

Intel Launches Latest 3rd Generation Intel Xeon Scalable Processors, Optimized for Cloud, High Performance Computing, Network and Security Workloads

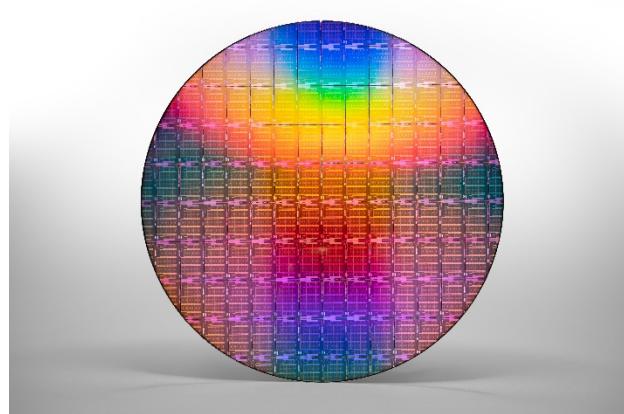
Featuring up to 40 Powerful Cores and Supporting a Wide Range of Frequency, Feature and Power Levels, as well as Intel's Portfolio of Memory, Storage and Connectivity

April 6, 2021 — 3rd Gen Intel® Xeon® Scalable processors, launched today by Intel, are built to allow customers to deploy flexible infrastructure that is optimized for multi-cloud environments and enables the world's broadest range of workload requirements, including 5G networking, artificial intelligence (AI), high performance computing (HPC), and intelligent edge infrastructure.

All of the world's largest cloud service providers plan to offer 3rd Gen Intel Xeon Scalable processor-powered services in 2021, including providers of infrastructure-as-a-service (IaaS), e-commerce, content distribution, social media and confidential computing.

3rd Gen Xeon Scalable platform

- Optimized for cloud, AI, enterprise, HPC, network, security and internet of things (IoT) workloads, 3rd Gen Intel Xeon Scalable processors come with eight to 40 powerful cores and a wide range of frequency, feature and power levels. New benefits include PCIe-Gen4 support, increased memory bandwidth, memory capacity per processor up to 6 terabytes per processor/socket and additional AVX-512 instructions.
- 3rd Gen Intel Xeon Scalable processors are the only x86 data center processors with built-in AI acceleration, supporting end-to-end data science tools and a vast ecosystem of smart solutions.
- The platform includes Intel® Software Guard Extensions (Intel® SGX), which help protect data and application code in real time from the edge to the data center and multi-tenant public cloud, enabling enhanced collaboration using shared data – without compromising privacy.
- Intel® Crypto Acceleration increases the performance of encryption-intensive workloads, including SSL web serving, 5G infrastructure and VPN/firewalls, and reduces the performance impact of pervasive encryption.



A wafer contains new 3rd Gen Intel Xeon Scalable processors. Intel introduced the processors and the platform they help power on April 6, 2021. Combined with Intel Optane persistent memory and storage, Ethernet adapters, FPGAs and optimized software solutions, the processors deliver performance and workload optimizations across hybrid-cloud, high performance computing, networking and intelligent edge applications. (Credit: Intel Corporation)

- A performant and flexible portfolio matters. 3rd Gen Intel Xeon Scalable processors, along with connectivity, storage and FPGA solutions delivered by Intel, can further enhance workload-optimized solutions designed to move more, store more and process everything.
- Core-for-core, 3rd Gen Intel Xeon Scalable processors offer industry-leading performance on popular cloud databases, HPC, virtualization and AI.
- 3rd Gen Intel Xeon Scalable processors deliver 1.5 times more performance than other CPUs across 20 popular machine and deep learning workloads.¹
- 3rd Gen Intel® Xeon® Platinum 8380 processor delivers 1.58 times higher performance on cloud microservices usage versus prior generation platform, enabling faster business decisions.²



Intel Software Guard Extensions (Intel SGX)

