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TECH FORUM 23

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What Transport Technology is Right for You ?

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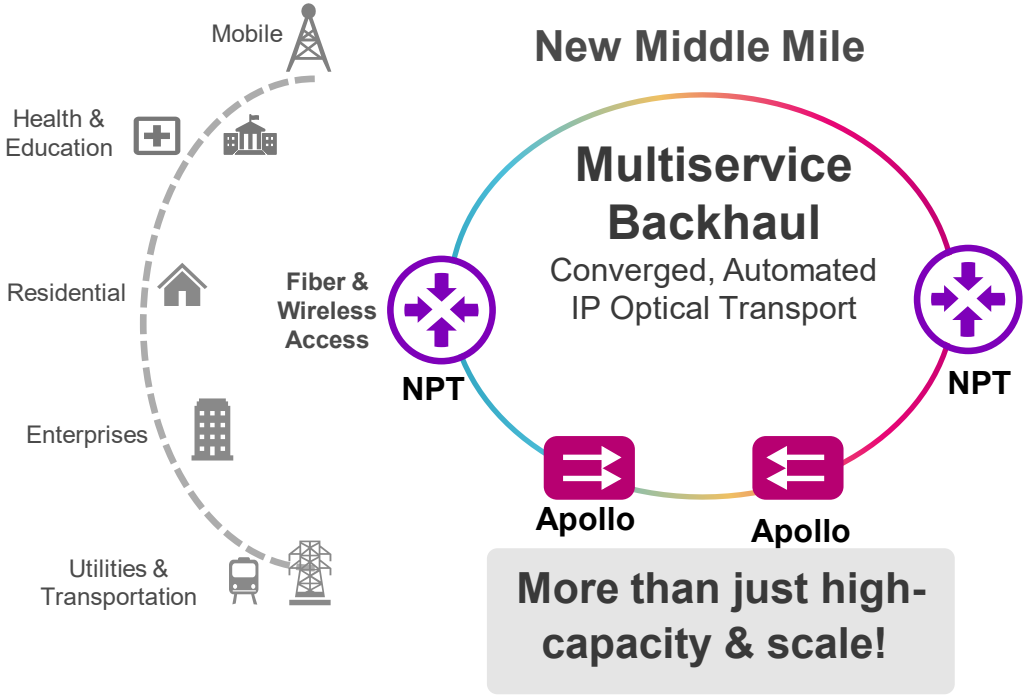
Solutions Architect

New Broadband Middle Mile Architecture

- **Sized properly to support the access**
- **Designed to provide:**
  - Scalable capacity
  - Advanced service awareness,
  - Service protection and security



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L2 / L3 Options

Layer 2

- G.8032 (ERPS), v1, v2
  - Older Tech, Superseded by MPLS-TP in Most Cases
  - Still Used in Access Ring
- MPLS-TP
  - Widely Deployed, Valuable in Rural Distribution and Access Rings
  - Fast Re-Route Protection
  - Deterministic protection paths defined by operator

Layer 3

- Routing – MPLS, OSPF, ISIS, etc
  - Widely Deployed
  - Can Be Complex to Administer
  - Depends Upon Rapid Convergence to Meet Quality Standards
  - Segment Routing MPLS
    - TI-LFA Tunnel Protection
    - Evolution to SR-TE for Traffic Engineering
- EVPN
  - Newer Alternative
  - Multiple Operating Modes
  - Allows Active-Active Connectivity

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Services Customers Demand – L2VPN

- MEF – Metro Ethernet Forum
  - Standards Organization that has Defined “Types” of Services Carriers Provide.

- CE – Carrier Ethernet
  - Defined Service Types to Provide Connectivity to Customers in Different Ways.

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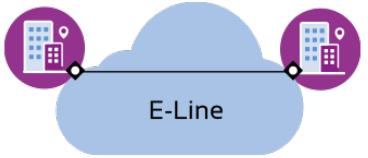
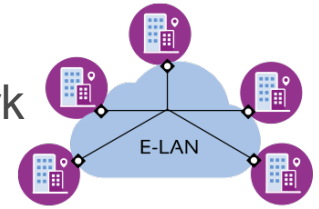
Subscriber Services

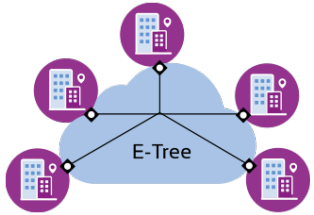
- E-Line Services – EPL – Ethernet Private Line



- E-LAN Services – ELAN - Ethernet Local Area Network



- E-Tree Services – Roots and Leaves



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Services Customers Demand – L3VPN

- Direct Internet Access (DIA)
  - Layer 3 Peering with customers to provide Internet and CDN connectivity
- ISP Peering
  - Providing Internet transit services for directly connected ISP customers
- Layer 3 Virtual Private Network
  - Classic business WAN offering, uses L3 peering, and multiple route tables in MPLS core to separate customer traffic

