

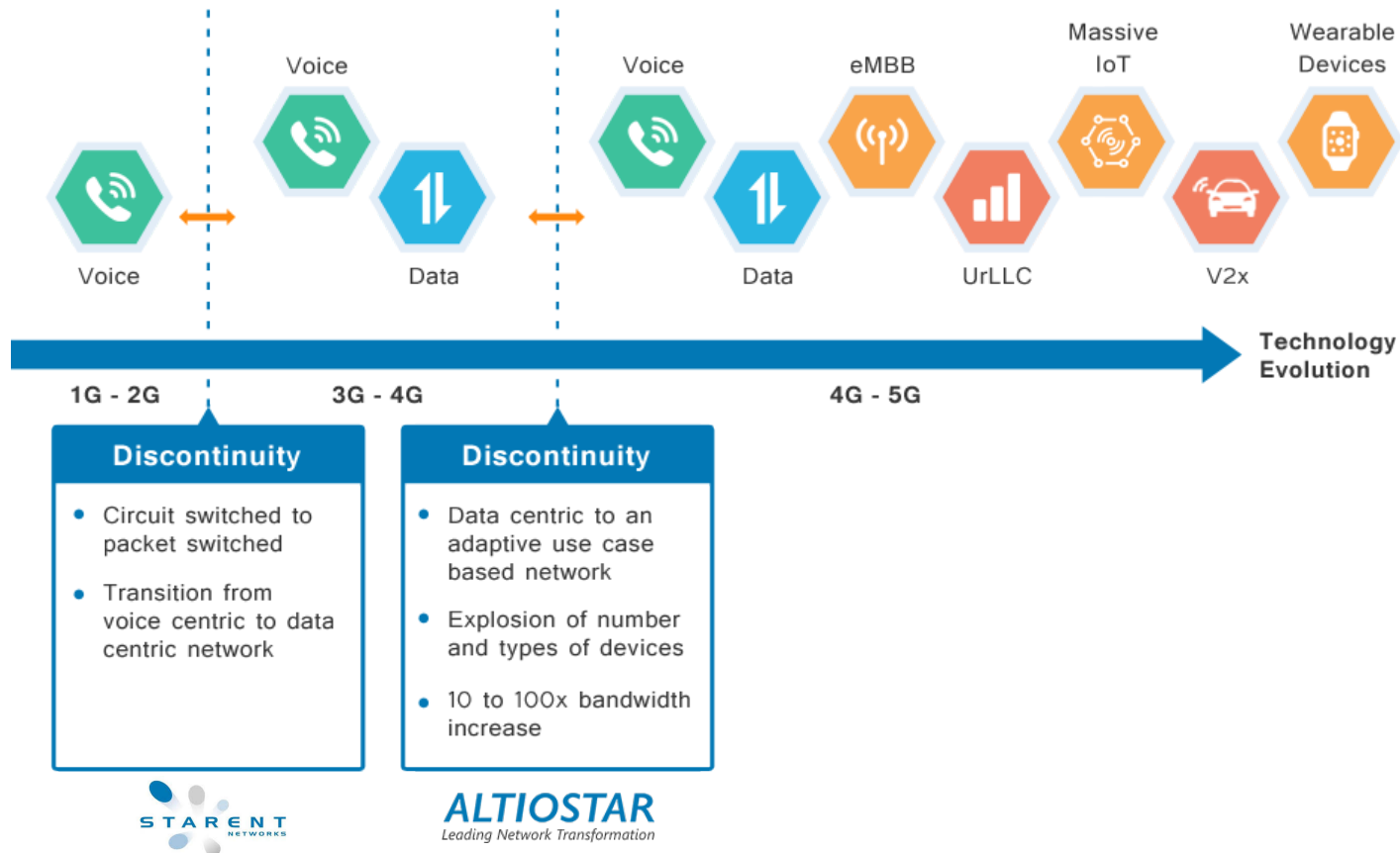
# 5G Transformation with Open Source



## Altiosstar Open vRAN

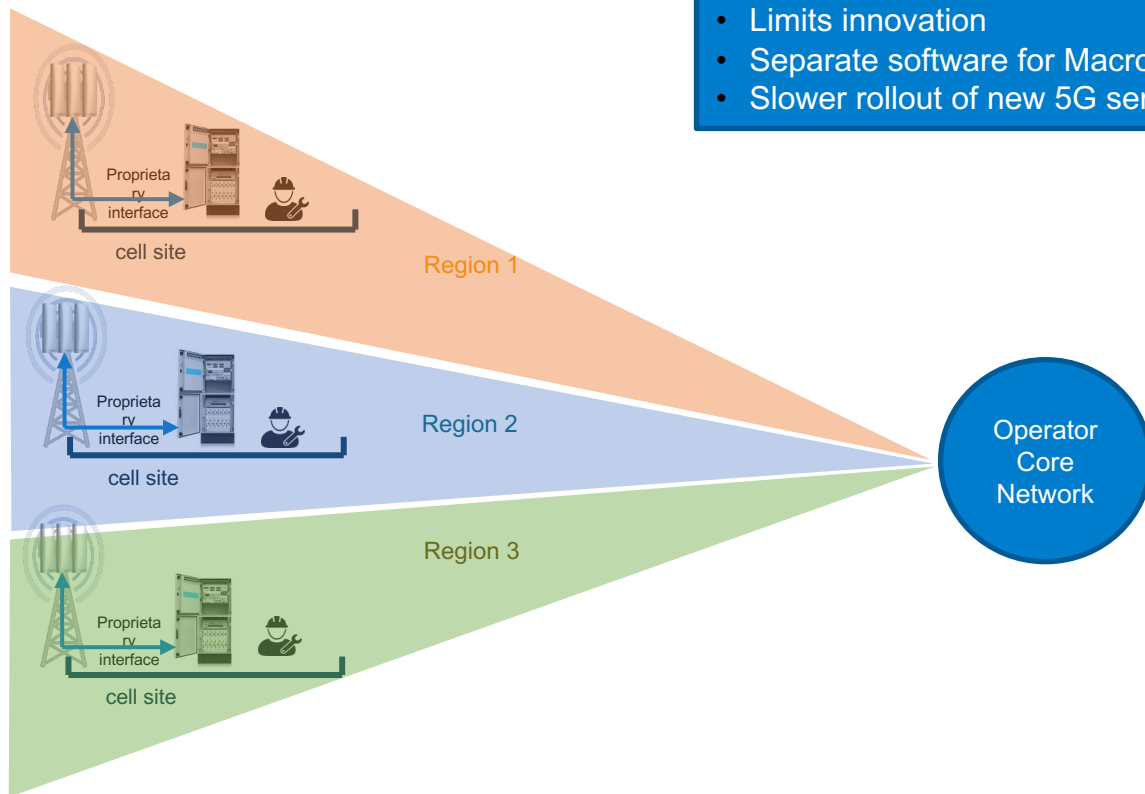
