

ASON and GMPLS

**Two ways to do the same thing –
but are they really different?**

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Promise of the Optical Control Plane

- Automation of the Optical Transport Network
 - Rapid provisioning
 - Lower Operations Cost
 - End user requested connections
 - New Services
- Accurate Inventory
- New Models for Restoration

Realize New Services, Network Efficiency
and Faster "Time To Revenue"

Two standardization activities currently

- ITU-T SG 15
 - G.8080 (ASON Architecture)
 - Based on G.805 Modeling
 - Protocols assisted by OIF and ATM Forum
 - Significant carrier participation (AT&T, BT, MCI, Sprint, TI, Verizon)
- IETF
 - GMPLS
 - Based on MPLS protocols
 - Significant vendor participation (Movaz, Juniper, Cisco, etc.)

Top Down –
Requirements driven

Bottom Up –
“What if we add this...”

Different Approaches
Common Desire to Standardize

The Result

- Standards that line up... somewhat...



What's Different?

- ITU expects:
 - Heterogeneity
 - G.805 "Sub-Networks" abstract the collection of equipment supporting a Sub-Network Connection
 - Allows sub-networks to use different methods for the same function (e.g. Protection)
 - No external view of Sub-Network internals
 - Different addressing formats may be used
 - Different protocols may be used

**Different Carriers and Vendors
may use different approaches**

What's Different?

- ITU expects:
 - Network Boundaries
 - E-NNI and UNI Reference Points
 - Hierarchical Multi-Area Routing
 - Maintaining Transport Behavior
 - Transport plane connection can only be taken down when explicitly signaled
 - Network managed through management of service instances
 - Distributions of Control Plane Components other than 1:1 (Control Plane : NE)

What's Different?

- IETF expects:
 - Homogeneity
 - Use of IP addressing everywhere
 - No Trust Boundaries within the network
 - Maintaining Packet Network Control Behavior
 - Control, Management, and Switching within one NE
 - All routers participate in all Control Plane protocols
 - Maintain IP Control Protocol processing approaches
 - Network managed through management of Control Plane Protocols

Just starting multi-area routing solutions

How is this manifested in the protocols?

- The protocols are mostly the same:
 - Same RSVP-TE PATH/RESV processing
 - Same RSVP-TE refresh mechanism
 - No change to defined RSVP objects
 - Same OSPF flooding mechanism
 - Same CSPF algorithm
 - No change to defined OSPF-TE TLVs
- A few additional objects/TLVs and procedures
 - Addresses ITU requirements

Good News!

Some specifics follow...

How is this manifested in the protocols?

- ASON Signaling (G.7713.2)
 - One New Object: "Call Object" (a.k.a. G-UNI)
 - Clarification on Z-end initiated disconnect
 - Different Soft Permanent Connection handling
- ASON Routing (OIF E-NNI *Draft* Extensions based on G.7715/.1)
 - 3 New SubTLVs for:
 - NodeID to handle RouterID / NodeID separation
 - Link capacity (separate layer network info)
 - Endpoint reachability (i.e. UNI endpoints)
 - G.805 Sub-Networks use containment hierarchy
 - Inter-Area TE route calculation procedure

How is this manifested in the protocols?

- ASON Neighbor Discovery (G.7714)
 - Built up on G.805 Trails/Link Connections
- ASON Signaling Communications Network
 - Strict separation of:
 - Packet network carrying signaling packets (SCN)
 - Optical Control Plane “Application”
 - SCN IP addresses are separate from RouterID
 - Allows for easy SCN redesign/renumbering

Where does this leave things?

- Joint IETF/ITU ASON work underway
 - ASON Signaling Requirements I-D
 - ASON Signaling Solution under discussion
 - RFC 3474/3476
 - CCAMP I-D
 - ASON Routing Requirements I-D
 - ASON Routing Solution I-D
- RFCs anticipated for ASON-compliant extensions

It is possible *with cooperation*
for the bridge to be completed.

Where does this leave things?

- In the meantime, inter-working is possible
 - ASON \Rightarrow GMPLS Signaling
 - I-D exists
 - draft-ong-ccamp-3473-3474
 - Demonstrated at MPLS 2003
 - ASON \Rightarrow GMPLS Routing

Summary

- ITU & IETF standardizing optical control plane
 - Different expectations yielded different results
- Protocol differences are not that great
 - ASON is a superset of GMPLS
 - Handled with a few new Objects/TLVs
 - Adds significant functionality required by carriers
- ITU/IETF working to bring ASON/GMPLS together
 - RFCs anticipated for ASON-extensions
 - In the meantime inter-working is possible