

CABLE-TEC EXPO® 2017

SCTE • ISBE

THE NEXT BIG...

DEAL
CONNECTION
INNOVATION
TECHNOLOGY
LEADER
NETWORK



DENVER, CO
OCTOBER 17-20



READY OR NOT, 5G IS COMING: AN
UNDERSTANDING THE BACKHAUL
REQUIREMENTS FOR 5G

SCTE · ISBE

Cell backhaul – Building the 5G- ready network of the future, today

Jon Baldry
Director Metro Marketing
Infinera



DENVER, CO
OCTOBER 17-20

This Session Will Be Interactive!



FXP | touch



- Personalize
- Chat
- Ask questions
- Take notes
- Move to current slide

Agenda

Evolution from 4G to 5G in mobile transport networks

Implications for mobile transport networks

- The evolution of mobile fronthaul networks
- The evolution of mobile backhaul networks

Cell backhaul for MSOs



What is “5G” to you?

What is “5G” to you?



An exciting opportunity to be part of the biggest thing to hit telecoms!

What is “5G” to you?

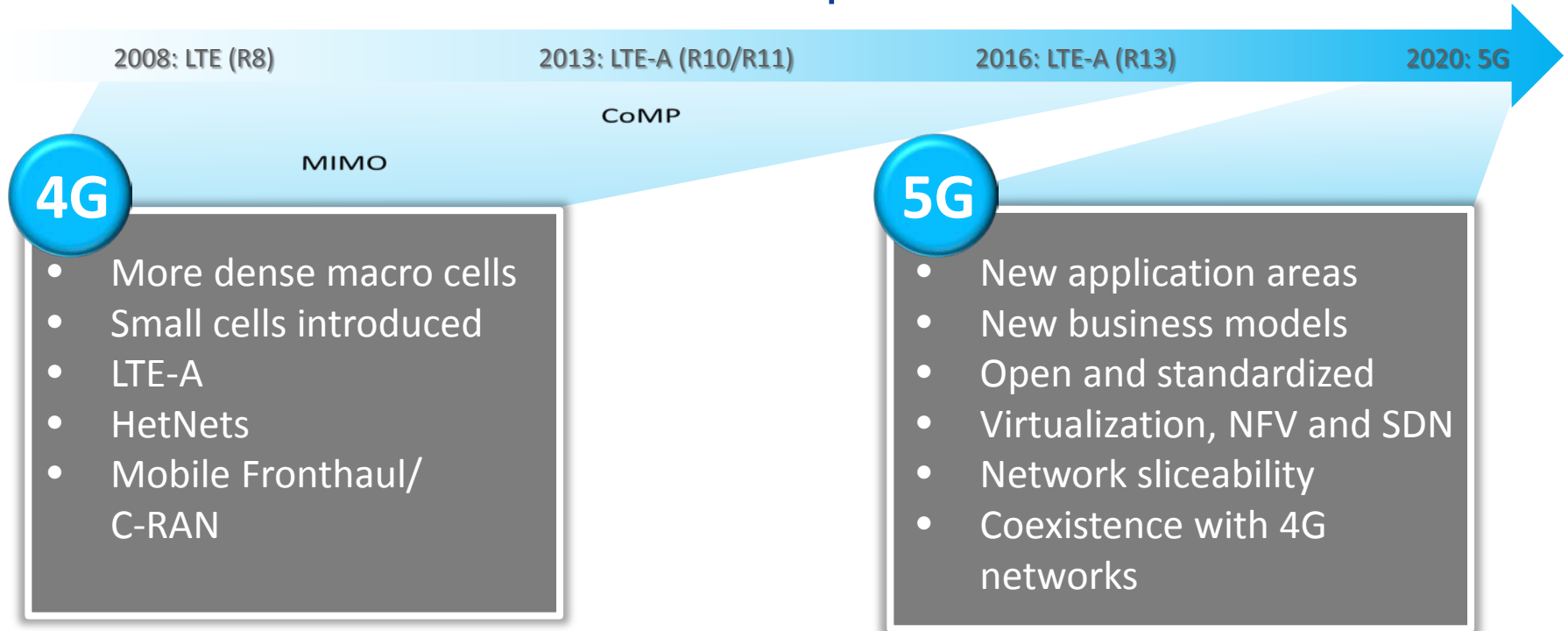
A

An exciting opportunity to be part of the biggest thing to hit telecoms!

