

Up to 2x Spectrum Multiplier for “Any G” Networks with Cohere

Cohere’s software-based Universal Spectrum Multiplier*, powered by 3rd Gen Intel® Xeon® Scalable processors, drastically improves performance and enables spectrum sharing of 4G, 5G, and future mobile standards.



The adoption of cloud-based cellular networks is growing as mobile network operators (MNOs) trial the technology to determine the cost, agility, and performance benefits it brings to their services. The coming 6G standard will specify using cloud computing, giving MNOs the opportunity to build their networks from scratch using this technology. Cohere Technologies* offers technology that leverages the cloud to increase the available spectrum, providing another compelling function that is delivered from the cloud.

The company’s Universal Spectrum Multiplier software platform for open virtual radio access networks (Open vRAN) and MNO cloud is waveform agnostic and delivers on the promise of 5G by extending the mobile network’s spectral efficiency by as much as two times¹. The Universal Spectrum Multiplier works in 4G and 5G networks today and will work with 6G when it arrives.



Cohere’s Universal Spectrum Multiplier xApp leverages the FlexRAN™ reference architecture and can be powered by 3rd Gen Intel® Xeon® Scalable processors. With its native support for cloud architecture, 3rd Gen Intel Xeon Scalable processors power cloud-ready Open vRANs.

Mobile Network Architecture Evolution

The promise of 5G mobile networks lies in a focus on user-centric applications thanks to higher density, faster speeds, and lower latencies, which provide better service for everyday applications. These unique 5G features are laying the foundation for the adoption of next-generation technologies such as artificial intelligence (AI) and machine learning (ML), augmented reality (AR), virtual reality (VR), and Internet of Things (IoT). These applications are especially critical for enterprise vertical applications.

To support the accelerating adoption of millions of next-generation mobile devices that can be supported by 5G, including robots, sensors, and autonomous vehicles, generating enormous volumes of traffic and data, MNOs may benefit greatly by transforming their mobile network architecture from a fixed-function, hard-wired appliance architecture to a software-based, open, virtualized, cloud platform. By moving intelligence from static purpose-built appliances to agile, software-led environments, MNOs can benefit from vast investments in cloud infrastructure innovations that optimize network resources, scale with growth, reduce hardware and installation costs, and become nimbler in adopting next-generation user experiences and revenue opportunities.

While 4G is still dominant, and 5G is just beginning to reach coverage goals, the next generation wireless vision of 6G is now being developed. At the center of 6G strategies is native support for cloud-based cellular network intelligence, features, and opportunities (see sidebar). MNOs with cloud-first solutions will be positioned to ride the wave of innovations for new 5G applications while readying for the imminent evolution of 6G. Intel® Network Builders ecosystem member Cohere is working with Intel to deliver a software-based solution that uses spectrum sharing to improve performance of “any G” mobile networks, starting with 4G and 5G networks, and readying MNOs for 6G in the future.

Cohere’s Universal Spectrum Multiplier

Cohere’s Universal Spectrum Multiplier software almost doubles both¹ 4G and 5G spectrum performance and enables a graceful transition from 4G to 5G by facilitating full performance spectrum sharing that will improve return on investment (ROI) and ease 4G-to-5G migration (see Figure 1). Cohere’s Universal Spectrum Multiplier software enables disaggregation of intelligence from today’s appliances and moves it into the cloud. Mobile operators could experience the ability to onboard services and innovations in a much faster manner with software-based cloud infrastructure.

