Product Overview

Intel is proud to announce its 6th generation Intel® Core™ processor family. Manufactured on the latest 14 nm technology, these processors offer dramatically higher CPU and graphics performance as compared to the previous generation, a broad range of power options, and new advanced features to boost edge-to-cloud Internet of Things (IoT) designs. The 6th generation Intel Core processor family also maintains a standardized thermal envelope for 65W and 35W desktop products, remaining consistent with the previous processor generation, and is as an ideal low-power option for manufacturing flexibility.

Stunning Visual Performance

The 6th generation Intel Core processors utilize the new Gen9 graphics engine, which improves graphic performance by up to 49 percent. The improvements are demonstrated through faster 3-D graphics performance and rendering applications at low power. Video playback is also faster and smoother, thanks to the new multiplane overlay capability. The new generation offers up to three independent audio streams and displays, Ultra HD 4K support, and workload consolidation for lower BOM costs and energy output.

Users will also enjoy enhanced high-density streaming applications and optimized 4K video conferencing with accelerated 4K hardware media codecs HEVC (8-bit), VP8, VP9, and VDENC encoding, decoding, and transcoding. Together, the stunning visual performance enhancements add up to more immersive computing experiences.

Power-Efficient Performance

The new 6th gen Intel Core processors make a powerful difference on the efficiency front as well. The improved technology promises up to 35 percent faster CPU and up to 49 percent faster graphics—all at the same or similar thermal design power (TDP) as the prior generation. Develop more flexible designs with up to 40 percent more high-speed I/O than previous generations and tap into new, faster memory performance with new memory support for DDR4 1.2V up to 2133, 64GB max capacity with 8GB density.

The 6th gen Intel® Core™ i7 and Intel® Core™ i5 processors come with Intel® Turbo Boost 2.0 Technology for that extra burst of performance and Intel® Hyper-Threading Technology (only on Intel Core i7 processors) so each processor core can work on two tasks simultaneously. Other important
features include Intel® Advanced Vector Extensions 2 (Intel® AVX2), which provides optimized instructions to drive enhanced performance on floating point–intensive apps, and Intel® Ready Mode Technology for PCIe* storage for improved data reliability and greater levels of performance, responsiveness, and expandability.

**Broad Design Range**

In addition to stunning visuals and efficient performance, the 6th generation Intel Core processor offers a broad product line with multiple operating system (OS) choices that scale from low-power systems requiring greater productivity and graphics, to sleek, high performance computing systems.

Operating system support ranges from small footprint real-time operating systems (RTOSs) to feature-rich OSs to optimize choice, flexibility, and OS investment protection.

The new 6th generation Intel Core processors enable more flexible designs with configurable I/O offering additional high-speed ports compared to the previous generation. More high-speed input/output (HSIO) means improved flexibility, increasing to 26 total HSIO ports, including up to 20 PCIe 3.0 ports, and up to 10 USB 3.0 ports and up to six SATA (6Gbps).

**Advanced Security and Manageability**

New 6th generation Intel Core processors protect IoT systems and data at rest and in flight through hardware- and software-based security hardening. Keep increasingly connected devices more secure and enhance the firmware trusted platform module (TPM) with Intel® Platform Trust Technology (Intel® PTT), Intel® Software Guard Extensions (Intel® SGX) to protect data while in use, Intel® Memory Protection Extensions (Intel® MPX) to protect memory from buffer-overload attacks, and Intel® Boot Guard to securely boot machines.

Intel® vPro™ technology allows you to remotely configure, diagnose, isolate, and repair an infected PC—even if it is turned off. In addition to helping secure the IT environment, hardware-based KVM Remote Control enables you to address issues remotely by seeing what users see.
KEY FEATURES

INTEL® BUILT-IN VISUALS

NEW Gen9 graphics: Supports the latest graphics APIs, DirectX® 12 and OpenGL® 4.5, for improved 3-D rendering performance at low power.

