



A Control Plane Perspective

Session:

Understanding the Role of Connection Oriented Ethernet in Packet-Optical Transport

Joe Whitehouse
Metaswitch Networks
Network Protocols Division
joe.whitehouse@metaswitch.com

packet-optical
transport evolution

PACKET-OPTICAL TRANSPORT EVOLUTION

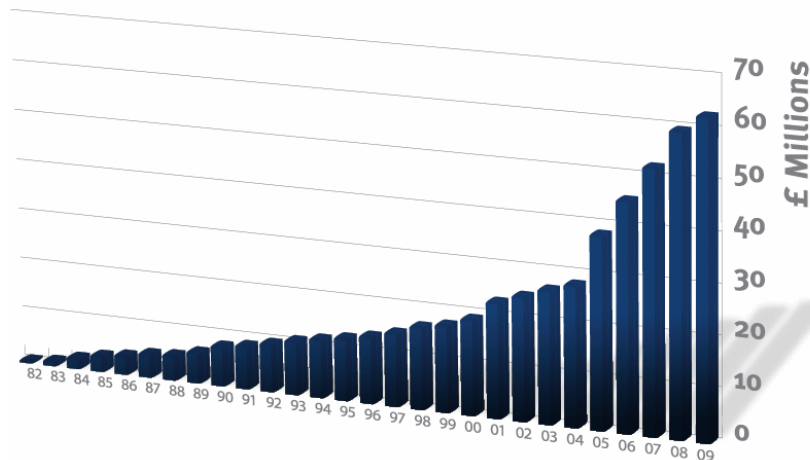
THE MARRIOTT MARQUIS - NEW YORK CITY - WEDNESDAY, MAY 19, 2010



Metaswitch Expertise

Previously Data Connection Ltd. (DCL)

- Network Protocol source code since 1983
- 1st portable GMPLS protocol solution
- 1st portable O-UNI protocol solution
- 1st portable LMP protocol solution
- 1st portable e2e recovery protocol solution
- 1st portable G.709 OTN protocol solution



