

## CASE STUDY

# Elisa successfully verifies the performance of Cloud RAN with In-Line acceleration

- Fast integration with 5G Core in the production network
- Proven interoperability with commercial 5G smartphones
- Performance consistency with In-Line acceleration

NOKIA

elisa

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**“Elisa is a pioneer in automation and in introducing the benefits of network cloudification to customers in Finland. We are now expanding this transformation to the radio access network.**

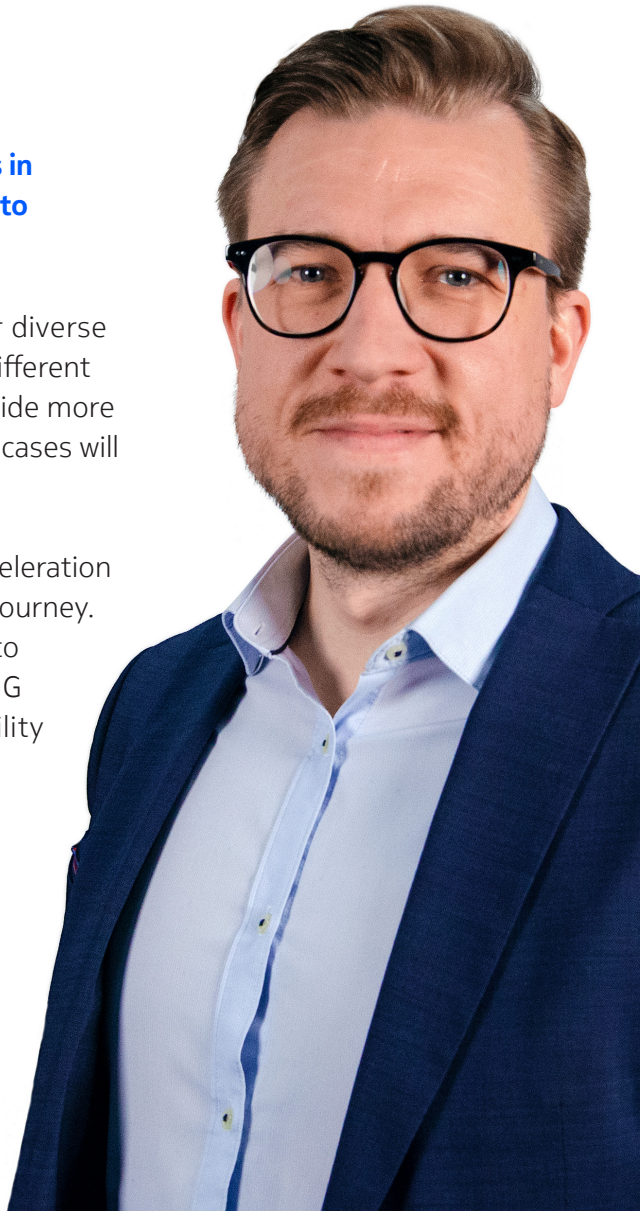
The key benefits of Cloud RAN include support for diverse network service platforms and scalability to meet different kinds of customer needs. In the future, we can provide more agile network services to the customers whose use cases will be closer to the network edge.

The first 5G data calls in Cloud RAN with In-Line acceleration mark a remarkable milestone on our cloudification journey. Nokia's anyRAN approach to Cloud RAN enables us to leverage the rich feature set from our commercial 5G network while building on the proven interoperability with our 5G Core network and the 5G smartphones that our subscribers are using.

Our tests confirm that Nokia's anyRAN approach delivers consistent performance with the selected key features as well as interoperability between Cloud RAN and purpose-built RAN.

### **Markus Kinnunen**

Vice President, Cloud Services, Elisa



**Elisa is the market-leading telecommunications operator in Finland. Elisa's mission is a sustainable future through digitalization.**

A pioneer in telecommunications, digital services, and 5G, Elisa provides sustainable solutions for over 2.8 million consumer, corporate and public administration customers in Finland and Estonia, as well as in over 100 countries internationally. Elisa is a carbon-neutral company.

In the summer of 2023, Elisa and Nokia successfully completed Europe's first Cloud RAN trial powered by In-Line acceleration.

Nokia is a Radio Access Network (RAN) provider for Elisa, including the major political and economic centers: the capital area of Helsinki, nearby Espoo – Finland's second largest city by population – and Oulu, the economic center in the North.

This case study provides a closer look at Elisa's evaluations of Nokia's anyRAN reference design for Cloud RAN.



## OBJECTIVE

# Verifying performance and interoperability of Cloud RAN

The Finnish mobile market has one of the world's highest mobile data consumptions per subscriber. Elisa is continuously evolving its radio access network and optimizing its performance to serve the ever-increasing data volumes in the network.

