PowerEdge Servers and 2nd Generation Intel® Xeon® Scalable Processors: Naming Convention and Special Use Case Offerings

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SUMMARY
This brief tech note gives a high-level overview of the 2nd Generation Intel® Xeon® Scalable Processors that Dell EMC will carry in PowerEdge servers.

In addition to a broad range of general-purpose processors, Intel has also introduced innovative offerings for special use cases.

More detailed information is available in a full-length white paper linked in this tech note.

PowerEdge servers configured with Intel's latest processor offerings, the 2nd Generation Intel® Xeon® Scalable Processors, bring users many benefits. Key among these benefits are performance gains throughout the processor stack, not just at the high end, and security protection against side-banded vulnerabilities, previously available through patches, is now embedded in the CPU's, thereby relieving the negative performance impact associated with patches. As with any announcement of a new technology family, new naming conventions and new processor offerings can lead to some confusion. This brief tech note explains the nomenclature of the 2nd Generation Intel® Xeon® Scalable Processors and describes the special use case processors. Deeper information on this new 2nd Generation processor family (including specs, intra-family processor comparison, memory subsystem, DIMMS, drivers, etc.) is available in a full-length white paper, *Dell EMC PowerEdge 2nd Generation Intel® Xeon® Scalable Platform Offering*.

The Intel® Processor naming convention
Processor numbers for the 2nd Generation Intel® Xeon® Scalable processors use an alphanumeric scheme based on performance, features, and processor generation following the brand and its modifier. The first digit in the four-number sequence indicated the performance and feature level, the second indicated the processor generation, and the next two are SKU numbers. Where applicable, either one or two alpha suffixes appear at the end of the processor name, which indicate integrations and optimizations and memory capacity.
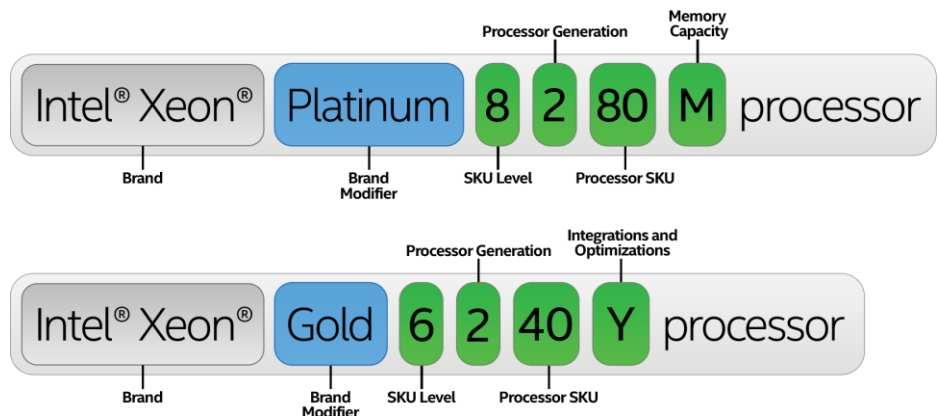
The tables on the next page identify the meaning of entries for SKU level, Processor generation, Memory capacity and Integrations and optimizations.

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SKU Level		Processor Generation	
8	Platinum	2	2nd Generation Intel® Xeon® Scalable processors
6, 5	Gold		
4	Silver		
3	Bronze		

Memory Capacity		Integrations and Optimizations	
No suffix	1 TB per Socket	N	NFV Optimized
M	2 TB per Socket	S	Search Optimized
L	4.5 TB per Socket	T	High Tcase/extended reliability
		U	Single Socket
		V	VM Density Optimized
		Y	Intel® Speed Select Technology

Table 1: Field identifiers for Intel® processor naming convention.

