RIC-TaaP (RIC Testing as a Platform)

Revolutionizing RIC testing with ns-O-RAN-flexric

Open innovation is a fundamental aspect of network optimization and serves as a key pillar of the Open RAN (Radio Access Network) concept. To support this, xApps and rApps have been introduced as third-party applications that automate network optimization across various time scales.

The ns-O-RAN-flexric architecture aligns with the Testing as a Platform strategy, offering operators enhanced opportunities through:

- **Improved Network Efficiency:** Streamlining operations to boost overall performance.
- **Greater Scalability:** Enabling networks to grow and adapt to evolving demands seamlessly.
- **Cost Reduction:** Minimizing operational expenses through optimized resource management.
- **Encouragement of Innovation:** Fostering the development of new solutions and services.
- **Vendor Diversity:** Promoting a multi-vendor ecosystem that enhances competition and choice.

What is ns-O-RAN-flexric?

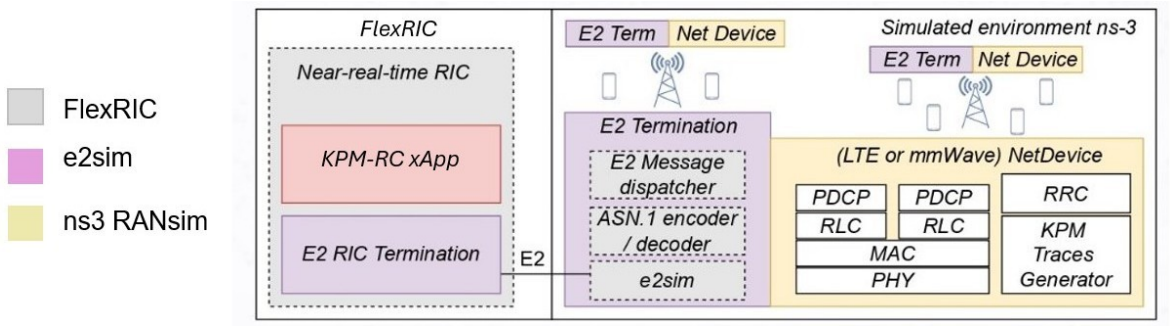
Integrated by **Orange Innovation Egypt's** team, **ns-O-RAN-flexric** is a powerful open-source platform designed to simulate and test 5G networks. It combines the best of both worlds, integrating the **FlexRIC** technology from EURECOM with the **ns-O-RAN** simulator. This combination provides a comprehensive and realistic environment for researchers, developers and network operators to experiment with and validate 5G technologies.

The network contains three important elements, FlexRIC, NONRTRIC, and ns-ORAN simulator act as near real-time, Non-real-time open-source RICs and RAN simulator, respectively. Orange successfully integrated these nodes to facilitate xApp/rApp design and verification within this test-bed network platform. The integration of FlexRIC with the ns-ORAN simulator represents a significant advancement in the development of a capable and fully open-

source platform for xApp operation testing, particularly considering the high costs of commercial RICs counterpart.

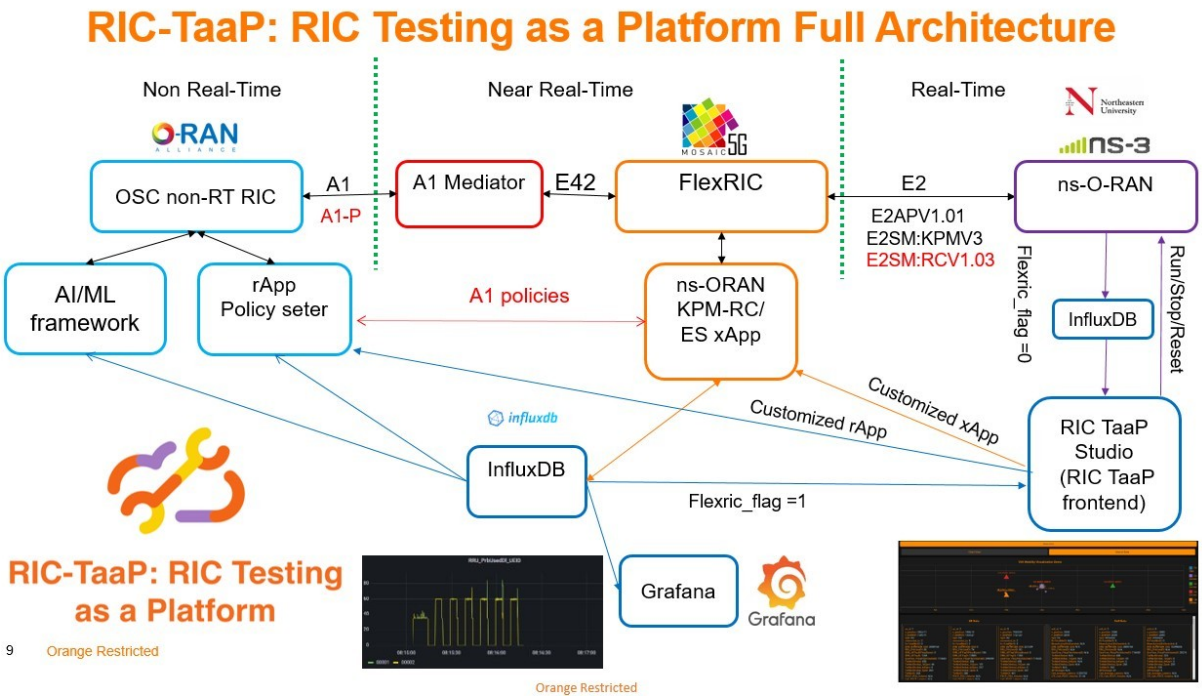
While the Integration of NONRTRIC with FlexRIC that extend the platform capabilities toward more intelligent functions like:

- Data statistics database and visual presentation to observe simulator status through rApp training
- Applying policies and testing.



