Intel CES 2023

CCG Press & Industry Analyst Pre-Brief

13th Gen Intel® Core™ Desktop Processors - 65W

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The Best Gaming Experience

13th Gen Intel® Core™ i9-13900

Faster P-Cores
Up to 5.6GHz

Double E-Cores
24C / 32T

Larger L2 Cache
2MB per P-core
4MB per E-core cluster

Delivering up to 11% ST and 34% MT Performance

Source Intel: As estimated by measurements made using SPECint_rate_base2017_IC2022.1 (1-copy & n-copy) using Intel validation Platforms comparing Core i9 13900 versus Corei9 12900
For all workloads and configuration see www.intel.com/PerformanceIndex. Results may vary.

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Designed For Platform Flexibility

Forward & Backward Compatibility

ASUS® GIGABYTE™ MSI

COLORFUL® ASRock®

Support for Both DDR5 & DDR4 Memory

CORSAIR G.SKILL crucial by Micron®

KINGSTON FURY™ PATRIOT™ T-FORCE THE POWER FROM TEAMGROUP

Incredible Partnerships for Product Readiness

140+ customers

30+ countries

70+ motherboards

intel®

Not a comprehensive list of customers and partners
Requires latest BIOS & SW drivers from motherboard vendor

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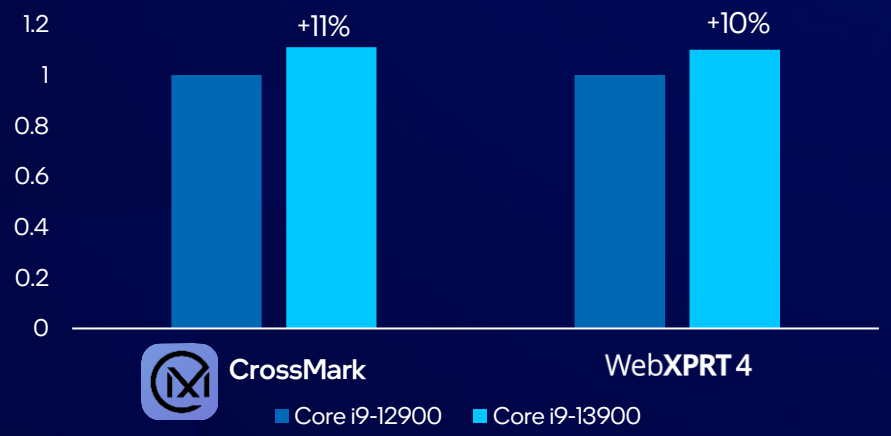
13th Gen Intel® Core™ - Delivering Next Level Performance

Mainstream Experience

13th Gen Intel Core desktop processor delivers next level performance, powerful platform features, and immersive system experiences

