Intel CES 2023
CCG Press & Industry Analyst Pre-Brief

13th Gen Intel® Core™ Desktop Processors - 65W
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 Core i9 12900.

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

Content Under Embargo Until: January 3, 2023 at 6AM Pacific Time
### Designed For Platform Flexibility

**Forward & Backward Compatibility**

- ASUS
- GIGABYTE
- MSI
- COLORFUL
- ASRock

**Support for Both DDR5 & DDR4 Memory**

- CORSAIR
- G.SKILL
- Crucial (Micron)
- KIngston
- Patriot
- Team

**Incredible Partnerships for Product Readiness**

- 140+ customers
- 30+ countries
- 70+ motherboards

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

- Up to 11% faster mainstream application performance
- 8 more E-cores and up to 18MB more L2 cache

Delivering Value

- 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
- Up to 39% improved multi-tasking performance
- Up to 8 more E-cores and up to 4MB more L2 cache
- Introducing Performance Hybrid Architecture

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

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Mainstream Experience

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

Mainstream Gaming

- Guardians of the Galaxy: +6%
- F1®22: +15%
- Marvel’s Spider-Man Remastered: +16%
- League of Legends: +19%

Content Creation

- Puget Bench - Photoshop: +3%
- CrossMark-Creativity: +10%

For all workloads and configuration see [www.intel.com/PerformanceIndex](http://www.intel.com/PerformanceIndex). Results may vary.
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

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

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## 13th Gen Intel® Core™ Desktop Processors

<table>
<thead>
<tr>
<th>Processor Number</th>
<th>Processor Cores (P+E)</th>
<th>Processor Threads</th>
<th>Intel® Smart Cache (L3)</th>
<th>Total L2 Cache</th>
<th>P-core Max Turbo Frequency (GHz)</th>
<th>E-core Max Turbo Frequency (GHz)</th>
<th>P-core Max Turbo Frequency (GHz)</th>
<th>E-core Max Turbo Frequency (GHz)</th>
<th>Processor Graphics</th>
<th>Total CPU PCIe Lanes</th>
<th>Max Memory Speed (MT/S)</th>
<th>Memory Capacity</th>
<th>Processor Base Power (W)</th>
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<th>RCP (USD$)</th>
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<td>24 (8+16)</td>
<td>32</td>
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<td>32MB</td>
<td>Up to 5.6</td>
<td>Up to 4.2</td>
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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.

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Performance Claim Appendix
<table>
<thead>
<tr>
<th>Claim#/Statement</th>
<th>Details</th>
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</thead>
</table>
| **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. |
<p>| <strong>2. Up to 11% better single threaded performance</strong> | 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 |
| <strong>3. Up to 34% better multithreaded performance</strong> | 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 |</p>
<table>
<thead>
<tr>
<th>Claim#/Statement</th>
<th>2. 13th Gen Intel Core i9-13900</th>
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<tr>
<td>Full Configurations:</td>
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<tr>
<td>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</td>
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<tr>
<td>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 ITB; Display Resolution: 1920x1080; OS: Microsoft Windows 11 Version 22621_755 Service pack: 22H2; Motherboard BIOS version: 2103</td>
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<td>Tested as of 09/27/2022</td>
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4. 13th Gen – Delivering Next Level Performance - Everyday Productivity

<table>
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<tr>
<th>Claim#/Statement</th>
<th>Description</th>
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<tr>
<td>4. Up to 11% faster mainstream application performance</td>
<td>As measured by CrossMark overall score on 13th Gen Intel® Core™ i9-13900 processor vs. 12th Gen Intel® Core™ i9-12900</td>
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<tr>
<td>5. Up to 10% faster Web browsing performance</td>
<td>As measured by WebXPRT 4 Edge overall score on 13th Gen Intel® Core™ i9-13900 processor vs. 12th Gen Intel® Core™ i9-12900</td>
</tr>
</tbody>
</table>

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

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**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

<table>
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<tr>
<th>6. Up to 11% faster mainstream application performance</th>
<th>As measured by CrossMark overall score on 13th Gen Intel® Core™ i9-13900 processor vs. 12th Gen Intel® Core™ i9-12900</th>
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<tr>
<td>7. Up to 39% improved multi-tasking performance</td>
<td>Based on performance estimated with measurements on 12th Gen Intel Core i5-13500 against Intel Core i5-12500. The metric used is the geometric mean of C/C++ integer benchmarks in SPECrate®2017_int_base (n copy)/IC 2022/1 LLVM</td>
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**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: 09/27/2022
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<tr>
<th>Claim#/Statement</th>
<th>5. Delivering Next Level Performance – Mainstream Gaming</th>
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<tbody>
<tr>
<td>8. Up to 16% more FPS on <em>Marvel’s Spider-Man Remastered</em></td>
<td>As measured by <em>Marvel’s Spider-Man Remastered</em> on 13th Gen Intel® Core™ i9-13900 vs. 12th Gen Intel® Core™ i9-12900</td>
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<td>9. Up to 15% more FPS on <em>F1 22</em></td>
<td>As measured by <em>F1 22</em> on 13th Gen Intel® Core™ i9-13900 vs. 12th Gen Intel® Core™ i9-12900</td>
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<td>10. Up to 6% more FPS on <em>Guardians of the Galaxy</em></td>
<td>As measured by <em>Guardians of the Galaxy</em> on 13th Gen Intel® Core™ i9-13900 vs. 12th Gen Intel® Core™ i9-12900</td>
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<td>11. Up to 19% more FPS on <em>League of Legends</em></td>
<td>As measured by <em>League of Legends</em> on 13th Gen Intel® Core™ i9-13900 vs. 12th Gen Intel® Core™ i9-12900</td>
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**Delivering Next Level Performance – Mainstream Gaming Configurations**

**Up to 16% more FPS on Marvel’s Spider-Man Remastered**

**Up to 15% 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

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**Games Tested:**

*Marvel’s Spider-Man Remastered* – v1.1014.0.0
*Guardians of the Galaxy* - CL:2983462
*F1 22* - v0.115.928484 (928484)
*League of Legends* – v12.22

Tested as of: 12/09/2022
## Delivering Next Level Performance – Content Creation

### Configurations:
- Up to 3% faster Photo editing Performance
- Up to 10% faster video editing Performance

### Processor Specifications:
**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

**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** – 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-Classici57/](https://www.pugetsystems.com/labs/articles/PugetBench-for-Lightroom-Classici57/)

- **Puget bench for Premiere 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/](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
### 6.13th Gen – Energy Efficiency & Sustainability

<table>
<thead>
<tr>
<th>Claim#/Statement</th>
<th>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</th>
</tr>
</thead>
</table>
| **14. 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 |