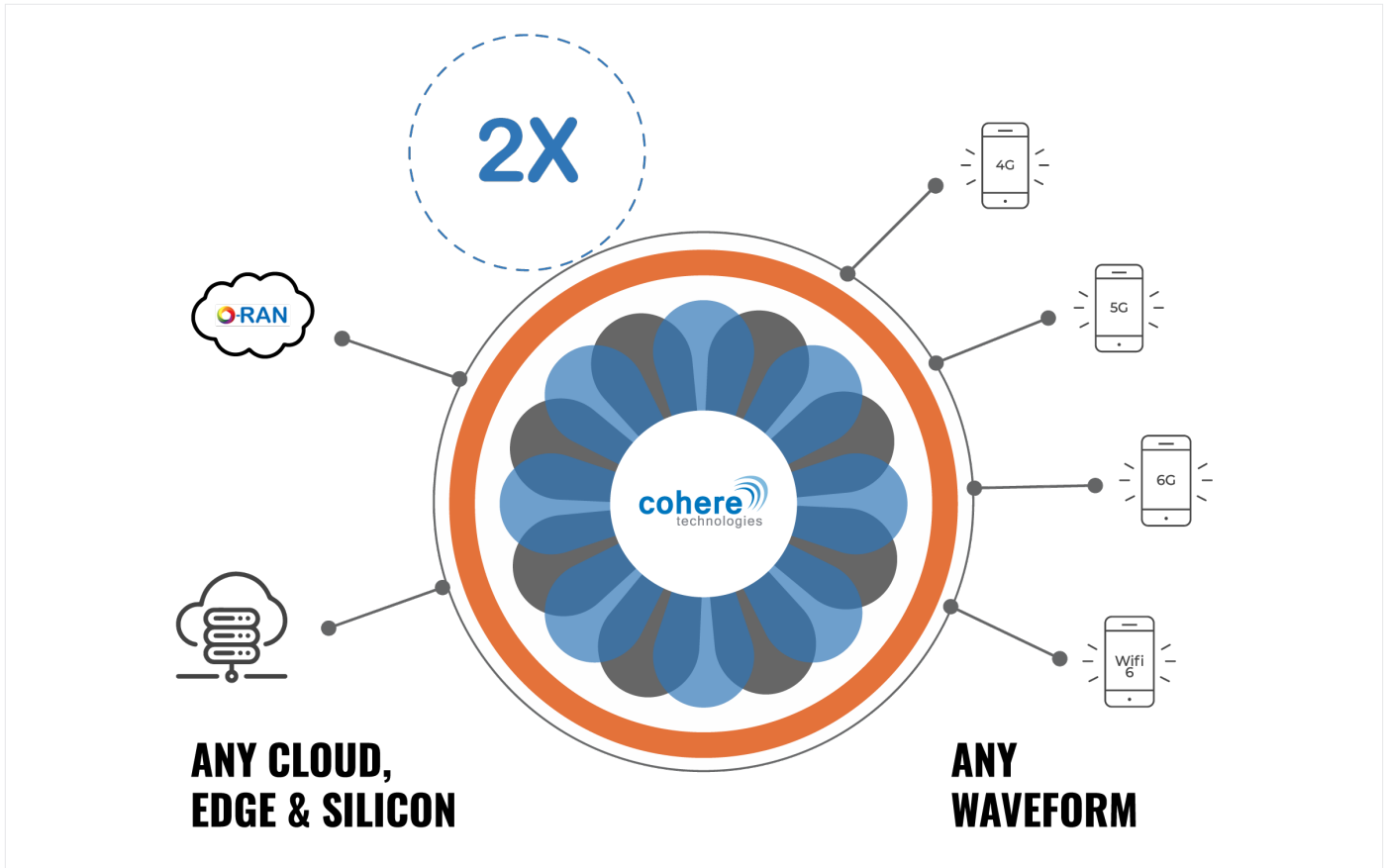


Figure 1. Cohere’s Universal Spectrum Multiplier software supports any cloud, edge, or waveform

Cohere’s patented Delay Doppler* channel detection method facilitates orthogonal beam management, which leads to breakthrough multi-user, multiple-input, multiple-output (MU-MIMO) performance in both Frequency Division Duplex (FDD) and Time Division Duplex (TDD) spectrum, using the same time and frequency resources. The Delay Doppler channel engine is waveform independent, thus facilitating multiple dissimilar waveforms to operate in the same spectrum band. The outcome is anticipated to improve performance and maximize value of all spectrum assets.

Cohere’s Universal Spectrum Multiplier platform can be integrated within an open radio access network (O-RAN) distributed unit (DU), the centralized unit (CU), or as a near real-time application (xApp) in the RAN intelligent controller (RIC) without any changes to handsets, radios, or antennae. The software works in any frequency band and with any waveform (see Figure 2).

