13th Gen Intel® Core™ Mobile Processors
Announcing 13th Gen Intel Core Mobile Processors

- **HX**
  - Extreme Performance
  - 55W

- **H-series**
  - Thin Enthusiast
  - 45W

- **P-series**
  - Performance Thin & Light
  - 28W

- **U-series**
  - Modern Thin & Light
  - 15W

Scalable Performance for Leadership Platforms
Introducing
13th Gen Intel Core HX Platform

The Fastest Mobile Processor

First 24-core, up to 5.6 GHz

The Best Gaming Laptop Platform

Intel Killer™ Wi-Fi 6E, Bluetooth® LE Audio, Thunderbolt™ 4

Built for Enthusiasts and Professionals

Gamers, Creators, Scientists and Engineers

1 At 5.6GHz, 13th Gen Intel Core i9-13980HX is the fastest mobile processor as of December 2022.

2 Based on unique features and superior in-game benchmark mode performance of 13th Gen Intel® Core™ i9-13950HX with NVIDIA RTX 3080 Ti GPU vs 12th Gen Intel® Core™ i9-12900HX with same GPU and vs AMD R9-6900HX with same GPU. See www.intel.com/PerformanceIndex for additional workload and configuration details. Results may vary. Other names and brands may be claimed as the property of others.
Advanced Performance Hybrid
- Up to 24-core: 8 P-cores + 16 E-cores
- Enhanced Intel® Thread Director
- Broad overclocking support with all HX SKUs unlocked

Broad Memory Support
- Up to DDR5-5600 and DDR4-3200
- Up to 128GB RAM (4 DIMM, 2 DPC)
- Dynamic Overclocking with XMP3.0 support

Leading IO and Connectivity
- Support for PCIe Gen5 x16 (or 2x8)
- Up to 2x discrete Thunderbolt™ 4 controllers
- Support for Intel® Killer™ Wi-Fi 6E and BT LE Audio
### 13th Gen Intel® Core™ HX Processors

**Powerful Mobile Performance**

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#### Single Thread Performance

**SPEC®2017_int_base (1 copy) (est)**

<table>
<thead>
<tr>
<th>Processor</th>
<th>Spec Value</th>
<th>Performance</th>
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<tbody>
<tr>
<td>Intel Core i9-13950HX</td>
<td></td>
<td>+11%</td>
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<tr>
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<tr>
<td>Apple M1 Max</td>
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</table>

**Baseline**

Source: Intel; Measured & Estimated December 2022; comparison of select top end laptops; For more information on SPEC CPU 2017, see [https://www.spec.org](https://www.spec.org); Windows binaries generated with Intel Compiler 2022.1, OS X binaries generated with Apple Clang 14.0.0, gfortran 12.1.0; For all workload and configuration details, see www.intel.com/PerformanceIndex. Results may vary.

*Other names and brands may be claimed as the property of others*

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#### Multitask Performance

**SPEC®2017_int_base (n copy) (est)**

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<th>Processor</th>
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**Baseline**

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For all workload and configuration details, see www.intel.com/PerformanceIndex. Results may vary.
3D Rendering Performance
Blender v3.3.1 BMW (CPU)

- Intel Core i9-13950HX: +79% performance
- Intel Core i9-12900HX
- Intel Core i9-12900HK (baseline)
- Ryzen R9 6900HX
- Apple M1 Max

3D Rendering Performance
Blender v3.3.1 Laundromat (CPU)

- Intel Core i9-13950HX: +74% performance
- Intel Core i9-12900HX
- Intel Core i9-12900HK (baseline)
- Ryzen R9 6900HX
- Apple M1 Max

For all workload and configuration details, see www.intel.com/PerformanceIndex. Results may vary.
*Other names and brands may be claimed as the property of others.
13th Gen Intel® Core™ HX Processors
Professional-Grade Performance

AUTODESK AutoCAD
Cadalyst – Total Score
- Intel Core i9-13950HX +24% performance
- Intel Core i9-12900HX
- Intel Core i9-12900HK baseline
- Ryzen R9 6900HX

AUTODESK Revit
Model Creation – Total Time
- Intel Core i9-13950HX +17% performance
- Intel Core i9-12900HX
- Intel Core i9-12900HK baseline
- Ryzen R9 6900HX

AUTODESK Inventor
InvMark – Overall Score
- Intel Core i9-13950HX +12% performance
- Intel Core i9-12900HX
- Intel Core i9-12900HK baseline
- Ryzen R9 6900HX

For workload and configuration details, see www.intel.com/PerformanceIndex. Results may vary.

