intel.

Accelerate Edge Innovations with More Cores, Threads, Cache, and I/O

Intel® Core™ processors (14th Gen) help businesses deploy AI everywhere to drive their success and stay ahead in hypercompetitive markets.

Power up your edge devices with this LGA-socket CPU that delivers higher performance, up to 24 cores, 32 threads, single-core turbo frequencies[1] up to 5.8 GHz, more cache, and expansive I/O. Performance hybrid architecture,[2] PCIe 5.0 connectivity, and DDR5-5600 memory enable flexibility for the latest use cases, such as rich retail displays or time-sensitive industrial use cases. Prior-gen LGA socket compatibility[3] enables an easier upgrade path, while long-life availability[4] and support for Windows 10 IoT Enterprise 2021 Long-Term Servicing Channel (LTSC) help businesses make the most from their investments.

Deploy more cores in an LGA socket

Get more choices for high performance in edge devices. Intel® Core™ processors (14th Gen) feature up to 24 cores and 32 threads, extra E-cores, and improved P-core performance. Performance hybrid architecture is featured on all Intel® Core™ i9, i7, and i5 processors, enabling solution builders to find exactly what they need for multitasking and compute-intensive AI at the edge, even as data growth pushes the limits of current systems. Intel® Thread Director on select SKUs enables modern operating systems to prioritize workloads to run on P-cores or E-cores intelligently and efficiently, while built-in Intel® Deep Learning Boost (Intel® DL Boost) and Vector Neural Network Instructions (VNNI) optimizes AI performance.

This generation also brings in key acceleration technologies that intelligently adapt system performance to data-heavy workloads: Intel® Thermal Velocity Boost, Intel® Adaptive Boost, and Intel® Turbo Boost Max Technology 3.0.[1] When the system has power and thermal headroom, these technologies can increase the processor core frequency to achieve even higher performance.

Pair powerful compute with rich interfaces and displays

Integrated graphics help meet the demand for digital displays and rich interfaces with socketed edge platforms while reducing the need for discrete GPUs. Intel® UHD Graphics 770 driven by Intel® Xᵉ architecture[6] with up to 32 graphics execution units (EUs) supports up to four 4K60 HDR displays or one 8K HDR display, with enhanced 12-bit media support.

What's new

- Increased single P-core turbo frequency up to 5.8 GHz
- More Efficient-cores in the Intel® Core™ i7 processor (14th Gen), with up to 20 cores/28 threads total (8P+12E)
- Intelligent acceleration with Intel® Thread Director,[5] Intel® Thermal Velocity Boost, Intel® Adaptive Boost, and Intel® Turbo Boost Max Technology 3.0[1]
- Discrete Wi-Fi 7 support

Intel® Core™ processors (14th Gen) vs. prior-generation processors

Up to
1.05x (est.)
faster single-thread performance[7]

Up to
1.18x (est.)
faster multithread performance[7]

Up to
1.05x
faster in CPU plus GPU image-classification inference performance[7]

Performance varies by use, configuration, and other factors. Learn more at intel.com/processorclaims: Intel® Core™ processors (14th Gen), Edge. Results may vary.

When combined with Genlock and Pipelock for smooth video-wall synchronization, this feature set creates more opportunities for high-value use cases in immersive media and intelligent displays. Businesses can also power multiple virtual kiosks or terminals cost-effectively with a single processor and single root I/O virtualization (SR-IOV).

Robust multitasking and platform expandability

With support for DDR5-5600, DDR4-3200, and error-correction code memory on select SKUs, you can achieve dependable application multitasking with extra capacity to manage data growth at the edge. Up to 16x lanes of PCIe 5.0 and 4x lanes of PCIe 4.0 on the CPU and up to 28x lanes of PCIe 4.0 and 3.0 on the PCH give more flexibility to device manufacturers to add in accelerators, cards, and peripherals to suit their customers' needs. The platform also includes optional discrete Thunderbolt™ 4 technology/USB4 for fast data transfers, and optional discrete Wi-Fi 7 and Wi-Fi 6E support.