B

An overhyped technology that’s going to be a nightmare to implement!

From 4G to 5G – what can we expect?



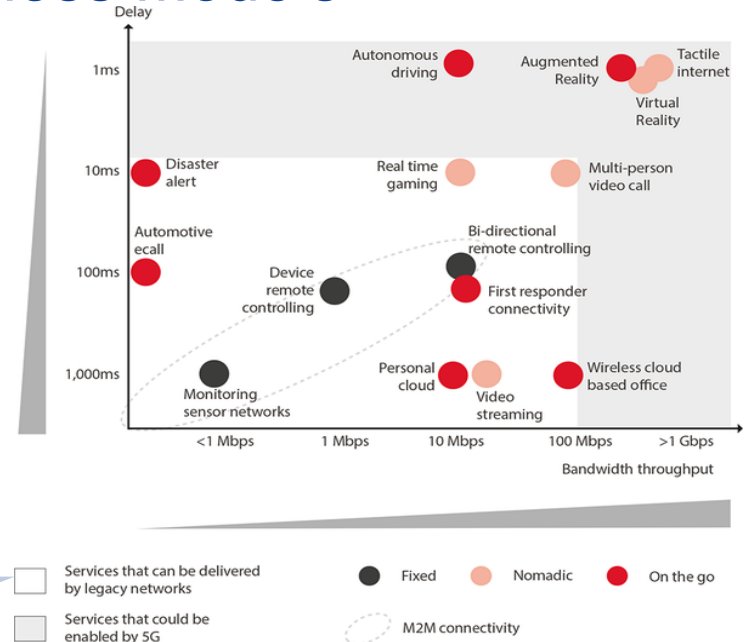
5G Trend: New Applications and Business Models

New application areas such as

- Enhanced mobile broadband
- Machine to Machine (M2M) communication
- Automotive, etc

New business models such as

- Shared infrastructure between multiple operators
- Enterprise carrier shared business