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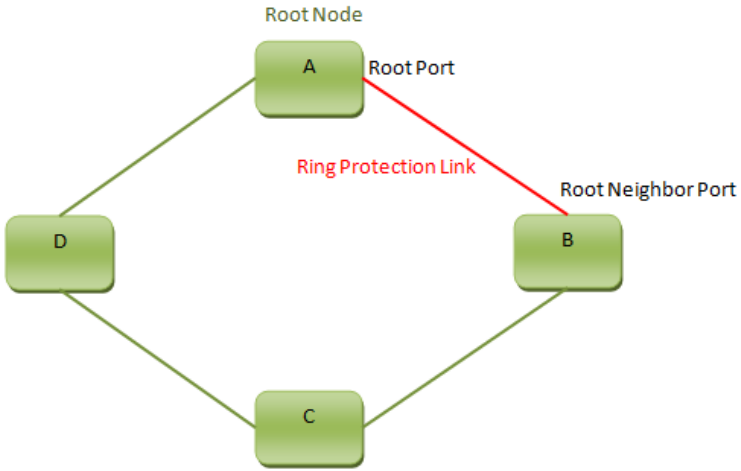
Ethernet Ring Protection

- Ethernet
  - ERPS – Ethernet Ring Protection Switching
  - ITU Standard G.8032
  - VPN Function Accomplished with 802.1Q VLANs



Pros
Very Easy to Use
Reliable Sub 50ms Failover
Cons
Static Topology – Rings
Smaller Geography

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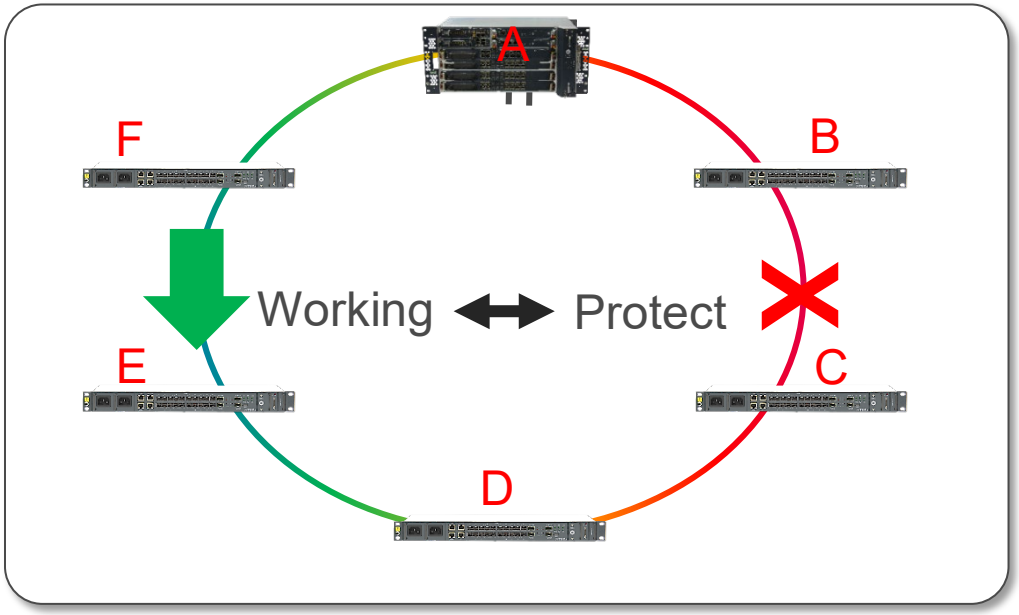
L2 Switching – MPLS-TP



Traffic Flow: A to D

MPLS-TP Tunneling

- Establishes Working and Protect Routes Upon Creation
- All Traffic Uses Working Route Until a Fault is Declared
- Upon Fault, All Traffic Immediately Switches to Protect
- Reversion Can Be Auto or Manual

