



4th Gen Intel Xeon Scalable Processors with Intel vRAN Boost

Enabling high performance, energy-efficient vRAN with fully integrated acceleration.

Feb. 27, 2023 — Intel Corporation today launched its 4th Gen Intel® Xeon® Scalable processors with Intel® vRAN Boost – a highly integrated solution for powering cloud-ready virtual radio access networks (vRAN). These processors include advanced features that optimize workload performance for packet and signal processing, load balancing, AI and machine learning and implementation of dynamic power management. They also uniquely include fully integrated vRAN acceleration for 5G and 4G, enabling communications service providers to consolidate their 5G, 4G and earlier generation networks and run them simultaneously on an Intel® Xeon® system-on-a-chip (SoC).

With this combination of processing innovation and feature integration, Intel expects its 4th Gen Intel Xeon Scalable processors with Intel vRAN Boost to match or better the performance-per-watt of the best Layer 1 SoC accelerator cards in the market.¹

Up to Double the vRAN Capacity with Outstanding Energy Efficiency

Intel's latest vRAN-optimized processors are designed for service scaling. Integrated [Intel® Advanced Vector Extensions \(AVX\) for vRAN](#) instruction set architecture (ISA) – built to support RAN-specific signal processing – helps 4th Gen Intel® Xeon® Scalable processors deliver up to 2x capacity gains within the same power envelope for vRAN² as compared with 3rd Gen Intel® Xeon® Scalable processors.

This effectively supercharges communications service providers' vRAN deployments with up to twice the performance-per-watt² to meet their critical performance, scaling and energy efficiency requirements.

What's more, Intel vRAN Boost fully integrates vRAN acceleration into the 4th Gen Intel Xeon SoC, eliminating the need for an external accelerator card. This architectural innovation results in an additional compute power savings of approximately 20%³, which is above and beyond the 4th Gen Intel Xeon platform's already outstanding performance-per-watt gain.

Communication service providers (CoSPs) can realize further energy efficiencies by applying the processors' integrated telemetry and dynamic P-state and C-state power management capabilities, which not only allow multiple levels of power states and control on a per-core basis, but also support very low sleep state exit latencies. These features enable CoSPs to modulate power for all applications, including real-time applications like the Layer 1 stack.

¹ Performance/power projections are based on Intel estimates and simulations as of October 2022.

² 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. Learn more at www.Intel.com/PerformanceIndex

³ 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. Learn more at www.Intel.com/PerformanceIndex



Simplified Solution Design for Simplified Cloud-native vRANs

By eliminating the need for an external accelerator card, 4th Gen Intel Xeon Scalable processors with Intel vRAN Boost allow CoSPs to reduce the component requirements of their virtualized RANs. This not only provides significant compute power savings, but also greatly simplifies solution design and helps CoSPs reduce their total cost of ownership (TCO) by simplifying system integration, lowering bill-of-materials costs and board complexity, and by reducing supply chain complexity.

4th Gen Intel Xeon Scalable processors with Intel vRAN Boost are drop-in compatible with any platform that supports 4th Gen Intel Xeon Scalable processors announced in January 2023. This compatibility allows for end-to-end network virtualization, leveraging general-purpose servers based on Intel architecture to deliver a converged-services advantage. Operators can run all their core, edge and access workloads flexibly on a common platform, driving dramatic resource efficiencies and reducing TCO.

Ease and Compatibility for Today, Scalability and Flexibility for Tomorrow

4th Gen Intel Xeon Scalable processors with Intel vRAN Boost are available in commercial, off-the-shelf hardware and provide CoSPs with a single, flexible platform for integrating diverse ecosystem innovations. This platform is highly scalable across vRAN deployments, from small cells to macro cells, and in distributed, centralized and cloud environments. The ability to use a single design across networks significantly reduces hardware design, software development and integration costs. Additionally, select SKUs of these new processors will support operation in ambient temperatures down to -40 C, simplifying solution delivery for networks across varied and uncontrolled environments.

These new processors' hardware flexibility is equaled by software flexibility, as software deployed in previous generations of Intel Xeon processors runs on all variants of 4th Gen Intel Xeon processors. Flexible software and powerful tools enable rapid adoption, migration, and the addition of innovative features and applications. Optimized, scalable FlexRAN™ reference software for vRAN supports a comprehensive set of features for a wide range of 5G deployments, including sub-6GHz, mmWave, small cell and private wireless. Independent software vendors (ISVs) can quickly modify the software for specific operator deployment scenarios.