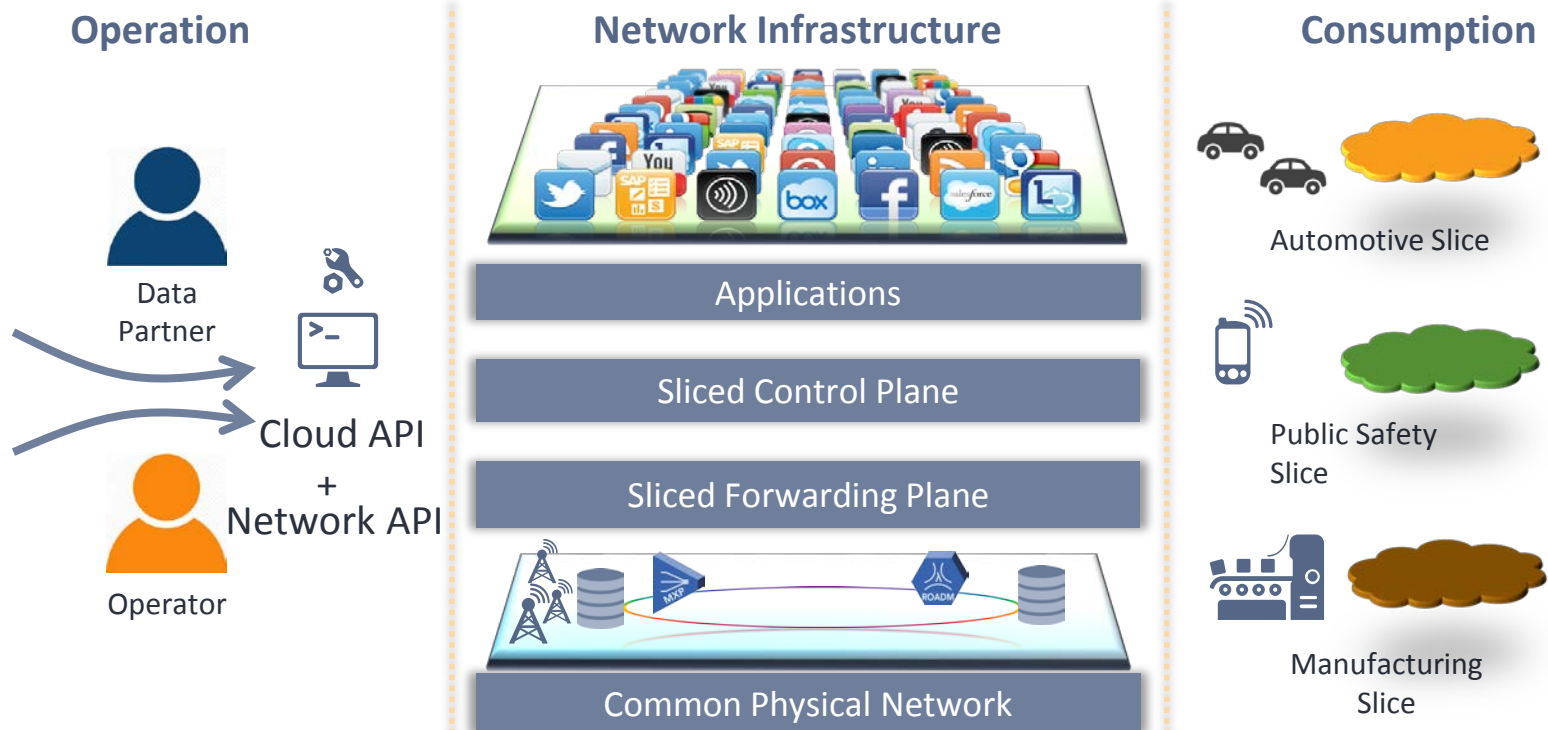


- Services that can be delivered by legacy networks
- Services that could be enabled by 5G
- Fixed
