I2RS Use Cases Summary

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Plea to Authors

- Please help me make this readable
- I need your help to put in the right text

Use Case Drafts

- PI: white-i2rs-use-case (10)
- BGP: keypate-i2rs-bgp-usecases (18)
- CCNE: ji-i2rs-usecases-ccne-services
- Virtual Topologies (46):
- MPLS-TE (8), MPLS-LDP (4)
- MBH (9)
- Large Flows (6), Large Data (13), CDNI(3)

Protocol independent

- **10 requirements, in charter**
1. Monitor RIB of Forwarding device (Add/Change Delete)
2. Install Src/dst routes
3. Install null route
4. Chang policies RIB and protocols
5. Interact Traffic flow and traffic measure protocols
6. Install dst routes
7. Read RIBs by destination
8. Read tables of protocol
9. Inject information in to local protocol table
10. Interact with policies and configuration through roll-forward/rollback

BGP Requirements

- **18 requirements, in charter**
1. Read/write/quick status notification
2. Push BGP routes with custom communities
3. Track BGP TE changes
4. Identify ASBR, PE router, IBGP router
5. Writing flow specification to I2RS agents for forwarding to ASBR and PE
6. Track flow specifications installed
7. Prioritize and control flowspec EBGP to I2RS Agent
8. Route filters directed to legacy routers with ASBR and PE
9. Read BGP Routes regarding best path
10. Watch for route change: Announce/Withdraw, Suppress/ damped, alternate best path

BGP requirements

11. I2RS read received but rejected routes
12. I2RS read bgp policies from bgp protocol
13. I2RS write bgp policies to bgp protocol
14. Read BGP Peer statistics (MAX_PREFIX)
15. Read BGP loc-RIB-in each CE sent to PE
16. install destination route NLRI, pref, metric, nexthop-tunnel in RIB Table in PE
17. loc-RIB-in BGP for overlapping route and be able to remove
18. Modify filtering rules in BGP

IGP use case

- **8 use cases, in charter**
1. Able to read/write unique IGP identification
2. Monitor IGP tables, allow updates of IGP configuration to partition IGPs, place ABRs and ASBRs. (rapid query/download)
3. Support Loop-Free (LFAs)
4. Balance ECMP Flows and ETE traffic flows
5. Filter the topology changes and publish in subscription system
6. Collect statistics based on collection of static information and dynamic statistics
7. Public critical event notification (E.g. overflow)
8. I2RS IGP packet statistics

Centralize Compute (CCNE)

- **7 requirements**, **Seem to work hub/spoke**
1. CCNE pulls BGP topology, routes stats, topology, PCE topo, PCE state (pull all quickly)
2. I2rs Client sets resource constraints on I2RS agent and get response on resource contraints
3. I2rs interface get service goals to CCNE
4. I2RS client support info-model to re-optimized at CCNE
5. Notifications of changes at client passed to Agent
6. Work in parallel with traditional network management or OAM protocols sent to NE
7. Light weight to support variety of devices (routers, centralized servers, virtualization)

Virtual topology Cases

\# 46 – topology requirements in charter

- Virtual Connections on Demand (VCoD) - 3 reqs
- Virtual Networks on Demand (VNOD) - 8 reqs
  - Hares-i2rs-use-case-vn-vc
- Virtual Topology Information – 15 reqs.
  - Amante-i2rs-topology-use-cases
- Virtual Topology Data Model – 14 req.
- Virtual Topology IP Data Model – 3 req.
- Virtual Topology Network Element - 3 req
  - Medved-i2rs-topology-requirements

SFC and Traffic Steering

- 7 requirements; SFC: bitar-i2rs-service-chaining
  - SFC1: Read obtain SFC address
  - SFC2: Read supported service types (NAT FW, LB)
  - SFC3: Virtual context
  - SFC4: Customers on nodes
  - SFC5: Customer-id list
  - SFC6: Service Resource Table (index, BW, packet rate, BW, RIBs, Max-RIB size, MAX FIB size, counters, Flows
  - SFC7: # of access points, topology

TS requrements

- 8, TS: chen-i2rs-ts-use-case
1. Collect topology and traffic load of links
2. Read local RIB and policies in each DC/Metro gateway
3. Add/Delete/Mod – RIB and Traffic policies to adjust traffic placement
4. Collect LSP info from PCE or ntwork
5. Read RIB info and policies
6. Collet topology and segment info to compute end-to-end path
7. Read Segment routing RIB
8. Add/Delete/Modify segment routing

MPLS-TE

- 13 requirements; huang-i2rs-mpls-te-use-cases

1. monitor and config static CR-LSP devices using I2RS client+ path calculation, label management entity

2. Synchronously send config to all network nodes from egress to ingress to set up path before install ingress path.

3. Able to signal abundant constraints explicit path, bandwidth, affinity, SRLG, priority, hop limit, and etc.

4. Manually re-optimize network and re-signal TE LSPs with make-before-break

MPLS-TE

5. Status notification out of resources condition for backup LS and TE; Trigger concurrent path calculation for backup LSP, TE tunnels send the updated paths to I2RS with command to re-signal

6. Agent notifies client of failure. This triggers global recalculation, trigger

    1. Backup calculation of back up LSP or TE Tunnel path calculation

    2. Re-Signal TE LSPs process with make-before break

7. I2RS calculates another path for affected TE tunnels to deviate traffic from/to planned outage nodes

8. I2RS Agents can notify clients of overload conditions (CPU, memory, LSP label space, LSP numbers)

MPLS-TE Network

7. Automatic Bandwidth balancing of MPLS-TE paths

8. Node failure or link failures to centralized servers gathers infromatino

9. Agents re-signal TE-LSPs if lack resources

10. Clients collect I2rs agents in hierarchy

MPLS LDP

- 4 items; draft-chen-i2rs-mpls-ldp-usecases
1. Distribution of config for PWE3, MPLS
2. Use wants to set type on the disable IPoMPLS application target LDP session
3. I2RS Agent provides stream of notification up/down; and allow additional queries on
    - a) invalid service,
    - b) calculate alternate path, and
    - c) switch to other links/nodes
4. Monitor and control limited resources on access devices via notifications or queries

Mobile BackHaul

- 9 requirements; draft-ietf-zhang-mbb-usecase-01

1. Position-critical changes to/From IGP using global knowledge; pass IGP, and AS

2. Time critical monitoring and config

3. Rapidly Pass T-LDP, BGP peer, VPN information regarding config, topology, and status

Mobile BackHaul

4. Route Policy Enforcement based on ASBR within AS

5. Read/write BGP policies

6. Collect device capabilities in order to LSP path optimization

7. Add LSPs for mobile backhual

8. Automate monitoring and config to provide be able to hierarchical protection

9. Allow multi-layer 2, faciliat reproting

Large Data Flow/Large Data/CDNI

- Large data flow: krishnan-i2rs-large-flow-use-case; 6 use cases

- Large data collection: draft-swhyte-i2rs-data-collection-system; 11 use cases

- CDNI
  - Shin-i2rs-usecases-cnd-requet-routing
  - 3 use case