Anil Bhandari, VP- Product Management, Altiosstar Networks

# Industry Paradigm Shift



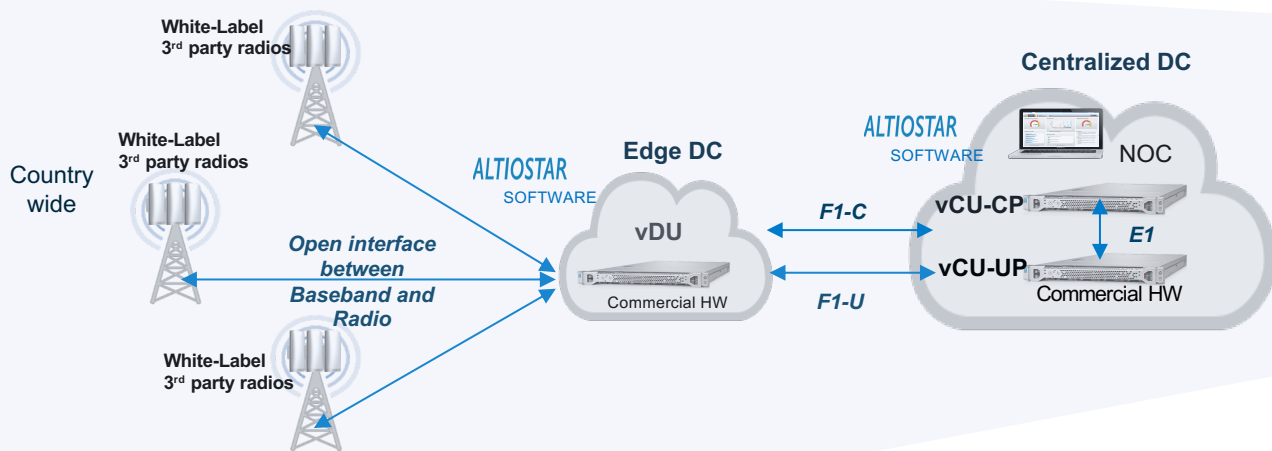
# Traditional RAN Model Constrains Operators

