OPEN Compute Project

TAIWAN Regional Community

OCP TAIWAN DAY

Road to 5G · AI · Edge Computing

openEDGE Ecosystem & VCO 2.0 at 5G

Hancock Chang OCP Team Lead

MITAC COMPUTING TECHNOLOGY CORP

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openEdge

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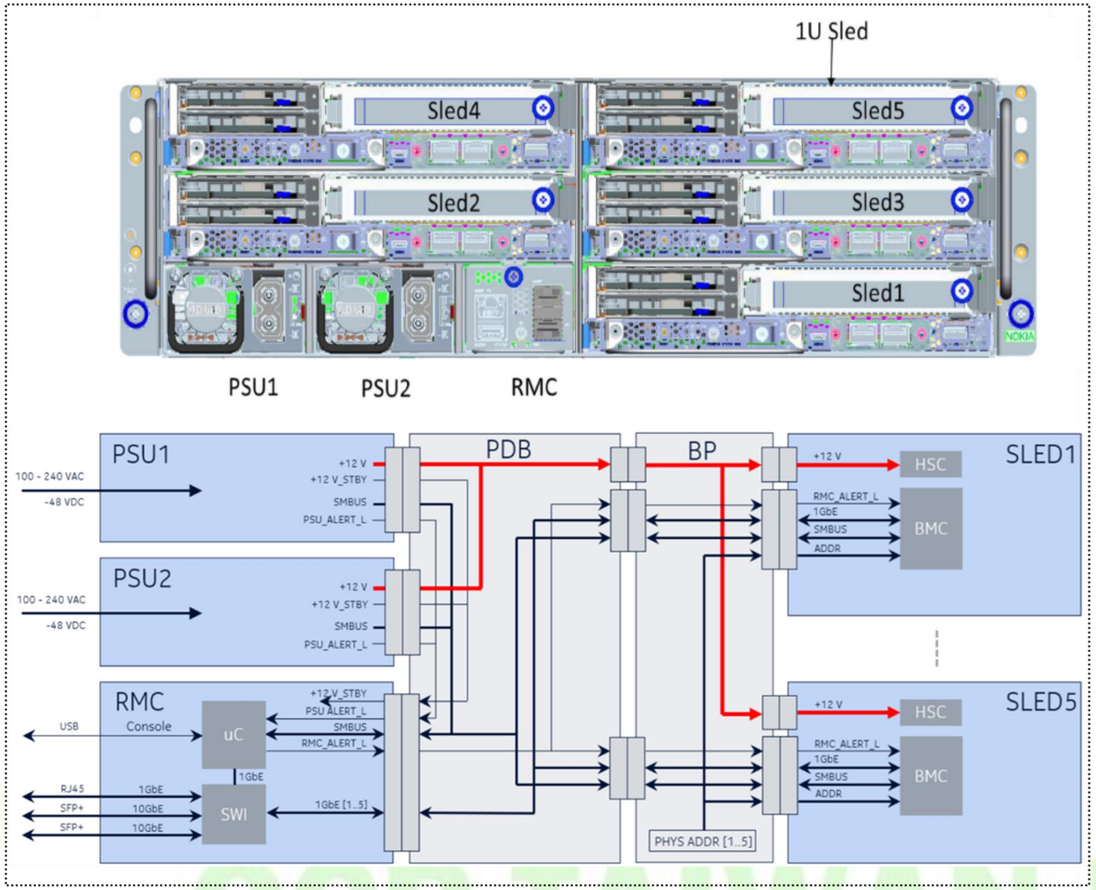
Understanding of openEDGE

