Product Brief

Intel® Xeon® 6 processors with Efficient-cores

Accelerate network and edge transformation with highly optimized performance-per-watt

Network and Edge scalability meets efficient-core density. With higher performance-per-watt[1] and up to 144 cores per socket, Intel® Xeon® 6 processors with E-cores offer greater parallel processing for workload throughput, while maximizing value.

Drive high throughput and power efficiency while improving sustainability for network and edge workloads

Utilize highly task-parallel, efficient compute on cores that drive performance for networking and edge workloads in today's thriving markets. Intel® Xeon® 6 processors with Efficient-cores (E-cores) enable higher performance-per-watt compared to the 2nd Gen Intel® Xeon® processor[1], featuring up to 144 cores per socket available on 6700 series, and higher on 6900 series platform[2]. Integrated accelerators[3] provide targeted enhancements for network and security workloads, amplifying overall efficiency and productivity. Intel® Xeon® 6 processors with E-cores spell great news, whether you are a software engineer looking to boost your edge solutions and products, or a network architect redesigning your services.

Up to 144 cores per socket enable high density, efficiency, and throughput

Enhance parallel processing with up to 144 cores per socket in 1- or 2-socket platforms to drive faster results, process more packets with encryption, and support more microservices across distributed environments. Built-in acceleration[3] speeds up encryption and compression, enhances resource management across cores, and accelerates edge and network workloads. Efficient TDP ranges of 205W–330W drive higher performance-per-watt[1], which enables compute resources at the edge to be used more efficiently than upstream cloud processing to contribute to sustainability efforts across businesses.

Support the next-gen security capabilities your growth depends on

Ramp up security operations for 5G networks and edge-to-cloud infrastructure to support advanced capabilities such as deep packet inspection, granular policy control, zero trust network, and next-gen firewalls (NGFWs). Confidential computing technologies such as Intel® Trust Domain Extensions (Intel® TDX) and Intel® Software Guard Extensions (Intel® SGX) help secure in-flight applications and data in trusted execution environment, mitigating the larger attack surface of service-based architectures, and helping to shield encryption key operations from exploits.

Capitalize on investments with common architectures, simplified designs, and longer deployments

Deploy platforms that are tuned and optimized for networking, edge, and security workloads, with greater longevity[2] to help businesses derive more value from their investments. Intel® Ethernet, GPU, IPU, world-class support, and an ecosystem of optimized software and tools help ensure success for networking and edge deployments. PCH-less boot and platform compatibility with P-core processors provide more design flexibility for solution designers while extending the value of validation cycles to more offerings.

Compute Performance

Up to
3.6x
higher integer throughput performance with Intel Xeon 6780E vs. 2nd Gen Intel Xeon 8280 processors[4]

Up to
2.3x
higher integer throughput performance/watt (socket power) with Intel Xeon 6780E vs. 2nd Gen Intel Xeon 8280 processors[4]

5G User Plane Function (UPF)

Up to
4.2x
higher 5G UPF performance and
2.7x
higher performance/watt (socket power) with Intel Xeon 6780E vs. 2nd Gen Intel Xeon 6252N processors[5]

Next Gen Firewall

Up to
5.8x
higher NGFW performance and
3.5x
higher performance/watt (socket power) with Intel Xeon 6780E vs. 2nd Gen Intel Xeon 6252N processors on Next Gen Firewall solutions[6]

Key features

Performance-per-watt efficiency and core density

- Up to 144 cores per socket in 1- or 2-socket configurations
- Processor base power between 205W and 330W
- Built-in accelerators:[3] Intel® Data Streaming Accelerator (Intel® DSA), Intel QuickAssist Technology® (Intel® QAT), Intel® Dynamic Load Balancer (Intel® DLB), Intel® In-Memory Analytics Accelerator (Intel® IAA)
- Intel® Advanced Vector Extensions (Intel® AVX) and support for the OpenVINO™ toolkit to accelerate AI inferencing workloads
- Intel® Speed Select Technology (Intel® SST)
- Intel® Resource Director Technology (Intel® RDT), Intel® Platform Monitoring Technology (Intel® PMT), and Intel® Seamless Firmware Update

Security

- Intel® Trust Domain Extensions (Intel® TDX)
- Intel® Software Guard Extensions (Intel® SGX)
- Intel® Platform Firmware Resilience (Intel® PFR) 4.0
- Linear address space separation (LASS) and linear address masking (LAM) support

