Product Brief

Intel® Core™ Ultra Desktop Processors (Series 2)

Intel® Core™ Ultra desktop processors (Series 2) are the ultimate desktop and entry workstation platform, engineered to unlock new levels of intelligent performance for the most demanding daily tasks.

Featuring:

- Enthusiast-level performance per watt.
- New NPU for AI performance.
- Maximized connectivity & peripherals.

Enthusiast-Level Power per Watt

These processors are desktop powerhouses, featuring up to 24 cores with new P-core and E-core architecture, along with new overclocking[1] features and performance technologies.

Built for Real-World Performance

Up to **8** **Next-Gen P-Cores**

Up to **5.7 GHz** **Max Turbo Frequency**[2]

Optimized for AI and single- or limited-threaded application performance.

Up to **16** **Next-Gen E-Cores**

Up to **4.6 GHz** **Max Turbo Frequency**[2,3]

Optimized for modern multi-tasking and multi-core performance per watt.

Intel® Thread Director[4] Optimizes workloads by helping the OS scheduler intelligently distribute workloads to the optimal cores.

Architecture Features

NEXT-GEN	P-core architecture
NEXT-GEN	E-core architecture
NEW	Integrated neural processing unit (NPU)
NEW	Xᵉ LPG graphics architecture[5]
UPGRADED	I/O
UPGRADED	Graphics architecture[5]
INCREASED	CPU PCIe 5.0 lanes
INTEGRATED	Thunderbolt™ 4 technology

Platform Features

UPGRADED	Memory support (DDR5-6400)[6]
NEW	Discrete Thunderbolt™ 5 port support with 80/120 Gbps bandwidth
ADDITIONAL	PCIe 4.0 capable ports
NEW	Core and memory overclocking features[1]
NEW	Intel® Gaussian and Neural Accelerator 3.5
FEATURING	Intel® Deep Learning Boost DP4A

For numbered references, please see Notices & Disclaimers section.

Powerful Overclocking and Optimization Technology[1]

Overclocking tuning controls have been resynthesized for Intel® Core™ Ultra desktop processors (Series 2)! New MCP designs provide opportunities to overclock die-to-die interfaces, while ratio granularity now offers 16.6 GHz increments for expert overclockers to maximize every bit of performance. Dual BCLK tuning gives users the ability to tune the compute and SoC die independently, while new OEM-defined voltage limits help prevent users from exceeding specified thresholds.

Intel® Extreme Memory Profile features DDR5 memory overclocking, while Intel® Extreme Tuning Utility brings dynamic CPU tuning, memory tuning, and performance monitoring.

New NPU for AI Performance

Neural nets are the new apps, and the AI accelerators in Intel® Core™ Ultra processors are designed to efficiently speed up the matrix multiplications at the heart of these neural networks.

NEW Integrated NPU and Xᵉ LPG Graphics[5] for AI Acceleration

NEW NPU
(Neural Processing Unit)

13 TOPS[7]

NEW Xᵉ LPG Graphics Architecture GPU[5]

Featuring up to
4 Xᵉ-Cores

Up to
36 Total Platform TOPS[7]

Intel® Core™ Ultra Processors

The Foundation of the AI PC

GPU
High Throughput
Ideal for AI-accelerated digital content creation.

+

NPU
Low Power
Ideal for sustained AI workloads and AI offload for battery life.

+

CPU
Fast Response
Ideal for low-latency AI workloads.

Introducing Intel's First Desktop Processor for AI PC[8]

The AI PC is your customers' gateway into the age of AI, featuring Intel® hardware, software, and technology that is purpose-built for AI workloads.

AI PCs use Intel® Core™ Ultra processors, with the CPU, GPU, and NPU working together for optimal performance, efficiency, and security.