Everyday Productivity



VS. Previous generation

Delivering Value

intel CORE i9

Up to 11% faster mainstream application performance

8 more E-cores and up to 18MB more L2 cache

Intel Thermal Velocity Boost

intel CORE i7

Max Turbo frequency up to 5.2GHz

4 more E-cores and up to 12MB more L2 cache

Continued support for Intel Turbo Boost Max 3.0

intel CORE i5

Up to 39% improved multi-tasking performance

Up to 8 more E-cores and up to 4MB more L2 cache

Introducing Performance Hybrid Architecture

13th Gen Intel® Core™ 65W SKUs VS. Previous generation

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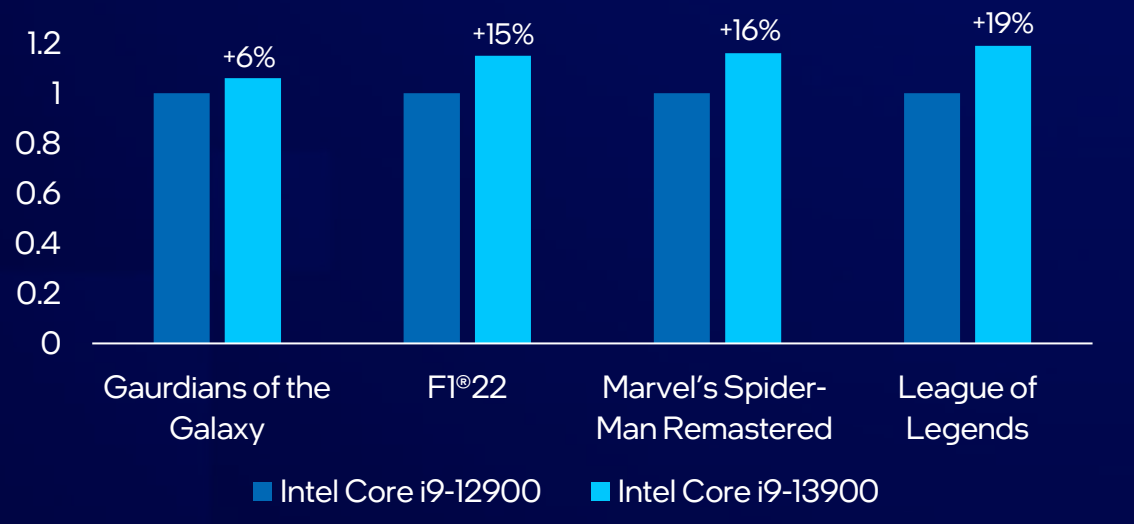
13th Gen Intel® Core™ - Delivering Next Level Performance

Mainstream Experience

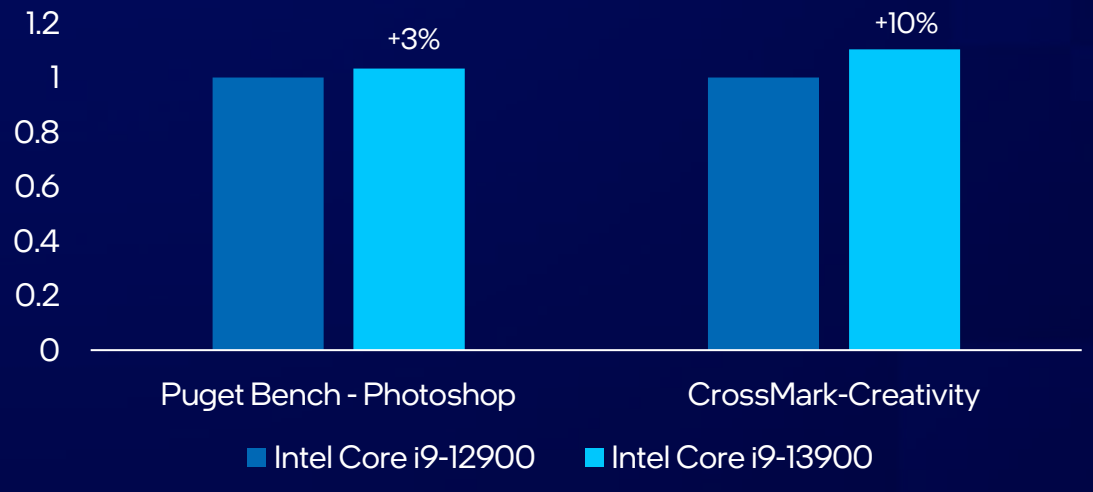
13th Gen Intel Core desktop processor delivers next level performance for mainstream gaming and content creation

Mainstream Gaming



VS. Previous generation

Content Creation



VS. Previous generation

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For all workloads and configuration see www.intel.com/PerformanceIndex. Results may vary.