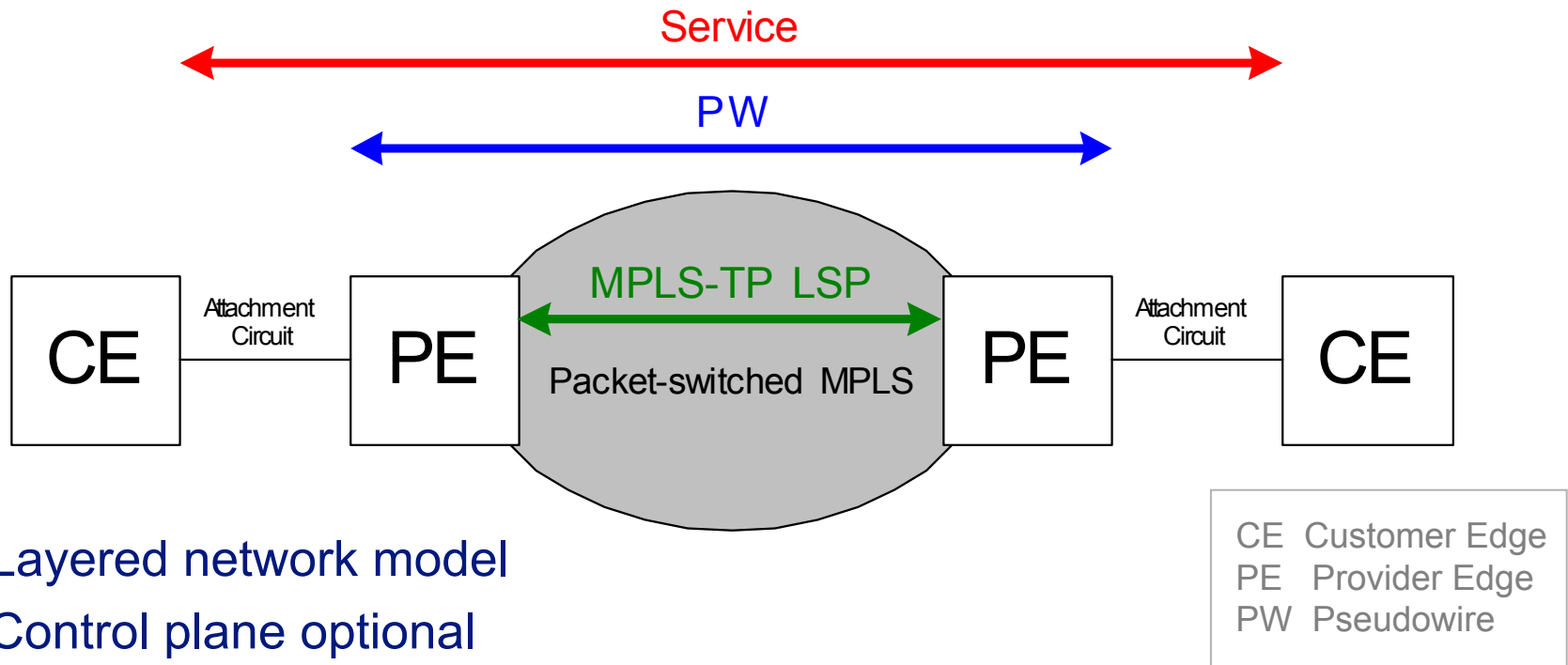
Customers



COE: MPLS-TP Momentum

- MPLS widely available for COE delivery
 - Layer 2 VPNs, Pseudowires, VPLS, ...
- MPLS-TP has won the PBB-TE debate
- MPLS-TP has huge momentum, but still evolving
 - Areas of contention
 - When to use a control plane
 - Multi-segment pseudowires
 - OAM complexity
 - Recovery mechanisms

MPLS-TP Overview

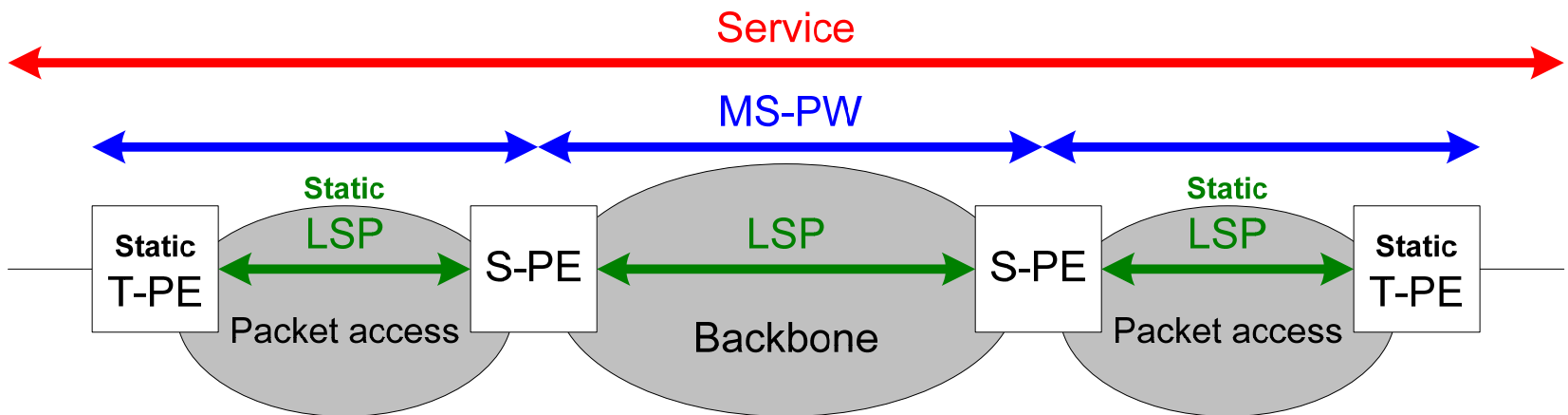


- Layered network model
- Control plane optional
- OAM capabilities equivalent to circuit networks
- Data plane recovery <50ms, includes ring topologies
- Data plane and control plane independence
- SONET / G.709 layers may underlie the MPLS-TP LSP

MPLS-TP Multi-Segment Pseudowires

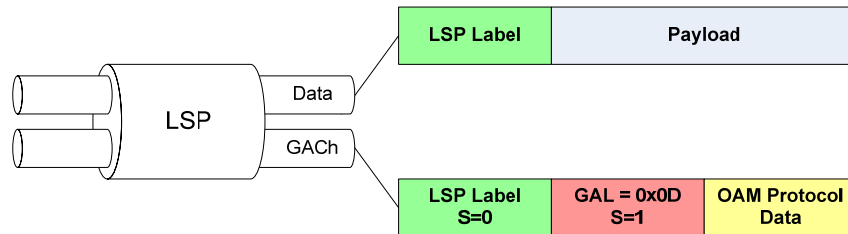
- MS-PWs have three variants in the control plane
 - Fully provisioned (no control plane)
 - LDP signaled with static placement of S-PEs
 - LDP signaled with dynamic placement of S-PEs
- Views differ among operators on MS-PW importance within MPLS-TP
- Anticipated deployment case
 - Statically provisioned PWs at the edge
 - Signaled PWs across the core with static placement
 - Potential for statically configured T-PEs on customer sites

