PRODUCT BRIEF

Intel® Xeon® Scalable Processors
Intel® Xeon® W Processors
Intel® Xeon® E Processors

Ultimate Workstation Performance

Intel® Xeon® Scalable Processors, Intel® Xeon® W Processors and Intel® Xeon® E Processors for Professional Workstations

Optimized to Over-Deliver

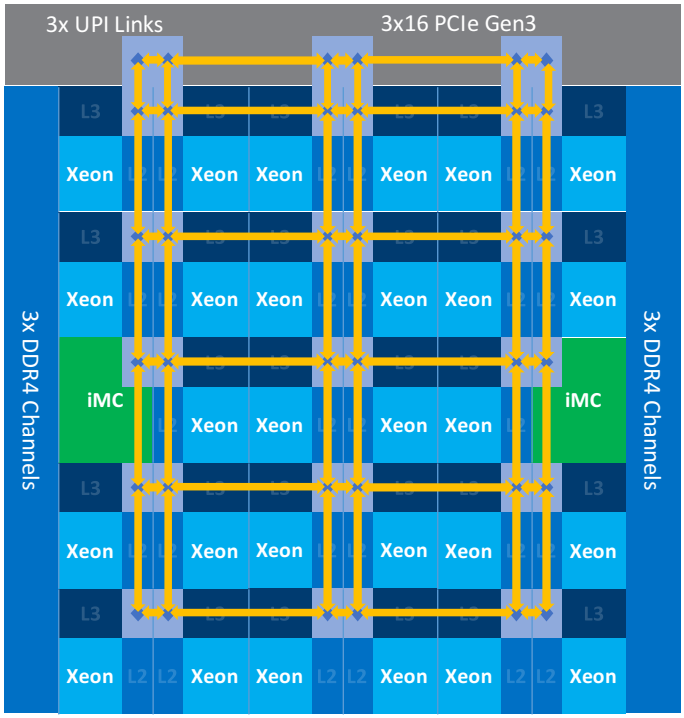
Designed for professionals, workstations powered by Intel® Xeon® processors are the trusted platform for the next generation of professional product designers, content creators, and data scientists. With the ideal combination of processor power, memory, and Intel® Optane™ storage, Intel Xeon processor-based workstations enable you to create, test, and deliver solutions faster than ever.

Intel® Xeon® Processors provides maximum performance and uptimes for workstation workloads

	WHAT MATTERS?	INTEL® XEON® PROCESSOR ADVANTAGES
PERFORMANCE	I can run applications easily and efficiently without getting bogged down	Frequency optimized options from 4 to 28 core options, per processor, mean you spend more time creating and less time waiting
UPTIME	I can increase productivity by minimizing system downtown	Professional-class processors designed and manufactured to perform in always-on usage scenarios
INNOVATION	I can explore more possibilities by designing in 3D virtual reality	Applications optimized for the vector processing capabilities of Intel® AVX-512 deliver significantly increased performance to drive complex, 3D CAD and content creation applications
ACCURACY	My designs and simulations are accurate	Error Correction Code (ECC) hardware circuitry built onto workstations powered by Intel® Xeon® processor tests for and corrects errors in your data as it passes in and out of memory

Pervasive, Breakthrough Performance

From its new Intel® Mesh Architecture and widely expanded resources to its hardware-accelerating technologies like Intel® AVX-512, Intel® Xeon® Scalable and Intel® Xeon® W processor-based workstation platforms enable a new level of breakthrough performance. Whether your application scales based on processor frequency or on the number of cores and threads, Intel Xeon processors provide a flexible range of options with processors up to 4.5 GHz or up to 28 cores.



In the Intel® Xeon® Scalable processor platform Intel® Mesh Architecture with up to 28 cores (per processor), the Last Level Cache (LLC), six memory channels, and 48 PCIe* channels are shared among all the cores, giving access to large resources across the entire die and creating dynamic scalability without sacrificing performance.

