

BGP I2RS Use Case Summary

Sue Hares

Keyur Patel, Susan Hares, Russ White

draft-keyupate-idr-i2rs-bgp-usecases-00.txt

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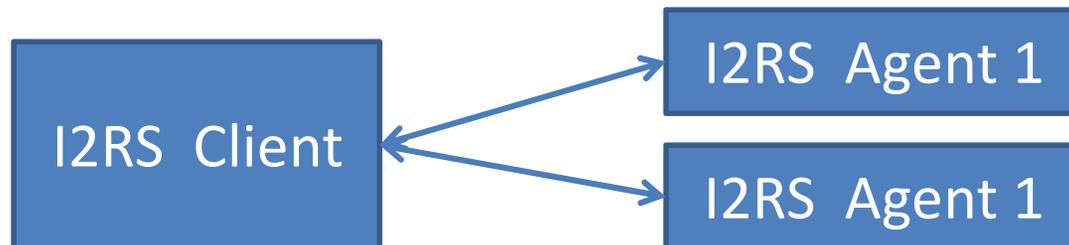
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BGP I2RS Use Case

- Why Draft :
 - Merged BGP Yang Module due by 6/15 based OpenConfig + [draft-zhdankin-idr-bgp-cfg-00](#)
 - BGP I2RS Yang Model based on Merged Model
 - Uses cases to create BGP I2RS Yang model
 - Uses suggest 18 requirements for module.
- I2RS BGP drafts worked on in IDR
- This presentation provides background on use cases

Types of BGP Use Cases

- BGP Protocol operations
- BGP Route Manipulation
- BGP Events
- Central Membership for MPLS based VPNS
- Marking Overlapping BGP Routes



BGP Protocol Operation

- Enhanced Error handling
 - Malformed Attribute event signaled along with real-time view of BGP routes (pub/sub) from I2RS agent to I2RS client
 - I2RS client dynamically interrogates BGP routes, and then loads filters
- Requirements:
 - BGP-REQ-01: Read/write, quick status notification of BGP operational state within AS including events that proceed destructive tear-down of BGP session.

BGP Route Manipulation by Central Agent

Centralized control via I2rsclient-agent interchange

- Customized Best Path Selection Criteria
 - I2RS client/agent inserts IGP cost [extended] communities [POI and cost values] in bgp routers
- Flowspec Routes
 - I2rs client/agent push flowspec to ASBR and PE routers
- Route Filter Routes for Legacy routers
 - I2rs client-pushes filters to BGP RR on behalf of all legacy routers participating in VPN, who do not support router-filter address family
- Optimized exit control
 - I2rs client/agent manipulates routes, parameters to get load balancing.

9 Requirements

Events

- Pub/sub capability to
 - Request monitoring of BGP routes + bgp events from I2RS agent;
 - Subscribe to I2RS client to receive data from lots of I2rs Agents
- Data
 - specific route (announce/withdrawn / suppress) or alternate best-path
 - Tracing bgp dropped routes due to: a) router policy or b) BGP Path select (E.g. AS path length)
 - BGP protocol statistics such as maximum prefix,
- Requirements: 10 – 14

Central Members for MPLS VPNS

- MPLS VPNS use RT extended communities to express members
 - Each PE holds BGP NLRI and process to determine members; then imports NLRI to MPLS/VPN tables
 - Takes up memory
- **Alternative:** Centralize Controller (CCNE) push to PE
 - Reduces PE load and configuration,
 - CCNE has compute power, filters,
 - Routes selectively pushed

Marking Overlapping

- Lots Overlapping routes created overhead
[draft-white-grow-overlapping-routes]
 - Extra routers increases states, and many do not have real impact on traffic.
 - Removing routes unneeded overlapping routes allows additional

BGP I2RS Use Case Requirements

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Route Manipulation Requirements 2-9 (1)

- **BGP-REQ02:** I2RS clients should be able to push and track BGP routes with custom cost communities to specific I2RS agents on BGP to aid in TE of data paths, and install in I2RS RIB.
- **BGP-REQ03:** I2RS client should be able to track all TE changes applied via pub/sub event notify or query read,
- **BGP-REQ04:** I2RS agents should support identification of routers as BGP ASBRs, PE routers, and IBGP routers.