Featuring:[9]

NEW Support for AI-Enhanced Security

- McAfee
- Microsoft Defender
- Bufferzone
- Trend Micro
- Xcitium

NEW Support for Client-Optimized LLMs

- Microsoft Phi-2
- Day0 Phi-3 Support
- LLaMa2-7B
- Day0 LLaMa3-8B Support
- Mistral-7B
- Qwen 7B (PRC)
- ChatGLM3 6B (PRC)

Broadest App Enablement

- Target 100+ ISV Applications
- Target 300+ AI Features for Productivity, Creativity, and Collaboration

NEW Support for Local Personal Assistants

- Acer Sidekick
- Lenovo AI Now
- +More in Pipeline

Featuring the Latest Connectivity Technology

An AI PC is a connected PC, offering next-gen Wi-Fi and Bluetooth, the latest Thunderbolt™ technology, and numerous PCIe lanes.

Integrated Wi-Fi 6E + Bluetooth® 5.3 Support
Delivering supercharged Wi-Fi performance and the advancements of Bluetooth LE Audio to desktop.

Discrete Intel® Wi-Fi 7[10] + Bluetooth® 5.4 Support
The next stage in the evolution of wireless connectivity, Wi-Fi 7 is helping provide extreme speed, responsiveness, and reliability. Intel's next-generation Bluetooth provides an extended range and quality for an enhanced user experience.

Intel® Connectivity Performance Suite[11]
Acts as your built-in IT expert by continuously optimizing your Wi-Fi connection and prioritizing your business-critical applications.

Thunderbolt™ 5 Technology
Best-in-class wired connectivity solution for gamers and creators, with up to 120 Gbps of transmit bandwidth, dual 6K video capability, and 2x more bandwidth for external SSD and other tools.

Thunderbolt™ 4 Technology
Integrated Thunderbolt™ 4 technology offers the simplest, most reliable cable solution available for connecting to a wide variety of accessories while providing outstanding performance.

Thunderbolt™ Share[12]
Offers users an easy, fast, and efficient way to do more with two PCs by sharing screens, keyboard, mouse, storage, and files with the speed of Thunderbolt™ technology.

Expanded I/O
Up to 20 PCIe 5.0 lanes and increased chipset PCIe 4.0 lanes.

Intel® Killer™ Networking
Delivers supercharged performance and enables seamless, immersive gameplay.

Proof Points

Power Efficiency

Office Productivity

Up To
44%[13, 14]
lower processor power with an Intel® Core™ Ultra 9 processor (285K)

Performance per Watt

Up To
6%[13, 15]
faster single-threaded performance on Intel® Core™ Ultra 9 processor (285K)

AND

Up To
41%[13, 15]
lower processor power on Intel® Core™ Ultra 9 processor (285K)

More Performance

Gen vs. Gen

Up To
29%[16, 17]
faster (est.) multi-threaded floating-point performance on Intel® Core™ Ultra 9 processor (285K)

Gen vs. Gen

Up To
19%[16, 18]
faster max threads CPU profile performance on Intel® Core™ Ultra 9 processor (285K)

Intel® Core™ Ultra Processor vs. Comp

Up To
22%[19, 20]
faster (est.) multi-threaded performance vs. AMD Ryzen 9 9950X

14 As measured by average processor power while running UL Procyon® Office Productivity benchmark on an Intel® Core™ Ultra 9 285K vs. Intel® Core™ i9 processor 14900K. Individual system results may vary as power and performance are affected by use, configuration and other factors. Details at intel.com/performanceindex.

15 As measured by average processor power while running SPECrate®2017_int_base (1 copy), performance estimates on an Intel® Core™ Ultra 9 285K vs. Intel® Core™ i9 processor 14900K. SPEC®, SPECrate® and SPEC CPU® are registered trademarks of the Standard Performance Evaluation Corporation. See http://www.spec.org/spec/trademarks.html for more information. Individual system results may vary as power and performance are affected by use, configuration and other factors. Details at intel.com/performanceindex.