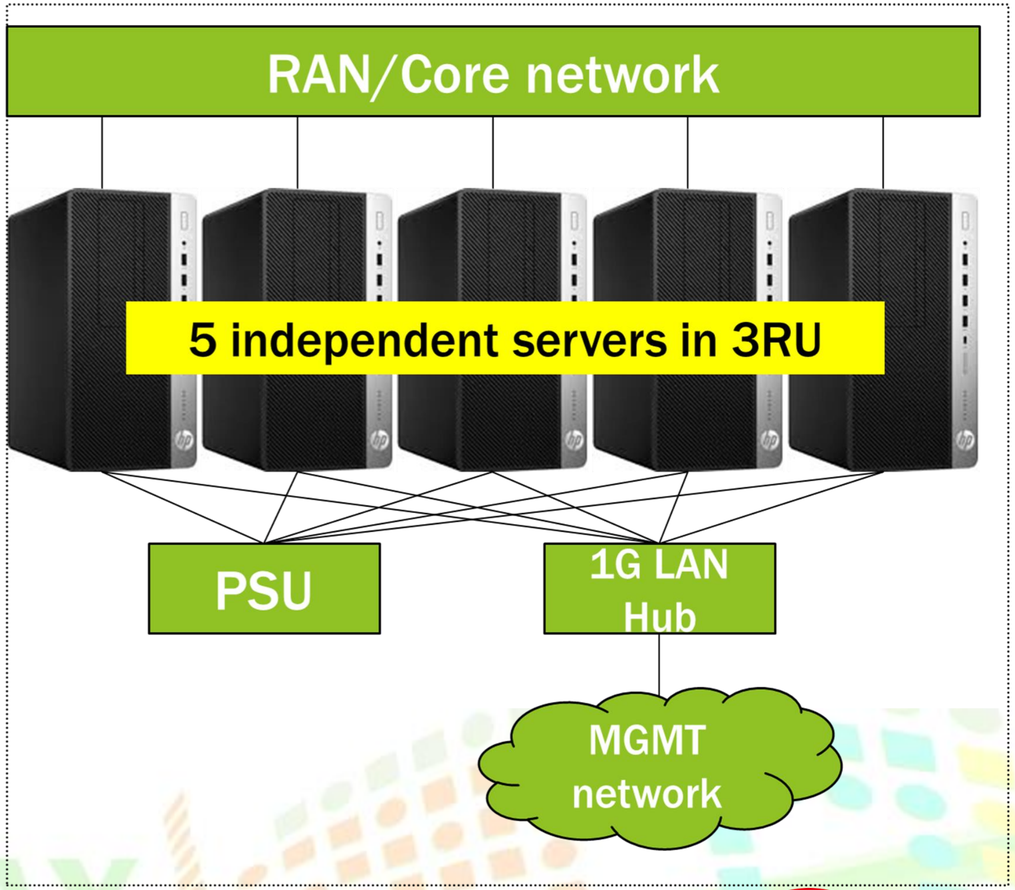
OCP openEDGE wiki

Physical topology



equivalent to

Logical topology



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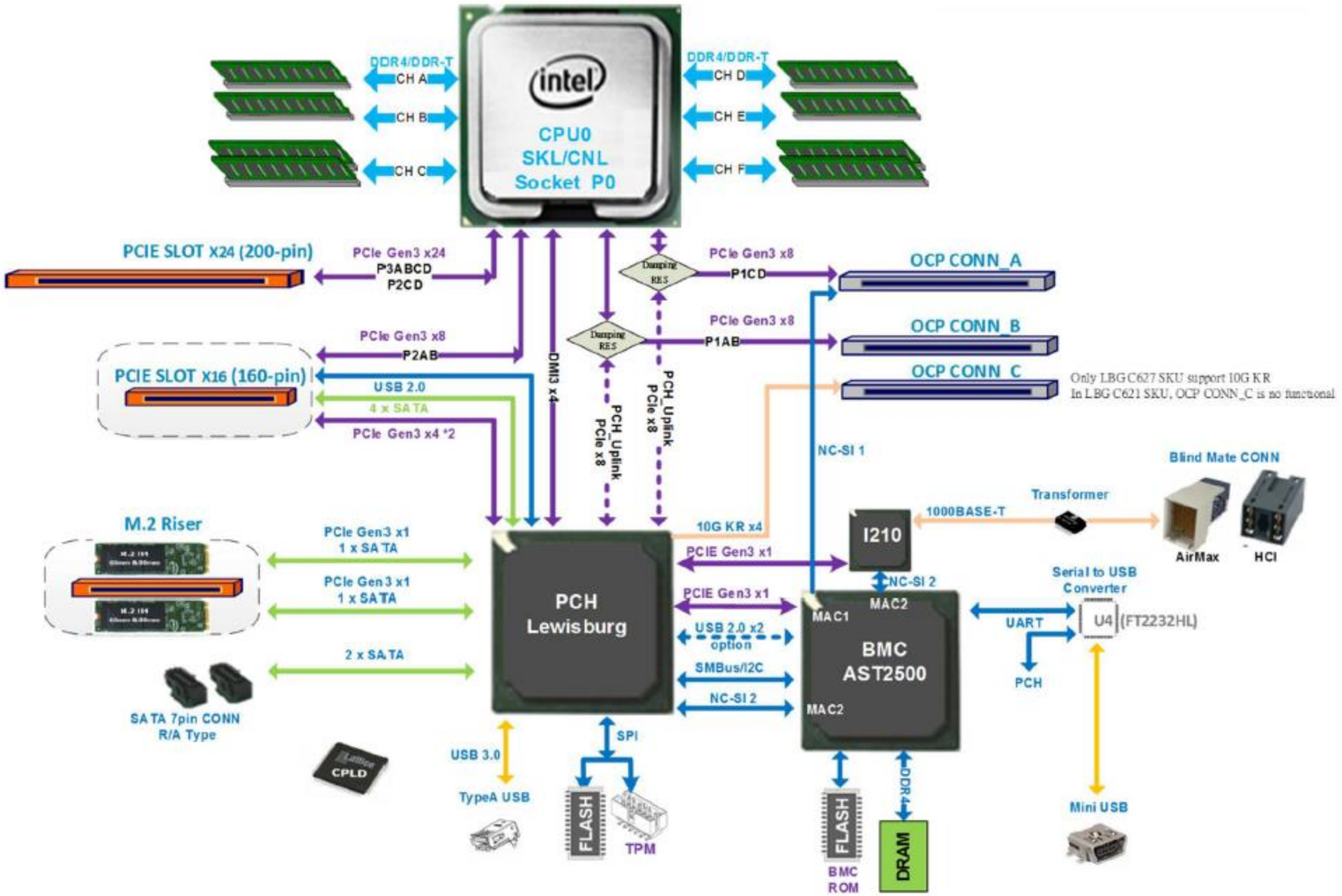
openEDGE Server Board Block Diagram



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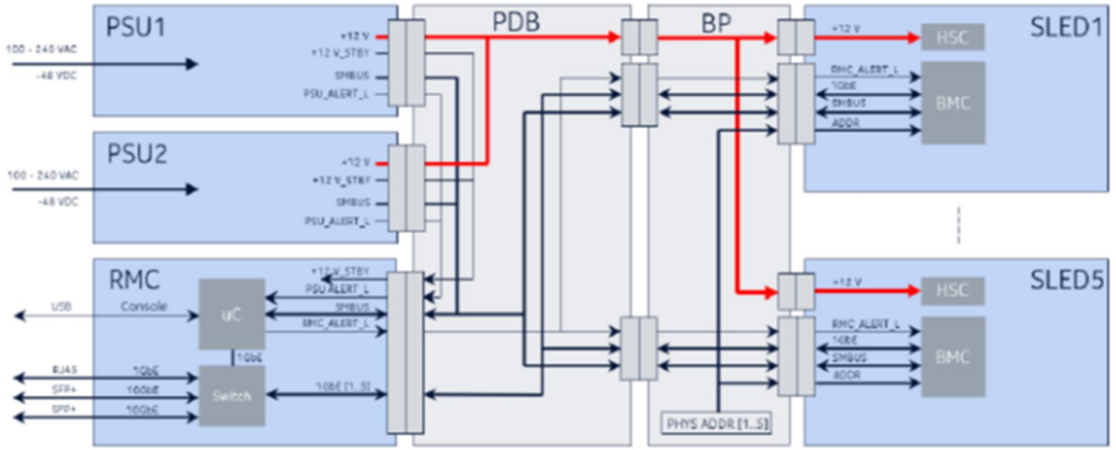
openEDGE System Overview-1

Key specifications

- 3U, 19” mountable (EIA-310 compatible)
- 130.6 x 440 x 430 mm (H x W x D)
- 1U and 2U, half width sleds are supported
- Redundant, centralized power supply
  - 2000 W max power feed capacity, 80+ Platinum
  - AC (100..127/ 200..240 VAC) and DC (-48 VDC) options
- Sled power feed capacity 400 W (1U sled), 700 W (2U sled), 12 VDC



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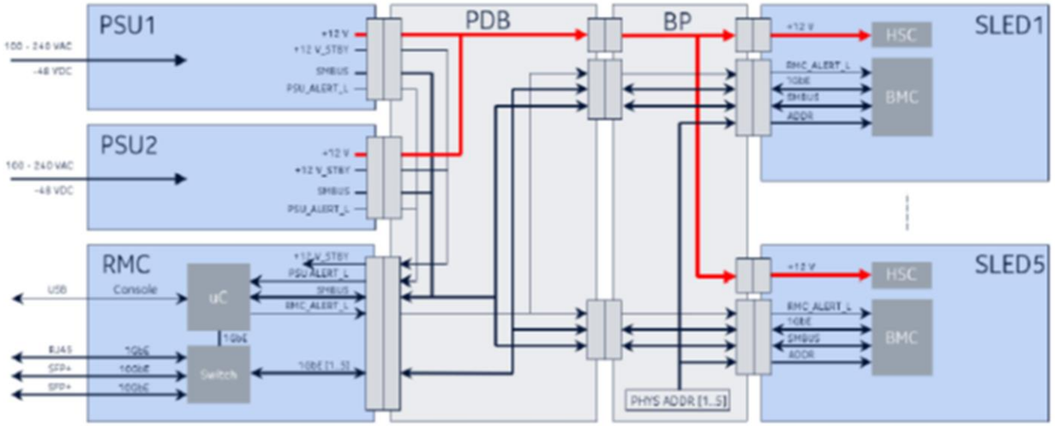
openEDGE System Overview-2

