

ALTIOSTAR

Leading Network Transformation

Response to NTIA 5G Challenge Notice of Inquiry

10th February 2021



AltioStar is pleased to provide comments and recommendations in response to the NTIA 5G Challenge Notice of Inquiry

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Benefits for O-RAN, Disaggregated RAN and 3GPP Open Interfaces

- 3GPP 5G architecture is designed to be open and supports disaggregation and virtualization through use of a service-based architecture and open interfaces
- Open RAN, spearheaded by O-RAN Alliance, aims to support
 - Disaggregated RAN Architecture with virtualized HW and SW and open interfaces
 - RAN Intelligent Control enabling use of data analytics and AI/ML
 - O-RAN Software Community Linux Foundation project leading development of open-source SW reference implementation based on O-RAN specifications
- Open RAN initiatives enable innovation through use of open RAN architecture and interfaces harnessing the power of virtualization, cloud infrastructure and COTS SW/HW and bringing intelligence to the network edge
- Fosters creation of a diverse and competitive RAN supplier ecosystem which can drive down CAPEX and OPEX and enabling new best-of-breed entrants especially of mature cloud infrastructure and orchestration technologies
- Fully virtualized RAN allows platform harmonization across RAN, Core network and Edge, multi-vendor COTS HW, multi tenancy, scaling, self healing and deployment flexibility
- O-RAN and other industry groups and alliances such as ONF, TIP, DARPA OPS-5G, and others are driving openness by promoting open 5G stacks and platform architectures

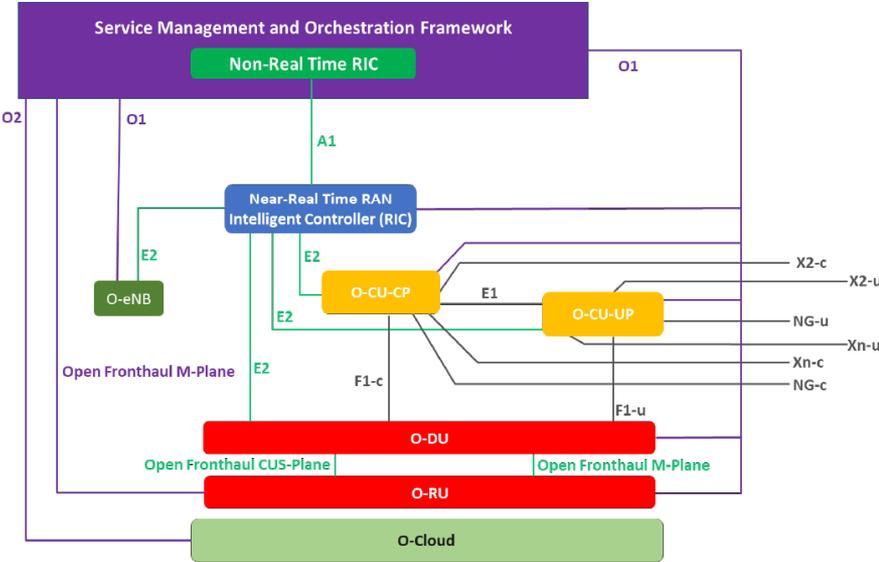


Figure 2: Logical Architecture of O-RAN
 Source: (www.o-ran.org) O-RAN.WG1.O-RAN-Architecture-Description-v02.00

I. Challenge Structure & Goals

A. How could a Challenge be structured such that it would take advantage of DOD's role as an early U.S. Government adopter of 5G technology to mature the open 5G stack ecosystem faster, encourage more participation in open 5G stack development including encouraging new participants, and identify any roadblocks to broader participation?

AltioStar Response:

Following are examples of themes around which a Challenge could be structured:

- Challenge: Plug and play integration and interoperability
 - Focus on interoperable Open Network Functions defined in 3GPP and O-RAN
- Challenge: Expand Open Radio (O-RU) eco-system
 - Develop high performance and efficient reference O-RU designs
 - Reference RU designs will drive innovation in L1 stack disaggregation
 - This will enable new Radio Original Design Manufacturers (ODMs) to compete and help proliferate O-RAN based architectures
- Challenge: Compact, outdoor O-DU using latest silicon technologies
 - Development of hardware accelerated SoC designs for compact and ruggedized outdoor O-DU solutions addressing lower space, cost and power targets
- Challenge: Develop platform, portable and interoperable applications on RAN Intelligent Controller (RIC), Open-source AI/ML algorithms to develop intelligent radio resource control functions
 - ONF Reference RIC Reference platforms to drive interoperability, portability of Apps
- Challenge: Demonstrate Zero Trust Security in O-RAN using a combination of standardized security protocols to secure open interfaces and industry-best cloud native security practices to secure containerized RAN network elements
- Challenge – Development of satellite-based mesh network where satellites serve as a communications backhaul and as base-stations

I. Challenge Structure & Goals

B. How could a Challenge be structured to focus on the greatest impediments to the maturation of end-to-end open 5G stack development?

Altiostar Response:

- Propose building industry consortiums to address DoD 5G Use Cases. Consortiums could focus on:
 - Developing Use Cases
 - Developing system functional requirements to realize end-to-end use case requirements
 - Developing interoperability profiles and performance benchmarks for functional use cases
- Foster open 5G stack development by prioritizing O-RAN architecture in DoD use cases and requirements
- Greater participation of DoD in 3GPP and O-RAN standards development

I. Challenge Structure & Goals

D. How will the open 5G stack market benefit from such a Challenge? How could a Challenge be structured to provide dual benefit to both the Government and the open 5G stack market?

AltioStar Response:

- Promote multi-vendor interoperability of O-RAN architecture and 3GPP based 5G open interfaces
- Ease of inter-vendor integration and plug-n-play deployments
- Development of reference O-RU designs for O-RAN based radios will help accelerate development of a reliable US based supply chain and O-RU vendor ecosystem

II. Incentives and Scope

A. What are the incentives in open 5G stack ecosystem development that would maximize cooperation and collaboration, promote interoperability amongst varied open 5G stack components developed by different participants, and mature desired featured sets faster with greater stability?

Altiostar Response:

- RAN development is a highly capital-intensive activity requiring 100s M\$ due to complexity of the product
 - Incentivize Open RAN vendors through grants/business for DoD contracts
- Funding the development of reference RU designs for O-RAN based radios will help accelerate development of a diverse supply chain and RU vendor ecosystem
- Fund development of a reference 5G network for DoD use cases

II. Incentives and Scope

B. Could a Challenge be designed that addresses the issues raised in previous questions and also includes test and evaluation of the security of the components?

Altiostar Response:

- Industry driven PlugFests are used define test benches, test plans, etc. which will support the E2E testing of Use Cases. This helps evaluate multiple solutions in a common test environment.
- Sufficient laboratory infrastructure with appropriate tools and test equipment to enable testing in a multi vendor environment
- Ensure that individual components of the network comply with 3GPP defined SeCurity Assurance Specifications (SCAS) for gNB, and industry-standard Center for Internet Security (CIS) configuration benchmarks. This will ensure that sufficient security measures are incorporated to harden the individual components of the network.

II. Incentives and Scope

E. What 5G enabling features should be highlighted in the Challenge, such as software defined networking, network slicing, network function virtualization, radio access network intelligent controller, radio access network virtualization?

AltioStar Response:

- 5G enabling features:
 - Virtualized RAN Orchestration and Automation
 - Radio Access Network Intelligent Controller
 - Network Function Virtualization and Cloud Native architecture
 - Software Defined Networking
 - Ultra reliable, Low Latency communications
 - Time Sensitive Networks



Thank You

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