- Intel SGX is the most tested, researched and deployed hardware-based trusted execution environment (TEE) for the data center, with the smallest available attack surface within the system. For customers that have strict data privacy and security requirements, Intel SGX offers a clear strategic advantage. Many of Intel's most security-conscious enterprise and cloud customers have built protected applications using Intel SGX, and the Intel SGX developer community and number of applications continues to expand.
- Since market release in 2015, Intel SGX has built a broad ecosystem of independent software vendors and cloud service providers that have driven global adoption. It enables application isolation in private memory regions, called enclaves, to help protect up to 1 terabyte of code and data while in use.

Navin Shenoy, executive vice president and general manager of the Data Platforms Group at Intel Corporation, holds a 3rd Gen Intel Xeon Scalable processor as part of the events to unveil the processor and the platform it powers. (Credit: Intel Corporation)

Intel Optane Persistent Memory 200 Series

- Intel® Optane™ persistent memory 200 series is Intel's next-generation persistent memory module and provides large capacity and native persistence to help extract more value from larger datasets and increase agility with fast access to more data closer to the CPU in security-enabled, reliable and persistent memory.
- Intel Optane persistent memory is a new category of devices containing aspects of both memory and storage. It has the flexibility to augment memory capacity beyond what is available on DRAM-only systems and can be used as a new persistent memory tier delivering high performance and low latency for accelerated data processing.
- 3rd Gen Intel Xeon Scalable Processors on Whitley platform support Intel Optane persistent memory 200 series to deliver:
 - Up to 6 terabytes total memory per socket.
 - With 32% higher persistent memory bandwidth versus the previous generation.³

- Improved application performance with support for the new platform feature eADR (extended asynchronous DRAM refresh).
- eADR is a new platform feature available on 3rd Gen Intel Xeon Scalable processors with Intel Optane PMem 200 series that improves performance of apps that use persistent memory by eliminating “cache flushes” – volatile data including the CPU caches save automatically, even if power fails.
 - When applications that manage data structures in persistent memory run on an eADR-enabled platform, the software detects eADR and skips the cache flushing, knowing the system will do them automatically, even if it experiences a system crash or power failure.
- Workload benefits and use cases with Intel Optane persistent memory 200 series include:
 - Lower costs per VM by up to 25% while delivering the same performance when deploying 3rd Gen Intel Xeon Scalable processors with Intel Optane persistent memory 200 series.⁴
 - Achieve up to 2.5 times more transactions on the new 3rd Gen Intel Xeon Scalable processor with Intel Optane persistent memory 200 and Intel® Ethernet E810 Network Adaptor running Aerospike with index and data in Intel Optane persistent memory versus prior-generation platform.⁵
 - Intel 3rd Gen Xeon Scalable processors and the latest Intel Optane persistent memory deliver up to 63% higher throughput for live video content and 33% more memory capacity, enabling content delivery providers the flexibility to serve the same number of subscribers at higher resolution or a greater number of subscribers at the same resolution compared to a platform using 2nd Gen Intel Xeon Scalable processors and Intel Optane persistent memory 100 series.⁶
 - Complete graph analytics computations used in search, social networks, recommender systems, bioinformatics and fraud detection are 2 times faster on average when using 3rd Gen Intel Xeon Scalable processors with Intel Optane persistent memory 200 series.⁷

Intel Optane SSD P5800X

- The Intel® Optane™ SSD P5800X is the world's fastest SSD for the data center.⁸ Data creation continues to grow at exponential rates, and workloads are becoming ever more intense. Legacy storage options are increasingly a performance bottleneck for the hottest stored data and inhibit the evolution of new architectures and the performance of new applications.
- Caching and tiering the hottest data to higher-performance storage can break these bottlenecks. However, reliance on today's NAND SSD risks disk wear-out, which can increase maintenance costs and downtime due to high write volumes. The optimized solution is to use Intel Optane SSD P5800X as the cache tier, which provides performance and endurance.
- Compared with the previous generation, the Intel Optane SSD P5800X enables unprecedented storage value by delivering⁹:
 - 40% lower average latency for faster actionable insights.
 - 50% better Quality of Service (QoS) to enable monetization of improved SLAs.
 - 4x greater random 4K mixed read/write IOPs to better saturate high-speed networks.
 - 67% higher endurance to help extend the life of lower endurance NAND SSDs.

