OPEN. FOR BUSINESS
Cell Site Gateway Router

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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

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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

Proprietary
- Fixed
- Siloed

Open - Standard
- Flexible
- Modular
Open Platform

Whitebox

Not Custom Built
Open Platform/Interfaces
Off-the-Shelf Technology
Multi-Vendor Sourced
**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

**Whitebox Requirement Framework**

**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

**Suppliers**

- Component Technologies
- VAR (Integration) NOS + HW
- NOS (internal/3rd party /Opensrc)
- ODM (HW)

**Open Source Community**
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.

Cell Site (tens of thousands)

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 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 (ER 4-40km 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

- **Intel CPU**: 4-Cores, 16GB DRAM, 128GB SSD
- **Qumran AX BCM88470**
- **External Packet Buffer**
- **IEEE 1588 Sync-E GPS, 1PPS Timing Block**
- **PSU1**
- **PSU2**
- **CON**
- **Fan Handle**
- **Fan1**
- **FanN**
- **Dual Flash**
- **TPM**
- **Eth MT RJ45**
- **RJ45 Serial**
- **Micro USB**
- **N-SFP Connectors**
- **8-SFP28 Connectors**
- **2 QSFP Connectors**
- **BITS, TOD, GPS, 1PPS, 10Mhz Inputs**
- **IEEE 1588 Sync-E GPS, 1PPS Outputs**
- **1PPS, 10Mhz Inputs**
- **Fit in 19" cabinet**
- **Shallow Depth to fit in Class 2 OSP Cabinet Including Clearance for Cables & Fibers and Airflow**

**Notes:**
- PHY is not a requirement. It is possible to have PHYLESS design as long as the design supports the required number of Long Reach optics.
• 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
Thank You