

September 23, 2020



# Intel Introduces IoT-Enhanced Processors to Increase Performance, AI, Security

SANTA CLARA, Calif.--(BUSINESS WIRE)-- **What's New:** Today at the Intel Industrial Summit 2020, Intel announced new enhanced internet of things (IoT) capabilities. The [11th Gen Intel® Core™ processors, Intel Atom® x6000E series, and Intel® Pentium® and Celeron® N and J series](#) bring new artificial intelligence (AI), security, functional safety and real-time capabilities to edge customers. With a robust hardware and software portfolio, an unparalleled ecosystem and 15,000 customer deployments globally, [Intel is providing robust solutions](#) for the \$65 billion edge silicon market opportunity by 2024.

This press release features multimedia. View the full release here: <https://www.businesswire.com/news/home/20200923005308/en/>

11th Gen Intel Core processors for IoT are enhanced specifically for essential internet of things applications that require high-speed processing, computer vision and low latency deterministic computing. They were introduced in September 2020. (Credit: Intel Corporation)

*"By 2023, up to 70% of all enterprises will process data at the edge.<sup>1</sup> 11th Gen Intel Core processors,*

*Intel Atom x6000E series, and Intel Pentium and Celeron N and J series processors represent our most significant step forward yet in enhancements for IoT, bringing features that address our customers' current needs, while setting the foundation for capabilities with advancements in AI and 5G."*

-- John Healy, Intel vice president of the Internet of Things Group and general manager of Platform Management and Customer Engineering

**Why It's Important:** Intel works closely with customers to build proofs of concept, optimize solutions and collect feedback along the way. Innovations delivered with 11th Gen Intel Core processors, Intel Atom x6000E series, and Intel Pentium and Celeron N and J series processors are a response to challenges felt across the IoT industry: edge complexity, total cost of ownership and a range of environmental conditions.

Combining a common and seamless developer experience with software and tools like the [Edge Software Hub's Edge Insights for Industrial](#) and the Intel® Distribution of OpenVINO™ toolkit, Intel helps customers and developers get to market faster and deliver more powerful outcomes with optimized, containerized packages to enable sensing, vision, automation and other transformative edge applications. For example, when combined with 11th Gen's SuperFin process improvements and other enhancements, OpenVINO running on an 11th Gen Core i5 delivers amazing AI performance: up to 2 times faster inferences per second than a prior 8th Gen Core i5-8500 processor when running on just the CPU in each product.<sup>2</sup>

**About 11th Gen Core Processors:** Building on the recently announced client processors,

11th Gen Core is enhanced specifically for essential IoT applications that require high-speed processing, computer vision and low-latency deterministic computing. It delivers up to a 23% performance gain in single-thread performance, a 19% gain in multithread performance and up to a 2.95x performance gain in graphics gen on gen.<sup>3</sup> New dual-video decode boxes allow the processor to ingest up to 40 simultaneous video streams at 1080p 30 frames per second and output up to four channels of 4K or two channels of 8K video. AI-inferencing algorithms can run on up to 96 graphic execution units (INT8) or run on the CPU with vector neural network instructions (VNNI) built in. With Intel® Time Coordinated Computing (Intel® TCC Technology) and time-sensitive networking (TSN) technologies, 11th Gen processors enable real-time computing demands while delivering deterministic performance across a variety of use cases:

- **Industrial sector:** Mission-critical control systems (PLC, robotics, etc.), industrial PCs and human-machine interfaces.
- **Retail, banking and hospitality:** Intelligent, immersive digital signage, interactive kiosks and automated checkout.
- **Healthcare:** Next-generation medical imaging devices with high-resolution displays and AI-powered diagnostics.
- **Smart city:** Smart network video recorders with onboard AI inferencing and analytics.

Intel's 11th Gen Core processors already have over 90 partners committed to delivering solutions to meet customers' demands.

#### **About Intel Atom x6000E Series and Intel Pentium and Celeron N and J Series**

**Processors:** These represent Intel's first processor platform enhanced for IoT. They deliver enhanced real-time performance and efficiency; up to 2 times better 3D graphics;<sup>4</sup> a dedicated real-time offload engine; Intel® Programmable Services Engine, which supports out-of-band and in-band remote device management; enhanced I/O and storage options; and integrated 2.5GbE time-sensitive networking. They can support 4Kp60 resolution on up to three simultaneous displays, meet strict functional safety requirements with the Intel® Safety Island and include built-in hardware-based security. These processors<sup>5</sup> have a variety of use cases, including:

- **Industrial:** Real-time control systems and devices that meet functional safety requirements for industrial robots and for chemical, oil field and energy grid-control applications.
- **Transportation:** Vehicle controls, fleet monitoring and management systems that synchronize inputs from multiple sensors and direct actions in semiautonomous buses, trains, ships and trucks.
- **Healthcare:** Medical displays, carts, service robots, entry-level ultrasound machines, gateways and kiosks that require AI and computer vision with reduced energy consumption.
- **Retail and hospitality:** Fixed and mobile point-of-sale systems for retail and quick service restaurant with high-resolution graphics.

The Intel Atom x6000E series and Intel Pentium and Celeron N and J series already have over 100 partners committed to delivering solutions.

**About the Intel Industrial Summit:** Intel is bringing the Industrial IoT (IIoT) ecosystem

together to address their specific challenges while expanding what's possible for tomorrow's autonomous operations. With over 40 partners and sessions plus nine demos, customers will learn about secure, interoperable, integrated solutions available to transform their business by reducing the time, costs and risks that come with IIoT deployments.

