



Open RAN for a New World Powered by 5G

"The next generation of telcos will be defined by leaders who act now, risking short-term advantages to seize untapped growth with a holistic approach to transformation."

—"A Blueprint for Telecom's
Critical Reinvention," April 2021

McKinsey&Company

WNRDRVR

A powered combination of trends will drive a **new future** for carriers, their customers, and the economy.

#1 Need: **True Compute**

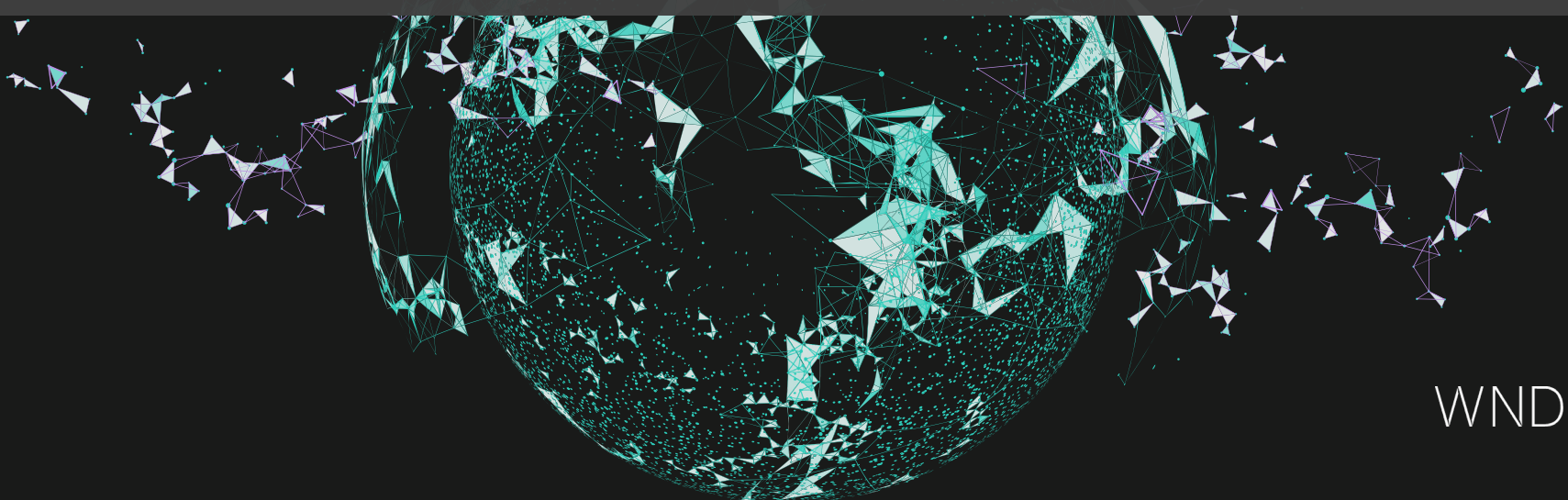
The #1 need right now is to get true compute on the far edge¹ + 50% of enterprise data will be processed at the edge by 2022²

20% of Total Connections Will Be 5G

20% of total connections will be on 5G by 2025³ + More than 8 million new cell towers will be added globally to support 5G⁴

79.4 Zettabytes of Data by 2025

41.6 billion device connections will generate nearly 79.4 zettabytes of data by 2025⁵ + By 2030, 70% of GDP growth (\$7T) will come from the machine economy, with AI, automation, machine learning, and autonomous compute on the far edge⁶



80% of network costs can come from the RAN

Eighty percent of the cost of a mobile network can come from the Radio Access Network (RAN).⁷ An Open RAN infrastructure helps control those costs while enabling innovation and growth potential for carriers and their clients.

