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Intel Brings the Most Integrated Platform-Wide Leadership to PCs with New 10th Gen Intel Core Processors and Project Athena at COMPUTEX 2019

Partners with the Industry to Deliver Breakthrough Performance, Artificial Intelligence, Battery Life and Responsiveness for Mobile, Gaming and Commercial Segments

NEWS HIGHLIGHTS

- 10th Gen Intel® Core™ processors (code-named “Ice Lake”) based on 10nm are now shipping.
- 10th Gen Intel Core processors with Iris® Plus graphics bring broad-scale artificial intelligence (AI) to the PC for the first time. With approximately 2.5x accelerated AI performance[1], approximately 2x graphics performance[2] and nearly 3x faster wireless speeds[3], these processors bring a new level of integration to power PC experiences for today and the future.
- First specification for the Project Athena innovation program revealed; compliant 10th Gen Intel Core processor-based systems are expected by holiday 2019.
- For gamers and enthusiasts, Intel announced the new special edition 9th Gen Intel® Core™ i9-9900KS, delivering 5 GHz all-core turbo, and Intel® Performance Maximizer.
- For professionals, Intel launches 9th Gen Intel Core vPro processors, bringing Intel Core i9 to the best-for-business platform for the first time.

TAIPEI, Taiwan--(BUSINESS WIRE)-- Today at COMPUTEX 2019, Intel made a sweeping set of product and technology announcements, spanning the hottest segments of the PC industry. From new 10th Gen Intel Core processors and new details on Intel’s innovation program (code-named “Project Athena”) that will take mobile computing to an entirely new level, to the first-ever gaming processor with an all-core turbo of 5 GHz, Intel again raised the bar for PC experiences.

This press release features multimedia. View the full release here: https://www.businesswire.com/news/home/20190527005311/en/

Gregory Bryant, Intel senior vice president and general manager of the Client Computing Group, displays a 10th Gen Intel Core processor on stage during a rehearsal for Intel's keynote at Computex 2019 on Tuesday, May 28, 2019, in Taipei, Taiwan. (Credit: Intel Corporation)

“No one wants to compromise; people want it all: battery life, performance, responsiveness,

connectivity and slick form factors. Our job is to come together as an industry and deliver incredible and differentiated PCs, purpose built to what real people want. 10th Gen Intel Core processors – our most integrated CPU – and Project Athena are great examples of how our deep investments at a platform level will help fuel innovation across the industry," said Gregory Bryant, Intel senior vice president and general manager of the Client Computing Group.

More: Intel at 2019 COMPUTEX (Press Kit) | Project Athena: Introducing the Next Era of Laptop Innovation (Video) | Project Athena: Next Era of Laptop Innovation (Video) | Project Athena: People-Led Design (Video) | Decades of Innovation (Video) | Create the World as You See It (Video)

10th Gen Intel Core Processors: Highly Integrated; Broad-Scale AI to the PC

Intel announced the first 10th Gen Intel Core processors, bringing high-performance AI to the PC at scale with Intel® Deep Learning Boost (Intel DL Boost). The processors are built on the company's 10nm process technology, new "Sunny Cove" core architecture and new Gen11 graphics engine. 10th Gen Intel Core processors will range from Intel Core i3 to Intel Core i7, with up to 4 cores and 8 threads, up to 4.1 max turbo frequency and up to 1.1 GHz graphics frequency.