Route Manipulation Requirements 5-7 (2)

Flow Specification Related

- **BGP-REQ05:** I2RS client-agents should support writing flow specifications to I2RS agents which will install them in BGP ASBRs
- **BGP-REQ06:** I2RS clients should track flow-specifications installed within a IBGP Cloud via pub/sub events or query reads
- **BGP-REQ07:** I2RS clients-agents should support prioritize and control BGP's announcement of flow specifications after reading status information regarding capacity of BGP routers (ASBR and PE).
 - ASBR/PE may forward flow specifications from EBGP peers to I2RS Agents, the I2RS Agent SHOULD be able to send these flow specifications from EBGP sources to a client in response to a client query or as part of pub/sub event notification.

Route Manipulation Requirements 8-9 (3)

Route Filter Related and BGP Parameters

- BGP-REQ08:
 - I2RS Client SHOULD be able to **read BGP route filter** information from I2RS Agents associated with legacy BGP routers, and **write filter information** via the I2RS agent to be **installed in BGP RR**.
 - The I2RS Agent SHOULD be able to **install [route-filter] routes in the BGP RR**, and **engage a BGP protocol action** to push these routes to ASBR and PE routers
- BGP-REQ09:
 - I2RS client(s) SHOULD be able to request the I2RS agent to read BGP routes with all BGP parameters that influence **BGP best path decision**, and write appropriate changes to the BGP Routes to BGP and to the RIB-Info in order to manipulate BGP routes

Events – Requirements 10-14

- ○ **BGP-REQ10:** I2RS Agent pub/sub
 - **I2RS client SHOULD be able instruct the I2RS agent(s) to notify the I2RS client** on route change (pub/sub)
 - **Route changes include:** 1) prefixes being announced or withdrawn, 2) prefixes being suppressed due to flap damping, or 3) prefixes using an alternate best-path for a given IP Prefix.
- **BGP-REQ11:** I2RS client Read received reject routes
 - **I2RS client SHOULD** be able to read BGP route information from BGP routers on routes in received but rejected from ADJ-RIB-IN due to policy, on routes installed in ADJ-RIB-IN, but not selected as best path, and on route not sent to IBGP peers (due to non-selection).

Events: Requirements 12-14

- **BGP-REQ12: I2RS Agent Read Installed BGP Policies**
 - I2RS client SHOULD be able to request the I2RS agent to read installed BGP Policies
- **BGP-REQ13: I2RS Agent Write BGP Policies**
 - I2RS client SHOULD be able to instruct the I2RS Agent to write BGP Policies into the running BGP protocols and into the BGP configurations.
- **BGP-REQ14: Read query or pub/sub on BGP stats**
 - I2RS client-agent SHOULD be able to read BGP statistics associated with Peer, and to receive notifications when certain statistics have exceeded limits. An example of one of these protocol statistics is the max-prefix limit.

Centralize Controller for MPLS VPNS

Requirements 15-16

- **BGP-REQ15: I2RS Agent read LOC-RIB-IN BGP Table**
 - The I2RS client via the I2RS agent MUST have the ability to read the loc-RIB-In BGP table that gets all the routes that the CE has provided to a PE router.
- **BGP-REQ16: I2RS Agent must ability to install destinations in LOC-RIB of PE devices (I2RS LOC-RIB)**
 - The I2RS client via the I2RS agent MUST have the ability to install destination based routes in the local RIB of the PE devices. This must include the ability to supply the destination prefix (NLRI), a table identifier, a route preference, a route metric, a next-hop tunnel through which traffic would be carried

Marking Overlapping routs

- **BGP-REQ17: I2RS Agent discovery of overlapping routes**
 - The I2RS client via the I2RS agent SHOULD have the the ability to read the loc-RIB-in BGP table to discover overlapping routes, and determine which may be safely marked for removal.
- **BGP-REQ18: I2RS modify filters and cause re-computation**
 - The I2RS client via the I2RS Agent SHOULD have the ability to modify filtering rules and initiate a re-computation of the local BGP table through those policies to cause specific routes to be marked for removal at the outbound eBGP edge.

Protocol independent Yang Modules

Sue Hares
(preliminary)

I2RS Protocol Independent

1. I2RS RIB
2. I2RS Topology (L1, L2, L3, Service)
3. Filter-Based RIB