

ONIC2019

タイトル調整中 ← 大規模NFV基盤の事例紹介

楽天モバイル株式会社

壬生 亮太

Rakuten

壬生 亮太

ネットワーク本部

クラウド基盤技術開発・運用部

クラウドR&D課

→ HW～OpenStack までやっています

→ これからコンテナ基盤やります



Agenda

Rakuten Mobile: Network Overview

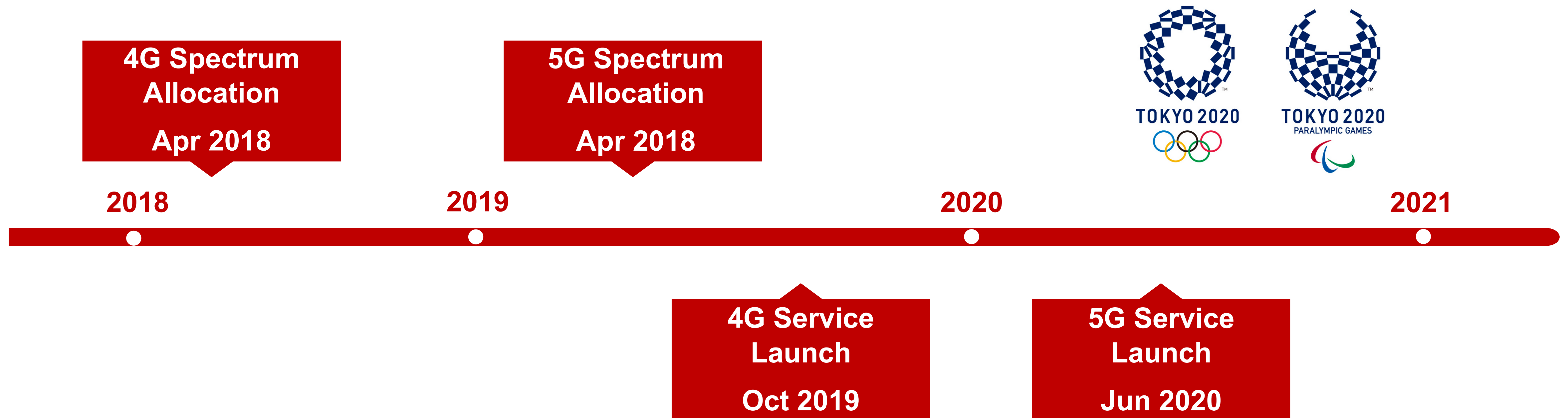
Virtualized RAN (vRAN)

Centralized & Regional DC (CDC, RDC)

Compute Node Setup

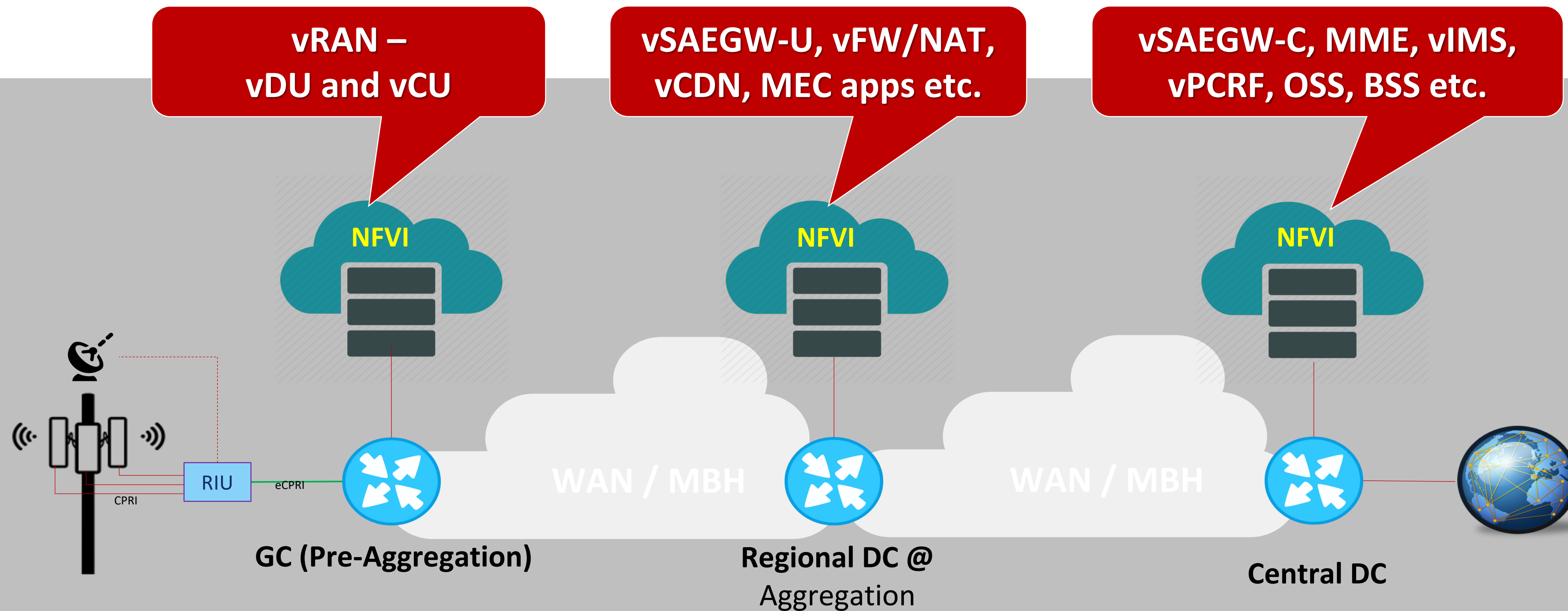
Automation

Rakuten 4G/5G Timeline



Distributed Telco Cloud

Spanning Across 1000s of Locations. Enabled by Rakuten Cloud Platform & Cisco VIM, NSO & ESC



