



Mobile-CORD

Enable 5G

ONOS/CORD Collaboration
<http://opencord.org/>





M-CORD Drivers = Operator Challenges

In the last 5 years

100,000%

Increase in Wireless Data
Traffic

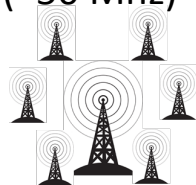


FREE
WiFi

Alternative
“shared” access
(WiFi, LAA, LTE-U)

\$50 Billion

Spectrum investment
(~50 Mhz)



New and very
diverse devices
with IoT

\$5 Billion

LTE System investment
(RAN, EPC)



Vendor
Lock-in
Interfaces

Flattening Revenue

M-CORD Drivers: Proprietary to Open



Today's infrastructure: Built with closed proprietary boxes

Leading to:

- Inefficient utilization of network resources including sub-optimal use of precious spectrum
- Inability to customize for various customers, or locations
- Slow in creating new innovative services
- For example, today it is hard to support industry-specific IoT solutions

Mobile infrastructure needs re-architecting



Capabilities to be Explored on M-CORD

✓ Enhance resource utilization

- Real-time resource management
- Exploit multiple Radio Access Technologies
- Real-time analytics framework

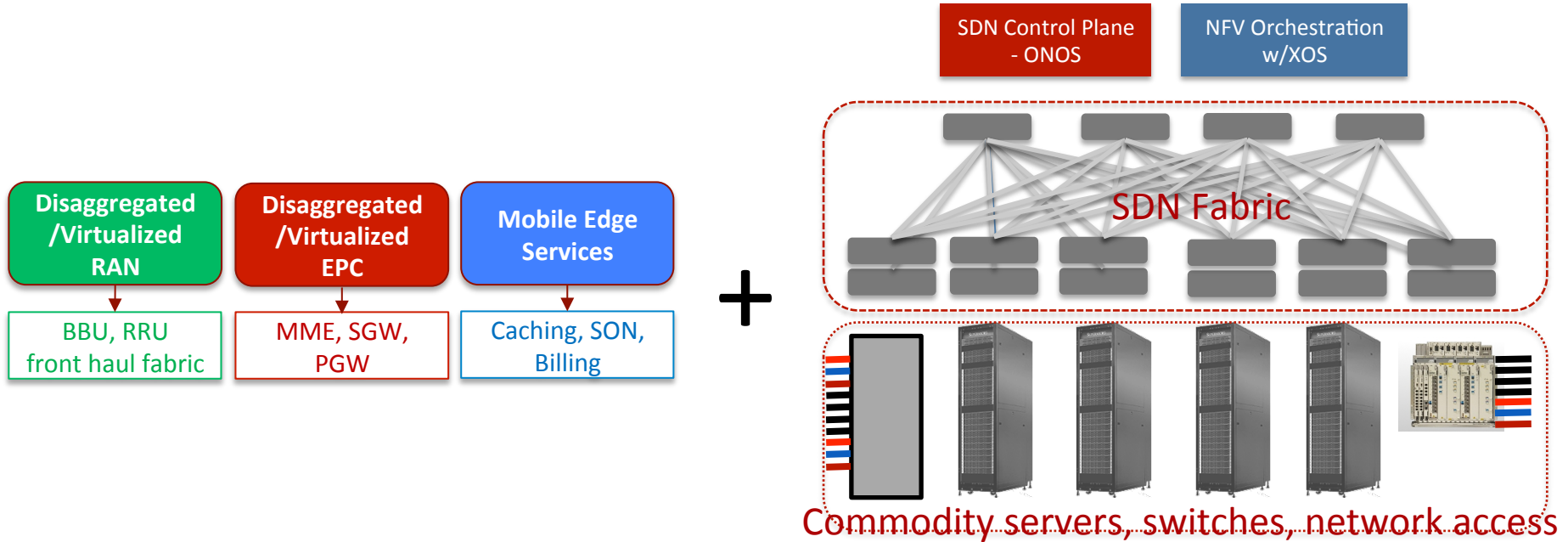
✓ Provides increased Programmability & QoE

- Customized service composition
- Differentiated QoE based on service requirements: latency and throughput
- Enable use cases: IOT, smart cities, hospital, education, industrial M2M apps

