



# Forecast RAN Traffic and Autoscale Resources with AI

## Reducing Energy Usage and Lowering OpEx with the Net AI xUPscaler xApp on VMware RIC

### PARTNER SOLUTION AT A GLANCE

Net AI's xUPscaler running on VMware Distributed RIC uses artificial intelligence to predict traffic levels across the RAN, allowing accurate allocation of computational resources to meet demand.

### MWC rAPPATHON PARTICIPANT

Net AI's xApp was one of seven applications demonstrated during the rAppathon RIC developer's competition hosted by VMware and Intel at MWC Barcelona 2023.

### COMPANY OVERVIEW

Net AI is a pioneering network intelligence company whose mission is to develop a deep traffic analytics platform that helps mobile operators drastically reduce their CapEx, OpEx, and TCO and generate new high-margin revenue streams. The company's key differentiator is a combination of AI-driven service traffic estimation and forecasting engines that provide real-time and predictive insights into per-service network usage. See <https://netai.tech/>

### The Need to Improve Traffic Forecasting

The mobile traffic ecosystem is increasingly complex, with applications ranging from immersive video experiences to industrial automation having diverse performance requirements in terms of bandwidth, latency and reliability. Real-time and predictive information about service-level network usage is critical to the effective management and monetization of 5G networks.

Currently, investment in network infrastructure is driven by traffic estimates obtained with the aid of deep packet inspection tools. As an example, provisioning of RAN Centralized Unit (CU) user plane capacity is largely performed to meet peak traffic demands and does not change in real-time to meet actual demands. Network resources are typically managed reactively, based on offline information that is generally dated and therefore not sufficiently timely to allow for effective decisions. This type of approach results in poor CapEx efficiency, high energy- and engineering-related OpEx, and modest user quality of experience.

### NetAI's xUPscaler Traffic Forecasting and Resource Autoscaling xApp

Net AI's xApp supported by VMware Distributed RIC fuels the automation of network management, helping operators tackle the challenges of meeting increasing traffic demands in a cost-effective way while becoming more energy efficient. The xApp embeds Net AI's proprietary artificial intelligence (AI) models and uses historic and real-time network traffic data to forecast upcoming traffic volumes at the level of base stations (or at higher geographic granularity), providing actionable analytics to the near-RT RIC through an O-RAN-compliant interface. The xApp sends comprehensive KPIs to a web service, which displays these values on a dashboard.

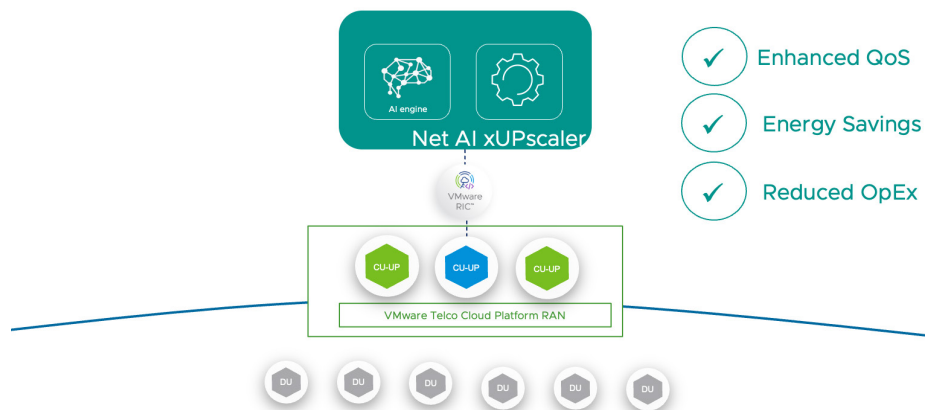
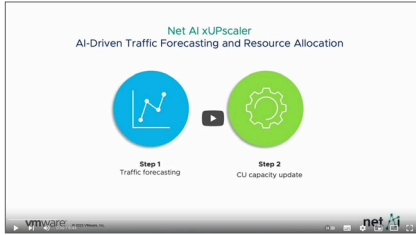
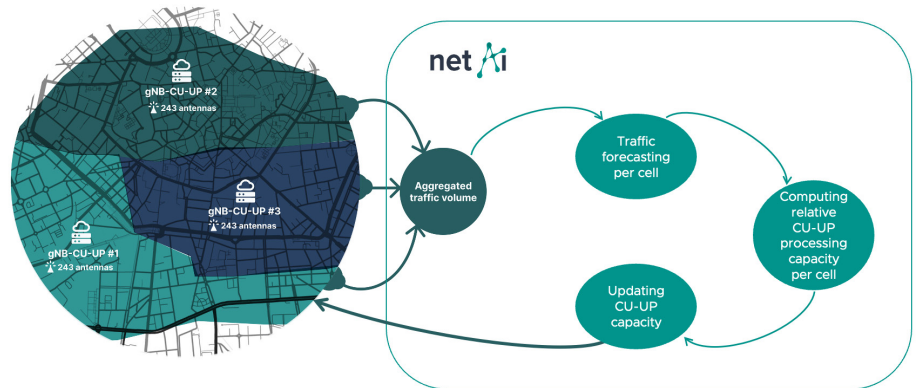


FIGURE 1: How the Net AI xUPscaler xApp works with VMware RIC.

