February 27, 2023

Intel Accelerates 5G Leadership with New Products

At MWC 2023, Intel showcases support from leading operators, OEMs and ISVs for new silicon and software as it highlights that nearly all vRAN and virtualized network core deployments run on Intel.

NEWS HIGHLIGHTS

- Intel launched the 4th Gen Intel® Xeon® Scalable processors with Intel® vRAN Boost, delivering 2 times the capacity gains gen over gen within the same power envelope[1] and up to an additional 20% power savings[2] with integrated acceleration, meeting critical performance, scaling and energy efficiency requirements.
- Developed in collaboration with SK Telecom, Intel announced the Intel® Infrastructure Power Manager for 5G core reference software, which provides a 30% average run-time[3] CPU power savings.
- Intel announced breakthrough performance by demonstrating the industry's first 1 terabit per second[4] (Tbps) 5G user plane function (UPF) workload performance on 4th Gen Intel Xeon Scalable processors.
- To further help network operators deliver innovative services on their platforms at the edge of their networks, Intel showcased the Intel® Converged Edge Media Platform.
- For network and cloud programmable solutions, Intel continued the expansion of its Intel Agilex® 7 family of FPGAs and eASIC structured devices.

BARCELONA, Spain--(BUSINESS WIRE)-- For more than a decade, Intel and its partners have been on a mission to virtualize the world's networks, from the core to the RAN (radio access network) and out to the edge, moving them from fixed-function hardware onto programmable, software-defined platforms, making networks more agile while driving down their complexity and cost.

This press release features multimedia. View the full release here: https://www.businesswire.com/news/home/20230227005290/en/

At MWC 2023, Intel launched the 4th Gen Intel Xeon Scalable processors with Intel vRAN Boost, a new general-purpose chip that fully integrates Layer 1 acceleration into the Xeon SoC and eliminates the need for external accelerator cards. Intel vRAN Boost allows operators to consolidate all base station layers on a common virtualized platform. (Credit: Intel Corporation)

Now operators are looking to cross the next chasm in delivering cloud-native functionality for automating, managing and responding to an increasingly diverse mix of data and services, providing organizations with the intelligence needed at the edge of their operations.

More: Intel at 2023 MWC (Press kit) | The Future of RAN is Virtualized and Open (Sachin

Katti editorial)

Today, Intel announced a range of products and solutions driving this transition and broad industry support from leading operators, original equipment manufacturers (OEMs) and independent software vendors (ISVs).

“Intel powers the world’s clouds, networks and enterprises, giving us unique insight on where to place compute and acceleration along the entire cloud-to-edge continuum and helping our customers scale to meet user demands,” said Sachin Katti, Intel senior vice president and general manager of the Network and Edge Group. “The advancements we’ve made in our 4th Gen Intel Xeon platforms to double vRAN performance[1] while staying within the same power envelope, to nearly doubling the 5G core UPF throughput[5], and to speed the deployment of a wide range of network, security and enterprise edge services, makes Intel the platform for our customers to modernize and monetize their networks of the future, today.”

vRAN is Here and Nearly All Deployments Run on Intel

The need for high-performance, scalable, flexible and energy-efficient systems is driving the transformation of mobile networks from fixed function, hardware-based silicon and infrastructure to software-based, fully virtualized platforms running on general-purpose processors. Accelerating the virtualization of the RAN positions communications service providers (CoSPs) to meet future requirements while improving RAN energy efficiency and reducing their total cost of ownership (TCO).

With expansive industry support from Advantech, Capgemini, Canonical, Dell Technologies, Ericsson, Hewlett Packard Enterprise, Mavenir, Quanta Cloud Technology, Rakuten Mobile, Red Hat, SuperMicro, Telefonica, Verizon, VMware, Vodafone and Wind River, among others, Intel launched 4th Gen Intel Xeon Scalable processors with Intel vRAN Boost

By fully integrating vRAN acceleration into the Intel Xeon system-on-chip (SoC) and eliminating the need for an external accelerator card, Intel is delivering 2x the capacity gains gen over gen within the same power envelope[1] and up to an additional 20% power savings[2] with integrated acceleration, which is above and beyond the 4th Gen Intel Xeon platform’s already outstanding performance-per-watt gain. With this combination of processing innovations and feature integration, Intel expects 4th Gen Xeon Scalable processors with Intel vRAN Boost will match or better the performance-per-watt of the best Layer 1 SoC accelerator cards in the market today[6], while delivering the benefits of software-defined, virtualized networks.

