MPLS-TP

Don’t Forget the Control Plane!

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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 G.709 OTN protocol solution
- 1st portable MPLS-TP protocol solution
Agenda

• MPLS-TP management provisioned vs. control plane

• The benefits of an MPLS-TP control plane

• Where does it fit?
MPLS-TP Management Provisioned

- Full centralized control of
  - Each LSP
  - Each hop of each LSP
  - Each backup LSP
  - Packet LSP and PW sublayers
- Intelligence resides in the NOC
- Simple and predictable
- Works well in simple topologies
MPLS-TP with a Control Plane

- As management provisioned
  - Same OAM
  - Plus a control plane
  - Both modes can co-exist
- One-touch provisions entire LSP
- Intelligence resides in NEs
  - Auto-discovery of NEs and topology
  - Auto-tracking of available capacity
  - Route calculation
  - Signalling of LSP
- Automated operation
  - Reduced OPEX
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Automated Discovery

- IGP (e.g. OSPF) used to auto-discover NEs and links
- Opaque LSAs flood link attributes
  - Available bandwidth
  - Latency
  - Whatever is important in your network
- Standard TE extensions to OSPF and IS-IS
Link Bundling

• New link detected by local NEs
• No change in network topology
  • IGP floods increased capacity on bundled link
  • Improved IGP scalability
• Signalling chooses component link to use for each LSP
Automated LSP Setup

- Ingress NE processes LSP setup request (egress, bandwidth, etc.)
  - OSPF-TE route calculation runs on ingress NE
  - GMPLS signalling sets up each NE on the MPLS-TP path
- Standard GMPLS extensions to RSVP-TE
- Targeted LDP signalling used for PW layer
Automated Protection and Restoration

- Various GMPLS protection and restoration schemes
  - Mesh Restoration and Segment Recovery defined
  - Linear and Ring Protection underway
- Substantial automation
  - Automated diverse route calculations for 1:N protection
  - Automated placement of branch and merge points
  - Automated reversion when primary LSP recovers
  - Intelligent use of backup LSP for low priority traffic
On-demand Provisioning

- LSP Setup request does not have to come from NOC
  - E.g. router acting as client to MPLS-TP layer
  - Router requests extra network capacity at its attached NE
- User-to-Network Interface (UNI)
  - Client-server model between network layers
Control Plane Extensions and Benefits

• OAM signalling
  • Enables NEs to agree what OAM mechanisms are to be used
  • No spurious alarms as OAM start is synchronized with end-to-end LSP activation
    ➢ Reduced OPEX

• Management ←→ Control Plane hand-off
  • Management-established LSPs transitioned to control plane
  • …and vice-versa
    ➢ Facilitates network migration

• Multi-segment pseudowire
  • Adapting existing MS-PW to the MPLS-TP profile
    ➢ Supports more diverse deployment scenarios

• Standards baked
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Typical Deployment Scenario

- Three MPLS-TP domains shown
  - Backbone uses control plane
  - Access uses management provisioning
- MS-PW crosses domains to provide the end-to-end service
Commonality Across Network Layers

- Multiple layers can include
  - MPLS-TP transport service sublayer (e.g. PW for L2 Ethernet service)
  - MPLS-TP transport sublayer
  - TDM layer (OTN ODU)
  - WDM layer (OTN OCh)

- Each Carrier uses only the layers it needs
  - Only use a layer if it adds value
  - Other layers possible

- GMPLS is common
Conclusion: Don’t Forget the Control Plane

• MPLS-TP control plane is beneficial
  • It brings significant automation and reduced OPEX
  • Management provisioned and control plane NEs will co-exist in many networks
  • Many vendors building NEs with both management and control plane provisioning

• Standards are in place
  • GMPLS has been around for years

• Common GMPLS technology across layers
  • Coherent management
  • Same look and feel

Come see Metaswitch MPLS-TP at the EANTC Live Demo
Thank you
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