- Proprietary solution from single vendor per region
- Vendor lock-in constrains competition
- Limits innovation
- Separate software for Macro, small cells, 4G & 5G
- Slower rollout of new 5G services



# Open vRAN Benefits

- HW/ SW disaggregation
- Open sourcing of best-of-breed network elements
- High services velocity
- Ability to support complex use cases
- Complex & expensive equipment removed from cell site
- End-to-end software managed network



# Open vRAN in Action

# Rakuten

*World's first large-scale Open vRAN deployment*

Data Volume  
0.5GB/Day  
Twice the other  
Japanese Operators

RCS Calls  
70%  
2.5x more RCS calls  
than VoLTE

Video Demand  
2 Million Videos/Day  
50% of traffic is video  
and streaming

Network meeting demands of data-hungry customers

**99.7%**

AVAILABILITY

**99.7%**

ACCESSIBILITY

**99.8%**

RETAINABILITY

Stable network performance with increasing traffic

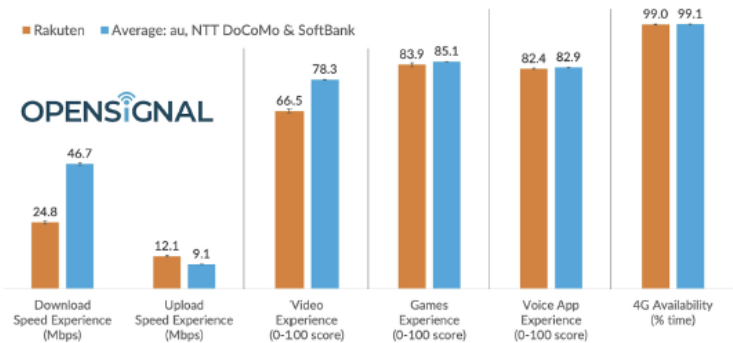
5,739

Base Stations as of June 2020