NEW Accelerated 4K hardware media codecs: Enhances high-density streaming applications and optimized 4K videoconferencing with codecs HEVC (8-bit); VP8; VP9; and VDENC encoding, decoding, and transcoding.

Intel® HD Graphics: Plays HD video with exceptional clarity; permits viewing and editing of even the smallest image details.

Intel® Quick Sync Video: Delivers excellent videoconferencing capability, fast video conversion, and fast video editing and authoring.

Ultra HD 4K support: Provides stunning display resolutions, now up to 4096 x 2304 pixels, and supports performance across three independent displays with audio.

Multiplane overlay: Enables faster, smoother, higher-quality video playback and improved 3-D graphics.

PERFORMANCE

Intel® Advanced Vector Extensions 2 (Intel® AVX2): Provides optimized instructions to deliver enhanced performance on floating point-intensive apps, adding 256-bit integer instructions and new instructions for Fused Multiply Add (FMA), which delivers better performance on media and floating-point computations.

Intel® Turbo Boost Technology 2.0: Dynamically increases the processor’s frequency, as needed, by taking advantage of thermal and power headroom when operating below specified limits.

Intel® Hyper-Threading Technology*: Delivers two processing threads per physical core. Highly threaded applications can get more work done in parallel, completing tasks sooner.

NEW Faster memory performance: Offers new DDR4 memory support, including new support for DDR4 1.2V up to 2133, 64GB max capacity with 8GB density.

NEW Additional HSIO: Increases flexibility from 18 to 26 total HSIO ports, from up to eight PCIe* 2.0 to 20 PCIe 3.0 ports, and from up to six USB 3.0 to 10 USB 3.0 ports.

SECURITY

Intel® Identity Protection Technology (Intel® IPT) with multifactor authentication (MFA): Provides enhanced security by verifying the boot portion of the boot sequence; protects your one-time password (OTP) credentials and PKI certificates and adds a layer of encrypted second-factor authentication for online transactions.

Intel® Advanced Encryption Standard New Instructions (Intel® AES-NI): Access a fast, secure AES engine for a variety of encryption apps, including whole-disk encryption, file-storage encryption, conditional access of HD content, Internet security, and VoIP. Consumers benefit from protected Internet and email content, plus fast, responsive disk encryption.

Intel® OS Guard: Protects the OS kernel and prevents use of malicious data or attack code located in areas of memory marked as user-mode pages from taking over or compromising the OS kernel. Intel OS Guard is not application-specific and protects the kernel from any application.

NEW Intel® Platform Trust Technology with BIOS Guard: Safeguards credential storage and key management, while helping reduce BOM cost and board space.

NEW Intel® Software Guard Extensions (Intel® SGX): Allows application developers to protect sensitive data from unauthorized access or modification by rogue software running at higher privilege levels; secures data while in use in a Windows* or Linux* environment.

Intel® Data Protection Technology (Intel® DPT) with Intel® Boot Guard: Prevents unauthorized software and malware takeover of boot blocks critical to a system’s function, thus providing an added level of platform security based on hardware.

NEW Intel® Memory Guard Extensions (Intel® MPX): Identifies errant pointer usage which, if left undetected, puts an application at risk of data corruption or malicious attack via buffer overruns and overflows. By adding extensions to the underlying architecture, Intel MPX achieves improved performance over software-based solutions.

Intel® Secure Key*: Generates high-quality keys for cryptographic (encryption and decryption) protocols, and provides quality entropy that is highly sought after for added security.

BIOS Guard: Augments existing chipset-based BIOS flash protection capabilities targeted to address the increasing malware threat to BIOS flash storage; protects from modification without platform manufacturer authorization, helps defend the platform against low-level denial of service (DOS) attacks, and restores BIOS to a known good state after an attack.