- Nomadic
- On the go
- M2M connectivity

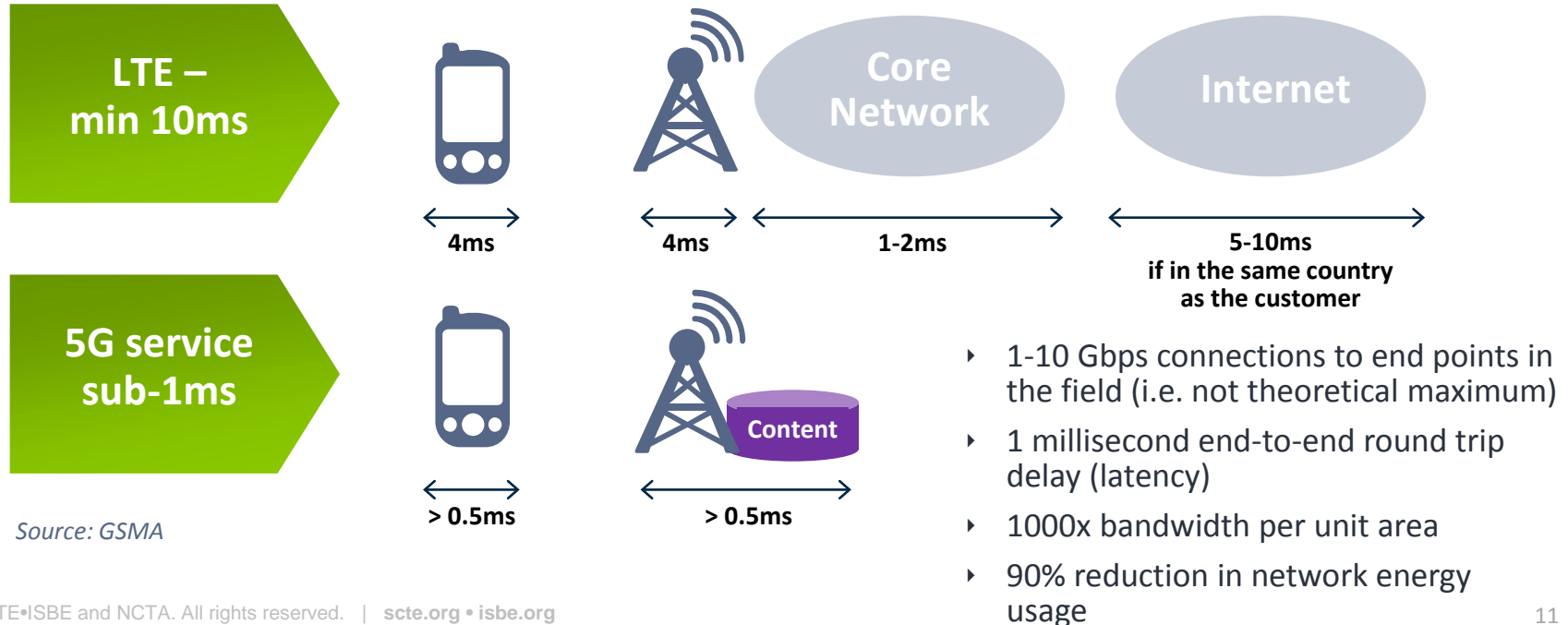
Requires ultra low latency, network sliceability and scalability

