LightReading LIVE! WEBINAR

Be 5G Ready With Next-Gen Programmable Radio

November 5, 2019

Sponsored by

STL

Today's Presenters

Gabriel Brown
Principal Analyst, Mobile Networks, Heavy Reading

Swapnil Shah
Head – System Engineering, PNI, Sterlite Technologies Limited

Dr. Ravishankar Ravindran
Principal Architect – Radio Technologies, Sterlite Technologies Limited

Agenda

- Role of RAN in 5G era
- 5G demands radical shift in network infrastructure
- 5G PODS for radio infrastructure
- 5G and ORAN
- ORAN use cases with pRadio
- STL at forefront

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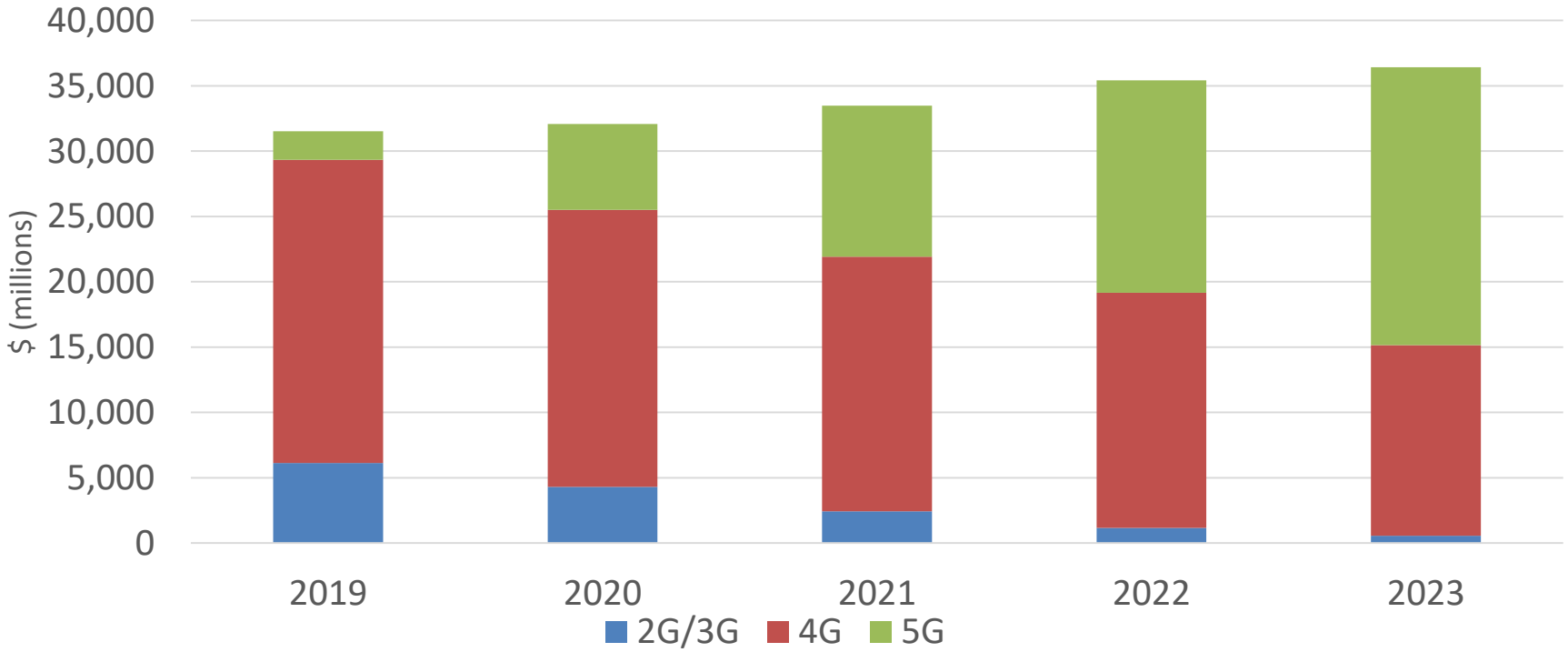
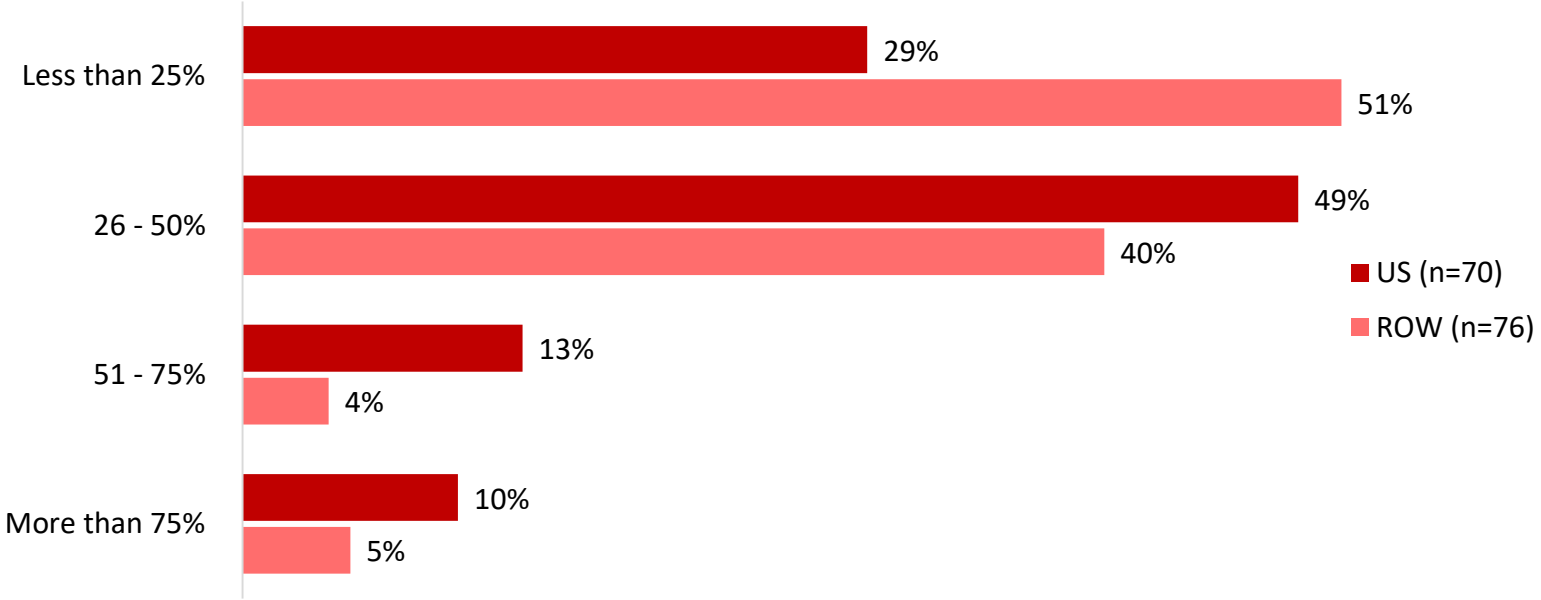
RAN Equipment Market Forecast