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13th Gen - Energy Efficiency & Sustainability

Energy Efficiency

More Energy Efficient

Up to 34% higher MT performance with the same power as Core i9-12900

- Energy Star V8.0 compliant with
  - ATX12VO Single Rail PSU
  - Modern Standby
- Intel Dynamic Tuning Technology

Sustainability

Responsible Packaging

13th Gen Intel Core Processor packaging is designed with sustainability as a priority using less material that is responsibly sourced and recyclable

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13th Gen Intel® Core™ Desktop Processors

Processor Number	Processor Cores (P+E)	Processor Threads	Intel® Smart Cache (L3)	Total L2 Cache	P-core Max Turbo Frequency (GHz)	E-core Max Turbo Frequency (GHz)	P-core Base Frequency (GHz)	E-core Base Frequency (GHz)	Processor Graphics	Total CPU PCIe Lanes	Max Memory Speed (MT/S)	Memory Capacity	Processor Base Power (W)	Max Turbo Power (W)	RCP (USD$)
i9-13900	24 (8+16)	32	36MB	32MB	Up to 5.6	Up to 4.2	2.0	1.5	Intel® UHD Graphics 770	20	DDR5 5600 DDR4 3200	128GB	65	219	$549
i9-13900F	24 (8+16)	32	36MB	32MB	Up to 5.6	Up to 4.2	2.0	1.5	n/a	20	DDR5 5600 DDR4 3200	128GB	65	219	$524
i7-13700	16 (8+8)	24	30MB	24MB	Up to 5.2	Up to 4.1	2.1	1.5	Intel® UHD Graphics 770	20	DDR5 5600 DDR4 3200	128GB	65	219	$384
i7-13700F	16 (8+8)	24	30MB	24MB	Up to 5.2	Up to 4.1	2.1	1.5	n/a	20	DDR5 5600 DDR4 3200	128GB	65	219	$359
i5-13600	14 (6+8)	20	24MB	11.5MB	Up to 5.0	Up to 3.7	2.7	2.0	Intel® UHD Graphics 770	20	DDR5 4800 DDR4 3200	128GB	65	154	$255
i5-13500	14 (6+8)	20	24MB	11.5MB	Up to 4.8	Up to 3.5	2.5	1.8	Intel® UHD Graphics 770	20	DDR5 4800 DDR4 3200	128GB	65	154	$232
I5-13400	10 (6+4)	16	20MB	9.5MB	Up to 4.6	Up to 3.3	2.5	1.8	Intel® UHD Graphics 730	20	DDR5 4800 DDR4 3200	128GB	65	148	$221
i5-13400F	10 (6+4)	16	20MB	9.5MB	Up to 4.6	Up to 3.3	2.5	1.8	n/a	20	DDR5 4800 DDR4 3200	128GB	65	148	$196
i3-13100	4 (4+0)	8	12MB	5MB	Up to 4.5	n/a	3.4	n/a	Intel® UHD Graphics 730	20	DDR5 4800 DDR4 3200	128GB	60	89	$134
i3-13100F	4 (4+0)	8	12MB	5MB	Up to 4.5	N/a	3.4	n/a	n/a	20	DDR5 4800 DDR4 3200	128GB	58	89	$109

Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families.
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. Max Turbo Frequency for P-cores may include Intel® Thermal Velocity Boost and/or Intel Turbo Boost Max 3.0.
All SKUs listed above support up to DDR5 (5600 MT/S)/DDR4 (3200 MT/S) memory.See ark.intel.com for more specification details

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13th Gen Intel® Core™ Desktop Processors