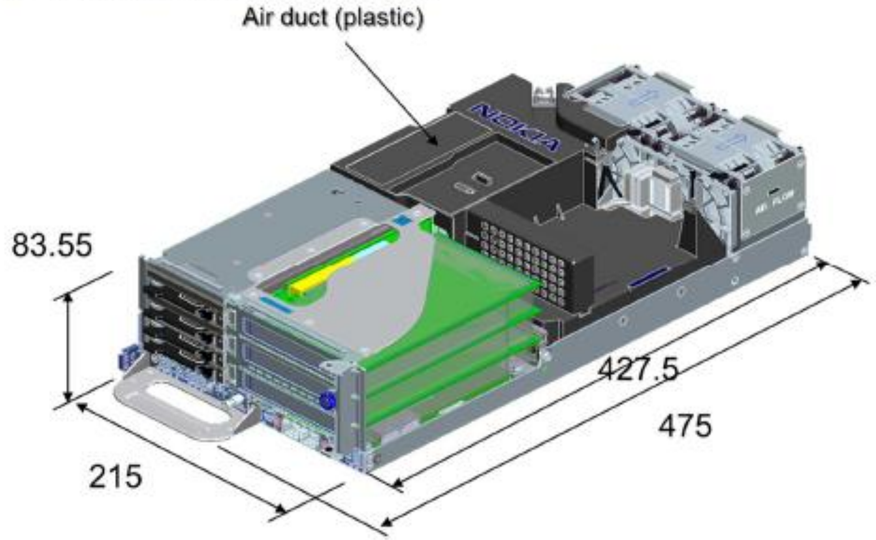
Key specifications

- Cooling: Fan units are part of sled solution
  - Air flow direction configurable: front to rear/rear to front
- Chassis management controller (RMC)
  - PSU management (control, sensors, ..)
  - Management Ethernet interface to sleds
    - 1 GE to all sleds via backplane
    - 1x 1 GE (RJ45) + 2x 10 GE (SFP+) front panel interface for external connectivity and chaining of multiple chassis
- Power distribution board and chassis backplane provide connectivity between RMC, sleds and PDUs



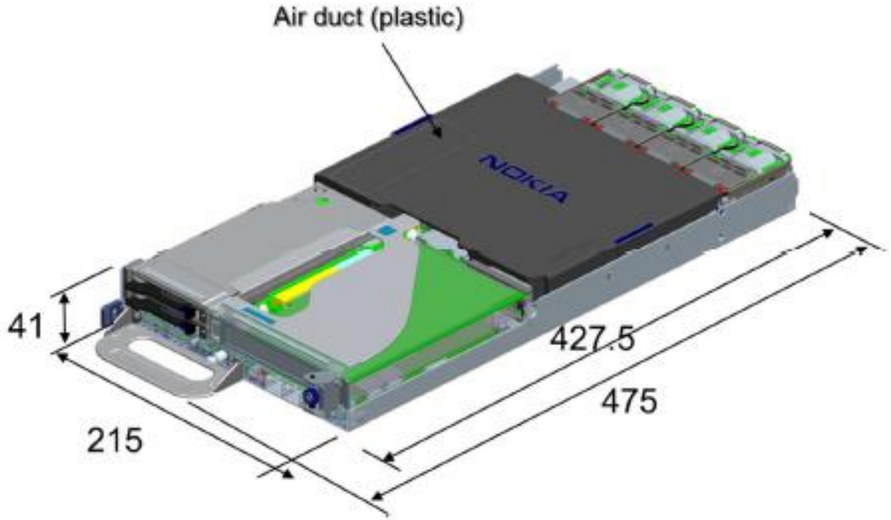
2U and 1U SLED overview

- Two M.2 cards
- One x16 FHH(/F)L PCIE card at PCIE slot3
- Two x8 FHHL PCIE card at PCIE slot1 and slot2
- 2 local 2,5" 9.5mm/7mm wide NVMe or SATA disks
- 2 local 2,5" 15mm wide NVMe or SATA disks

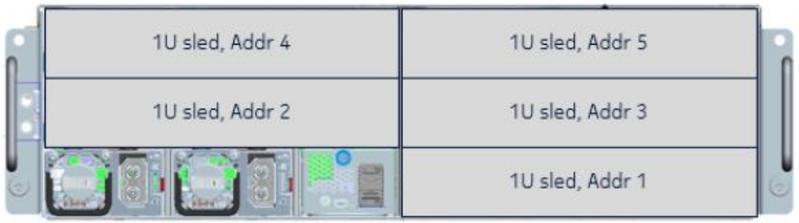


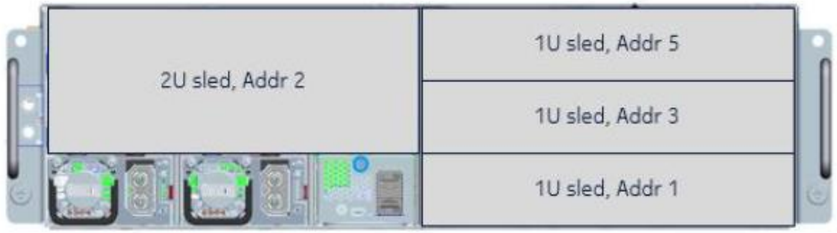
Dimension 475 mm x 215 mm x 41 mm (DxWxH). It can support below configurations:

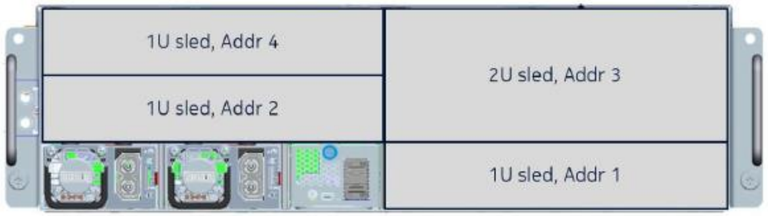
- Two M.2 cards
- One x16 FHHL PCIE card
- 2 local 2,5" 9.5mm/7mm wide NVMe or SATA disks