Foundational Enhancements

- **Higher Per-Core Performance or Higher Frequency Performance:** Up to 28 cores and 56 threads, per processor, for Intel Xeon Scalable processors. Up to 18 cores and 36 threads for Intel Xeon W processors and up to 6 cores and 12 threads for Intel Xeon E processors delivering high performance and scalability for compute-intensive workstation workloads. For frequency-bound workstation applications, Intel Xeon E processors provide up to 4.7 GHz of frequency to drive increased performance.
- **Expanded I/O:** 48 lanes of PCIe* 3.0 bandwidth and throughput for demanding I/O-intensive workloads.
- **Intel® Advanced Vector Extensions 512 (Intel® AVX-512):** With double the flops per clock cycle compared to previous generation Intel® AVX2,[1] Intel® AVX-512 boosts performance and throughput for the most demanding computational tasks in applications, such as modeling and simulation, data analytics and machine learning, visualization, and digital content creation.

Essential Workstation Features

- **Error correcting code (ECC):** Error correcting code, or ECC memory, automatically detects and repairs single-bit errors on-the-fly to keep workstation applications running reliably and free of data corruption.
- **Intel® Turbo Boost Technology 2.0:** Dynamically increases the processor's frequency, as needed, by taking advantage of thermal and power headroom when operating below specified limits.
- **Intel® Hyper-Threading Technology:** Delivers two processing threads per physical core. Highly threaded applications can get more work done in parallel, completing tasks sooner.
- **Intel® Speed Shift Technology:** Delivers dramatically quicker responsiveness with single-threaded, transient (short duration) workloads by allowing the processor to more quickly select its best operating frequency and voltage for optimal performance and power efficiency.
- **Intel® vPro™ Technology:** Intel® vPro™ Technology delivers hardware-enhanced security, identity protection, and remote manageability to ease workstation deployment for IT managers.
- **Integrated Intel® Ethernet:** Intel 1 Gigabit Ethernet provides high-bandwidth access to simulation, rendering, or analytics servers.

Intel Xeon Scalable Processors Deliver World Class Performance for Expert Workstation Professionals

Intel Xeon Scalable Processors deliver breakthrough performance for photorealistic design, modeling, and content creation done in real-time. Stunning professional quality VR experiences immerse the creator into the design, simulation, animation, and video.

With up to 28 cores at 3.8 GHz or 6 cores at 4.2 GHz, per processor, the Intel Xeon Scalable processor delivers dual-socket, world class performance, to a broad range of workstation applications.

Intel Xeon Scalable processors are ready for **expert-level professional quality VR**, a revolution in design and content creation delivering the experience of real life in real time.

EXPERT WORKSTATION PERFORMANCE

2018 Dual-Socket Intel® Xeon® Scalable Processor vs. 2016 Dual-Socket Intel® Xeon® E5-2600 v4 Processors

UP TO 1.55X FASTER[2]

Intel Xeon W Processors Deliver Optimized Performance for Mainstream Workstation Professionals

The new Intel Xeon W processors are based on the Intel Xeon Scalable processor microarchitecture, but designed into a cost-optimized one-socket form factor specifically for professional workstations.

With up to 18 cores at 4.3 GHz or 4 cores at 4.5 GHz, Intel Xeon W processors deliver optimized performance whether your workstation application scales best with increased processor core count or with increased processor frequency. With Intel® Turbo Boost Technology, you can further boost performance for frequency-bound applications.

Intel Xeon W processors are ready for **professional quality VR**. Experience the difference in design and product/service development using a professional quality VR solution.

MAINSTREAM WORKSTATION PERFORMANCE

2018 Intel® Xeon® W Processor vs. 2016 Intel® Xeon® E5-1500 v4 Processor

UP TO 1.45X FASTER[3]

Intel Xeon E Processors Deliver Essential Performance and Built-In Visuals for Entry Workstation Professionals

The Intel Xeon E processor delivers enhanced performance, reliability and advanced security for the increasing demands and workflows of professional CAD, media and mobile workstations customers. Improvements in processor speed, enhanced memory capabilities, advanced hardware-enhanced security and reliability features available with support for 4K UHD Intel® graphics technology.

