MPLS to the mobile cell site

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Presenters:
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- Hadi Choueiry
AGENDA

• The benefits of IP/MPLS in the access network
• The challenges of rolling out IP/MPLS in the access
• MPLS-Transport integration
Benefits of IP/MPLS in the access
BENEFITS OF IP/MPLS IN THE ACCESS

1. Network virtualization
2. Densification and scalability
3. New revenue generating services
4. Faster end-to-end service provisioning
5. Preparing for VoLTE
6. Utilizing the X2 interface
7. Unified transport
8. Intelligent backhaul utilization
NETWORK VIRTUALIZATION

• Today's cell site have 2G, 3G, 4G services as well as WiFi, Synchronization devices, broadband services and more.

• MPLS L2VPN, VPLS and L3 VPN allow for virtualization of a physical network into logical networks.

• **Advantages:**
  - Simpler network operation
  - Easier debugging and troubleshooting
DENSIFICATION & SCALABILITY

- With LTE there’s a shift from **coverage** to **densification** in order to support more users per cell and higher throughputs.
- Femto cells, WiFi access points and CCTV are also being introduced at the cell site.
- A layer 2 transport will not scale to support the thousands of network elements in the access.

As part of its new "Project VIP" network upgrade, AT&T is adding 10,000 new large cells and 40,000 small cells in urban areas. By shrinking the size of each cell, AT&T can support more users per square mile. That means fewer blocked calls and more consistent data speeds in dense cities.

*PC Magazine AT&T Aims to 'Densify,' Boosting Big-City 4G Networks*
NEW REVENUE GENERATING SERVICES

• Operators must look at new sources of revenue such as:
  • Customized services (guaranteed throughput, HD streaming, video calling)
  • Enterprise services
  • RAN sharing

Today’s Macro cell is tomorrow’s POP
FASTER END-TO-END SERVICE PROVISIONING

• The network is the bottleneck of service delivery
• Services (virtual machines) in the datacenter are turned up in minutes, the network needs to catch up!
• A seamless MPLS architecture drastically reduce network provisioning time
• Ability to manage layer 1, Layer 2 and Layer 3 from one platform.

Configuration Points

CE  PE  Aggregation  P  Aggregation  PE  CE

Seamless MPLS
PREPARING FOR VoLTE

• MPLS Traffic Engineering guarantees bandwidth and SLAs for voice traffic.
• MPLS millisecond fast failure recovery mechanisms eliminate failure impact on voice traffic.
• MPLS is inherently more secure than IP networks. IPSec could also be used for encryption.
UTILIZING THE X2 INTERFACE

X2 is key challenge going forward

• High capacity: up to 10 percent of an eNodeB’s total traffic
• Low latency

MPLS enables scalable X2 network design

• eNodeBs on different subnets, routing is required between Layer 2 domains for complete X2 solution
• Flexible and Scalable as the network grows
UNIFIED TRANSPORT

- MPLS provides a single converged transport solution for all access technologies. Plus MPLS is generally deployed in core networks so MPLS in the access is just an extension of existing network transport architecture.

- **CAPEX and OPEX savings.** No need to maintain multiple transport networks!
INTELLIGENT BACKHAUL UTILIZATION
ESPECIALLY AS NETWORK GROWS

MPLS-TE Enables Optimum Network Planning

And Optimization When New Cell Sites or Enterprise VPN Services are Added
Operator realization that MPLS is coming

74% of MNOs say they are likely to need L3 in access network in 3 years

Analysts forecasting strong demand for Microwave Router

Top operators in all sectors committed to MPLS at cell site

Key vendors advocating MPLS at cell site too…

SDN not coming to backhaul any time soon

“Don’t believe the hype of SDN – widespread production deployment outside the data center will not begin for another two years”

Jennifer Pigg, Yankee Group
Challenges of rolling out MPLS in the backhaul
SEPARATE CELL SITE ROUTER

- COSTLY
- COMPLEX MANAGEMENT
- POOR PERFORMING NETWORK

Router

Switch

Microwave IDU
3 KEY CHALLENGES STILL EXIST

1. Too many boxes (L3 + L2 + L1)
   - Costly, poorly performing network, complex management

2. Packet switched technology is not well understood by transmission department
   - TR engineer vs. network engineering
   - Difficult to design, deploy, and maintenance

3. Service delivery still too slow
   - Not adaptable to business needs – especially enterprise
Solutions for rolling out MPLS in the backhaul
ADDRESSING CHALLENGES:

Technology convergence:

1. MPLS-Transport Integration (Microwave Router)
   - Microwave router includes fiber and MW solution

2. Efficient service provisioning from a single management platform
   - Enable optimum IP/MPLS design and implementation with real time network performance and intelligence
CONVERGED MICROWAVE ROUTER

Microwave IDU, switch, router and TDM mux all in one device!

- COST EFFECTIVE
- SIMPLE MANAGEMENT
- BETTER PERFORMING NETWORK

CTR 8540
AVIAT NETWORKS
Router Specialists
Microwave Specialists
Generalists
Integration Is An Afterthought
Purpose-Built For Microwave
Separate Vendors
Single Vendor
MW-Router
Industry Innovator
MW-Aware Card In Router
Basic Handshaking
INTEGRATED MANAGEMENT SIMPLIFIES IP/MPLS NETWORKS ENABLED BY INTEGRATED MICROWAVE ROUTER

Different operations teams able to manage single microwave router
- Transport: RAC, L2 configuration
- RAN/IP: Ethernet ports, Routing configuration

Point/click provisioning and management of all L1, L2, L3 configuration from same interface

Eliminate mis-configuration and interoperability concerns across all layers

Aligned security / QoS / synchronization policy across microwave, routing and management domains

End-end coordination of media awareness, failure recovery
INTEGRATION MEANS SMALL MULTI-SERVICE HUBS

WTM 3200

ODU 600

12x
10/100/1000
Ethernet (8 RJ45 + 4SFP)

8x
RADIO
(IF or POE)

IP/MPLS VPN

IF / Coax
Fiber
T1/Copper

Gigabit Ethernet

12x

Enterprises

8x

Enterprises

Small Cell

Small Cell

12x

10/100/1000
Ethernet (8 RJ45 + 4SFP)

8x
RADIO
(IF or POE)

IP/MPLS VPN

IF / Coax
Fiber
T1/Copper

Gigabit Ethernet
SUMMARY
# BENEFITS OF MPLS-TRANSPORT INTEGRATION

<table>
<thead>
<tr>
<th>RADIO PATHS</th>
<th>INITIAL COST (site)</th>
<th>LATENCY</th>
<th>FAILURE DETECTION (router aware)</th>
<th>POWER CONSUMPTION</th>
<th>QoS POLICIES</th>
<th>IP ADDRESSES</th>
<th>MANAGEMENT PLATFORMS</th>
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<tbody>
<tr>
<td>Microwave Router + ODU</td>
<td>8</td>
<td><strong>$34k</strong></td>
<td>LOW 1X shaping, Scheduling</td>
<td>50ms</td>
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<td>1</td>
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<tr>
<td>ROUTER + ETHERNET ODR</td>
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<td><strong>$42k</strong></td>
<td>HIGH 2X shaping, Scheduling</td>
<td>100ms</td>
<td>2</td>
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TRANSFORM YOUR NETWORK INTO A SERVICE DELIVERY NETWORK
IP/MPLS NETWORK BUILT WITH AVIAT CTR 8540
THANK YOU!

WWW.AVIATNETWORKS.COM