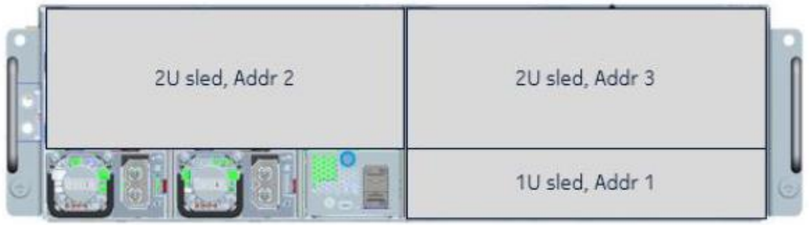


Various Combinations





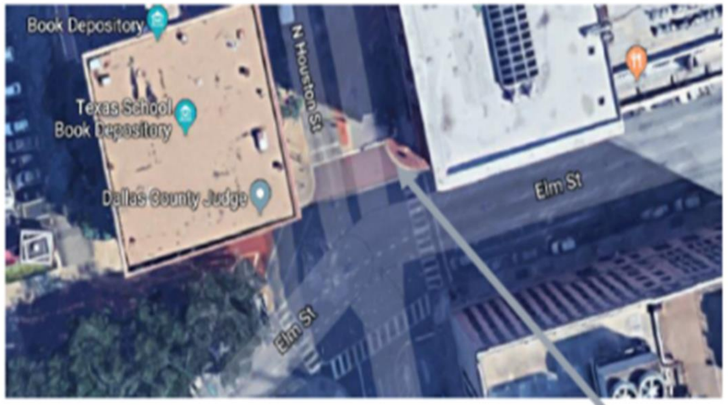




Different User Cases of Far Edge

Reuse existing BBU/Cellsite Cabinet Options

Intersection Case Configuration



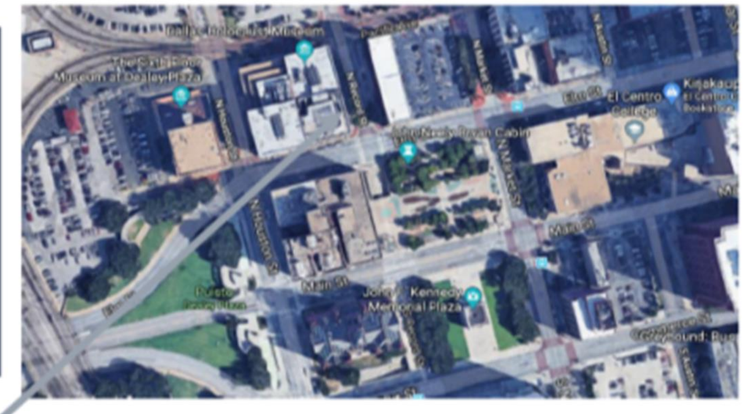
openEDGE server

Adding compute capabilities to a base station site

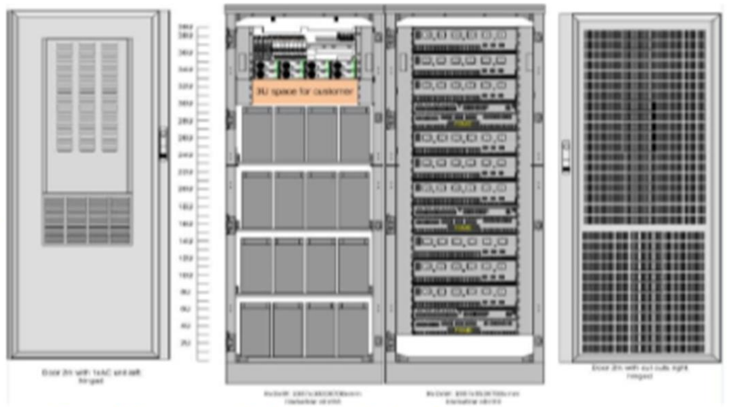
Reuse existing site solutions

Base station

Block Case Configuration

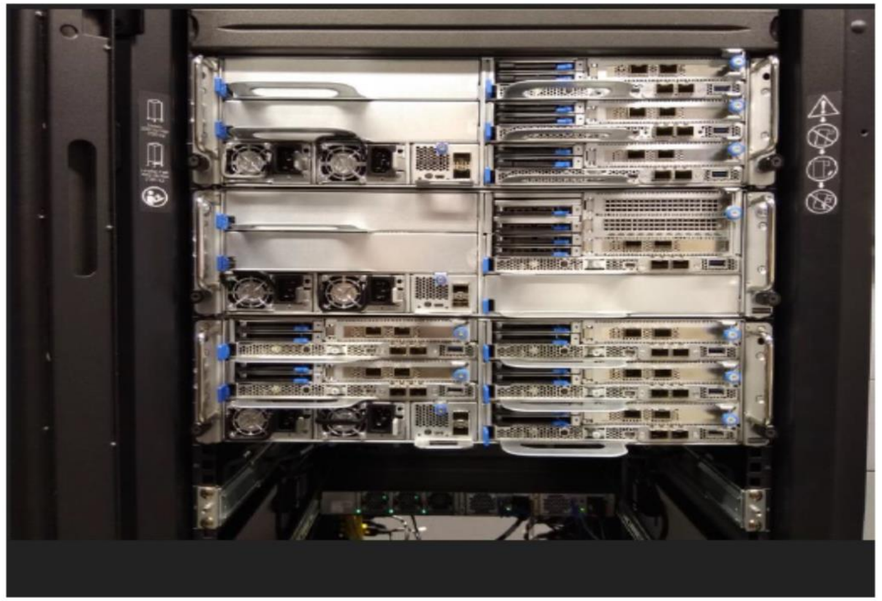


Outdoor cabinet



Dual/Street Cabinet Solution

Installation Examples



openEdge for Outdoor

New Proposed Contribution for openEdge

- ARM-base sled for openEDGE
  The ARM SoC (X-Gene 3, current model name is ™ eMAG 8180 64-bit) was designed by AMCC (Applied Micro Circuit Corp), AMCC ARM business was sold to Carlyle Group, current CEO is Rene James
- Compute sled with Xeon-D or E3, Switch Sled, Sled with FPGA for vOLT, SEBA, etc.. By ADLink
- BBU by Inventus Power

- The Open Edge chassis consists of 6 sections
  - 5 useable sleds
  - 1 sled dedicated for a primary & secondary PSU and the rack management controller
- 1U sled, Addr 1 can support either server or battery backup unit (BBU)
  - Twin Power connectors - Each 85A
  - Expected BBU output 133A @ 12A

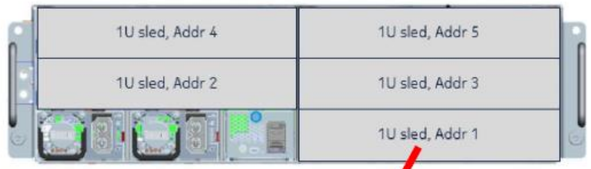
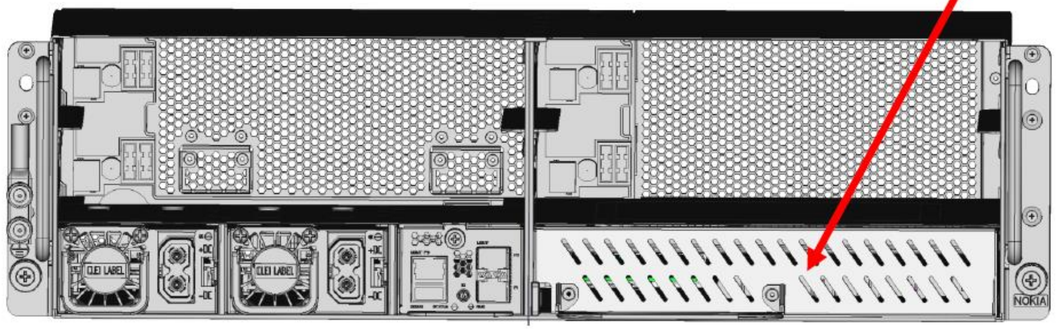