Source: GSMA

5G Trend: Sliceability – per Industry and Service Type

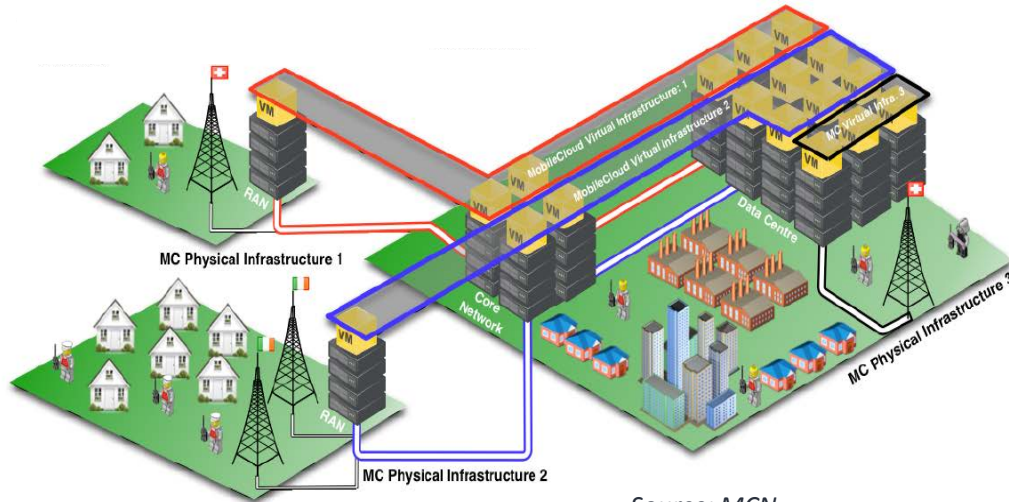


5G Trend: Lower Latency, More Capacity, Content Closer



Source: GSMA

5G Trend: Macro to Micro Data Centers for Mobile-Cloud



Source: MCN

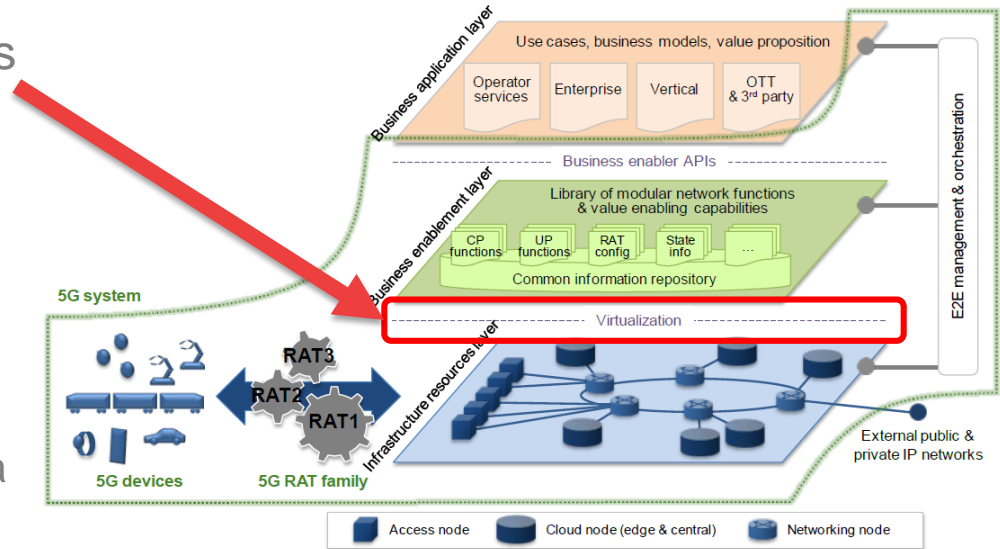
- ▶ Data Center technology is used throughout the mobile networks
- ▶ Each function is virtualized, i.e. cloud based
- ▶ Cloudification needs to interact with transport network to achieve the Mobile Edge/Fog Computing architecture

5G Trend: NFV and Virtualization; Driver for CORD

5G design leverages the structural separation of HW and SW, as well as the programmability offered by SDN and NFV

NFV is a top driver for CORD – (central office re-architected as a data center) in Smart COs

- Combines NFV and SDN to improve elasticity and bring data center economics and cloud agility to the telco CO
- A mini DC in a CO



Source: NGMN 5G Whitepaper

Which region will be the first to deploy commercial 5G?

A

Asia

B

Europe

C

North America

D

Other

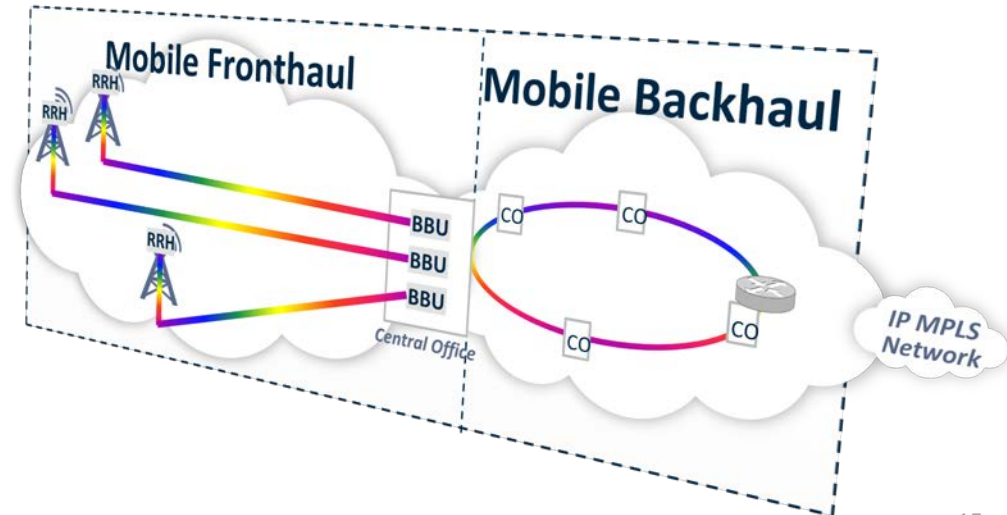
Today's LTE-A Architecture

Mobile Fronthaul

- Evolution of mobile RAN
 - Distributed base station architecture and Centralized base band units
 - Introduction of small cells
 - Introduction of mobile enterprise

Next gen Mobile Backhaul

- LTE-Advanced
- More and different cell types
- Coordination of cell types
- More capacity/advanced services

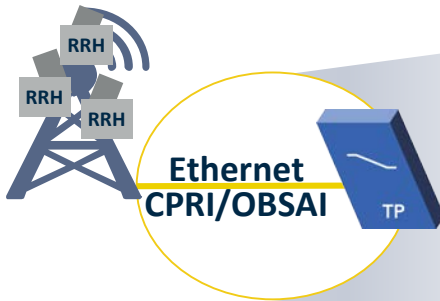


How is the Mobile Fronthaul Network Evolving?