Source: Ovum, 1Q 2019

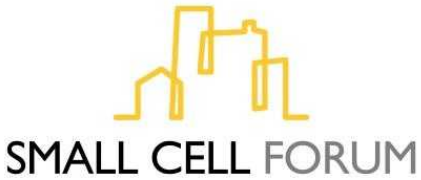
Ambitious on 5G Coverage

How much of your RAN footprint will be running 5G by end of 2021?



Source: Heavy Reading, 1Q 2019

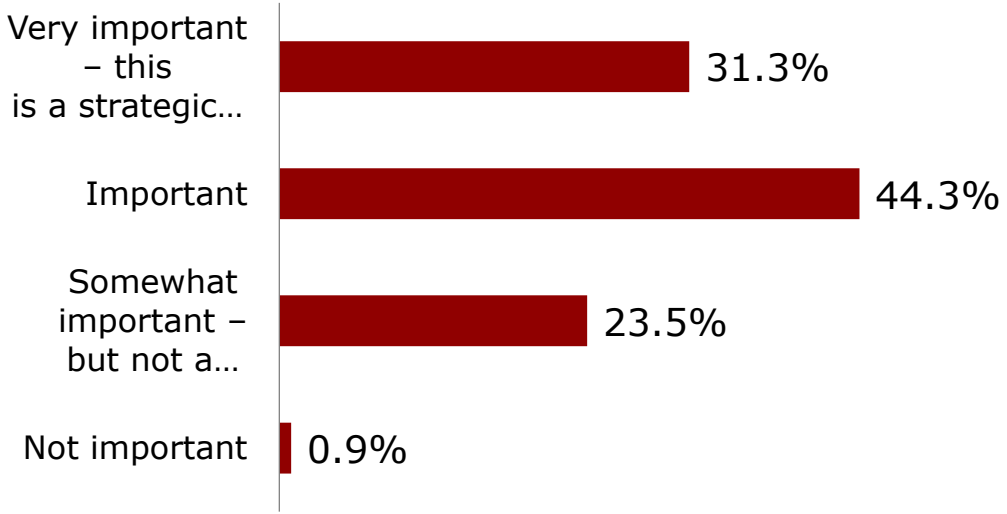
Open RAN Initiatives



TELECOM INFRA PROJECT

Open RAN is Strategic

How important will Open RAN be to your company's network over the next three years? (n=115)