17 As measured by SPECrate®2017_fp_base (n-copies) performance estimates on an Intel® Core™ Ultra 9 285K vs. Intel® Core™ i9 processor 14900K. SPEC®, SPECrate® and SPEC CPU® are registered trademarks of the Standard Performance Evaluation Corporation. See http://www.spec.org/spec/trademarks.html for more information. See www.intel.com/PerformanceIndex for workloads and configurations. Results may vary.

18 As measured by 3DMark CPU Profile Max Threads benchmark on an Intel® Core™ Ultra 9 285K vs. Intel® Core™ i9 processor 14900K. See www.intel.com/PerformanceIndex for workloads and configurations. Results may vary.

20 As measured by SPECrate®2017_int_base (n-copies) performance estimates on an Intel® Core™ Ultra 9 285K vs. AMD Ryzen™ 9 9950X. SPEC®, SPECrate® and SPEC CPU® are registered trademarks of the Standard Performance Evaluation Corporation. See http://www.spec.org/spec/trademarks.html for more information. See www.intel.com/PerformanceIndex for workloads and configurations. Results may vary.

Proof Points

Groundbreaking AI

Intel® Core™ Ultra processor vs. Comp	Intel® Core™ Ultra processor vs. Comp
Up To **15%**[19, 21] faster AI performance with Audacity Dynamic Noise Suppression feature vs. AMD Ryzen 9 9950X	Up To **17%**[19, 22] faster AI video editing performance using Topaz Video AI video editing vs. AMD Ryzen 9 9950X

Made to Game

Gen vs. Gen	Intel® Core™ Ultra processor vs. Comp
Up To **11%**[16, 23] higher FPS with Sid Meier's Civilization VI: Gathering Storm on Intel® Core™ Ultra 9 processor (285K)	Up To **8%**[19, 24] higher FPS with Hitman 3: Dartmoor vs. AMD Ryzen 9 9950X

21 As measured by Audacity Dynamic Noise Suppression feature with OpenVINO on an Intel® Core™ Ultra 9 285K vs. AMD Ryzen™ 9 9950X. See www.intel.com/PerformanceIndex for workloads and configurations. Results may vary.

22 As measured by Topaz Video AI video editing workload on an Intel® Core™ Ultra 9 285K vs. AMD Ryzen™ 9 9950X. See www.intel.com/PerformanceIndex for workloads and configurations. Results may vary.

23 As measured by Sid Meier's Civilization VI: Gathering Storm on an Intel® Core™ Ultra 9 285K vs. Intel® Core™ i9 processor 14900K. See www.intel.com/PerformanceIndex for workloads and configurations. Results may vary.

24 As measured by Hitman 3: Dartmoor on an Intel® Core™ Ultra 9 285K vs. AMD Ryzen™ 9 9950X. See www.intel.com/PerformanceIndex for workloads and configurations. Results may vary.

Features at a Glance

Feature	Benefit
Performance Hybrid Architecture[25]	Integrates two all-new core microarchitectures into a single die, prioritizing and distributing workloads to optimize performance.
Intel® Thread Director[4]	Optimizes workloads by helping the OS scheduler intelligently distribute workloads to the optimal cores.
NPU	A neural processing unit is a processor built for handling AI & machine learning tasks. Select Intel® Core™ Ultra processors include a CPU, a GPU, and an NPU.
TOPS[7]	Trillions of operations per second. A calculated technical specification of the theoretical maximum an AI accelerator can achieve if it is 100% efficient with software and workload.
Intel® Graphics Featuring Xᵉ LPG Graphics Architecture[5]	A purpose-built graphics architecture optimized for lower wattage and higher performance per watt. Rich media and intelligent graphics capabilities enable amplified visual complexity, enhanced 3D performance, and faster image processing.
Intel® Smart Cache	CPU memory caching method for sharing among P-cores, E-cores, and processor graphics if applicable
Intel® Extreme Tuning Utility (Intel® XTU)[1]	A precision toolset for tuning and overclocking, featuring processor overclocking, so that new and experienced users can get more from their unlocked processors.
Intel® Extreme Memory Profile (Intel® XMP) 3.0[1]	Allows users to overclock compatible DDR5 memory modules to enhance the gaming features built into PCs with Intel® Core™ Ultra processors.
Intel® Speed Shift Technology	Gives your CPU finer control over its frequency, allowing a fast jump up to its maximum clock speed.
Intel® Turbo Boost Max Technology 3.0	Identifies the processor's fastest cores and directs critical workloads to them as power, heat, and workload allow.
Intel® Turbo Boost Technology 2.0	Accelerates processor and graphics performance for peak loads, automatically allowing processor cores to run faster than the rated operating frequency if they're operating below power, current, and temperature specification limits.
Intel® Dynamic Tuning Technology[26]	Power optimization tools that intelligently adapt power policies based on usage mode and temperature, with a new policy that determines and directs application resource optimization in real time.