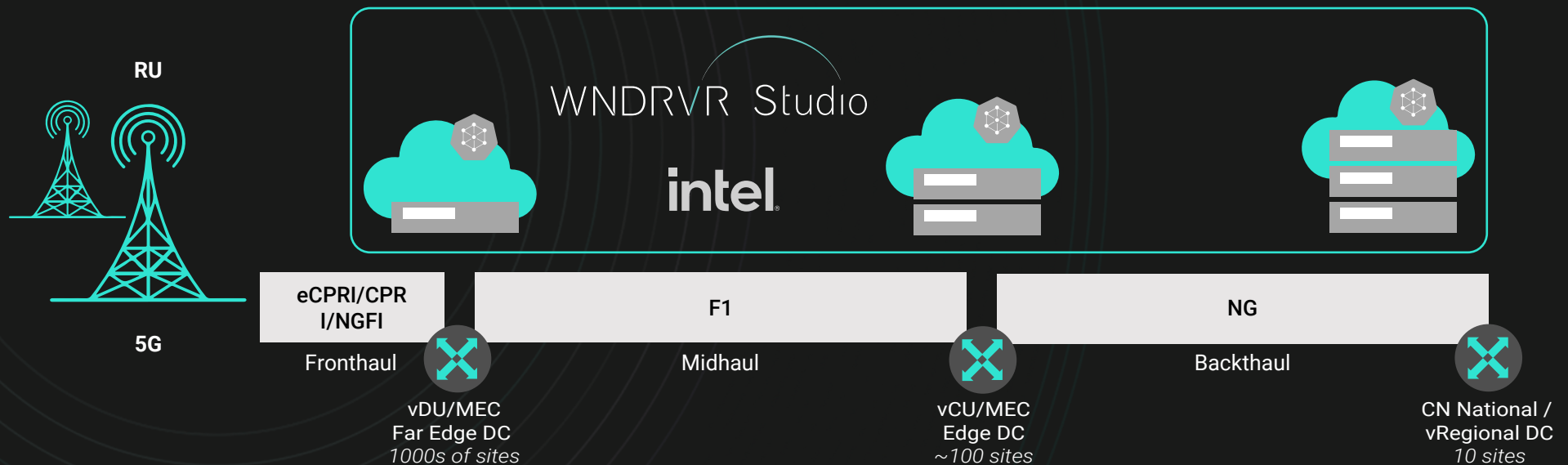


Figure 1. Disaggregated Open RAN with Intel and Wind River Studio

Imagine eliminating **75% of your costs.**

Wind River vRAN is up to 75% more cost-effective.⁸



*"When you look at 5G, we are not looking at delivering a single vector but actually looking at delivering across multiple vectors. High throughput [with] lower latency, better security, and higher reliability — and all of these dimensions are delivering a service on demand within a matter of minutes. To do that, it requires us to rethink the way we build the networks and actually transform on the way."*⁹

—Sri Kalapala, Vice President, Technology Planning and Development for Verizon



*"Open RAN provides huge advantages for customers. Our network will become highly programmable and automated, meaning we can release new features simultaneously across multiple sites, add or direct capacity more quickly, resolve outages instantly, and provide businesses with on-demand connectivity. Open RAN is also reinvigorating our industry. It will boost the digital economy by stimulating greater tech innovation from a wider pool of vendors, bringing much-needed diversity to the supply chain."*¹⁰

—Johan Wibergh, Vodafone Chief Technology Officer



Intel® Xeon® Scalable platform offers industry-leading, real-world advantages:

EXPERIENCE

93% of the world's data runs on Intel,¹¹ with more than 81 million Intel Xeon processors deployed in the past three years.¹²

WORKLOAD FLEXIBILITY AND OPTIMIZATION

Intel technology powers 5G, the intelligent edge, cloud, enterprise, IoT, and AI workloads.

PERFORMANCE

The latest third-generation Intel Xeon Scalable processors deliver, on average, up to 62% more performance on a range of broadly deployed network and 5G workloads, compared to the prior generation.¹³

SECURITY

Platform includes Intel SGX, which helps protect data and application code in real time.