1000's

~50

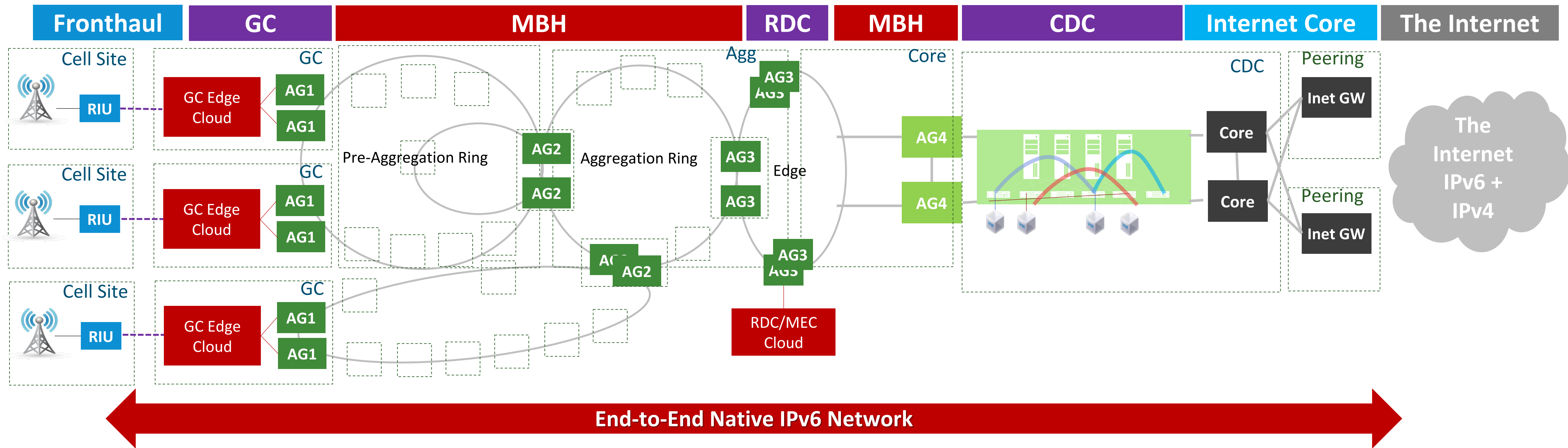
2

Optimized for smallest footprint and Performance

Optimized for Application Flexibility

Optimized for Capacity and Scale

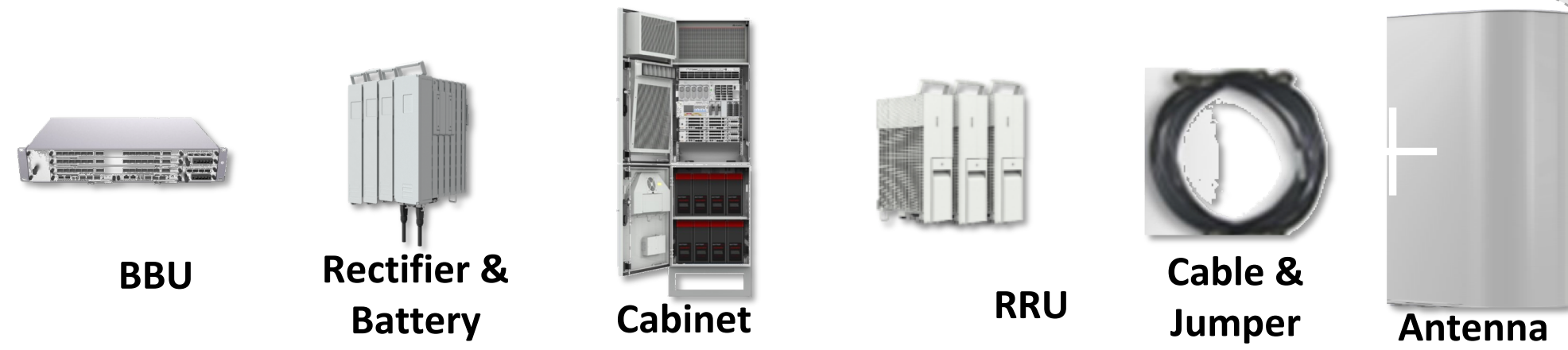
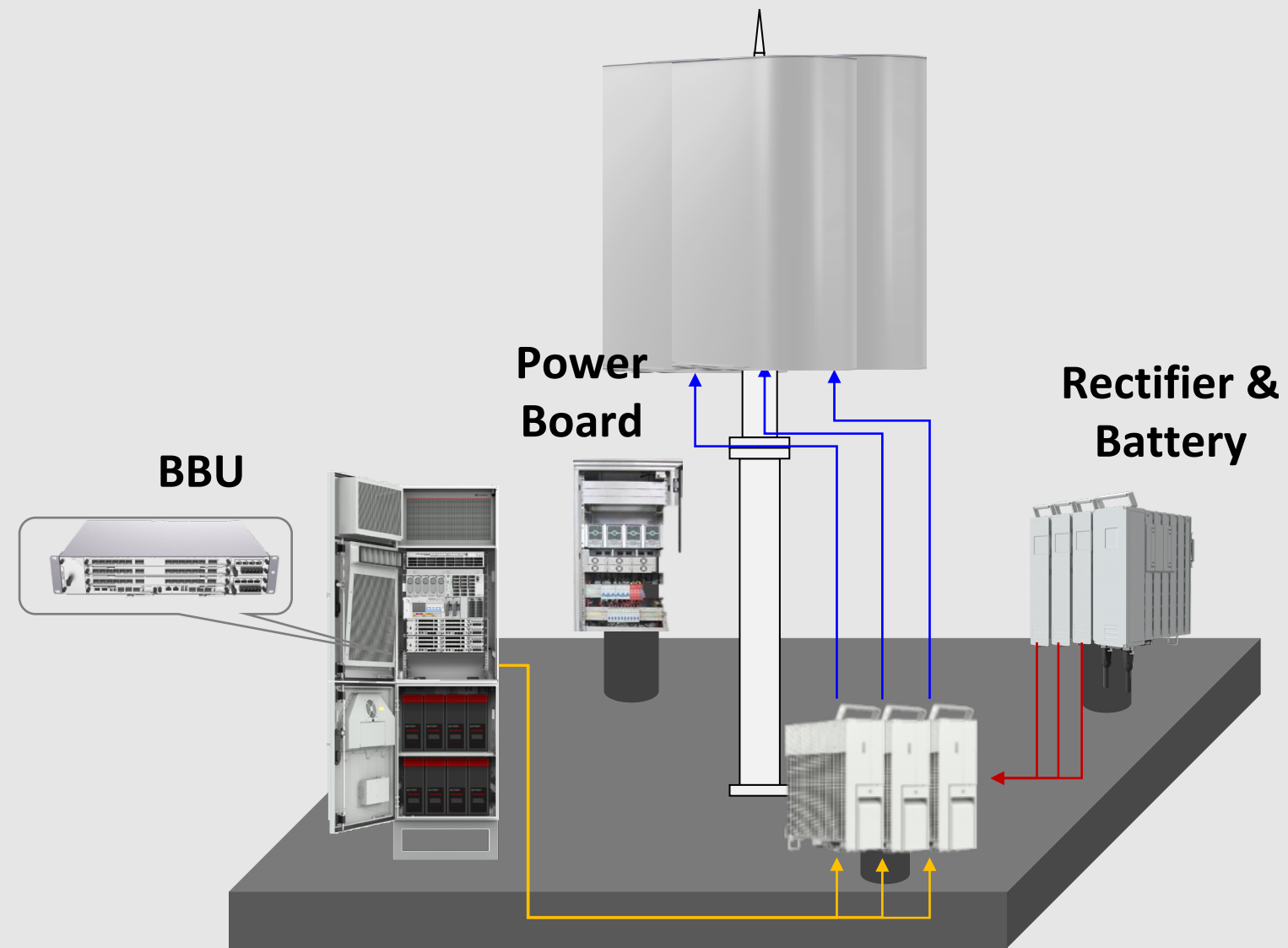
IPv6 Transport/Backhaul Network



