AirScale Cloud RAN
Scale your 4G/5G network for any demand
Nokia AirScale cloud base station is the essential next step to the fully flexible, highly scalable cloud-based network for a seamless 4G/5G user experience.
Radio access goes fully into the cloud

Radio Access Network (RAN) solutions built in the cloud are widely accepted as essential for meeting extreme new requirements as 4G networks are pushed to deliver ever greater performance and as the communications industry deploys 5G.

With broadband everywhere, billions of Internet of Things (IoT) devices, widely diverse services and demanding new applications, huge new business growth opportunities are arising for Communications Service Providers (CSPs). Simplified, virtualized and cloud-based mobile networks provide the flexibility, scalability and low operational expenditure (OPEX) that many CSPs see as the top drivers of cloud RAN deployment.

Today, Cloud RAN is taking advantage of converged edge cloud deployments, providing even more flexibility for CSPs. Radio functions can be virtualized and run in a centralized cloud or a distributed cloud at the network’s edge to deliver ultra-low latency and high bit rates for demanding services. Meanwhile, other radio functionality can be centralized for the highest spectral efficiency and cell site simplicity. Full flexibility is achieved by running both cloud RAN models in the same network.

The first field-proven and commercially available cloud base stations deliver all these benefits and more for 4G and 5G. Welcome to the Nokia AirScale cloud base station portfolio.

Percentage of 78 global CSPs placing a reason for deploying cloud RAN in their top three reasons, highlighting that flexibility, cost saving and distributed cloud are the most important benefits (Source: Analysys Mason, October 2017).
Take the path you want to the cloud RAN you need

The Nokia Cloud RAN solution provides CSPs a choice of AirScale cloud base station deployments. AirScale Cloud RAN supports centralized and distributed deployments that run Virtualized Network Functions (VNFs) where they can most cost-effectively meet application needs and the latency performance demands of use cases at any location. Real time (RT) and non-real time (NRT) traffic processing can be split as required between centralized cloud platforms and edge cloud servers or base station hardware close to 4G and 5G radio.

Nokia AirScale Cloud RAN delivers high scalability, business agility and operational efficiency to minimize Total Cost of Ownership (TCO), while retaining maximum flexibility to meet unpredictable demand. The same data centers running AirScale cloud base station functions can also be used to support other VNFs, such as Multi-access Edge Computing (MEC) and a cloud-based core network.

**AirScale cloud base station with field proven RT/NRT split**

AirScale cloud base station functions run in a central data center in the cloud as VNFs and locally on distributed Nokia Flexi or Nokia AirScale baseband hardware at base station sites.

Crucially, AirScale cloud base station can process real-time and non-real-time traffic separately. Non-real-time traffic can be handled by the AirScale cloud base station server, allowing much longer backhaul latency to be tolerated, protecting existing transport investments. Meanwhile, time-critical functions can be processed in real time at the cell site by the AirScale baseband system module to support services with low latency demands.

**AirScale all-in-cloud base station enables the monetization of ultra-low latency services**

AirScale all-in-cloud base station goes a step further towards the fully cloudified base station. It virtualizes real-time baseband processing, enabling it to be run in the cloud at the far edge of the network, close to the radio. As well as handling even the most extreme latency requirements, cloud-based, real-time processing at the network edge can be scaled as required to meet changing demand.

Processing closer to the radio site ensures that tighter latency requirements can be handled, helping CSPs to monetize new 5G services. Furthermore, the flexible architecture options enable CSPs to locate functions to meet requirements in each area, depending on application needs and latency targets, as well as available and planned transport capacity.

**Nokia AirScale Cloud RAN architectures working in parallel for any needs**

Flexible 4G-5G & real-time/non-real-time options

A flexible mixture of local and cloud-based processing is ready to meet any capacity and service level need.
All the features of a base station, all the capabilities of the cloud

AirScale Cloud RAN’s total flexibility of centralized and distributed deployment enables functions to be placed according to the needs in each area, depending on application needs and latency targets, as well as available and planned transport.

The base station application can run on a centralized server or on distributed hardware at several locations, either a CSP’s own infrastructure, or on the Nokia AirFrame data center, which is built to meet stringent telco capacity, performance and latency requirements.

The cloud-based architecture enables multiple Radio Access Points (RAPs) to be configured and multiple carriers to be aggregated under one cloud base station VNF. Multi-connectivity is easily coordinated to provide exceptional data rates and robust connectivity for the best customer experience.

Both AirScale cloud base stations support the widely deployed Common Public Radio Interface (CPRI) and Open Base Station Architecture Initiative (OBSAI) interfaces to the radio units. The Nokia Fronthaul gateway solution converts CPRI and OBSAI to eCPRI for the AirScale all-in-cloud solution.

This, together with the use of Ethernet backhaul and fronthaul, allows a CSP to optimize transport costs and use its legacy transport deployments while it follows the cloud RAN path most suited to its plans.

Cloud RAN operations and management is provided by the Nokia NetAct platform and Nokia CloudBand application manager to run both legacy and cloud-based networks using the same view.

Cloud flexibility at the edge

Flexible cloud deployment allows CSPs to upgrade and scale AirScale cloud base station capacity as needed with resources scaled centrally, locally and at the network edge as required.