- Using Intel Optane SSD P5800X and volume storage with the Intel® SSD D5-P5316 for data caching and tiering make hyperconverged infrastructure, database, VDI and content-delivery workloads substantially more responsive.

Intel SSD D5-P5316

- The Intel SSD D5-P5316 is the industry's first 144-L PCIe QLC NAND.
- Built on industry-leading QLC NAND technology, the Intel SSD D5-P5316 can enable massive storage consolidation while significantly lowering total cost of ownership (TCO). Built from the ground up to optimize and accelerate storage, the Intel® SSD D5-P5316 has Intel's most advanced Quad-Level Cell NAND technology, and delivers industry-leading SSD storage density for the data center and the high bandwidth of PCIe 4.0 interface.
- Compared to HDDs, the Intel SSD D5-P5316 can accelerate access to stored data by up to 25 times. Performance optimizations bring up to 2 times higher sequential read performance, up to 38% higher random read performance, up to 48% better latency and up to 5 times higher endurance compared with the previous-generation Intel QLC SSD family. The innovative form factor also enables up to 20 times reduction of a data center storage footprint compared to HDDs.¹⁰
- Well-suited for a wide range of read intensive, low latency workloads, the Intel SSD D5-P5316 is ideal for content delivery network, hyper converged infrastructure (HCI), big data, AI, cloud storage and HPC.

Next Generation Intel Xeon D processors

- The next-generation Intel® Xeon® D processor is designed to support denser, size-constrained and ruggedized designs at the edge for both indoor and outdoor use cases, including vRAN, security appliances, uCPE/SD-WAN, switches and routers, edge computing, storage and more.
- The Intel Xeon D processor will be available in a wide range of power envelopes from 25W to 125W with a system-on-chip featuring integrated CPU, hardware acceleration for Intel® QuickAssist Technology, IO and NIC. Native AI (VNNI and Intel® Deep Learning Boost), inline crypto capabilities and precision timing support come built-in to facilitate deployment of edge services.

Intel Ethernet Network Adapter E810-2CQDA2

- The 3rd Gen Xeon Scalable platform supports the latest Intel® Ethernet 800 series adapters delivering up to 100 Gbps port speeds with features only available on Intel platforms.
- Up to 2 times increase in resources for virtualized and containerized networks compared with Intel® Ethernet 700 series, enabling support for greater VM and container density.¹¹
- The Intel® Ethernet Network Adapter E810-2CQDA2 increases network data throughput up to 200 Gbps per adapter for bandwidth intensive workloads such as vRAN, NFV forwarding plane, storage, HPC, cloud and content delivery networks.
- The Intel® Ethernet Network Adapter E810-2CQDA2 allows customers to maximize throughput in PCIe 4.0 systems, which offer more available bandwidth than previous generation servers. And this adapter supports all Intel Ethernet 800 series performance optimizations and uses the same drivers and software.

- Intel offers a full family of Intel Ethernet 800 series network adapters designed for use in a wide variety of workloads and system configurations. With support for port speeds up to 100 GbE, these adapters are available in PCIe and OCP form factors. The Intel Ethernet 800 series moves data faster and includes innovative, versatile technologies such as application device queues, dynamic device personalization, and TCP, as well as two type of RDMA: iWARP and RoCE v2.