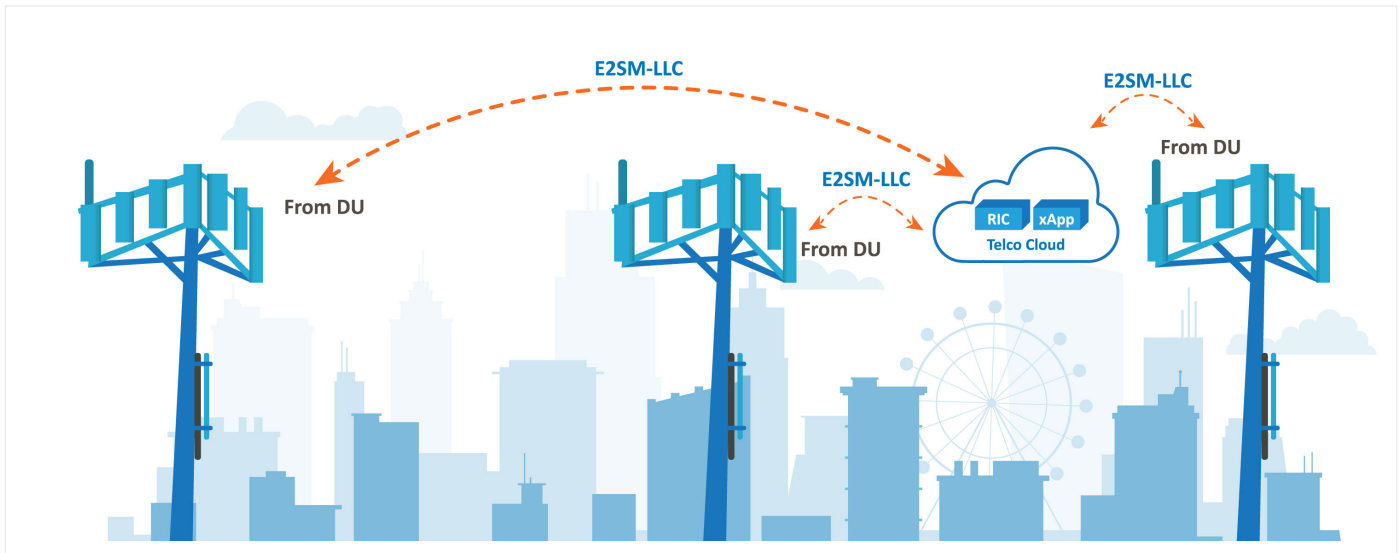


Figure 2. Cohere’s Universal Spectrum multiplier xApp can be integrated into an Open vRAN without any changes to handsets, radios, or antennae.

Today’s Solutions Ready for Tomorrow’s 6G

6G is expected to emerge as a cloud native ecosystem where the cellular network technologies are deeply embedded in cloud services for normal operations. The cloud enables a shift of intelligence from traditional purpose-built appliances to an agile software-led environment. Cloud native solutions will bring the wireless industry into a new world of agility and scalability. By moving intelligence into the cloud, spectrum sharing of 4G, 5G, and, eventually, 6G will be possible (see Figure 3).

There is growing industry interest in next generation base stations that support open vendor ecosystems. Likewise, MNOs are expected to progressively migrate a considerable amount of their network intelligence into scalable, highly available, and agile cloud-based data centers. With spectrum sharing among multiple waveforms of 4G, 5G, and eventually 6G, MNOs will have the ability to be agile and add innovations to the network rapidly.