■ Rakuten ■ Average: au, NTT DoCoMo & SoftBank

OPENSIGNAL



Data collection period: 5 May - 4 June, 2020. © Opensignal Ltd

Meets or beats customer experience KPIs globally

# 5G Transformation with Open Source



## Thank You

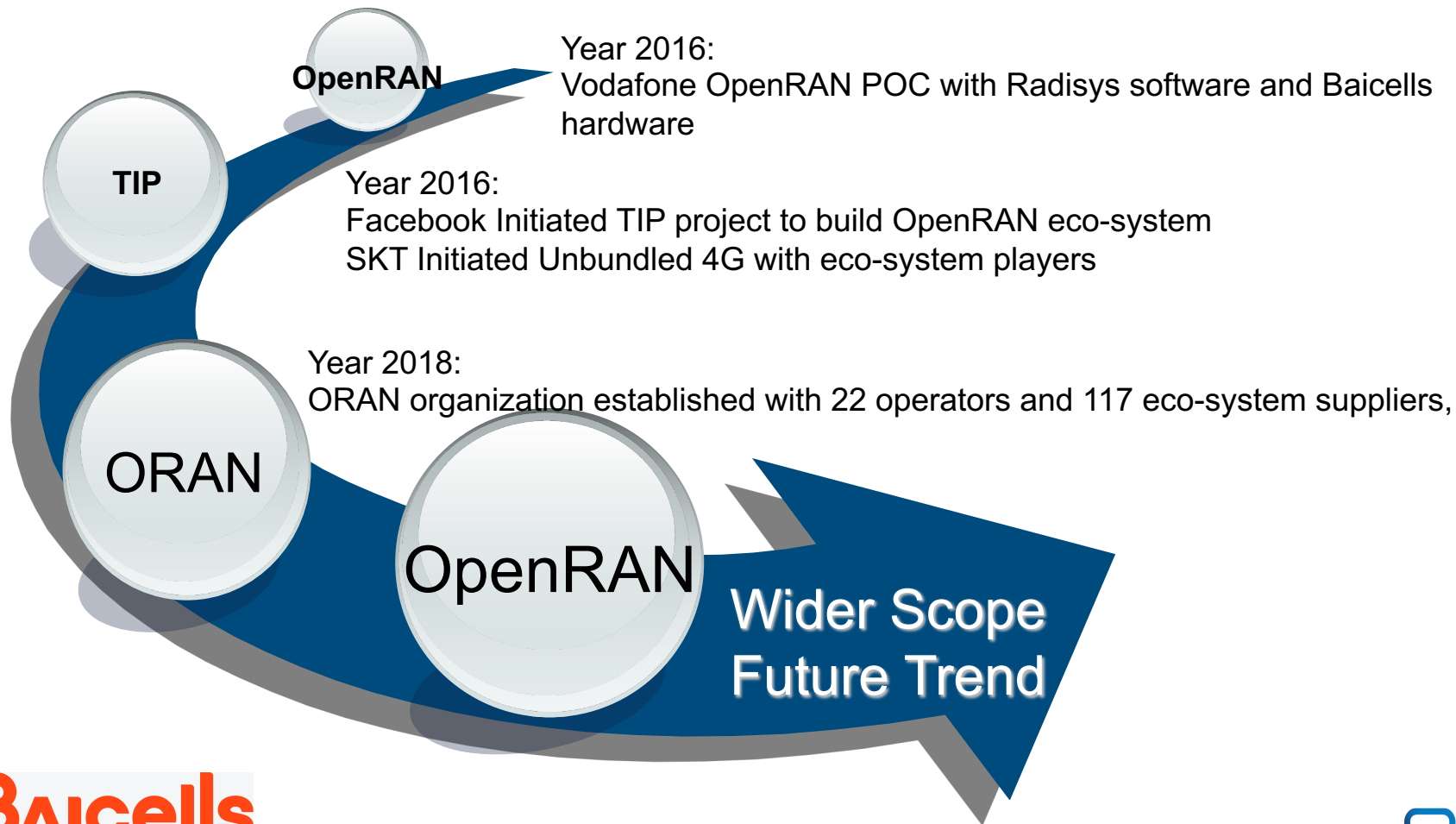
[marketing@Altistar.com](mailto:marketing@Altistar.com)  
[www.Altistar.com](http://www.Altistar.com)

# 5G Transformation with Open Source



## Computing is the essence of OpenRAN

BaiWei  
GM Int'l Market / VP  
Baicells





OpenRAN is about Opening the ubiquitous computing resource

# What should be called OpenRAN?

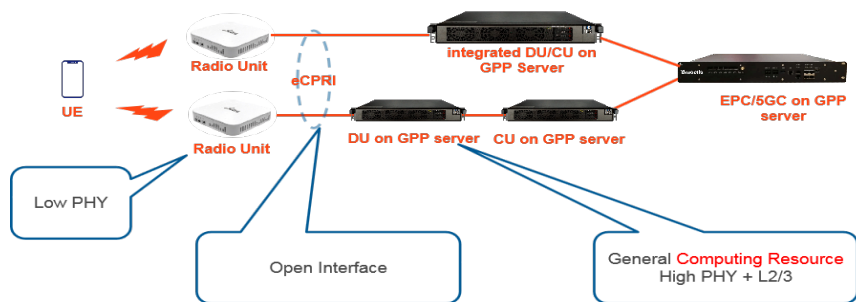
- OpenRAN shall have software and hardware decoupled, hardware shall be generally open for all the corresponding software

- OpenRAN shall have inter-operatable interface between hardware and software, between different layers of software, e.g. PHY/MAC/RLC/PDCP

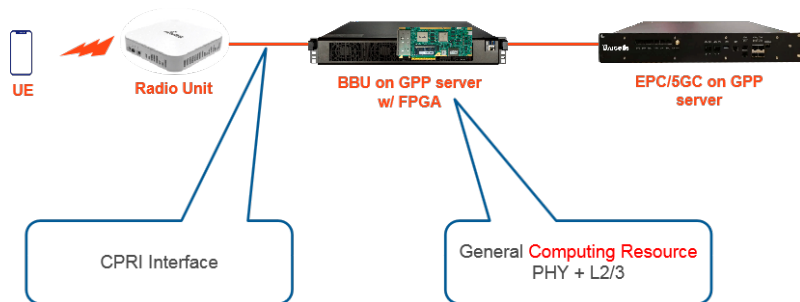
- OpenRAN shall be transparent and flexible, shall provide additional options for operator to choose.

