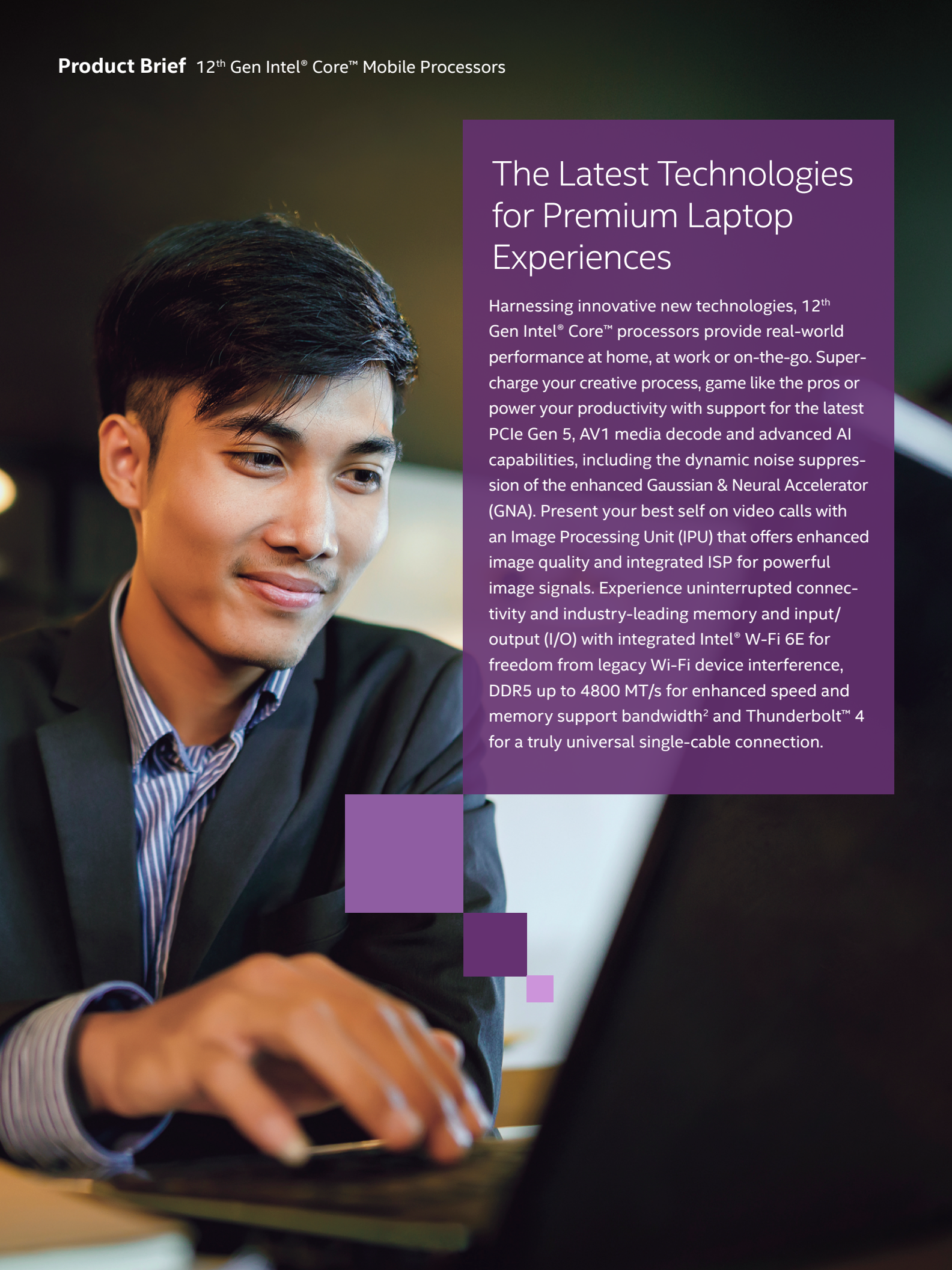
12th Gen Intel® Core™ Mobile Processors

Unleash the Future of Performance with 12th Gen Intel® Core™ Mobile Processors

12th Gen Intel® Core™ mobile processors redefine multi-core architecture for laptop PCs with an all-new performance hybrid architecture. Built on the new Intel 7 process, this design breakthrough brings together two types of specialized cores to deliver revolutionary performance and responsiveness. The latest platform technologies, like DDR5 memory support, Thunderbolt™ 4 connectivity and Intel® Wi-Fi 6E (Gig+), elevate your experience even further. Whether you're a casual multi-tasker, an elite gamer or an imaginative creator, 12th Gen Intel® Core™ mobile processors excel in the areas that matter most.

