

I2RS Use Cases Summary

draft-ietf-i2rs-usecase-reqs-summary

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Goal of Use Cases

- “ Information to Guide the creation of Yang models
 - . Summaries and not details
 - . Detailed Use Cases can be published through Independent stream
- “ Status of Requirements
 - . Guide the WG for this charter
 - . Out-of charter (OC) can go to IC (in-charter) if we complete our work
- “ How WG Chairs will use requirements
 - . Compare yang modules against requirements

Focus of Yang Module Work

- “ Finish the I2RS Protocol Independent work
 - . RIB Modules
 - . Topology Modules

- “ Work on Protocol (BGP, OSPF, ISIS) goes to protocol group

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)

In-charter / Out of Charter

- “ IC: In Charter
- “ OC: Out of Charter
- “ NA: not applicable
- “ ??: indicates additional classification – let’s chat and chairs will ask AD for clarification

Protocol independent

” **10 requirements, in charter**

1. Monitor RIB of Forwarding device (Add/Chg/Del) - IC
2. Install Src/dst routes – IC
3. Install null route - IC
4. Change policies RIB and protocols - ??
5. Interact Traffic flow and traffic measure protocols - OC
6. Install destination routes – IC
7. Read RIBs by destination- IC
8. Read tables of protocol- IC
9. Inject information in to local protocol table – OC for some protocols
10. Interact with policies and configuration through roll-forward/rollback – OC

Virtual topology Cases

25 topology requirements in charter

- “ Virtual Connections on Demand (VCoD) 3 REQ – OC
- “ Virtual Networks on Demand (VNOD) - 8 reqs (7 IC, 1 OC)
- “ Virtual Topology Info. (Topo) 15 reqs (5 IC, 7 OC, 3 NA)
- “ Virtual Topology Data Model (VT-TDM-REQ) – 15 reqs (8 IC, 2 OC, 3 NA, 1??)
 - . Amante-i2rs-topology-use case
- “ Virtual Topology IP Data Model – 3 req. (3 IC)
- “ Virtual Topology Network Element - 3 req- (2 IC, 1 NA)
 - . Medved-i2rs-topology-requirements

Discussion Questions

- “ Is it OK for use-case requirements to judge yang data models?
- “ Are the In-Charter (IC) Protocol-independent use cases reasonable for I2RS RIB to fulfill?
- “ Are the In-Charter (IC) topology requirements reasonable for the Topology drafts to fulfill?

**BACKUP SLIDES FOR DISCUSSION
ON PROTOCOLS**

Protocol independent

” **10 requirements, in charter**

1. Monitor RIB of Forwarding device (Add/Chg/Del) - IC
2. Install Src/dst routes – IC
3. Install null route - IC
4. Change policies RIB and protocols - ??
5. Interact Traffic flow and traffic measure protocols - OC
6. Install dst routes – IC
7. Read RIBs by destination- IC
8. Read tables of protocol- IC
9. Inject information in to local protocol table – OC for some protocols
10. Interact with policies and configuration through roll-forward/rollback – OC

BGP Requirements

” **18 requirements, in charter**

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

BGP requirements

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

IGP use case

“ 8 use cases, in charter

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

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) – IC
2. I2rs Client sets resource constraints on I2RS agent and get response on resource constraints – IC
3. I2rs interface get service goals to CCNE – IC
4. I2RS client supports Info-Model to re-optimized at CCNE - OC
5. Notifications of changes at client passed to Agent – IC
6. Work in parallel with traditional network management or OAM protocols sent to NE - NA
7. Light weight to support variety of devices (routers, centralized servers, virtualization) – NA

Virtual topology Cases

46 – topology requirements in charter

- “ Virtual Connections on Demand (VCoD) 3 REQ – OC
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- “ Virtual Topology Info. (Topo) 15 reqs (5 IC, 7 OC, 3 NA)
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SFC and Traffic Steering

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

TS requirements

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

MPLS-TE

13 requirements;

huang-i2rs-mpls-te-use-cases (mostly OC)

1. monitor and config static CR-LSP devices using I2RS client+ path calculation, label management entity (OC)
2. Synchronously send config to all network nodes from egress to ingress to set up path before install ingress path. (OC)
3. Able to signal abundant constraints explicit path, bandwidth, affinity, SRLG, priority, hop limit, and etc. (OC)
4. Manually re-optimize network and re-signal TE LSPs with make-before-break (NA)

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 (OC)
6. Agent notifies client of failure. This triggers global recalculation, trigger (NA)
 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 (NA)
8. I2RS Agents can notify clients of overload conditions (CPU, memory, LSP label space, LSP numbers) (OC)

MPLS-TE Network

9. Automatic Bandwidth balancing of MPLS-TE paths (IC)

10. Node failure or link failures to centralized servers part of notification stream by agent to centralized server(IC)

11. Clients notify agents to re-signal TE-LSPs if lack resources (IC)

12. Clients gather TE-LSP state from I2RS Agents from all nodes in order to coordinate LSP resources (IC)

13. Clients collect I2rs agents in hierarchy (OC)

MPLS LDP

- “ 4 items; draft-chen-i2rs-mpls-ldp-usecases
 1. Distribution of config for PWE3, MPLS (IC)
 2. Use wants to set type on the disable IPoMPLS application target LDP session (IC)
 3. I2RS Agent provides stream of notification (OC) 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 (IC)

Mobile BackHaul

- ” 9 requirements; draft-ietf-zhang-mbb-usecase-01
- 1. Position-critical changes to/From IGP using global knowledge; pass IGP, and AS (OC)
- 2. Time critical monitoring and config (OC)
- 3. Rapidly Pass T-LDP, BGP peer, VPN information regarding config, topology, and status (OC)

Mobile BackHaul

4. Route Policy Enforcement based on ASBR within AS (IC)
5. Read/write BGP policies (NA)
6. Collect device capabilities in order to LSP path optimization (??)
7. Add LSPs for mobile backhaul (??)
8. Automate monitoring and config to provide be able to hierarchical protection (NA)
9. Allow multi-layer 2, facilitate reporting (OC)

Large Data Flow/Large Data/CDNI

- “ Large data flow: krishnan-i2rs-large-flow-use-case; 6 use cases:
 - . 5 IC, 1 OC (L-Flow-REQ-04)
- “ Large data collection: draft-swhyte-i2rs-data-collection-system; 11 use cases
 - . (10 IC, 1 OC (L-Data-REQ-01))
- “ CDNI
 - . Shin-i2rs-usecases-cnd-requet-routing
 - . 3 use case; all 3 OC