Applicability of Abstraction and Control of Traffic Engineered Networks (ACTN) to Packet Optical Integration (POI)

draft-ietf-teas-actn-poi-applicability-06

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I-D Use Cases

1. Inventory, Service and Topology Discovery
   - Inter-domain link discovery
   - Multi-layer IP Link discovery
   - Inventory discovery
   - SR-TE paths discovery

2. Establishment of L2VPN/L3VPN with TE requirements
   - Optical Path Computation
   - Multi-layer IP Link Setup and Update
   - SR-TE Path Setup and Update

Figure 1 - Reference Scenario
Updates/Discussion for Latest Version (06)

• Updates in version 06
  – Major editorial review to align content and structure to the agreed scope (SR-TE end-to-end)
  – Added details about the inter-domain link discovery and use of LLDP snooping
  – Added a section to summarize the gaps identified
  – Minor text updates in the 06 version
Reaching our Conclusions

• The intention of the document was to provide an applicability statement of how key IETF technologies could be applied for the key use cases.
• The analysis provided in this document has shown that the IETF YANG models described (section 3.2) broadly provides:
  – ACTN Packet Optical Integration (POI) capabilities, including
    • Resource discovery (network inventory, network topology, tunnels and services)
    • Supporting for multi-layer/multi-domain L2/L3 VPN network connectivity services
• Several gaps have also been identified and these are described in section 6 (Conclusions)
  – Need for a network inventory model
  – A technology-specific augmentations of the path computation RPC
  – Packet topology discovery mechanisms
  – SR-TE Path setup and update
What next?

• Ongoing discussions
  – How the binding between a L3VPN and end to end SR-TE path can be configured?
    • Incoming packets have an active SID matching a local BSID at the headend
    • Per-destination Steering: incoming packets match a BGP/Service route which recurses on an SR policy
    • Per-flow Steering: incoming packets match or recurse on a forwarding array of where some of the entries are SR Policies
    • Policy-based Steering: incoming packets match a routing policy that directs them on an SR policy
  – Discuss and Document SR-TE Protection options
  – Multi-layer Intra-domain IP Link setup
    • See next slide(s)
Multi-layer Intra-domain IP Link setup

• MDSC receives a request to setup a L2/L3 VPN service
• MDSC understands that in order to fulfill this service requests it needs to setup a new optical tunnel (to support the setup of a new IP link)
• MDSC requests the O-PNC to setup the optical tunnel
• After the optical tunnel has been successfully setup, MDSC waits for the P-PNC to configure the new IP link
  – After the new optical tunnel has been setup, the P-PNC may automatically discovers the new adjacency (e.g., through LLDP) and configures the new IP link.
  – Alternatively, the MDSC may configure the new intra-domain Ethernet link and the P-PNC can then configure the new IP link.
• After the P-PNC has setup the new IP link, the MDSC requests the P-PNC to setup a new SR-TE path or re-route an existing SR-TE path through the new IP link
  – The MDSC will get notified that the new IP link has been setup by the P-PNC by a topology update of the SR-TE topology exposed by the P-PNC
Multi-layer Intra-domain IP Link setup

IP Topology (P-PNC 1)

Ethernet Topology (P-PNC 1)

Ethernet Topology (O-PNC 1)

Optical Topology (O-PNC 1)

Multi-layer Intra-domain IP Link setup

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Next steps for the Document

• Issue tracking and current version available on Git
  - Currently we are tracking 22 open issues - https://github.com/FabioPeruzzini/actn-poi/issues

• Continue to work with SPRING and resolve open SR-TE issues, and other items listed below

• Active discussions, hot topics/issues include
  - Issue #83 Binding between a L3VPN and an end-to-end SR-TE path
  - Issue #81 Intra-domain IP Link Configuration
  - Issue #80 Protection options with SR-TE
  - Issue #78 Reconcile WDM terminology with optical-impairment draft
  - Issue #36: Transparent Services of WDM
  - Issue #5: Provisioning of LAG
  - Plus, several additional issues

• Resuming weekly ACTN POI calls after IETF 113
  - Slot 1 at 4:30am EST starting from March 29
  - Slot 2 at 11am EST starting from April 5

• The plan is to complete the open actions/issues shortly after IETF 113, then
  - Ask WG participant to review the latest version of the I-D
  - Prepare for WG Last Call before IETF 114