Nokia AirFrame open edge server offers the optimum solution for a small far edge data center. Built for telecoms environments, this ultra-small footprint server is the first x86 solution developed for far edge cloud deployments, offering carrier-grade availability and flexible scalability, from a single-server edge cloud to multi-rack solutions.

Cloud-based real-time processing at the edge of the network enables easier delivery of extremely low latency applications and provides CSPs with extended scalability and high pooling gains enabled by cloud-based processing at the network edge. Costly cell site space is used more efficiently, sites become simpler and easier to roll out, while operational costs are reduced because less hardware is needed at each site.

New services can be rolled out more quickly, while the software-based, AirScale Cloud RAN which supports open architectures enables innovative network functions to be developed in partnership with specialist partners.

Nokia’s wide-reaching business ethos is built on openness. Nokia is an active member of a collaborative ecosystem, promoting the development and adoption of openness and standardization. For example, ONAP, O-RAN and OpenStack – amongst many other similarly focused industry bodies.
Working with CSPs, meeting their needs

“Vendors and MNOs (mobile network operators) must work together on the upgrade path to 5G, including technologies such as cloud RAN and MIMO.”
Analysys Mason

Nokia AirScale cloud base station has been the subject of extensive field trials by leading CSPs globally. As well as proving the product’s performance and reliability, the involvement of frontline CSPs helps to ensure Nokia develops and offers the features they need.

**Verizon Wireless and Nokia collaborate on new RAN architectures**
Nokia and Verizon demonstrated the successful operation of Nokia AirScale cloud base station on Verizon’s Virtual Cloud Platform (VCP edge) infrastructure and connected by Ethernet backhaul in a trial in Oklahoma City, USA.

Verizon is also first to trial the new AirScale all-in-cloud RAN architecture.

“Verizon is committed to furthering innovation within the ecosystem by ensuring deployment flexibility. Verizon’s Intelligent Edge Network, which maximizes this flexibility, will allow faster upgrades, enabling our customers access to the latest technology as quickly as possible,” said Bill Stone, Vice President, Technology Development & Planning, Verizon.

**Orange prepares for 5G with Nokia cloud RAN trial**
A trial with Orange in Poland saw a Nokia AirScale cloud RAN deployed on the CSP’s data center infrastructure connected to sites 70 kilometers away by Ethernet.

“RAN virtualization is a critical enabler for a better and more homogeneous customer experience on 4G and future 5G networks, allowing these multi-service networks to simultaneously handle various types of objects with different connectivity needs. The positive outcome is an important step towards the implementation of this enabler inside our networks in Europe and Africa,” said Arnaud Vamparys, VP Radio Access Networks and Microwaves of Orange Labs Networks.
China Mobile and Nokia verify split, cloud-based approach
Nokia and China Mobile have run the first live deployment of cloud RAN centralized and distributed split architecture in China. The trial verified how the functional split of real-time and non-real-time applications can be deployed effectively for a smooth transition towards 5G while protecting the existing installed base.

“The trial demonstrates the strong capabilities of the Nokia cloud RAN commercial platform. Going forward, China Mobile will continue to collaborate with industry players such as Nokia to accelerate the commercialization of 5G in China,” said Huang Yuhong, Deputy General Manager of China Mobile Research Institute.

Chunghwa Telecom trial confirms cloud RAN performance
Taiwan’s Chunghwa Telecom has completed a trial of Nokia cloud RAN centralized and distributed split architecture, verifying that peak throughput, calls, radio performance and other functions can enable new applications needing low latency and ultra-broadband.

“Cloud RAN offers the advantages of centralized and flexible allocation of radio resources, as well as improved spectral efficiency and network capacity. It is an important milestone for Chunghwa Telecom to move towards 5G,” said Dr. Rong-Syh Lin, President of Telecommunication Laboratories at Chunghwa Telecom.
Cloud RAN - the innovative way to transform CSP business

“Mobile network operators are turning to virtualization and densification to meet (exponential) demand while maintaining high quality of experience (QoE) and quality of service (QoS) metrics. The emergence of 5G will only compound these challenges.”

ABI Research¹

Cloud RAN’s flexibility and lower costs are welcomed by many CSPs, helping them to efficiently and rapidly expand their current 4G services. Deploying AirScale cloud base stations early helps CSPs to more easily achieve network densification to create better customer experiences. Furthermore, an AirScale all-in-cloud base station deployment enables CSPs to keep their RAN network capacity and applications always at the leading edge through simple hardware-independent software upgrades.

In parallel, implementing cloud RAN provides a solid foundation on which to build 5G. CSPs gain the agility to run shorter software and innovation cycles to bring new services to market quickly. They can also introduce network slicing to serve new markets with innovative business models.

With Nokia AirScale cloud base station, CSPs can depend on a radio network that has the sheer flexibility and performance they need to support their business growth plans as they enhance 4G and deploy 5G.

Nokia AirScale cloud RAN wins innovation award

Nokia AirScale cloud RAN won the GTI Innovative Breakthrough in Mobile Technology Award 2018. The judges especially recognized the solution’s built-in flexibility that will enable greater innovation with new applications, services and plug-ins.

Nokia has won five GTI awards in a row underlining how Nokia AirScale is the leading solution for 5G.

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From the enabling infrastructure for 5G and the Internet of Things, to emerging applications in digital health, we are shaping the future of technology to transform the human experience. networks.nokia.com

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