Memory and I/O

- DDR5 memory speeds up to 6400MT/s (1DPC)/5200MT/s (2DPC)[7]
- Up to four links of Intel® UPI 2.0 links per CPU at speeds up to 24 GT/s
- Up to 64 lanes CXL 2.0 Type 3 per socket
- Eight DDR5 memory channels per CPU
- Up to 88 lanes: PCIe 5.0
- Intel® Ethernet Network Adapters

Longevity, investment, and value

- Long-life for both networking and edge SKUs[2]
- Server reliability of up to five years
- Platform and I/O compatibility with Intel® Xeon® 6 processors with P-cores
- Ecosystem support to minimize required validation for end customers

Discrete graphics

- Support for Intel® Data Center GPU Flex Series
- Works with other accelerators including IPU and PTL

Software and OS support

- OpenVINO™ toolkit
- Intel® oneAPI Toolkits
- Linux:
  - Red Hat Enterprise Linux 9.6 LTS or later[8]
  - SUSE Enterprise Linux SLES 15 SP7 or later[8]
  - Ubuntu 25.04 or later[8]
- Windows Server 2022/vNext
- Hypervisors
  - KVM packaged with Linux OSs
  - Hyper-V packaged with Windows Server
  - VMware with ESXi 9.0[8]

Intel® Xeon® 6 Processors for Networking and Edge

SKU[A]	SST Profile[B]	Processor Cores	Base Frequency (GHz)[D]	All-Core Turbo (GHz)	Cache (MB)	TDP (Watts)	Maximum Scalability	DDR5 8Ch Memory Speed	Intel® UPI Links Enabled	Default Intel® DSA Devices	Default Intel® IAA Devices	Default Intel® QA Devices	Default Intel® DLB Devices	Thermal T Case	Long-Life Availability[C]
Intel® Xeon® 6780E processor	SST PP0	144	2.2	3.0	108	330	2S	6400	4	2	2	2	2	84	Yes
Intel® Xeon® 6780E processor	SST PP1	144	2.3	3.0	108	320	2S	6400	4	2	2	2	2	84	Yes
Intel® Xeon® 6766E processor	SST PP0	144	1.9	2.7	108	250	2S	6400	4	2	2	2	2	84	Yes
Intel® Xeon® 6756E processor	SST PP0	128	1.8	2.6	96	225	2S	6400	4	2	2	2	2	81	No
Intel® Xeon® 6746E processor	SST PP0	112	2.0	2.7	96	250	2S	5600	4	2	2	2	2	83	No
Intel® Xeon® 6740E processor	SST PP0	96	2.4	3.2	96	250	2S	6400	4	2	2	4	4	84	Yes
Intel® Xeon® 6740E processor	SST PP1	96	2.6	3.2	96	250	2S	6400	4	2	2	4	4	84	Yes
Intel® Xeon® 6740E processor	SST PP2	96	2.6	3.2	96	225	2S	6400	4	2	2	4	4	84	Yes
Intel® Xeon® 6731E processor	SST PP0	96	2.2	3.1	96	250	1S	5600	0	2	2	2	2	84	No
Intel® Xeon® 6710E processor	SST PP0	64	2.4	3.2	96	205	2S	5600	4	2	2	4	4	85	Yes
Intel® Xeon® 6710E processor	SST PP1	64	2.5	3.2	96	205	2S	5600	4	2	2	4	4	85	Yes

Intel® UPI: Intel® Ultra Path Interconnect

Intel® DSA: Intel® Data Streaming Accelerator

Intel® QAT: Intel® QuickAssist Technology

Intel® DLB: Intel® Dynamic Load Balancer

Intel® IAA: Intel® In-Memory Analytics Accelerator

Intel® processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families.

[A] The frequency of cores and core types varies by workload, power consumption, and other factors. Visit intel.com/content/www/us/en/architecture-and-technology/turbo-boost/intel-turbo-boost-technology.html for more information.

[B] Supports Intel® Speed Select Technology Performance Profile (Intel® SST-PP)

[C] Intel does not commit or guarantee product availability or software support by way of road map guidance. Intel reserves the right to change road maps or discontinue products, software, and software support services through standard EOL/PDN processes. Contact your Intel account rep for additional information.

For product specifications, please refer to ark.intel.com.