Processor Number	Processor Cores (P+E)	Processor Threads	Intel® Smart Cache (L3)	Total L2 Cache	P-core Max Turbo Frequency (GHz)	E-core Max Turbo Frequency (GHz)	P-core Base Frequency (GHz)	E-core Base Frequency (GHz)	Processor Graphics	Total CPU PCIe Lanes	Max Memory Speed (MT/S)	Memory Capacity	Processor Base Power (W)	Max Turbo Power (W)	RCP (USD$)
I9-13900T	24 (8+16)	32	36MB	32MB	Up to 5.3	Up o 3.9	1.1	0.8	Intel® UHD Graphics 770	20	DDR5 5600 DDR4 3200	128GB	35	106	$549
I7-13700T	16 (8+8)	24	30MB	24MB	Up to 4.9	Up to 3.6	1.4	1.0	Intel® UHD Graphics 770	20	DDR5 5600 DDR4 3200	128GB	35	106	$384
i5-13600T	14 (6+8)	20	24MB	11.5MB	Up to 4.8	Up to 3.4	1.8	1.3	Intel® UHD Graphics 770	20	DDR5 4800 DDR4 3200	128GB	35	92	$255
i5-13500T	14 (6+8)	20	24MB	11.5MB	Up to 4.6	Up to 3.2	1.6	1.2	Intel® UHD Graphics 770	20	DDR5 4800 DDR4 3200	128GB	35	92	$232
i5-13400T	10 (6+4)	16	20MB	9.5MB	Up to 4.4	Up to 3.0	1.3	1.0	Intel® UHD Graphics 730	20	DDR5 4800 DDR4 3200	128GB	35	82	$221
i3-13100T	4 (4+0)	8	12MB	5MB	Up to 4.2	n/a	2.5	n/a	Intel® UHD Graphics 730	20	DDR5 4800 DDR4 3200	128GB	35	69	$134

Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families.
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. Max Turbo Frequency for P-cores may include Intel® Thermal Velocity Boost and/or Intel Turbo Boost Max 3.0.
All SKUs listed above support up to DDR5 (5600 MT/S)/DDR4 (3200 MT/S) memory.See ark.intel.com for more specification details

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Notes & Disclaimer

All information provided here is subject to change without notice. Contact your Intel representative to obtain the latest Intel product specifications and related information.

Unless otherwise noted, testing as of dates shown in the configurations and may not reflect all publicly available updates. See above for configuration details. No product or component can be absolutely secure.

Performance varies by use, configuration and other factors. Learn more at www.Intel.com/PerformanceIndex.

Your costs and results may vary.

Intel contributes to the development of benchmarks by participating in, sponsoring, and/or contributing technical support to various benchmarking groups, including the BenchmarkXPRT Development Community administered by Principled Technologies.

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

All product plans and roadmaps are subject to change without notice.

Intel does not control or audit third-party data. You should consult other sources to evaluate accuracy.


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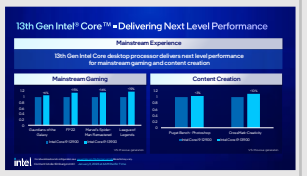
Performance Claim Appendix

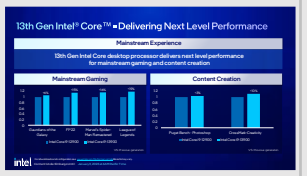
Claim#/Statement		**2. 13th Gen Intel Core i9-13900**
1. The Best Gaming Experience		Based on performance testing (as of September 7, 2022) and other attributes of 13th Gen Intel Core processors that combine to form the best overall desktop experience. These include: ▪ Fast speeds: up to Max Turbo Frequency of 5.8GHz – the highest for any desktop processor ▪ Strong processor performance across a collection of benchmarks and real-world Gaming, Productivity, & Content Creation workloads, including in relation to prior generation (12th Gen Intel Core) and competitive processor offerings such as AMD Ryzen 9 5950X and AMD Ryzen 7 5800X3D ▪ Broad memory support for both DDR4 and DDR5 memory modules ▪ Support for best in class wired and wireless connectivity. See intel.com/PerformanceIndex (connectivity) for details ▪ Intel's unparalleled approach to security like security assurance programs founded on security by design principles, transparency and disclosure of vulnerabilities and a robust Intel Platform Update process, an esteemed bug bounty program as well as internal research through red teams and more ▪ Breadth of price and performance options available in 13th Gen Intel Core family ▪ Extensive open ecosystem enablement (e.g., OEMs, ODMs, OSs, ISVs, etc.) Additional details available at intel.com/13thgen.
2. Up to 11% better single threaded performance		Source: Intel. Based on performance estimated with measurements on 12th Gen Intel Core i9-13900 against Intel Core i9-12900. Binaries compiled with ICC for both SKUs. The metric used is the geometric mean of C/C++ integer benchmarks in SPECrate®2017_int_base (1 copy)IC 2022.1 LLVM
3. Up to 34% better multithreaded performance		Source: Intel. Based on performance estimated with measurements on 12th Gen Intel Core i9-13900 against Intel Core i9-12900. Binaries compiled with ICC for both SKUs. The metric used is the geometric mean of C/C++ integer benchmarks in SPECrate®2017_int_base (n copy)IC 2022.1 LLVM