Features at a Glance

Feature	Benefit
Intel® Application Optimization[26]	A software policy within Intel® Dynamic Tuning Technology (DTT) that determines and directs application resource optimization in real-time.
Intel® Deep Learning Boost	Significantly accelerates inference performance for deep-learning workloads optimized to use VNNI.
Intel® Thermal Velocity Boost	Opportunistically and automatically increases clock frequency of select Intel® Core™ Ultra Desktop processors by up to 100 MHz if the processor is at a temperature of 70°C or lower and turbo power budget is available.
Intel® Adaptive Boost Technology	Intelligently boosts the processor to run faster than its rated frequency as power, heat, and workload allow.
Intel® Gaussian and Neural Accelerator 3.5	Designed to process AI speech and audio applications such as neural noise cancellation while simultaneously freeing up CPU resources for overall system performance and responsiveness.
Thunderbolt™ 5 Technology	Next-generation universal cable connectivity for a simple, reliable connection that provides incredible performance.
Thunderbolt™ 4 Technology	An Intel-developed connectivity standard that delivers power, data, and a video signal over a single connection. The Thunderbolt™ technology certification establishes mandatory minimum requirements for cables, PCs, and accessories to help ensure greater reliability and interoperability across devices and vendors.
Thunderbolt™ Share[12]	Unlocks ultra-fast PC-to-PC connectivity experiences.
Discrete Wi-Fi 7 Support[10]	The next step in the evolution of wireless connectivity, helping provide extreme speed, responsiveness, and reliability.
Intel® Connectivity Performance Suite[11]	A software solution that improves PC networking performance by creating a personalized network experience based on each user's unique situation, automatically prioritizing high-priority traffic over lower-priority traffic.

K-SKUs Chart

Processor Brand String with Number[27]	Intel® Core™ Ultra 9 Processor 285K	Intel® Core™ Ultra 7 Processor 265K	Intel® Core™ Ultra 7 Processor 265KF	Intel® Core™ Ultra 5 Processor 245K	Intel® Core™ Ultra 5 Processor 245KF
Processor Cores (P+E)[28]	24 (8+16)	20 (8+12)	20 (8+12)	14 (6+8)	14 (6+8)
Processor Threads	24	20	20	14	14
Intel® Smart Cache (L3, MB)	36	30	30	24	24
Total L2 Cache	40	36	36	26	26
Intel® Thermal Velocity Boost Frequency (GHz)[2]	Up to 5.7	N/A	N/A	N/A	N/A
Intel® Turbo Boost Max Technology 3.0 Frequency (GHz)[2]	Up to 5.6	Up to 5.5	Up to 5.5	N/A	N/A
P-Core Max Turbo Frequency (GHz)[2]	Up to 5.5	Up to 5.4	Up to 5.4	Up to 5.2	Up to 5.2
E-Core Max Turbo Frequency (GHz)[2,3]	Up to 4.6				
P-Core Base Frequency (GHz)	3.7	3.9	3.9	4.2	4.2
E-Core Base Frequency (GHz)[3]	3.2	3.3	3.3	3.6	3.6
Unlocked[1]	Yes				
Processor Graphics[5]	Intel® Graphics	Intel® Graphics	N/A	Intel® Graphics	N/A
CPU PCIe Lanes	24				
Maximum Memory Speed (MT/s)[6]	DDR5-6400				
Memory Channels	2				
Maximum Memory Capacity[6]	192				
Processor Base Power (W)	125				
Maximum Turbo Power (W)	250	250	250	159	159
Reliability, Availability & Serviceability[29]	Enabled	Enabled	Disabled	Enabled	Disabled
Intel® SIPP[30]	Yes	Yes	No	Yes	No
Intel® ISM[29, 31]	Yes	Yes	Yes	Yes	Yes
Boxed	Yes	Yes	Yes	Yes	Yes