With up to 6 cores and frequencies up to 4.7 GHz, the Intel Xeon E processor delivers enhanced performance for frequency-bound workstation applications. Optimized Intel® UHD Graphics P630 drivers are available at downloadcenter.intel.com.

Intel Xeon E processors are ready for **entry-level professional quality VR**. Experience the difference in design and product/service development using a professional quality VR solution.

ENTRY WORKSTATION PERFORMANCE

2018 Intel® Xeon® E Processor vs. 2017 Intel® Xeon® E3-1200 v6 Processor.

UP TO 1.36X FASTER[4]

Professional Workstation Storage Support

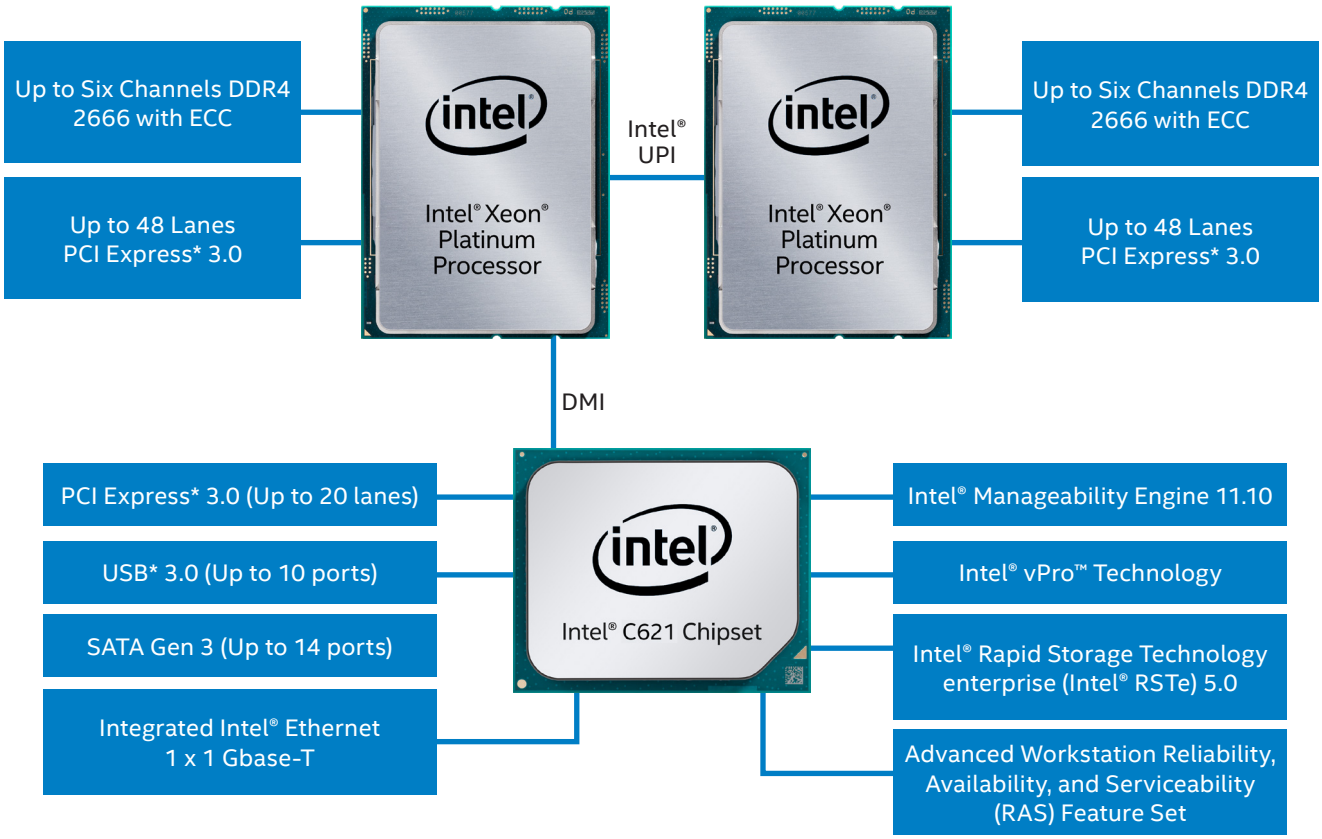
A balanced workstation platform goes beyond just raw compute, memory, and network performance. Storage innovations can drive significant improvements in efficiency and performance of data-hungry workloads. Intel Xeon Scalable processors, the Intel Xeon W processors, and Intel Xeon E processors feature key storage enhancements.