Source: Heavy Reading's Open RAN operator Survey (n=117)

- **A majority of respondents see Open RAN as important or strategic to their company over the next three years.** Optimistic, but not irrationally so, is one way to summarize this response.
- **U.S. respondents were significantly more likely than the rest of the world (RoW) to identify Open RAN as "a strategic priority," (39% vs 25%).** This pattern of the U.S. being more bullish than RoW is repeated several times in the survey.

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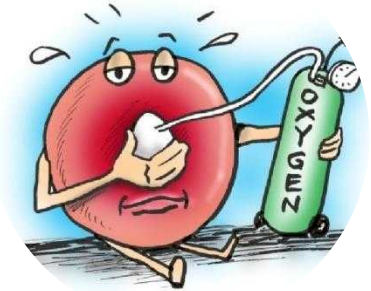
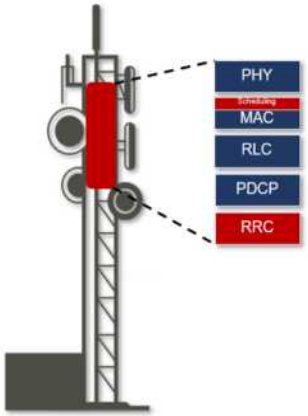
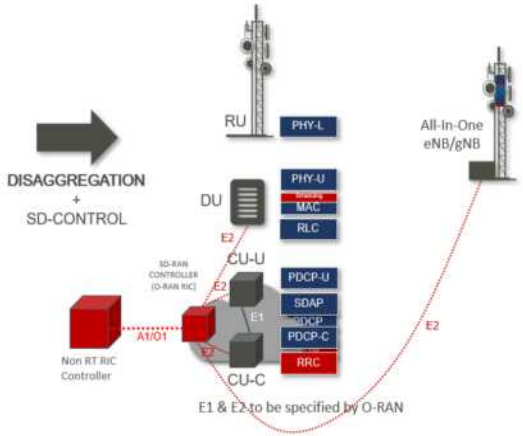
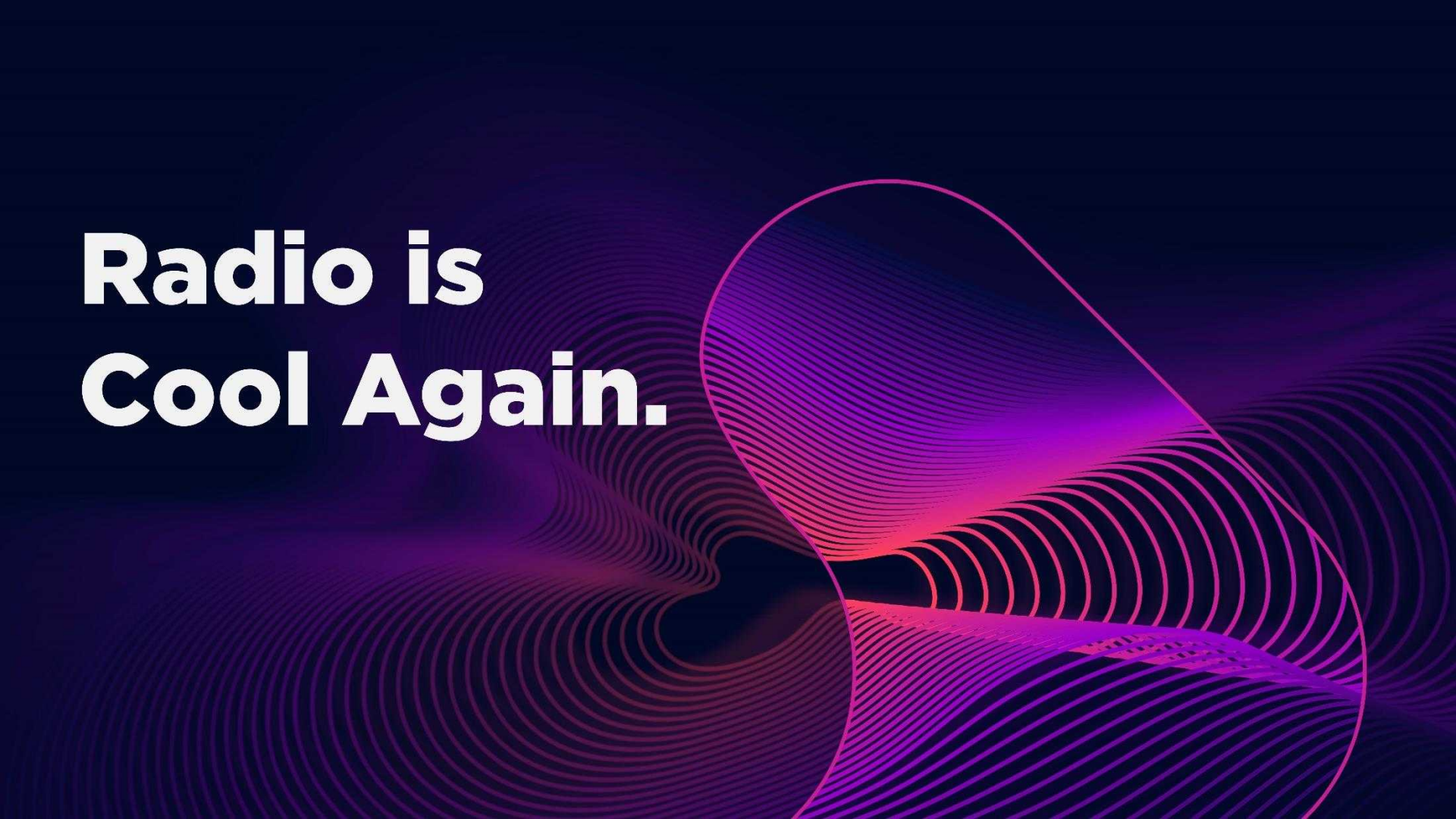
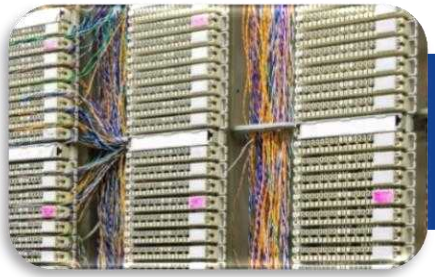