Multiple options:

- 4G Fronthaul continues with CPRI/OBSAI at higher rates
- 5G Fronthaul follows the NGFI path and migrates to Ethernet

Today's Fronthaul solutions need to support both



Selected fronthaul solutions are both 4G and 5G ready - supporting Ethernet and CPRI/OBSAI in the same unit.

No rip and replace needed

5G Mobile Transport Standardization Bodies

▶ ETSI and CPRI

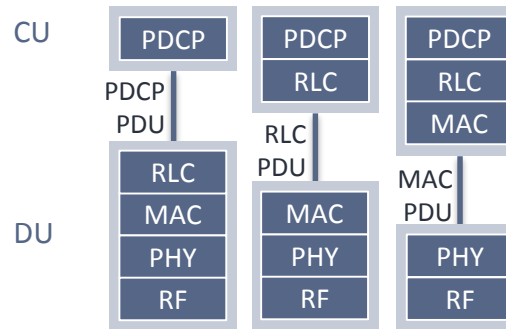
- CPRI rates from 0.614 Gb/s (option 1) to 24.330 Gb/s (option 10)



▶ NGFI

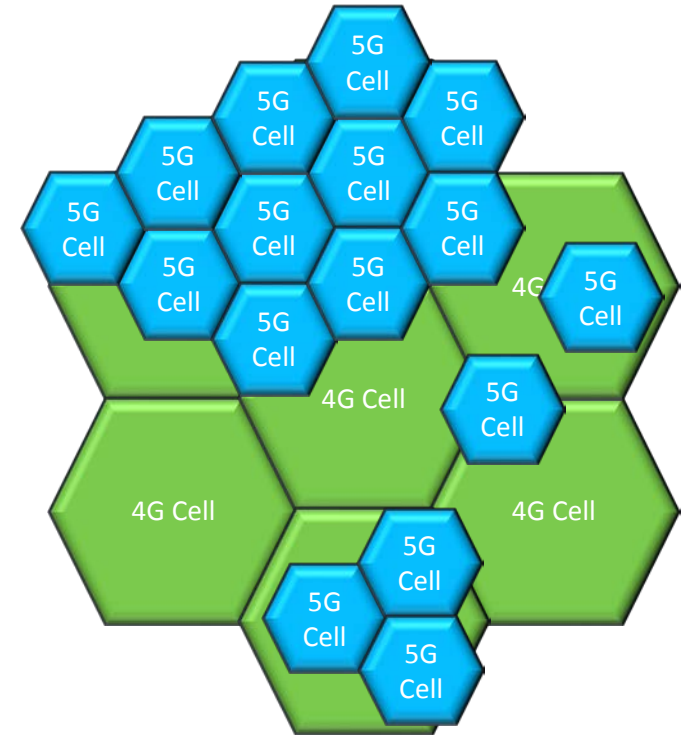
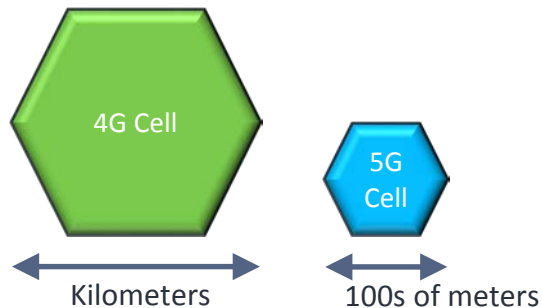
- CPRI over Ethernet
- Time sensitive Ethernet

