Cell Site Gateway Router

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OCP SUMMIT

Agenda

Why New Cell Site Gateway Router?

Open and Flexible

Whitebox Requirement Framework

Cell Site Gateway Router Topology

Deployment Environment

Major Requirements

High Level Systems Block Diagram

Summary of AT&T Whitebox Experience

Why New Cell Site Gateway Router?

Exponential Data Traffic Growth

- Increased internet adoption, faster broadband, next generation wireless networks, the Internet of Things, and increased live streaming of online videos are expected to drive exponential traffic growth
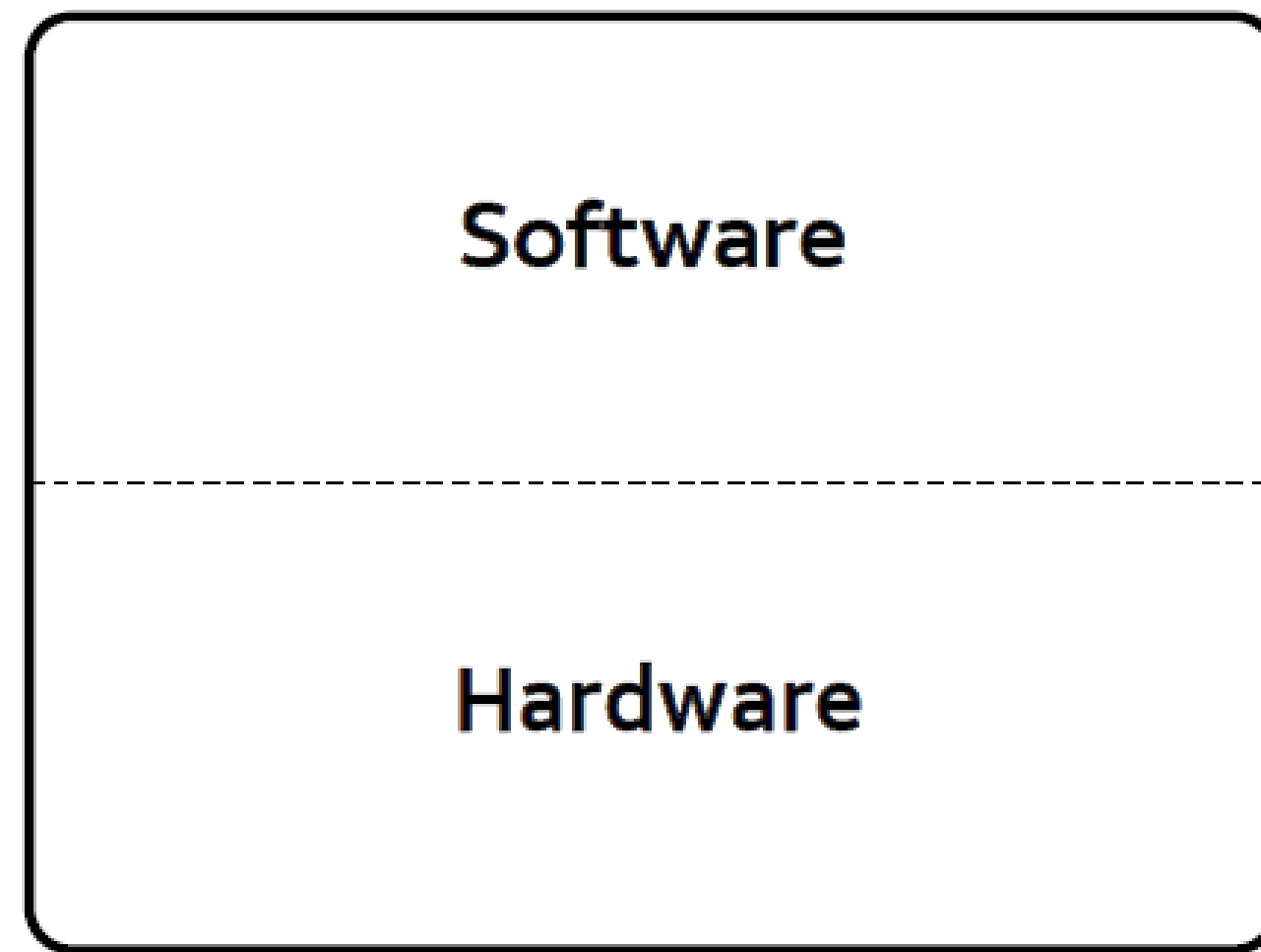
- **The old hardware model simply can't keep up**