10th Gen Intel Core processors will take thin-and-light laptops and 2 in 1s to the next level, offering:

- **Intelligent performance:** Intel's first processors designed to enable high-performance AI on the laptop, delivering approximately 2.5x AI performance[1] with Intel DL Boost for low latency workloads. The new graphics architecture delivers up to 1 teraflop of vector compute for heavy duty inference workloads to enhance creativity, productivity and entertainment on highly mobile, thin-and-light laptops. For low-power AI usages on the PC, Intel® Gaussian Network Accelerator (GNA) is built into the SoC.
- **A leap in graphics capabilities:** New Intel Iris Plus graphics, based on the Gen11 graphics architecture, nearly doubles performance[2] for stunning visual experiences. Reach pro-level content creation capabilities on the go with approximately 2x HEVC encode[4]; watch 4K HDR in a billion colors[5]; game with up to 2x faster FPS[6] and play thousands of popular titles in 1080p.
- **Best-in-class connectivity**: Delivering both integrated Thunderbolt™ 3 and integrated Intel® Wi-Fi 6 (Gig+) for the first time to enable nearly 3x faster wireless speeds[3] alongside the fastest[7] and most versatile port available. Intel's Gig+ implementation of Wi-Fi 6 connectivity delivers greater than 1 Gbps wireless speeds[8] with enhanced reliability and performance.

Intel's highly integrated 10th Gen Intel Core processors give OEM partners the freedom to innovate on design and aesthetic by reducing the silicon footprint while still delivering the latest and greatest standards and world-class performance. The new 10th Gen Intel Core processors are now shipping, with OEM systems expected to be available for holiday 2019.

Project Athena: Accelerating the Pace of Innovation

Intel also shared more details on its innovation program code-named "Project Athena," including the 1.0 target specification[9] that will usher in the first wave of laptops in the second half of this year. The company also previewed some of the first designs to come from partners spanning consumer and commercial including Acer*, Dell*, HP* and Lenovo*.

Based on years of research to understand people's needs, challenges and expectations of the laptop, the program prioritizes enabling experiences that are reflective of real-world conditions as measured by "key experience indicators" (KEI).

Intel developed the new KEI engineering metrics, used during the program's verification process, to test and drive consistent experiences on the laptop. Metrics are based on day-in-the-life research of laptop users at home or at work under real-world conditions. Intel's goal for the new metrics is to work with the ecosystem to drive innovation that noticeably impacts people's experiences on the laptop and evolve those capabilities year over year. The first wave of KEI targets includes:

- Consistent responsiveness on battery[10]
- 16 or more hours of battery life in local video playback mode[11] and 9 or more hours of battery life under real-world performance conditions[12]
- System wake from sleep in less than 1 second[13]

The specification that will enable these experiences includes platform-level requirements – such as Thunderbolt 3, Intel Wi-Fi 6 (Gig+), OpenVINO AI on PC compatibility and modern connected standby – across six areas: instant action, performance and responsiveness, intelligence, battery life, connectivity and form factor. For highlights of the 1.0 target specification, see the Project Athena fact sheet.

As part of Project Athena, Intel is providing co-engineering support across the ecosystem – with more than 100 companies signed on – and new tools and Open Labs facilities to support verification and testing of laptops.

Project Athena is a multi-year journey, with today's announcement on the 1.0 target specifications and design previews representing just the beginning.

Performance Leadership for Gamers, Enthusiasts, Content Creators and Professionals

Intel made several more disclosures, including the announcement of the special edition 9th Gen Intel Core i9-9900KS processor, which has been fine-tuned to deliver 5 GHz all-core turbo, making the world's best gaming desktop processor[14] even better. It is expected to be available by holiday 2019.

For the first time, the company also showed the new Intel® Performance Maximizer (IPM), an automated overclocking[15] tool that brings overclocking to the masses by making it easy to dynamically and reliably custom-tune unlocked 9th Gen Intel Core desktop processors based upon their individual performance DNA. IPM will be free and is part of the Intel® Adaptix™ Technologies toolkit, a collection of advanced software technology tools that helps OEMs and consumers maximize platform-level performance and experience. The toolkit also

includes Intel® Dynamic Tuning Technology, Intel® Extreme Tuning Utility and Intel® Graphics Command Center.