Smooth operation for latency-bounded workloads

Select SKUs of Intel Core processors (14th Gen) integrate support for Intel® Time Coordinated Computing (Intel® TCC) and Time-Sensitive Networking (TSN) to help ensure the prioritization of latency-bounded workloads. Intel provides tools, libraries, and APIs to help system builders design and deploy real-time solutions, along with support for real-time operating systems and real-time hypervisors.

Flexibility in innovation lets you build what customers want

Build the custom solutions customers need for compute-intensive use cases. Intel Core processors (14th Gen) feature a versatile portfolio of CPU and PCH combinations, with expansive I/O to support multiple add-in cards and accelerators. The platform also makes upgrading easier through socket compatibility with previous-generation 12th and 13th Gen Intel® Core™ processors for the Edge. Long-life availability and Windows 10 IoT Enterprise 2021 Long-Term Servicing Channel (LTSC) enable customers to drive high value out of their technology investments by maintaining deployments for longer periods and extending the time between upgrades and refreshes.

Key features

Performance
- Performance hybrid architecture in Intel Core processors (14 Gen) with Intel Thread Director
- Increased single P-core turbo frequency up to 5.8 GHz
- Up to 24 cores and up to 32 threads
- Up to 36 MB Intel® Smart Cache
- Processor base power between 35W and 65W
- Intel Core i7 SKUs featuring more E-cores, with up to 20 cores (8P + 12E) and 28 threads
- Intel Turbo Boost Max Technology 3.0
- Integrated performance management and boost technologies, including Intel Thread Director, Intel Thermal Velocity Boost, Intel Adaptive Boost, and Intel DL Boost (VNNI)

Memory and I/O
- Up to DDR5-5600 and up to DDR4-3200
- Up to 16x lanes of PCIe 5.0 and 4x lanes of PCIe 4.0 on the CPU
- Up to 28x lanes of PCIe 4.0 and 3.0 on the PCH
- Error correction code (ECC) memory[6]

Graphics
- Intel® UHD Graphics 770 driven by Intel X^e architecture with up to 32 graphics execution units (EUs)
- Support for up to four independent displays at up to 4K60 HDR resolution or one display at 8K resolution
- HDMI 2.0b integrated, HDMI 2.1 supported with LSPCON
- Up to three multiformat codec (MFX) engines (up to 2x video decode and 1x video encode)
- Genlock and Pipelock video synchronization for Windows, with bezel correction and EDID management/lock display
- SR-IOV for GPU virtualization

Real-time capabilities
- Integrated 1GbE MAC and 2x 2.5GbE MAC
- Support for Intel TCC and TSN[6]

Flexible deployments
- LGA socket compatible with 12th and 13th Gen Intel Core processors for edge
- Long-life availability of up to 10 years

Security and manageability
- Support for Intel vPro® platform on select SKUs
- Intel® Converged Security and Management Engine Version 16.1

Connectivity
- Discrete 1x Thunderbolt™ 4 technology/USB4
- Discrete Wi-Fi 7 and Wi-Fi 6E support

Software and OS support
- Windows 10 IoT Enterprise 2021 LTSC and EFLOW support
- Yocto Project, Ubuntu, Red Hat Enterprise Linux, and Wind River Linux
- Celadon (Android) in VM (community support)
- KVM and ACRN hypervisor (community support)
- Real-Time Systems (RTS) hypervisor
- Intel® oneAPI Toolkit, Intel® Distribution of OpenVINO™ toolkit, Intel® In-Band Manageability, Intel® Active Management Technology
- Intel® Slim Bootloader, UEFI/BIOS, Intel® FSP

📄 Use cases

RETAIL, BANKING, EDUCATION, HOSPITALITY

Deploy numerous edge devices with a top-to-bottom SKU stack and powerful compute headroom to support data ingestion and analytics

Applications: Point of sale, kiosk, video walls, digital signage, AI-driven in-store advertising, analytics, and interactive flat-panel displays (IFPDs)

- Support for four 4K displays or one 8K display without a discrete GPU for digital signage enables businesses to easily set up video walls or interactive signage with Pipelock or Genlock synchronization for smooth playback.

- Intel DL Boost and the Intel Distribution of OpenVINO toolkit improve AI efficiency on edge platforms, combined with high core counts for impressive inference results on larger datasets.

- SR-IOV for GPU virtualization enables cost efficiency for deploying multiple kiosks or terminals per processor to facilitate classroom learning.