VMCS shadowing: Allows a Virtual Machine Manager (VMM) running in a guest (nested virtualization) to access a shadow VMCS memory area using the normal VMRead/VMWrite instructions. This reduces overhead for a more natural and responsive user experience, allowing users to take control of their personal and professional data and apps while being protected by game-changing security.
KEY FEATURES

**POWER EFFICIENCY**

**Integrated Memory Controller:** Supports DDR4 and offers stunning memory read/write performance through efficient prefetching algorithms, lower latency, and higher-memory bandwidth, when compared to previous generations.

**Intel® Smart Cache:** Dynamically allocates shared cache to each processor core, based on workload, reducing latency and improving performance.

**Intel® Power Optimization and processor c-states:** Increases periods of silicon sleep state across the platform ingredients—including the CPU, chipset, and third-party system components—to reduce power.

**PCI Express® 3.0 Interface:** Offers up to 8 GT/s for fast access to peripheral devices and networking with up to 16 lanes. PCI Express ports can be configured as x1, x2, x4, x8, and x16 depending on motherboard designs.

**Intel® Ready Mode Technology:** Improves OS boot time and wakes up from deep sleep state more quickly than previous generations for better system responsiveness.

**Intel® vPro™ Technology**

**Intel® Active Management Technology (Intel® AMT):** Remotely monitors, maintains, updates, upgrades, and repairs PCs through hardware and firmware technology for remote out-of-band management.

**Intel® Trusted Execution Technology (Intel® TXT):** Protects embedded devices and virtual environments against rootkit and other system-level attacks. Using an industry-standard TPM 1.2 to store keys and other protected data, this portion of Intel® vPro™ technology boots the BIOS, operating system, and software into a “trusted” execution state, verifying the integrity of the virtual machine and protecting the platform from unauthorized access.

**Intel® Virtualization Technology:** Allows one hardware platform to function as multiple "virtual" platforms; offers improved manageability by limiting downtime and maintaining productivity by isolating computing activities into separate partitions.

**Intel® Transactional Synchronization Extensions (Intel® TSX):** Focuses on enterprise-level multithreaded performance scaling, making parallel operations more efficient via improved control of software threads and locks. This offers performance benefits for enterprise-level big data analytics/business intelligence and visualization apps, which involve multiuser collaboration. (Available on the Intel® Core™ i7 and Intel® Core™ i5 processors with Intel® vPro™ technology and unlocked processors.)

**SUSTAINABILITY**

**Green technology:** Manufactured with lead-free and halogen-free component packages.

**Conflict-free:** Products do not contain conflict minerals (tin, tantalum, tungsten, and/or gold) that directly or indirectly finance or benefit armed groups in the Democratic Republic of the Congo (DRC) or adjoining countries.
SOFTWARE OVERVIEW

The following independent operating system and BIOS vendors provide support for these platforms.

<table>
<thead>
<tr>
<th>OS VENDOR</th>
<th>OPERATING SYSTEM (TARGETED FOR SUPPORT)</th>
<th>DISTRIBUTION</th>
<th>SUPPORT</th>
<th>BIOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft</td>
<td>Windows* 10 (64b)</td>
<td>Microsoft</td>
<td>Intel/Microsoft</td>
<td></td>
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<tr>
<td>Microsoft</td>
<td>Windows* 8.1 Au (64b)</td>
<td>Microsoft</td>
<td>Intel/Microsoft</td>
<td></td>
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<tr>
<td>Microsoft</td>
<td>Windows* Embedded Industry 8.1 (64b)</td>
<td>Microsoft</td>
<td>Intel/Microsoft</td>
<td></td>
</tr>
<tr>
<td>Microsoft</td>
<td>Windows* 7 Pro (32/64b)</td>
<td>Microsoft</td>
<td>Intel/Microsoft</td>
<td></td>
</tr>
<tr>
<td>Microsoft</td>
<td>Windows* POSready 7 and WES7* (32/64b)</td>
<td>Microsoft</td>
<td>Intel/Microsoft</td>
<td></td>
</tr>
<tr>
<td>Linux*</td>
<td>Fedora* Distribution (64b)</td>
<td>Open Source</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linux*</td>
<td>Ubuntu*, SUSE*, Red Hat Enterprise (64b)</td>
<td>Canonical Ltd.*, Attachmate Group, Red Hat, and Open Source</td>
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<td></td>
</tr>
<tr>
<td>Linux*</td>
<td>Yocto* Tool-Based Embedded Linux* (64b)</td>
<td>Yocto Project Community</td>
<td></td>
<td></td>
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<tr>
<td>RTOS</td>
<td>Wind River VxWorks 7* (64b)</td>
<td>Wind River Systems</td>
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</tbody>
</table>

