Product Brief

PS Series of Intel® Core™ Processors

AI acceleration, graphics performance, and LGA flexibility for your edge deployments

Support edge designs and use cases that require scalability alongside graphics and AI inferencing performance with Intel® Core™ processors. These powerful edge processors combine the performance profile and power ranges of 13th Gen Intel® Core™ mobile processors with LGA socket flexibility. This SoC features our performance hybrid architecture[1] with Intel® Thread Director[2] and an integrated PCH, plus integrated Intel® Graphics. Intel® Core™ processors are a great option for developers who need more AI and graphics performance without sacrificing LGA socket flexibility.

Unlock faster edge AI in an LGA socket

Power advanced edge AI applications with an LGA socket CPU that offers enhanced performance in up to 14 cores and 20 threads alongside 96 graphics execution units (EUs).[3] Take advantage of powerful video stream ingestion and inferencing capabilities accelerated by Intel® Deep Learning Boost to unlock new AI use cases with optimized efficiency.

Power amazing visual experiences at the edge

Meet the demands of engaging, immersive visual workloads with Intel® Graphics with up to 96 graphics EUs.[3] Power advanced video wall and kiosk applications with Pipelock and bezel correction for a seamless video experience.

Accelerate edge AI quickly and cost-effectively

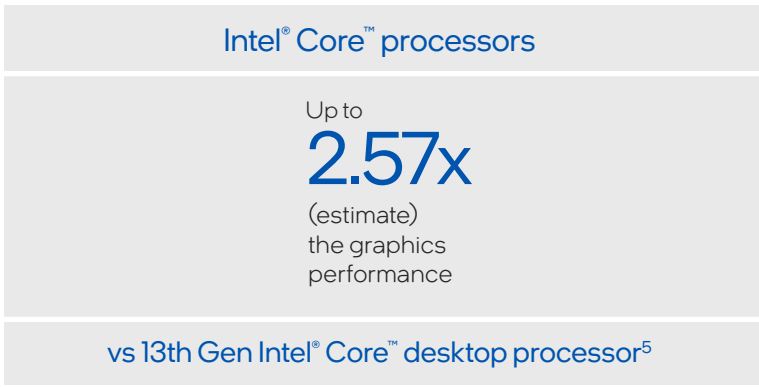
Get the performance you need for today's emerging edge applications. Intel® Core™ processors enable demanding AI inferencing and computer vision workloads with powerful video stream ingestion and inferencing capabilities.

- Deploy AI-based computer vision with greater ease by taking advantage of up to 96 graphics execution units (EUs)[3] and Intel® Deep Learning Boost with int8 support
- Shorten development time for AI with support for the Intel® Distribution of OpenVINO™ toolkit (validation to be completed in 2024)
- Consolidate workloads with a powerful SoC featuring up to 14 cores (6P+8E), up to 20 threads, and up to 24 MB Intel® Smart Cache

[1] 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. See ark.intel.com for SKU details, including cache size and core frequency.

[2] 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.

[3] Available on select SKUs



Power advanced visual workloads

Deliver engaging visual experiences for demanding edge applications. Intel® Core™ processors deliver powerful graphics capabilities for rich digital signage and self-service kiosks.

- Engage more customers with visually rich experiences using up to 96 graphics execution units[2]—3x more than 13th Gen Intel® Core™ desktop processor
- Simplify video wall solutions with support for up to 4x 4K60 HDR displays or one 8K display and Pipelock video synchronization
- Deploy multiple kiosks cost-effectively with a single SoC and SR-IOV GPU virtualization
- Reduce hardware requirements and efficiently decode up to 48 simultaneous 1080p video streams

Built for edge flexibility

Design and deploy with confidence thanks to long-term software support and long-life availability.[7] Take advantage of the LGA socket X based design to enable future upgrades and expandability.

- SoC in an LGA package allows for single-board design across the entire SKU stack, lowering R&D costs and accelerating time to market
- Support compact, fanless designs for space-constrained applications
- Extend the value of deployments and keep devices in the field longer with long-life availability[8] for long-term platform stability and long-term software support, including Windows 10 IoT Enterprise 2021 LTSC and Windows 11 IoT Enterprise 2024 LTSC (2H'24)

[2] Available on select SKUs.