- **Support for Intel® Optane™ DC SSDs and Intel® 3D NAND Solid State Drives:** Delivers an enhanced combination of high throughput, low latency, high QoS, and ultra-high endurance to break through data access bottlenecks.
- **Support for Intel® Optane™ memory:** Enjoy a faster, smoother, and amazingly responsive computing experience with Intel® Optane™ memory, a smart, adaptable system accelerator, now for Intel® Xeon® E-2100 processor-based entry workstations.
- **Intel® Software for Storage:** Optimizes storage hardware, such as encryption, for increased storage performance.
  - **Intel® Virtual RAID on Chip (Intel® VROC):** Directly attach NVMe* SSDs to the CPU PCIe lanes to unleash NVMe* RAID performance at low power and low TCO.
  - **Intel® Rapid Storage Technology (Intel® RSTe) for SATA RAID SSDs:** Dynamic storage accelerator accelerates the performance of your SSD by dynamically adjusting system power management policies to deliver percent faster performance during heavy multitasking compared to default power management.
  - **Intel® Cache Acceleration Software (Intel® CAS):** Combined with Intel® Solid State Drives, Intel® CAS interoperates with system memory to create a multilevel cache that automatically determines the best cache level for active data.

Workstation Features

	Intel® Xeon® E Processor (2100 Series)	Intel® Xeon® W Processor (2100 Series)	Intel® Xeon® Gold Processor (6100 Series)	Intel® Xeon® Platinum Processor (8100 Series)
Highest Core Count Supported (Per Processor)	6 cores	18 cores	22 cores	28 cores
Highest Supported Base Frequency	3.8 GHz (6C/95W)	4.0 GHz (4C/120W)	3.4 GHz (6C/115W)	3.6 GHz (4C/105W)
Number of CPU Sockets	1	1	2	2
Intel® UPI	N/A	N/A	3	3
Intel® UPI Speed	N/A	N/A	10.4 GT/s	10.4 GT/s
Intel® AVX-512	not supported	2 FMA	2 FMA	2 FMA
Memory Speed Support (DDR4)	2666 MHz	2666 MHz	2666 MHz	2666 MHz
Highest Memory Capacity Supported Per Socket	64 GB	512 GB	768 GB, 1.5 TB	768 GB, 1.5 TB
Memory Channels	2	4	6	6
Error Correcting Code (ECC) Memory Support	•	•	•	•
PCIe 3.0	•	•	•	•
Intel® Turbo Boost Technology 2.0	•	•	•	•
Intel® Hyper-Threading Technology	•	•	•	•

Typical Intel® Xeon® Scalable Platform Dual-Socket Configuration



Processors, chipset, and diagram provided for illustration purposes only.
Not comprehensive of all features and capabilities.

