



NS2022

ACCELERATING INNOVATION



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CHARLOTTE, NC | APRIL 4-6



Niagara Embedded Intel Powered Control and IoT Hardware



Ged
Tyrrell



Ali
Dioury



Elkhart Lake Platform Overview



What It Is

- Elkhart lake is the 2020 product offering in our Entry swimlane
- IOTG led product with gen-gen CPU and GFX performance over Apollo Lake. Real Time and Functional Safety capabilities.
- Optimized for industrial, retail, office automation, and transportation applications.
- IOTG Timeline: Production Intel® Pentium® and Celeron N and J Series Q1'21, Intel Atom® x6000E Series Q1'21



Outstanding Performance

- Gen-Gen Performance improvements up to 1.7x on CPU and up to 2x on graphics¹
- Up to 4Kp60 display resolution on three simultaneous displays



Improved I/O

- x12 Configurable HSIO lanes, PCIe 3.0, SATA Gen 3, USB 3.1
- Integrated 2.5 Gigabit Ethernet
- Fully Integrated Voltage Regulator (FIVR)



IoT Value Add

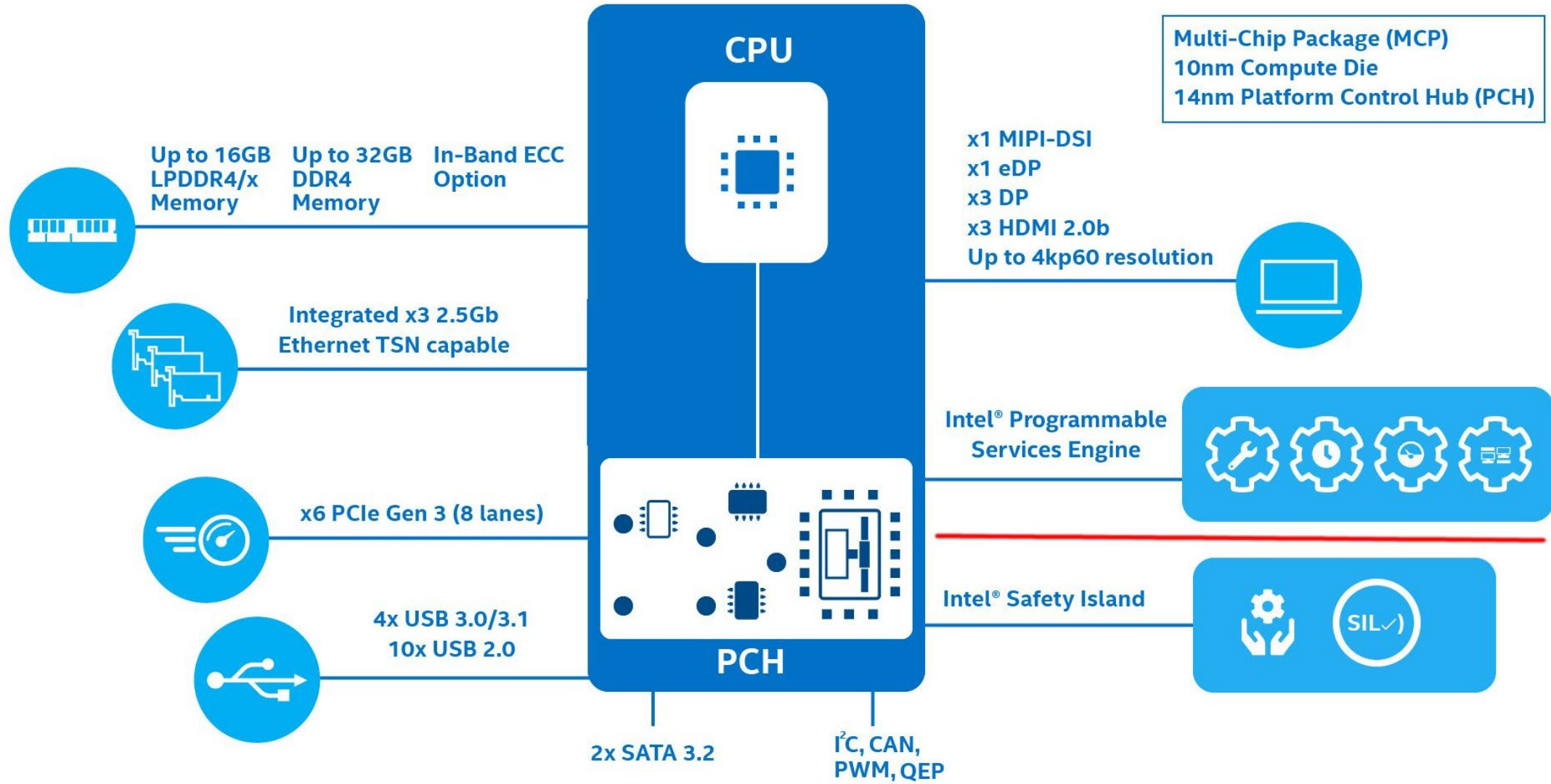
- Intel® Programmable Services Engine
- Intel® Time Coordinated Computing and TSN for Real Time applications
- Functional safety: SIL2/Cat.3 PL d certified, SIL3/Cat.4 PL e capable