- Software defined, programmable WAN, native IPv6 networking
- Built for 5G with up to 400Gbps of bandwidth of Pre-Agg (GC) locations (vs. traditional 1G/10G)
- Terabits of Capacity in the Mobile Backhaul Core Network
- Scale with IPv6 to support zillions of connected devices

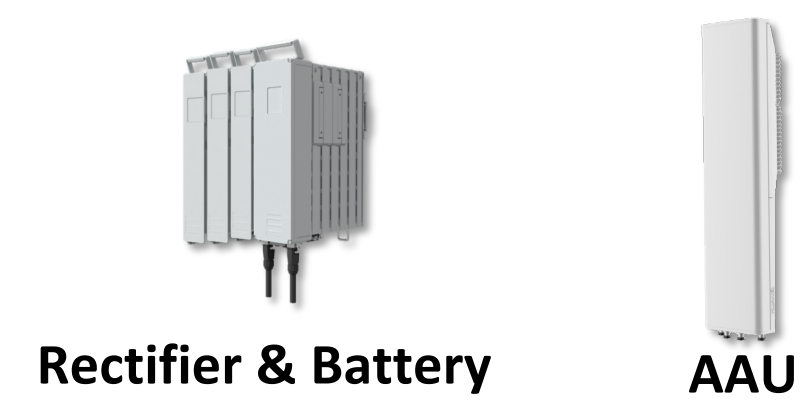
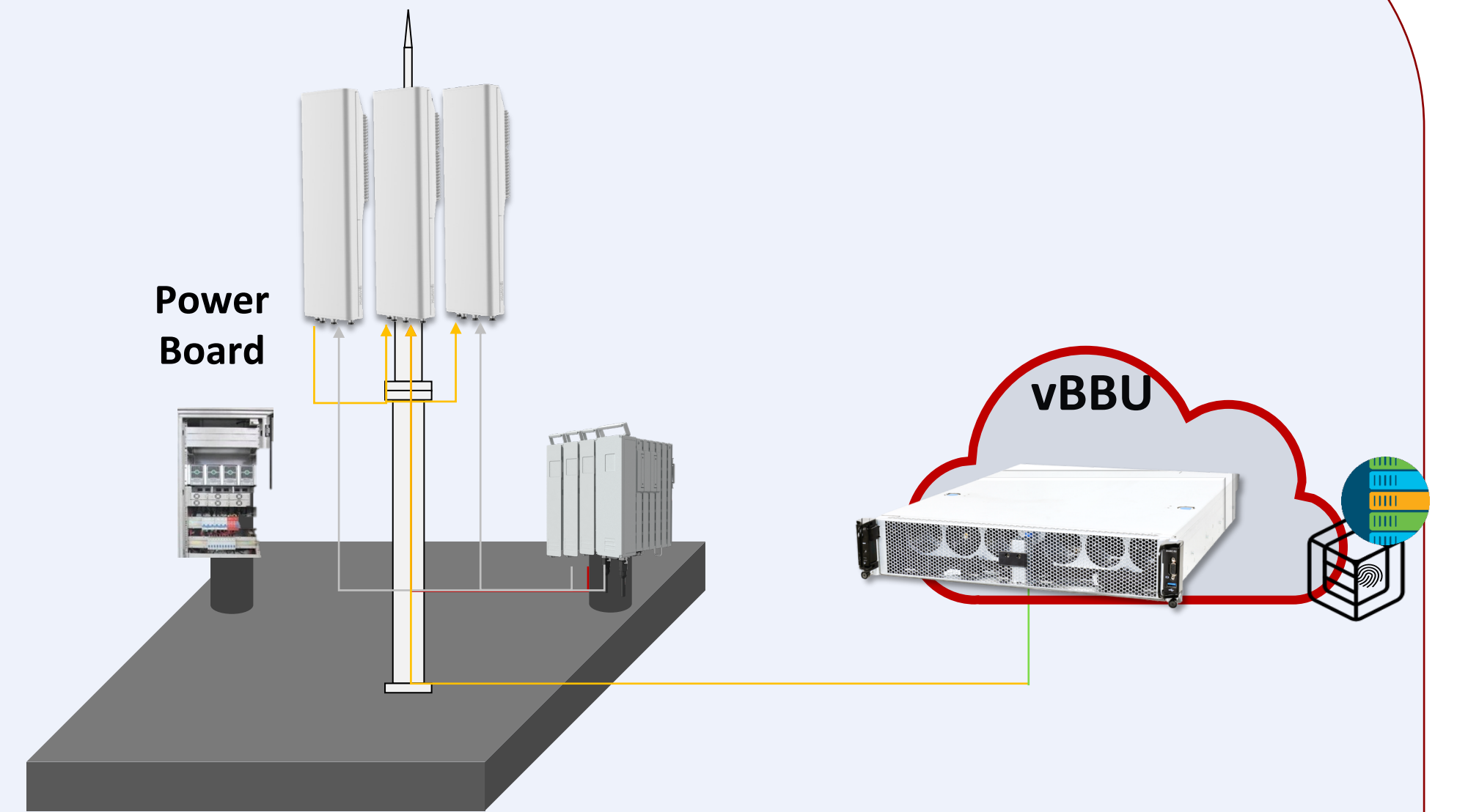
Compact cell site