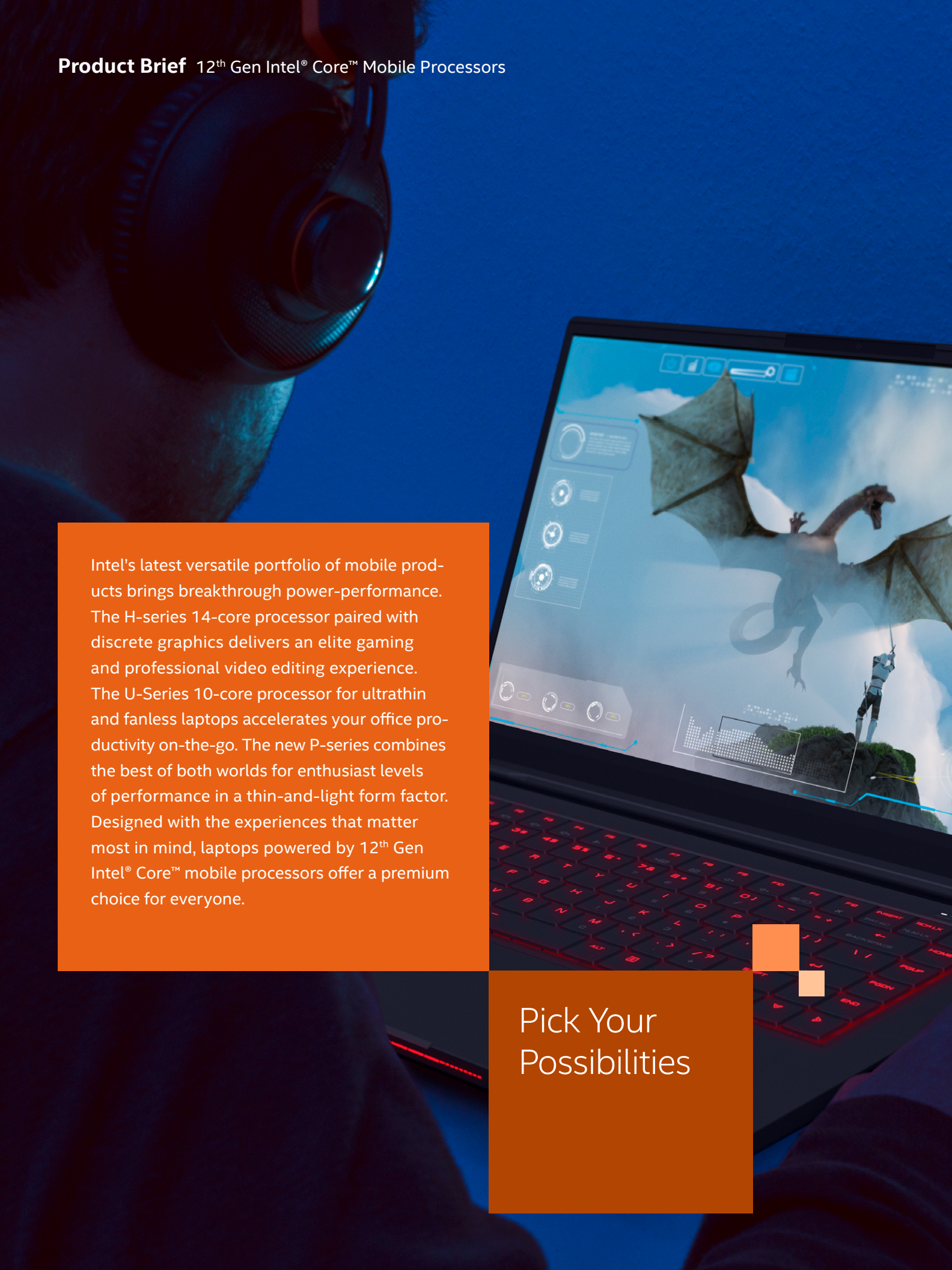
All-New Performance Hybrid Architecture

12th Gen Intel® Core™ mobile processors deliver leadership in performance architecture. Performance cores—or "P-cores"—maximize single-thread performance and responsiveness, while efficient cores—or "E-cores"—deliver scalable, multi-threaded performance and efficient offload of background tasks for modern multi-tasking. Intel® Thread Director[1] works seamlessly with the Operation System (OS) to intelligently optimize performance—placing the right task on the right core at the right time.