Figure 7 Open edge chassis with five 1U sleds



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VCO 2.0

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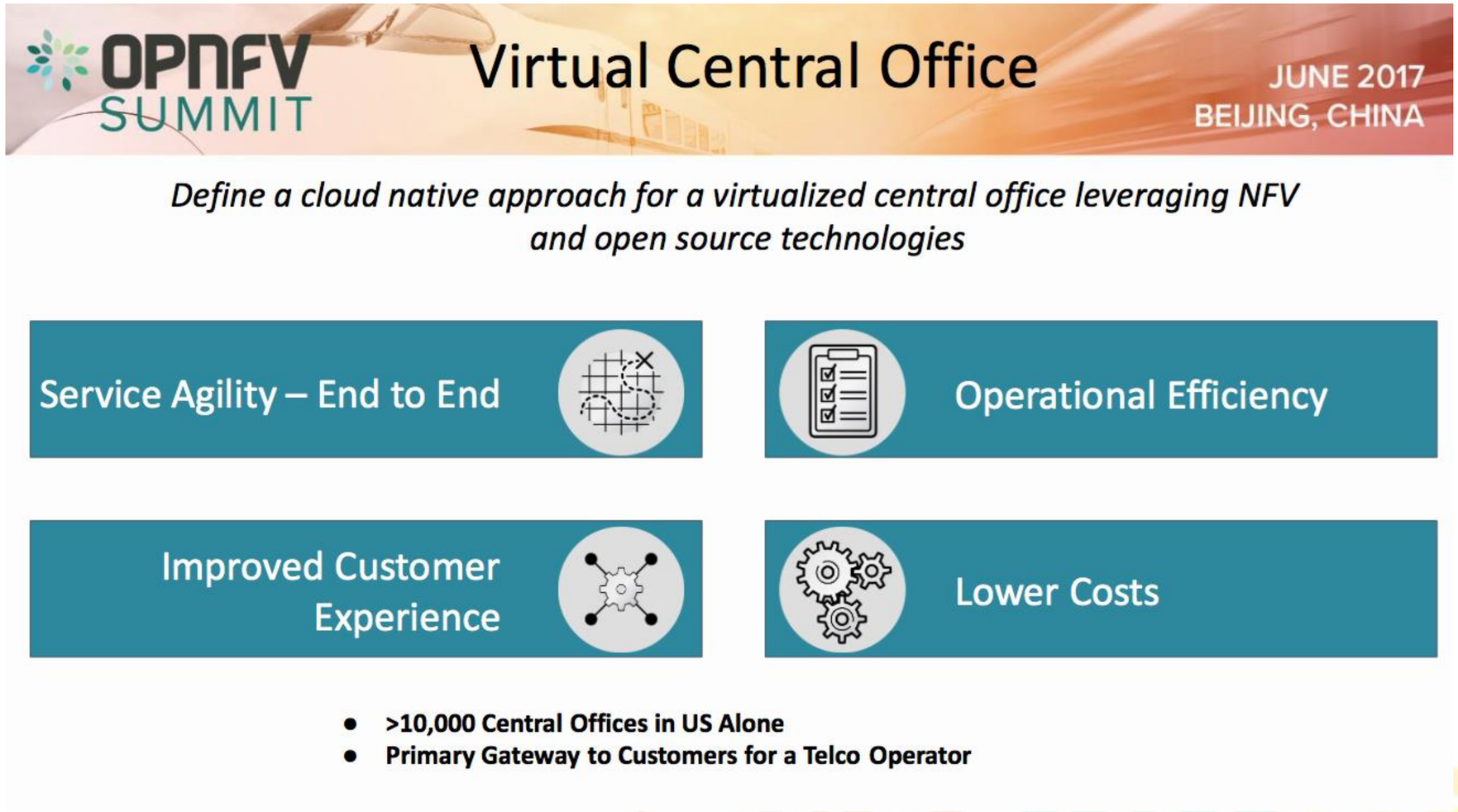
What is VCO?

- Cloud Native approach to deploying NFV closest to subscriber
- One of the Edge Blueprints as discussed in the community
- Based on OpenStack and Kubernetes
- Massive Scale => Large Number of sites

VCO 1.0, 2.0, 3.0 wiki



COs Serve Residential, Business & Mobile Customers

Telco CO - Traditional Status

- Closed, Rigid and Complex
- Variety of Access & Speeds
- Wide variety of hardware –
  - routers, switches, gateways, servers etc
- Lack of standard interfaces => lack of programmability

Telco COs - Modernization

- Virtualization
- Reduction in CAPEX and OPEX by >30%
- Open and Flexible & Standardized
- Software Defined
  - Network
  - Orchestration
- Programmability

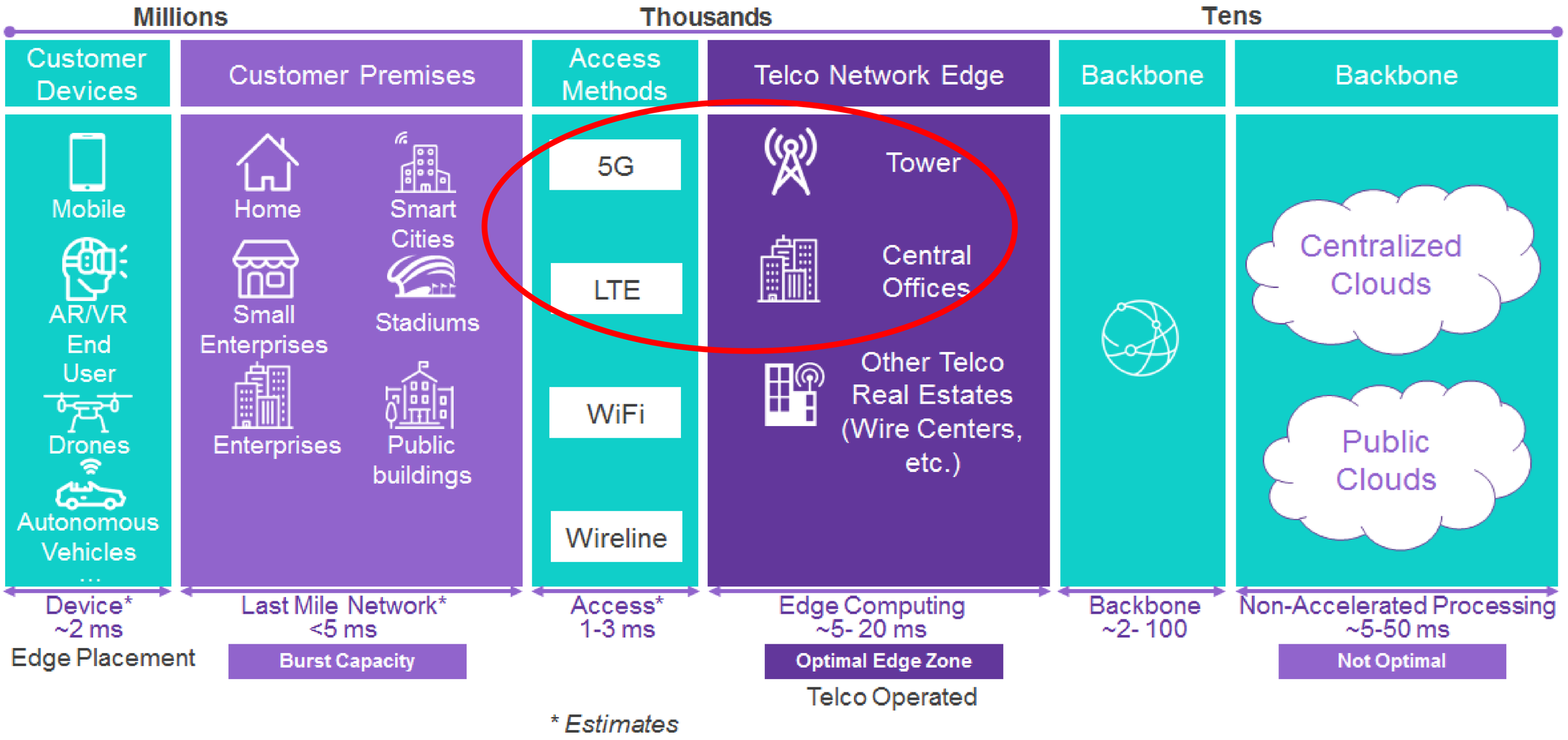
Telco COs - Cloud Native

- Fully Software Defined
- Further Reduction in CAPEX and OPEX
- Disaggregated and flexible
- Massive Scale
- Edge Blueprint

What Has Been Done for VCO 1.0

- 2017 OPNFV Summit in Beijing: Phase I of the Project: Residential Services and Enterprise Business Services live on stage (vOLT, VNFaaS, BNG, etc)
- Generic blueprint for Central Office with open source components and OpenDaylight SDN controller
- Focus on residential and enterprise VNF on-boarding and assurance