Traditional Site Deployment

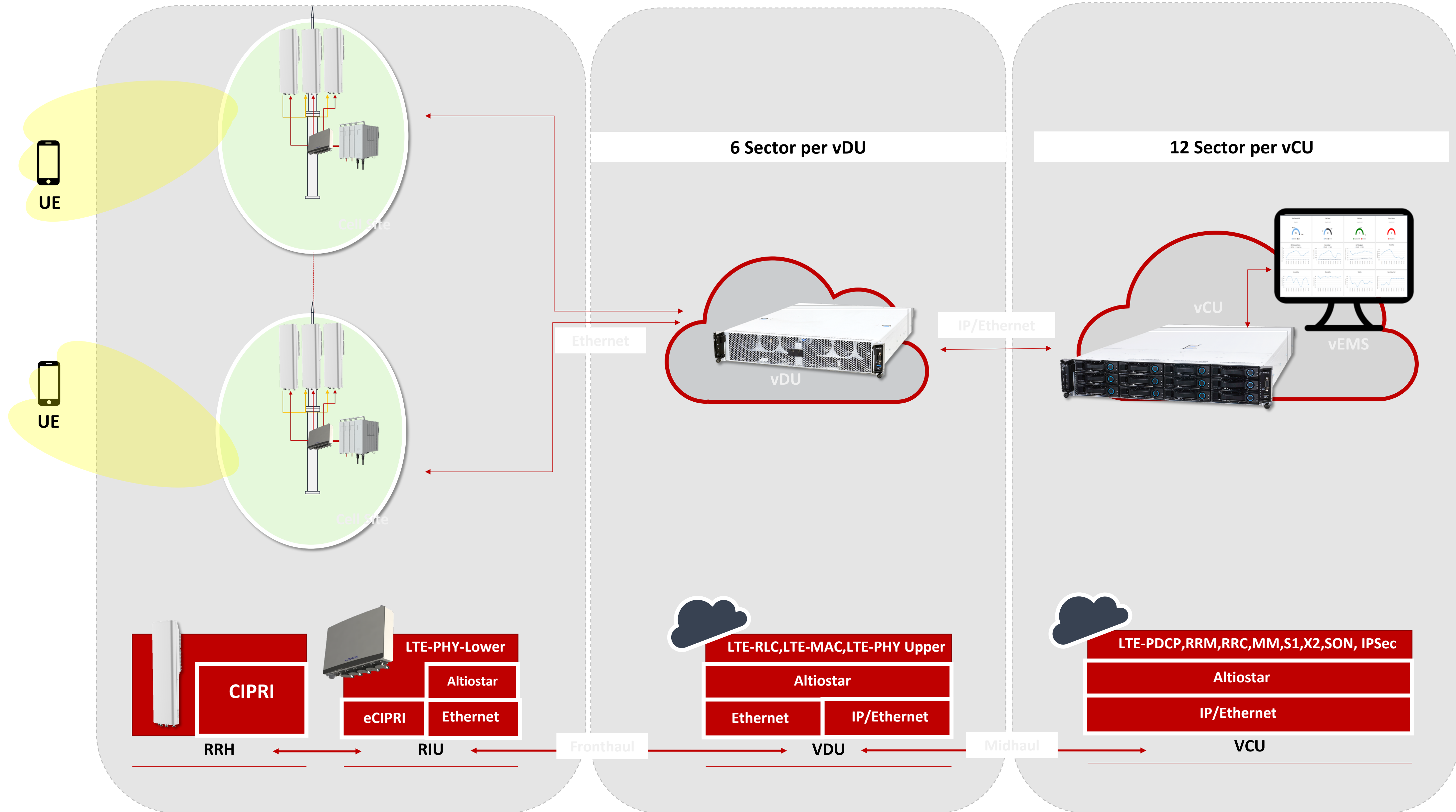


VS

Rakuten Simplified Site Deployment



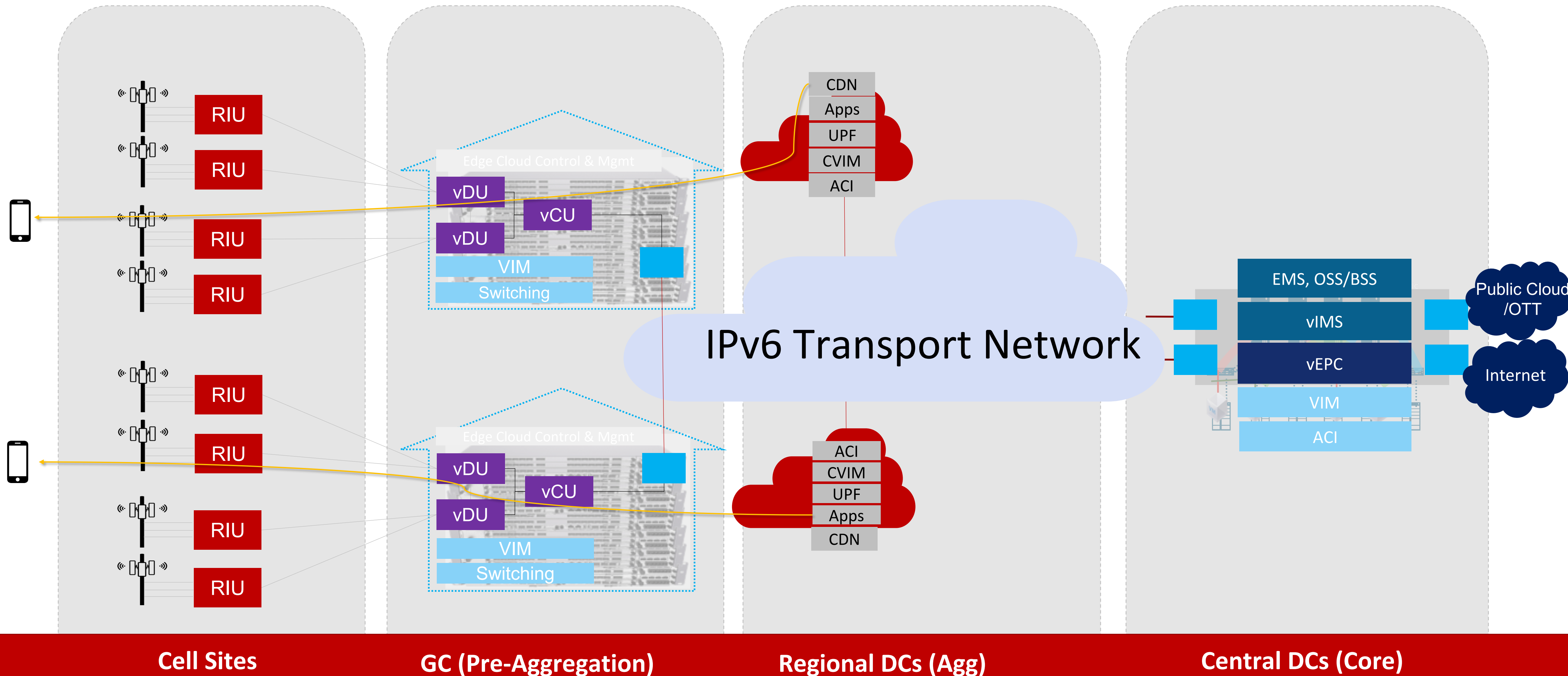
vRAN Architecture