The new 2nd Generation Intel® Xeon® Scalable Processors come in a variety of flavors. The table below provides an overview and key specs:

Intel® Xeon® Platinum 8200	**Best performance and business agility, hardware-enhanced security.** • Up to 28 cores • 2-4-8 sockets • 3 UPI links @ 10.4 GT/s • Up to 3.80 GHz (4 cores) • 6-ch DDR4 @ 2933 MT/s @ 1DPC • 48 lanes PCIe Gen 3 • Intel® AVX-512 (2 FMA) • Intel® Turbo Boost & Hyperthreading • Intel® Optane™ DC Persistent Memory module • Intel® DL Boost (VNNI) • Advanced RAS
Intel® Xeon® Gold 6200	**Great performance, fast memory, more interconnect/accelerator engines.** • Up to 24 cores • 2-4 sockets • 3 UPI links @ 10.4 GT/s • Up to 3.60 GHz (8 cores) • 6-ch DDR4 @ 2933 MT/s @ 1DPC • 48 lanes PCIe Gen 3 • Intel® AVX-512 (2 FMA) • Intel® Turbo Boost & Hyperthreading • Intel® Optane™ DC Persistent Memory module • Intel® DL Boost (VNNI) • Advanced RAS
Intel® Xeon® Gold 5200	**Better performance, advanced reliability.** • Up to 18 cores • 2-4 sockets • 2 UPI links @ 10.4GT/s • Up to 3.80 GHz (4 cores) • 6-ch DDR4 @ 2666 MT/s • 48 lanes PCIe Gen 3 • Intel® AVX-512 (1 FMA) • Intel® Turbo Boost & Hyperthreading • Advanced RAS • Intel® Optane™ DC Persistent Memory module • Intel® DL Boost (VNNI)
Intel® Xeon® Silver 4200	**Efficient performance at lower power.** • Up to 16 cores

	• 2 sockets • 2 UPI links @ 9.6GT/s • Up to 2.70 GHz (8 cores) • 6-ch DDR4 @ 2400 MT/s • 48 lanes PCIe Gen 3 • Intel® AVX-512 (1 FMA) • Intel® Turbo Boost & Hyperthreading • Standard RAS • Intel® DL Boost (VNNI)
Intel® Xeon® Bronze 3200	**Entry performance.** • Up to 6 cores • 2 sockets • 2 UPI links @ 9.6GT/s • Up to 1.70 GHz (6 cores) • 6-ch DDR4 @ 2133 MT/s • 48 lanes PCIe Gen 3 • Standard RAS • Intel® AVX-512 (1 FMA) • Intel® DL Boost (VNNI)

Table 2: Key specifications of the 2ⁿᵈ Generation Intel® Xeon® Scalable Processors

Special Use Case Offerings - 2ⁿᵈ Generation Intel® Xeon® Scalable Processors

Speed Select Technology

Intel® Speed Select Technology is an umbrella term for a collection of features that provide more granular control over CPU performance. There are two unique sets of optimized processor offerings that support the Intel® Speed Select Technology: -N & -Y suffix processor SKU's. The paragraphs below describe the different features and use cases for the new Intel® Speed Select Technology feature. Readers are encouraged to read the white paper *Dell EMC PowerEdge 2ⁿᵈ Generation Intel® Xeon® Scalable Platform Offering* for further detail.

Speed Select Technology – Base Frequency (SST-BF) (-N)

The -N processors are optimized offerings specifically designed for NFV and networking/storage workloads. These processors may be of interest to Communication Service Providers, Cloud Service Providers, and Security Appliance Customers.

Two of these processors (6252N & 6230N) will support 2 additional bins of frequency vs. the standard 6252 & 6230 processors, while the 5218N will support a lower processor TDP (105 W) vs. the standard 5218 (125 W) processor.

All the "N" processors will support a new feature called Intel® Speed Select Technology-Base Frequency (SST-BF). SST-BF enables the processor to increase the base frequency of certain cores (called high priority cores) in exchange for lowering the base frequency (called low priority cores) on the other CPU's cores.

