

Concurrent Real-Time and AI: Innovation with Intel® Core™ Ultra Series 3 Processors

Intel® Core™ Ultra Series 3 processors, previously codenamed Panther Lake, have enhanced features for concurrent Real-Time and AI workload execution, while operating within the thermal/power envelope necessary for Industrial and Robotics use cases.



Power Efficient Real-time and AI at the Edge with Intel® Time-Coordinated Computing (Intel® TCC)

Intel platforms include a comprehensive set of optimizations from silicon up to the application layer that enables highly deterministic behavior for real-time workloads that share resources such as cache, memory and network with best-effort workloads. Intel's Edge platform optimizations supporting Time Coordinated Computing and IEEE 802.1 Time-Sensitive Networking (TSN) for bounded low latency and jitter, prioritize real-time workloads and enhance predictability and reliability for time-critical systems.

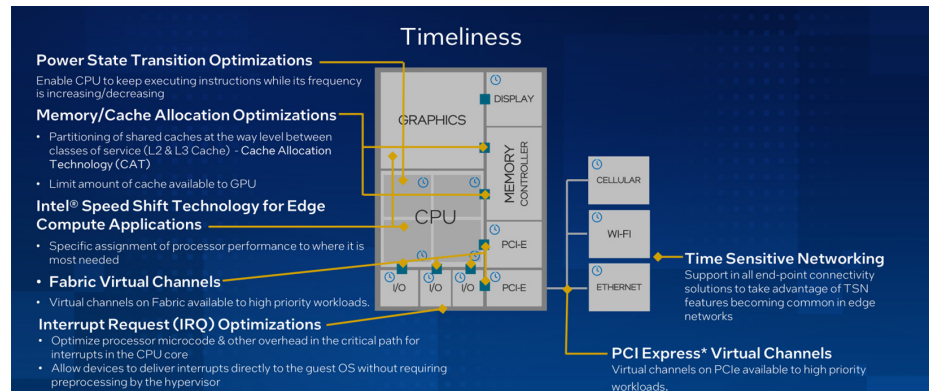


Figure 1. Intel Silicon and Platform Enhancements for Real-Time Technology ([document](#))

Intel® TCC Enables RT and AI at the Edge

Coexistence & Performance (Protection of Real-Time with High Efficiency):

TCC optimizations ensure that real-time workloads are not impacted by non-real-time AI workloads running on CPU, GPU, or NPU. Power-optimized RT capabilities of the SOC increase residual performance available for AI workloads.

AI in the Real-Time Loop Gets Performance Guarantees Enabled by TCC:

Edge AI applications benefit from precise timing, efficient resource allocation, and precision time coordination across edge devices. This includes synchronized operations, real-time data fusion, improved reliability and low deterministic latency.

RealTime and AI workloads in coexistence : RT (RTC Testbench) + AI (Resnet-50)

AI workloads running in parallel to RealTime workloads - have practically no negative impact on RT workload performance and jitter