Intel Agilex FPGAs

- The Intel® Agilex™ FPGA family has the industry's leadership position for FPGA performance and power efficiency for diverse workloads including 5G, network, cloud and edge applications.
 - Up to 50% faster fabric performance than prior generations for 5G fronthaul gateway applications, critical to enabling high speed fiber-based connection between the baseband unit (BBU) and remote radio head (RRH).¹²
 - 50% faster video IP performance and lower fabric power versus competing 7 nanometer FPGAs for embedded edge vision applications.¹³
 - Intel Agilex FPGA enables next-generations SmartNICs with high throughput and optimized performance per watt for flexible acceleration of key workloads like OVS, storage and NVMEoF.
 - 1.4 million to 2.7 million logic element FPGAs with PCIe Gen4 compliance, PCIe Gen5, and Optane persistent memory support to accelerate computational storage workloads.
- Intel Agilex FPGAs are key to the rapidly growing category of Intel® SmartNICs, accelerating key workloads such as Open vSwitch (OVS), storage and NVME-over-fabric (NVMEoF).
- Intel® FPGA-based acceleration solutions help move, process and store data faster and more efficiently. By providing hardware programmability on production-qualified platforms, solution providers can design and then deploy the latest solutions quickly, while allowing for the flexibility needed in rapidly changing environments, ensuring that assets are deployed efficiently and cost effectively.
- With the latest optimizations, Intel Agilex FPGAs deliver 30% higher logic fabric performance and 2 times better fabric performance per watt compared to competing 7 nanometer FPGAs, enabling higher performance, faster real-time capabilities and lower TCO for FPGA-accelerated applications.¹⁴
- Intel Agilex FPGAs have the highest data rate SerDes transceivers in the FPGA market with 116 Gbps data rates, plus support for 400Gbps Ethernet and PCIe Gen4/Gen5.¹⁵
- The latest release of Intel® Quartus® Prime software combined with continuous improvements in Intel's 10 nanometer SuperFin technology and 2nd Gen Hyperflex™ architecture maximize the performance of the Agilex design and precisely manage system power for ultimate efficiency.
 - Designers can choose the optimal balance of performance and power to match the needs of their FPGA application.

Intel Solutions

- Building on more than 10 years of delivering solutions, Intel Xeon Scalable processors are supported by more than 500 ready-to-deploy Intel® Market Ready and Intel® Select Solutions that help to accelerate customer deployments – with more than 80% of the existing Intel Select Solutions portfolio being refreshed to take advantage of 3rd Gen Intel Xeon Scalable processors.

- Building on a long history of solutions work, the Intel Select Solutions program was established in 2017 with the mission of making it easier for the ecosystem to build and deploy solutions optimized for Intel's broad data-centric portfolio.
- Today, Intel Select Solutions are verified configurations of hardware and software designed to reduce qualification time, accelerate time to deployment and increase confidence in optimal application performance. The program boasts more than 60 development and solution provider partners and has over 150 partner-delivered solutions in market, covering data-centric workload areas like AI, analytics, HPC, network, cloud and HCI. When coupled with Intel's IoT-focused program, Intel has more than 500 solution offerings being delivered through our ecosystem partners, supporting workloads from the edge to the cloud.
- Intel is announcing seven new or updated optimized solution reference designs for the data center that utilize the latest Intel products and technologies, including 3rd Gen Intel Xeon Scalable processors, with more solutions from the portfolio being updated throughout the year. Intel Select Solutions for Microsoft Azure Stack HCI, Microsoft SQL, Open Cloud, simulation and modeling, NFVI Forwarding Platform and Visual Cloud Delivery Network are being updated, and a new solution, Intel Select Solutions for Virtual Radio Access Networks (vRAN), is being introduced. To date, more than 25 solution partners have committed to build, verify and sell this set of 3rd Gen Intel Xeon Scalable processor-based solutions this year.