**VIDEO DEMONSTRATION OF THE PARTNER'S SOLUTION ON VMWARE RIC**



*Forecasting RAN Traffic and Autoscaling Resources with a Net AI xApp on VMware RIC*



**FIGURE 2:** How the Net AI xUPscaler xApp works.

Net AI's forecasting engine exploits spatiotemporal correlations characteristic of mobile traffic. This information is used along with AI-driven autoscaling logic to produce relative capacity values for gNB Centralized Unit User Plane (gNB-CU-UP) entities, which are used to load-balance traffic between gNB-CU-UPs. As a result, network resources can be scaled ahead of time and managed more efficiently.

Specifically, the AI-driven autoscaling method avoids resource overprovisioning, resulting in a reduction of energy consumption in the RAN. Through accurate traffic predictions, CSPs can easily allocate resources to guarantee SLAs and improve customer quality of experience while reducing operational costs thanks to the inherent automation.

**Net AI xUPscaler Technology**

Net AI's xApp uses artificial intelligence to disentangle metadata that summarizes traffic consumption measured by the volume of uplink and downlink data into the demands of the individual services that make up these aggregates. It further predicts future traffic consumption over configurable time horizons.

The AI engines that the Net AI xApp embeds exploit spatiotemporal correlations that are unique to mobile traffic, thereby providing insights in near-real-time. Based on the generated forecasts, the xApp provides processing capacity allocation recommendations through VMware RIC to ensure that the CU-UP loads are balanced, and application demands are met when and where they are needed.

**How Forecasts are Generated**

Forecasts are generated using traffic volume information from each antenna in the RAN relayed to the xApp by an E2 interface subscription to VMware Distributed RIC. The xApp uses a Net AI proprietary SoothsAler forecasting engine to predict future traffic volumes at each antenna accurately. These forecasts are also saved to the VMware RIC shared data layer so that they are also available to other xApps registered with the RIC.

The NetAI xUPscaler xApp aggregates the antenna-level predictions at the level of the gNB Centralized Unit User Plane (gNB-CU-UP). Capacity allocation messages are sent by the xApp to the E2 node through the RIC to scale network resources ahead of time and therefore handle cell load more efficiently.

**Benefits**

Net AI's xUPscaler xApp delivers near real-time RAN-resource auto-scaling to optimize QoS performance according to current traffic demands. The artificial

**RAN PROGRAMMABILITY**

The RAN intelligent controller gives applications from different vendors access to the functions running in the control and management planes of your radio access network, empowering you to program and optimize your RAN by using methods like artificial intelligence and machine learning.



*Demo Video: Activating Network Programmability with VMware RIC*

## VMWARE RIC AT A GLANCE

VMware RIC lets you programmatically manage and control your radio access network (RAN). The RAN intelligent controllers from VMware enable third-party application developers to tap into network data, process it, and use it to modify RAN behavior.

VMware Distributed RIC hosts near-real-time applications (xApps), and VMware Centralized RIC runs non-real-time applications (rApps). These apps introduce new use cases — automation, optimization, and service customization — that fuel innovation across a telecommunications network.

### KEY BENEFITS

- **Multi-vendor interoperability and a vibrant partner ecosystem** – use a vendor- and technology-agnostic platform and tap pioneering solutions.
- **Network optimization** – gain network-wide observability and automate optimization with AI/ML.
- **Efficiency** – reduce energy consumption and improve spectrum utilization by using applications from various partners.

## RIC SDK PARTNER PROGRAM

A rich developer ecosystem is critical to the successful adoption of open RAN technology. The VMware RIC SDK Partner Program expands access to and simplifies the development of RIC applications. The program gives partners access to RIC SDKs as well as training videos and application developer support. To find out more, visit

<https://techpartnerhub.vmware.com/programs/vmware-ric>

## LEARN MORE

For more information about the VMware Telco Cloud or VMware RIC, call 1-877-VMWARE (outside North America, dial +1-650-427-5000) or visit <https://telco.vmware.com/>

intelligence technology provides greater accuracy in traffic forecasts compared to traditional approaches. The result enhances quality of service for customers, lowers energy costs, and reduces OpEx.

## VMware and the Path to a Disaggregated, Programmable RAN

For the past five years, VMware has been methodically introducing new telco cloud solutions and changing expectations in the service provider industry about modernization. With an established footprint in telco cloud deployments globally, VMware has been expanding its capabilities to address the challenges in the disaggregation of the RAN.

With a horizontal platform that enables workload consistency from the core and the RAN to the public cloud, we've revealed what is possible—simplicity, speed, agility, and far-reaching automation. The objective is to enable our customers to modernize their entire networks, simplify their operations with end-to-end consistency, and further disaggregate their RAN.