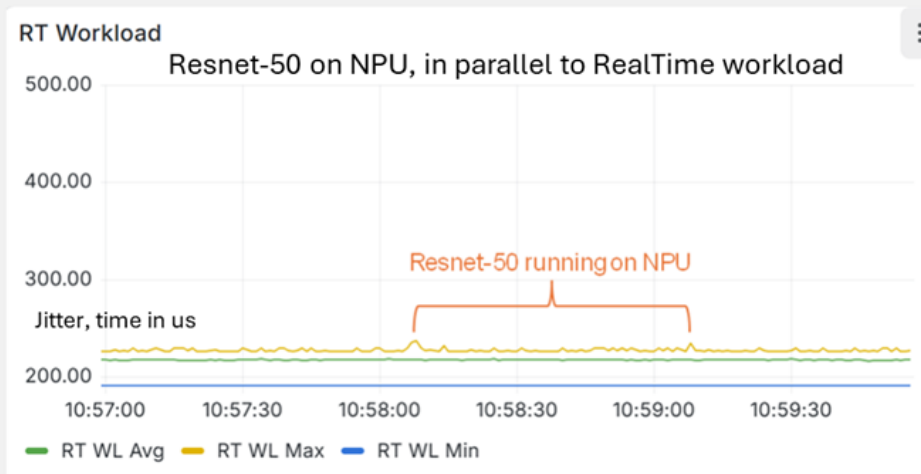
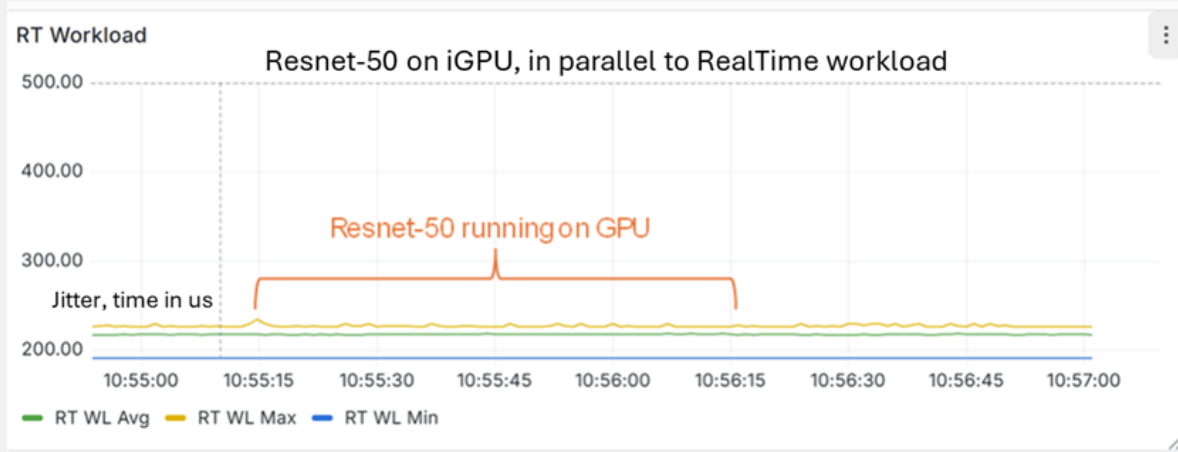


Figure 2. Jitter Time measurements with Real-Time and AI workloads running concurrently

Witness significant improvement with seamless concurrent Real-Time and AI performance in the power envelope and power efficiency with Intel® Core™ Ultra Series 3 processors. Real-Time capabilities in the Intel Core Ultra Series 3 processor enables isolation of Real-Time and AI workloads on the same system leveraging improvements in processor architecture and power efficiency. In Intel Core Ultra Series 3 processors, Real-Time performance is achieved with higher power efficiency leaving more power head room for other components including GPU and NPU, while still meeting strict timing requirements. This enhances the overall power envelope for all workloads.

Select Next-generation edge computing for Real-Time, AI-mixed criticality workloads for long-life availability, Industrial use conditions with Intel Core Ultra Series 3 processors



Robotics

Applications: Industrial/tactical robots, Mobile Robots, vision controllers, humanoid vision-language-action (VLA)

Platform focus: Sense-Think-Act all in a timebound loop



Industrial Automation Compute and Control

Applications: Industrial PCs and gateways, high-end automation and machine controllers

Platform focus: Intel® TCC, Edge-AI, low power, extended availability, extended temperature



Industrial Controllers

Applications: Human-machine interfaces, Programmable Logic Controllers (PLC)

Platform focus: High performance, low power, FuSa, extended-temperature operation



Energy Generation and Distribution

Applications: Substations and smart microgrids

Platform focus: Accelerated edge AI, ruggedized form factors

Learn More

Intel technologies power the next generation of industrial solutions with work across the ecosystem that extends silicon innovation into mission-critical implementations.

- [Intel® Core™ Ultra processors](#)
- [Intel® Solutions for Industry 4.0](#)
- [Industrial & Robotics Innovation with Intel® Core™ Ultra Series 3 Processors](#)



¹ Available on select SKUs.

² Speeds vary based on processor SKU, T3 vs T4 board and memory topology (SO-DIMM, LP down, LP-CAMM). Performance varies by use, configuration and other factors. Learn more at www.Intel.com/PerformanceIndex.

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