4th Gen Intel® Xeon® Scalable processors with Intel® vRAN Boost

# Optimizing vRAN Sustainability:

## An End-to-End Approach



To meet rapidly rising demand for mobile network access and services, communications service providers (CoSPs) are migrating to cloud-native virtualized radio access networks (vRANs) and Open RAN architectures. As they migrate, CoSPs can maximize vRAN sustainability outcomes with 4th Gen Intel® Xeon® Scalable processors with Intel® vRAN Boost to improve energy efficiency, enable network virtualization all the way to Layer 1, reduce the total cost of ownership (TCO), and help organizations reach their own sustainability goals.



mobile subscribers by 2025





\* 325 EB<sup>2</sup> of global mobile data traffic per month by 2028



of CoSPs rate energy efficiency and sustainability as a top priority

#### Demand, Power Consumption CoSPs are building next-gen infrastructure to meet

New Services Drive vRAN Data

unprecedented growth in mobile data use, more diverse connected endpoints, and demand for data-intensive, latency-sensitive services. Software-defined RAN offers service providers the opportunity to improve network performance, simplify operations, and reduce costs while gaining flexibility to support evolving service needs, changing infrastructure demands, and scalability for future growth. However, the potential for increasing power costs has made energy efficiency a top priority for CoSPs amid growing industry-wide pressure to improve network sustainability.

#### Three Foundational Elements to Maximize **Energy Savings**

A power-optimized vRAN architecture is achievable using a holistic approach that leverages three critical elements. While each element delivers a variety of benefits, combining them is a force multiplier that enables highly granular energy management across the entire network.



#### End-to-end network virtualization

Virtualizing the entire network—all the way to Layer 1—enables CoSPs to avoid dedicated hardware and intelligently optimize processing resources and power consumption across core, edge, and access workloads.



#### Applying a cloud-native approach to a fully virtualized

Cloud-native environment

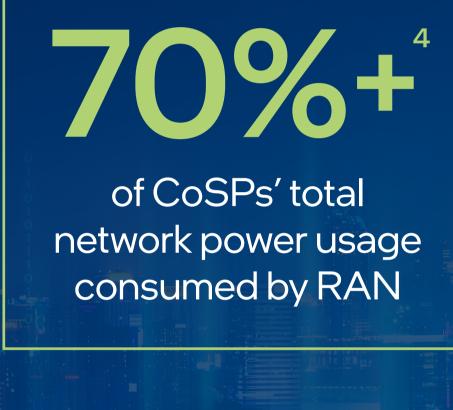
network empowers CoSPs to deploy composable applications, rapidly deliver new services, and maximize power efficiency while leveraging cloud service provider infrastructure.



## Advanced silicon power management

CoSPs to dynamically manage silicon power usage based on fluctuating demand using P-States to modulate processor frequency and voltage and C-States to put cores in various states.

Adopting Intel® Xeon® Scalable processors enables





20-40% of network OpEx allocated to

energy consumption

reduction in power consumption using intelligent hardware features

30-40%

#### **Potential** A cloud-native, fully virtualized architecture enables many power-saving features that are

otherwise limited or impossible using a

hardware baseband accelerator. These features—and the power savings they each deliver—can result in enormous aggregate power savings across the entire network.



#### usage, and to reduce downtime by dynamically modulating microservices hosted in containers

to tightly manage network performance and power

RAN functions as microservices

Artificial intelligence (AI)

and machine learning (ML)

to predict CPU and radio usage, predict traffic

### loads, and to dynamically reconfigure networks to save energy costs

Automation and workload rebalancing to dynamically optimize network throughput and minimize power consumption while meeting

#### service level agreements (SLAs) using automation to monitor telemetry data, resource utilization, and variations in traffic

Baseband pooling in the distributed unit to consolidate baseband traffic on fewer

processing cores in periods of low activity, thereby

### Optimal processor usage

reducing RAN compute power use

to put unused cores to sleep or apply them to other non-traffic processing workloads



#### Network Innovation, vRAN Sustainability 4th Gen Intel® Xeon® Scalable processors with Intel® vRAN Boost can empower CoSPs to take full advantage of cloud-native vRAN. Backed

and are designed to enhance the energy efficiency of service providers'

~20%

power savings from integrated

cloud-ready vRAN and Open RAN deployments.

Processing Power for

by Intel's technology leadership and broad ecosystem of strategic alliances, these processors support virtualization all the way to Layer 1

capacity gains

**Up to** 

By eliminating external vRAN acceleration, Intel® vRAN Boost helps CoSPs maximize network sustainability by reducing vRAN or Open RAN compute power consumption by approx. 20 percent<sup>9</sup> above and beyond the performance-per-watt gains of the 4th Gen Intel® Xeon® platform.

acceleration with Intel® vRAN Boost

With exceptional performance-per-watt, fully integrated vRAN acceleration, P-State and C-State power management, and integrated Al acceleration, 4th Gen Intel® Xeon® Scalable processors with Intel® vRAN Boost address critical performance, scaling, and energy efficiency challenges and help CoSPs evolve the network sustainably.

Learn more at intel.com/vran

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