5G Deployment

- Stringent demands of 5G on speed, bandwidth and performance with low latency

- 5G mobile technology can send massive amounts of data with low latency, little downtime in between

- Changing needs of backhaul transport requirements as mobile service providers make the transition from legacy technologies toward 5G RAN technologies

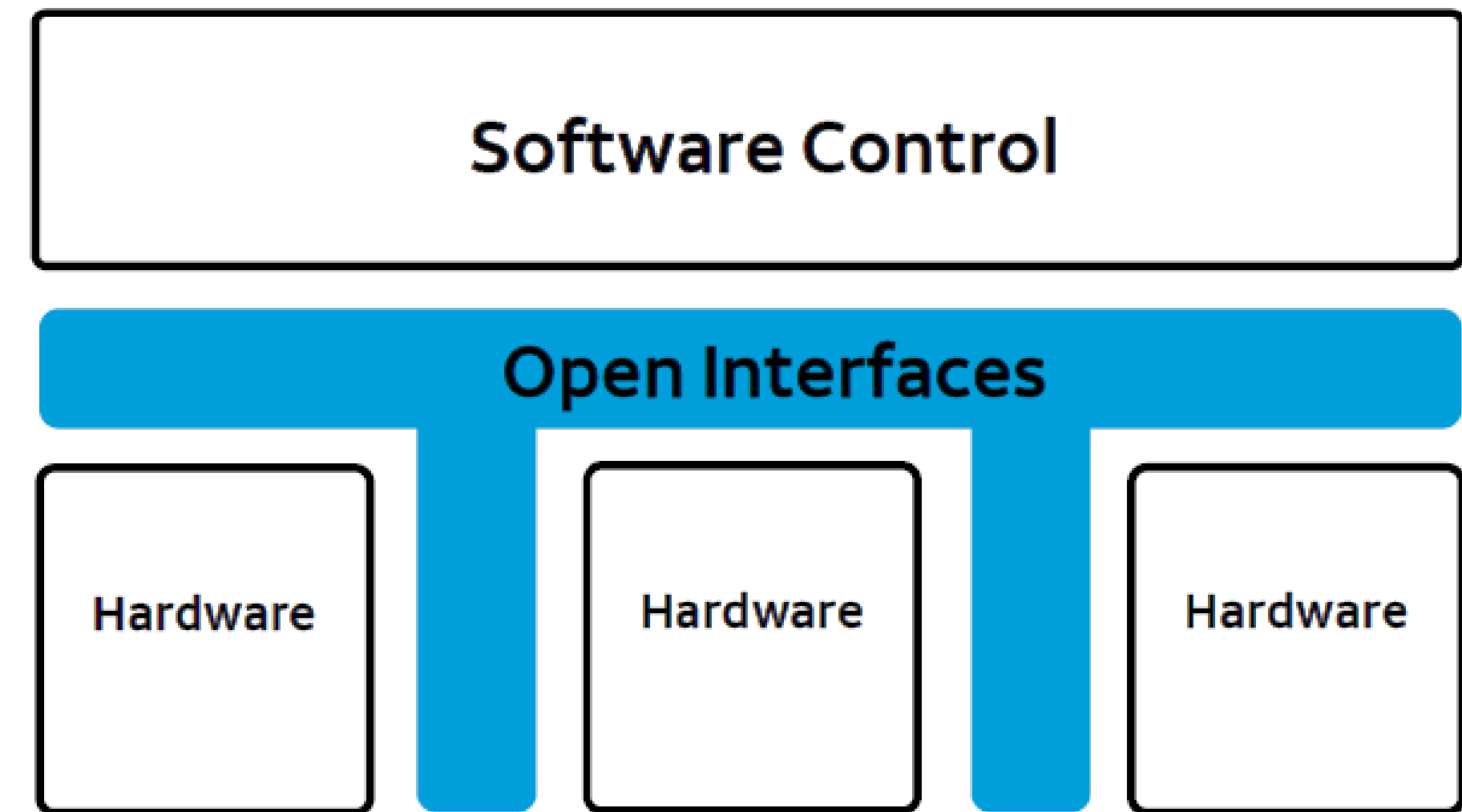**Need a high-performance, versatile router to meet service requirements**