# 4 Options about Opening computing resource for OpenRAN

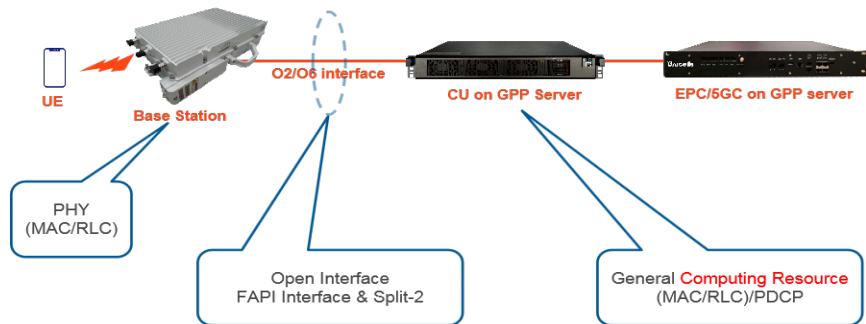
## OpenRAN With Split 7-2



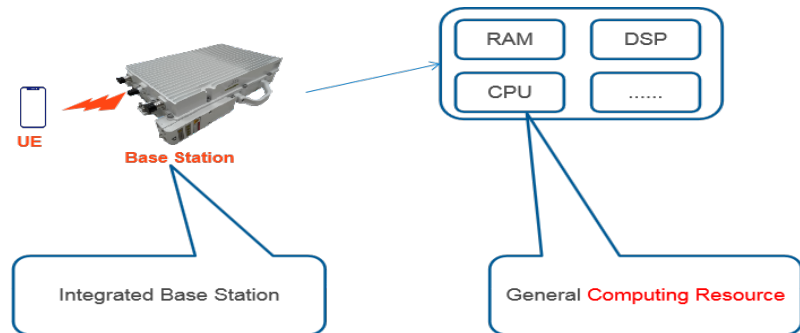
## OpenRAN With Split 8



## OpenRAN With Split 2/6




























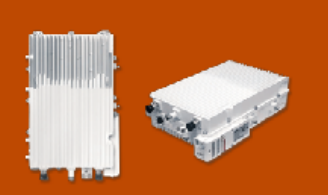
## OpenRAN With Integrated BTS



OpenRAN is about

- Opening strong hardware capability
- Opening rich hardware portfolio

# Fully utilize the existing products as OpenRAN hardware portfolio

BBU/DU		RRU		Outdoor eNB		Indoor eNB		CPE	
									
BBU/DU - IDU1U	BBU/DU - IDU2U	pRRU (Gamma632)	pRRU (Gamma430)	Nova249 (2X40W)	Nova246 (2X20W)	Relaycell	Relaycell-E	PoE Router	Atom Indoor CPE
									
BBU/DU-ODU	Accelerator Card	AAU (Gamma 846)	mmWave eNB	Nova436Q (4X1W)	Nova243 (2X10W)	Neutrino	Neutrino-E	Atom Outdoor CPE	Atom Outdoor CPE
									
rHub	EU			Nova233 (2X1W)	Nova230 (2X500mW)	IoT Smallcell		High-power IoT Base Station	

OpenRAN is about to come

# Baicells OpenRAN Compatible Site at China Mobile



## Typical Scenario :

Hot Spot in city or downtown

## Scenario Feature:

1. Difficult for site acquisition, and high cost for site rent;
2. Large population density

## Scenario Value :

1. High-integrated, mini footprint, no high-requirement for site
2. flexible backhaul for fast deployment to realize traffic diversion.