Intel oneAPI Toolkits

- To accelerate workloads on 3rd Gen Intel Xeon Scalable platforms, software developers can optimize their applications using Intel® oneAPI open, cross-architecture programming, which provides freedom from technical and economic burdens of proprietary models. Intel® oneAPI Toolkits help realize the processors' performance, AI and encryption capabilities through advanced compilers, libraries and analysis and debug tools.
- For high performance compute and cryptography, the compilers and libraries in the Intel® oneAPI Base and HPC Toolkits take advantage of Intel® AVX-512, Intel Deep Learning Boost technology, and Intel Crypto Acceleration to deliver high performance applications. With new library optimizations using 3rd Gen Intel Xeon Scalable's multi-buffer technology, they gain greater than 4 times cryptography performance.¹⁶
- To accelerate AI from edge to cloud, the Intel® oneAPI AI Analytics and Intel® Distribution of OpenVINO™ Toolkits, including Intel-optimized deep learning frameworks and Python machine learning libraries, boost performance for training and inference across Intel architectures from edge to cloud.

¹ See [43] at www.intel.com/3gen-xeon-config for details. Results may vary

² See [98] at www.intel.com/3gen-xeon-config for details. Results may vary

³ See [1] at www.intel.com/optane-pmem-config for details. Results may vary.

⁴ See [3] at www.intel.com/optane-pmem-config for details. Results may vary.

⁵ See [5] at www.intel.com/optane-pmem-config for details. Results may vary.

⁶ See [2] at www.intel.com/optane-pmem-config for details. Results may vary.

⁷ See [4] at www.intel.com/optane-pmem-config for details. Results may vary.

⁸ T See [14] at <http://www.intel.com/optane-ssd-config> for details. Results may vary.

⁹ See [13, 9, 15, 2] at <http://www.intel.com/optane-ssd-config> for details. Results may vary.

¹⁰ Testing by Intel. Mainboard: Intel® Server Board S2600WFT, Version: R2208WFTZS, BIOS: SE5C620.86B.00.01.0014.070920180847, Platform architecture: x86_64, CPU: Intel® Xeon® Gold 6140 CPU @ 2.30GHz, CPU Sockets: 2, RAM Capacity: 32G, RAM Model: DDR4, OS version: centos-release-7-5, Build id: 1804, kernel: 4.14.74, NVMe Driver: Inbox, Fio version: 3.5, G4SAC PCIe Gen4 switch PCIe card (Microsemi). Intel® SSD D5-P5316 was tested on ACV10100 firmware. Testing as of March 2021.

intel. FACT SHEET

25x acceleration - Sequential read performance based on Intel® SSD D5-P5316 compared to Seagate Exos X18 (seagate.com/files/www-content/datasheets/pdfs/exos-x18-channel-DS2045-1-2007GB-en_SG.pdf).

¹¹ The 800 series has up to 2x more virtual functions, queue pairs, etc. than the 700 series.

¹² <https://edc.intel.com/content/www/us/en/products/performance/benchmarks/overview/>

¹³ <https://edc.intel.com/content/www/us/en/products/performance/benchmarks/overview/>

¹⁴ <https://edc.intel.com/content/www/us/en/products/performance/benchmarks/overview/>

¹⁵ <https://edc.intel.com/content/www/us/en/products/performance/benchmarks/overview/>

¹⁶ Testing conducted on Intel® IPP Cryptography 2020 Update 3 on Intel® Xeon® Platinum 6330 processor comparing with GMP solution. Testing done by Intel® and WeBank.

These news disclosures represent the progress of Intel's six pillars of technology innovation strategy. Intel is taking full advantage of its unique position to deliver a mix of scalar, vector, matrix and spatial architectures deployed in CPUs, GPUs, accelerators and FPGAs – unified by an open, industry-standard programming model, oneAPI, to simplify application development.

Performance varies by use, configuration and other factors. Learn more at www.intel.com/performanceindex.

Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. See backup for configuration details. No product or component can be absolutely secure.

Intel contributes to the development of benchmarks by participating in, sponsoring, and/or contributing technical support to various benchmarking groups, including the BenchmarkXPRT Development Community administered by Principled Technologies.

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