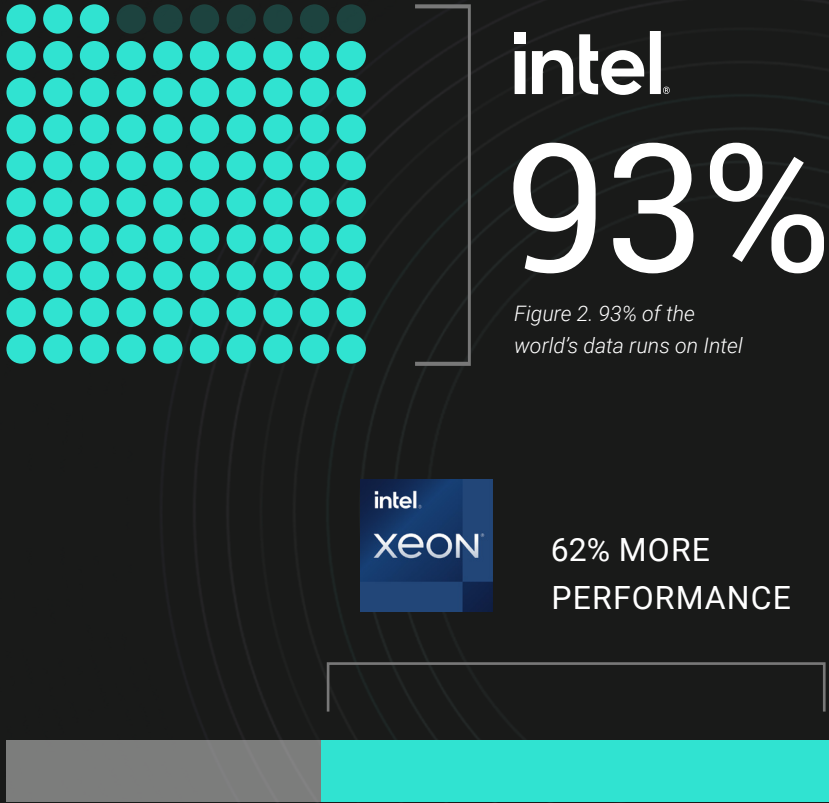


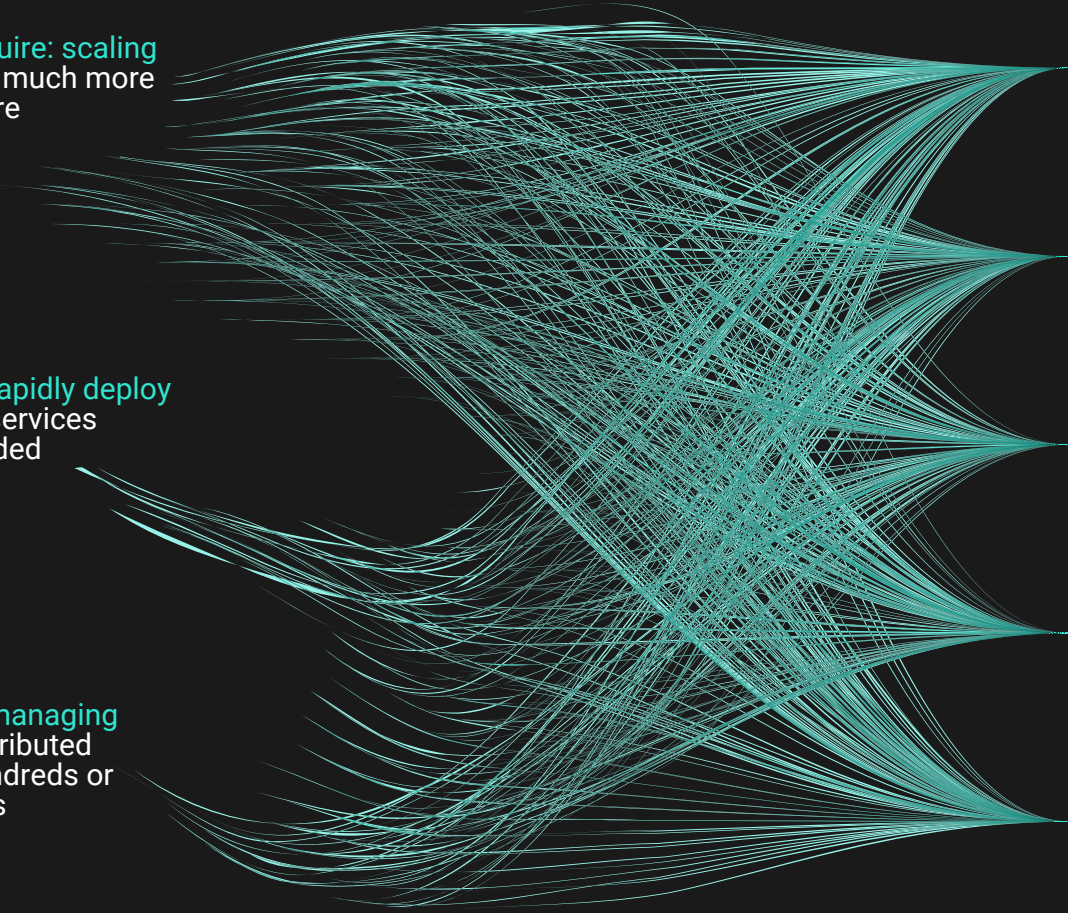
Figure 3. The latest third-generation Intel Xeon Scalable processors deliver, on average, up to 62% more performance

Three challenges carriers face on their way to the **open world** can be met with these five Wind River Studio attributes:

Businesses will require: scaling their networks with much more flexibility than before

CSPs will need to: rapidly deploy infrastructure and services where they are needed

Studio helps with: managing a very complex distributed network across hundreds or thousands of nodes



CLOUD PLATFORM ZERO TOUCH EDGE OPERATIONS

Zero touch deployment, configuration, and enablement, including automatic updates and upgrades, with no operator involvement

AUTOMATED DEPLOYMENT OF SERVICES IN A FEW MINUTES

Full automation from core to edge – deploy applications and orchestrate the resources needed simply, intuitively, and logically

DEEP ANALYTICS TO OPTIMIZE PERFORMANCE

Full-stack monitoring to identify and address issues before they become problems, maintaining service assurance

DIGITAL FLEXIBILITY FOR DIGITAL BUSINESS MODELS

Integrated cloud platform unifying infrastructure, orchestration, and analytics capabilities so operators can deploy and manage their intelligent 5G edge networks globally

MISSION CRITICAL TESTED FOR INFINITE SCALING

Scaling from a handful of nodes to thousands of nodes in a geographically dispersed distributed environment through a single pane of glass

Wind River® and Intel® are partnering to architect advantages for customers who are making the move to Open RAN and the world of growing opportunities as 5G networks expand and evolve – and where cost advantages need to be sustained. Studio combines with Intel Xeon Scalable processors for optimized and unrivaled efficiency and performance.

This partnership offers customers three unique, critical advantages:

SUSTAINED FOCUS ON INNOVATION = ENABLEMENT OF DIGITAL BUSINESS MODELS

A constant investment profile with Intel and Wind River shifts the performance envelope of reducing costs and increasing capabilities to work on the edge over the long run.

- Studio includes a fully open source, Kubernetes-based cloud platform, plus analytics and an automated operations composer to scale to thousands of nodes in a geographically dispersed distributed environment.
- Wind River has been active in open source for over 15 years and has been meaningfully involved in more than 40 different consortia memberships, including O-RAN and StarlingX, along with other projects such as ONAP, TIP, ETSI, and Open-Source MANO.

OPEN INFRASTRUCTURE = ABILITY TO INNOVATE AND DRIVE CAPACITY GROWTH

An open infrastructure solution enables agile innovation as the market evolves, and it provides the OpEx and CapEx control that can be a challenge in closed infrastructure solutions.

- Intel and Wind River worked in close collaboration with Verizon and Vodafone to ensure that our solution meets the demanding requirements of our customers' edge networks.
- Building on the work we've done already with the Intel Select Solutions for vRAN, our partnership spans multiple years and generations of Intel processors with a roadmap designed to help our customers be successful over the long haul.

FORTY YEARS OF INDUSTRY EXPERTISE = HIGHER ATTACHMENT OF 5G TO BUSINESS MODELS

We have decades of expertise in industry-specific requirements that tie 5G network use directly into the way devices and applications will compute, sense, learn, and adapt on the edge.

- VDC Research recently recognized Wind River as #1 in edge compute platforms, overtaking Microsoft® as the overall leader in the edge compute OS market.
- Wind River works with companies such as NASA, Northrup Grumman, Rockwell Automation, Ford, Continental, Collins Aerospace, Olympus, and many others that require high-performance, can't-fail solutions for the most demanding environments and applications.

"We have a long history of collaboration ... and are leveraging all that knowledge, experience, and work coming with optimized, ready-to-use solutions that can help operators build a future-proof network."

–Cristina Rodriguez, GM of the Wireless Access Network Division at Intel

Key benefits to service providers

- A readily available solution with tight integration between Intel devices and Wind River Studio. The maturity of the solution brings confidence to service providers that we not only provide the solution today but are also actively evolving "next-generation Intel Xeon® Scalable processors (Sapphire Rapids).
- The technology is able to meet service provider requirements, especially performance per watt. Wind River Studio is capable of running on a very small footprint. This combined with 3rd Gen Intel Xeon Scalable processors, Intel Ethernet 800 series and Intel vRAN dedicated accelerators, which can get to 2x mMIMO throughput¹⁴ in a similar power envelope to previous generations, allows CoSPs to maximize performance per watt.
- Infrastructure that is agile, nimble, and flexible so service providers can take advantage of latency-sensitive, high-reliability use cases of today as well as those of the future.