Radio is
Cool Again.

Radical shift to open and programmable radio networks



PODS™
Programmable Open Disaggregated Solutions

TRADITIONAL	NON-TRADITIONAL
Closed interfaces	Standardized open interfaces
Vendor specific hardware	Programmable white boxes
Monolithic and proprietary	Cloud native, disaggregated
Localized control and data plane	Centralized, programmable control plane
Expensive	Frugal

100% Programmable Open Disaggregated radio solution

P Programmable

O Open

D Disaggregated

S Solutions

Chipset, Hardware, Software

O-RAN ALLIANCE · TELECOM INFRA PROJECT · ONAP · ONF Open Networking Foundation

ASOCS On-premise mobile clouds · vmware · DELL · KMW · MIRANTIS · Polaris Networks 5G - Connecting the Future · .....

- 5G NSA AND SA
- PRIVATE LTE
- RURAL CONNECTIVITY
- EDGE CLOUD

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pRadio Solution

Example STL 5G POD

- OCP Compliant
- RU - 3 certified partners
- CU & DU - Partnership established, Integration and testing ongoing currently
- RIC - Setup for RT and NON-RT with use cases
- Virtualization and Cloud Platform - 2 certified partners
- Orchestration - Pre-production setup
- EPC / 5GC - Integration certified
- OSS BSS Analytics - Integration certified
- ML - Use Case implementation
- Each module disaggregated with tested open interfaces support
- Community Pre-production lab at Santa Clara (US) and Pune (India)

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5G and ORAN

- **5G with Rel-15 has solution to offer eMBB with flexible 5G-NR**
  - Core Networking using CUPS and realizing heterogeneous services using Architecture enabled Network Slicing paradigm
- **Rel-16 and beyond to address more pressing URLLC use cases**
- **ORAN focused on disaggregating RAN with real-time optimization over open interfaces, while keeping 3GPP core interfaces**
  - Best of the breed applications
  - Open Front Haul (RU/DU i/f)
  - Open Interfaces to Disaggregated RAN (DU, CU-CP, CU-UP) -> O1/A1/E2
  - Open Whitebox design for E2 nodes design and implementation

ORAN Architecture

ORAN Architecture :