https://news.mynavi.jp/photo/article/20190801-rakuten_optimism_2019_2/images/0021.jpg

Open, Disaggregated and Virtualized RAN



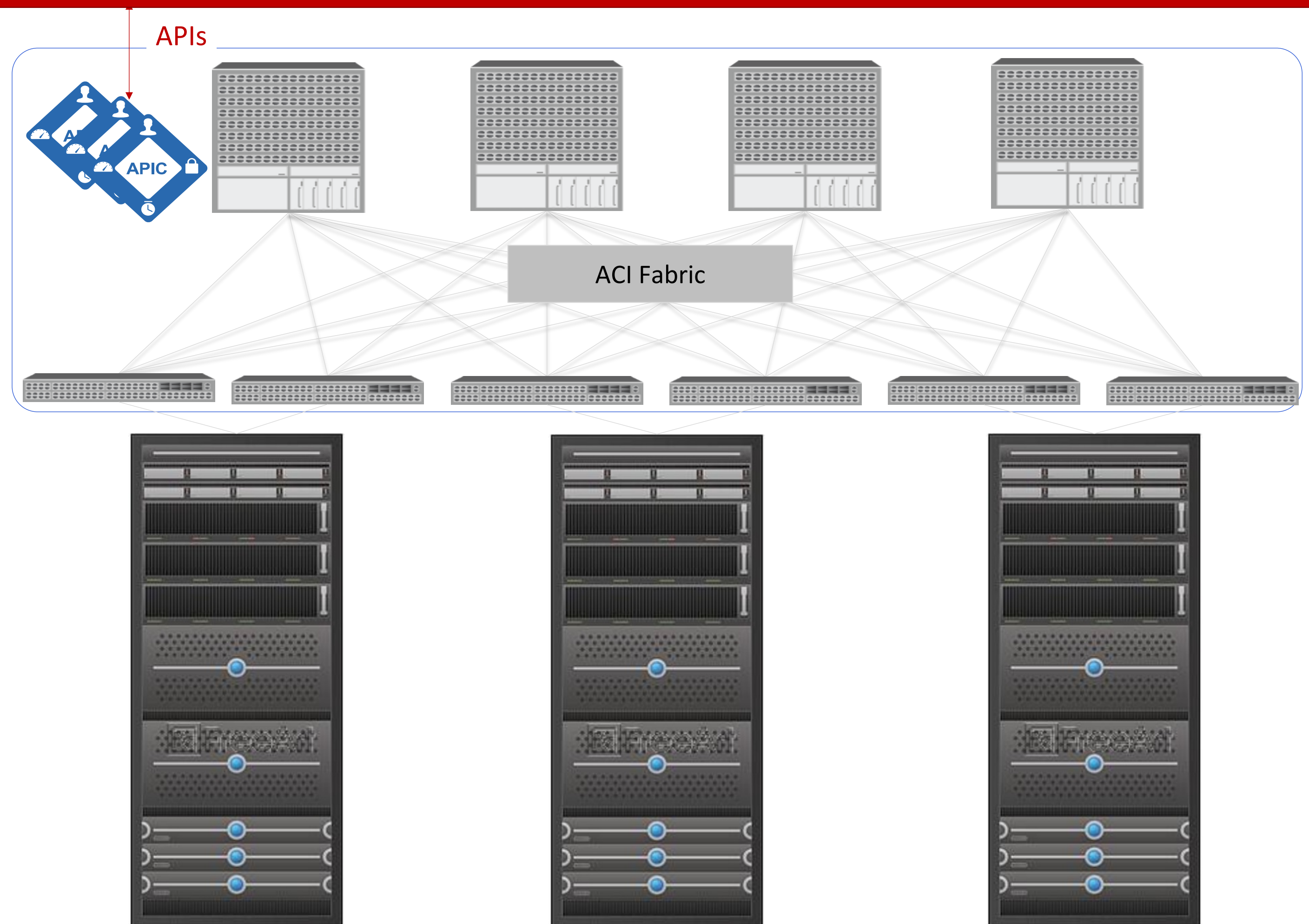
Leaner Cell Site, Zero Touch Provisioning, Speed of Software

