Evolution Toward the Next Generation Radio Access Network

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***Abstract*—The O-RAN Alliance introduces a disaggregated Radio Access Network (RAN) architecture to drive flexibility, speed and innovation into 5G RAN deployments. To facilitate open implementations of this architecture the O-RAN Alliance and the Linux Foundation have launched the O-RAN Software community focused on aligning a software reference implementation with the O-RAN Alliance's open architecture and specifications. The aim is to achieve a solution that can be utilized to unify and accelerate the evolution and deployment in the RAN. We briefly introduces the O-RAN Alliance, its architecture and key outcomes, as well as showcases its first open source implementation, Amber Release.**

***Keywords*—5G, RAN, Virtualization**

I. Introduction

It is expected that the number of connected devices will be more than three times the global population by 2022. This implies not only a huge increase in traffic demands in mobile networks, but also a diversification in the provided services as well as its requirements. Therefore, 5G networks are expected to meet the exponentially increasing throughput demands, while guaranteeing the diverse requirements of the provided services.

This new generation of mobile networks comes with the promise to open the door to new services which are classified in three categories: enhanced Mobile Broadband - eMBB (up to 10 Gbit/s), ultra-Reliable and Low-Latency Communications - uRLLC (up to ~ 1 ms), and massive Machine Type Communications (mMTC). Together with the concept of Network Slicing, the 5G attempts to introduce a certain flexibly, thus to efficiently deploy these new services over a common shared network infrastructure.

In this context, AT&T, China Mobile, Deutsche Telekom, NTT DOCOMO, and Orange jointly announced the creation of the ORAN Alliance [1] in February 2018, a carrier-led effort to drive new levels of openness in the Radio Access Network (RAN).

II. Towards an Open & Smart RAN

The O-RAN Alliance is committed to evolving radio access networks and promises making it more open and smarter. Figure 1 shown the O-RAN Alliance Reference Architecture [1]–[3], introducing new interfaces (i.e. Open Front Haul, A1, O1, E2), making open and fully inter-operable key 3GPP interfaces (X2, F1, Xn, W1, E1), redefining the RAN functional blocks (near-real-time RAN intelligent controller - near-RT RIC, non-real-time RAN intelligent controller - non-RT RIC, open central unit - O-CU, open distributed unit - O-DU) and leveraging Network Functions Virtualization (NFV) and Software-Defined Networking (SDN) technologies.

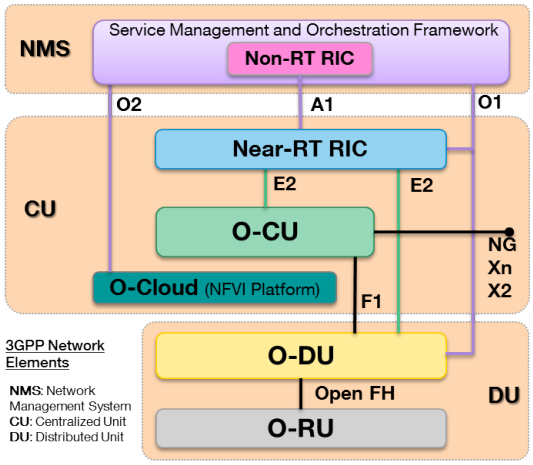

Fig. 1: O-RAN Alliance Reference Architecture

In order to facilitate and accelerate open implementations of this architecture, the O-RAN Alliance and the Linux Foundation have launched the O-RAN Software community (OSC) [4] in April 2019.

In December 2019, a first open source O-RAN software suite is released, Amber Release. This release includes key milestones as the functional pre-specification near-RT RIC, RAN applications (xApps) that run on top of the Near-RT RIC (e.g., Admission Control, KPI Monitoring) and Operations, Administration and Maintenance (OAM) support for pre-specification implementation of O1 interface to support O-RAN Open Front Haul.

Amber release marks a big step towards quick availability of commercial O-RAN capabilities in operational networks and pave the way to the next release "Bronze" expected by June 2020.

References

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