RIC-TaaP Full Architecture

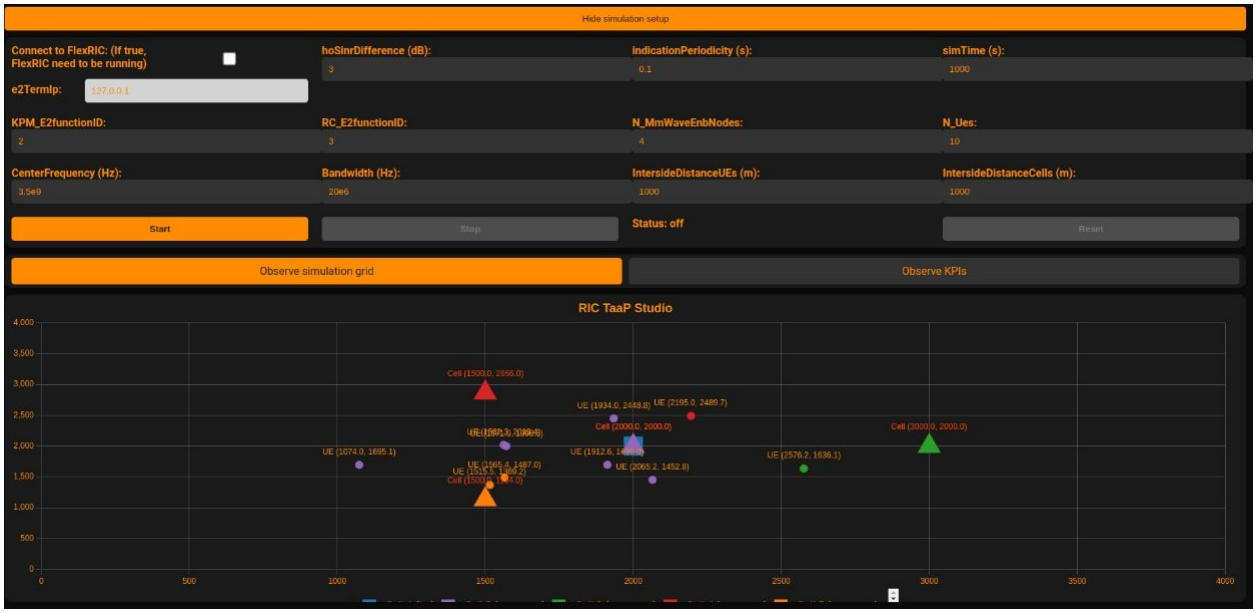
The platform contains three important elements, FlexRIC form EURECOM , NONRTRIC from O-RAN Software Community (SC), and ns-O-RAN simulator form Institute for the Wireless Internet of Things (WIoT) act as Near real-time, Non real-time open-source RICs and 4G/5G RAN simulator, respectively. The team successfully integrated these nodes to facilitate xApp/rApp design and verification within this test-bed network platform. Also, RIC- TaaP studio is an NMS, supports several features.



RIC-TaaP Studio

The RIC-TaaP Studio serves as the frontend for the ns-O-RAN-flexric developed by Orange. It offers a variety of features, including:

- Create Scenario: Create scenarios with a wide range of customizable parameters.
- Operational Features: Start, stop and reset the simulator.
- Reported KPIs visualization: Access a comprehensive list of Key Performance Indicators (KPIs) that can be reported by the simulator.
- Controlled Parameters notifications: Identify the parameters managed by xApp operations.
- Customized xApp design: Design your own xApp logic through the GUI by selecting a set of options in the studio.



How is ns-O-RAN-flexric Making a Difference?

Given the commercial O-RAN large-scale simulators are very expensive and closed solutions, development cycle of xApp/rApp is threatened and undermined. Fully open-source RIC-TaaP is required to cultivate and foster xApp/rApp development. RIC-TaaP is easy to deploy and does not require

dedicated or specialized hardware. RIC-TaaP platform allows to do innovations in RAN faster and without involvement of large resources.

SMEs and researchers (i.e. industry and academia) in the field of RAN innovation are seeking to test and verify their designs in a complete environment. Those communities will adopt RIC-TaaP since they are unable to afford costly RIC test solutions or platforms.

Useful Links:

- **Project link repo:**
  https://github.com/Orange-OpenSource/ns-O-RAN-flexric/
- **Announcement with FlexRIC community:**
  https://gitlab.eurecom.fr/mosaic5g/flexric/-/tree/dev?ref_type=heads#34--integration-with-ns3-oran-ran-simulator
- **10th OpenAirInterface Anniversary Workshop Demo Video:**

  https://youtu.be/PgwKyk8b6K0
- **KPM-RC xApp Demo:**

  https://www.youtube.com/watch?v=xD4TbgZ74wY