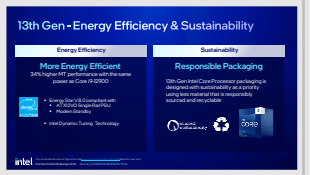
Claim#/Statement		**2. 13th Gen Intel Core i9-13900**
Up to 11% better single threaded performance Up to 34% better multithreaded performance		**Full Configurations:** Processor: 13th Gen Intel® Core™ *i9-13900* processor (RPL-S) , 24C32T (8P + 16E); Motherboard: Intel RVP; Memory: G. Skill DDR5 CL 28-34-34-89, 2X16GB DDR5-5600MHz; Storage: Samsung 980 Pro 1TB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Version 22621_755 Service pack: 22H2; Motherboard BIOS version: 3361.A06 Processor: 12th Gen Intel® Core™ *i9-12900* processor (ADL-S) , 16C24T (8P + 8E); Motherboard: Asus Prime Z690-A; Memory: G.Skill DDR5 CL 28-34-34-89, 2X16GB DDR5-4800MHz; Storage: Samsung 980 Pro 1TB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Version 22621_755 Service pack: 22H2; Motherboard BIOS version: 2103 Tested as of 09/27/2022

Claim#/Statement 	**4. 13th Gen – Delivering Next Level Performance - Everyday Productivity**
4. Up to 11% faster mainstream application performance	As measured by CrossMark overall score on 13th Gen Intel® Core™ i9-13900 processor vs. 12th Gen Intel® Core™ i9-12900
5. Up to 10% faster Web browsing performance	As measured by WebXPRT 4 Edge overall score on 13th Gen Intel® Core™ i9-13900 processor vs. 12th Gen Intel® Core™ i9-12900
13th Gen – Delivering Next Level Performance - Everyday Productivity Configurations: Up to 11% faster mainstream application performance Up to 10% faster Web browsing performance	Processor: 13th Gen Intel® Core™ i9-13900 processor (RPL-S) , 24C32T (8P + 16E); Motherboard: Intel RVP; Memory: G. Skill DDR5 CL 28-34-34-89, 2X16GB DDR5-5600MHz; Storage: Samsung 980 Pro 1TB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Version 22621_755 Service pack: 22H2; Motherboard BIOS version: 3361.A06 Processor: 12th Gen Intel® Core™ i9-12900 processor (ADL-S) , 16C24T (8P + 8E); Motherboard: Asus Prime Z690-A; Memory: G.Skill DDR5 CL 28-34-34-89, 2X16GB DDR5-4800MHz; Storage: Samsung 980 Pro 1TB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Version 22621_755 Service pack: 22H2; Motherboard BIOS version: 2103 **Benchmark:** *CrossMark* is a benchmark from the BAPCo* consortium that is an easy to run native cross-platform benchmark that measures the overall system performance and system responsiveness using models of real-world applications. Testing as of: 12/09/2022

