

Update on MRT-FRR related drafts

Fast reroute for IP/LDP traffic using maximally redundant trees

draft-bowers-rtgwg-mrt-applicability-to-8021qca-00 (8021qca)
draft-ietf-rtgwg-mrt-frr-architecture (arch)
draft-ietf-rtgwg-mrt-frr-algorithm (algo)
draft-ietf-mpls-ldp-mrt (ldp)
draft-ietf-ospf-mrt (ospf)
draft-ietf-isis-mrt (isis)

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MRT-related draft update

- **draft-bowers-rtgwg-mrt-applicability-to-8021qca-00**
 - New draft (discussed in next slides)
- **draft-ietf-rtgwg-mrt-frr-algorithm-03**
 - Added clarifications driven by use of MRT by 802.1Qca
- **draft-ietf-rtgwg-mrt-frr-architecture-05**
 - Minor changes
- **draft-ietf-mpls-ldp-mrt-00**
 - Adopted as MPLS WG document in January
- **draft-ietf-ospf-mrt-00**
 - Adopted as OSPF WG document in January
- **draft-ietf-isis-mrt-00**
 - Adopted as ISIS WG document in February

draft-bowers-rtgwg-mrt-applicability-to-8021qca-00

Applicability of Maximally Redundant Trees to IEEE 802.1Qca Path Control and Reservation

- **IEEE 802.1aq Shortest Path Bridging (SPB)**
 - Approved in 2012.
 - 802.1aq: allows bridged frames to follow shortest path from source to dest, as opposed to paths on shared spanning trees.
 - RFC6329: IS-IS extensions allowing bridges to share topology info to construct shortest path trees.
- **IEEE 802.1Qca Path Control and Reservation(PCR)**
 - 802.1Qca is currently being standardized by IEEE.
 - 802.1Qca: Explicit trees, bandwidth assignment, and protection for bridged networks.
 - draft-farkas-isis-pcr: IS-IS extensions allowing bridges to share info to construct explicit trees.
 - In addition to strict and loose explicit trees, 802.1Qca specifies MRT and 'MRT with GADAG'.

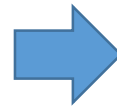
draft-bowers-rtgwg-mrt-applicability-to-8021qca-00

(continued)

- MRT explicit trees:
 - Each bridge uses topology information and MRT lowpoint algorithm from draft-ietf-rtgwg-mrt-frr-algorithm to compute a common GADAG, which is then used to compute Blue and Red MRT next-hops.
- ‘MRT with GADAG’ explicit trees:
 - A common GADAG is computed centrally and distributed to the bridges via ISIS-PCR. Each bridge then uses that common GADAG to compute Blue and Red MRT next-hops as specified in draft-ietf-rtgwg-mrt-frr-algorithm.
- Special considerations in using the MRT algorithm for 802.1Qca
 - Unequal link metrics: 802.1aq enforces symmetric link metrics for shortest path computation, so MRT computation for 802.1Qca must also enforce symmetric link metrics.
 - For IP/LFP FRR, a given node computes and installs its own Blue and Red MRT next-hops given for all destinations, without needing to compute the next-hops used by other nodes. In some scenarios, a bridge using 802.1Qca may also need to compute the MRT next-hops from the point of view of other nodes.

updates to draft-ietf-rtgwg-mrt-frr-algorithm-03

- 802.1Qca uses IS-IS as a flooding protocol.
- However, 802.1Qca uses SPB-Metric sub-TLVs for metric values, as opposed to metrics built into TLV#22 and #222.
- 802.1Qca also creates a Bridge ID by combining Bridge Priority and System ID, as opposed to just System ID.
- MRT algorithm uses these values to order interfaces.
- Added table to draft to remove potential ambiguity in applying MRT algorithm in the different applications.



IGP/flooding protocol and application	mrt_node_id of neighbor on interface	metric of interface
OSPFv2 for IP/LDP FRR	4 octet Neighbor Router ID in Link ID field for corresponding point-to-point link in Router-LSA	2 octet Metric field for corresponding point-to-point link in Router-LSA
OSPFv3 for IP/LDP FRR	4 octet Neighbor Router ID field for corresponding point-to-point link in Router-LSA	2 octet Metric field for corresponding point-to-point link in Router-LSA
IS-IS for IP/LDP FRR	7 octet neighbor system ID and pseudonode number in Extended IS Reachability TLV #22 or Multi-Topology IS Neighbor TLV #222	3 octet metric field in Extended IS Reachability TLV #22 or Multi-Topology IS Neighbor TLV #222
ISIS-PCR for protection of traffic in bridged networks	8 octet Bridge ID created from 2 octet Bridge Priority in SPB Instance sub-TLV (type 1) carried in MT-Capability TLV #144 and 6 octet neighbor system ID in Extended IS Reachability TLV #22 or Multi-Topology Intermediate Systems TLV #222 (informational)	3 octet SPB-LINK-METRIC in SPB-Metric sub-TLV (type 29) in Extended IS Reachability TLV #22 or Multi-Topology Intermediate Systems TLV #222. In the case of asymmetric link metrics, the larger link metric is used for both link directions. (informational)

MRT document relationships (for reference)