Finally, the company shared updates on three more product lines:

- Intel launched 14 new 9th Gen Intel Core vPro processors for high-performance mobile (H-series) and desktop (S-series) PCs, the highest performing business processors. Intel® Core™ i9 vPro™ processors – with up to 8 cores and 16 threads reaching up to 5 GHz on desktop and up to 4.8 GHz on mobile – join the best-for-business Intel® vPro™ platform for the first time, delivering superior performance on demanding workloads for an exceptional business user experience, built-in security features, remote manageability and stability.
- Intel launched 14 new Intel® Xeon® E processors for mobile and desktop workstations that are purpose-built with professional-grade performance, real-time data analytics capabilities, built-in platform security features, and remote manageability features as part of the Intel vPro platform. For the first time, Intel Xeon E processors include: up to 8 cores, 16 threads, 5 GHz turbo frequency, Wi-Fi 6 (Gig+), Intel® Optane™ Memory H10 and 128 GB DDR4-2666 ECC memory support.
- Plus, Intel announced that the new Intel® Core™ X-series family of processors for premium creators will come this fall. These processors will bring frequency improvements, increased memory speed and updated Intel® Turbo Boost Max Technology 3.0.

For more information on all of Intel's client computing platforms, visit the Intel.com processors page.

About Intel

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[1]Approx. 2.5x Ice Lake AI Performance: Workload: images per second using AIXPRT Community Preview 2 with Int8 precision on ResNet-50 and SSD-Mobilenet-v1 models. Intel preproduction system, ICL-U, PL1 15w, 4C/8T, Turbo TBD, Intel Gen11 Graphics, GFX driver preproduction, Memory 8GB LPDDR4X-3733, Storage Intel SSD Pro 760P 256GB, OS Microsoft Windows 10, RS5 Build 475, preprod bios. Vs. Config – HP spectre x360 13t 13-ap0038nr, Intel® Core™ i7-8565U, PL1 20w, 4C/8T, Turbo up to 4.6 GHz, Intel UHD Graphics 620, Gfx driver 26.20.100.6709, Memory 16GB DDR4-2400, Storage Intel SSD 760p 512GB, OS – Microsoft Windows 10 RS5 Build 475 Bios F.26. Measured by Intel as of April 2019.

[2]Approx. 2x Ice Lake Graphics Performance: Workload: 3DMark11 v 1.0.132. Intel PreProduction ICL U4+2 15W Configuration (Assumptions):, Processor: Intel® Core™ i7 (ICL-U 4+2) PL1=15W TDP, 4C8T, Memory: 2x8GB LPDDR4-3733 2Rx8, Storage: Intel® 760p m.2 PCIe NVMe SSD with AHCI Microsoft driver, Display Resolution: 3840x2160 eDP Panel 12.5”, OS: Windows* 10 RS5-17763.316, Graphics driver: PROD-H-RELEASES_ICL-PV-2019-04-09-1006832. Vs config – Intel PreProduction WHL U4+2 15W Configuration (Measured), Processor: Intel® Core™ i7-8565U (WHL-U4+2) PL1=15W TDP, 4C8T, Turbo up to 4.6 GHz, Memory: 2x8GB DDR4-2400 2Rx8, Storage: Intel® 760p m.2 PCIe NVMe SSD with AHCI Microsoft driver, Display Resolution: 3840x2160 eDP Panel 12.5”, OS: Windows* 10 RS4-17134.112. ,Graphics driver: 100.6195. Measured by Intel as of April 2019.

[3]Nearly 3x Ice Lake Wireless Speeds: 802.11ax 2x2 160MHz enables 2402Mbps maximum theoretical data rates, ~3X (2.8X) faster than standard 802.11ac 2x2 80MHz (867Mbps) as documented in IEEE 802.11 wireless standard specifications and require the use of similarly configured 802.11ax wireless network routers.

[4]Approx. 2x Ice Lake Video Encode: Based on 4k HEVC to 4k HEVC transcode (8bit). Intel preproduction system, ICL 15w compared to WHL 15w. Measured by Intel as of April 2019.

[5]10th Gen Intel Core processors with Intel Iris Plus graphics include support for 10 bit/RGB channel for HDR content. Requires compatible display.