- RAN focused with 3GPP compatibility
- Openness, agility and cost
- Software-defined through RIC
- Data-driven optimization (AI/ML)

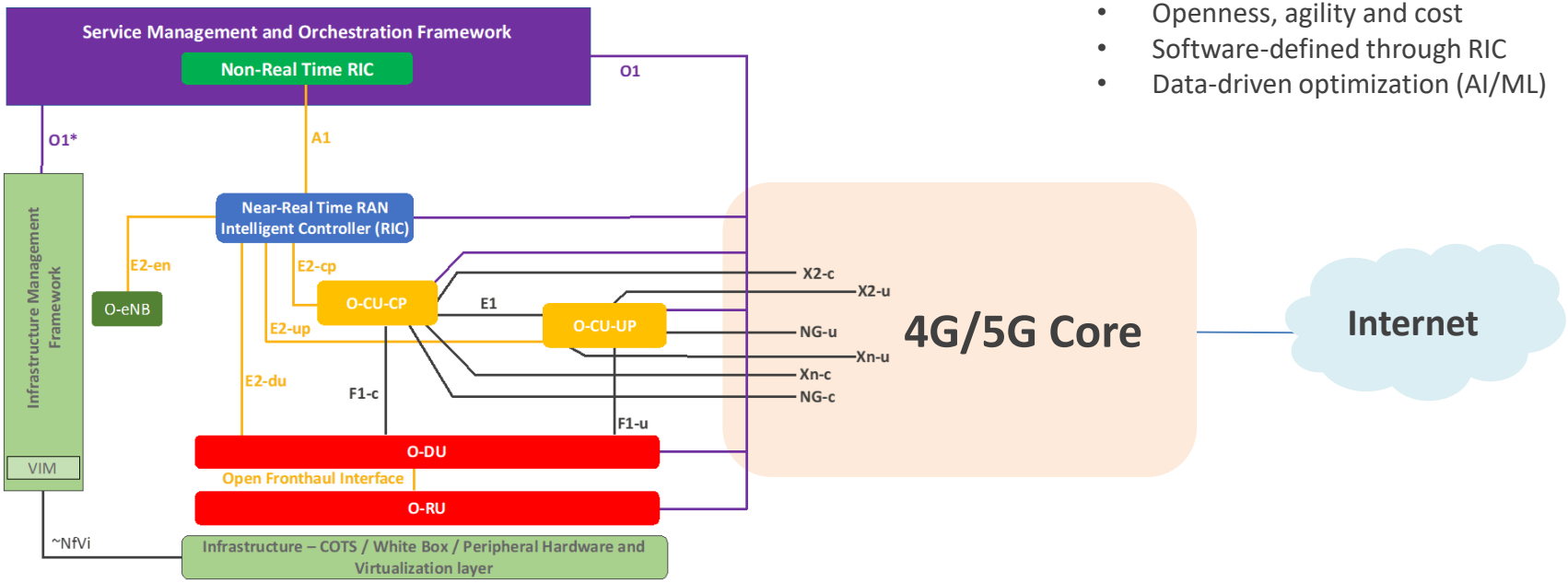