Pros
Very Easy to Use
Reliable Sub 50ms Failover
Cons
Limited Architectures

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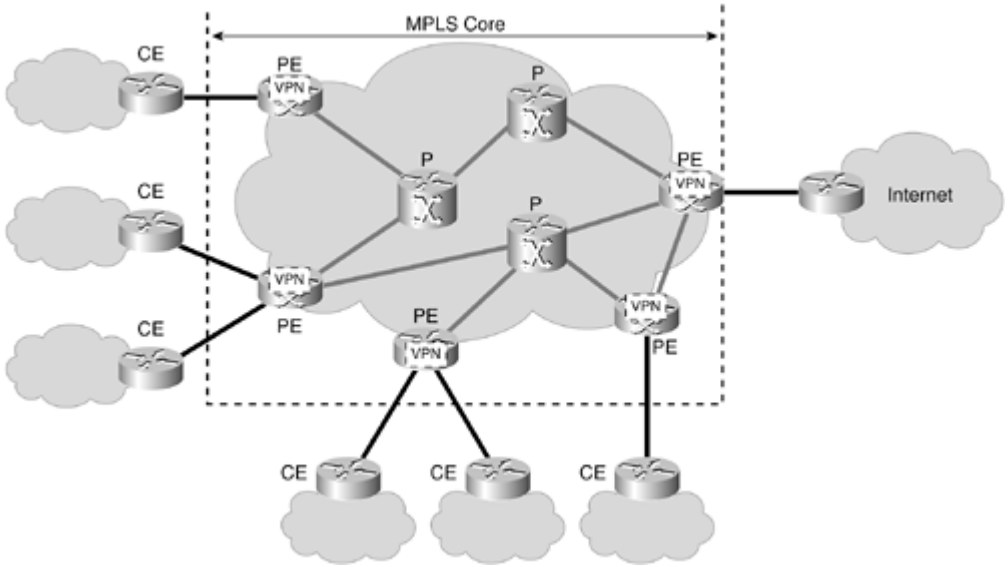
MPLS Transport

- MPLS – Multi-Protocol Label Switching
  - Packets switched based on labels, not L3 addresses
  - LDP/SR – Distributes labels to nodes in the network



- Many Delivery Options:
  1. VPWS/VPLS
  2. TI-LFA Tunnels
  3. L3 Peering and Connectivity

Pros
Extremely Flexible
Dynamic Route Failover
Required for L3VPN
Cons
Most Complicated

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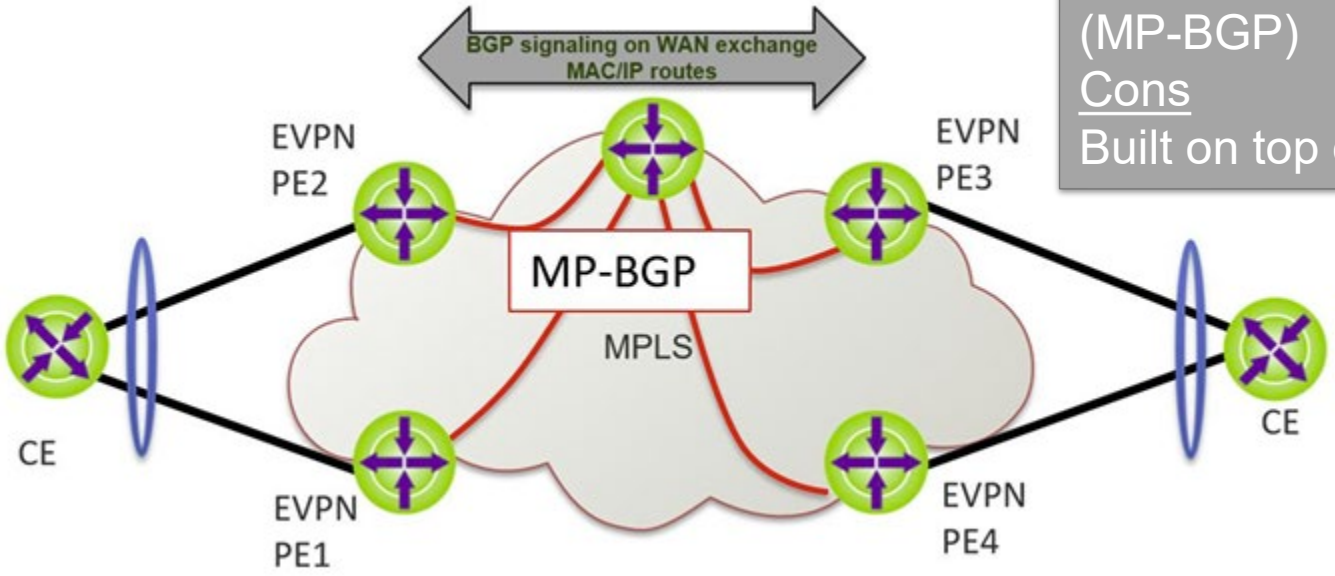
EVPN

- EVPN – Ethernet Virtual Private Network
  - Can Build E-Line or E-LAN Services
  - MAC Learning Moves into the Control Plane
  - Active-Active Multi-Homing is Natively Supported



Pros

Extremely Flexible

Built on top of MPLS

Common control plane protocol (MP-BGP)

Cons

Built on top of MPLS

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Conclusions – Which is right for my network?

- Look at the service offerings
  - Define the service offerings, don’t try to be everything to every customer
  - No solution is perfect, Ribbon will help you adapt the network to your customers' needs
  - Consider the future, will you be offering more?

- What can be supported
  - The network must be operated and maintained
  - Make choices that ensure customers are not harmed
    - Internal Talent
    - Quality of vendor support

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Highlights

- Standards-Based IP and Optical Solutions
- Widely Deployed Globally
- No Persistent Licensing Fees
- Pay As You Grow Model
- *“Buy America Act”* Compliant
- 10-12 Week Delivery on All Products

IP WAVE

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