Not all features are supported. Contact your local Intel representative for more information.

6TH GENERATION INTEL® CORE™ PROCESSORS FOR INTERNET OF THINGS SOLUTIONS

<table>
<thead>
<tr>
<th>PROCESSOR NUMBER</th>
<th>CORES/THREADS</th>
<th>BASE FREQUENCY</th>
<th>1 CORE TURBO (MAX)</th>
<th>INTEL® SMART CACHE</th>
<th>THERMAL DESIGN POWER</th>
<th>PACKAGE</th>
<th>INTEL® AES-NI</th>
<th>INTEL® AVX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel® Core™ i7-6700 processor</td>
<td>4C/8T</td>
<td>3.4 GHz</td>
<td>4.0 GHz</td>
<td>8M</td>
<td>65W</td>
<td>LGA1151</td>
<td>Y</td>
<td>Intel® AVX2</td>
</tr>
<tr>
<td>Intel® Core™ i7-6700TE processor</td>
<td>4C/8T</td>
<td>2.4 GHz</td>
<td>3.4 GHz</td>
<td>8M</td>
<td>35W</td>
<td>LGA1151</td>
<td>Y</td>
<td>Intel® AVX2</td>
</tr>
<tr>
<td>Intel® Core™ i5-6500 processor</td>
<td>4C/4T</td>
<td>3.2 GHz</td>
<td>3.6 GHz</td>
<td>6M</td>
<td>65W</td>
<td>LGA1151</td>
<td>Y</td>
<td>Intel® AVX2</td>
</tr>
<tr>
<td>Intel® Core™ i5-6500TE processor</td>
<td>4C/4T</td>
<td>2.3 GHz</td>
<td>3.3 GHz</td>
<td>6M</td>
<td>35W</td>
<td>LGA1151</td>
<td>Y</td>
<td>Intel® AVX2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INTEL® VPRO™ TECHNOLOGY</th>
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<tbody>
<tr>
<td>Intel® Core™ i7-6700/i7-6700TE processor</td>
</tr>
<tr>
<td>Intel® Core™ i5-6500/i5-6500TE processor</td>
</tr>
</tbody>
</table>
### Intel® Chipsets for Internet of Things Solutions

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>PRODUCT CODE</th>
<th>PACKAGE</th>
<th>FEATURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel® Q170 Chipset</td>
<td>GL82Q170 PCH</td>
<td>FC-BGA13</td>
<td>Up to six SATA ports (6 Gbps); 14 total USB ports (up to 10 USB 3.0); up to 20 PCI Express* x1 gen 3.0 ports; 1x16, 2x8 or 1x8+2x4 PCI Express graphics support; memory channels/DIMM per channel = 2/2; support Intel® vPro™ technology</td>
</tr>
<tr>
<td>Intel® H110 Chipset</td>
<td>GL82H110 PCH</td>
<td>FC-BGA13</td>
<td>Up to four SATA ports (6 Gbps); 10 total USB ports (up to 4 USB 3.0); up to six PCI Express* x1 gen 2.0 ports; 1 x 16 PCI Express graphics support; memory channels/DIMM per channel = 2/1</td>
</tr>
</tbody>
</table>

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