Mobile Edge Computing **Low Latency. Edge Offload**

SDN Based Centralized & Regional DC

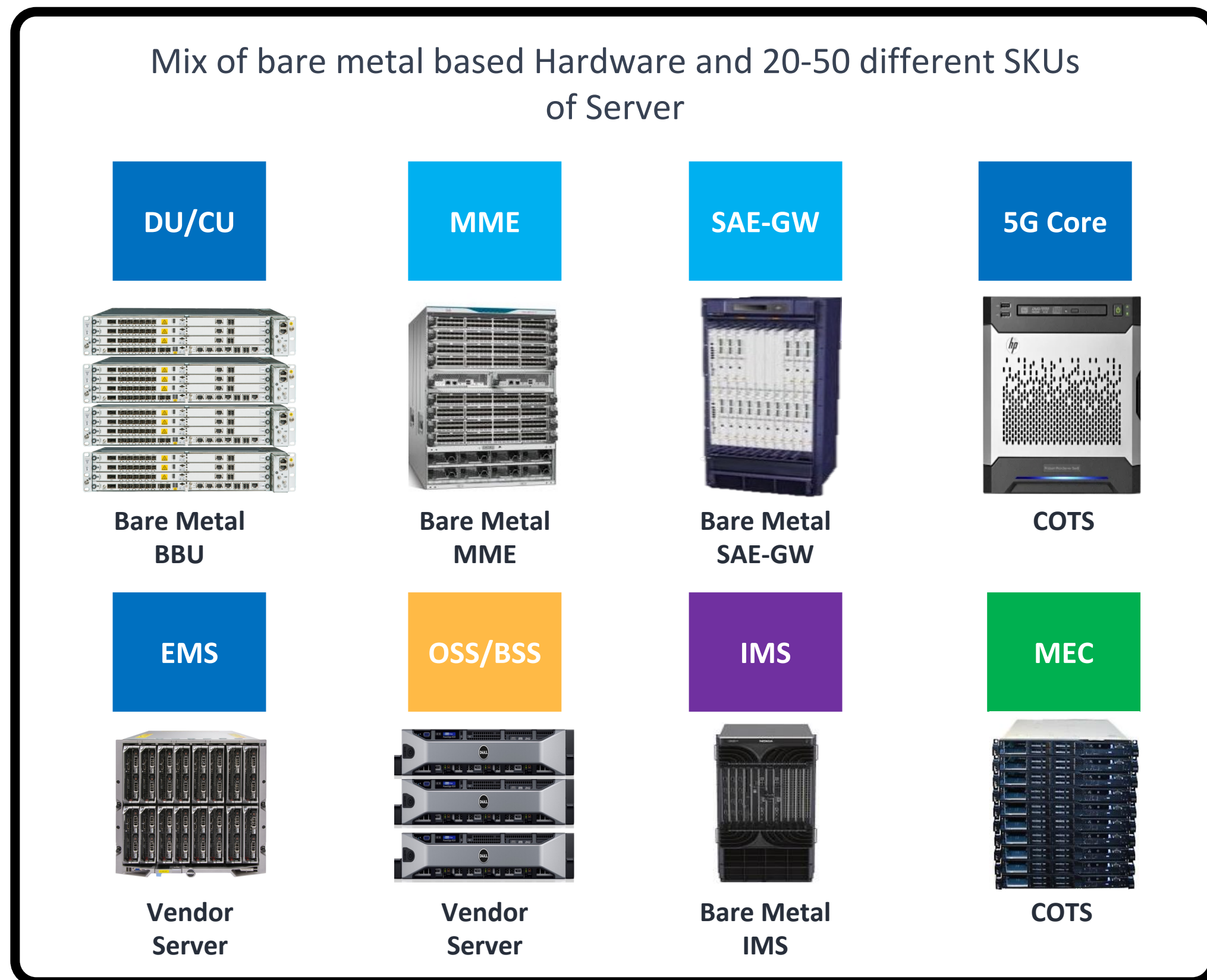
- Modular DC Architecture
- Fully automated
- Policy driven
- Built for 5G scale in mind
- VM, Containers, Bare Metal
- Service Chaining
- Carrier Grade
- Highly secure
- Telemetry and assurance

Management and Orchestration Systems



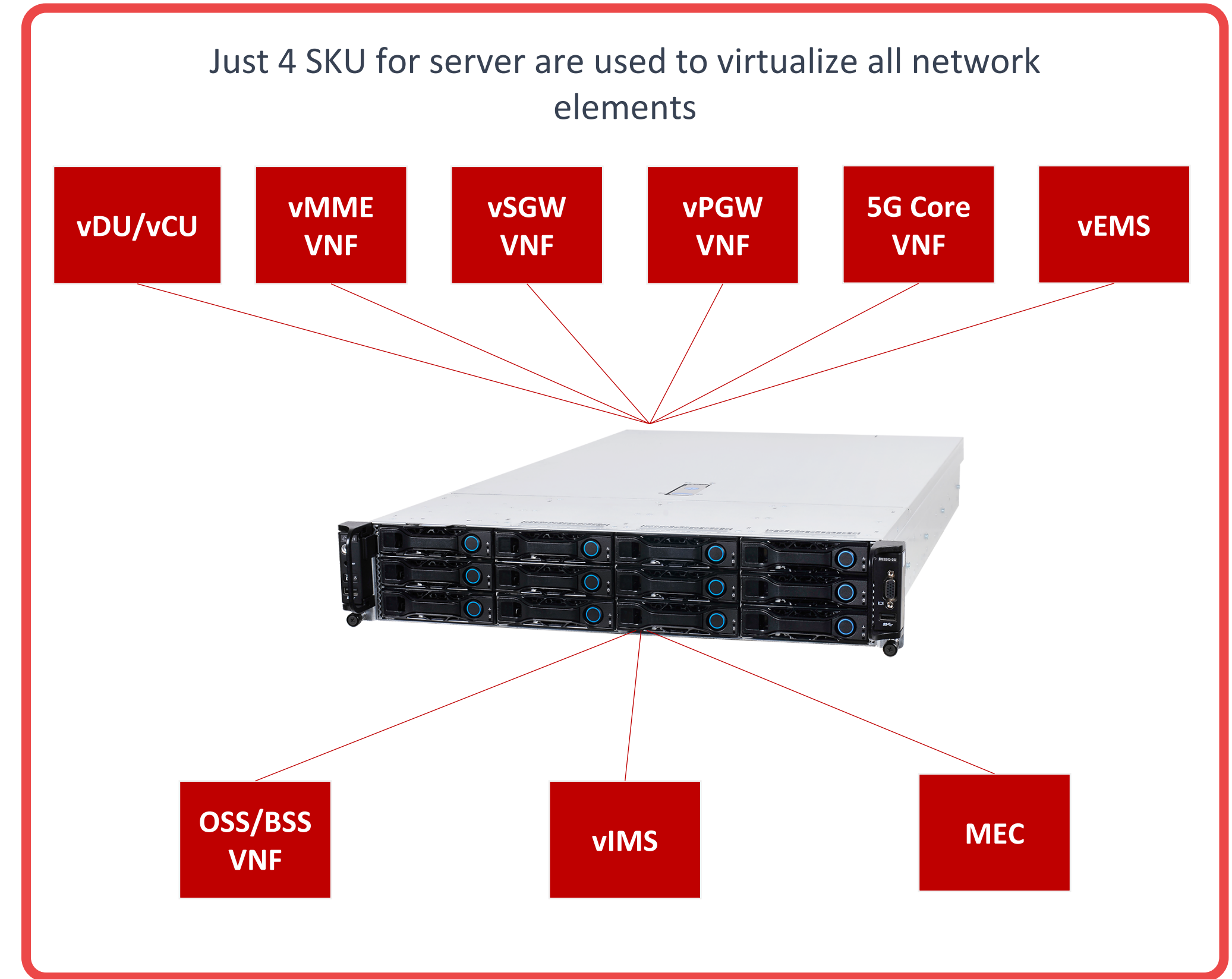
Low complexity hardware design

Traditional Network



VS

Rakuten Network



Cisco NFVI

North Bound APIs

NFVO, Resource Orchestration & VNF Service Orchestration

NSO – Network Services Orchestrator enabled by Tail-f

Virtual Network Functions

EPC

IMS

OSS

BSS

vRAN

CPNR

...