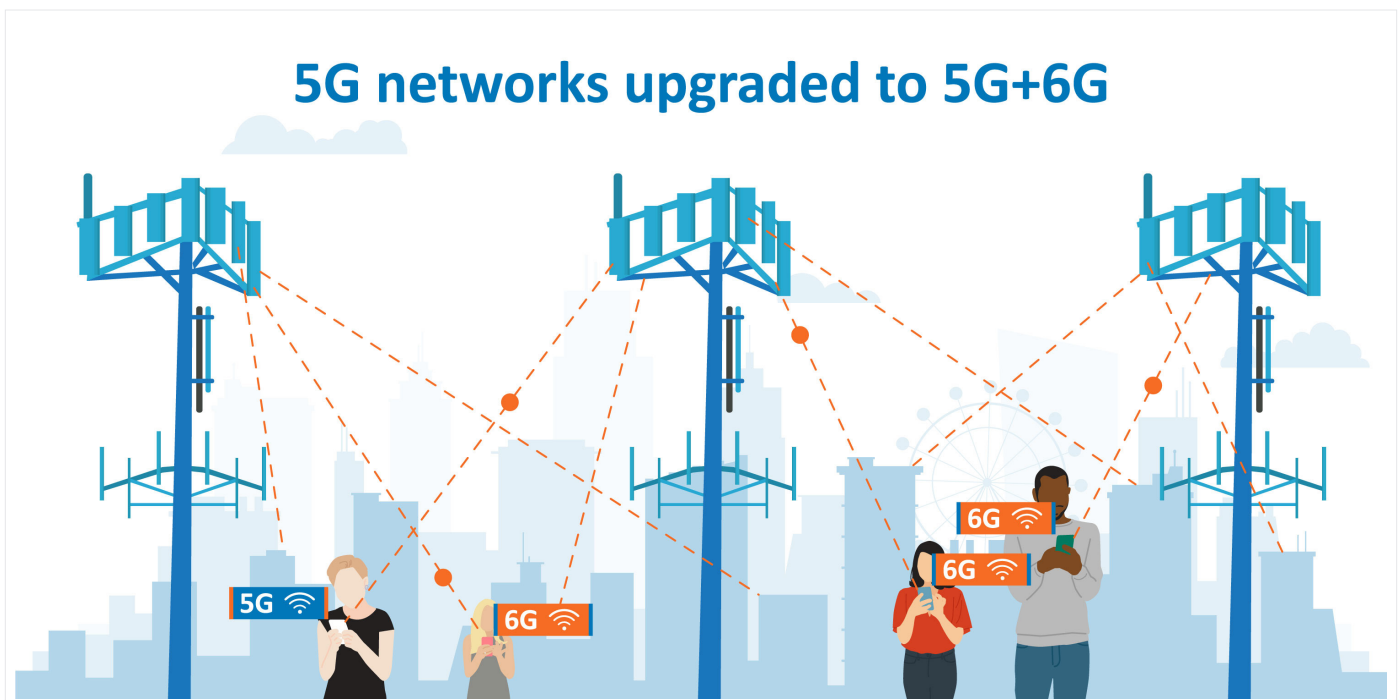


Figure 3. With Cohere’s Universal Spectrum Multiplier software platform, spectrum sharing with 6G will be possible in the future.



The Vision of 6G

While standards are still being developed, here are some potential key 6G features²:

- Up to Supersonic Speeds and support for satellite communications
- Latency below one millisecond
- Present spectrum plus use of new spectrum
- Highly accurate sensing of devices with centimeter-level positioning
- Land, sea, and space coverage.
- Significant energy efficiency and use of green energy sources

5G Performance Made Flexible

Intel Xeon Scalable processors are optimized for multi-cloud environments, serving many workloads, from core to edge to cloud. While 5G use cases come in all shapes and sizes, workloads are unique and need to be delivered across multiple locations, meaning that as networks evolve, the technology must too.

Network-optimized 3rd Gen Intel Xeon Scalable processors—N SKUs—are designed to support diverse network environments. Optimized for many workloads and performance levels, they are available in a wide range of cores, frequencies, features, and power. For organizations ready to drive 5G networking to the next level, these CPUs increase 5G user plane function (UPF) performance by up to 1.42x vs. the prior generation³. Here are more features of the N SKU CPUs:

- Network-optimized N SKUs deliver low latency and high throughput.
- Enhanced Intel® Advanced Vector Extensions 512 (Intel® AVX-512) cryptography processing.
- Robust and proven ecosystem to improve time to deployment.
- Intel® Crypto Acceleration increases encrypted network workload performance and virtually eliminates the performance impact of full encryption for normal workloads.
- With up to 36 latest-gen cores, these CPUs offer higher base frequency for greater throughput for virtualized network functions and lower power for dense or constrained physical deployments.

Through alliances with a proven, broad ecosystem, including more than 400 Intel Network Builders members, Intel is delivering solution blueprints based on 3rd Gen Intel Xeon Scalable processors—all resulting in accelerated qualification and shortened time-to-deployment for vRAN, network functions virtualization infrastructure (NFVI), virtual content delivery networks (CDN), and more.

Intel® Dedicated vRAN Accelerator ACC100 Adapter

vRAN architectures deliver higher channel capacity and easier deployment of edge-based services and applications. vRAN solutions are ideally located at the network edge to deliver low-latency services with the flexibility to increase or decrease capacity based on the volume of real-time traffic and demand on the network.