For Cloud RAN, this translates into the requirement of feature and performance consistency between the already rolled-out purpose-built RAN and Cloud RAN. Consistency is essential for downlink and uplink data rates, latency and voice services in a hybrid RAN environment.

In addition, mobility needs to work on Cloud RAN as well as between Cloud RAN and purpose-built RAN with the excellent reliability that Elisa's customers expect.

Delivering a consistent, high-quality performance in a hybrid RAN environment is also a prerequisite for large-scale deployments of Cloud RAN.

At the same time, the Edge Cloud landscape, including cloud infrastructure and data center hardware (both server and processor) is becoming more dynamic. This development favors an open Cloud RAN design that works with any Containers-as-a-Service (CaaS) layer, server, and CPU of choice – important also for Elisa as it's looking to provide more agile services closer to the network edge.

In this trial with Nokia, Elisa wanted to verify the performance and interoperability of the solution based on Nokia's reference design for Cloud RAN.

## SOLUTION

# Cloud RAN based on the Nokia anyRAN approach

The chosen trial setup allowed for a direct comparison of Cloud RAN with Elisa's commercial radio access network built with the Nokia AirScale baseband.

The setup consisted of:

- 5G radio cells of 100 MHz bandwidth within Elisa's commercial n78 (3.5 GHz) spectrum allocation served by Nokia AirScale radio
- Distances of up to 10 km between radio units (RU) and virtualized Distributed Units (vDU)
- Commercial 5G smartphones
- Elisa's commercial 5G Core network.

The chosen Nokia Cloud RAN reference design runs the virtualized DU (vDU) and the virtualized central unit (vCU) on servers with x86 processor cores. In the first of its kind deployment in Europe, the vDU used In-Line architecture for layer 1 (L1) acceleration. This is a key element of the Nokia anyRAN approach, enabling efficiency and independent choice of server architecture, including x86 and ARM options.

In Nokia's reference design, the cloud infrastructure or CaaS layer is RedHat OpenShift Cloud Platform (OCP), a commercial off-the-shelf solution.

Combining all the elements above, the trial setup for Elisa reflected the Nokia anyRAN approach of enabling disaggregation and choice in hardware and software.

- Fast to market with reference designs
- Flexibility with openness
- Feature and performance consistency enabled by In-Line acceleration



## RESULTS

# Performance and interoperability confirmed

The trial with Elisa confirmed that the Nokia reference design for Cloud RAN enables fast Cloud RAN introduction.

The reference design accelerates the configuration of data center hardware and cloud infrastructure as well as reduces planning and coordination requirements.

The trial also confirmed feature and performance consistency between the Cloud RAN and purpose-built RAN. In an end-to-end network, this starts with the interoperability of user equipment, radio access network and core network.

The trial confirmed that the Nokia anyRAN approach brings a head-start advantage in terms of interoperability. The interworking proven on purpose-built RAN translated into hassle-free interworking from day 1 also for the Cloud RAN.

The 5G standard provides for more RAN parametrization options than any earlier cellular generation. The parameters are the key to great 5G performance. With the anyRAN approach, RAN feature parametrization is identical in Cloud RAN and purpose-built RAN.

Consequently, observed uplink and downlink data rates and network key performance indicators were in line with the expectations: intra- and inter-frequency handovers, Voice over New Radio (VoNR) performance and inter-RAT mobility between 5G Standalone and 4G LTE were all proven successful.

In summary, the trial proved that Nokia anyRAN will facilitate the transition of today's advanced radio networks to a hybrid environment consisting of purpose-built RAN and Cloud RAN.

- Proven interoperability
- Proven performance
- Readiness for hybrid networks

# Cloud RAN stepping alongside purpose-built RAN

The insights in this case study are based on one of the early Cloud RAN pilots in Europe, reflecting a pragmatic approach to validating key aspects of the commercial feasibility of Cloud RAN.

Those include platform flexibility for hardware and software as well as feature and performance consistency.

The results of the trial show that Nokia is evolving Cloud RAN towards a solution, which will step alongside the purpose-built RAN.

The Nokia anyRAN approach addresses the key requirements of operators as they are moving

towards hybrid and Cloud RAN environments. These include feature and performance consistency and the flexibility of choice for data center and cloud infrastructure options.

Based on close cooperation and co-innovation with an ecosystem of trusted cloud partners, Nokia anyRAN delivers a collaborative advantage to both operators and enterprises.

It also extends the Cloud RAN server and cloud infrastructure options to best fit an operator's data center and edge cloud strategy.



Visit Nokia AirScale Cloud RAN webpage to learn more.

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At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering networks that sense, think and act by leveraging our work across mobile, fixed and cloud networks. In addition, we create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs.

Service providers, enterprises and partners worldwide trust Nokia to deliver secure, reliable and sustainable networks today – and work with us to create the digital services and applications of the future.

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