Open & Flexible

Open Platform

Whitebox

Not Custom Built

Open Platform/Interfaces

Off-the-Shelf Technology

Multi-Vendor Sourced

Open Network Environment
Software Define Data Center Networking Solution

Orchestration Control & Network Mgmt

openstack

Open Network Environment

ONAP

API ↑ API ↑

NOS

Universal OS Installer

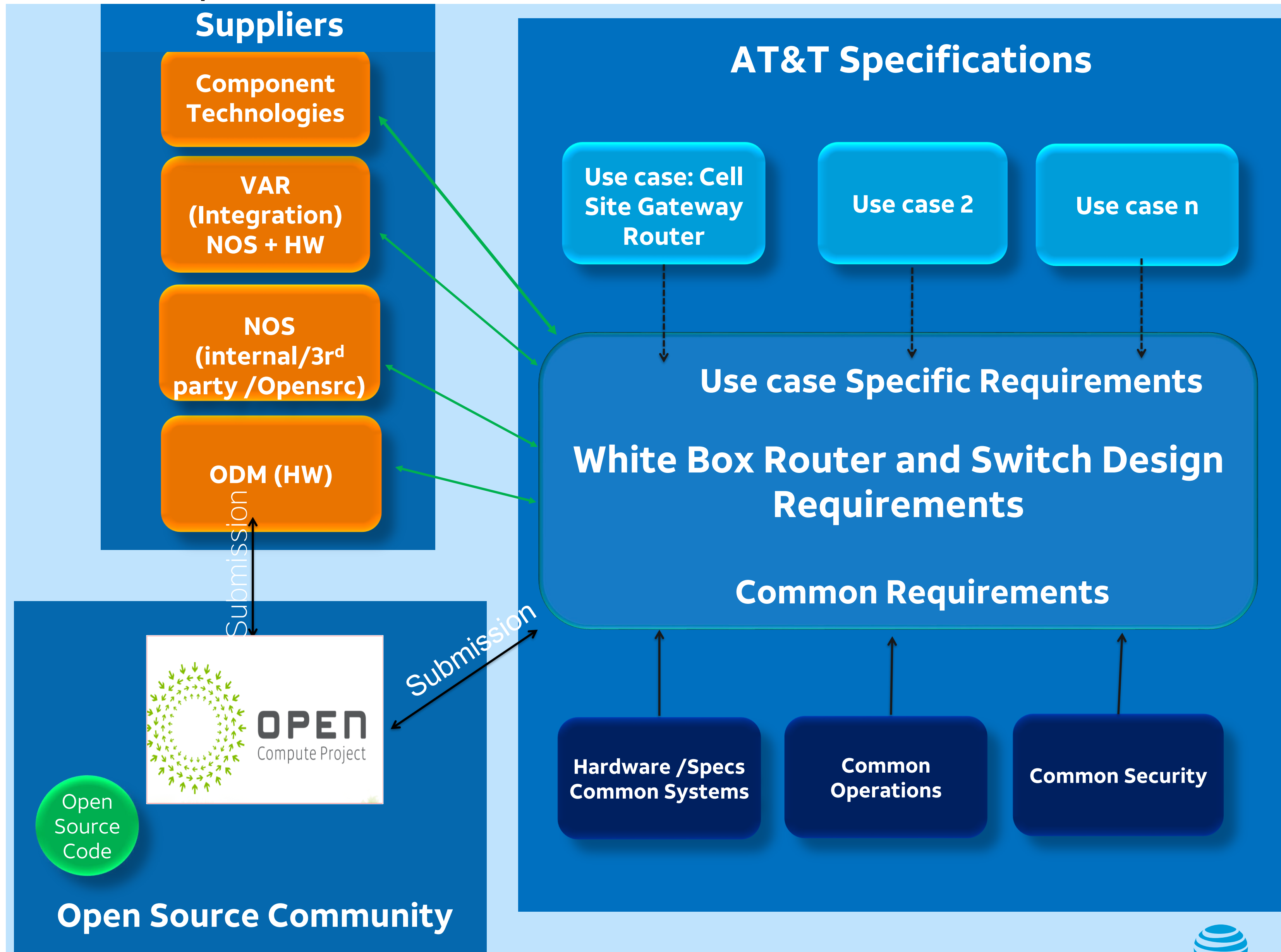Firmware

Bare Metal Switch

White Box

Whitebox Requirement Framework
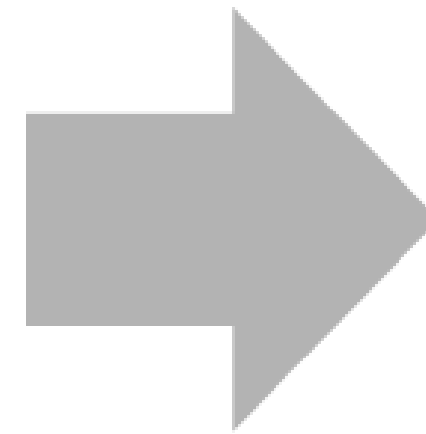
Principle

- Open-standard, flexible, modular
- Interactive approach, engage all key stakeholders
- Work towards a solution with the end game in mind
- Common spec
- Use case specific spec

Cell Site Gateway Router

- AT&T is releasing hardware specs to OCP
- ODMs are contributing detailed design package

Suppliers

Component Technologies

VAR (Integration) NOS + HW

NOS (internal/3rd party /Opensrc)

ODM (HW)

Submission

Open Source Community

Open Source Code

OPEN Compute Project

Submission

AT&T Specifications

Use case: Cell Site Gateway Router

Use case 2

Use case n

Use case Specific Requirements

White Box Router and Switch Design Requirements

Common Requirements

Hardware /Specs Common Systems

Common Operations

Common Security

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AT&T Cell Site Gateway Router (CSGR) Topology

5G requires new technologies and solutions to deliver an order of magnitude higher capacity, performance and low cost

Core

CSGR

Access

RU

BU

CPRI/
eCPRI

IP/ETH

CSGR

Cell Site
(tens of thousands)