[3] 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] Performance varies by use, configuration, and other factors. Learn more at intel.com/processorclaims: Intel® Core™ Ultra processors, Edge. Results may vary.

[7] 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.

Key features

Performance

- Performance hybrid architecture[8] with multithreaded Performance-cores and single-threaded Efficient-cores
- Intel Thread Director[9] optimizes performance for concurrent workloads across cores
- Up to 14 cores and 20 threads
- Up to 24 MB Intel® Smart Cache
- 45W processor base power HL series with 35W to 65W assured power range
- 15W processor base power UL series with 12W to 28W assured power range

Accelerated AI

- Up to 96 graphics execution units (EUs)[10] and Intel® Deep Learning Boost with int8 support for faster AI inference
- Intel® Gaussian and Neural Accelerator (Intel® GNA) 3.0 optimizes dynamic noise suppression

Memory and I/O

- Up to DDR5–5200 and up to DDR4-3200
- Up to 8x lanes PCIe 4.0 on the CPU (2x4)
- Up to 12x lanes PCIe 3.0 on the integrated PCH

Graphics

- Intel® Graphics with up to 96 graphics EUs[10]
- Support for up to four independent displays at up to 4K60 HDR resolution or one display at 8K resolution
- eDP 1.4b, HBR3, DP2.1, HDMI 2.0b (HDMI 2.1 via bridge)
- Support for ingesting up to 48 simultaneous 1080p streams
- Pipelock video synchronization for Windows with bezel correction and EDID management/lock display
- GPU virtualization through Single root I/O virtualization (SR-IOV)

Flexible deployments

- Long-term software support including Windows 10 IoT Enterprise 2021 LTSC, Windows 11 IoT Enterprise 2024 LTSC (2H'24), and LTS Linux kernel
- Long-life availability[11] for long-term platform stability
- Socketed LGA package for flexible designs

Security and manageability

- Support for Intel vPro® platform on select SKUs

Connectivity

- 4x Intel® Thunderbolt™ 4 technology/USB4 integrated
- Support for discrete Wi-Fi 6E and 5G m.2 modules

Software and OS support

- Intel® Distribution of OpenVINO™ toolkit (validation to be completed in 2024)
- Linux, Celadon (Android)4 in VM (community support)
- KVM hypervisor (community support)
- Intel® oneAPI toolkit, Intel® In-Band Manageability
- Intel® Slim Bootloader, UEFI BIOS

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Use cases

Applications: Digital signage, interactive kiosks, in-store analytics, Point of Sale (POS) systems

- Accelerate AI inference with up to 96 graphics execution units (EUs)[12] and Intel® Deep Learning Boost with int8 support
- Simplify video wall solutions with support for up to 4x 4K displays or one 8K display and Pipelock video synchronization
- Enable multiple interactive kiosks per CPU cost-effectively with SR-IOV GPU virtualization
- Accelerate build-to-order media player or Point of Sale (POS) offerings with a wide selection of SKUs and LGA flexibility; support compact, fanless designs for space-constrained applications

Applications: Interactive whiteboards, thin clients, remote classrooms

- Engage students visually with up to 96 graphics execution units (EUs)[12]
- Optimize dynamic noise suppression with Intel® Gaussian and Neural Accelerator (GNA) 3.0 for virtual classroom environments
- Enable more multitasking for demanding classroom applications with 14 cores (6P+8E), up to 20 threads, and up to 24 MB Intel® Smart Cache
- Accelerate build-to-order remote classroom or thin client solutions with a wide selection of SKUs and LGA flexibility

Applications: License plate recognition, traffic management

- Accelerate AI inferencing for smart city edge analytics with up to 96 graphics execution units (EUs)[13] and Intel® Deep Learning Boost with int8 support
- Support up to 48 simultaneous 1080p streams ingestion for AI-capable digital safety and network video recorder applications
- Consolidate workloads with a powerful SoC featuring up to 14 cores (6P+8E), up to 20 threads, and up to 24 MB Intel® Smart Cache
- Accelerate build-to-order NVR or AI Box solutions with a wide selection of SKUs and LGA flexibility