Mobil Edge



SOURCE: AKRAINO WIKI

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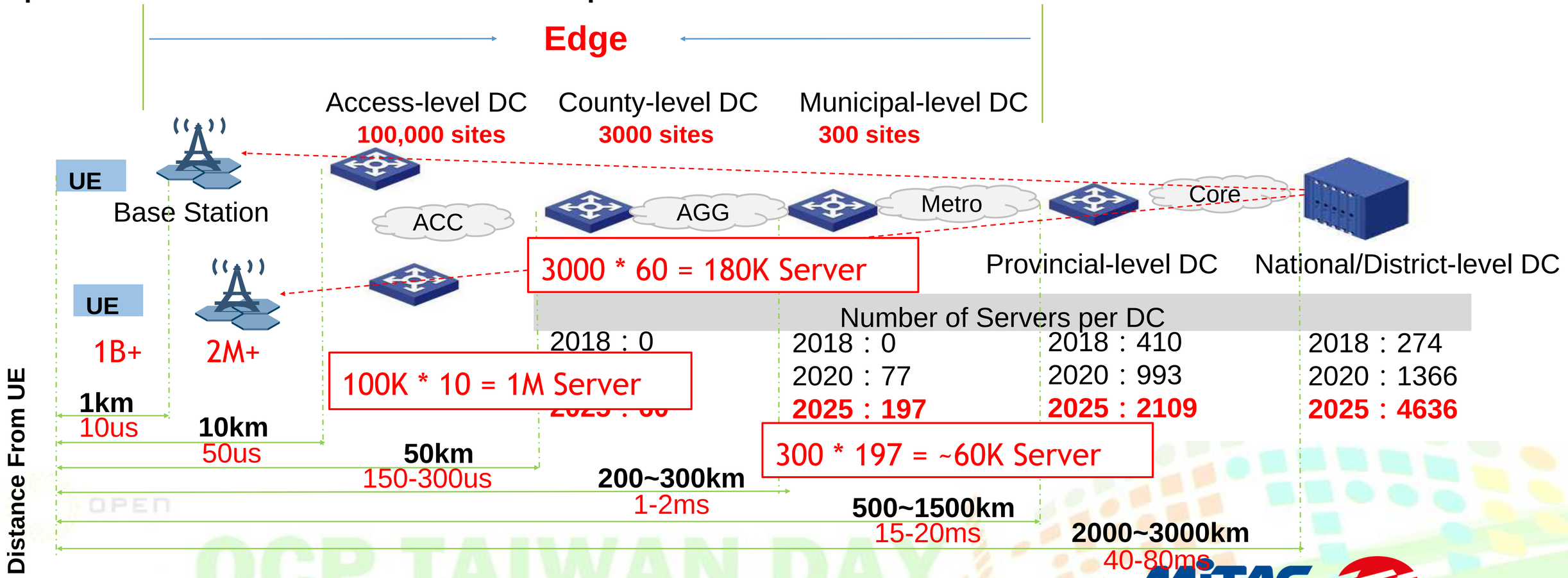
China Mobile's Edge TICs

Located from city level to AP. Support services including mobile & residential/enterprise UP, MEC and CRAN. Based on open-source Virtualization and/or Container platform



VCO 2.0 Scope

Telecom Provider Requirements

- Massive Scale → "Distributed Hyperscale"
- Common deployment model for Data Center and CO locations
- OpenStack and/or Kubernetes
- Flexible and Agile
- LTE and 5G Radio with vEPC & NG-Core
- Centralized Management and Troubleshooting
- Service assurance - Metrics and Events
- End-to-End Orchestration

VCO Demo Checklist

- vRAN/CRAN for LTE
- vRAN LTE low layer split (RoE)
- vRAN LTE high layer split (F1-like)
- Low latency service
- Network slicing*
- Single LTE vEPC
- IMS and VoLTE*
- Ansible based orchestration
- Service assurance & monitoring
- Mix of bare metal, VMs, (containers*)

* Goal for future VCO demo

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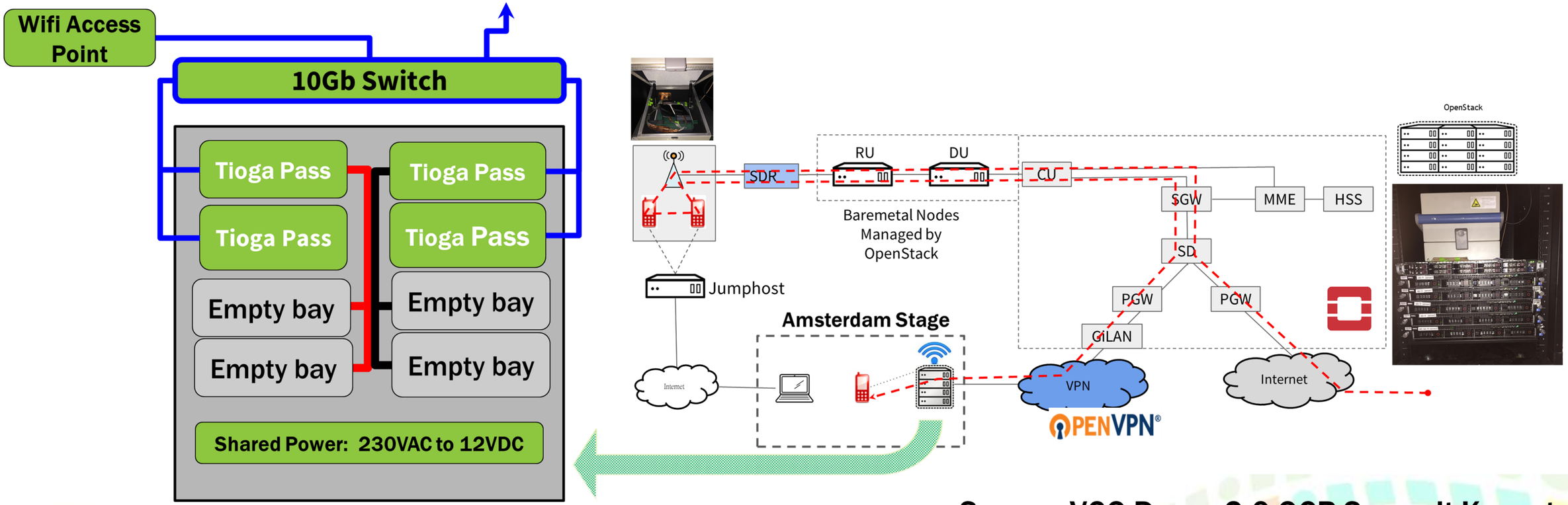
Demo Topology

