



# 3rd Gen Intel Xeon Scalable Processors



Up to  
**40**  
powerful cores per socket

Up to  
**3.7GHz**  
single-core Turbo frequency

Flexible TDP ranges from  
**105W to 270W**

## Workload-optimized performance and security features, now for 1 and 2-socket platforms

To build for today's needs while planning for unknown future demands, flexible infrastructure is key. Businesses need systems optimized to serve a range of workloads, anywhere, at any time—and **3rd Gen Intel Xeon Scalable processors** deliver that ability. They're the only data center CPU with built-in AI acceleration, end-to-end data science tools, and an ecosystem of smart solutions supporting app and service deployments from the edge to the cloud.

### Built-in acceleration

Deliver a fast, cost-effective time-to-solution, without the need for expensive, proprietary add-in hardware.

### Data protection at rest, in flight, and in use

Address current and future privacy and security concerns with a built-in set of new and enhanced security capabilities.

### New, improved CPU architecture

Support space- and power-constrained environments without compromising performance or security.

## Next-gen performance

Up to  
**6TB**  
memory capacity  
per socket

(DRAM + Intel Optane PMem 200 series)

Up to  
**8 channels**  
DDR4-3200 memory  
per socket

Up to  
**64 lanes**  
PCIe Gen 4  
per socket

## Key selling points

### Built-in acceleration

Speed up cost-effective time-to-solution for demanding workloads—without the need for discrete AI acceleration.

#### Intel Deep Learning Boost (Intel DL Boost)

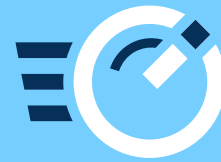
Provide built-in flexibility to run complex AI operations on the same hardware as existing workloads. Plus, int8 Vector Neural Network Instructions enhance inference workloads by maximizing compute resources, improving cache utilization, and reducing bottlenecks.

#### Intel Speed Select Technology (Intel SST)

Custom-tune infrastructure for specific workloads with multiple configurations in a single CPU. Four distinct modes deliver core count and frequency flexibility.<sup>2</sup> A new, easy-to-deploy configuration replaces time-consuming restarts required in previous-gen systems.<sup>3</sup>

#### Intel Advanced Vector Extensions 512 (Intel AVX-512)

Boost performance and throughput for the most demanding tasks with increased memory bandwidth, improved frequency management, and 2x the fused multiply-add (FMA) operations—now across Platinum, Gold, and Silver SKUs.



Up to **1.56x**

AI inference improvement  
for image classification  
with enhanced Intel Deep Learning Boost  
vs. prior gen<sup>1</sup>

### Customizable performance to power a range of workloads<sup>2</sup>

Intel SST – Performance Profile 2.0

Intel SST – Base Frequency

Intel SST – Core Power

Intel SST – Turbo Frequency

**2x**

the FMA operations  
now across Platinum, Gold, and Silver SKUs



Up to **1.48x**  
faster encryption  
performance

with Intel Crypto Acceleration  
vs. prior gen<sup>1</sup>

### Revolutionary security features<sup>4</sup>

Built-in security and privacy solutions help protect valuable data assets from theft or tampering while opening the door to new collaboration opportunities.

#### Intel Software Guard Extensions (Intel SGX)

Provide fine-grain data protection via application isolation in memory, independent of operating system or hardware configuration.

#### Intel Crypto Acceleration

Boost encryption-intensive workloads, such as SSL web serving, VPN and firewalls, and 5G infrastructure, while virtually eliminating the performance impact of full data encryption.

#### Intel Total Memory Encryption (Intel TME)

Enable full system memory encryption for added protection against physical attacks. This hardware-level security offers flexibility with single or multiple encryption keys.

## The Intel platform advantage

Speed up time to deployment with a flexible, powerful, end-to-end platform supported by workload-optimized toolkits.

### Intel Optane persistent memory 200 series

Help extract more value from larger datasets with large capacity and native persistence. Certified for in-memory databases and analytics tools, including Aerospike, Microsoft Azure Stack, and VMware.

### Intel Ethernet 800 Series

Offer port data rates from 10 Gbps to 100 Gbps, supporting both PCIe Gen 3 and Gen 4 across a variety of port counts. The Application Device Queues (ADQ) feature prioritizes application traffic for network-intensive workloads.

### Intel Optane SSD P5800X

Combine no-compromise I/O performance and never-before-seen SSD endurance to deliver unprecedented storage value for workloads such as hyperconverged infrastructure, databases, VDI, and content delivery networks.

### Intel Toolkits

The Intel AI Analytics Toolkit includes optimized oneAPI libraries such as oneDNN, oneDAL, and Intel Distribution for Python. The Intel Distribution of OpenVINO Toolkit drives AI inference model deployment, while the oneContainer Portal includes >125 containers of pre-optimized models.