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13th Gen Intel® Core™ HX Processors
Built for Creators

Puget Bench for Premiere Pro

- Intel Core i9-13950HX: +6% performance
- Intel Core i9-12900HX
- Intel Core i9-12900HK: baseline
- Ryzen R9 6900HX

Puget Bench for Photoshop

- Intel Core i9-13950HX: +12% performance
- Intel Core i9-12900HX
- Intel Core i9-12900HK: baseline
- Ryzen R9 6900HX

Puget Bench for After Effects

- Intel Core i9-13950HX: +15% performance
- Intel Core i9-12900HX
- Intel Core i9-12900HK: baseline
- Ryzen R9 6900HX

For all workload and configuration details, see www.intel.com/PerformanceIndex. Results may vary.

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13th Gen Intel® Core™ HX Processors
Amazing Game Performance

Up to 12% Faster

Based on in-game benchmark mode performance of 13th Gen Intel® Core™ i9-13950HX with NVIDIA RTX 3080 Ti GPU vs 12th Gen Intel® Core™ i9-12900HX with same GPU and vs AMD R9-6900HX with same GPU. See www.intel.com/PerformanceIndex for additional workload and configuration details. Results may vary. Other names and brands may be claimed as the property of others.
13th Gen Intel® Core™ HX Processors

Leading Wireless Connectivity for Enthusiasts

**Intel® Killer™ Wi-Fi 6E (Gig+)**
- Great Wi-Fi Gaming
  - 6 GHz Speed / Low Latency
  - Game Traffic Prioritization
  - Dynamic Connection Optimization

**Intel® Double Connect Technology**
- Enhanced Wi-Fi Performance & VR
  - Enhanced Prioritization
  - Band Aggregation ~3 Gbps
  - Up to 20% Lower VR Latency

**Intel® Bluetooth® LE Audio**
- Next-Gen Bluetooth® Audio
  - Synchronized Multi-stream TWS
  - High Fidelity Music / SWB speech
  - Up to 50% Lower Bit-Rate / Power

Learn more at intel.com/performance-wireless. Other names and brands may be claimed as the property of others.
13th Gen Intel® Core™ HX Processors

Breakthrough Design Scale

60+ Incredible HX Designs
Across a wide range of performance laptop form factors

Other names and brands may be claimed as the property of others
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<th>Max Turbo Frequency E-cores</th>
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</table>

Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family not across different processor families. Intel vPro® eligible systems will be available at the launch of Intel vPro™. The frequency of cores and core types varies by workload, power consumption and other factors. Visit intel.com for more information.

All SKUs shown support CPU, GPU, and memory overclocking. Max Turbo Frequency for P-cores may include Intel Turbo Boost Max 3.0 and Thermal Velocity Boost. See all intel.com for more specification details.
13th Gen Intel® Core™ HX Processors

Powerful Multitasking for Creative Professionals

- **Game Development**
  - Unreal Engine + MetaHuman + RealityCapture
  - Intel Core i9-13950HX (10% better)
  - Intel Core i9-12900HX (Baseline)

- **8K Streaming**
  - Adobe Premiere Pro + OBS
  - Intel Core i9-13950HX (<1%)
  - Intel Core i9-12900HX (~10% better)

- **AEC Engineering**
  - Autodesk Inventor + ReCap
  - Intel Core i9-13950HX (29% better)
  - Intel Core i9-12900HX (Baseline)

For all workload and configuration including Blender & CrossMark details, see www.intel.com/PerformanceIndex. Results may vary.

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13th Gen Intel® Core™ HX Processors

Game Development Workflow

**Game Development Multitasking**
RealityCapture + Unreal Engine 5 + MetaHuman

**Foreground Task(s)**
Prepare images for custom character based on a real person in RealityCapture for use in MetaHuman Creator. Here the workload involves the CPU heavy “Align Images” operation in RealityCapture.

**Background Task**
Import a real person’s customized MetaHuman file into the Unreal Engine project.

- Intel Core i9-13950HX
  - 10% better
- Intel Core i9-12900HX
  - Baseline

For all workload and configuration details, see www.intel.com/PerformanceIndex. Results may vary.

*Other names and brands may be claimed as the property of others*
13th Gen Intel® Core™ HX Processors

8K Streaming Workflow

Create | Stream | Record
Adobe Premiere Pro + OBS (streaming to YouTube)

Foreground Task(s)
Creative Streamer showcasing 8K video playback and editing experience. Premiere Pro takes advantage of hardware accelerated HEVC 422 decoding for smooth playback, along with WinML to quickly Auto Reframe content to different aspect ratios for posting to different social media channels such as Instagram, YouTube, or TikTok.

Background Task
OBS allows the user to stream AND record content simultaneously. The Streamer utilizes the CPU x264 "Slower" preset, providing a high-quality stream and recording in the background.