INDUSTRIAL

Support Industry 4.0 use cases such as AI automation and robotics as well as rich displays for HMIs and greater control on the factory floor

Applications: AI-based industrial process control (AIPC), industrial PCs, edge servers, human-machine interfaces (HMIs) for machine control and monitoring

- Faster CPU plus GPU image-classification inference performance[7] supports machine vision use cases for process and quality control on the factory floor.

- More cores and cache, PCIe 5.0, and DDR5 memory drive platform consolidation with multiple accelerators or add-in cards supported per socket.

- Real-time-capable integrated 2x 2.5GbE MAC enables Time-Sensitive Networking and Intel Time Coordinated Computing for critical workloads.

- Four 4K displays or one 8K display deliver rich graphical interfaces for HMI.

HEALTHCARE

Deliver exceptional performance and responsiveness for data-intensive use cases at the medical edge

Applications: Ultrasound imaging, medical carts, endoscopy, clinical devices

- Up to 24 cores and 32 threads with performance hybrid architecture support more devices, more apps, and more multitasking per processor.

- Intel DL Boost and the Intel Distribution of OpenVINO toolkit improve AI-driven tools to support more-efficient inferencing for assistance in diagnostics and medical procedures.

- Long-life availability ensures consistent supply for repairs and maintenance and drives value from long certification cycles.
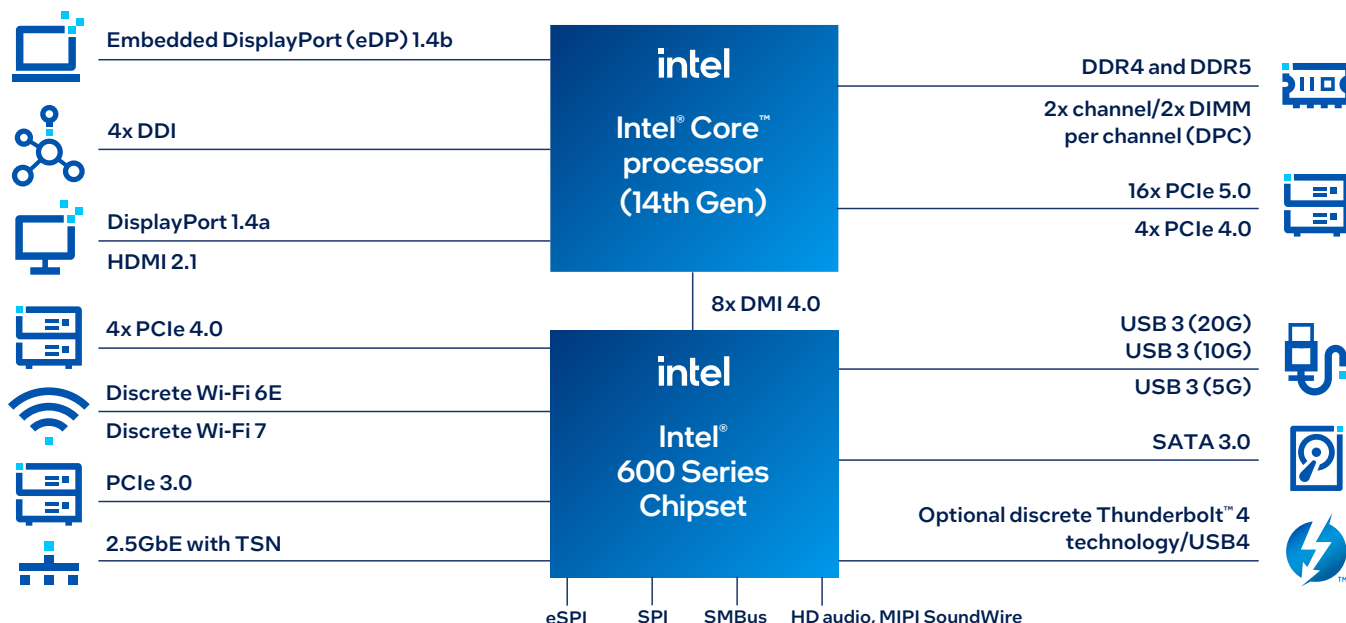
CITIES AND CRITICAL INFRASTRUCTURE

Process more video streams in smart city use cases while delivering integrated graphics to support edge inference in hard-to-reach places

Applications: Network video recorder (NVR), AI box, roadside units (RSUs)

- More cores, threads, and PCIe 5.0 bandwidth help move and process more video and other sensor data (e.g., LiDAR) for smart intersections and digital safety deployments.