CSGR

Aggregation

CSGR

Access

CSGR

CSGR

CPRI/eCPRI - Common Public Radio
Interface/ enhanced CPRI
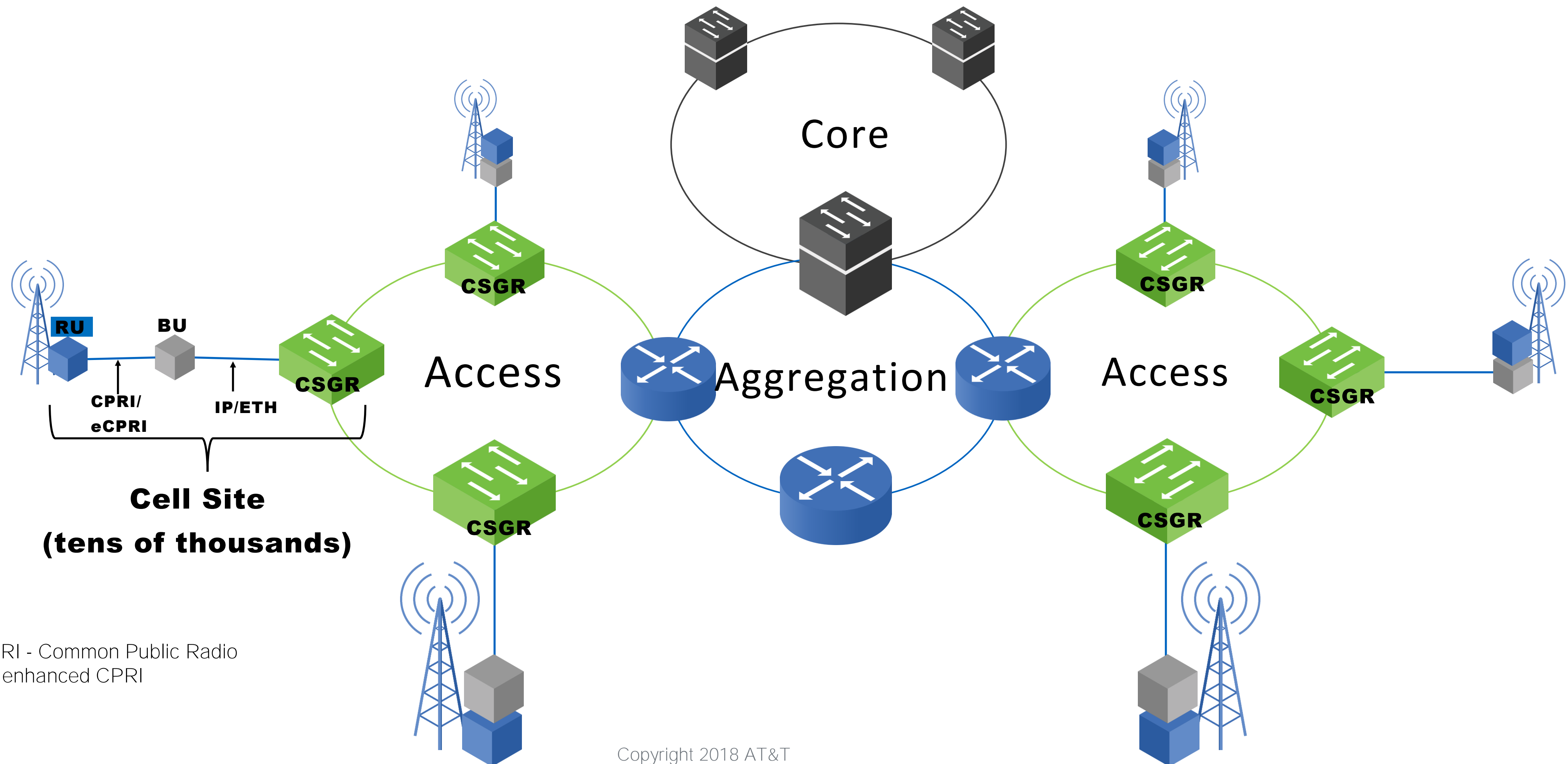
Deployment Environment

- Designed to operate at hardened temperature ranges (-40C to + 65C)