[6]Up to 2x faster FPS: Total War: Three Kingdoms (prerelease Intel internal build), Battle integrated benchmark, 1920x1080 – Fullscreen, V-Sync: off, Low Quality Preset, Resolution scaling: 100%. Intel preproduction system, ICL-U, PL1 15w, 4C/8T, Turbo TBD, Intel Gen11 Graphics, GFX driver preproduction, Memory 8GB LPDDR4X-3733, Storage Intel SSD Pro 760P 256GB, OS Microsoft Windows 10, RS5 Build 475, preprod bios. Vs. Config – HP spectre x360 13t 13-ap0038nr, Intel® Core™ i7-8565U, PL1 20w, 4C/8T, Turbo up to 4.6 GHz, Intel UHD Graphics 620, Gfx driver 26.20.100.6709, Memory 16GB DDR4-2400, Storage Intel SSD 760p 512GB, OS – Microsoft Windows 10 RS5 Build 475 Bios F.26.

Measured by Intel as of May 2019.

[7]As compared to other PC I/O connection technologies including eSATA, USB, and IEEE 1394 Firewire*. Performance will vary depending on the specific hardware and software used. Must use a Thunderbolt™-enabled device.

[8]To achieve speed of over 1Gbps requires Gig internet service, router/gateway with either Wi-Fi 6 or 11ac with 160 MHz channel support, and PC with Intel Wireless 9260/9560 or Intel Wi-Fi 6 AX200/AX201.

[9]Project Athena targets are preliminary and subject to change. Intel does not guarantee performance of any third-party system

[10]Simulated to replicate typical scenario: shipped HW/SW configuration running multiple background applications and open web pages; on 802.11 wireless Internet connection, DC power, and 250nit screen brightness

[11]Simulated to replicate in-transit local video playback scenario: 150nit screen brightness, in airplane mode

[12]Real-world performance testing conditions include out-of-box OEM default settings along with respective value add software, display brightness set to 250nits and always connected to internet with commonly used applications installed such as Office 365*, Microsoft One Drive* and Google Chrome* and with multiple tabs open and resident in the background. Project Athena targets are preliminary and subject to change. Intel does not guarantee performance of any third-party system

[13]From button press, lid open, or voice, to display on and ready for authentication

[14]As measured by in-game benchmark mode performance where available, or highest median frames per second (FPS) where benchmark mode is unavailable. PC Gaming Processors Compared: 9th Gen Intel® Core™ i9-9900K, Intel® Core™ i9-9980XE Extreme Edition, and Intel® Core™ i9-9900X X-series; 8th Gen Intel® Core™ i7-8700K and i7-8086K; and AMD Ryzen™ 7 2700X, AMD Ryzen™ Threadripper 2990WX, and AMD Ryzen™ Threadripper 2950X. Prices of compared products may differ. Configurations: Graphics: NVIDIA GeForce GTX 1080 TI, Memory: 4x16GB DDR4 (2666 or 2933 per highest speed of the corresponding processor), Storage: 1TB, OS: Windows* 10 RS4 Build 1803, Samsung 970 Pro SSD. Results: Intel® Core™ i9-9900K scored better on the majority of the 19 game titles tested. The Intel® Core™ i9-9900K scored the same as the Intel® Core™ i7-8700K and the Intel® Core™ i7-8086K on “Middle Earth: Shadow of War,” and scored less than the Intel® Core™ i9-9980XE Extreme Edition on “Rise of the Tomb Raider.” More detail on workloads, test methodology, and configurations available at [http://facts.pt/11u9e2].

[15]Warning: Altering PC clock or memory frequency and/or voltage may (i) reduce system stability and use life of the system, memory and processor; (ii) cause the processor and other system components to fail; (iii) cause reductions in system performance; (iv) cause additional heat or other damage; and (v) affect system data integrity. Intel assumes no responsibility that the memory, included if used with altered clock frequencies and/or voltages, will be fit for any particular purpose. Check with memory manufacturer for warranty

and additional details.

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