Mainstream SKU Chart

Processor Brand String with Number[27]	Intel® Core™ Ultra 9 Processor 285	Intel® Core™ Ultra 7 Processor 265	Intel® Core™ Ultra 7 Processor 265F	Intel® Core™ Ultra 5 Processor 245	Intel® Core™ Ultra 5 Processor 235	Intel® Core™ Ultra 5 Processor 225	Intel® Core™ Ultra 5 Processor 225F
Processor Cores (P+E)[28]	24 (8+16)	20 (8+12)	20 (8+12)	14 (6+8)	14 (6+8)	10 (6+4)	10 (6+4)
Processor Threads	24	20	20	14	14	10	10
Intel® Smart Cache (L3, MB)	36	30	30	24	24	20	20
Total L2 Cache	40	36	36	26	26	22	22
Intel® Thermal Velocity Boost Frequency (GHz)[2]	Up to 5.6	N/A	N/A	N/A	N/A	N/A	N/A
Intel® Turbo Boost Max Technology 3.0 Frequency (GHz)[2]	Up to 5.5	Up to 5.3	Up to 5.3	N/A	N/A	N/A	N/A
P-Core Max Turbo Frequency (GHz)[2]	Up to 5.4	Up to 5.2	Up to 5.2	Up to 5.1	Up to 5.0	Up to 4.9	Up to 4.9
E-Core Max Turbo Frequency (GHz)[2,3]	Up to 4.6	Up to 4.6	Up to 4.6	Up to 4.5	Up to 4.4	Up to 4.4	Up to 4.4
P-Core Base Frequency (GHz)	2.5	2.4	2.4	3.5	3.4	3.3	3.3
E-Core Base Frequency (GHz)[3]	1.9	1.8	3.0	2.9	2.7	2.7	2.7
Unlocked[1]	No						
Processor Graphics[5]	Intel® Graphics	Intel® Graphics	N/A	Intel® Graphics	Intel® Graphics	Intel® Graphics	N/A
CPU PCIe Lanes	24						
Maximum Memory Speed (MT/s)[6]	DDR5-6400						
Memory Channels	2						
Maximum Memory Capacity[6]	192						
Processor Base Power (W)	65						
Maximum Turbo Power (W)	182	182	182	121	121	121	121
Reliability, Availability & Serviceability[29]	Yes	Yes	No	Yes	Yes	No	No
Intel® SIPP[30]	Yes	Yes	No	Yes	Yes	No	No
Intel® ISM[29, 31]	Yes	Yes	No	Yes	Yes	No	No
Boxed	Yes	Yes	Yes	No	Yes	Yes	Yes

The Most Modern Platform for Enthusiasts[32] Package Platform

Based on extensive new AI capabilities and experiences, broad compatibility, unique architecture, and impressive performance that combine to deliver the most modern platform for desktop enthusiasts, in comparison to prior generation and competition enthusiast processors (targeting ~125W TDP), as of October 2024. AI features may require additional purchase or specific compatibility requirements. See intel.com/performanceindex for details.