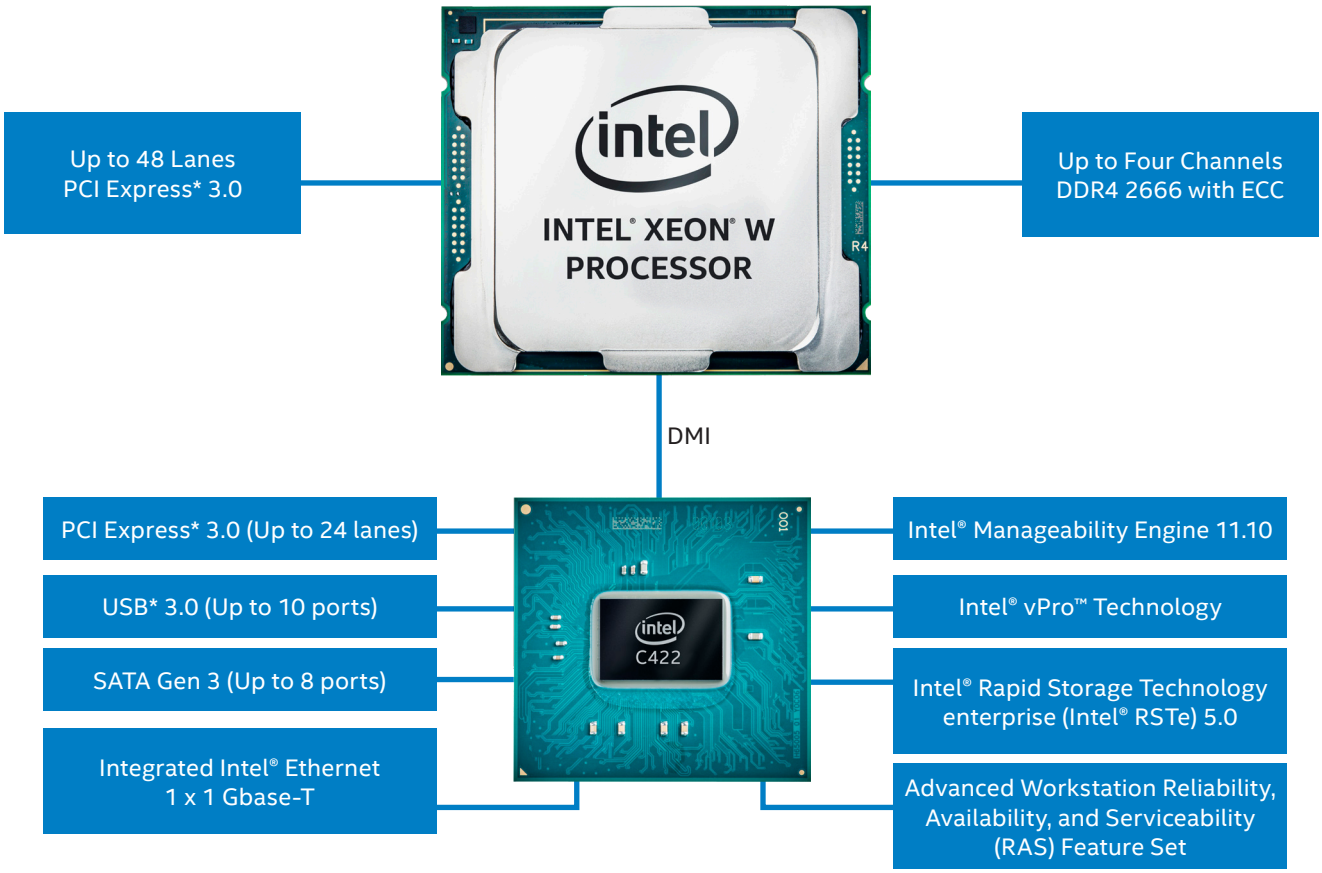
Intel® Xeon® Scalable Processor SKUs and Chipset