✓ Provides a platform for cost-efficient deployment of Services

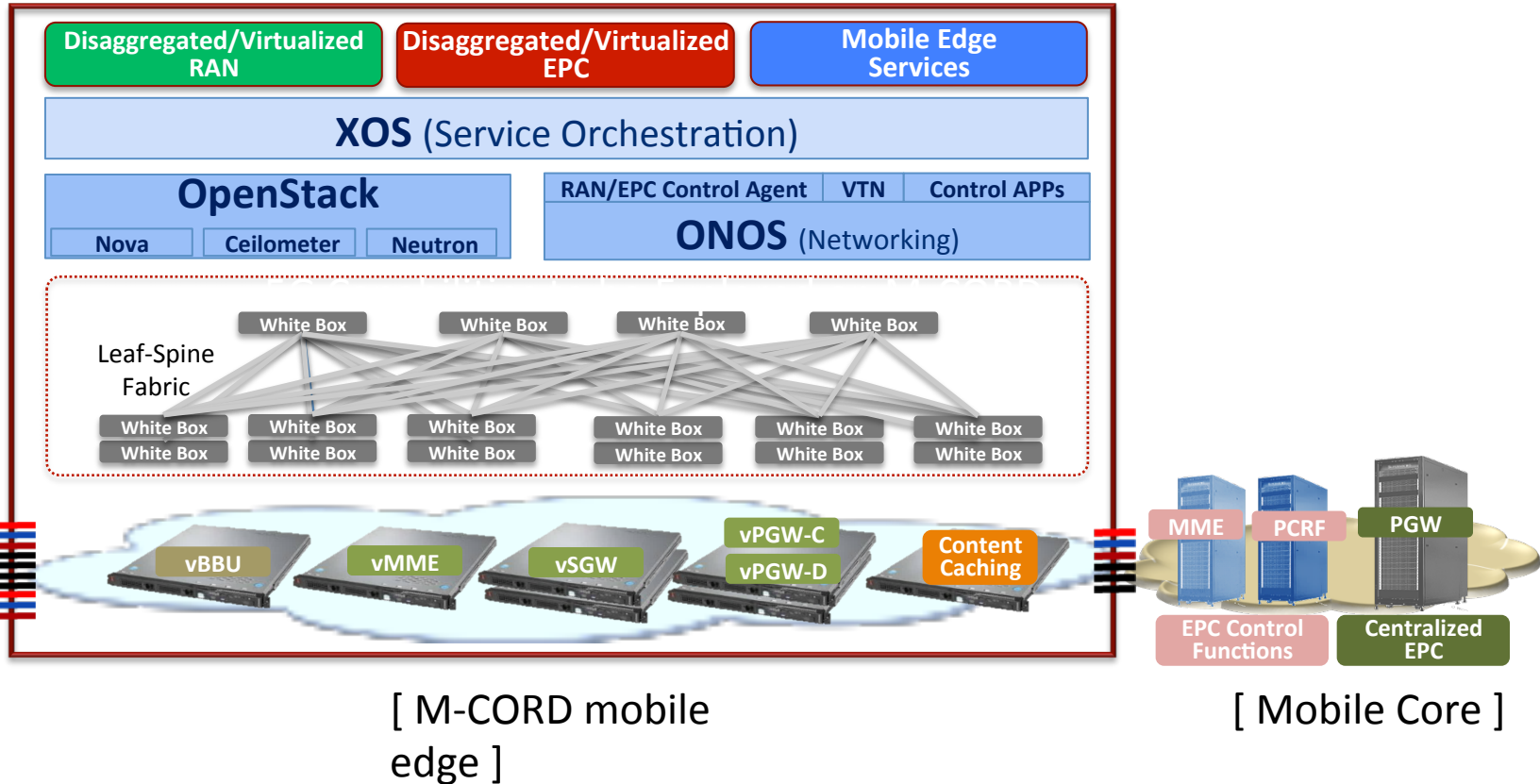
- Agile and on on-demand deployment models
- Virtualized /disaggregated RAN and EPC
- Based on commodity H/W and open source solutions