Fig. Source ORAN WG1 - Use case and Architecture

Non real-time and real-time RIC Details and Multi-level Optimization Loops

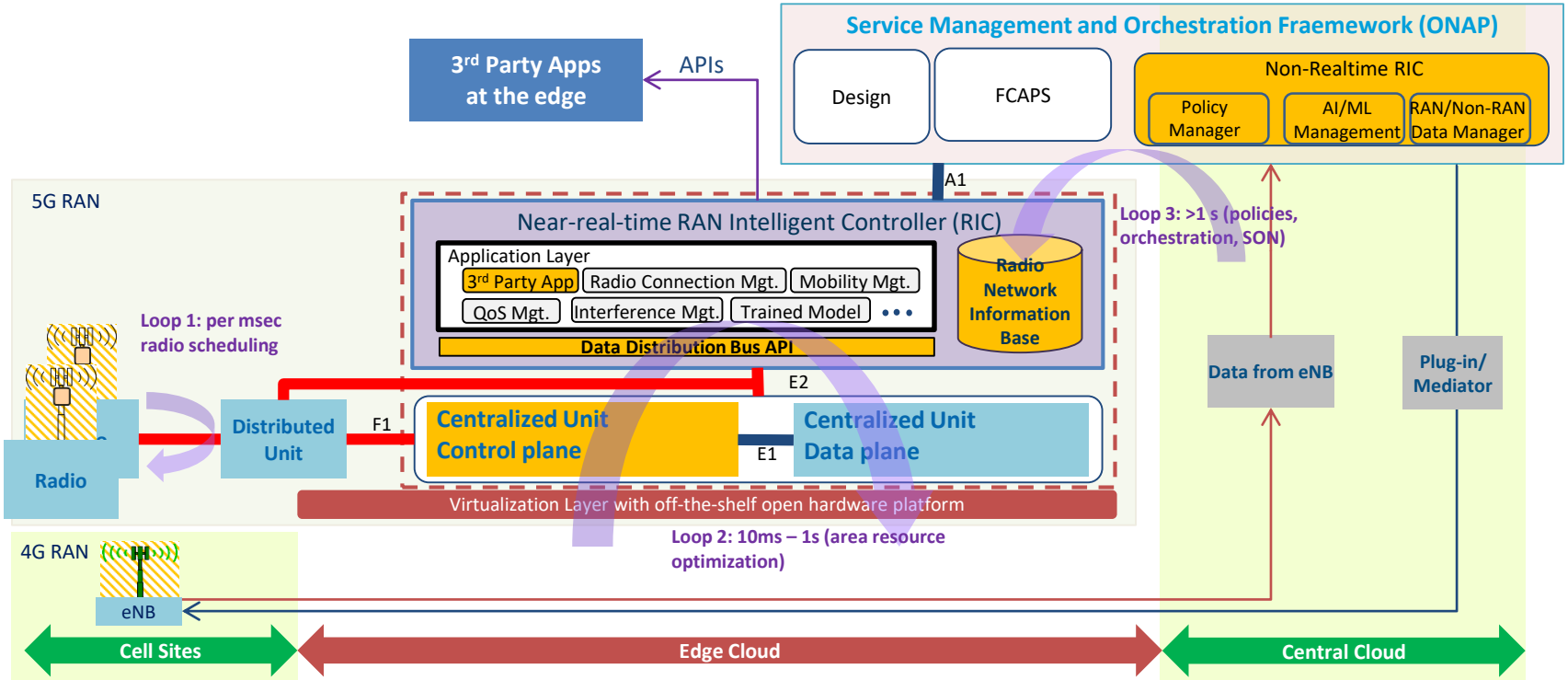
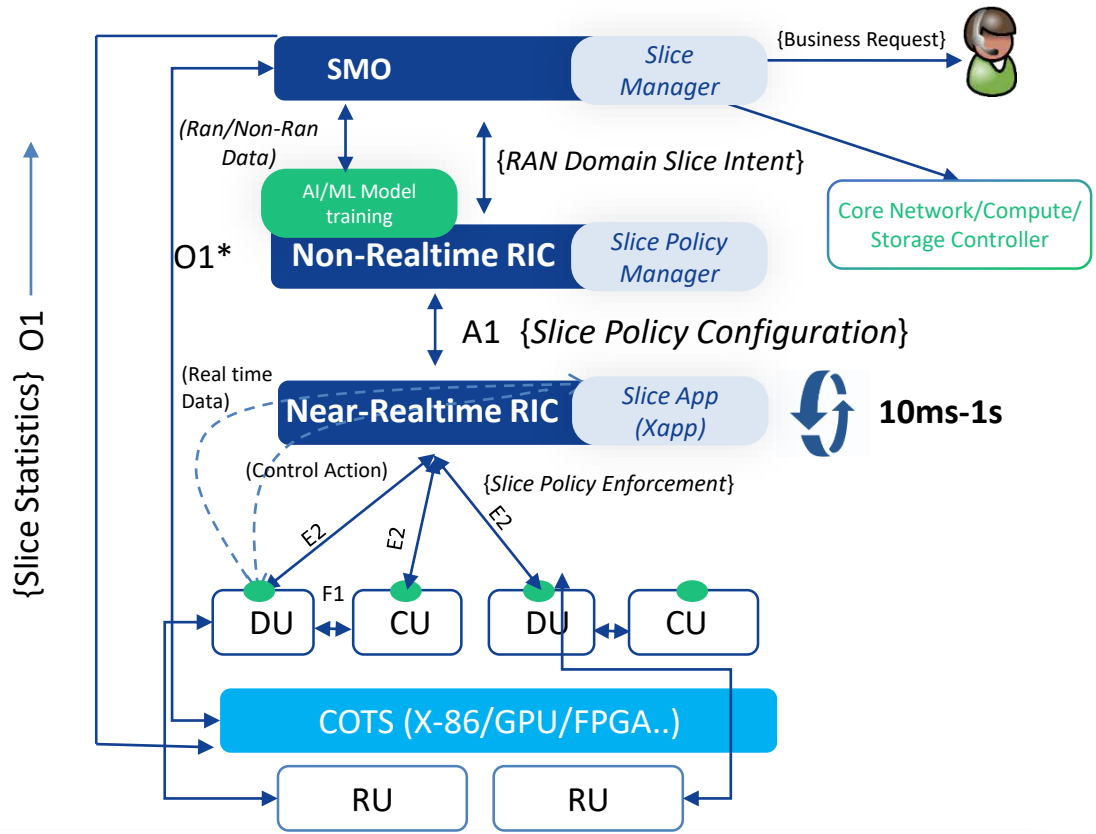