- Meet NEBS Level 3 in both Carrier Communications and Class 2 OSP (Outside Plant) space
- **Physical Dimension: 1RU, 19", shallow** depth
- Front to Back Air flow. Front access to power and ports
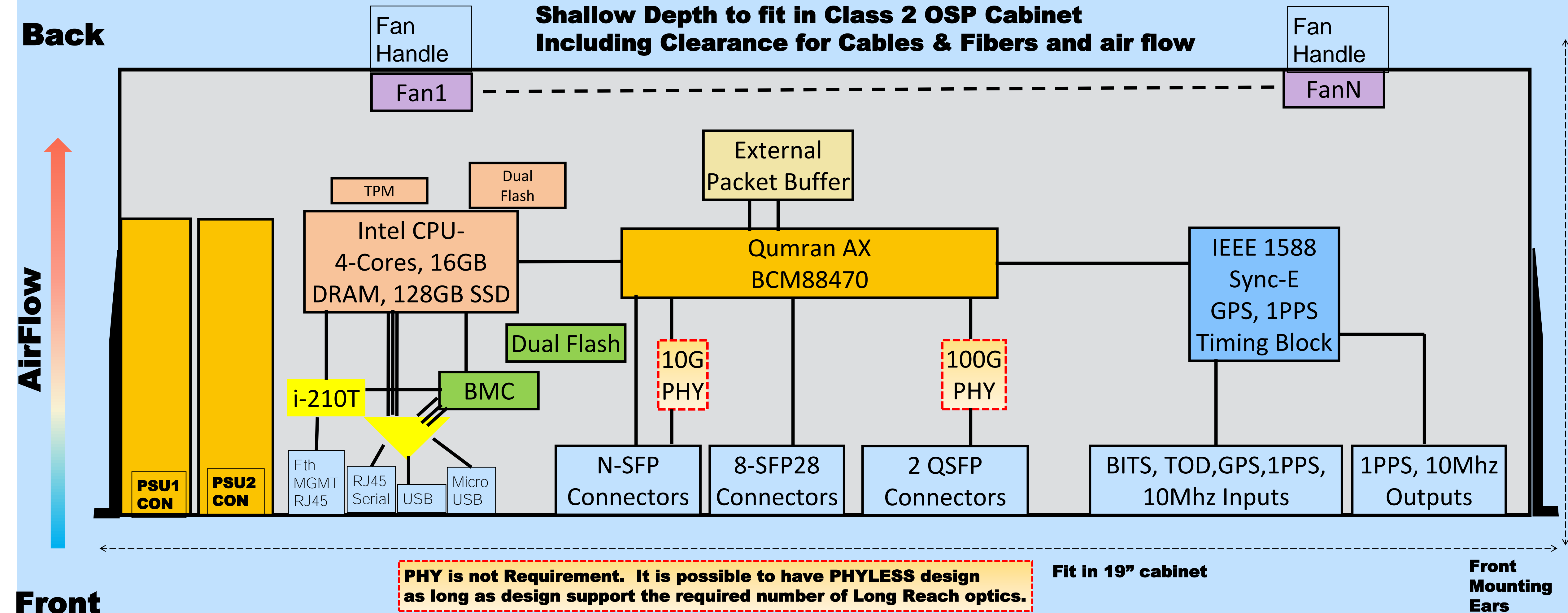- Redundant, Replaceable Fans and Power Supply modules