Applications: AI-augmented industrial PC for discrete and process manufacturing, microgrid controller, robotics

- Accelerate AI inference for Industry 4.0 automation with up to 96 graphics execution units (EUs)[12] and Intel® Deep Learning Boost with int8 support
- Consolidate hardware with a powerful SoC featuring up to 14 cores (6P+8E), up to 20 threads, and up to 24 MB Intel® Smart Cache
- Extend the value of deployments and keep devices in the field longer with long-life availability[13] for long-term platform stability and long-term software support
- Accelerate build-to-order industrial PC offerings with a wide selection of SKUs and LGA flexibility; support compact, fanless designs for space-constrained applications

[12] Available on select SKUs.

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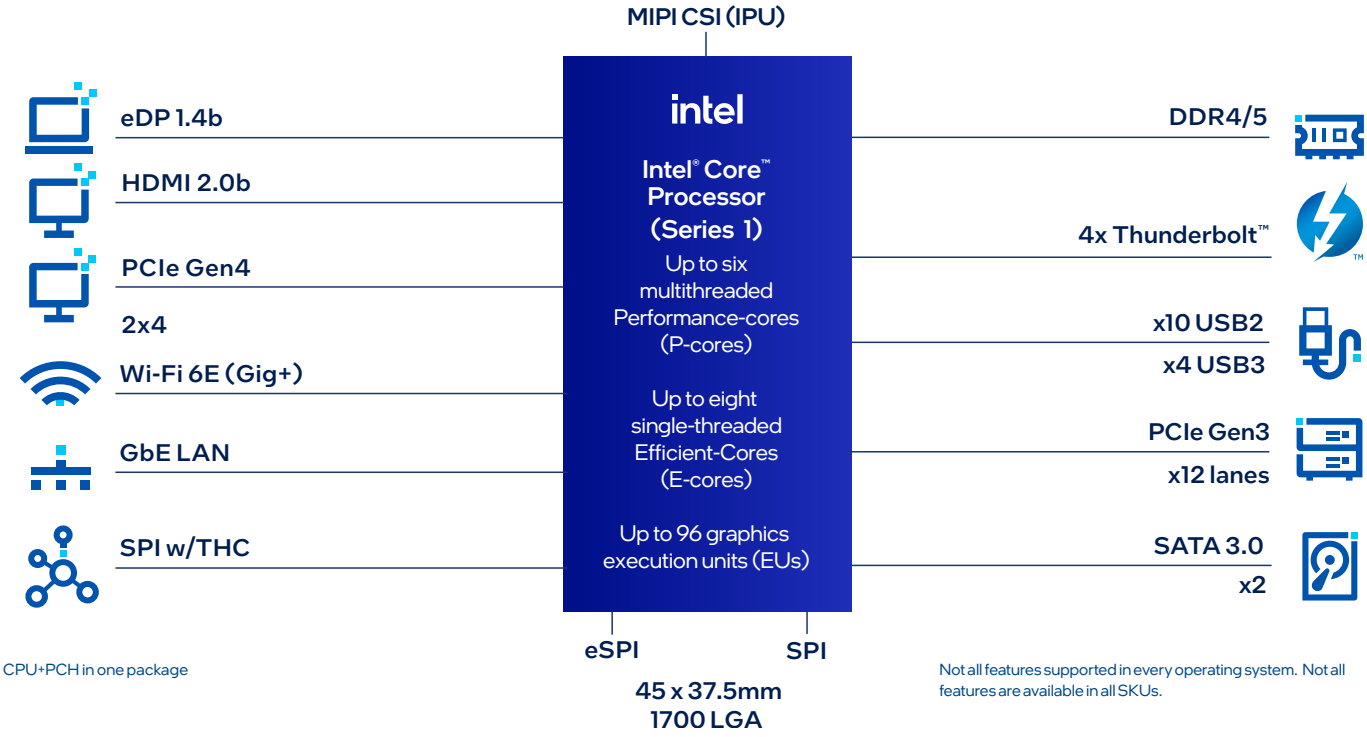
Processor block diagram