Flexible Installation  
Mounted on Pole or on Wall

Camouflaged Antenna or  
Landscape Antenna

Scenario	Details of Simplified Site
Hot Spot in City	<p>1 eNB + 1 Antenna, with camouflage if eco-friendliness needed, reducing complaints.</p> <p>Mini Footprint, flexibly mounted on wall or on pole;</p> <p>Fixed broadband network can be used as backhaul.</p>

### 3 Key factors to make OpenRAN a success

#### Hardware

**Hardware** industry need to open the computing resource and provide sufficient portfolio to enable the OpenRAN commercial deployment

#### Integration

**Integration** is desired to be done by one of the OpenRAN segments provider, should behave the product management rather than project management

#### TCO

**Total Cost Ownership** need to be reduced and reasonable by innovative ideas, can't be just copying traditional solutions and decouple things.



# 5G Transformation with Open Source



## Thank You

[contact@baicells.com](mailto:contact@baicells.com)  
[www.baicells.com](http://www.baicells.com)

# 5G Transformation with Open Source



## The opportunities of CBRS Network Hosted by Aether

Ben Lin, Sercomm

# The Benefits of Aether Project Brings



Note: it is cited from the slides of Aether Webinar

# Citizens Broadband Radio Service Overview

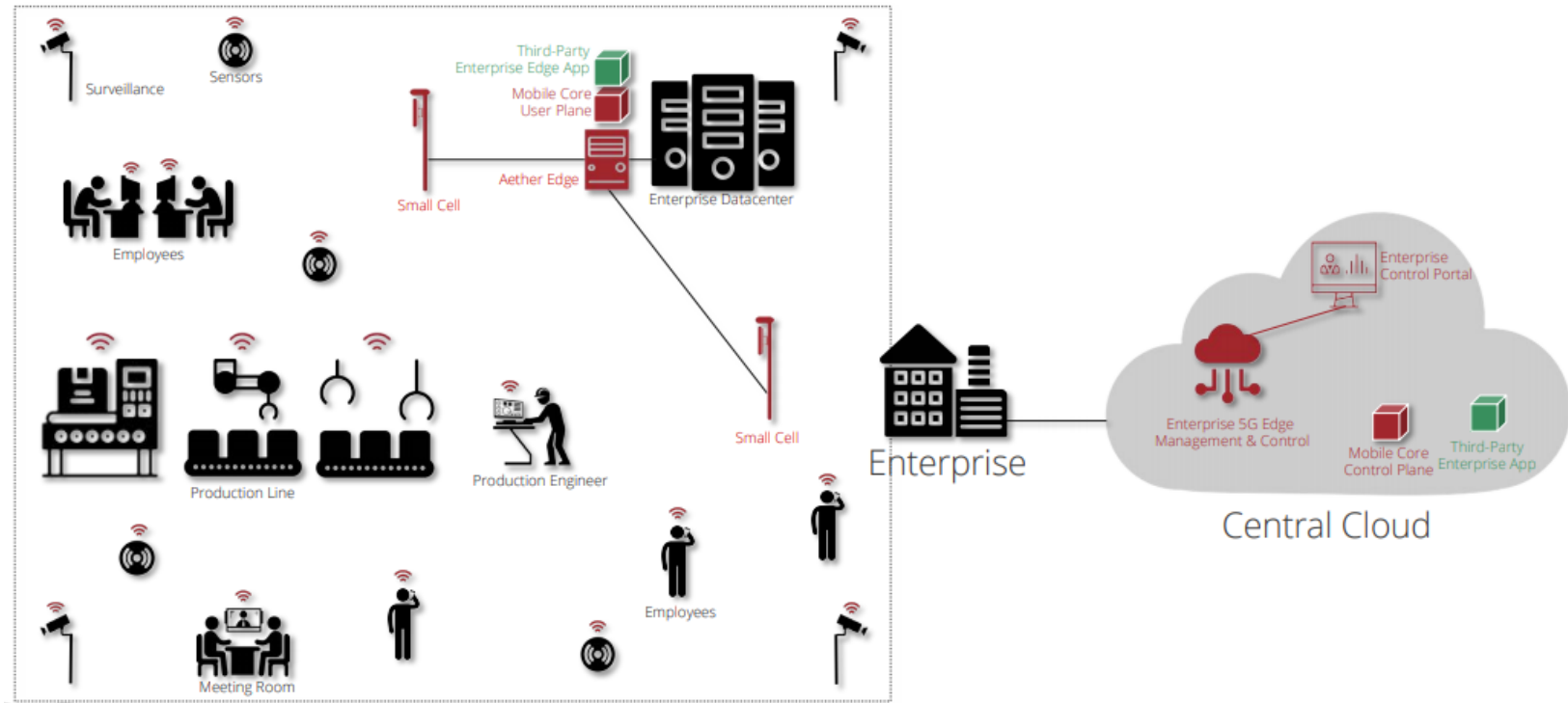
## Features

- **CBRS = 3.5GHz band**
- **Defined by 3GPP as B48/N48**
- **Spectrum is Shared**
  - Incumbents
  - Priority Access (PAL)
  - General Authorized Access (GAL)
- **Spectrum is Controlled**
  - Minimize Interference
  - Maximize Reuse
  - Security
- **Spectrum is Available**
  - GAL approved by FCC in 2019
  - PAL auction completed by FCC in Aug, 2020

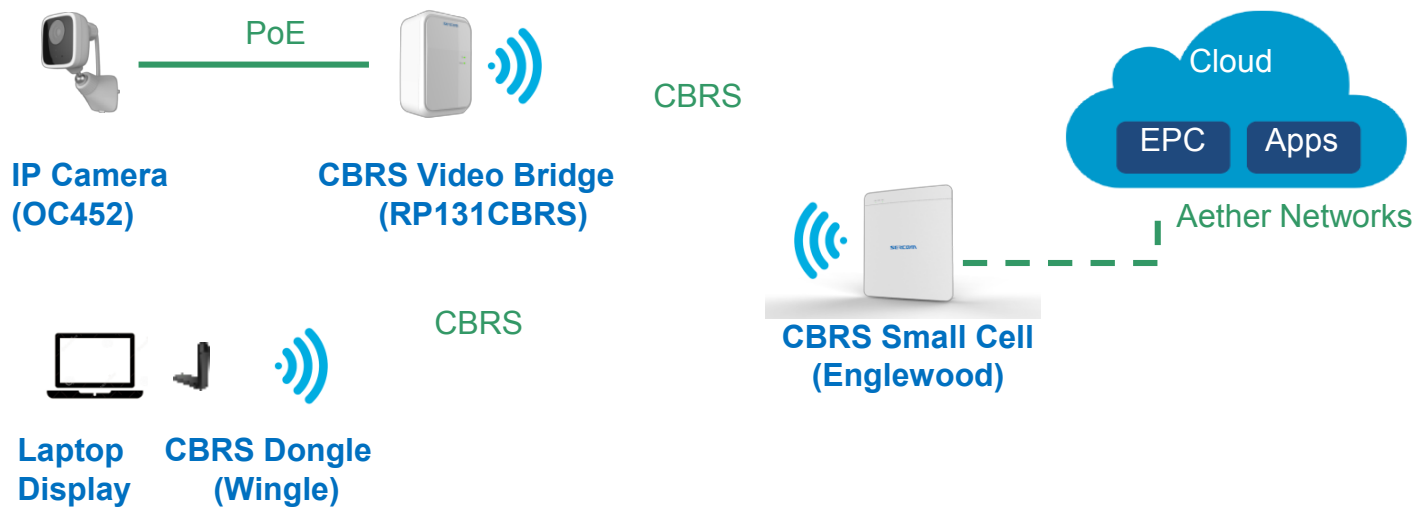
## Benefits

- **Cellular grade security & QoS**
- **WiFi level economic scale**
- **Create Seamless Experience**
  - Connect Automatically
  - No SSID or Login
  - Roaming between licensed band
- **Speed Time to Market**
  - Enterprise
  - Factory Automation
  - Smart City
  - In-Home

