

NOKIA

O-RAN

Celedonio von Wuthenau

November 2021

O-RAN was formed by operators to lower TCO

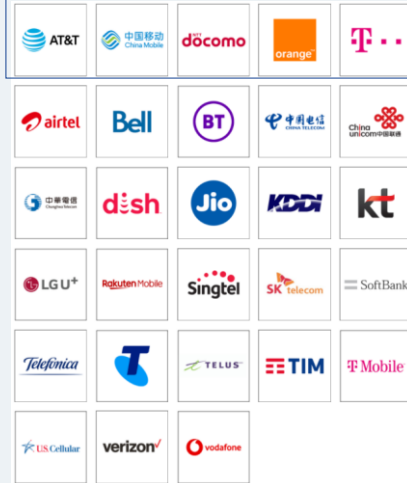
RAN openness, programmability, HW vs. SW separation



- Launched June 2018 by major CSPs by merging of the xRAN Forum with the C-RAN Alliance
- 10 working groups led by operators with vendors co-chairing
- Some traditional RAN vendors are not members
- Many small HW and SW companies with limited portfolio

240+ contributors
28 operators

Founders



Key objectives

- Bring agility to RAN
- Bring cloud scale economies to RAN
- Full interoperability of vendors

Key principles

- Lead the industry towards open, interoperable interfaces, RAN virtualization, and big data enabled RAN intelligence
- Specify APIs and interfaces, driving standards to adopt them as appropriate, and exploring open source where appropriate
- Maximize the use of common-off-the-shelf hardware and minimizing proprietary hardware

Nokia active in all O-RAN working groups

Co-leads RIC and Fronthaul groups



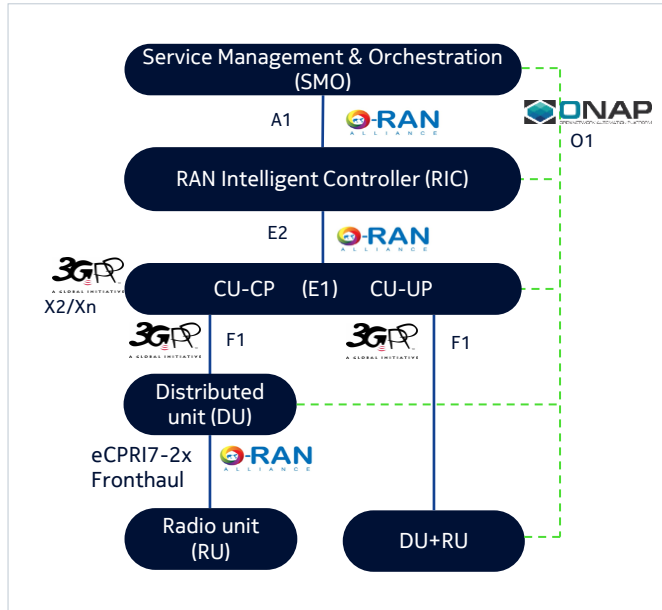
Nokia priorities

- **Global adoption** of O-RAN → **no market fragmentation**
- **No proprietary solutions** (open CPRI is not O-RAN)
- **Avoid overlap** with 3GPP and ONAP
- **Fronthaul specification** continuation
- **RAN Intelligent Controller**

Nokia active contribution / co-leading

O-RAN architecture – defines fronthaul specification and a new element RIC

3 main pillars build on technical specification work



O-RAN architecture

RAN Intelligent Controller (RIC)

- New virtualized function
- RAN programmability / SON type functions

O-RAN fronthaul

- Facilitates different suppliers for the DU and RU
- O-RAN Alliance defines IoT profile interoperability testing (IOT) for O-DU and O-RU from different vendors

Virtualization

- HW / SW separation of network elements (especially DU and CU)

Nokia objective:

Global adoption of O-RAN technical specification with **no market fragmentation**
Avoid overlap with 3GPP and ONAP

Key Takeaways



1

Nokia is investing to lead in Open RAN solutions.

Nokia has a solid plan for all O-RAN domains.

2

Current state-of-the-art shows multivendor and cloudification of RAN still at very early stage

Plug-n-Play solutions expected in mid-long term (2025 and onwards)

3

E2E performance remains a key factor.

Multivendor O-RAN requires feature matching and compatibility

4

Multivendor integration still requires a lot of CSP effort

TCO reduction expected in the mid to long term

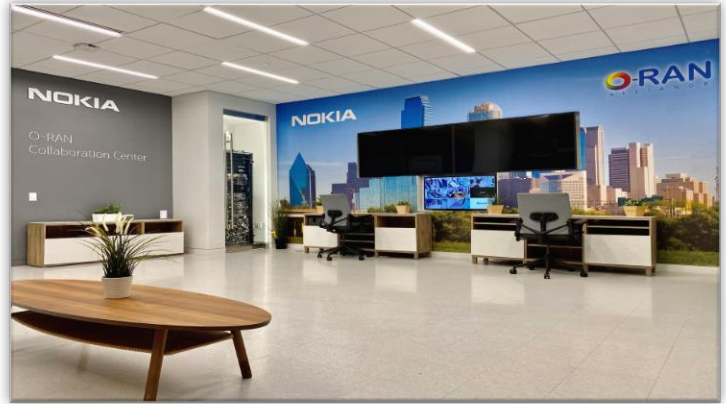
Welcome to the Nokia Dallas O-RAN Center

Nokia O-RAN Collaboration Center (OCC) and O-RAN Testing Center (OTC)

- Nokia provides the perfect environment to demonstrate the capabilities of our O-RAN solution to customers, vendors and suppliers.
- Lab and field environments for **E2E, field test and technical demonstration** capabilities for both
- **RAN Intelligent Controller (RIC)** and **Open-FH** and the interfaces as specified by the O-RAN Alliance.

O-RAN Center in Dallas offers E2E testing in O-RAN Alliance-inspired indoor & outdoor environment for multi-vendors integration and verification of a subset of O-RAN blue-print

Nokia O-RAN Center is equipped with various testing devices and environment



Demos

RIC use cases

- Advanced Traffic Steering
- More in planning 2H2021

vRAN

- Nokia vRAN on different HW and SW platforms (AWS, VMWare, Azure)

Open FH

- Nokia Classical DU and Nokia emulator for Netconf/Yang (M-Plane)
- 3rd party RU/UE emulator integration (E2021)

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