SKUS						
SKU	**Cores/Threads**	**Base Speed (GHz)**	**Max Intel® Turbo Boost Technology 2.0 Speed (GHz)**	**Intel® AVX-512**	**TDP (W)**	**Last Level Cache (MB)**
Platinum 8180	28/56	2.5	3.8	2 512-bit FMA	205	38.5
Platinum 8168	24/48	2.7	3.7	2 512-bit FMA	205	33
Platinum 8158	12/24	3.0	3.7	2 512-bit FMA	150	24.75
Platinum 8156	4/8	3.6	3.7	2 512-bit FMA	105	16.5
Gold 6152	18/36	3.0	3.7	2 512-bit FMA	200	24.75
Gold 6152	22/44	2.1	3.7	2 512-bit FMA	140	30.25
Gold 6148	20/40	2.4	3.7	2 512-bit FMA	150	27.5
Gold 6146	12/24	3.2	4.2	2 512-bit FMA	165	24.75
Gold 6144	8/16	3.5	4.2	2 512-bit FMA	150	24.75
Gold 6128	6/12	3.4	3.7	2 512-bit FMA	115	19.25

PRODUCT NAME	USB 3.0	SATA* Gen 3	PCIe* Gen 3	Intel® Ethernet	DMI
Intel® C621 Chipset	10 ports	14 ports	20 lanes	1 x 1 Gbase-T	x4 Gen 3

Visit **intel.com/xeonscalable** for a full list of available Intel® Xeon® Scalable processors.

Typical Intel® Xeon® W Platform Configuration



Processors, chipset, and diagram provided for illustration purposes only.
Not comprehensive of all features and capabilities.

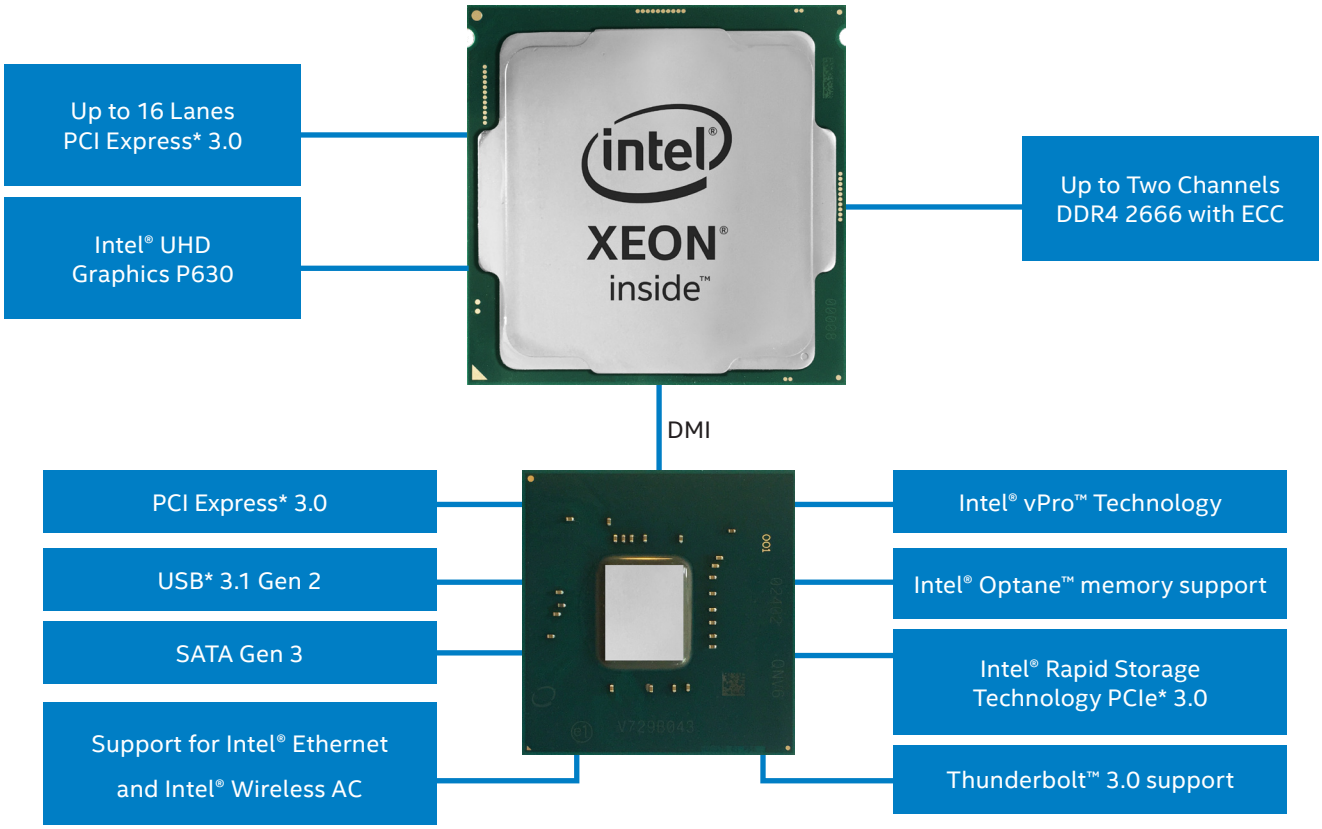
Intel® Xeon® W Processor SKUs and Chipset

