A man with a beard and glasses is shown in profile, looking thoughtfully to the right. He is wearing a blue denim shirt. His hand is resting on his chin. The background is a blurred office setting with computer monitors.

12th Gen Intel[®] Core[™] Processors for Workstation

The 12th Gen Intel[®] Core[™] processors for workstation employ an innovative performance hybrid architecture to accelerate your productivity and help you tackle your most demanding workloads. With a full suite of platform technologies like Gaussian & Neural Accelerator 3.0 (GNA), Intel[®] Wi-Fi 6E (Gig+), and support for PCIe Gen 5, you can stay focused on the task at hand while having the peace of mind that your data is secure with DDR5 Error Correcting Code (ECC) memory support. Together, the 12th Gen Intel[®] Core[™] workstations combine high performance and unmatched productivity with game-changing data integrity for professionals who expect the most out of their system.


Performance that Delivers

The 12th Gen Intel® Core™ processors for workstation bring you unprecedented laptop and desktop performance through their all-new dynamic core architecture. Performance cores—or “P-cores”—bring single-thread and burst performance, while Efficient cores—or “E-cores”—enhance modern multi-tasking through multi-threaded performance and efficient offload of background tasks. To augment this hybrid architecture, the Intel® Thread Director intelligently schedules workloads for single-threaded performance when you need it and multi-threaded performance for larger workloads like rendering, video encoding and code compiling.¹ Harness this processor’s power, efficiency and intelligence to accomplish more.

Uninterrupted Productivity

Powered by a suite of cutting-edge technologies, 12th Gen Intel® Core™ processors for workstation allow you to dive deeper into your workflow. Support for the latest PCIe Gen 5.0 offers the connectivity bandwidth for future storage devices, accelerators and graphics cards. The dynamic noise suppression of the enhanced Gaussian & Neural Accelerator 3.0 (GNA) ensures crystal-clear audio for online video calls. Dedicated Image Processing Units (IPUs) help present your best self on video calls through enhanced image quality. Execute with uninterrupted connectivity from integrated Intel® Wi-Fi 6E (Gig+) for freedom from legacy Wi-Fi device interference. Integrated Thunderbolt™ 4 offers mobile professionals a truly universal single-cable connection for power and high-speed data connection to external devices. The 12th Gen Intel® Core™ platform sets a new bar for professional-class productivity.





Reliable,
Secure,
Seamless

These processors provide peace of mind by helping to protect your data, guaranteeing seamless software performance and providing more security for your device. Support for DDR5 ECC UDIMM memory moves beyond the data checking of standard DDR5 memory to provide protection of business-essential data against bit-flipping. Customized, configured and certified to perform, ISV apps run as intended with these processors. The 12th Gen Intel® Core™ platform features vPro® technology for seamless system integration into existing IT managed networks. Get hardware-enhanced security through the vPro® platform with Intel® Hardware Shield. With these features and more, the 12th Gen Intel® Core™ processors for workstation empower you to work fearlessly.