Claim#/Statement		**4. Delivering Next Level Performance – Delivering Value**
6. Up to 11% faster mainstream application performance		As measured by CrossMark overall score on 13th Gen Intel® Core™ i9-13900 processor vs. 12th Gen Intel® Core™ i9-12900
7. Up to 39% improved multi-tasking performance		Based on performance estimated with measurements on 12th Gen Intel Core i5-13500 against Intel Core i5-12500. Binaries compiled with ICC for both SKUs. The metric used is the geometric mean of C/C++ integer benchmarks in SPECrate®2017_int_base (n copy)IC 2022.1 LLVM Full Configuration: Processor: 13th Gen Intel® Core™ *i5-13500* processor (RPL-S) , 14C20T (6P + 8E); Motherboard: Intel RVP; Memory: G. Skill DDR5, 2X32 GB DDR5-5200MHz; Storage: Samsung PM9A1 500 GB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Version 22621_165 Service pack: 22H2; Motherboard BIOS version: NA Processor: 12th Gen Intel® Core™ *i5-12500* processor (ADL-S) , 6C12T (6P); Motherboard: Intel RVP; Memory: G. Skill DDR5, 2X32 GB DDR5-4800MHz; Storage: Samsung PM9A1 500 GB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Version 22621_165 Service pack: 22H2; Motherboard BIOS version: NA Testing as of 09/27/2022
Delivering Next Level Performance – Delivering Value Configurations: Up to 11% faster mainstream application performance		Processor: 13th Gen Intel® Core™ i9-13900 processor (RPL-S) , 24C32T (8P + 16E); Motherboard: Intel RVP; Memory: G. Skill DDR5 CL 28-34-34-89, 2X16GB DDR5-5600MHz; Storage: Samsung 980 Pro 1TB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Version 22621_755 Service pack: 22H2; Motherboard BIOS version: 3361.A06 Processor: 12th Gen Intel® Core™ i9-12900 processor (ADL-S) , 16C24T (8P + 8E); Motherboard: Asus Prime Z690-A; Memory: G.Skill DDR5 CL 28-34-34-89, 2X16GB DDR5-4800MHz; Storage: Samsung 980 Pro 1TB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Version 22621_755 Service pack: 22H2; Motherboard BIOS version: 2103 **Benchmark:** *CrossMark* is a benchmark from the BAPCo* consortium that is an easy to run native cross-platform benchmark that measures the overall system performance and system responsiveness using models of real-world applications. Testing as of: 12/09/2022

Claim#/Statement		**5. Delivering Next Level Performance – Mainstream Gaming**
8. Up to 16% more FPS on Marvel's Spider-Man Remastered		As measured by Marvel's Spider-Man Remastered on 13th Gen Intel® Core™ i9-13900 vs. 12th Gen Intel® Core™ i9- 12900
9. Up to 15% more FPS on F1 22		As measured by F122 on 13th Gen Intel® Core™ i9-13900 vs. 12th Gen Intel® Core™ i9- 12900
10. Up to 6% more FPS on Guardians of the Galaxy		As measured by Guardians of the Galaxy on 13th Gen Intel® Core™ i9-13900 vs. 12th Gen Intel® Core™ i9- 12900
11. Up to 19% more FPS on League of Legends		As measured by League of Legends on 13th Gen Intel® Core™ i9-13900 vs. 12th Gen Intel® Core™ i9- 12900
Delivering Next Level Performance – Mainstream Gaming Configurations Up to 16% more FPS on Marvel's Spider-Man Remastered Up to15% more FPS on F1 22 Up to 6% more FPS on Guardians of the Galaxy Up to 19% more FPS on League of Legends		Processor: 13th Gen Intel® Core™ *i9-13900* processor (RPL-S) , 24C32T (8P + 16E); Motherboard: Intel RVP; Memory: G. Skill DDR5 CL 28-34-34-89, 2X16GB DDR5-5600MHz; Storage: Samsung 980 Pro 1TB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Version 22621_755 Service pack: 22H2; Motherboard BIOS version: 3361.A06 Processor: 12th Gen Intel® Core™ *i9-12900* processor (ADL-S) , 16C24T (8P + 8E); Motherboard: Asus Prime Z690-A; Memory: G.Skill DDR5 CL 28-34-34-89, 2X16GB DDR5-4800MHz; Storage: Samsung 980 Pro 1TB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Version 22621_755 Service pack: 22H2; Motherboard BIOS version: 2103 **Games Tested:** Marvel's Spider-Man Remastered – v1.1014.0.0 Guardians of the Galaxy - CL:2983462 F1 22 - v01.15.928484 (928484) League of Legends – v12.22 Tested as of: 12/09/2022