Combined optimization

The combined optimization of Studio and Intel Xeon Scalable processors provides an unbeatable market solution for today and tomorrow. By integrating a 5G vRAN solution with third-generation and next-generation Intel Xeon Scalable processors (Sapphire Rapids), Intel and Wind River enable our customers to benefit from work we've already done with Verizon.

Studio provides a cloud-native platform for the development, deployment, operations, and servicing of mission-critical intelligent systems such as 5G networks.

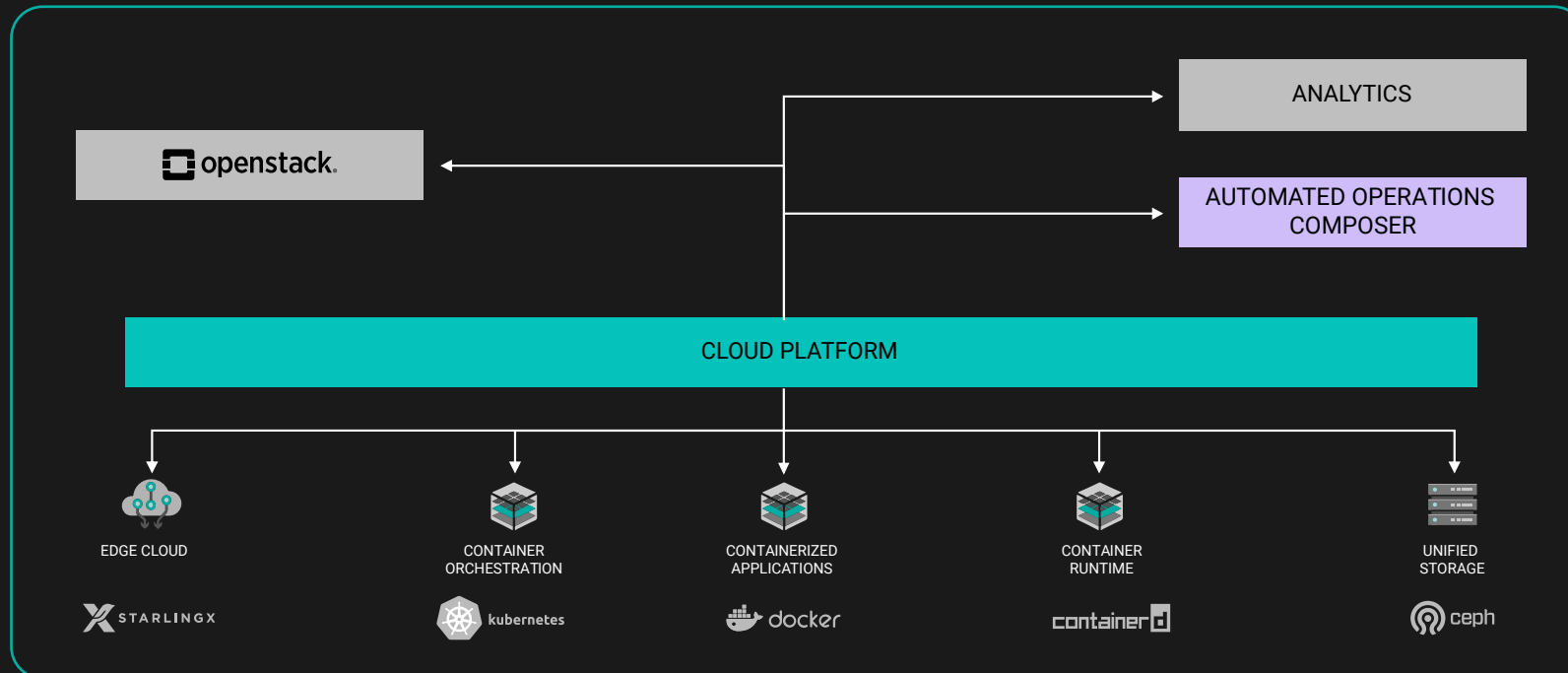
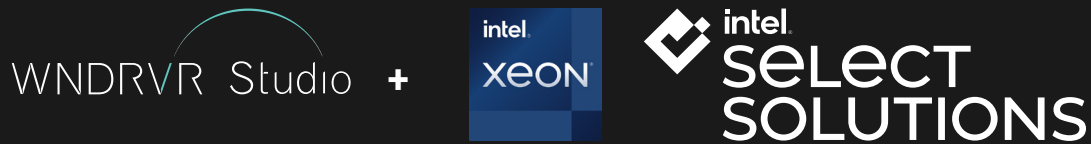


Figure 4. Wind River Studio components for edge network operators

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