Likewise, FlexRAN reference software for vRAN, already compliant with the O-RAN Alliance's AAL APIs and currently running on 3rd Gen Intel Xeon Scalable processors, can also be reused for 4th Gen Intel Xeon Scalable processors with Intel vRAN Boost. Intel provides a suite of advanced software development tools, libraries and software kits that simplify the development of optimized software for all RAN workloads – signal processing, packet processing, control plane processing and emerging applications powered by AI/ML algorithms.

What Our Customers and Partners are Saying

Dell Technologies: "As network operators move toward open networks, they need solutions that will simplify deploying compute at the edge and reduce their total cost of ownership. Dell PowerEdge servers with 4th Gen Intel Xeon Scalable processors with Intel vRAN Boost help network operators run open RAN and mobile edge computing workloads at scale, while meeting performance and efficiency goals."

-- Dave Lincoln, vice president of Networking and Emerging Server Solutions



Ericsson: “The 4th Gen Intel Xeon Scalable processor represents a big step forward in the industry’s transition to the cloud-based paradigm. It’s optimized performance and power efficiency, combined with the scalability and flexibility of Ericsson Cloud RAN, help enable our high-capacity solutions for RAN environments. And we’re looking forward to the launch of the 4th Gen Xeon processor with Intel vRAN Boost and see it deployed within our customers’ networks.”
-- David Hammarwall, vice president, Global Head of Product Area Networks

Rakuten Mobile: “The integrated acceleration and increased power efficiency of the Intel 4th Gen Xeon processor with vRAN Boost is a game-changer for open COTS-based radio networks. Intel has been a long-standing partner with Rakuten Mobile, going back to the launch of our network in Japan. Our partnership to drive all costs down and drive performance up is only just starting.”
-- Tareq Amin, chief executive officer

Telefonica: “Network sustainability is a critical priority for Telefonica in all our markets. Like many other Tier-1 comms service providers, we require network platforms that deliver both high performance and power efficiency for 5G core and Open RAN. With 4th Gen Intel Xeon processors, Telefonica can achieve these objectives.”
-- Enrique Blanco, chief technology officer

Verizon: “Intel’s 4th Generation Xeon processor with Intel vRAN Boost provides a major increase in compute performance for massive MIMO radio networks. This helps us build infrastructure that can deliver the best user performance and further increase capacity. Integrated acceleration for vRAN is key to improving energy efficiency, which is a high priority for Verizon.”
-- Adam Koeppel, senior vice president, Technology Planning

Vodafone: “The long-term collaboration between Intel and Vodafone is key to our target of achieving 30% of our European network on Open RAN by 2030. 4th Gen Intel Xeon Scalable processors with Intel vRAN Boost will be a strategic platform to deliver the efficiency and performance needed to deploy Open RAN in dense urban environments at scale.”
-- Francisco “Paco” Martin Pignatelli, head of Open RAN

Additional support from: Advantech, Canonical, Hewlett Packard Enterprise, Mavenir, Quanta Cloud Technology, Red Hat, Supermicro, VMware and Wind River

Product Availability

Intel is offering multiple SKUs of its 4th Gen Intel Xeon Scalable processor with Intel vRAN Boost:

- Power-optimized SKUs up to 20 cores – available in the second quarter of 2023 – are ideal for deployments with challenging space, thermal and power requirements, like rural and small cell deployments.
- Performance-per-watt optimized SKUs up to 32 cores – available in the third quarter of 2023 – are perfectly suited for scaling up vRAN services for dense urban environments and massive MIMO deployments.

Both variants feature fully integrated vRAN acceleration. They are drop-in compatible with previously announced 4th Gen Intel Xeon Scalable processors and are software compatible with existing 3rd Gen Intel Xeon Scalable processors.



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.

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Availability of accelerators varies depending on SKU. Visit the [Intel Product Specifications page](#) for additional product details. Performance varies by use, configuration and other factors. Learn more at <https://www.intel.com/PerformanceIndex>.

Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. See configuration disclosure for configuration details. No product or component can be absolutely secure.

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