CPU+PCH in one package

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

Software overview

CATEGORY	OPERATING SYSTEMS / SDKS / BOOTLOADERS	IMPLEMENTATION	DISTRIBUTION AND SUPPORT
Operating systems[1]	Windows* 10 IoT Enterprise 2021 LTSC Windows* 11 IoT Enterprise 2024 LTSC (2H'24)	Intel	Intel, Microsoft*
	Ubuntu*, Red Hat* Enterprise Linux*, Wind River Linux* [3]	Canonical Ltd., Red Hat & Wind River Systems	Distributed and supported by commercial Linux* vendors; Intel upstream kernel drivers
	Kernel Overlay & BKC	Intel	Intel, Linux* ISVs
	Celadon (Android*) in VM	Intel	Celadon community, ISV Partners
Hypervisors	KVM[3]	KVM	KVM community
Boot Loaders[2]	UEFI/BIOS and Intel® FSP	Intel	Intel, IBVs
	Slim Bootloader and Intel® FSP	Intel	Bootloader Ecosystem & SBL community
SDK	Intel® oneVPL (Video Processing Library)	Intel	Intel
	OpenVINO™ toolkit (validation to be completed in 2024)	Intel	Intel
	Intel® oneAPI toolkit	Intel	Intel
	Intel® In-Band Manageability and Active Management Technology	Intel	Intel

[1] Not all features are supported in all Operating Systems.
[2] Legacy boot is not supported for Windows* and Linux* OSes. Customers should work with their BIOS vendors for enabling/validating legacy BIOS features.
[3] Supported by Intel via the up-streaming to Open-Source Community. Adoption into individual Linux* distributions/hypervisors is dependent upon the OS/HV vendors.
*Other names and brands may be claimed as the property of others.

Intel® Core™ Processor SKUs

Intel® Core™ processors (HL Series, 45W base power)

Brand	Processor Number MM# Order Code	Processor Cores	Number of P-cores	Number of E-cores	Number of Threads	Intel® Smart Cache (L3)	Max Turbo Freq (GHz)[1] P-core	Max Turbo Freq (GHz) [1]E-core	Processor Base Freq (GHz) P-core	Processor Base Frequency (GHz) E-core	Graphics Max Freq (GHz)	Intel® vPro® Enterprise[2]	Version and Type of Firmware Support ME16		Processor Graphics	Number of Execution Units (EUs)	Video Decode Boxes	Total PCIe Lanes	Max Memory Speed	Max Memory Capacity	Processor Base Power (W)
Intel® Core™ Processor	Core 7 160HL	14	6	8	20	24MB	5.2	4.0	2.9(@65W) 2.5(@45W) 1.9 (@35W)	1.8	1.5	√	Corp	Consumer	Intel® Graphics	96	2	8 (CPU) 12 (PCH)	DDR5-5200 DDR4-3200	64GB	65W (Max Assured Power) 45W (Base Power) 35W (Min Assured Power)
Intel® Core™ Processor	Core 7 150HL	14	6	8	20	24MB	5.0	3.7	2.9(@65W) 2.4(@45W) 1.7 (@35W)	1.8	1.5		Corp	Consumer	Intel® Graphics	96	2				
Intel® Core™ Processor	Core 5 130HL	12	4	8	16	18MB	4.8	3.6	3.3(@65W) 2.8(@45W) 2.2(@35W)	2.1	1.5	√	Corp	Consumer	Intel® Graphics	80	2				
Intel® Core™ Processor	Core 5 120HL	12	4	8	16	18MB	4.7	3.5	3.2(@65W) 2.6(@45W) 1.9 (@35W)	1.9	1.45		Corp	Consumer	Intel® Graphics	80	2				
Intel® Core™ Processor	Core 3 100HL	8	4	4	12	12MB	4.6	3.4	2.6(@65W) 2.1(@45W) 1.2 (@35W)	1.5	1.4		Corp[3]	Consumer	Intel® Graphics	48	1				

Intel® Core™ processors (UL Series, 15W base power)

