel® Optane™ SSDs performs compared with previous-generation processors and SSDs, GigaSpaces conducted internal tests. Testing compared query and load times of the platform on Intel Xeon Scalable processors with Intel® Optane™ SSDs against the platform on the Intel Xeon processor E5-2660 v4 with the Intel® SSD DC P3700 Series. The results show that the newer generation of Intel architecture delivers faster queries and load times for the platform than the previous-generation architecture.³ The newer generation of Intel architecture also delivers other benefits for GigaSpaces users.

GigaSpaces InsightEdge Platform

GigaSpaces InsightEdge Platform uses GigaSpaces XAP* In-Memory Data Grid as its core technology. The platform unifies fast data analytics, AI, ML, DL, and real-time applications on a single high-performance mature software platform that can be deployed in the cloud, on-premises, or in a hybrid environment. The platform includes a full Apache Spark* distribution and integrates the Spark analytics framework with all of the XAP In-Memory Data Grid capabilities.

The Spark distribution is managed by a highly available clustering tier that provides auto-healing, five-nines availability, zero single points of failure, local and geographical redundancy, and more.² By co-locating Spark jobs in-place with the data grid's low-latency application fabric, the need to separate analytics and applications is eliminated. Users can access insights and make insight-driven decisions instantaneously.

GigaSpaces InsightEdge Platform, Powered by Intel® Architecture

GigaSpaces InsightEdge Platform, powered by Intel architecture, delivers high performance in on-premises, cloud, and hybrid cloud deployments. Intel Xeon Scalable processors offer increased performance compared to the previous-generation Intel Xeon processor E5 v4 family.³ Intel Xeon Scalable processors also offer more memory per system, easy scalability, and support for low latency and high input/output (I/O) operations per second (IOPS). With more memory per system, users can store, process, and analyze data-heavy applications and workloads in real time at a smaller RAM footprint, which can help eliminate cluster sprawl and can provide a lower operational costs.

Intel® Optane™ SSDs for storage help further reduce latencies when accessing stored data, which can provide even greater throughput and response times. Intel® Optane™ SSDs also reduce cluster and component sprawl, minimize moving parts, and provide multi-tiered data storage where data is immediately available in InsightEdge Platform. Intel® Optane™ SSDs complement GigaSpaces XAP MemoryXtend*, a multi-tier data storage architecture. Together, these solutions create a hybrid storage model where hot data is stored in RAM and cold data is stored on the SSD, which can lower costs by reducing the RAM footprint.

GigaSpaces XAP* In-Memory Data Grid

GigaSpaces XAP is the core in-memory data grid for GigaSpaces InsightEdge Platform*.

XAP supports low latency and high-throughput applications. It scales applications on demand. And its simplified architecture eliminates cluster and component sprawl to minimize moving parts and lower operational costs.