**More Context:** [Intel Industrial Summit](#) (Press Kit) | [Intel Industrial Hub](#) | [11th Gen Intel Core Processors Platform Brief](#) (Product Brief) | [Intel Atom x6000E Series and Pentium and Celeron N and J Series Platform Brief](#) (Product Brief) | [Intel Internet of Things News](#) | [Intel IOT](#) | [Intel IoT Solutions Alliance](#) | [Intel Solutions Marketplace](#) | [Introducing the Intel 11th Gen Core Processors Enhanced for IoT](#) (Video) | [Introducing the Intel Atom x6000E Series](#) (Video)

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Refer to <https://software.intel.com/articles/optimization-notice> for more information regarding performance and optimization choices in Intel software products.

<sup>1</sup> IDC FutureScape, Worldwide Internet of Things 2020 Predictions

<sup>2</sup> Performance results obtained on September 9, 2020

Tiger Lake system configuration.

CPU: Intel® Core™ i5-1145G7E @ 2.6 GHz,

Motherboard: Intel prototype, TigerLake U DDR4 SODIMM RVP

Memory: 2 x 8 GB @ 3200 MHz DDR4

Hard disk: Intel® 250 GByte SSD

Graphics: Intel® Gaussian and Neural Accelerator 2.0 96 EU

OS: Ubuntu\* 18.4 LTS, (kernel 5.8.0-050800-generic)

OpenVINO™: OV-2021.1.075 (pre-release, engineering build)

Coffee Lake system configuration:

CPU: Intel® Core™ i5-8500T @ 3.00 GHz,

Motherboard: AsusTek\* Computer Inc. Prime Z370A

Memory: 2x16 GB @ 2667 MHz. DDR4

Hard disk: Intel® 500GB SSD

Graphics: Intel Corporation UHD Graphics 630

OS: Ubuntu\* 18.04 LTS, (kernel: 5.3.0-24-generic)

OpenVINO(TM) pre-release build OV-2021.1.075

Compiler: gcc (Ubuntu 7.5.0-3ubuntu1~18.04) 7.5.0

OV-Libraries: CPU: MKLDNNPlugin version ..... 2.1, Build ..... 2021.1.0-1117-062a4e29003,

GPU: cldnnPlugin version ..... 2.1, Build ..... 2021.1.0-1117-062a4e29003,

MULTI: MultiDevicePlugin version ..... 2.1, Build ..... 2021.1.0-1117-062a4e29003,

Dataset (size, shape): IMAGENET. Resnet-50 (224x224), Squeezenet (227x227)

VOC2012: Deeplabv3 (513x513), SSD-300 (300x300), Mobilenet-SSD (300x300)

Precision: FP16-INT8

<sup>3</sup> Source: Intel. Performance claim based on SPEC CPU 2017 metrics estimated by measurements on Intel internal reference platforms completed on August 27, 2020. Graphics claim based on 3DMark11\_V1.0.4 Graphics Score estimated by measurements on Intel internal reference platforms on August 27, 2020. Testing Configuration:

Processor: Intel® Core™ i7 1185G7E PL1=15W TDP, 4C8T Turbo up to 4.4GHz

Graphics: Intel Graphics Gen 12 gfxMemory: 16GB DDR4-3200

Storage: Intel SSDPEKKW512GB (512 GB, PCI-E 3.0 x4)

OS: Windows\* 10 Pro (x64) Build 19041.331 (2004/ May 2020 Update).

Power policy set to AC/Balanced mode for all benchmarks. All benchmarks run in Admin mode & Tamper Protection Disabled / De-fender Disabled.

Bios: Intel Corporation TGLSFWI1.R00.3333.A00.2008122042

OneBKC: tgl\_b2b0\_up3\_pv\_up4\_qs\_ifwi\_2020\_ww32\_4\_01

Processor: Intel® Core™ i7 – 8665UE 15W PL1=15W TDP, 4C8T Turbo up to 4.4GHz

Graphics: Intel Graphics Gen 9 gfxMemory: 16GB DDR4-2400

Storage: Intel SSD 545S (512GB)

OS: Windows\* 10 Enterprise (x64) Build 18362.175 (1903/ May 2019 Update).

Power policy set to AC/Balanced mode for all benchmarks. All benchmarks run in Admin mode & Tamper Protection Dis-abled / Defender Disabled.

Bios: CNLSFWR1.R00.X208.B00.1905301319

<sup>4</sup> Source: Intel. Claims based on a) SPEC CPU 2006 metric estimates based on Pre-Si projections and b) 3DMark11 estimates based on Pre-Si projections, using Intel® Pentium® J4205 as prior gen.

Configurations:

Performance results are based on projections as of September 1, 2020

Processor: Intel® Pentium® J6425 PL1=10W TDP, 4C4T Turbo up to 3.0GHz

Graphics: Intel Graphics Gen 11 gfx

Memory: 16GB LPDDR4-3200

OS: Windows 10 Pro

Compiler version: IC18

Processor: Intel® Pentium® J4205 PL1=10W TDP, 4C4T Turbo up to 2.6GHz

Graphics: Intel® Graphics Gen 9 gfx

Memory: 16GB LPDDR4-2400

OS: Windows 10 Pro

Compiler version: IC18

Performance numbers are Pre-Si projections and are subject to change. Results reported may need to be revised as additional testing is conducted. The results depend on the specific platform configurations and workloads utilized in the testing, and may not be applicable to any particular users components, computer system or workloads. The results are not necessarily representative of other benchmarks.

<sup>5</sup> Not all features are available on all SKUs.

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