<1% 
Intel Core i9-13950HX

~10% 
Intel Core i9-12900HX

Percentage of Skipped Frames (lower is better)

For all workload and configuration details, see www.intel.com/PerformanceIndex. Results may vary.

*Other names and brands may be claimed as the property of others
Product Design Modern Multitasking
Autodesk Inventor + Autodesk Recap

For all workload and configuration details, see www.intel.com/PerformanceIndex. Results may vary.
*Other names and brands may be claimed as the property of others
Announcing 13th Gen Intel Core Mobile Processors

### HX
- Extreme Performance
- 55W

### H-series
- Thin Enthusiast
- 45W

### P-series
- Performance Thin & Light
- 28W

### U-series
- Modern Thin & Light
- 15W

Scalable Performance for Leadership Platforms
Introducing
13th Gen Intel Core Mobile Processors
H-series, P-series, and U-series

Advanced Hybrid Performance
Up to 10% faster office productivity1

Best-in-Class Connectivity
Intel Wi-Fi 6E, Bluetooth® LE Audio, Thunderbolt™ 4

Powering the Newest, Fastest Laptops
Coming to over 250 designs in 2023

1As measured by Cross Mark overall score on 13th Gen Intel® Core™ i9-13900H vs. 12th Gen Intel® Core™ i9-12900H based on measurements as of December 2022. See www.intel.com/PerformanceIndex for additional workload and configuration details. Results may vary. See www.intel.com/PerformanceIndex (connectivity) for details.
Advanced Performance Hybrid
- Up to 14-cores: 6 P-cores + 8 E-cores
- Enhanced Intel Thread Director

Leading IO and Connectivity
- Up to 4xThunderbolt™ 4† with DP2.1 and USB3.2
- Integrated Intel® Wi-Fi 6E (Gig+), BT LE Audio

Broad Memory Support
- Support for DDR5-5200† and DDR4-3200†
- Support for LPDDR5/x-6400 and LPDDR4x-4267†
13th Gen Intel® Core™ H Processors

CrossMark Performance

Productivity

Intel Core i9-13900HK
Intel Core i9-12900H
Ryzen R9 6900HX
Apple M1 Max
+10% performance

Creativity

Intel Core i9-13900HK
Intel Core i9-12900H
Apple M1 Max
Ryzen R9 6900HX
+10% performance

Responsiveness

Intel Core i9-13900HK
Intel Core i9-12900H
Ryzen R9 6900HX
Apple M1 Max
+11% performance

For all workload and configuration details, see www.intel.com/PerformanceIndex. Results may vary.
*Other names and brands may be claimed as the property of others.
13th Gen Intel® Core™ Processors

New Intel Iris Xe Graphics Features

**Endurance Gaming**

Play up to 4.5hrs unplugged on games like LOL & Rocket League with Endurance Gaming

**XeSS Super Sampling**

XeSS brings up to 30% FPS vs. native rendering on enabled titles like Hitman 3 & Shadows of the Tomb Raider

**Intel® Arc™ Control**

Tune your graphics performance, stream with a built-in studio, & more with Intel Arc Control

For all workload and configuration details, see www.intel.com/PerformanceIndex. Results may vary.

*Other names and brands may be claimed as the property of others
13th Gen Intel® Core™ Processors

Best in Class Wired Connectivity with Thunderbolt™ 4
One cable powers your laptop and connects to displays, storage, and accessories

Thunderbolt – The Best USB-C Connection
Simple, Reliable, High Performance

- Dual 4K 60Hz or dual 240 Full HD
  - Now supporting DP2.1
  - Immerse in lifelike visuals

- Fast data transfer thru PCIe based SSDs
  - Now supporting USB3.2 at 20Gb/s
  - Move and store big files quickly

- Capture up to 240Hz in Full HD
  - Share/stream high quality reels

- High-end desktop GPU thru PCIe
  - Level up the experience

- Consolidate all accessories with a dock
  - Clean desk with one cable

Details at intel.com/performance-wired. Results may vary.
**13th Gen Intel® Core™ Processors**

**Intel® Movidius™ VPU for Laptops**
Discrete Module for AI Acceleration

- **Premium Video Collaboration**
  - High Quality Background Blur + Eye Contact + Automatic Framing
  - Professional grade collaboration & streaming
  - Powered by advanced Windows AI models

- **Uncompromised AI**
  - CPU/GPU offload
  - Discrete VPU module
  - Future IP Integration

- **Seamless Integration**
  - Consistent Windows video effects
  - Turn on/off in Windows Settings
  - Available to all apps that use the integrated camera

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Shipping as discrete option with select 13th Gen Intel Core-based laptops for developers and early adopters
## 13th Gen Intel® Core™ H-series Processors