Claim#/Statement		**5. Delivering Next Level Performance – Content Creation**
12. Up to 3% faster Photo editing Performance		As measured by Puget Bench Adobe Photoshop overall score on 13th Gen Intel® Core™ i9-13900 processor vs. 13th Gen Intel® Core™ i9-12900
13. Up to 10% faster video editing Performance		As measured by CrossMark – Creativity Subscore on 13th Gen Intel® Core™ i9-13900 vs. 12th Gen Intel® Core™ *i9-12900* processor
Delivering Next Level Performance – Content Creation Configurations: Up to 3% faster Photo editing Performance Up to 10% faster video editing Performance		Processor: 13th Gen Intel® Core™ *i9-13900* processor (RPL-S) , 24C32T (8P + 16E); Motherboard: Intel RVP; Memory: G. Skill DDR5 CL 28-34-34-89, 2X16GB DDR5-5600MHz; Storage: Samsung 980 Pro 1TB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Version 22621_755 Service pack: 22H2; Motherboard BIOS version: 3361.A06 Processor: 12th Gen Intel® Core™ *i9-12900* processor (ADL-S) , 16C24T (8P + 8E); Motherboard: Asus Prime Z690-A; Memory: G.Skill DDR5 CL 28-34-34-89, 2X16GB DDR5-4800MHz; Storage: Samsung 980 Pro 1TB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Version 22621_755 Service pack: 22H2; Motherboard BIOS version: 2103 **Applications Tested** Puget bench for Lightroom Classic bench – this is a photo editing performance measurement benchmark developed by Puget Systems and is a part of Content creation benchmark suite. The benchmark can be accessed from: https://www.pugetsystems.com/labs/articles/PugetBench-for-Lightroom-Classic-1571/ Puget bench for Premier Pro – this is a video editing performance measurement benchmark developed by Puget Systems and is a part of Content creation benchmark suite. The benchmark can be accessed from: https://www.pugetsystems.com/labs/articles/PugetBench-for-Premiere-Pro-1519/ **Benchmark:** *CrossMark* is a benchmark from the BAPCo* consortium that is an easy to run native cross-platform benchmark that measures the overall system performance and system responsiveness using models of real-world applications. Tested as of: 12/09/2022

Claim#/Statement		6. 13th Gen – Energy Efficiency & Sustainability
14. Up to 34% higher MT performance with the same power as Core i9-12900		Source: Intel. Based on performance estimated with measurements on 12th Gen Intel Core i9-13900 against Intel Core i9-12900. Binaries compiled with ICC for both SKUs. The metric used is the geometric mean of C/C++ integer benchmarks in SPECrate®2017_int_base (n copy)IC 2022.1 LLVM
Up to 34% higher MT performance with the same power as Core i9-12900		**Full Configurations:** Processor: 13th Gen Intel® Core™ *i9-13900* processor (RPL-S) , 24C32T (8P + 16E); Motherboard: Intel RVP; Memory: G. Skill DDR5 CL 28-34-34-89, 2X16GB DDR5-5600MHz; Storage: Samsung 980 Pro 1TB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Version 22621_755 Service pack: 22H2; Motherboard BIOS version: 3361.A06 Processor: 12th Gen Intel® Core™ *i9-12900* processor (ADL-S) , 16C24T (8P + 8E); Motherboard: Asus Prime Z690-A; Memory: G.Skill DDR5 CL 28-34-34-89, 2X16GB DDR5-4800MHz; Storage: Samsung 980 Pro 1TB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Version 22621_755 Service pack: 22H2; Motherboard BIOS version: 2103 Tested as of: 09/27/2022