Fig. Source ORAN

O1*/O1/A1/E2 Interfaces

Life cycle showing the use of these three Interfaces for Slice Management

- **O1***
  - NFVI related LCM Management of virtual E2 nodes and the Control Plane components.
- **O1**
  - FCAPS of E2 Nodes (Fault, Configuration, Accounting, Performance, Security), Non-Realtime and Real time RIC.
  - Data subscription interface from E2 nodes (DU/CU).
- **A1**
  - Application specific Policy, Intent, Trigger and Data Management
  - AI/ML Model Management
  - Application specific Enrichment Data to Near-RT RIC
- **E2**
  - Policy to control mapping
  - Control Management
  - E2 Node Data Subscription to X-APPs



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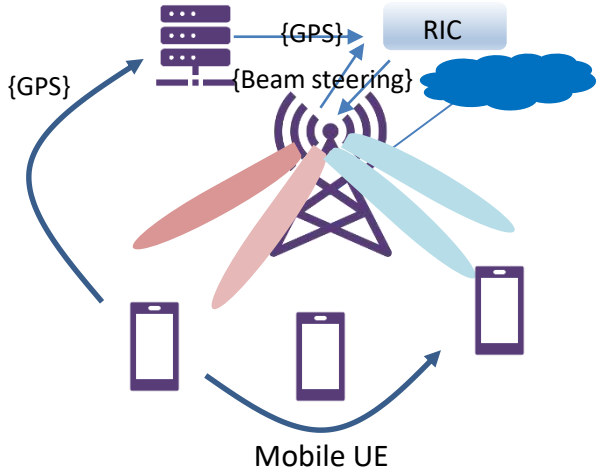
Use cases motivating ORAN

- **Three broad Categories**
  - **RAN Service Assurance (Application Specific optimization)**
    - Dynamic RAN Slicing and Management considering slice SLAs
  - **RAN Automation (Minimizing Human effort)**
    - 3D MIMO Optimization
      - Adaptive Beam Configuration in non-Realtime and Real time conditions
  - **RAN Optimization (User performance metrics or Spectral Efficiency)**
    - Traffic Steering
      - Move from cell-centric to Use Centric Optimization
    - QoE Optimization
      - Application classification, QoE prediction, and available bandwidth prediction