IOT Differentiation

- Extended product availability², PC Client, Embedded & Industrial Use Conditions
- Extensive OS and firmware support: Windows* 10 IoT Enterprise, Yocto* Project* , Android* , Ubuntu* & Wind River Linux* LTS & VxWorks* via WRS UEFI, Coreboot, Slim Bootloader
- Tools/SDK: Media SDK, OpenVINO™, Intel® TCC Tools

1. 3DMark®1Spec® CPU2006* SPECint2006 Rate Max users UP (4) & SPECint2006 Rate 1 user tests of Intel® Pentium® J6425 projection vs. Intel Pentium J4205 with Windows* 10 turbo off 1* 3DMark® Score,
2. *Other names and brands may be claimed as the property of others.

Elkhart Lake - Designed for the world of the IoT



Gen to Gen Performance Improvements

SPECint_rate_base2006
(1 copy) Single Thread

Up to **1.9x**

Performance Improvement

VS Intel® Pentium® J4205

SPECint_rate_base2006
(n copy) Multi Thread

Up to **1.9x**

Performance Improvement

VS Intel® Pentium® J4205

3DMark11 Graphics

Up to **2.7x**

Performance Improvement

VS Intel® Pentium® J4205

Source: Intel. SPEC metric estimates based on Pre-Si projections. 3DMark11 estimates are based on Pre-Si projections.

See backup for configuration details. For more complete information about performance and benchmark results, visit www.intel.com/benchmarks.

Intel® Time Coordinated Computing (Intel® TCC) & Time-sensitive Networking (TSN) Software

INTEL® TCC AND TSN SOFTWARE ENABLING SPANS MULTIPLE LAYERS OF SOLUTION STACK	TSN REFERENCE SOFTWARE	INTEL® TCC SOFTWARE SINGLE ENTRY POINT FOR DEVELOPERS	3 RD PARTY ENABLED SW
Application	Samples and Documentation	Code Samples & Tools	
Middleware	OPC UA and OpenAvnu	Intel® TCC Tools	
Operating System	Standard Linux TSN Interfaces	Intel® TCC Configurations, Yocto*	VxWorks*
Drivers	Linux preempt-RT	Optimized for real-time and time synchronization	
BIOS / Firmware	Standard BIOS	Intel® TCC Settings	ACRN*, RTS*
Hardware Platform	Integrated/Discrete Ethernet w/TSN	Intel® TCC Processor Features	
Developer Language	C	C	

Elkhart Lake Key Target Verticals and Applications



INDUSTRIAL/ ENERGY

Industrial PC
Motion Control
Robotics
Vision
Workload Consolidation
HMI
Intelligent Gateways
Energy Substations

KEY TECHNOLOGIES
FIVR, FuSa, GbE (TSN), Intel® TCC, Security



OFFICE AUTOMATION

Division / Enterprise Multi-function Printer Scanner Projector

KEY TECHNOLOGIES
GPGPU, FIVR, GbE, Security



RETAIL

**POS
Mobile POS
Thin Client
Digital Signage**

KEY TECHNOLOGIES
FIVR, GbE, Security



GAMING

**Table Gaming
Lottery
Machines
Player Tracking
Gateways**

KEY TECHNOLOGIES
FIVR, GbE, Security



HEALTHCARE

**Remote Monitoring
Medical displays/carts
Robotics
Low-end Ultrasound machines
Gateways and Kiosks**

KEY TECHNOLOGIES
FIVR, GbE, Security



TRANSPORTATION

**Seaways
Transport Fleet
Roadways
Railways
(Air) Ports and Stations**

KEY TECHNOLOGIES
FIVR, Real-Time, FuSa, Security

Intel® Programmable Services Engine Features

GP Low Power Compute, OOB Manageability

GP Low Power Compute, OOB Manageability, Network Proxy

GP Low Power Compute, OOB Manageability

GP Low Power Compute, OOB Manageability

GP Low Power Compute, OOB Manageability

GP Low Power Compute, OOB Manageability

eBMS/IoT-Controller Capabilities

- Familiar Package Standards
- OEM Control Applications
- Edge Analytics
- Full Throttle Niagara Web UI
- Industrial Applications with ACE
- Future Proof Power