S-PE Switching PE
T-PE Terminating PE



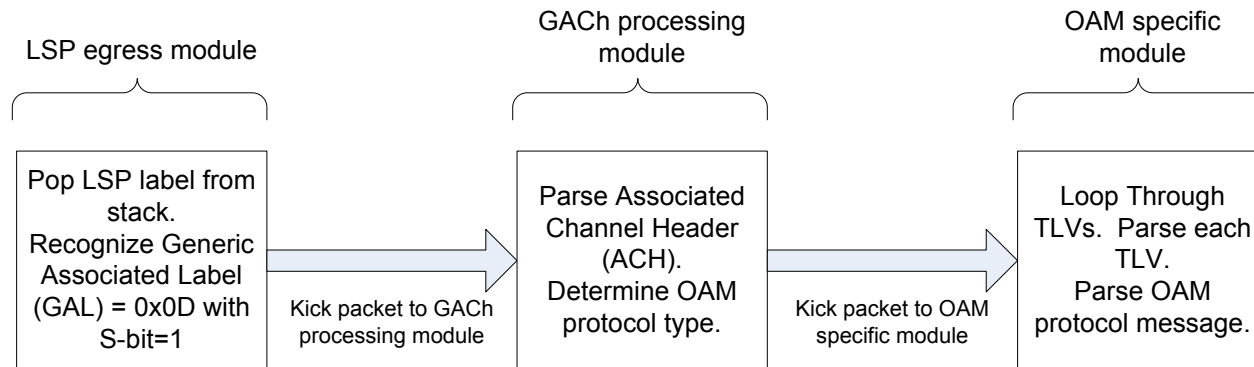
MPLS-TP OAM

- There are a number proposed OAM alternatives
- OAM runs in-band using a dedicated channel
 - RFC 5586 MPLS Generic Associated Channel (GACH)
- Different OAM protocols run within this channel



- Continuity Check
- Continuity Verification
- Packet Loss Monitoring
- Delay Measurement
- Remote Defect Indication
- Alarm Reporting
- Client Signal Failure Indication
- Lock Reporting
- More...

- GACH processing will be intensive



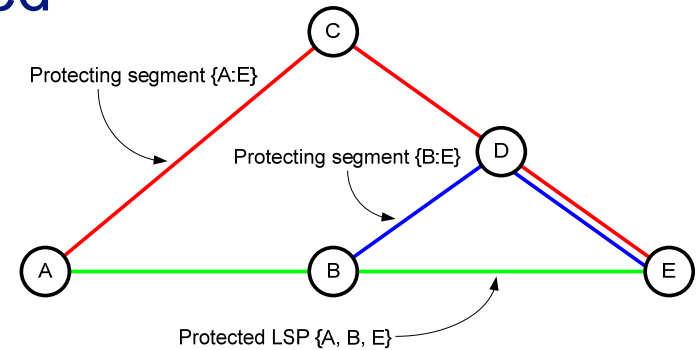
MPLS-TP Recovery Mechanisms

- Many alternatives/options proposed

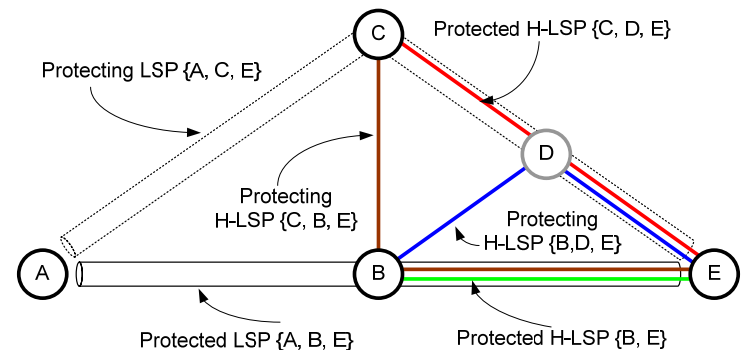
- Linear protection
- Ring protection
- Mesh protection
- e2e recovery
- Segment recovery
- PW redundancy
- Fast reroute

- GMPLS segment recovery

- 1+1 bidirectional
- 1+1 unidirectional
- 1:N
- Rerouting
- Full LSP Rerouting



RFC 4873 segment recovery



H-LSPs with e2e recovery

Summary

- MPLS-TP has huge momentum
 - Basics are available today
 - Starting to see pre-standard announcements
 - Some areas need resolution
-
- We expect control plane solutions to play a role