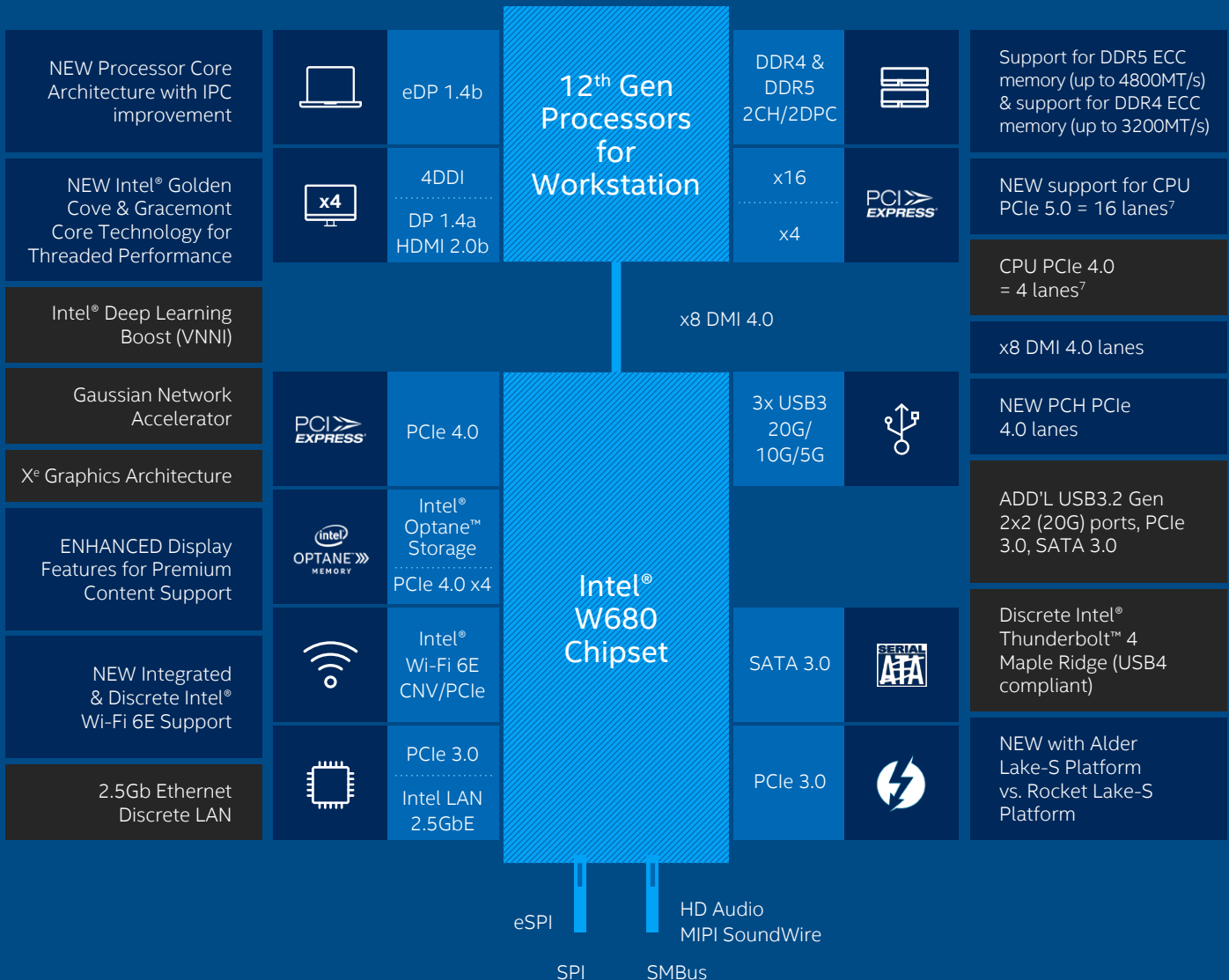
12TH GEN INTEL® CORE™ PROCESSORS FOR WORKSTATION: FEATURES AT A GLANCE

FEATURE	BENEFIT
Performance Hybrid Architecture	Performance hybrid architecture, combining Performance-cores (P-cores) and Efficient-cores (E-Cores) to deliver balanced single-thread and multi-threaded real-world performance.
Intel® Thread Director ¹	Optimizes workloads by helping the OS scheduler intelligently distribute workloads to the optimal cores.
PCIe 5.0 up to 16 Lanes	Offers readiness for up to 32 GT/s for fast access to peripheral devices and networking with up to 16 PCI Express 5.0 lanes.
PCIe 4.0 up to 4 Lanes	Offers up to 16 GT/s for fast access to peripheral devices and networking with up to 4 PCI Express 4.0 lanes.
Up to DDR5 4800 MT/s	This industry first memory technology supports fast frequencies and high bandwidth and throughput leading to enhanced workflow and productivity.
Up to DDR4 3200 MT/s	Supports faster frequencies and higher bandwidth and throughput leading to enhanced workflow and productivity.
L3 and L2 Cache	Increased shared Intel® Smart Cache (L3) and L2 cache sizes deliver large memory capacity and reduced latency for fast game loading and smooth frame rates.
Gaussian & Neural Accelerator 3.0 (GNA 3.0)	Processes AI speech and audio applications such as neural noise cancellation while simultaneously freeing up CPU resources for overall system performance and responsiveness.
Intel® Turbo Boost Max Technology 3.0	Identifies the processor's fastest cores and directs critical workloads to them.
Intel® UHD Graphics driven by Intel® X ^e Architecture	Rich media and intelligent graphics capabilities enable amplified visual complexity, enhanced 3D performance, and faster image processing.