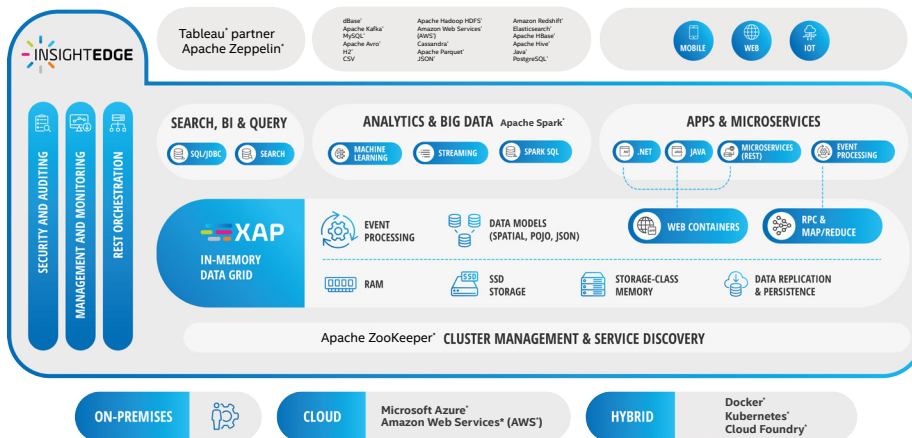


Figure 1. GigaSpaces InsightEdge Platform*

Tests Show Latest Generation Performance

To demonstrate the performance of GigaSpaces InsightEdge Platform on the latest generation of Intel Xeon Scalable processors in an on-premises deployment, GigaSpaces performed internal testing. GigaSpaces ran geospatial and advanced data analysis on 4 GB datasets in InsightEdge Platform to carry out real-time operational decision-making. The tests compared the Intel Xeon Platinum 8168 processor with the Intel® Optane™ SSD DC P4800X Series against the Intel Xeon processor E5-2660 v4 with the Intel SSD DC P3700 Series. The Intel Xeon Platinum 8168 processor and the Intel® Optane™ SSD DC P4800X Series decreased data load times to the platform by 33 percent and decreased query times from the platform by 23 percent (see Figure 2 and Figure 3).³

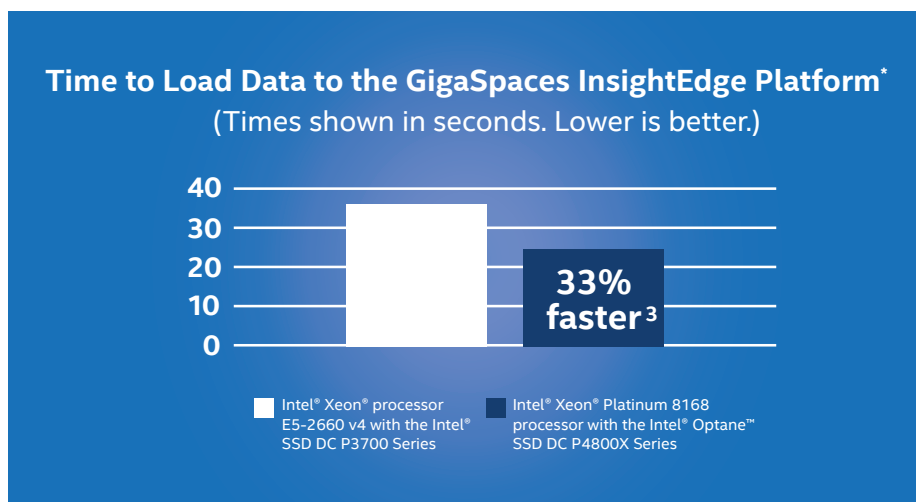


Figure 2. The comparison of the time to load data to GigaSpaces InsightEdge Platform* at 36.5 seconds with the Intel® Xeon® processor E5-2660 v4 and the Intel® SSD DC P3700 Series compared 24.3 seconds with the Intel Xeon Platinum 8168 processor and the Intel® Optane™ SSD DC P4800X Series³

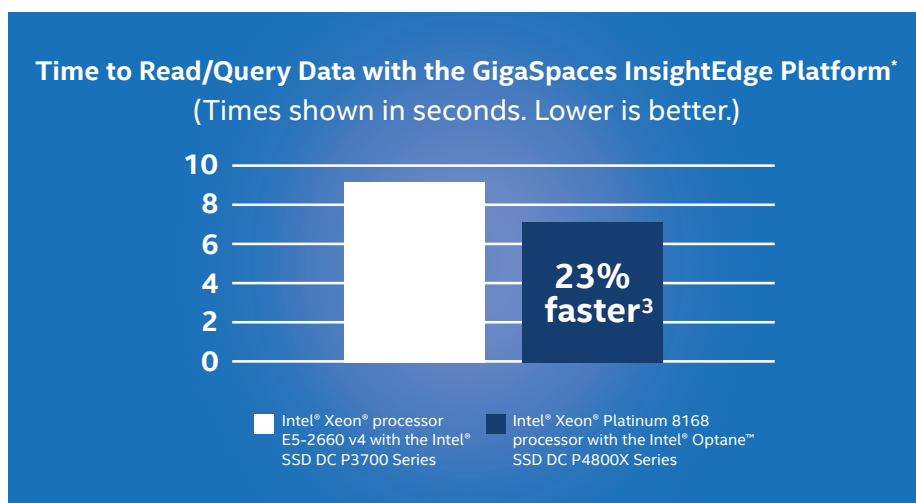


Figure 3. The comparison in time to query data from GigaSpaces InsightEdge Platform* at 9.4 seconds with the Intel® Xeon® processor E5-2660 v4 and the Intel® SSD DC P3700 Series compared to 7.2 seconds with the Intel Xeon Platinum 8168 processor with the Intel® Optane™ SSD DC P4800X Series³