3rd Gen Intel Xeon Scalable processors offer outstanding gen-on-gen performance, immediate benefits, and ROI over the life of the platform. Deliver a balanced infrastructure with built-in acceleration and advanced security capabilities—all with the consistent, open Intel architecture you know and trust.

Contact your Intel Authorized Distributor or visit [intel.com/xeon](https://intel.com/xeon)

Up to **6TB**

of memory per socket

and on avg. **32%**

higher memory bandwidth with Intel Optane PMem 200 series for faster analysis of the largest data sets vs. prior gen & platform<sup>5</sup>

Up to **2x** increase

in resources for virtualized and containerized networks

with the Intel Ethernet 800 Series compared to the Intel Ethernet 700 Series

Up to **4x** greater random 4K mixed read/write IOPS

with the Intel Optane SSD P5800X to better saturate high-speed networks vs. prior gen<sup>6</sup>

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

Your costs and results may vary.

Intel technologies may require enabled hardware, software or service activation.

Intel optimizations, for Intel compilers or other products, may not optimize to the same degree for non-Intel products.

Intel may make changes to specifications and product descriptions at any time, without notice.

Performance varies by use, configuration and other factors.

- Please visit [www.intel.com/3gen-xeon-config](https://www.intel.com/3gen-xeon-config) and use the corresponding performance number [#] to access full system configuration and performance detail.v
  - Up to 1.48x faster encryption performance with Intel Crypto Acceleration vs. prior gen [97]
  - 1.56x improvement in AI inference for image classification with enhanced Intel Deep Learning Boost vs. prior gen [119]
- Mode availability varies by SKU. Intel SST-PP and Intel SST-BF are only available on 25 3rd Gen Intel Xeon Scalable processors. Intel SST-CP and Intel SST-TF are available on 25, 45, and 85 Intel Xeon Scalable processors. See full SKU configurations at [intel.com](https://intel.com) for details.
- OS support required to enable OS-level management of Intel SST. Check with your retailer or manufacturer.
- No product or component can be absolutely secure.
- Based on testing by Intel as of April 27, 2020 (Baseline) and March 23, 2021 (New).  
Baseline configuration: 1-node, 1 x Intel Xeon Platinum 8280L processor (28 cores at 2.7 GHz) on Neon City with a single Intel Optane PMem module configuration (6 x 32 GB DRAM; 1 x {128 GB, 256 GB, 512 GB} Intel Optane PMem module), ucode rev: 04002F00 running

Fedora 29 kernel 5.1.18-200.fc29.x86\_64 and Intel Memory Latency Checker (Intel MLC) version 3.8 with App Direct Mode.

New Configuration: 1-node, 1 x Intel Xeon pre-production ICX-XCC processor (38 cores at 2.0 GHz) on Wilson City with a single Intel Optane PMem module configuration (8 x 32 GB DRAM; 1 x {128 GB, 256 GB, 512 GB} Intel Optane PMem module), ucode rev: 8d000270 running RHEL 8.1 kernel 4.18.0-147.el8.x86\_64 and Intel MLC version 3.9 with App Direct Mode.

6. Source – Intel; Date tested – March 18, 2021

Workload – FIO rev 3.5, based on random 512B transfer size with total queue depth of 64 (QD=8, workers/jobs=8) workload, 4KB transfer size with total queue depth of 32 (QD=4, workers/jobs=8) workload, 8KB transfer size with total queue depth of 16 (QD=4, workers/jobs=4) workload in most case, except where specified.

System configuration

Intel Optane SSD P5800X 1.6TB: CPU: Intel Xeon Platinum 8380 2.30GHz 270W 40 cores per socket, CPU Sockets: 2, BIOS: SE5C6200.86B.3021.D40.2103160200, UCODE: 0X8D05A260, RAM: 32GB @3200 MT/s DDR4, DIMM Slots Populated: 16 slots, PCIe Attach: CPU (not PCH lane attach), OS: Ubuntu 20.04.2 LTS, Kernel: 5.4.0-67-generic, FIO version: 3.16; NVMe Driver: Inbox, C-states: Disabled, Hyper Threading: Disabled, CPU Governor (through OS): Performance Mode, Intel Turbo Mode, and P-states = Disabled; IRQ Balancing Services (OS) = Off; SMP Affinity, set in the OS; FIO with ioengine=io\_uring. See Intel Optane SSD DC P4800X product specifications at <https://ark.intel.com/content/www/us/en/ark/products/97161/intel-optane-ssd-dc-p4800x-series-375gb-2-5in-pcie-x4-3d-xpoint.html>

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