12TH GEN INTEL® CORE™ DESKTOP PROCESSORS COMPARISON

	Intel® Core™ i9	Intel® Core™ i7	Intel® Core™ i5
Max Turbo Frequency [GHz]	Up to 5.2	Up to 5.0	Up to 4.9
Intel® Turbo Boost Max Technology 3.0 Frequency [GHz] ²	Up to 5.2	Up to 5.0	n/a
Performance-core Max Turbo Frequency [GHz] ³	Up to 5.1	Up to 4.9	Up to 4.9
Efficient-core Max Turbo Frequency [GHz] ³	Up to 3.9	Up to 3.8	Up to 3.6
Performance-core Base Frequency [GHz]	Up to 3.2	Up to 3.6	Up to 3.7
Efficient-core Base Frequency [GHz]	Up to 2.4	Up to 2.7	Up to 2.8
Processor Cores (P-cores + E-cores) ⁴	16 (8P + 8E)	12 (8P + 4E)	10 (6P + 4E) or 6 (6P + 0E) ⁴
Intel® Hyper-Threading Technology ²	Yes	Yes	Yes
Total Processor Threads	24	20	16 or 12 ⁴
Intel® Thread Director ¹	Yes	Yes	Yes, available on select processors ⁴
Intel® Smart Cache (L3) Size [MB]	30	25	20 or 18 ⁴
Total L2 Cache Size [MB]	14	12	9.5 or 7.5 ⁴
Max Memory Speed [MT/s]	Up to DDR5 4800 Up to DDR4 3200	Up to DDR5 4800 Up to DDR4 3200	Up to DDR5 4800 Up to DDR4 3200
Number of Memory Channels	2	2	2
CPU PCIe 5.0 Lanes	16	16	16
CPU PCIe 4.0 Lanes	4	4	4
Enhanced Intel® UHD Graphics driven by Xe Architecture ⁵	Intel UHD Graphics 770	Intel® UHD Graphics 770	Intel UHD Graphics 770 or 730
Graphics Dynamic Frequency ⁵ [MHz]	Up to 1550	Up to 1500	Up to 1450
Processor P-core / E-core / Graphics / Memory Overclocking ^{5,6}	Yes, available on select processors	Yes, available on select processors	Yes, available on select processors
Intel® Quick Sync Video	Yes	Yes	Yes
Intel® Deep Learning Boost (Intel® DL Boost)	Yes	Yes	Yes
Intel® Advanced Vector Extensions 2 (Intel® AVX2)	No	Yes	Yes
Intel® Gaussian and Neural Accelerator (GNA)	Yes	Yes	Yes
Intel® Virtualization Technology (Intel® VT-x / VT-d)	Yes	Yes	Yes
Mode-based Execution Control (MBEC)	Yes	Yes	Yes
Intel® Threat Detection Technology (Intel® TDT)	Yes	Yes	Yes
Intel® Control-Flow Enforcement Technology (Intel® CET)	Yes	Yes	Yes
Intel® Advanced Encryption Standard New Instructions (Intel® AES-NI)	Yes	Yes	Yes
Intel® BIOS Guard	Yes	Yes	Yes
Intel® Boot Guard	Yes	Yes	Yes
Intel® OS Guard	Yes	Yes	Yes
Intel® Advanced Programmable Interrupt Controller Virtualization (Intel® APIC-v)	Yes	Yes	Yes
Intel® Secure Key	Yes	Yes	Yes
Intel® Platform Trust Technology (Intel® PTT)	Yes	Yes	Yes

12th Gen Intel® Core™ Processors for Workstation Block Diagram



Product Brief 12th Gen Intel® Core™ Processors for Workstation

Notices & Disclaimers

- ¹Built into the hardware, Intel® Thread Director is provided only in performance hybrid architecture configurations of 12th Gen Intel® Core™ processors; OS enablement is required. Available features and functionality vary by OS.
- ²Intel® Hyper-Threading Technology and Intel® Turbo Boost Max Technology 3.0 are only available on P-cores.
- ³Maximum Performance-core or Efficient-core turbo frequency derived from Intel® Turbo Boost Technology.
- ⁴12th Gen Intel® Core™ i5-12600K and i5-12600KF have 10 total processor cores (6P + 4E); all other 12th Gen Intel® Core™ i5 desktop processors have 6 total processor cores (6P + 0E). Number of processor threads, cache sizes and Intel® Thread Director enablement on 12th Gen Intel® Core™ i5 desktop processors will vary based upon the presence of E-cores.
- ⁵Processor names with an 'F' suffix do not have processor graphics and require a discrete graphics solution. Without processor graphics the processor display output ports will not function.
- ⁶Unlocked features are present with select chipsets and processor combinations. Altering clock frequency or voltage may void any product warranties and reduce stability, security, performance, and life of the processor and other components. Check with system and component manufacturers for details.
- ⁷CPU PCIe lanes are only validated for discrete graphics (x16) and PCIe storage (1x4). 1x16 bifurcated to 2x8 provides discrete graphics (x8) + additional storage configuration support (1x8).

Performance varies by use, configuration and other factors.

Learn more at www.intel.com/PerformanceIndex.

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.

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