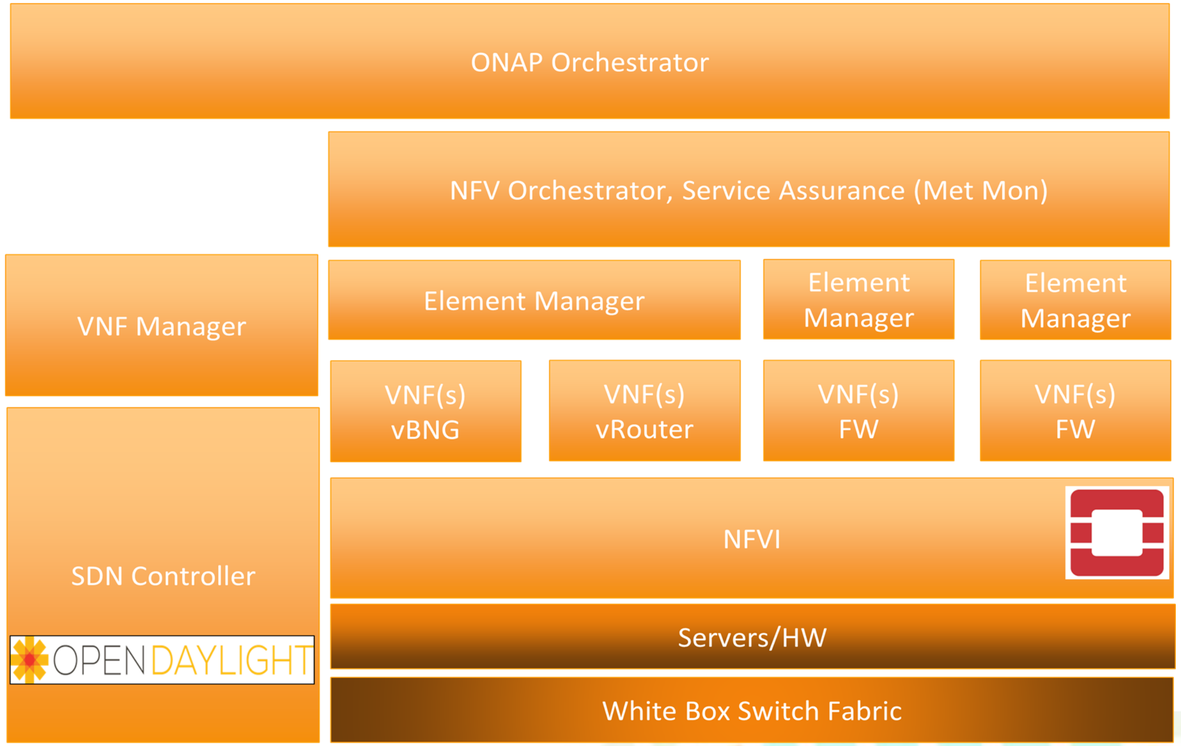
OCP solution including Tioga Pass and ESA Kit from MiTAC



Source: VCO Demo 2.0 OCP Summit Keynote Slides

VCO 2.0 with OCP platform

- MiTAC contributed OCP solution including ESA Kit and Tioga Pass for VCO 2.0
- MiTAC commit to contribute OCP solution for VCO 3.0



Source: VCO Demo 2.0 OCP Summit Keynote Slides

MiTAC
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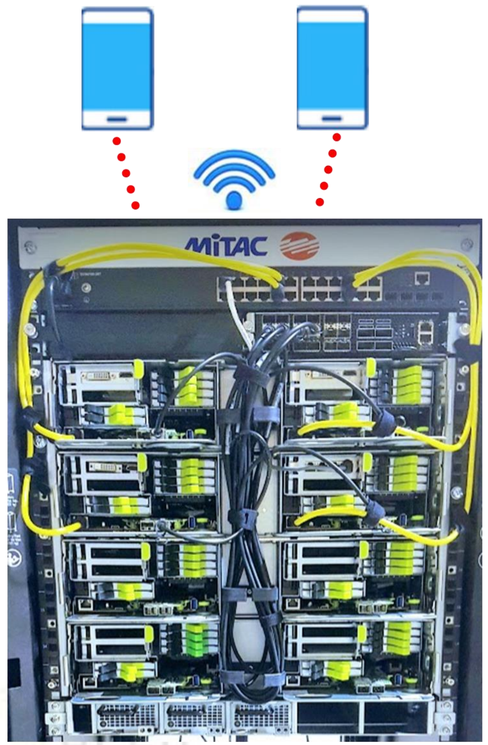
Virtual Branch Demo Set for Telco on OCP

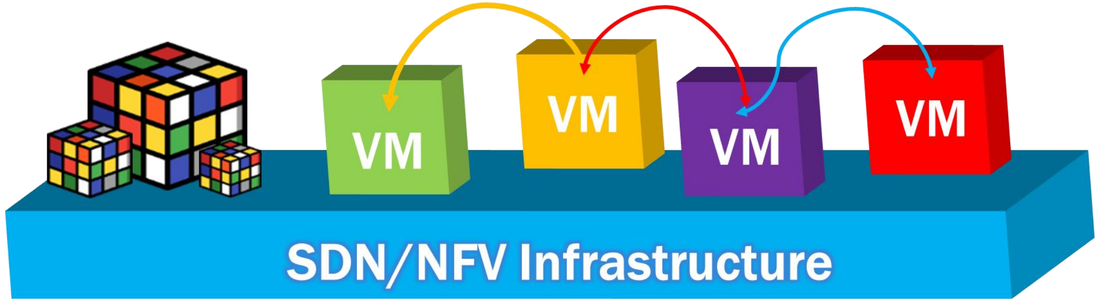
Mellanox TECHNOLOGIES

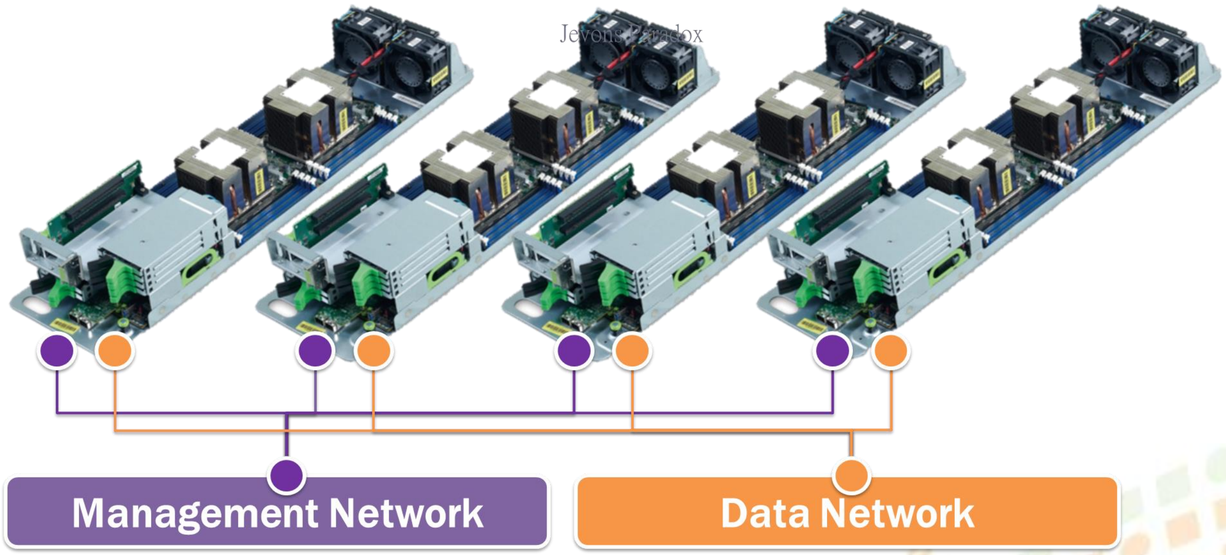
muRata INNOVATOR IN ELECTRONICS

Schneider Electric

inwinSTACK







Mice Workload

Elephant Workload

Real-time Workload

openstack.

OPEN DAYLIGHT

onos Open Network Operating System

MiTAC MITAC COMPUTING TECHNOLOGY CORP.