The Latest Technologies for Premium Laptop Experiences

Harnessing innovative new technologies, 12th Gen Intel® Core™ processors provide real-world performance at home, at work or on-the-go. Super-charge your creative process, game like the pros or power your productivity with support for the latest PCIe Gen 5, AV1 media decode and advanced AI capabilities, including the dynamic noise suppression of the enhanced Gaussian & Neural Accelerator (GNA). Present your best self on video calls with an Image Processing Unit (IPU) that offers enhanced image quality and integrated ISP for powerful image signals. Experience uninterrupted connectivity and industry-leading memory and input/output (I/O) with integrated Intel® W-Fi 6E for freedom from legacy Wi-Fi device interference, DDR5 up to 4800 MT/s for enhanced speed and memory support bandwidth[2] and Thunderbolt™ 4 for a truly universal single-cable connection.



Intel's latest versatile portfolio of mobile products brings breakthrough power-performance. The H-series 14-core processor paired with discrete graphics delivers an elite gaming and professional video editing experience. The U-Series 10-core processor for ultrathin and fanless laptops accelerates your office productivity on-the-go. The new P-series combines the best of both worlds for enthusiast levels of performance in a thin-and-light form factor. Designed with the experiences that matter most in mind, laptops powered by 12th Gen Intel® Core™ mobile processors offer a premium choice for everyone.

Pick Your Possibilities

12TH GEN INTEL® CORE™ MOBILE PROCESSORS: 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.
Support for up to DDR5 4800 MT/s[2]	This industry first memory technology supports fast frequencies and high bandwidth and throughput leading to enhanced workflow and productivity.
Support for up to DDR4 3200 MT/s[2]	Supports faster frequencies and higher bandwidth and throughput leading to enhanced workflow and productivity.
PCIe 4.0 up to 8 Lanes	Offers up to 16 GT/s for fast access to peripheral devices and networking with up to 8 PCI Express 4.0 lanes.
Intel® Deep Learning Boost (VNNI)	Accelerates AI inference—vastly improving performance for deep learning workloads.
Gaussian & Neural Accelerator 3.0 (GNA 3.0)	Runs AI workloads on accelerator to more efficiently blur video background and suppress background noise.
Intel® UHD Graphics driven by Intel® Xe architecture	Rich media and intelligent integrated graphics capabilities enable amplified visual complexity, enhanced 3D performance and faster image processing.
Enhanced Display	Immerse in up to four simultaneous 4K displays at 60Hz and view up to 8K60 HDR Video in billions of colors.
Enhanced Media (12bit AV1/HEVC, E2E compression)	Greater system-wide performance and support for enhanced quality of media encode and decode, efficiently.
Intel® Wi-Fi 6E (Gig+)	Intel® Wi-Fi 6E is 3 times faster and with 40% higher peak data rates compared to the standard 802.22ac 2x2 and dual spatial stream 802.11ac, respectively.
Up to 16 CPU PCIe 5.0 lanes	Latest generation PCIe lanes deliver greater performance efficiency, smooth gameplay and increased workflow productivity.
Intel® Optane™ Memory H20	Performance improvements and power reduction over Intel® Optane™ memory H10 with SSD.
Integrated USB 3.2 Gen 2x2 (20G)	Up to twice the USB bandwidth (vs USB 3.2 Gen 1x1 (10G)) for fast data transfers.
USB Audio Offload	Deep sleep states are possible with the USB Audio Offload.
Discrete Intel® Thunderbolt™ 4 (USB4 compliant)	Universal cable connectivity for a simple, reliable connection that provides incredible performance.

12TH GEN INTEL® CORE™ MOBILE PROCESSORS SKU COMPARISON—H SERIES

		i9-12900HK	i9-12900H	i7-12800H	i7-12700H	i7-12650H	i5-12600H	i5-12500H	i5-12450H
Processor Cores		14	14	14	14	10	12	12	8
Processor Threads		20	20	20	20	16	16	16	12
Number of P-cores		6	6	6	6	6P	4	4	4
Number of E-cores		8	8	8	8	4	8	8	4
Intel® Smart Cache (L3)		24MB	24MB	24MB	24MB	24MB	18MB	18MB	12MB
Max Turbo Frequency (GHz)[3] up to	P-core	5	5	4.8	4.7	4.7	4.5	4.5	4.4
	E-core	3.8	3.8	3.7	3.5	3.5	3.3	3.3	3.3
Base Frequency (GHz)[3]	P-core	2.5	2.5	2.4	2.3	2.3	2.7	2.5	2.0
	E-core	1.8	1.8	1.8	1.7	1.7	2	1.8	1.5
Processor Graphics		96EU	96EU	96EU	96EU	64EU	80EU	80EU	48EU
Max Graphics Frequency (GHz) up to		1.45	1.45	1.4	1.4	1.4	1.4	1.3	1.2
Base Power (PL1)		45W							
Turbo Power (PL2)		115W	115W	115W	115W	115W	95W	95W	95W