M-CORD: Mobility Technology Trends + CORD

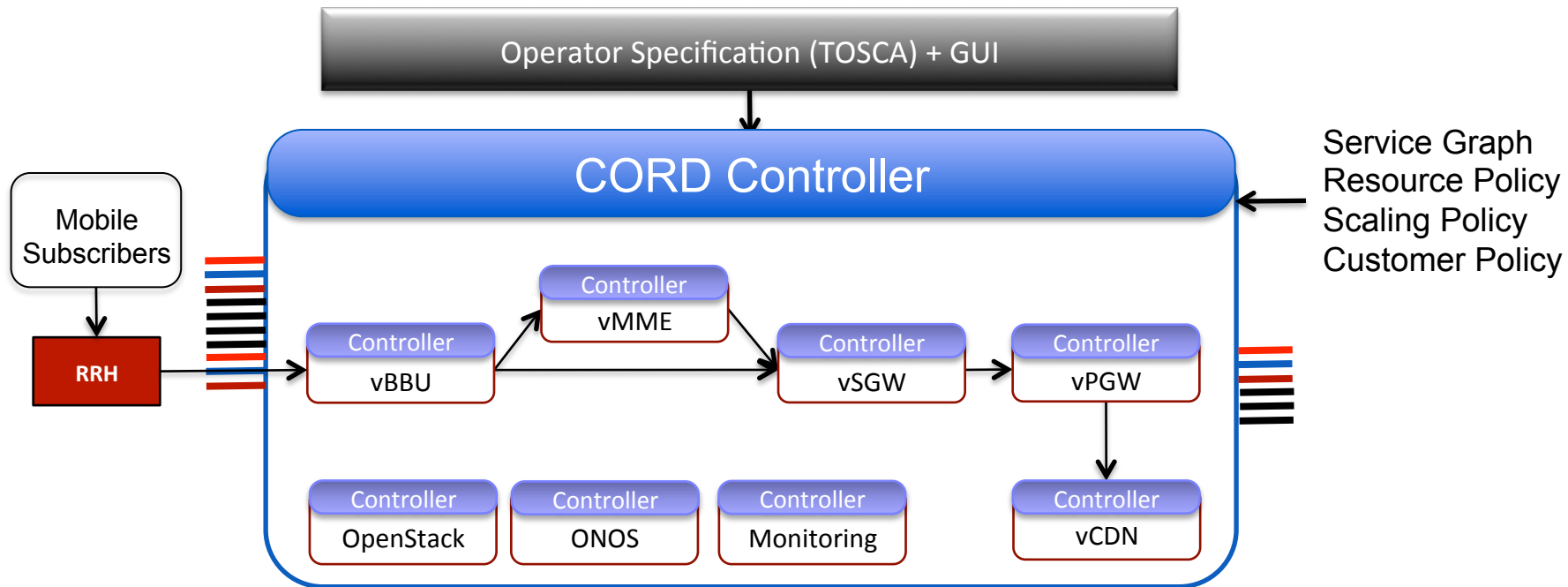


M-CORD: A Platform for 5G Exploration

M-CORD Architecture



M-CORD Software Architecture



- *Mobility Functions modeled as XOS services*
- *Utilizes XOS Service composition*

Mobile CORD POC (March 2016)



Service
Provider View



Enterprise
Customer View



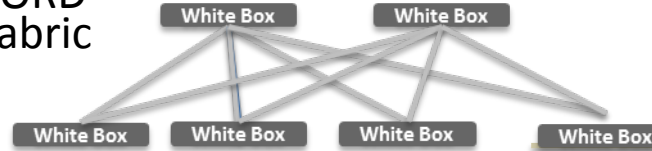
Caching Service
Monitoring Service
eSON Service