SKUS						
SKU	**Cores**	**Base Speed (GHz)**	**Max Intel® Turbo Boost Technology 2.0 Speed (GHz)**	**Intel® AVX-512**	**TDP (W)**	**Last Level Cache (MB)**
W-2195	18	2.3	4.3	2 512-bit FMA	140	24.75
W-2175	14	2.5	4.3	2 512-bit FMA	140	19.25
W-2155	10	3.3	4.5	2 512-bit FMA	140	13.75
W-2145	8	3.7	4.5	2 512-bit FMA	140	11
W-2135	6	3.7	4.5	2 512-bit FMA	140	8.25
W-2133	6	3.6	3.9	2 512-bit FMA	140	8.25
W-2125	4	4.0	4.5	2 512-bit FMA	120	8.25
W-2123	4	3.6	3.9	2 512-bit FMA	120	8.25

PRODUCT NAME	USB 3.0	SATA* Gen 3	PCIe* Gen 3	Intel® Ethernet	DMI
Intel® C422 Chipset	10 ports	8 ports	24 lanes	1 x 1 Gbase-T	x4 Gen3

Visit **intel.com/xeonw** for a full list of available Intel® Xeon® W processors.

Typical Intel® Xeon® E Platform Configuration



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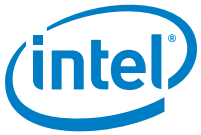
Not comprehensive of all features and capabilities.

Intel® Xeon® E Processor SKUs and Chipset

SKUS						
SKU	**Cores**	**Base Speed (GHz)**	**Max Intel® Turbo Boost Technology 2.0 Speed (GHz)**	**Intel® UHD Graphics P630**	**TDP (W)**	**Processor Cache (MB)**
E-2186G	6	3.8	4.7	Yes	95	12
E-2176G	6	3.7	4.7	Yes	80	12
E-2174G	4	3.8	4.7	Yes	71	8
E-2146G	6	3.5	4.5	Yes	80	12
E-2144G	4	3.6	4.5	Yes	71	8
E-2136	6	3.3	4.5	No	80	12
E-2134	4	3.5	4.5	No	71	8
E-2126G**	6	3.3	4.5	Yes	80	12
E-2124G**	4	3.4	4.5	Yes	71	8
E-2124**	4	3.3	4.3	No	71	8

PRODUCT NAME	USB 3.1/3.0	SATA* Gen 3	PCIe* Gen 3	Intel® Ethernet and Intel® Wireless	DMI
Intel® C246 Workstation Chipset	6 ports/10 ports	8 ports	40 lanes (CPU + Chipset)	Supported	x4 Gen3

Visit **intel.com/xeone** for a complete list of available Intel® Xeon® E processors.
**Intel® Xeon® E-2126G, E-2124G, and E-2124 processors do not support Intel® Hyper-Threading Technology (Intel® HT technology)



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Notice revision #20110804

[1] As measured by Intel® Xeon® Processor Scalable Family with Intel® AVX-512 compared to an Intel® Xeon® E5 v4 with Intel® AVX2.