12TH GEN INTEL® CORE™ MOBILE PROCESSORS SKU COMPARISON—P SERIES

		i7			i5		i3
		i7-1280P	i7-1270P	i7-1260P	i5-1250P	i5-1240P	i3-1220P
Processor Cores		14	12	12	12	12	10
Processor Threads		20	16	16	16	16	12
Number of P-cores		6	4	4	4	4	2
Number of E-cores		8					
Intel® Smart Cache (L3)		24MB	18MB	18MB	12MB	12MB	12MB
Max Turbo Frequency (GHz)[3] up to	P-core	4.8	4.8	4.7	4.4	4.4	4.4
	E-core	3.6	3.5	3.4	3.3	3.3	3.3
Base Frequency (GHz)[3]	P-core	1.8	2.2	2.1	1.7	1.7	1.5
	E-core	1.3	1.6	1.5	1.2	1.2	1.1
Processor Graphics		96EU	96EU	96EU	80EU	80EU	64EU
Max Graphics Frequency (GHz) up to		1.45	1.4	1.4	1.4	1.3	1.1
Base Power (PL1)		45W					
Turbo Power (PL2)		64W					

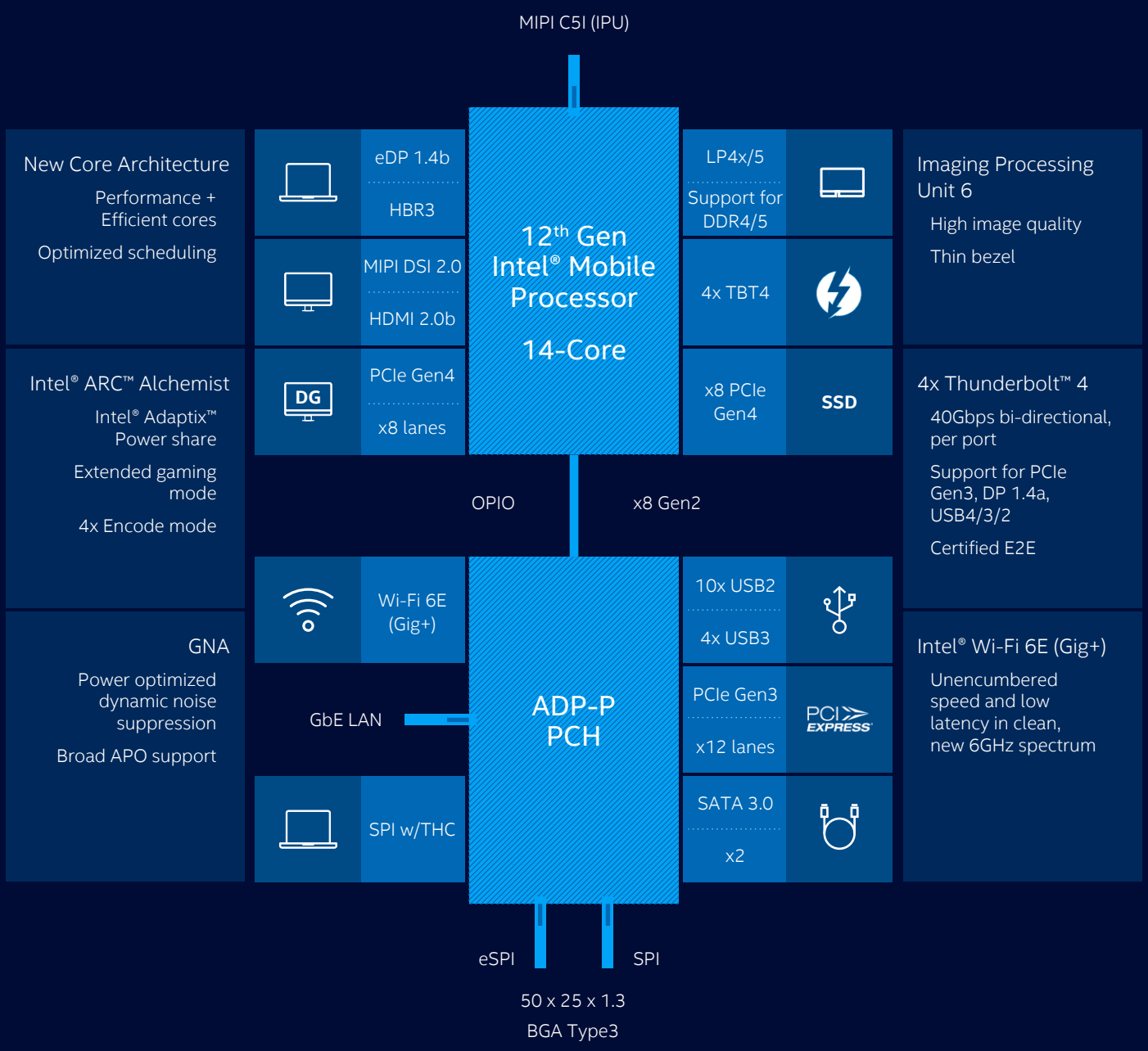
12TH GEN INTEL® CORE™ MOBILE PROCESSORS SKU COMPARISON—U SERIES/15W

		intel. CORE i7		intel. CORE i5		intel. CORE i3	Pentium	Celeron
		i7-1265U	i7-1255U	i5-1245U	i5-1235U	i3-1215U	8505	7305
Processor Cores		10	10	10	10	6	5	5
Processor Threads		12	12	12	12	8	6	6
Number of P-cores		2	2	2	2	2	1	1
Number of E-cores		8	8	8	8	4	4	4
Intel® Smart Cache (L3)		12MB	12MB	12MB	12MB	10MB	8MB	8MB
Max Turbo Frequency (GHz)[3] up to	P-core	4.8	4.7	4.4	4.4	4.4	4.4	-
	E-core	3.6	3.5	3.3	3.3	3.3	3.3	-
Base Frequency (GHz)[3]	P-core	1.8	1.7	1.6	1.3	1.2	1.2	1.1
	E-core	1.3	1.2	1.2	0.9	0.9	0.9	0.9
Processor Graphics		96EU	96EU	80EU	80EU	64EU	48EU	48EU
Max Graphics Frequency (GHz) up to		1.25	1.25	1.2	1.2	1.1	1.1	1.1
Base Power (PL1)		15W						
Turbo Power (PL2)		55W						

12TH GEN INTEL® CORE™ MOBILE PROCESSORS SKU COMPARISON—U SERIES/9W

		intel. CORE i7		intel. CORE i5		intel. CORE i3	Pentium	Celeron