Fronthaul: New Interface options tbd

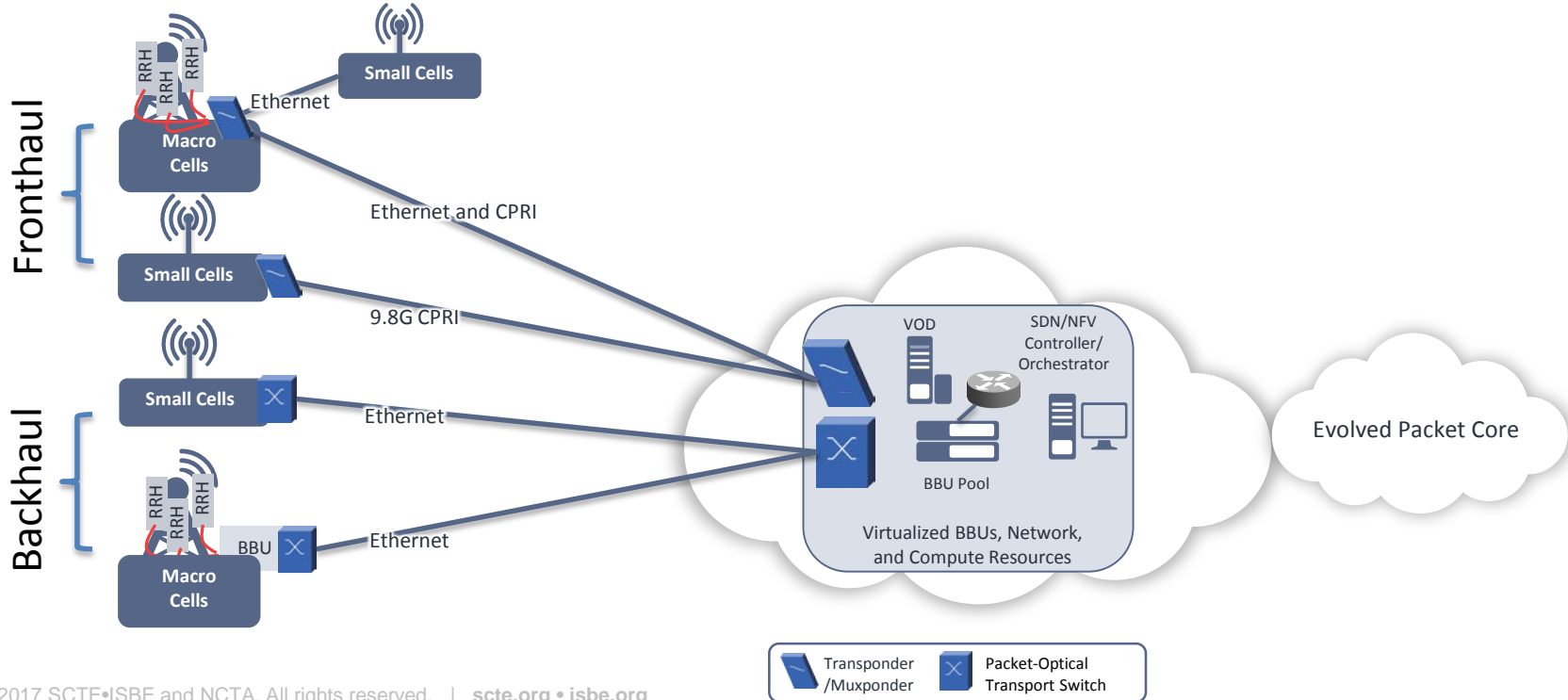


Cell Site Evolution from 4G to 5G

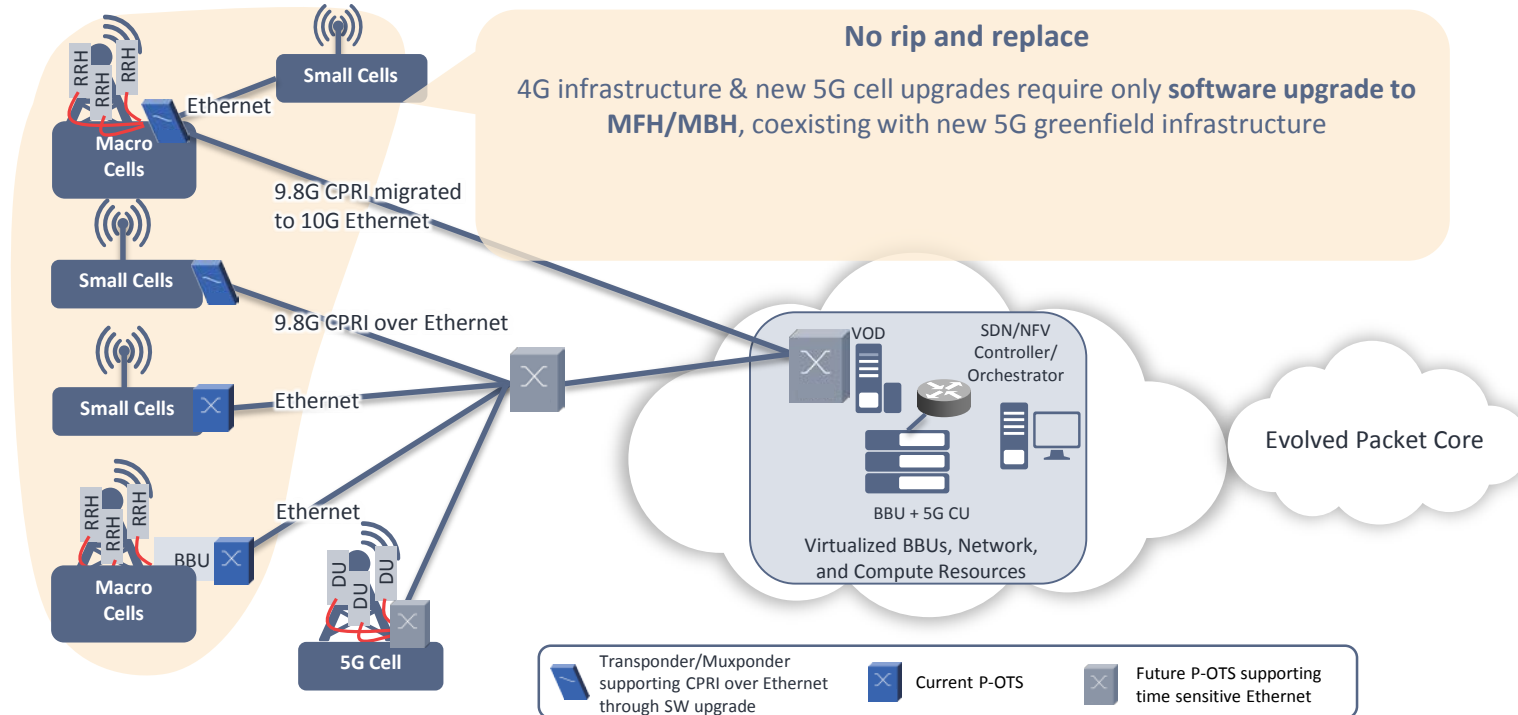
- ▶ Transition to 5G will take many years
 - 5G likely to require millimeter wave (30-300 GHz) RAN
 - Reduces transmission range, trend towards small cells
 - 4G infrastructure coexists with 5G to “fill the gaps”



5G-Ready Mobile Transport Networks – Today



5G-Ready Mobile Transport Networks – 5G and Beyond



When do you think we'll see the first widescale commercial 5G?

A

2018-19

B

2020-21

C

2022 onwards

Cell backhaul opportunities for MSOs

- 5G creates enlarged market opportunity
 - Massive expansion of number of cells
 - Utilize fiber and HFC plant for wholesale services
 - Massive bandwidth
 - High Performance
 - Sync, latency
- But 5G creates uncertainty around mid-haul/X-haul
- Tight synergies with other MSO architecture shifts
 - Remote PHY etc.



Cell backhaul opportunities for MSOs

MSOs should consider Dark Fiber vs Managed Services:

- Leverage economics of one network to support multiple wireless operators or multiple applications (e.g. Remote PHY)
- Utilize field resources to support proliferation of 5G cells
- Take advantage of network slicing and SDN control

MSOs should consider service differentiation

- Differentiation with service performance
 - Synchronization, Latency
- Investigate “5G-Ready” fronthaul and backhaul



SCTE · ISBE

THANK YOU!

Jon Baldry

jon.baldry@infinera.com

+44 7766 146 440



DENVER, CO
OCTOBER 17-20