[2] Up to 1.55X faster vs. 2016 Dual-Socket Intel® Xeon® E5-2600 v4 Processors. Configuration: Estimates based on Intel internal testing as of June 2018 on SPECint*_rate_base2006 : 1-Node, 2 x Intel® Xeon® Platinum 8180M Processor on Wolf Pass SKX with 384 GB Total Memory on Red Hat Enterprise Linux* 7.4 using Benchmark software: SPEC CPU® 2017,Compiler: Intel® Compiler IC18 OEM, Optimized libraries: AVX512. Data Source: Request Number: 40, Benchmark: SPECrate*2017_int_base (estimated), Score: 281 Higher is better vs. 1-Node, 2 x Intel® Xeon® Processor E5-2699 v4 on Wildcat Pass with 256 GB Total Memory on Red Hat Enterprise Linux* 7.4 using Benchmark software: SPEC CPU® 2017 v1.2, Optimized libraries: IC18.0_20170901, Other Software: MicroQuill SMART HEAP, Script / config files: xCORE-AVX2. Data Source: Request Number: 40, Benchmark: SPECrate*2017_int_base(estimated), Score: 181 Higher is better.

[3] Up to 1.45X faster vs. 2016 Intel® Xeon® E5-1600 v4 Processor. Configuration: Estimates based on Intel internal testing as of June 2018 on 1x Intel® Xeon® W-2155 Processor, Platform: BSF, 4 x 32GB DDR4 2666 MHz, OS: Ubuntu 17.10 (Kernel 4.13.0-30-generic), Benchmark: SPECrate*2017_int_base (Estimated), Compiler: ICC 18.0.2,BIOS: BSFSWSR1.R00.X060.B42.1802230717 02/23/2018, (uCode: 0x2000043), SNC enabled, IMC 2-way interleaving, Storage: SSD S3710 Series 400 GB, Score: 70.5 vs 1x Intel® Xeon® Processor E5-1680 v4, Platform: Supermicro X10SRA, 4 x 32GB DDR4 2400 MHz, OS: Ubuntu 17.10 (Kernel 4.13.0-35-generic), Benchmark: SPECrate*2017_int_base (Estimated), Compiler: ICC 18.0.2,BIOS: American Megatrends Inc. 2.1 03/29/2018, (uCode: 0xb00002a), Storage: SSD S3710 Series 800 GB, Score: 48.4.

[4] Up to 1.36X faster vs. 2017 Intel® Xeon® E3-1200 v6 Processor. Configuration: Estimates based on Intel internal testing as of June 2018 on 1x Intel® Xeon® E-2186G Processor, Platform: Moss Beach, 4 x 8GB DDR4 2666 ECC (32 GB 2666 MHz) ,OS: Ubuntu 17.10 (Kernel 4.13.0-35-generic), Benchmark: SPECrate2017_int_base (Estimated), Compiler: ICC 18.0.2,BIOS: CNLSE2R1.R00. X119.B54.1803131307, 03/13/2018 (uCode: 0x84), Storage: SSD S3710 Series 800 GB, Score: 40.9 compared to 1x Intel® Xeon® Processor E3-1285 v6, Platform: S1200SP, 4 x 8 GB DDR4 2400 MHz, OS: Ubuntu 17.10 (Kernel 4.13.0-35-generic) ,Benchmark: SPECrate2017_int_base (Estimated), Compiler: ICC 18.0.28, BIOS: S1200SP.86B.03.01.1029.012520180838 (uCode:0x84), Storage: SSD S3710 Series 800 GB, Score: 29.9.

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