Demo: A dense vRAN deployment to challenge computing

Romain Beurdouche
romain.beurdouche@eurecom.fr
EURECOM
Biot, Provence Alpes Côte d'Azur, France

Raymond Knopp
raymond.knopp@eurecom.fr
EURECOM
Biot, Provence Alpes Côte d'Azur, France

Abstract

Several computer architectures were offered by the industry for implementing virtualized Radio Access Networks (vRAN). Assessing these solutions requires to challenge them in complete full-stack setups at scale. In this demo, we implement a deployment of several O-RAN Distributed Units (O-DU) on three different systems to compare their behavior.

CCS Concepts

• **Networks** → **Middle boxes / network appliances**; **Mobile networks**; **Network experimentation**; • **Hardware** → Platform power issues; *Board- and system-level test*.

Keywords

O-RAN, OpenAirInterface

ACM Reference Format:
Romain Beurdouche and Raymond Knopp. 2026. Demo: A dense vRAN deployment to challenge computing. In *20th ACM Workshop on Wireless Network Testbeds, Experimental evaluation & Characterization (WiNTECH '26), October 26–30, 2026, Austin, TX, USA.* ACM, New York, NY, USA, 1 page. https://doi.org/10.1145/3831662.3844795

1 Context

Several silicon industrials offered competing solutions for implementing O-DUs from the O-RAN standard architecture. They rely on combinations of general-purpose processors and Hardware Accelerators (HA). Several such systems enable to implement an O-DU with the OpenAirInterface RAN software stack. For instance, two systems from AMD, the first one relying on an EPYC Zen5 processor and the second one on a combination of an EPYC Zen4c processor and an RFSoC and a third system from Intel relying on a Sapphire Rapids Edge Enhanced processor embedding an accelerator for vRAN baseband processing [1].

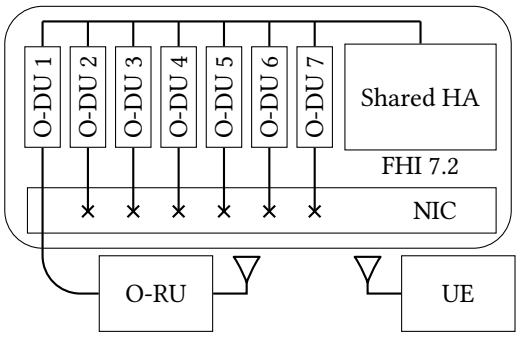

Figure 1: Schematic of the intended vRAN deployment

Solutions should be at some point evaluated in operational conditions, with full-stack operation and in intensive usage conditions. A framework enabling end-to-end experiments with several O-DUs sharing compute would enable these evaluations on existing and future computer architectures for vRANs.

2 Demo Content

In this demo, we implement a deployment of several 5G small-cell O-DUs on the three systems we introduced. This deployment enables us to make relevant observations on the behavior of networks on the three systems under load. This is a protocol with which we already carried out several studies on computer architectures from the industry [1].

We implement between 3 and 7 100MHz 4T4R small-cell O-DUs with the OpenAirInterface software stack on the different systems as illustrated in Figure 1. Only one O-DU instance connects to a real radio device. Traffic is emulated on the other O-DUs. The sharing of resources by the O-DUs is a key concern in this setup. Sharing the Network Interface Cards (NIC) and HAs is achieved with Single-Root I/O Virtualization (SR-IOV). We monitor the behavior of physical layer processing, especially the tail latencies and real-time compliance.

References

[1] Romain Beurdouche and Raymond Knopp. 2026. A framework for experimental dense vRAN deployments. In *WiNTECH '26* (Austin, TX, USA). ACM. doi:10.1145/3831662.3844162

WiNTECH '26, Austin, TX, USA

ACM ISBN 979-8-4007-2879-2/26/10
https://doi.org/10.1145/3831662.3844795