Brand	Processor Number MM# Order Code	Processor Cores	Number of P-cores	Number of E-cores	Number of Threads	Intel® Smart Cache (L3)	Max Turbo Freq (GHz)[1] P-core	Max Turbo Freq (GHz) [1]E-core	Processor Base Freq (GHz) P-core	Processor Base Frequency (GHz) E-core	Graphics Max Freq (GHz)	Intel® vPro® Enterprise[2]	Version and Type of Firmware Support ME16		Processor Graphics	Number of Execution Units (EUs)	Video Decode Boxes	Total PCIe Lanes	Max Memory Speed	Max Memory Capacity	Processor Base Power (W)
Intel® Core™ Processor	Core 7 160UL	10	2	8	12	12MB	5.2	3.9	2.7(@28W) 1.8(@15W) 1.3 (@12W)	1.3	1.3	√	Corp	Consumer	Intel® Graphics	96	2	8 (CPU) 12 (PCH)	DDR5-5200 DDR4-3200	64GB	28W (Max Assured Power) 15W (Base Power) 12W (Min Assured Power)
Intel® Core™ Processor	Core 7 150UL	10	2	8	12	12MB	5.0	3.7	2.6(@28W) 1.7(@15W) 1.1(@12W)	1.2	1.3		Corp	Consumer	Intel® Graphics	96	2				
Intel® Core™ Processor	Core 5 130UL	10	2	8	12	12MB	4.7	3.5	2.5(@28W) 1.6(@15W) 1.0 (@12W)	1.2	1.25	√	Corp	Consumer	Intel® Graphics	80	2				
Intel® Core™ Processor	Core 5 120UL	10	2	8	12	12MB	4.6	3.4	2.5(@28W) 1.3(@15W) 0.8 (@12W)	0.9	1.25		Corp	Consumer	Intel® Graphics	80	2				
Intel® Core™ Processor	Core 3 100UL	6	4	4	8	10MB	4.5	3.3	2.5(@28W) 1.2(@15W) 0.8 (@12W)	0.9	1.25		Corp[3]	Consumer	Intel® Graphics	64	1				
Intel® Processor	U303L	5	1	4	6	12MB	2.6	2.0	2.5(@28W) 1.8(@15W) 0.9 (@12W)	1.3	1.1		Corp[3]	Consumer	Intel® Graphics	96	2				
Intel® Processor	U302L	5	1	4	6	10MB	2.4	1.8	2.3(@28W) 1.6(@15W) 0.9 (@12W)	1.2	1.1		Corp[3]	Consumer	Intel® Graphics	80	2				
Intel® Processor	U301L	5	1	4	6	8MB	2.2	1.6	2.1(@28W) 1.4 (@15W) 0.9 (@12W)	1.1	1.1		Corp[3]	Consumer	Intel® Graphics	64	1				
Intel® Processor	U300L	5	1	4	6	8MB	4.4	3.3	2.5(@28W) 1.2 (@15W) 0.9 (@12W)	0.9	1.1		Corp[3]	Consumer	Intel® Graphics	48	1				

[1] The frequency of cores and core types varies by workload, power consumption and other factors.
Visit https://www.intel.com/content/www/us/en/architecture-and-technology/turbo-boost/turbo-boost-technology.html for more information.
[2] Intel vPro® Enterprise includes Intel® TXT, Intel® Hardware Shield, Intel® AMT. Please refer to vPro brand requirements for full details (RDC #635949).
[3] Validated, but Intel® Active Management and other security features not available.

It’s time to unlock new possibilities with your edge designs.

Learn more about the PS series of Intel® Core™ Processors at https://www.intel.com/core-ps

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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.

Intel® processors of the same SKU may vary in frequency or power as a result of natural variability in the production process.

All product plans and road maps are subject to change without notice.

Statements in this document that refer to future plans or expectations are forward-looking statements. These statements are based on current expectations and involve many risks and uncertainties that could cause actual results to differ materially from those expressed or implied in such statements. For more information on the factors that could cause actual results to differ materially, see our most recent earnings release and SEC filings at intc.com.

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Not all features are supported in every operating system.

Intel may change availability of products and support at any time without notice. All product plans are subject to change without notice.

Your costs and results may vary.

Intel® technologies may require enabled hardware, software, or service activation.

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