Notices & Disclaimers

1. Overclocking: 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.
2. Boost Frequencies: Intel® Turbo Boost Max Technology 3.0 and Intel® Thermal Velocity Boost are only available on Performance-cores.
3. E-Core Frequencies: 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 https://www.intel.com/content/www/us/en/gaming/resources/turbo-boost.html for more information.
4. Intel® Thread Director: Built into the hardware, Intel® Thread Director is provided only in performance hybrid architecture configurations of 12th Gen or newer Intel® Core™ processors; OS enablement is required. Available features and functionality vary by OS.
5. Intel® Graphics / Xᵉ LPG Graphics Architecture: Available only on Intel® Core™ Ultra desktop processors (Series 2) that feature integrated graphics.
6. Memory Support: Maximum memory speeds are associated with 1 DIMM per Channel (1DPC) configurations. Additional DIMM loading on any channel may impact maximum memory speed. Up to DDR5-6400 MT/s 1DPC CUDIMM 1Rx8, 1Rx16, 2Rx8. Maximum memory capacity is achievable with 2DPC configurations. For additional 2DPC configuration details, refer to the Arrow Lake-S and Arrow Lake-HX Processor External Design Specification (EDS), Doc ID 729037.
7. TOPS: All TOPS are "up to" and approximate until final IP frequency defined, different SKUs with different frequency & power targets will have different TOPS.
8. As of October 2024, refers to Intel® Core™ Ultra 200S series processors, based on new and extensive AI capabilities and experiences, broad compatibility, software options, unique architecture, impressive performance, and other attributes that combine to deliver the best overall AI experience, including in comparison to prior generation enthusiast processor(s), as measured by:
    a. New NPU for low power AI focused compute
    b. Strong AI performance on CPU, GPU, and NPU features, including on benchmarks such as UL Procyon® AI OpenVINO™ CPU, iGPU, and NPU subtests
    c. Strong AI performance on CPU, GPU, and NPU features, including on numerous workloads across various ISVs
    d. More than 35 platform TOPs for AI compute, over 3.5x the platform TOPs available in prior gen
    e. Broad selection of publicly available applications & proof of concepts
    f. Ongoing expansion of AI features and ISV-developed application
9. AI Features: AI features may require software purchase, subscription, or enablement by a software or platform provider, or may have specific configuration or compatibility requirements. Details at intel.com/AIPC. Results may vary.
10. Discrete Wi-Fi 7: While Wi-Fi 7 is backward compatible with previous generations, new Wi-Fi 7 features require PCs configured with Intel® Wi-Fi 7 solutions, PC OEM enabling, operating system support, and use with appropriate Wi-Fi 7 routers/APs/gateways. 6 GHz Wi-Fi 7 may not be available in all regions. Performance varies by use, configuration, and other factors. For details on performance claims, learn more at www.Intel.com/performance-wireless.
11. Intel® Connectivity Performance Suite: The Intel® Connectivity Performance Suite (ICPS) software application requires Microsoft Windows 11 operating system and enables automated network traffic prioritization and connection optimization for Intel PC platforms configured with Intel® Wi-Fi 7 (Gig+) products.
12. Thunderbolt™ Share: Thunderbolt™ Share is required to be installed on both PCs. See the release notes via intel.com for supported hardware, what is new, bug fixes, and known issues.
13. Performance results are based on testing as of 10/04/2024

    Processor: Intel® Core™ Ultra 9 285K Processor, 24C24T (8P + 16E); PL1 = PL2 =250W; Memory: 2x16GB DDR5-6400MHz; Storage: Samsung 980 Pro 500GB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Pro 24H2 OS Build 26100.1457; Integrated Graphics: Intel® Graphics; Integrated Graphics Driver: 32.0.101.5866; Motherboard: Intel RVP; BIOS Version: MTLSFW1.R00.4165.D02.2404300646; NPU Driver: 32.0.100.2540; Power Plan set to High Performance; Resizable BAR: On; Trusted Platform Module: On; VBS: On; Defender: On

