Way to an Open RAN

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5G New Services Demand New Networks

Internet of Everything

- Mobile Internet
- Vertical Industry

Open
Intelligent
Principles of Network Transformation

1. Virtualization and White-box
2. Next Generation Intelligent Network Operation
3. SDN based Programmable Connectivity
4. Cloud Native and Devops

Cost Reduction, Efficiency Maximization, Innovation Acceleration
Open and Intelligent Network

Intelligent Platform

Open Fixed Access
Open Mobile Access

Disaggregated IP and
Optical Transport

Cloud based Core
Intelligent Platform
Open Source Enables Openness

Fixed Access
- vOLT
- vBRAS
- CPE
- vOLT
- vBRAS
- CPE
- vOLT
- vBRAS
- CPE

Enterprise
- vOLT
- vBRAS
- CPE
- vOLT
- vBRAS
- CPE
- vOLT
- vBRAS
- CPE

Macro BS
- vOLT
- vBRAS
- CPE
- vOLT
- vBRAS
- CPE
- vOLT
- vBRAS
- CPE

Micro BS
- vOLT
- vBRAS
- CPE
- vOLT
- vBRAS
- CPE
- vOLT
- vBRAS
- CPE

Telecom Cloud Platform

Public Internet

Industrial Internet

Network Orchestration

GPP based Infrastructure

Edge Cloud

Intelligent Controller

CU

UPF

MEC

Telecom INFRA PROJECT

ORAN ALLIANCE

ACUMOS

ONAP

ONAPFV

AkraiO

Edge Stack

AKRAINO
CU’s RAN initiative: CUBE-RAN

1. **Cloudification**
   - HW and SW decoupled
   - Open design and open source
   - CU/UPF/MEC co-platform

2. **Ubiquitous**
   - Open F1/F1/Xn/NG interface
   - Macro and Micro cells coordination

3. **Brilliant**
   - Radio Resource Management
   - Network management and orchestration

4. **Edge Innovation**
   - Network capability exposure
   - End-to-end local services for vertical industry
Key Challenges for an Open RAN

- White-box design of RRU, pushing the convergence of components choice
- C/U/S/M Plane definition for open F1 and FH for multi-vendor interoperability
- BBU Performance guarantee under HW and SW disaggregation
- CU, UPF and MEC co-platform design without performance penalties

New Business Model, New RAN Ecosystem
Objectives for Various Scenarios

**Macro BS**
- Virtualization and cloudification
- Elastic infrastructure management

**Micro BS**
- White-box design and open source stack
- Common network management platform

**Enterprise BS**
- BS/Core/Application co-platform
- Highly flexible air interface protocol configuration

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Diagram:
- **Access Layer**
  - DU
  - RU
  - MEC
  - UPF
  - CU
  - Controller
  - Macro BS
  - Micro BS (hot spot, poor coverage area, etc)
  - Macro BS
  - Enterprise BS

- **Aggregation Layer**
  - F1
  - NG
  - BBU
  - MEC
  - CU
  - Macro BS
Joint Development and Trials

China Unicom set up the CUBE-RAN Lab in 2018.

**First** 1.8GHz LTE and 3.5GHz NR NSA Cloudified RAN Platform, Exhibited in 2018 PT EXPO CHINA

**Largest** Cloud-RAN Network for Field Trial, XiongAn, China, 2019

**First** Open BS based Network for Factory Use Case with GUOXUAN-HIGH TECH, AnHui, China, 2019
Accelerating an Open 5G RAN

ONF SD-RAN Project

- CU, UPF and MEC co-deployed based on COMAC platform. CU will be realized under a SDN powered control plane and P4 powered user plane.
- ONOS based RAN Controller. Interfaces definition between controller and CU and DU.
- DU and RU designed with FH decoupled.
Build an open and prosperous industrial eco-system together!