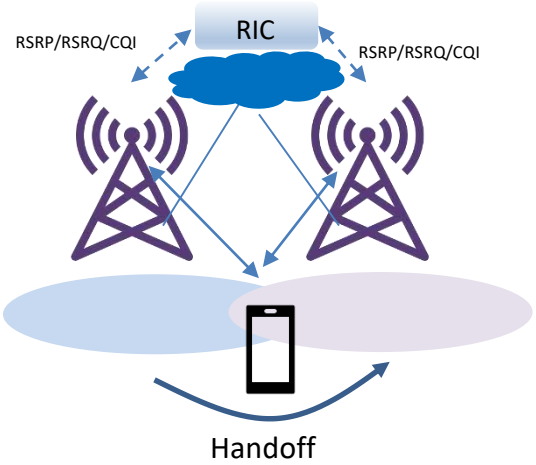


Fig. Source ORAN WG1

Deployment models

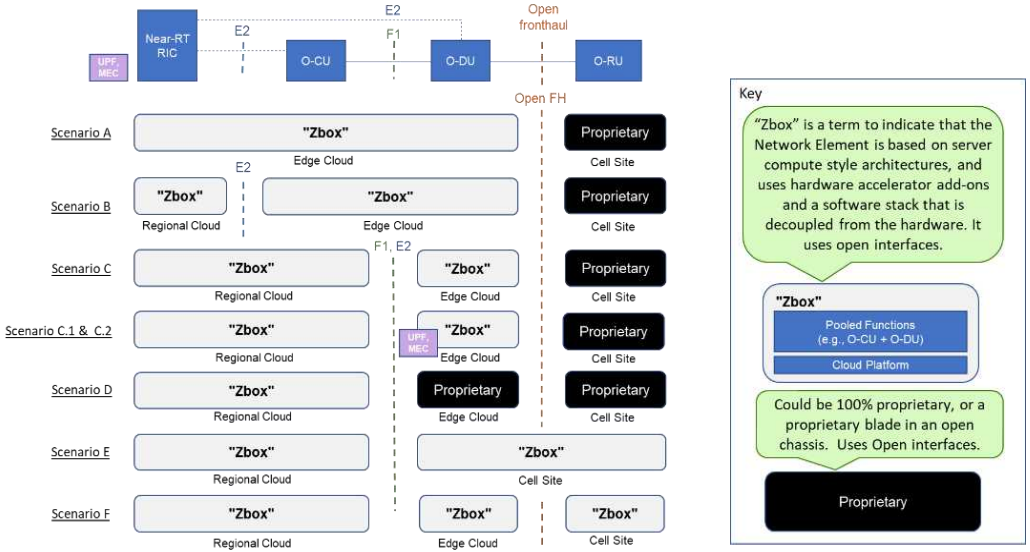


Fig. Source ORAN WG6

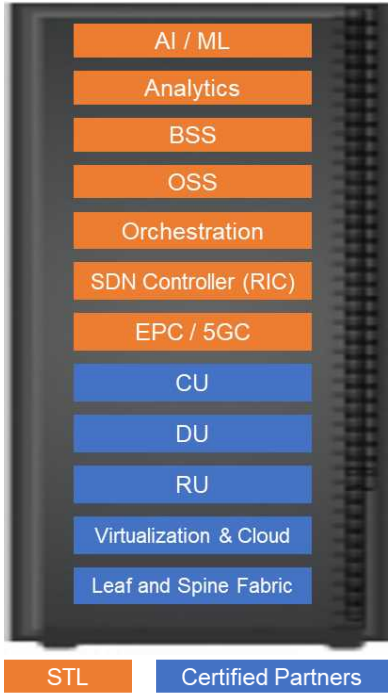
Deployment Models

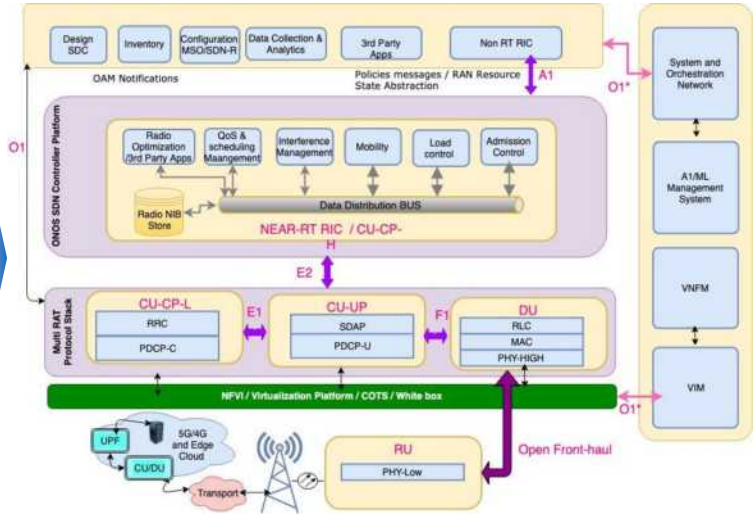
- Different models of deployment for Neal-Realtime RIC and CU/DU/RU
- Choice of deployment depends no user context, workload, and QoS requirements

Enterprise Scenario

- Specific deployment scenario converging outdoor and Pico cell deployment
- Near-RT RIC managing many CU-DU pairs
- Multiple RU aggregating to and Edge Cloud (Central Office)
- Ideal for Latency sensitive services

5G in a box (pRadio Solution) - powered by STL





Programmable

- Global Orchestrator
- Near-Realtime Controller
- Non-Realtime Controller
- Intelligent Applications for RAN

Open

- ORAN / 3GPP Aligned

Disaggregated

- Disaggregated RAN
- CUPS based
- Virtualized

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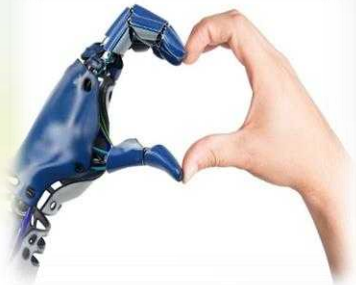
Why STL - Value Proposition



Q&A