Major High Level Requirements

- 1+1 redundant high efficiency power supply

- Intel x86 for the NOS routing software

- BMC for platform health status monitoring and recovery

- Broadcom Qumran-AX switching chip with deep buffers to support advanced features and QoS

- Interfaces: support up to 2x100G/40G, 8x25G/10G/1G, and N {10G, 1G,100M}

- Support Long Range Optics (ZR-80km for 1G/10G) and (ER4-40km for 100G)

- Timing circuitry block that supports a variety of inputs and outputs support to the evolving timing requirements and implementations in the 5G technology evolution, including 1588v2 and SyncE

High-Level Systems Block Diagram

**Shallow Depth to fit in Class 2 OSP Cabinet
Including Clearance for Cables & Fibers and air flow**

Back

Front

AirFlow

Fan Handle

Fan1 ---- FanN

Fan Handle

TPM

Dual Flash

External Packet Buffer

Intel CPU-4-Cores, 16GB DRAM, 128GB SSD

Qumran AX BCM88470

IEEE 1588 Sync-E GPS, 1PPS Timing Block

Dual Flash

i-210T

BMC

10G PHY

100G PHY

PSU1 CON

PSU2 CON

Eth MGMT RJ45

RJ45 Serial

USB

Micro USB

N-SFP Connectors

8-SFP28 Connectors

2 QSFP Connectors

BITS, TOD,GPS,1PPS, 10Mhz Inputs

1PPS, 10Mhz Outputs

PHY is not Requirement. It is possible to have PHYLESS design as long as design support the required number of Long Reach optics.

Fit in 19" cabinet

Front Mounting Ears

Summary of AT&T Whitebox Experience

- AT&T has made great progress and is on track to deploy whitebox hardware

- Provide leadership and direction on Telco/Service Provider space

- Educate ODMs and suppliers on AT&T use cases and collaborate on systems design to ensure hardware and software have the flexibility to support the disaggregated model

- **Learn about ODMs and component technology suppliers' development processes and products**

- Define and create new whitebox integration processes and operational model

- Opportunity to provide feedback on component technologies of features and requirements that are important for Telco use cases

- Stable hardware, agile firmware and software development process to support dev ops model

- Direct interaction with ODMs and suppliers to make sure designs meet common systems requirements and deployment practices such as cabling, powering cooling constraints

- Continue collaboration with open source community and other service providers to advance work in Telco space

Q&A

Thank You