OCP Product Portfolio

- Tioga Pass OCP Server — MP
- ESA Kit for EIA 19” Rack — MP
- Crystal Lake OCP Storage — 19’Q3

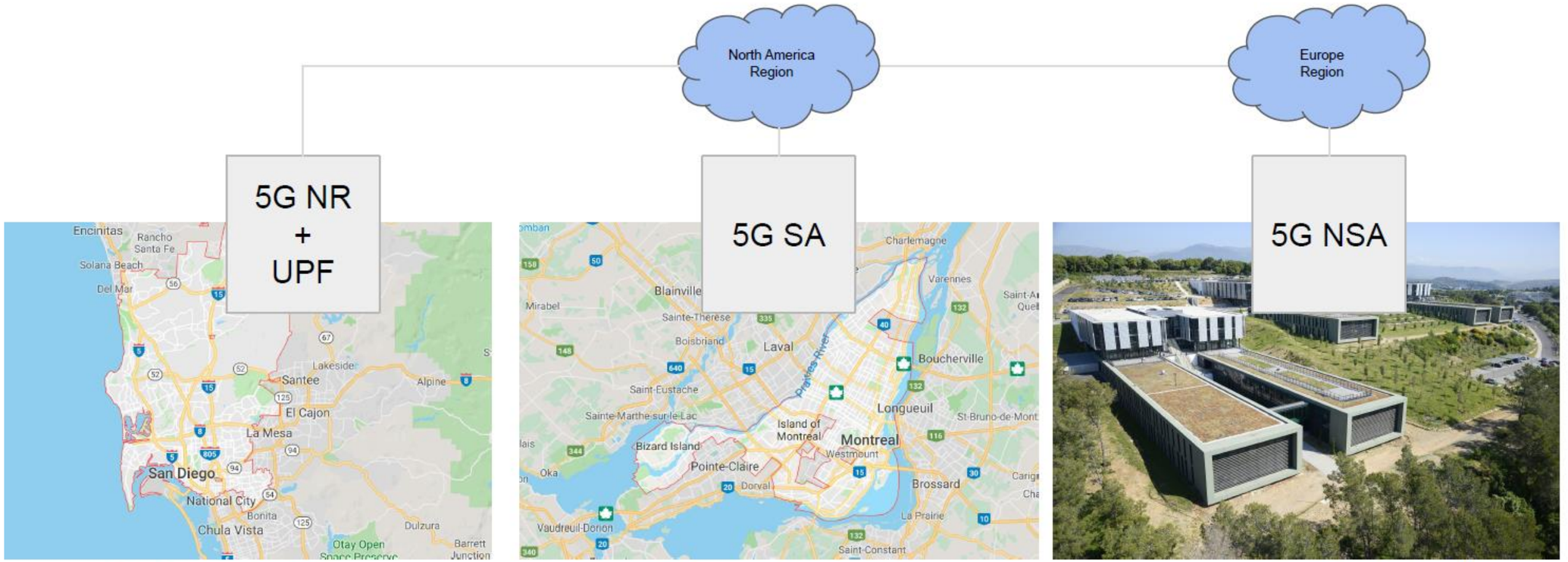
MiTAC MITAC COMPUTING TECHNOLOGY CORP.

Cloud Native 5G Network with VCO 3.0

- The current plan for **VCO 3.0** is in progress with LF Networking (OPNFV) supporting the initiative
- The two key requirements for this new version are containerization of the 5G networks functions and deployment of both **5G NSA and 5G SA mobile networks**
- The proof of concept is planned to be showcased at **Kubecon November 19-21, 2019 in San Diego**
- Multiple labs will be built to support all activities. The lab in **France will focus on 5G NSA**, the lab in **Canada will focus on the 5G SA**.
- Bell Canada, China Mobile and Orange are listed as participants to the project

Source: VCO 3.0 wiki

End to End Setup



5G PoP - San Diego | 5G Lab - Montreal | Eurecom - Sophia Antipolis

Source: VCO 3.0 wiki

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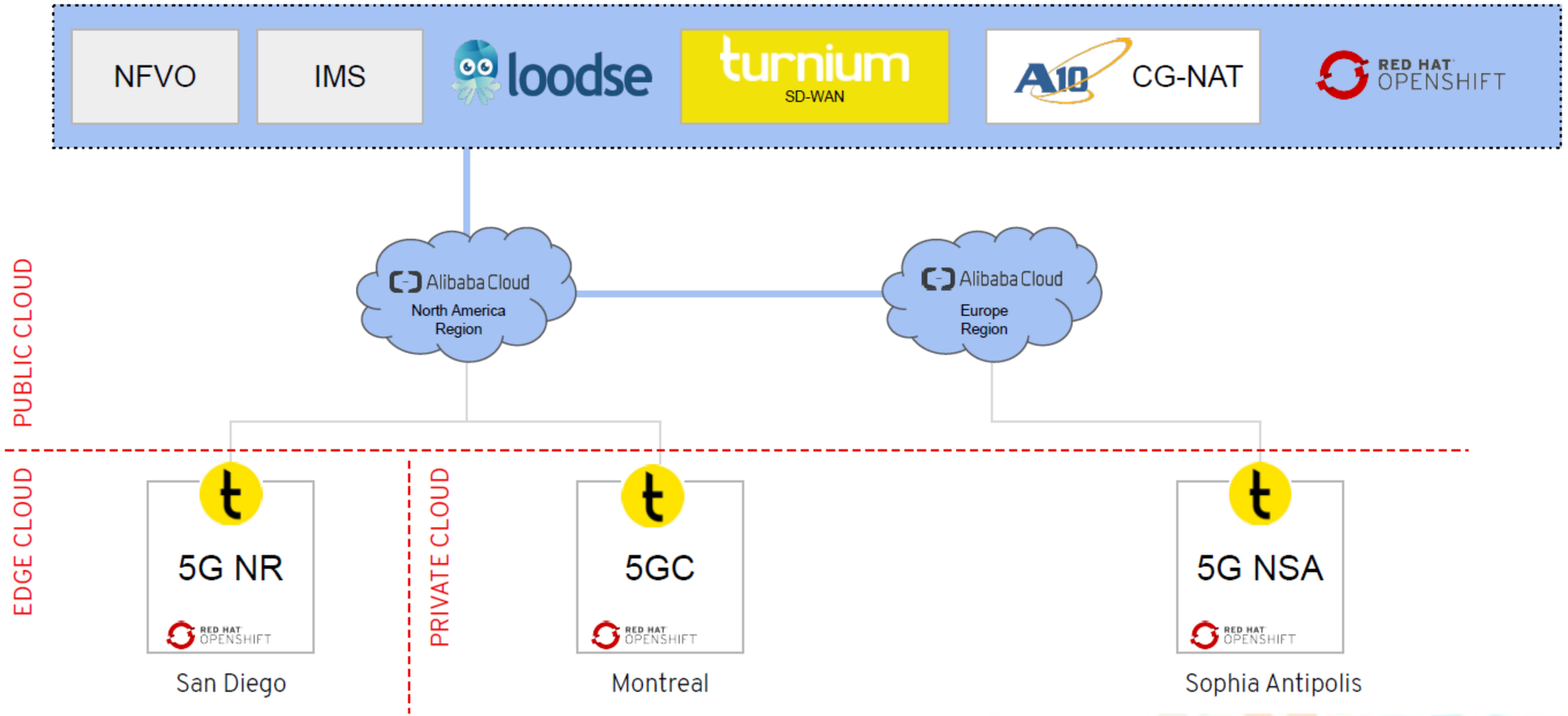
Hybrid Cloud



Source: VCO 3.0 wiki

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Thank You

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