

# Enhancing RAN resilience and scalability:

Leveraging multicloud application orchestration across diverse O-Cloud environments



## Application benefits

- Choose cloud providers based on unique services, pricing models, and/or geographic regions
- Gain an accurate understanding of managed O-Cloud instances and their infrastructure inventory and associated capabilities
- Ensure the efficient use of compute, storage, and networking capabilities in each environment
- Optimize resource utilization across O-Clouds

## Functional elements

- Virtuora® SMO Offering
- Wind River® Studio
- Working knowledge of O-RAN orchestration standards and O-RAN O2 API

Multicloud orchestration and management distributes cloud-native applications and software across O-Cloud environments for greater resilience, scalability, and flexibility in the virtualized Radio Access Network (vRAN). This function coordinates and manages deployment, operation, and interaction across multiple providers (AWS, Azure, Google Cloud, Wind River, and more). Network operators are free to choose providers based on services, pricing, or regions and they depend on effective interoperability to ensure seamless integration between applications and services.

O-Cloud infrastructure management leverages distributed control and management of the policies and functions, including automation to dynamically adjust configurations based on real-time network requirements. O-Clouds can be rapidly deployed and scaled to meet changing network demands, enabling faster service rollout and better responsiveness to traffic fluctuations.

In the Open RAN ecosystem, the O2 interface enables comprehensive infrastructure management through efficient communication and data exchange. It allows the Service Management and Orchestration (SMO) function to remotely monitor, control, and optimize distributed RAN elements, leading to more agile, efficient, and cost-effective network operations.

## O-RAN compliant orchestration between O-Clouds

Orchestration between O-Clouds streamlines operations for Network Operators by managing infrastructure and lifecycles (deployment, scaling, updating, and decommissioning) across diverse environments that are O-RAN compliant. It ensures efficient use of compute, storage, and network capabilities by providing failover/redundancy for high availability and optimizing resource utilization across O-Clouds.

The O-RAN O-Cloud is a key component in the evolution toward more flexible, programmable, and interoperable Radio Access Networks.

- The Virtuora SMO Offering provides orchestration for any O-RAN compliant cloud environment that supports Open Radio Access Network (O-RAN) principles and functionalities.
- Wind River Studio provides an O-Cloud platform that supports the complete lifecycle management of intelligent systems at the edge. It provides a unified environment for developers, operators, and service providers to build, deploy, operate, and service mission-critical intelligent edge systems.

# Unlock the full potential of Open RAN with Fujitsu and Wind River

## O-RAN O-Cloud Registration and Initialization

O-RAN O-Cloud Registration and Initialization enables efficient and automated deployment and configuration of Open RAN networks. It ensures that the SMO has accurate and up-to-date information about available O-Cloud resources, allowing it to make intelligent decisions about resource allocation and orchestration. Network Operators can combine the Virtuora SMO Offering and Wind River Studio to perform O-RAN O-Cloud Registration and Initialization use case to:

- Register an O-Cloud with the Virtuora SMO, providing O-Cloud capabilities, resources, and location
- Initialize O-Cloud services, allowing the O-Cloud to prepare itself for serving RAN functions and applications, such as loading software, configuring hardware, and starting specific services
- Leverage the O-RAN O2 interface, facilitating communication between the O-Cloud and the SMO.

These capabilities can improve resource utilization and simplify troubleshooting with available information about O-Cloud resources and configurations.

## O-RAN O-Cloud Inventory Update

The O-RAN O-Cloud Inventory Update communicates changes in its inventory to make sure that Virtuora SMO always has the latest information about available resources, capabilities, and current state. By understanding the state and configuration of the O-Cloud resources, Virtuora SMO can manage and optimize network performance. It also allows Virtuora SMO to discover potential problems, such as resource failures, configuration errors, or performance bottlenecks.

The Virtuora SMO Offering and Wind River Studio can perform the O-RAN O-Cloud Registration and Initialization use case as well as the O-Cloud Inventory Update. These use cases play a crucial role in unlocking the full potential of Open RAN. It enables seamless onboarding, efficient resource management, increased flexibility, and a more open and innovative RAN ecosystem. These benefits translate to improved network performance, cost optimization, and ultimately, a better user experience for mobile network subscribers.

## Application homing in the RAN

In the O-RAN Plugfest 2023, Virtuora SMO and Wind River Studio used the O-Cloud Registration and Initialization and Inventory Update use cases to perform application homing, a type of orchestration in mobile networks. The orchestrator selects the O-Cloud with the best latency, throughput, and cost performance for the application to run on. Application homing benefits both mobile users and network operators. For users, it improves user experience and application performance while reducing battery consumption. For operators, it increases network efficiency, enhances service differentiation, and reduces network congestion.

## Virtuora SMO

The Virtuora SMO Offering belongs to Fujitsu's established multivendor ecosystem that expands the RAN's reach, productivity, and value. Total RAN automation (powered by AI/ML) unifies orchestration, control, and management of the multilayer, multivendor network, unwinding complexity and enabling powerful functionality. With Virtuora SMO, operations teams can build an optimized network around offerings and services powered by open software.

## Wind River Studio

Wind River Studio includes an integrated cloud platform, automation, orchestration, and analytics capabilities so that operators can deploy and manage their 5G edge networks globally. Wind River Studio is designed to deliver digital scale across the full lifecycle through a single pane of glass to accelerate transformative business outcomes.

With a production-grade distributed Kubernetes cloud platform for managing edge cloud infrastructure, which is based on the OpenStack StarlingX project, Wind River Studio compiles best-in-class open-source technology to deploy and manage single node, multinode, and distributed cloud networks.

# Demonstrating interoperability use cases during O-RAN Plugfest 2023

The O-RAN Plugfest, an annual global event organized by the O-RAN Alliance, provides an opportunity to test and validate the interoperability of RAN vendors' hardware and software components. During the 2023 O-RAN Plugfest, Fujitsu tested application orchestration between O-Clouds using the Virtuora SMO Offering with Wind River Studio.

Fujitsu and Wind River demonstrated the O-RAN O-Cloud Registration and Initialization and the O-Cloud Inventory Update use cases. These orchestration use cases show how Fujitsu and Wind River solutions provide accurate and up-to-date O-Cloud information to the orchestrator prior to resource allocation. The Virtuora SMO Offering and Wind River Studio used the O2 interface to:

- Register an O-Cloud with the SMO and initialize its services
- Update the SMO with O-Cloud inventory information

Tests included two Wind River Studio Cloud Platforms (O-Clouds): one with a low-latency Operating System (OS) and the other with a standard OS. The team used Virtuora SMO to deploy an application with low-latency OS requirements on the O-Cloud that met requirements. The team also deployed an application with no specific OS requirements on the O-Cloud with a standard OS. Both tests successfully demonstrated resource orchestration between clouds that matched application requirements, proving both use cases create interoperability and automated efficiencies in Open RAN environments.

**O-RAN Plugfest: Allocating  
multivendor resources with Virtuora  
SMO and Wind River Studio**