Why Intel Xeon Scalable Processors Deliver

Intel Xeon Scalable processors power GigaSpaces InsightEdge Platform to deliver better data load and query times because they are engineered with more memory support for online analytical processing (OLAP) and online transaction processing (OLTP) compared to the Intel Xeon processor E5 v4 family. These processors have six memory channels compared to the four channels in the Intel Xeon processor E5 v4 family used in the testing. They also offer more flexible configurations to better meet requirements for high capacity high-performance computing (HPC) applications and memory-intensive workloads.

The added memory support is made possible with systems that support up to eight sockets and up to 1.5 TB memory capacity per socket for a total of up to 12 TB in an eight-socket configuration. Intel Xeon Platinum processors also offer more threads, DDR4-2666 memory, and eight more lanes of Peripheral Component Interconnect Express* (PCIe*) 3.0 bandwidth—48 compared to 40 in the Intel Xeon processor E5 v4 family.

In addition to more cores and threads than the previous generation of processors, Intel Xeon Scalable processors have a new microarchitecture, which uses a uniform shape for all CPUs, enabling any CPU to fit into the same Intel Socket P socket type. This means systems can scale from two sockets to four and on to eight without requiring external chipsets from third parties.

The new microarchitecture is one of the many benefits of Intel Xeon Scalable processors. An array of enhanced and all-new technologies engineered into Intel Xeon Scalable processors adds to the memory capabilities and new architecture to improve performance, reliability, availability, serviceability, and manageability. These technologies include the following:

- **Graphics processing unit (GPU)-free optimized machine and deep learning frameworks** eliminate the need for a GPU without diminishing performance.
- **Integrated Intel® QuickAssist Technology (Intel® QAT)** enables hardware-assisted acceleration for critical workloads, such as data compression and cryptography, across servers, storage, and networks in software-defined infrastructures (SDIs).
- **Integrated memory, storage, and networking dynamically self-provisions resources**—on-premises, through the network, and in the public cloud—based on workload needs.
- **Storage innovations**, including support for Intel® Optane™ SSDs and Intel® 3D NAND SSDs, enable improved efficiency and performance for data-hungry workloads.
- **Intel® Volume Management Device (Intel® VMD)** enables hot-swap replacement of NVMe Express* (NVMe*) SSDs from the PCIe bus without shutting down the system, and standardized LED management helps provide quick identification of SSD status.

"The combination of the Intel Xeon Scalable platform and InsightEdge Platform increases overall performance by over 30 percent while reducing TCO. This allows data engineers, developers, and scientists to operate on the same dataset, right when it's born, and at massive scale."

—Barak Bar-Orion, Director of In-Memory Computing R&D, GigaSpaces

Intel® Optane™ SSDs Further Drive Performance

Intel® Optane™ SSDs combine the attributes of memory and storage to unleash the full potential of Intel Xeon Scalable processors. Intel® Optane™ SSDs help eliminate data center storage bottlenecks and allow for the processing of bigger datasets more affordably. Intel® Optane™ SSDs can accelerate applications, reduce transaction costs for latency-sensitive workloads, and improve overall data center efficiency, because they can:

- **Deliver up to 550,000 IOPS**, or about 2GB per second (GB/s), at a queue depth of 16.⁴
- **Maintain consistent read-response times**, regardless of the write throughput applied to the drive. Read-response times remain below 30microseconds (µs) while withstanding up to 2GB/s of random write pressure.⁴
- **Include Intel® Memory Drive Technology**, which transparently extends system memory by integrating the SSD into the memory subsystem and making it appear like DRAM to the operating system and applications.