BBU, MME,
SGW, PGW
Services

POC at
ONS 2016

ONOS + OpenStack + XOS

CORD
Fabric



TeraVM

INTERNET

UE1



UE2

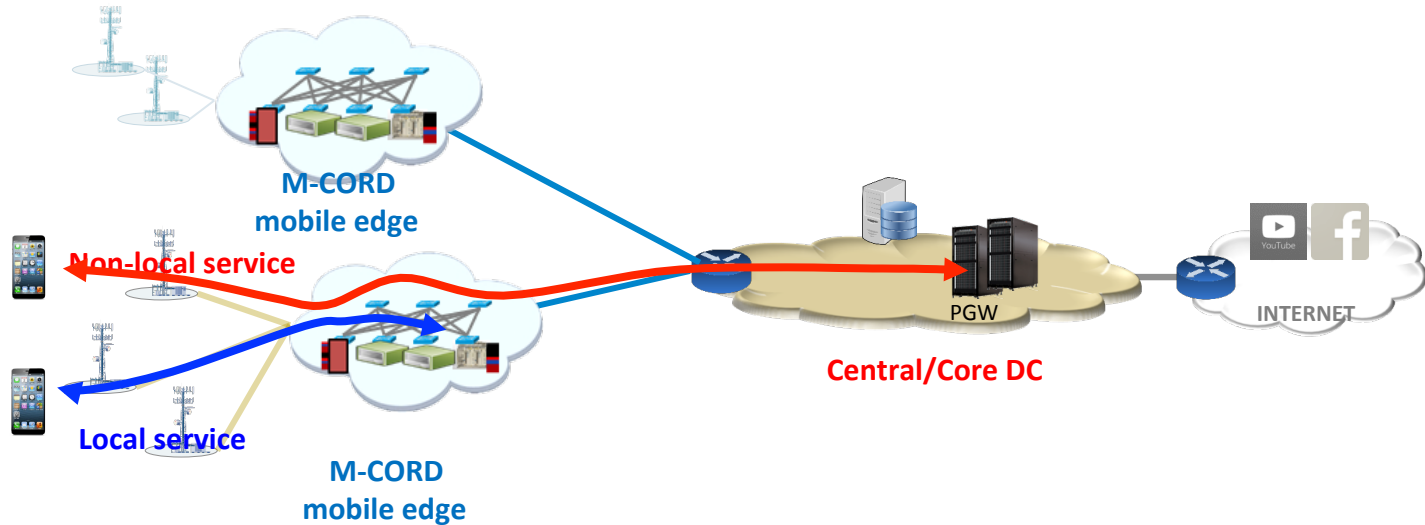


RRUs



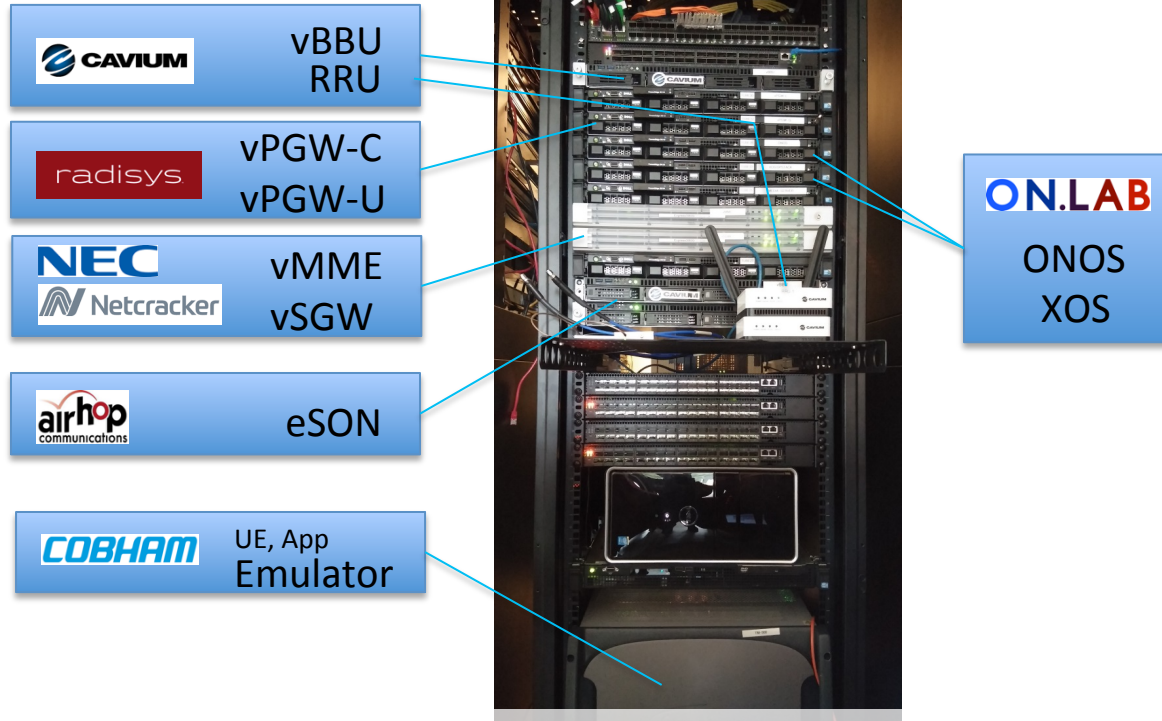
Commodity Servers, Storage, Switches, and I/O

M-CORD Service example: Video from the Edge



- Local service : UE1 → vBBU → vSGW → local-PGW
- Non-local Service : UE2 → vBBU → vSGW → global-PGW

M-CORD ONS 2016 PoC Infrastructure & Collaborators



[M-CORD POC Rack]

Factors contributing to our success



- **Community Interest & Engagement**
- **Focused effort**
- **Willingness to take risk**



Current Work Highlights



- RAN Slicing
 - Integration of Argela UE based slicing into CORD
- HSS (Home Subscriber Server) integration
 - Moved from emulated to real HSS, and integrated with CORD
- SON(Self-Organizing Networks)
 - Upgraded the SON portal and integrating with A-CORD
- Packaging of vPGW, vSGW as XOS services
 - vPGW is completed
 - vSGW is in progress

Current Work Highlights



- Fabric integration
 - VLAN to VXLAN conversion for some EPC components in progress
- End to end testing of M-CORD POD
 - End to end function testing framework with Cobham UE emulator
 - Automatic test with Jenkins is in progress

M-CORD Roadmap



- **RAN Slicing**
- **CORE Slicing**
- **Observability and Analytics**
- **Connectionless**
- **M-CORD Lite**
- **New Applications & Services**

Learn more at the M-CORD Breakout Session

Summary



- M-CORD is all about enabling innovations by all
- Create Open Reference Platform for 5G exploration
- Our goal is to create 10s of M-CORD PODs around the globe for development, testing and experimentation
- Join us @ the breakout session to plan future of M-CORD

ThankYou to all the existing collaborator! (Cavium, Radisys, Airhop, NEC/Netcracker, Cobham)

Welcome new collaborators: Intel, Argela, Quortus, Tech-Mahindra, Viavi, Netronome, Lime-Micro