		i7-1265U	i7-1255U	i5-1245U	i5-1235U	i3-1215U	8505	7305
Processor Cores		10	10	10	10	6	5	5
Processor Threads		12	12	12	12	8	6	6
Number of P-cores		2	2	2	2	2	1	1
Number of E-cores		8	8	8	8	4	4	4
Intel® Smart Cache (L3)		12MB	12MB	12MB	12MB	10MB	8MB	8MB
Max Turbo Frequency (GHz)[3] up to	P-core	4.7	4.7	4.4	4.4	4.4	4.4	-
	E-core	3.5	3.5	3.3	3.3	3.3	3.3	-
Base Frequency (GHz)[3]	P-core	1.1	1.1	1.1	1.0	1.0	1.0	1.0
	E-core	0.8	0.8	0.8	0.7	0.7	0.7	0.7
Processor Graphics		96EU	96EU	80EU	80EU	64EU	48EU	48EU
Max Graphics Frequency (GHz) up to		0.95	0.95	0.9	0.85	0.85	0.8	0.8
Base Power (PL1)		9W						
Turbo Power (PL2)		29W						

12th Gen Intel® Core™ Mobile Block Diagram



Notices & Disclaimers

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

All processors are lead-free (per EU RoHS directive July 2006) and halogen free (residual amounts of halogens are below November 2007 proposed IPC/JEDEC J-STD-709 standards).

All processors support Intel® Virtualization Technology (Intel® VT-x, VT-d).

1. Built 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.

2. Based on memory bandwidth results using Intel® Memory Latency Checker Tool v3.9a System A: Core i9-12900K on Asus Z690 TUF DDR4 Motherboard. 2x16GB G.Skill TridentZ 3200Mhz CL14 RAM System B: Core i9-12900K on Asus Z690 Prime-P DDR5 Motherboard. 2x16GB SK.Hynix 4400Mhz CL40 RAM.

3. 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.

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.

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

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