The Intel Dedicated vRAN Accelerator ACC100 adapter enables balanced platform performance by rapidly performing Layer 1 FEC acceleration, making more CPU processing power available for increased channel capacity on edge-based services and applications. This fixed-function PCIe 3.0 adapter works with Intel® Xeon® Scalable processors and Intel® Xeon® D processors to enable low-cost, power-efficient 4G and 5G vRAN solutions.

FlexRAN™ Reference Architecture for Wireless Access

This reference architecture (see Figure 4) consists of hardware and software building blocks that are used with an Open vRAN ecosystem to build and deploy highly optimized, feature-rich 5G scalable cloud-native vRAN solutions on Intel architecture processors.

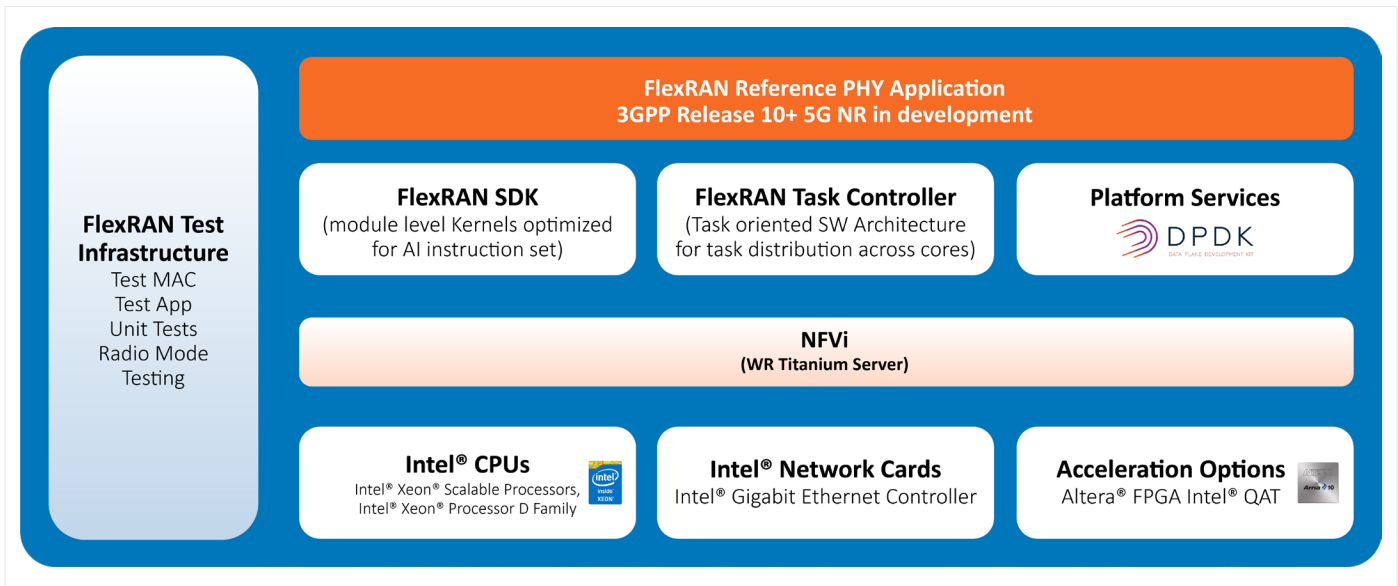


Figure 4. Intel® FlexRAN™ Solution for Wireless Access

The Cloud is Transformative for MNOs

Mobile networks are currently made up of a vast infrastructure of hardware and software, with hundreds of thousands of cell sites, a deep investment in legacy technology, and billions of users who depend on network reliability and availability. With the high concentration of base station installations required for 5G, MNOs are challenged with using spectrum most efficiently and cost-effectively. Cloud-based solutions are vital to helping MNOs meet increasing demands on their networks, today and most definitely tomorrow. Cohere’s Universal Spectrum Multiplier software platform, powered by 3rd Gen Intel Xeon Scalable processors and Intel FlexRAN, give MNOs a solution today to double 4G and 5G network performance, and ready their networks and customers for the promise of 6G in the future.

Learn More

[Cohere Technologies](#)

[Cohere’s Universal Spectrum Multiplier](#)

[3rd Gen Intel® Xeon® Scalable Processors](#)

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¹ <https://www.vodafone.com/news/services/vodafone-and-partners-boost-5g-capacity>

² <https://whatis6g.com/definition/>

³ Please visit www.intel.com/3gen-xeon-config and use the corresponding performance number 91 to access full system configuration and performance detail

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