

IETF ROUTING AND MPLS STANDARDS UPDATE

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Context

- What happened within IETF RTG and SUB-IP areas in last 2 years
- Where we are with standardization (RTG, MPLS, CCAMP, L2VPN, L3VPN)
- New efforts in IETF RTG area

Format

- For each block
 - Recently approved
 - Almost there
 - In progress
 - New work

IETF Sub-IP Area

- SUB-IP area was established as a temporary area for sub-ip efforts (MPLS, GMPLS, VPNs)
- As MPLS/GMPLS became a streamline IETF technology, more cooperation with permanent areas was needed
- WGs from SUB-IP were moved to primary areas
- TEWG remains in SUB-IP, but will conclude soon

IETF RTG Area

- Currently 14 WGs. Since 2002:
 - Concluded: 4 (MSDP, RIP, BGMP, UDLR)
 - New: 3 (RPSEC, RTGWWG, BFD)
- Document statistics (since 2002, includes SUB-IP):
 - 45 RFCs published (20 STD, 4 EXP, 21 INFO)
 - 20 docs in RFC-Ed queue (12 STD, 2 EXP, 6 INFO)

IP Routing: recently approved

- **ISIS:**
 - Graceful restart (RFC3847)
 - Interop update (RFC3787, RFC3719)
 - TE (RFC3784)
- **OSPF:**
 - Graceful restart (RFC3623)
 - TE (RFC3630), GMPLS TE (rfc-ed)
 - NSSA update (RFC3101)
- **BGP :**
 - Route oscillations (RFC3345)
 - Capability announcement (RFC3392)
 - Sec reqs for MD5 keys (RFC3562)

IP Routing: recently approved (cont.)

- Mcast:
 - SSM Overview (RFC3569),
 - PIM-DM rev (rfc-ed),
 - MSDP (RFC3618)
 - BGMP (rfc-ed)
 - IGMPv3 (RFC3376)
- RPSEC:
 - Generic threats analysis (rfc-ed)

IP Routing: almost there

- **ISIS:**
 - P2P LAN links
 - Experimental TLVs
- **OSPF:**
 - Scalability recommendations
 - Refresh reduction
 - OSPFv3 authentication
 - MIB update

IP Routing: almost there (cont.)

- BGP:
 - BGP4 spec update (!)
 - Extended communities
 - RR spec update
 - Graceful restart
 - Cease subcode
 - MP-BGP spec update
- Mcast:
 - SSM architecture
 - PIM-SM rev
 - PIM-Bidir
 - PIM-Anycast-RP
 - DVMRPv3

IP Routing: new work

- BFD WG:
 - Chartered to produce an Internet Standard specification for a Bidirectional Forwarding Detection Protocol
- RTGWG:
 - Chartered to be a home for small routing-related projects, such as:
 - GTSM (Generalized TTL Security Mechanism)
 - TE shortcuts in IGPs
 - IP Fast Reroute

IP Routing: BFD

- A generic failure detection mechanism that
 - detects failures between adjacent forwarding engines...
- And is:
 - Fairly fast (allows subsecond detection)
 - Media-independent
 - Low-overhead (for efficient HW implementation)
- For more info see:
 - <http://www.ietf.org/html.charters/bfd-charter.html>
 - draft-ietf-bfd-*

IP Routing: IP FRR

- Fast rerouting mechanism for pure-IP (non-MPLS) networks
 - Pre-calculate back-up next hops and make them ready for forwarding (pre-install)
 - Avoid black-holes by switching to back-ups in case of failure
 - Backups calculated so that using them is safe even before the normal reconvergence is completed
 - Avoid rerouting micro-loops
- Basic and advanced methods (and specs)
- For more info see:
 - <http://www.ietf.org/html.charters/rtgwg-charter.html>
 - draft-ietf-rtgwg-ipfrr-*

MPLS: STD status

- Recently approved
 - LDP graceful restart (RFC3478) and fault tolerance (RFC3479)
 - LDP MTU extensions (rfc-ed)
 - MPLS recovery framework (RFC3469)
 - MPLS MIB modules (RFC3811-3815)
- Almost there:
 - MPLS Fast Reroute
 - MPLS in IP/GRE

MPLS: cont.

- In progress
 - MPLS OAM requirements
 - MPLS LSP Ping:
 - Requirements for P2MP TE LSPs
 - MPLS explicit NULL label
- New work:
 - Multi-area/AS MPLS TE (with CCAMP)
 - BCP on MPLS load sharing

GMPLS: STD status

- Recently approved:
 - GMPLS Architecture (rfc-ed)
 - GMPLS signaling (RFC3471-3473)
 - GMPLS routing (rfc-ed)
 - GMPLS tunnel tracing requirements (RFC3609)
 - LMP spec (rfc-ed)
 - LMP for SONET/SDH and WDM (rfc-ed)
 - GMPLS egress interface control (rfc-ed)

GMPLS: cont.

- In progress:
 - GMPLS MIB modules
 - GTTP (generic tunnel tracing protocol)
 - Generalized inter-area/AS TE extensions
 - Signaling for G.709 networks
 - Signaling and routing for ASON networks

VPNs: organization

- Work originally hosted in PPVPN WG in SUB-IP
- PPVPN was split:
 - L3VPN: MPLS/BGP VPNs (2547bis), , VR-based, CE-based
 - L2VPN: VPLS, VPWS, IP-only L2VPNs

L3VPN: STD status

- Recently approved:
 - Generic requirements for provider-provisioned VPNs (RFC 3809)
 - Service requirements for L3 VPNs (rfc-ed)
 - Framework for L3 VPNs (rfc-ed)
- Almost there:
 - 2547bis
 - OSPF as PE-CE
 - 2547bis over IP/GRE
 - L3 VPN security framework
 - Terminology

L3VPN: cont.

- In progress:
 - CE-based, VR-based VPNs
 - PE-PE IPsec for 2547bis
 - Constrained route distribution

L2VPN: STD status

- Recently approved:
 - Framework for L2 VPNs (rfc-ed)
- In progress:
 - LDP-based VPLS
 - BGP-based VPLS

RTG Area: plans

- Complete the BGPv4 spec update
- Wrap up current PIM and SSM work
- Start a WG on securing inter-domain routing in the Internet
- Close IDMR WG

Thank you!