- Support more video streams with four display pipes, up to three multiformat codec (MFX) engines (up to 2x video decode and 1x video enhancement), and Intel UHD Graphics 770 driven by Intel X^e architecture.

- Flexible expansion with up to 16x lanes of PCIe 5.0 and 4x lanes of PCIe 4.0 on the CPU and up to 12x lanes of PCIe 4.0 and 16x lanes of PCIe 3.0 on the PCH.

Platform block diagram

Embedded DisplayPort (eDP) 1.4b

4x DDI

DisplayPort 1.4a
HDMI 2.1

4x PCIe 4.0

Discrete Wi-Fi 6E
Discrete Wi-Fi 7

PCIe 3.0

2.5GbE with TSN

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Intel® Core™ processor (14th Gen)

8x DMI 4.0

intel
Intel® 600 Series Chipset

DDR4 and DDR5
2x channel/2x DIMM per channel (DPC)

16x PCIe 5.0
4x PCIe 4.0

USB 3 (20G)
USB 3 (10G)
USB 3 (5G)

SATA 3.0

Optional discrete Thunderbolt™ 4 technology/USB4

eSPI   SPI   SMBus   HD audio, MIPI SoundWire

Not all features are supported in every operating system.
Not all features are available on all SKUs.

NEX approval is required for Thunderbolt™ 4 technology support.
Please contact your Intel representative.

Software overview

CATEGORY	OPERATING SYSTEMS/SDKs/ BOOTLOADERS	IMPLEMENTATION	DISTRIBUTION AND SUPPORT
Operating systems[a]	Windows 10 IoT Enterprise 2021 LTSC	Intel, Microsoft	Intel, Microsoft
	Ubuntu, SUSE, Red Hat Enterprise, WR Linux[c]	Canonical Ltd., Red Hat, Wind River Systems	Distributed and supported by commercial Linux vendors, Intel® upstream kernel drivers
	Yocto Project BSP tool-based embedded Linux distribution	Intel	Intel, Yocto Project community, Linux ISVs
	Celadon (Android) in VM	Intel	Celadon community, software partners
RTOS	Wind River VxWorks, BlackBerry QNX	Wind River, BlackBerry	Wind River, BlackBerry
	Zephyr RTOS	Intel	Zephyr project community
Hypervisors	KVM,[c] ACRN[c]	KVM, ACRN community	KVM, ACRN community
	RTS Hypervisor[c]	Real-Time Systems	Real-Time Systems
Bootloaders[b]	UEFI/BIOS and Intel® FSP	Intel	Intel, IBVs
	Slim Bootloader and Intel® FSP	Intel	Bootloader ecosystem, SBL community
SDKs	Intel® oneAPI Video Processing Library (Intel® oneVPL)	Intel	Intel
	Intel® Distribution of OpenVINO™ toolkit	Intel	Intel
	Intel® oneAPI Toolkits	Intel	Intel
	Intel® In-Band Manageability and Intel® Active Management Technology	Intel	Intel

Not all features are supported in every operating system. Refer to Intel's IoT and Edge Solutions Community for partner contact information.
a. Not all features are supported in all operating systems.
b. Legacy boot is not supported for Windows or Linux. Customers should work with their BIOS vendors for enabling/validating legacy BIOS features.
c. Supported by Intel via upstreaming to the open source community. Adoption into individual Linux distributions/hypervisors is dependent upon the OS/HV vendors.