BigDL* and Intel® Math Kernel Library (Intel® MKL)

GigaSpaces InsightEdge Platform integrates with BigDL and the Intel® Math Kernel Library (Intel® MKL), and it capitalizes on multithreaded programming in each Spark task. BigDL is a distributed deep learning library for Spark that lets users create deep learning applications as Scala* or Python* programs and harness the power of scalable Spark clusters. Intel MKL features highly optimized, threaded, and vectorized math functions that can improve performance on each Intel processor family.

Reduce Infrastructure Sprawl with GigaSpaces InsightEdge Platform, Powered by Intel Architecture

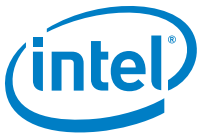
Insight-driven enterprises understand that actionable data insights can increase revenues, reduce costs, mitigate risks, and enable the companies to outperform their competitors. Additionally, enterprises can immediately access data and act on insights with less infrastructure by using a single platform for in-memory data analysis and applications: InsightEdge Platform, powered by Intel Xeon Scalable processors and Intel® Optane™ SSDs.

Learn More

GigaSpaces InsightEdge Platform: gigaspaces.com/product/insightedge-platform

Intel Xeon Scalable processors: intel.com/xeonscalable

Intel® Optane™ SSD DC P4800X: intel.com/optane



¹ InsideBIGDATA. "The Exponential Growth of Data." February 2017. <https://insidebigdata.com/2017/02/16/the-exponential-growth-of-data/>.

² GigaSpaces. "InsightEdge: Empower the Insight-Driven Organization." gigaspaces.com/product/insightedge-platform.

³ Configurations: Baseline, two-socket Intel® Xeon® processor E5-2660 v4, 2.0 GHz, total 28 cores, Intel® Turbo Boost Technology and Intel® Hyper-Threading Technology (Intel® HT Technology) on, 256 GB total memory, 16 DIMMs, 16 GB, 2,133 megatransfers per second (MT/s), DDR4, CentOS 7*, Intel® SSD DC P3700 Series (1.6 TB Intel® 3D NAND SSD with NVMe Express* [NVMe*]) compared to a two-socket Intel Xeon Platinum 8168 processor, 2.7 GHz, total 48 cores, Intel Turbo Boost Technology and Intel HT Technology on, 192 GB total memory, 12 DIMMs, 16 GB, 2,100 MT/s, DDR4 LRDIMM, 1 x 800 GB, CentOS 7 Linux*, Intel® Optane™ SSD DC P4800X Series (375 GB, NVMe). The proof of concept used 2 dual socket servers with the following configuration: 2x Intel® Xeon® Platinum 8180 processors, 768 GB RAM, Intel® SSD DC P3600 Series 1.6TB NVMe drive, Intel® SSD DC P4800X Series 375TB NVMe drive, 2x Intel® SSD DC S4500 Series 800GB. Host OS: CentOS 3.10, and applied all security updates released to the proof-of-concept execution date. The proof-of-concept was conducted and executed by GigaSpaces, at July 11th, 2018. Performance results are based on testing as of July 11, 2018 and may not reflect the publicly available security updates. See configuration disclosure for details.

⁴ Intel. December 2018. intel.com/content/www/us/en/solid-state-drives/optane-ssd-dc-p4800x-brief.html. Intel drive evaluated - Intel® Optane™ SSD DC P4800X 375GB. Test and System Configuration: CPU: Intel® Xeon® E5-2687W v4 3.0GHz 30MB 160W 12 cores, CPU Sockets: 2, RAM Capacity: 32GB, RAM Model: DDR4 2133MHz, PCIe Attach: CPU (not PCH lane attach), Chipset: Intel C610 chipset, BIOS: SE5C610.86B.01.01.0024.021320181901, Switch/ReTimer Model/Vendor: Intel A2U44X25NVME DK, OS: CentOS 7.3.1611, Kernel: 4.14.50, FIO version: 3.5; NVMe Driver: Inbox, C-states: Disabled, Hyper Threading: Disabled, CPU Governor (through OS): Performance Mode; EIST (Speed Step): Disabled, Intel Turbo Mode: Disabled, P-states = Disabled; IRQ Balancing Services (OS) = Off; SMP Affinity, set in the OS; QD1 utilizes I/O Polling Mode. Performance results are based on testing as of August 31, 2018 and may not reflect the publicly available security updates. See configuration disclosure for details.

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