With SST-BF, the feature must be enabled in the BIOS at boot. After initial enablement, the feature can be turned on or off during run time. The number of cores that are high- or low-priority and which cores are high- or low priority are set by Intel and cannot change.

Speed Select Technology – Performance Profile (SST-PP) (-Y)

The -Y processors are specialized offerings specifically designed to support customers who want to optimize their TCO by capacity management & SKU consolidation. Examples of customers who may be interested in these processor offerings are IaaS providers, customers with different compute needs during day/night, FSI (trading/analytics), media studios (VDI/rendering) and any customer wanting to simplify their infrastructure by managing fewer types of hardware SKU's.

All the -Y processors will support a new feature called Intel® Speed Select Technology-Performance Profile (SST-PP). SST-PP provides the capability to configure the CPU to run at 3 distinct operating points. Each operating point is defined by a core count with a base frequency associated to that core count:

- Higher core count with lower base frequency
- Lower core count with higher base frequency

BIOS discovers capability and prompts user to select from configurations at boot.

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Optimized for Search (-S)

The -S suffix processors are a new offering that are optimized for consistent performance for search workloads. These processors have a higher base frequency than the comparable mainstream SKU (5220) and have been tuned specifically for search workloads.

Single Socket (-U)

The -U suffix processors are a new offering that support a single processor configuration. These "U" 1-socket offerings are optimized for a higher core count & frequency at a lower cost vs. the standard 2-socket processors. Networking customers such as edge server, router, next gen central office and security applications may be interested in these processor offerings.

The -U model numbers all share identical cores & frequencies to their standard SKU offerings (6212U/8260, 6210U/6248 & 6209U/6230), but these -U processors will only be supported in 1-socket configurations. If a customer wishes to upgrade from the -U 1-socket parts to a standard 2-socket part, the "U" 1-socket part must be removed & replaced with 2 x 2-socket standard processors.

Optimized for VM density (-V)

The -V suffix processors are a new offering that are designed to help maximize cores/threads/VMs per dollar. These SKU's have a lower cost, TDP and base frequency vs. comparable SKU's (24C 6252 & 20C 6230) in the mainstream processor offering. The higher core counts with lower TDP enable high density solutions for customers that use co-location sites or where the energy cost is large part of the TCO. These optimized frequencies at higher core counts also enable lower TDP's with more overall cores, particularly in a 4-socket system. Customers who may be interested in these processors include IaaS, customers interested in increasing VMs per rack or customers needing high VM density solutions due to space limitations or high energy costs.

Optimized for NEBS (-T)

The -T suffix processors are a continuation of the Intel® Xeon® 1st Generation Scalable -T processors that are designed specifically for Network Equipment Building System (NEBS). These processors are designed for sustained, long term usage (10 years) and have a longer supply life of 7 years. These processors may be of particular interest to Telco's or workloads that require long term, sustained operation or higher reliability.

Further information on each of these special use case processors, along with tables and graphical descriptions, is available in the _Dell EMC PowerEdge 2nd Generation Intel® Xeon® Scalable Platform Offering_ white paper.

Conclusion

PowerEdge servers configured with the new 2nd Generation Intel® Xeon® Scalable processors bring users impressive performance gains throughout the stack along with security hardening that avoids negative performance impact. In addition to a broad family of general-purpose processors, Intel has also developed and introduced innovative new technologies and new special use case offerings. Speed Select Technology, available in -N and -Y processors, provides users with more granular control over CPU performance. Other processor offerings address customer requirements for optimization for search (-S processors); single-socket configurations (-U); and VM density (-V); while the -T processors are designed specifically for the Network Equipment Building System (NEBS) specification. Further information on the complete family of the new 2nd Generation Intel® Xeon® Scalable processors is available in the white paper listed in the Notes section below.

Notes:

- For further and deeper information, see the 31-page white paper, _Dell EMC PowerEdge 2nd Generation Intel® Xeon® Scalable Platform Offering_