Intel® Core™ processors

CPU Part Number	Validated Chipset	Processor Cores (P+E)[A]	Processor Threads	Intel® Smart Cache (L3)	Processor Base Power	Single P-core Turbo Frequency[B]	Single E-core Turbo Frequency[B]	P-core Base Frequency[B]	E-core Base Frequency[B]	Graphics Execution Units (EUs)
Intel® Core™ i9 processor 14900	H610E/ H610	24 (8+16)	32	36 MB	65W	Up to 5.8 GHz	Up to 4.3 GHz	2.0 GHz	1.5 GHz	32 EU
Intel® Core™ i9 processor 14900T	H610E/ H610	24 (8+16)	32	36 MB	35W	Up to 5.5 GHz	Up to 4.0 GHz	1.1 GHz	0.8 GHz	32 EU
Intel® Core™ i7 processor 14700	H610E/ H610	20 (8+12)	28	33 MB	65W	Up to 5.4 GHz	Up to 4.2 GHz	2.1 GHz	1.5 GHz	32 EU
Intel® Core™ i7 processor 14700T	H610E/ H610	20 (8+12)	28	33 MB	35W	Up to 5.2 GHz	Up to 3.7 GHz	1.3 GHz	0.9 GHz	32 EU
Intel® Core™ i5 processor 14500	H610E/ H610	14 (6+8)	20	24 MB	65W	Up to 5.0 GHz	Up to 3.7 GHz	2.6 GHz	1.9 GHz	32 EU
Intel® Core™ i5 processor 14500T	H610E/ H610	14 (6+8)	20	24 MB	35W	Up to 4.8 GHz	Up to 3.4 GHz	1.7 GHz	1.2 GHz	32 EU
Intel® Core™ i5 processor 14400	H610E/ H610	10 (6+4)	16	20 MB	65W	Up to 4.7 GHz	Up to 3.5 GHz	2.5 GHz	1.8 GHz	24 EU
Intel® Core™ i5 processor 14400T	H610E/ H610	10 (6+4)	16	20 MB	35W	Up to 4.5 GHz	Up to 3.2 GHz	1.5 GHz	1.1 GHz	24 EU
Intel® Core™ i3 processor 14100	H610E/ H610	4 (4+0)	8	12 MB	60W	Up to 4.7 GHz	NA	3.5 GHz	NA	24 EU
Intel® Core™ i3 processor 14100T	H610E/ H610	4 (4+0)	8	12 MB	35W	Up to 4.4 GHz	NA	2.7 GHz	NA	24 EU
Intel® processor 300	H610E/ H610	2 (2+0)	4	6 MB	46W	Up to 3.9 GHz	NA	3.9 GHz	NA	16 EU
Intel® processor 300T	H610E/ H610	2 (2+0)	4	6 MB	35W	Up to 3.4 GHz	NA	3.4 GHz	NA	16 EU

Intel® processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families.
A. Processor cores listed first are the total number of cores in the processor followed by the number of Performance-cores and number of Efficient-cores in parentheses (P+E).
B. Efficient-core frequencies are lower to optimize power usage. 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/turbo-boost-technology.html for more information.

P-cores = Performance-cores

E-cores = Efficient-cores

For more information about Intel® On Demand, visit intel.com/ondemand.
For product specifications, please refer to ark.intel.com.

Build powerful multitasking platforms for AI solutions at the edge, with more cores, threads, cache, and I/O. **Learn more about Intel® Core™ processors (14th Gen) at intel.com/14thgen-edge.**

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Notices and disclaimers

1. Intel® Hyper-Threading Technology, Intel® Turbo Boost Max Technology 3.0, and Intel® Thermal Velocity Boost are only available on Performance-cores.

2. Performance hybrid architecture combines two core microarchitectures, Performance-cores (P-cores) and Efficient-cores (E-cores), on a single processor die first introduced on 12th Gen Intel® Core™ processors. Select 12th Gen and newer Intel® Core™ processors do not have performance hybrid architecture, only P-cores or E-cores, and may have the same cache size. See ark.intel.com for SKU details, including cache size and core frequency.

3. Socket compatible with 12th and 13th Gen Intel® Core™ processors for edge.

4. 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.

5. Support for Intel® Thread Director is expected in Windows 11 IoT Enterprise LTSC.

6. Available on select SKUs.

7. Performance varies by use, configuration, and other factors. Learn more at intel.com/processorclaims: Intel® Core™ processors (14th Gen), Edge. Results may vary.

Availability of accelerators varies depending on SKU. Visit the Intel® Product Specifications page for additional product details.

Performance varies by use, configuration, and other factors. Learn more at 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.

Your costs and results may vary. Intel® technologies may require enabled hardware, software, or service activation.

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