VNF Manager

Cisco ESC

Nokia CBAM

Virtual Infrastructure

Virtual Compute
(RHEL)

Virtual Storage
(Ceph)

Virtual Network
(OVS, SR-IOV)

Infrastructure Abstraction with RHEL, KVM/Qemu, Host Packages, vSwitches

Cisco Physical Infrastructure

Compute (Quanta) 


Network (N9k)

Storage (Quanta) 

API



Infrastructure
Management

 Red Hat OSP

 Cisco VIM
Lifecycle Manager



OPENSTACK
QUEENS

VIM

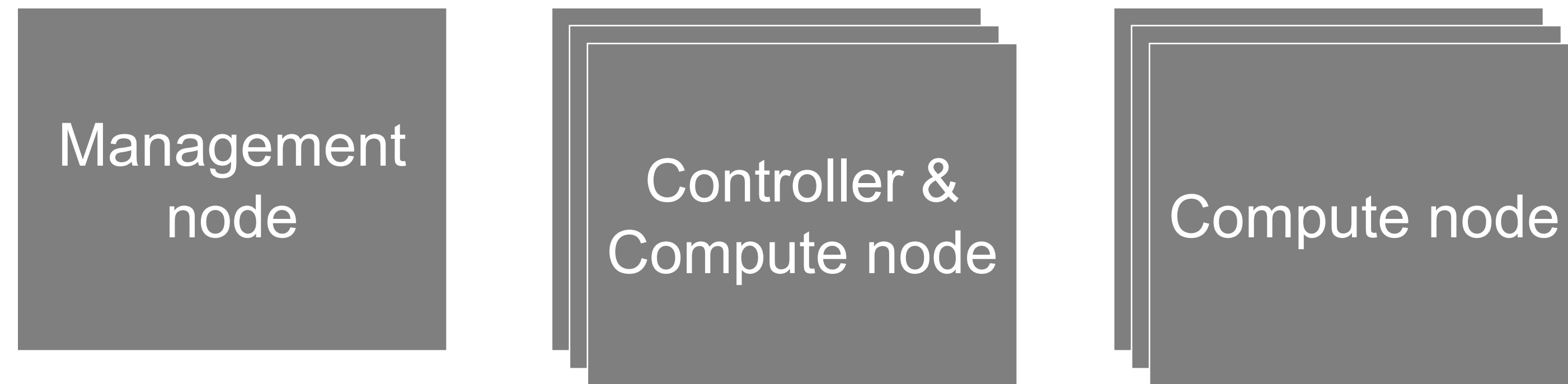
Cisco NFVI Scope

Cloud Infra Nodes

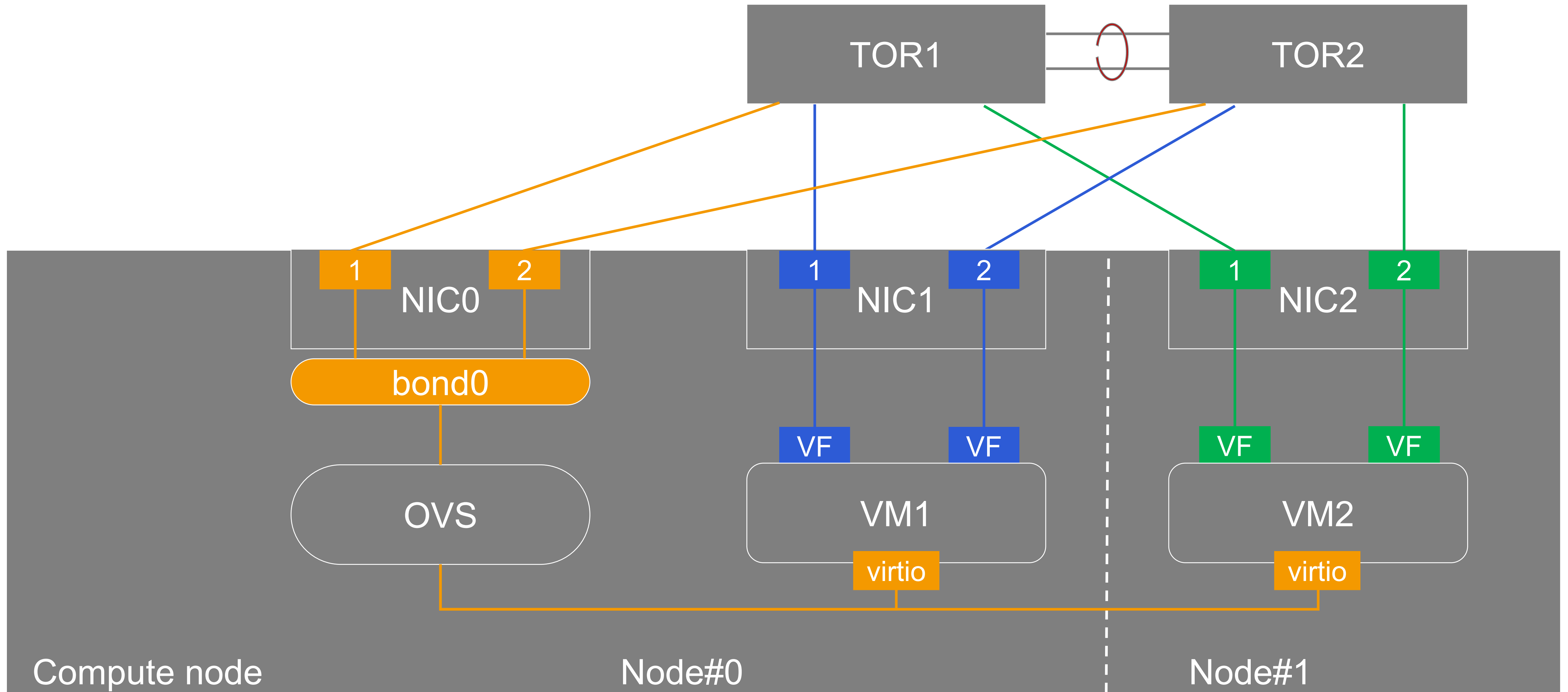


CDC&RDC

GC



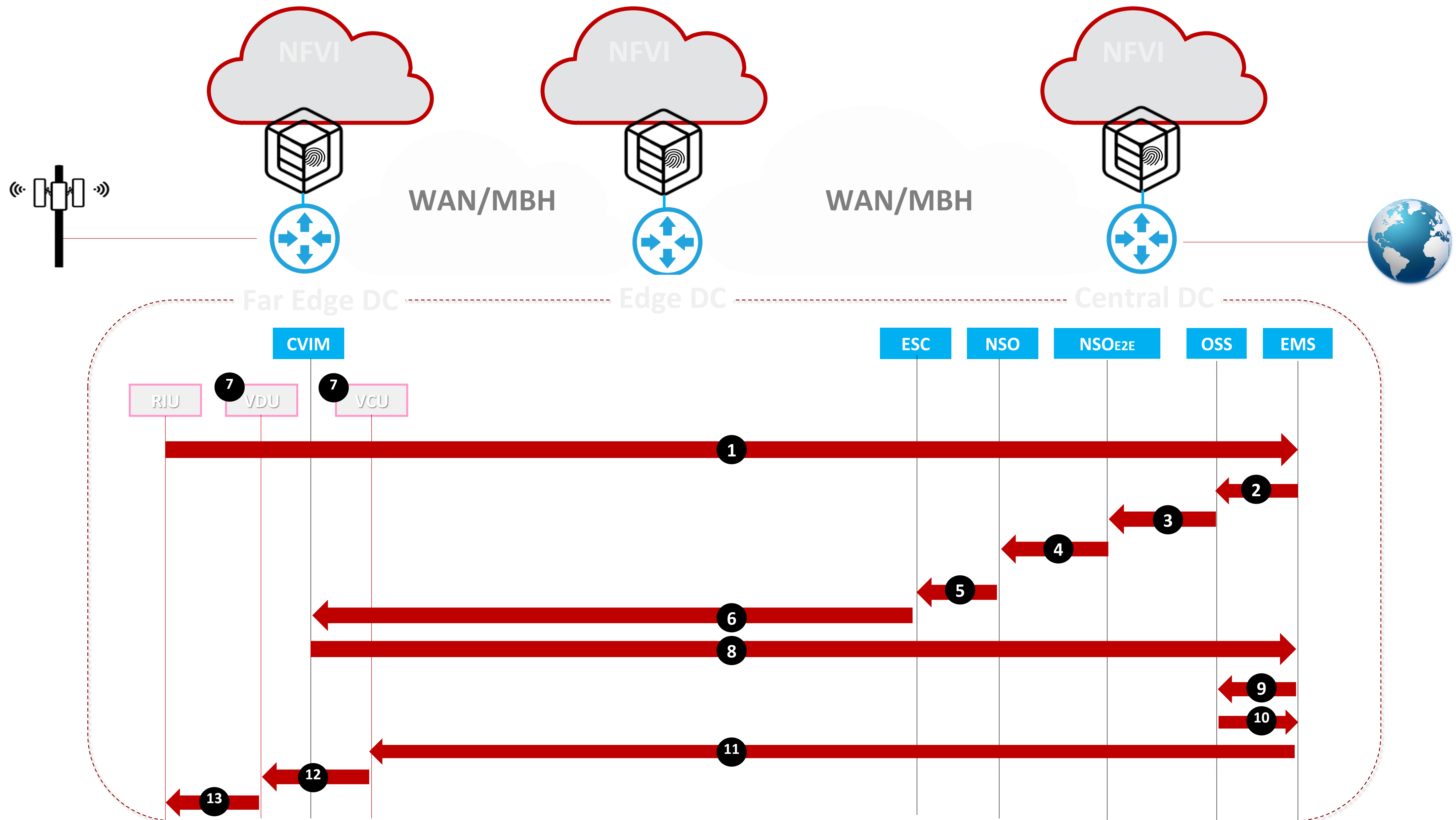
Compute Node Network Setup Example



One CPU Socket BBU SKU



End-to-End Automation in Action



Automated GC Setup

The screenshot displays a web-based Configuration Management interface for a POD-Life-Cycle. The main content area is titled "POD - Tokyoomori2/tkomr2" and shows a grid of five configuration categories, each with a list of completed tasks. Each task is represented by a green icon, a title, and a "COMPLETED" status with a date.

Configuration Category	Task Name	Status	Completion Date