5G Core Networks Run on Software, Delivering Cloud-Native Agility

At the core of the network, Intel is leading the evolution to cloud-native, service-based architectures with open solutions for addressing challenges like performance, TCO, power efficiency, security and lack of visibility across the network stack. Intel’s hardware and software solutions will enable 5G core networks to work harder and smarter at achieving a balance between critical business and customer requirements for power efficiency, performance and latency.

To further assist network operators in modernizing their networks, reducing their total cost of

ownership (TCO) at the 5G core, Intel demonstrated 4th Gen Intel Xeon Scalable processors now enable the industry's first 1 Tbps of performance for the 5G UPF workload within a single dual-socket server[4], further validated by Samsung.

Additionally, the new Intel Infrastructure Power Manager for 5G Core reference software dynamically matches run-time server power consumption with data traffic without compromising key performance indicators such as throughput, latency and packet drop.

The software, in tests with Casa Systems, NEC and Nokia, significantly reduces time-to-market for ISVs and operators by simplifying access to key capabilities in Intel's 3rd and 4th Gen Xeon Scalable processors, including power telemetry, granular power control states and low-latency frequency change. Operators can use the reference software to reduce network TCO and accelerate progress toward net zero emissions goals, realizing millions of dollars in potential savings and a significant amount of CO_2 emissions offset[7].

Intel is Setting the Pace at the Edge

Massive growth at the network edge, largely in video services, will define much of this decade's competitive landscape for service providers. The operators' network edge facilities position them for a competitive advantage to deliver to this growth, yet it's challenging to predict which specific video services will take off.

Alongside partners Broadpeak, China Mobile, Cloudsky, Thundersoft and ZTE, Intel showcased the Intel Converged Edge Media Platform, which delivers multiple video services from a shared, multitenant architecture and leverages cloud-native scalability to intelligently respond to shifting requirements.

Video services – such as CDNs (content delivery networks), cloud gaming, mixed reality and 3D rendering – can be delivered in a single cloud-native environment supported by both CPU and GPU-accelerated applications. Operators no longer need to invest in dedicated resources for services that may not take off. Instead, they can build on a general-purpose architecture where services reside together and can leverage cloud-native scalability to automatically change or resize services to changing needs.

Delivering Customer Choice in Acceleration

Alongside the integrated network acceleration built into 4th Gen Intel Xeon Scalable processors, Intel is expanding its Agilex 7 FPGAs and eASIC N5X structure ASIC devices for cloud, communications and embedded applications.

As cloud service providers (CSPs) begin transitioning from 200G to 400G networks in 2023, with CoSPs to follow suit in 2024, Intel Agilex 7 FPGA AGI 041 devices will enable next-generation 400G infrastructure acceleration solutions. AGI 041 devices deliver the right balance of capacity, power efficiency and performance for the 400G Infrastructure Processing Unit (IPU) and networking solutions.

Additionally, Intel provides the unique ability to further optimize cost and power across customers' 400G infrastructure solutions through Intel eASIC structured ASICs. For networking workloads, N5X080 devices are capable of reducing core power by up to 60% versus an FPGA, while reducing prototyping time by 50% compared to a traditional ASIC[8].

Visit the **Intel Booth at MWC 2023** and don't miss its technology demo showcases on building 5G networks and delivering 5G services, featuring voices from industry partners including Dell, Ericsson, Microsoft and Verizon, among others.

About Intel

Intel (Nasdaq: INTC) is an industry leader, creating world-changing technology that enables global progress and enriches lives. Inspired by Moore's Law, we continuously work to advance the design and manufacturing of semiconductors to help address our customers' greatest challenges. By embedding intelligence in the cloud, network, edge and every kind of computing device, we unleash the potential of data to transform business and society for the better. To learn more about Intel's innovations, go to newsroom.intel.com and intel.com.

[1] (2x capacity): Estimated as of 12/06/2022 based on 4th Gen Intel® Xeon® Scalable processor as compared to 3rd generation Intel Xeon Scalable at similar core count, socket power, and frequency, using a FlexRAN test scenario. Results may vary. Performance varies by use, configuration and other factors. … (double PPW): Estimated as of 12/06/2022 based on 4th Gen Intel® Xeon® Scalable processor as compared to 3rd generation Intel Xeon Scalable at similar core count, socket power, and frequency, using a FlexRAN test scenario. Results may vary. Performance varies by use, configuration and other factors.