Use cases

Intel Xeon 6700-series excel in a range of use cases, including:

TELECOMMUNICATIONS:
5G core networks, control plane (CP), and user plane functions (UPF)

Intel Xeon 6 processors drive high performance per watt[1] and core density to help 5G core networks achieve more capacity, higher throughput, and energy efficiency across the load line.

- Up to 144 cores per socket in 1- or 2-socket configurations boost processing capacity, accelerate service mesh performance, and decrease transaction latency.
- Improved power efficiency[1] and lower idle power ISO configurations contribute to enhanced sustainability with a TDP range of 205W–330W.
- Intel QuickAssist Technology (Intel QAT) drives fast encryption/key protection, while Intel Software Guard Extensions (Intel SGX) and Intel Trust Domain Extensions (Intel TDX) enable confidential computing for regulated workloads.
- Intel Xeon 6 processor-based platforms with Intel® Ethernet 800 Series Network Adapters set the bar for maximum 5G core workload performance and lower operating costs.

ENTERPRISE:
Network security appliances, secure access service edge (SASE), next-gen firewall (NGFW), real-time deep packet inspection, antivirus, intrusion prevention and detection, and SSL/TLS inspection

Support more devices, users, and key capabilities such as real-time threat detection while processing higher network throughput. Enhanced power efficiency and density drive advanced security features for growing network infrastructure.

- Intel QuickAssist Technology (Intel QAT) accelerates and offloads key encryption/compression workloads from the CPU to free up CPU cycles.
- Trusted execution environments (TEEs) with Intel Software Guard Extensions (Intel SGX) and Intel Trust Domain Extensions (Intel TDX) help protect network workloads and encryption keys across edge-to-cloud infrastructure.
- Up to 144 cores per socket enable high throughput for security workloads and Intel Advanced Vector Extensions (Intel AVX).

MEDIA AND ENTERTAINMENT:
Content delivery networks
Media processing, video on demand (VOD)

Deliver increased performance per watt[1] and enable denser deployments.

- Higher core density and scalability with more PCIe 5.0 lanes and higher DDR5 memory bandwidth enhance throughput and efficiency for CDN workloads.
- Highly parallel compute enhances codec performance and helps drive low total cost of ownership (TCO) for both live video encoding and VOD.
- Intel QuickAssist Technology (Intel QAT) accelerates and offloads key portions of TLS encryption workloads from the CPU to free up valuable CPU cycles.
- Highly task-parallel processing with built-in Intel Advanced Vector Extensions (Intel AVX) delivers high-efficiency, high-performance TLS encryption.
- Exceptionally high core-count enables CDN operators to allocate more cores for open Edge compute transactions (JSON, WASM and others) along their CDN streaming services.

INDUSTRIAL/ENERGY:
Digitalization of automation, protection, and control

Helps ensure system reliability. Improve manageability and help reduce the operational costs of automation and control systems in industrial and energy sectors. Hardened platforms help ensure system reliability in extreme conditions, and high core density provides more dedicated resources to VMs.

- Higher performance per watt,[1] core density, and faster DDR5 memory bandwidth enhance throughput and efficiency for edge security workloads.
- Trusted execution environments (TEEs) with Intel Software Guard Extensions (Intel SGX) and Intel Trust Domain Extensions (Intel TDX) harden platforms from unauthorized access.
- Cache Allocation Technology (CAT) within the Intel® Resource Director Technology (Intel® RDT) framework enables performance prioritization for key applications to help meet real-time deterministic requirements.

Start innovating at the edge today.

Learn more

https://www.intel.com/content/www/us/en/products/docs/processors/networking-and-edge/xeon6.html

For more complete information about performance and benchmark results, visit intel.com/PerformanceIndex

[1] Performance varies by use, configuration, and other factors. Learn more at intel.com/processorclaims: Intel Xeon 6 with E-cores. Results may vary.
[2] Intel does not commit or guarantee product availability or software support by way of road map guidance. Intel reserves the right to change road maps or discontinue products, software, and software support services through standard EOL/PDN processes. Contact your Intel account rep for additional information.
[3] Availability of accelerators varies depending on SKU. Visit the Intel® Product Specifications page for additional product details.
[4] See [7G1] at intel.com/processorclaims:Intel Xeon 6. Results may vary.
[5] See [7N1] at intel.com/processorclaims:Intel Xeon 6. Results may vary.
[6] See [7N2] at intel.com/processorclaims:Intel Xeon 6. Results may vary.
[7] Available on select SKUs.
[8] Contact OS vendor for exact support and version information.