Data Center Configuration	Data Center Registration	COMPLETED	06-Sep-2019
TOR Configuration	TOR Configuration User Approval	COMPLETED	06-Sep-2019
	TOR DHCP Registration	COMPLETED	06-Sep-2019
	TOR Config Upload	COMPLETED	06-Sep-2019
	TOR Registration Request	COMPLETED	06-Sep-2019
	TOR Registration	COMPLETED	06-Sep-2019
CVIM Configuration	Setup Data Generation	COMPLETED	09-Sep-2019
	Setup Data User Approval	COMPLETED	09-Sep-2019
	Fetch Cvim Detail	COMPLETED	09-Sep-2019
	Request Offline Validation	COMPLETED	10-Sep-2019
	Offline Validation Status	COMPLETED	10-Sep-2019
	Create Configuration	COMPLETED	10-Sep-2019
OpenStack Configuration	POD Registration	COMPLETED	10-Sep-2019
	Project and user Creation	COMPLETED	10-Sep-2019
	Image Onboarding	COMPLETED	10-Sep-2019
	Create host Aggregates	COMPLETED	10-Sep-2019
	Create host Flavours	COMPLETED	10-Sep-2019
	Create Network Subnet	COMPLETED	10-Sep-2019
RIU EMS Configuration	EMS Registration	COMPLETED	10-Sep-2019
	RIU DHCP Registration	COMPLETED	10-Sep-2019

Infra Monitoring Tool (CVIM-MON)