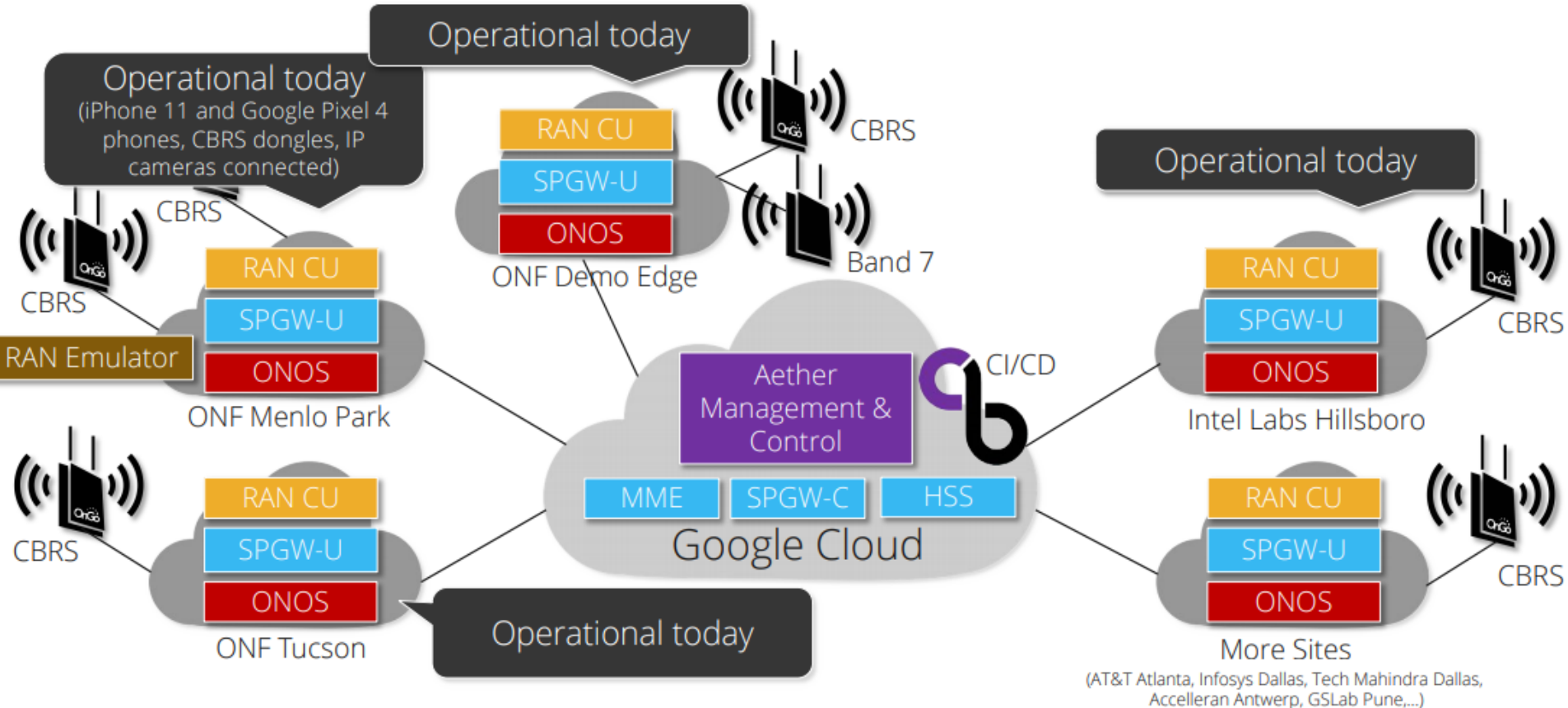
# Aether: Enterprise-5G/LTE-Edge-Cloud-as-a-Service



# CBRS Test Kits in Aether



# Aether is operational today



# CBRS Turn-Key Solutions for Private and Neutral Host Network

## ONF/SERCOMM Enterprise CBRS Solutions



**ONF Aether**  
Edge Cloud-as-a-Service



**Sercomm**  
CBRS Enterprise Small Cell



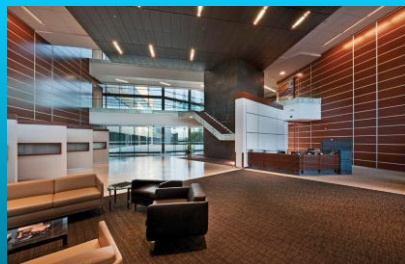
**Sercomm**  
CBRS Video Bridge



**Sercomm**  
CBRS USB Dongle

Edge Computing and LTE Management for Enterprises  
LTE Traffic Offload to Corporate LTE Network  
Enhanced Signal Quality, Security, Control and QoS

### Private CBRS-LTE Networks



### Venue Operated Neutral Host LTE Networks



WISP Communications Data Network and Managed Services



[illegible][illegible]

A GLOBAL INITIATIVE



**SMALL CELL FORUM**  
Solving the HetNet puzzle



# 5G Transformation with Open Source



## Thank You

[ben\\_lin@sercomm.com](mailto:ben_lin@sercomm.com)  
[www.sercomm.com](http://www.sercomm.com)