    Processor: Intel® Core™ i9-14900K Processor, 24C32T (8P + 16E); PL1 = PL2 =253W; Memory: 2x16GB DDR5-5600MHz; Storage: Samsung 980 Pro 500GB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Pro 24H2 OS Build 26100.1457; Integrated Graphics: Intel® UHD Graphics; Integrated Graphics Driver: 31.0.101.5537; Motherboard: Intel RVP; BIOS Version: RPLSFWI1.R00.5045.A00.2401260733; Power Plan set to High Performance; Resizable BAR: On; Trusted Platform Module: On; VBS: On; Defender: On
14. As measured by average processor power while running UL Procyon® Office Productivity benchmark on an Intel® Core™ Ultra 9 285K vs. Intel® Core™ i9 processor 14900K. Individual system results may vary as power and performance are affected by use, configuration and other factors. Details at intel.com/performanceindex.
15. As measured by average processor power while running SPECrate®2017_int_base (1 copy), performance estimates on an Intel® Core™ Ultra 9 285K vs. Intel® Core™ i9 processor 14900K. SPEC®, SPECrate® and SPEC CPU® are registered trademarks of the Standard Performance Evaluation Corporation. See http://www.spec.org/spec/trademarks.html for more information. Individual system results may vary as power and performance are affected by use, configuration and other factors. Details at intel.com/performanceindex.
16. Performance results are based on testing as of 10/04/2024

    Processor: Intel® Core™ Ultra 9 285K 24C24T processor; PL1=PL2=250W; Memory: G.Skill 2x16GB 6400MHz 32-39-39-102 DDR5; Motherboard: ASUS ROG MAXIMUS Hero Z890; BIOS: 8001; Storage: Samsung SSD 980 PRO 1TB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Pro 24H2 26100.1591; Discrete Graphics Card: Nvidia RTX 4090; Discrete Graphics Driver: 32.0.15.6094; Integrated Graphics: Intel® Graphics; Integrated Graphics Driver: 32.0.101.5866; NPU Driver: 32.0.100.2820; Power Supply: EVGA 1200P2 Supernova; Power Plan: High Performance; Resizable BAR: On; Trusted Platform Module: On; VBS: On; Defender: On

    Processor: AMD Ryzen™ 9 9950X 16C32T; Memory: G.Skill 2x16GB 5600MHz 28-34-34-89; Motherboard: ASUS ROG CROSSHAIR X670E Hero; BIOS: 2401; Storage: Samsung SSD 980 PRO 1TB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Pro 24H2 26100.1591; Discrete Graphics Card: Nvidia RTX 4090; Discrete Graphics Driver: 32.0.15.6094; Integrated Graphics: AMD Radeon™ Graphics; Integrated Graphics Driver: 32.0.11037.4004; Power Supply: EVGA 1200P2 Supernova; Power Plan: High Performance; Resizable BAR: On; Trusted Platform Module: On; VBS: On; Defender: On.
17. Intel® Core™ Ultra 9 285K vs. Intel® Core™ i9 processor 14900K. SPEC®, SPECrate® and SPEC CPU® are registered trademarks of the Standard Performance Evaluation Corporation. See http://www.spec.org/spec/trademarks.html for more information. See www.intel.com/PerformanceIndex for workloads and configurations. Results may vary.
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    Processor: AMD Ryzen™ 9 9950X 16C32T; Memory: G.Skill 2x16GB 5600MHz 28-34-34-89; Motherboard: ASUS ROG CROSSHAIR X670E Hero; BIOS: 2401; Storage: Samsung SSD 980 PRO 1TB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Pro 24H2 26100.1591; Discrete Graphics Card: Nvidia RTX 4090; Discrete Graphics Driver: 32.0.15.6094; Integrated Graphics: AMD Radeon™ Graphics; Integrated Graphics Driver: 32.0.11037.4004; Power Supply: EVGA 1200P2 Supernova; Power Plan: High Performance; Resizable BAR: On; Trusted Platform Module: On; VBS: On; Defender: On