[2] Estimated as of 12/06/2022 based on scenario design power (SDP) analysis on pre-production 4th Generation Intel® Xeon® Scalable processor with Intel® vRAN Boost and pre-production 4th Generation Intel® Xeon® Scalable processor with external 5G accelerator card, at same core count and frequency. Performance and power varies by use, configuration and other factors.

[3] Tested by Intel as of 01/26/23.
1-node, 2x Intel(R) Xeon(R) Gold 6438N CPU, 32 cores, HT On, Turbo Off, Total Memory 512GB (16x32GB DDR5 4800 MT/s [4000 MT/s]), BIOS EGSDCRB1.SYS.0090.D03.2210040200, microcode 0x2b0000c0, 2x Intel E810-2CQDA2 (CVL, Chapman Beach, Total – 4x100G ports), 1x 223.6G INTEL SSDSC2KB240G8, 1x 745.2G INTEL SSDSC2BA800G3, Ubuntu 22.04 LTS, 5.15.0-27-generic, GCC 7.5.0, DPDK 22.11

[4] Tested by Intel as of 01/27/23.
1-node, 2x Intel(R) Xeon(R) Platinum 8470N CPU, 52 cores(104 Total), HT On, Turbo Off, Total Memory 1024GB (16x64GB DDR5 4800 MT/s [4800 MT/s]), BIOS EGSDCRB1.SYS.0093.D22.2211170057, microcode 0x2b000130, 6x Intel E810-2CQDA2 (CVL, Chapman Beach, Total – 6x100G ports), 1x Intel E810-CQDA2 (CVL, Tacoma Rapids, Total – 2x100G ports) 1x 447.1G INTEL SSDSCKKB8 , 1x 931.5G CT1000MX500SSD1, Ubuntu 22.04 LTS, 5.15.0-53-generic, UPF(GCC 9.4.0/Clang9.0.0,DPDK 22.07,VPP 20.09)

[5] Tested by Intel as of 01/26/23.
1-node, 2x Intel(R) Xeon(R) Gold 6438N CPU, 32 cores, HT On, Turbo Off, Total Memory 512GB (16x32GB DDR5 4800 MT/s [4000 MT/s]), BIOS EGSDCRB1.SYS.0090.D03.2210040200, microcode 0x2b0000c0, 2x Intel E810-2CQDA2 (CVL, Chapman Beach, Total – 4x100G ports), 1x 223.6G INTEL SSDSC2KB240G8, 1x 745.2G INTEL SSDSC2BA800G3, Ubuntu 22.04 LTS, 5.15.0-27-generic, GCC 7.5.0, DPDK

22.11

[6] Performance/power projections are based on Intel estimates and simulations as of October 2022.

[7] Estimated by Intel as of 02/21/23. Calculations: OPEX power energy cost savings per year: Total number of CPUs X (CPU TDP in KW x POWER SAVINGS) X PUE X (COST/KWH) X (24x365); CO2 emission offset:((CPU TDP in KW x POWER SAVINGS) X PUE) / (1 Metric Ton to KWH conversion); Source of energy prices – US and EU: $0.155/KWH: https://www.statista.com/statistics/1267500/eu-monthly-wholesale-electricity-price-country/; Source of Euro to $$ conversion rate: 1 Euro = US $1.06; https://www.xe.com/currencyconverter/convert/?Amount=1&From=EUR&To=USD; Source of KWH to Metric Tons of CO2 emission conversion: 1450 KWH = 1 Metric Ton of CO2 emission; https://www.epa.gov/energy/greenhouse-gasequivalencies-calculator#results; PUE Source: 1.5 - https://www.statista.com/statistics/1229367/data-center-average-annual-pueworldwide/

[8] Up to 50% lower power at same performance compared to FPGA – Power estimation completed by Intel July 28, 2020. Power estimated using Quartus 20.3 for Agilex FPGAs and pre-silicon projections for N5X devices. FPGA device is Agilex AGF014 and N5X device is N5X047. Logic and memory clock rates used are 500MHz and toggle rates are 33% for logic and 50% for memory for both devices.

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Source: Intel Corporation