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<td>4P</td>
<td>8E</td>
<td>18MB</td>
<td>4.7 GHz</td>
<td>3.5 GHz</td>
<td>2.6 GHz</td>
<td>19 GHz</td>
<td>80EU</td>
<td>145 GHz</td>
<td>6400</td>
<td>45W</td>
<td>95W</td>
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<td>i5-13420H</td>
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<td>12T</td>
<td>4P</td>
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<td>3.4 GHz</td>
<td>2.1 GHz</td>
<td>15 GHz</td>
<td>48EU</td>
<td>14 GHz</td>
<td>5200</td>
<td>45W</td>
<td>95W</td>
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</tr>
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</table>

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/intel-turbo-boost-technology.html for more information. Intel® Turbo Boost Technology 2.0 supports CPU Over Clocking. Memory Ratio Override is not supported. Intel® Thermal Velocity Boost (TVB) not supported on 15th Gen mobile processors. Max Turbo Frequency for P-cores may include Intel® Turbo Boost Max 3.0. All H-series type 3 support up to DDR5 (5200 MT/S)/DDR4 (3200 MT/S)/LPDDR4X (4267 MT/S) memory (LPDDR5 frequencies are listed above). All H-series type 4 SKUs only support LPDDR5/X (6400MT/S). See www.intel.com for more specification details.
## 13th Gen Intel Core™ P-series Processors

For Performance Thin & Light Laptops

<table>
<thead>
<tr>
<th>Processor Number</th>
<th>Processor Cores</th>
<th>Processor Threads</th>
<th>Performance Cores</th>
<th>Efficient Cores</th>
<th>L3 Cache</th>
<th>Max Turbo Frequency Pcores</th>
<th>Max Turbo Frequency Ecores</th>
<th>Base Frequency Pcores</th>
<th>Base Frequency Ecores</th>
<th>Processor Graphics</th>
<th>Max Graphics Frequency</th>
<th>Processor Base Power</th>
<th>Max Turbo Power</th>
<th>Intel vPro® eligible</th>
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<tr>
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<td>2.2 GHz</td>
<td>1.6 GHz</td>
<td>96EU</td>
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<td>3.5 GHz</td>
<td>1.9 GHz</td>
<td>1.4 GHz</td>
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<td>Enterprise</td>
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<td>4.6 GHz</td>
<td>3.4 GHz</td>
<td>1.9 GHz</td>
<td>1.4 GHz</td>
<td>80EU</td>
<td>1.45 GHz</td>
<td>28W</td>
<td>64W</td>
<td>Essentials</td>
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</tbody>
</table>

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The frequency of cores and core types varies by workload, power consumption and other factors.

Visit [Intel® ARC](https://ark.intel.com) for more information.

Intel Thermal Velocity Boost not supported on 13th Gen mobile processors.

Max Turbo Frequency for Pocores may include Intel Turbo Boost Max 3.0.

All SKUs support up to DDR5 (5200 MT/s)/DDR4 (3200 MT/s)/LPDDR5 (6400 MT/s)/LPDDR4 (4267 MT/s) memory.

See [ark.intel.com](https://ark.intel.com) for more specification details.
## 13th Gen Intel Core™ U-series Processors

<table>
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<th>Processor Number</th>
<th>Processor Cores</th>
<th>Processor Threads</th>
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<th>Efficient Cores</th>
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<th>Max Turbo Frequency (P cores)</th>
<th>Max Turbo Frequency (E cores)</th>
<th>Base Frequency (P cores)</th>
<th>Base Frequency (E cores)</th>
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<th>Max Graphics Frequency</th>
<th>LPDDR5 Frequency</th>
<th>Processor Base Power</th>
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<th>Intel vPro® eligible</th>
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<td>8E</td>
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<td>1.7 GHz</td>
<td>1.2 GHz</td>
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<td>1.2 GHz</td>
<td>80EU</td>
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<td>5200</td>
<td>15W</td>
<td>55W</td>
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</tr>
</tbody>
</table>

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- Instant Wake
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Project Athena Specification Target Highlights

**13th Gen Intel® Core™ Processors** with Intel® Iris® Xe Graphics Based Laptops
Co-engineered Designs Verified to Deliver

---

**Instant Action**
- Wake in an instant with Adaptive Connected Standby / Lucid Sleep
- Biometric login; fingerprint sensor, face recognition or Bluetooth phone proximity

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  - Windows 11 support
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  - Synchronized Multi-stream TWS
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  - Up to 50% Lower Bit-Rate / Power

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- **Switch** automatically to the best technology quickly & with minimal application impact

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  - AI-based dynamic background noise suppression
  - Block out unwanted noise

- **Verified**

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Reliability
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