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20. As measured by SPECrate®2017_int_base (n-copies) performance estimates on an Intel® Core™ Ultra 9 285K vs. AMD Ryzen™ 9 9950X. SPEC®, SPECrate® and SPEC CPU® are registered trademarks of the Standard Performance Evaluation Corporation. See http://www.spec.org/spec/trademarks.html for more information. See www.intel.com/PerformanceIndex for workloads and configurations. Results may vary.
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24. As measured by Hitman 3: Dartmoor on an Intel® Core™ Ultra 9 285K vs. AMD Ryzen™ 9 9950X. See www.intel.com/PerformanceIndex for workloads and configurations. Results may vary.
25. Performance Hybrid Architecture: 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.
26. Intel® Dynamic Tuning Technology / Intel® Application Optimization: Performance varies by use, configuration, and other factors. Learn more at www.Intel.com/PerformanceIndex.
27. Processor Numbers: Intel® processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families.
28. Processor Cores: Processor cores listed first are the total number of cores in the processor. The number of Performance-cores and the number of Efficient-cores are listed in parentheses (P+E).
29. Reliability, Availability, Serviceability / Intel® Standard Manageability (ISM): When paired with the eligible Intel® W880 Series chipset SKU, a motherboard with supporting hardware and software, and potential service activation.
30. Intel® Stable IT Platform Program (SIPP): Eligible for Intel® Stable IT Platform Program (Intel® SIPP) starting with Arrow Lake-S Commercial platform availability.
31. Intel® Standard Manageability: When paired with the eligible Intel® Q880 Series chipset SKU, a motherboard with supporting hardware and software, and potential service activation.
32. As of October 2024, refers to Intel® Core™ Ultra 200S series processors, based on new and extensive AI capabilities and experiences, strong performance across CPU, iGPU, and NPU, broad compatibility, software options, unique architecture, impressive performance, and other attributes that combine to deliver Intel's most modern desktop processor for enthusiasts, including in comparison to prior generation and AMD Ryzen™ 9 9950X enthusiast processors (targeting ~125W TDP), as measured by:
    a. New NPU for low power AI focused compute
    b. Strong performance, including in AI, on CPU, GPU, and NPU features, including on benchmarks such as UL Procyon® AI OpenVINO™ CPU, iGPU, and NPU subtests
    c. Strong performance, including in AI, on CPU, GPU, and NPU features, including on real-world representative workloads
    d. Strong overall performance across gaming, content creation, productivity, and more
    e. More than 35 platform TOPs for AI compute, over 3.5x the platform TOPs available in prior gen
    f. Broad selection of publicly available applications & proof of concepts
    g. Ongoing expansion of AI features and ISV-developed application
    h. Integrated Thunderbolt™ 4 for the first time on desktop, as well as discrete Thunderbolt™ 5
    i. Advanced connectivity capabilities including integrated Wi-Fi 6E, as well as discrete Wi-Fi 7
    j. New overclocking capabilities on CPU and memory, as well as new features in Intel® Extreme Tuning Utility
    k. Lower processor power consumption during AI focused benchmarks and workloads on CPU and NPU

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. Results that are based on systems and components as well as results that have been estimated or simulated using an Intel Reference Platform (an internal example new system), internal Intel analysis or architecture simulation or modeling are provided to you for informational purposes only. Results may vary based on future changes to any systems, components, specifications, or configurations.

No product or component can be absolutely secure. Your costs and results may vary. Intel technologies may require enabled hardware, software, or service activation.

All Intel® Evo™ branded designs are verified based on specific hardware and other requirements and must meet demanding thresholds for key mobile user experiences. Details at http://www.intel.com/performance-evo.

All versions of the Intel vPro® platform require an eligible Intel® processor, a supported operating system, Intel® LAN and/or WLAN silicon, firmware enhancements, and other hardware and software necessary to deliver the manageability use cases, security features, system performance, and stability that define the platform. See www.intel.com/PerformanceIndex for details.

AI features may require software purchase, subscription, or enablement by a software or platform provider, or may have specific configuration or compatibility requirements. Details at intel.com/AIPC.

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