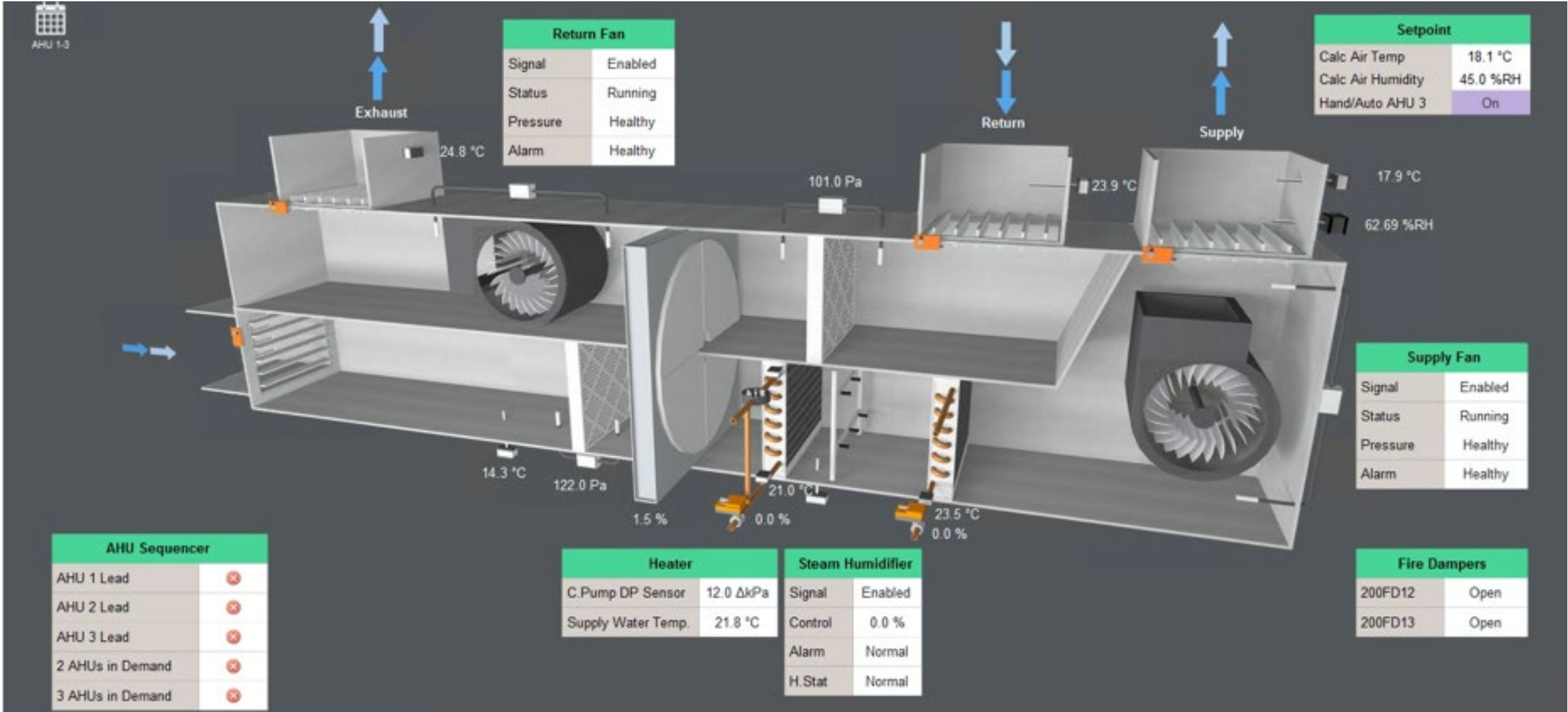
Unrivalled Power

- Dual core 1.3 GHz Fanless
- Quad core 1.5 GHz Fanless
- 16GB DDR RAM
- 32GB eMMC



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eBMS/IoT-Controller Foundation Control Application



Extensive I/O and Ports

- 8 Universal Outputs / 4 230VAC Relays
- 6 x Universal Inputs / 6 Digital Inputs
- 2 x Ethernet Ports / 2 x USB3.0 Ports
- 3 x RS485 Ports / 1 x RS232 Port
- Edge IO Connector



Performance Benchmarking

>> From power up to station running >>

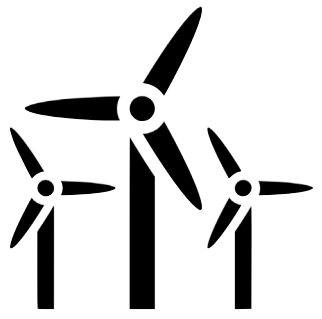
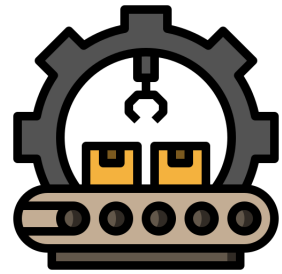
Test N4 Device A → 550s

Test N4 Device B → 335s

Test N4 Device C → 315s

eBMS/IoT-Control → 45s  Powered by 

Collaboration for Growth





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Thank You and get
in touch today

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