**O-RAN**

This is the logical architecture of O-Ran. As I understand it, every component of this architecture should be implemented.

Diagram

Description automatically generated

Diagram

Description automatically generated

**Release Notes:**

<https://docs.o-ran-sc.org/en/latest/release-notes.html>

**F Release**

The F release is completed and its source code is maintained within the master branch of each repo. The release image lists and source code can be found here for each projects.

<https://wiki.o-ran-sc.org/display/REL/F+Release>

1. Near-Real-time RAN Intelligent Controller Platform (E2 Interface) (RICPLT)
2. Near-Real-time RIC X-APPs (RICAPP)
3. Non-Real-time RIC (A1 & R1 Interfaces) (NONRTRIC)
4. Operation and Maintenance (OAM)
5. O-RAN Central Unit (OCU)
6. O-DU High
7. O-DU Low
8. Simulators (SIM)
9. Infrastructure (INF)
10. Integration and Test (INT)
11. Documentation (DOC)
12. Service Management and Orchestration (SMO)

**Progresses:**

I have successfully implemented these two parts. I am following this guideline video:

<https://wiki.o-ran-sc.org/download/attachments/51904936/demo_f_release_1680x1050.mp4?version=1&modificationDate=1655980117725&api=v2>

1. **Near-Real-time RAN Intelligent Controller Platform (E2 Interface) (RICPLT)**
2. **Near-Real-time RIC X-APPs (RICAPP)**

**Next step:**

Setup **Non-Real-time RIC (A1 & R1 Interfaces) (NONRTRIC)**

<https://wiki.o-ran-sc.org/display/RICNR/Release+F+-+Build#ReleaseFBuild-ProjectRequirements>

**Important Links:**

* **Release criteria checklist - Release F (near -RT RIC) :** <https://wiki.o-ran-sc.org/display/RICP/Release+criteria+checklist+-+Release+F>
* **O-RAN ALLIANCE Specifications:** <https://orandownloadsweb.azurewebsites.net/specifications>
* **Releases:** <https://wiki.o-ran-sc.org/display/REL/Releases>

**Components:**

**Near Real-Time RAN Intelligent Controller (Near-RT RIC)**

The near-RT RIC software platform provides xApps cloud-based infrastructure for controlling a distributed collection of RAN infrastructure (eNB, gNB, CU, DU) in an area via the O-RAN Alliance’s E2 protocol (“southbound”).

Near RT RIC is a near‐real‐time, micro‐service‐based software platform for hosting micro-service-based applications called **xApps.** They run on the near-RT RIC platform. The near-RT RIC software platform provides xApps cloud-based infrastructure for controlling a distributed collection of RAN infrastructure (eNB, gNB, CU, DU) in an area via the O-RAN Alliance’s E2 protocol (“southbound”). As part of this software infrastructure, it also provides “northbound” interfaces for operators: the A1 and O1 interfaces to the Non-RT RIC for the management and optimization of the RAN.

The main takeaway: Near-RT RIC is responsible for creating a software platform for a set of xApps for the RAN; non-RT RIC provides configuration, management and analytics functionality. For Open RAN deployments to be successful, both functions need to work together.

**The examples of xApps/rApps proposed so far include [4], [24]:**

 Context-based dynamic handover management for vehicle-to-everything (V2X)

 Dynamic radio resource allocation for unmanned aerial vehicles

 Traffic steering

 Quality of service/quality of experience (QoS/QoE) optimisation

 Massive MIMO beamforming optimisation

 RAN sharing

 QoS-based resource optimisation

 Service assurance for RAN slices

 Multi-vendor slice performance management

 Dynamic spectrum sharing

 Optimisation of resource allocation for network slice subnet instances (NSSIs),

 Local indoor positioning in the RAN