Comparison Between 2 ISIS Yang Drafts
draft-hares-i2rs-isis-compare-yang-00

Abstract

This document contains a comparison of two ISIS yang models: draft-litkowski-isis-yang-isis-cfg-01 and draft-wang-i2rs-isis-dm. The yang model in draft-litkowski-isis-yang-isis-cfg-01 is model focused on configuration. The yang model in draft-wang-i2rs-isis-dm-00 is focused on the status and ephemeral state changes needed for IGP use cases specified for I2RS interface by the I2RS WG. The conclusion of comparison is that there little overlap except the definitions of common ospf structures. The draft-wang-i2rs-isis-dm-00 is necessary to fulfil a majority of the requirement drawn from the IGP use cases in the I2RS use cases.

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1. Introduction

The Interface to the Routing System (I2RS) provides read and write access to the information and state within the routing process within routing elements. The I2RS client interacts with one or more I2RS agents to collect information from network routing systems. The processing of collecting information at the I2RS agent may require the I2RS Agent to filter certain information, group pieces of information, or perform actions on the I2rs collected information based on specific I2rs policies.

This draft is a comparison of the following two ISIS yang models:
[I-D.litkowski-isis-yang-isis-cfg], and [I-D.wang-i2rs-isis-dm]. The comparison provides an overview of the differences, overlaps, and unique features of each yang model. The analysis also evaluates whether both models or a single model is necessary to satisfy the requirements for the IGP use cases found in the
[I-D.ietf-i2rs-usecase-reqs-summary]. Additional explanatory information on the [I-D.wang-i2rs-isis-dm] is available in the
[I-D.wu-i2rs-isis-info-model].

Please note the IGP use cases have been determined to be out of charter (OC) by the I2RS chairs.

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The rest of this draft is the details so those who desire "sounds bytes" level reading may stop reading now.

2. Definitions and Acronyms

BGP - Border Gateway Protocol version 4

CLI: Command Line Interface

IGP: Interior Gateway Protocol


I2RS: Interface to (2) Routing system.

Information Model: An abstract model of a conceptual domain, independent of a specific implementations or data representation

INSTANCE: Routing Code often has the ability to spin up multiple copies of itself into virtual machines. Each Routing code instance or each protocol instance is denoted as Foo_INSTANCE in the text below.

NETCONF: The Network Configuration Protocol

RESTCONF: The RESTCONF Protocol

3. Comparison of draft-litkowski-isis-yang-isis-cfg-01 with draft-wang-ospf-dm-00

[I-D.litkowski-isis-yang-isis-cfg] was released on June 27, 2014. The [I-D.litkowski-isis-yang-isis-cfg] has the following parts:

- configuration,
- operational status information per protocol instance,
- RPC operations (clear adjacency, clear isis-database), and
- notifications events (read-only).

The configuration portion of [I-D.litkowski-isis-yang-isis-cfg] has a different structure than [I-D.wang-i2rs-isis-dm] with the key difference being how the isis-mt structure is defined. The [I-D.litkowski-isis-yang-isis-cfg] document has the following sections: isis protocol (section 2.1), multi-topology parameters (section 2.2), per isis-level configuration (2.3), and per interface
parameters (2.4). The draft [I-D.wang-i2rs-isis-dm] closely mirrors one variant of the internal structure of the ISIS protocol that contains multi-topology having configuration definitions for: protocol (isis), multi-topology support (isis-mt, mt-route), per isis level (isis-level), lsdb (isis-lsdb), and per interface (isis-interface). The [I-D.litkowski-isis-yang-isis-cfg] variant of configuration uses a boolean value (isis-multi-topology-cfg) to determine if a family is supported in the isis-mt configuration support.

The second of [I-D.litkowski-isis-yang-isis-cfg] contains the read-only operational state information (isis-state) for adjacencies, spf events, lsp events, LSDB database, and system-id host name mappings. The same state is included in [I-D.wang-i2rs-isis-dm]. The isis-lsp-database in [I-D.litkowski-isis-yang-isis-cfg] contains a description of the lsp, but not in accordance with the mt-extensions to the ISIS protocol since it omits the mpls-te information and multi-topology (mt) information. This information is found in [I-D.wang-i2rs-isis-dm].

The third section of [I-D.litkowski-isis-yang-isis-cfg] contains:

- an RPC to clear a isis-adjacency within a protocol instance for a particular set of interfaces and levels.
- an RPC to clear the isis lsdb data base at a particular isis level

The [I-D.wang-i2rs-isis-dm] does have a read/write variable for adjacencies and for lsdb so the config and I2RS methods operate to do the same function. The I2RS Agent must be aware of the possibility for an isis-adjacency and isis lsdb to be cleared via the configuration module.

The fourth section on notifications examines provides a notification based on adjacency up/down. The I2RS notification process will specify a section of the yang module and a use notifications to updated the information.

4. Major differences in yang structures

the remaining difference are the following:

- The nodes of [I-D.wang-i2rs-isis-dm] are mostly read/write. This includes the isis lsp-database and the isis-neighbor lists. In [I-D.litkowski-isis-yang-isis-cfg] status nodes are only readable.

5. Unique features for I2RS IGP Requirements

The following are unique features for I2RS IGP requirements:

- mt-ipv4-rib and mt-ipv6-rib - which is used for transient loop avoidance.
- nbr-list - to aid fast route convergence in the event of the loss of a neighbor
- route state information for subscribing for notification of route changes and neighbor changes

These I2RS features in [I-D.wang-i2rs-isis-dm] are described in the sections below.

5.1. mt-rib

Link-state protocols may need to re-converge when the network topology changes. During this phase packet loss and transient loops are frequently observed since inconsistent RIBs exist, even the reachability of the destinations is not compromised after the topology change. [IGP-REQ-02] in [I-D.ietf-i2rs-usecase-reqs-summary] suggests that there should be rapid cycle of querying and configuration change. Monitoring via the mechanisms in [IGP-REQ-04] and [IGP-REQ-05], [IGP-REQ-06], [IGP-REQ-07], and [IGP-REQ-08] in [I-D.ietf-i2rs-usecase-reqs-summary] may aid in detecting the condition.
5.2. nbr-list

The isis yang structure nbr-list supports fast convergence during loss of an ospf neighbor.

IGP Hello packet is used to discover and maintain adjacencies among different IS-IS nodes. Without the deployment of fast detection techniques, one node has to wait for several seconds before it realizes the adjacency has been broken. This kind of issue can cause one device is cut off from its network causing a complete loss of connectivity. No matter planned or accidentally this outage causes traffic to be blackholed before damage can be controlled. [IGP-REQ-01] and [IGP-REQ-02] plus the monitoring requirements in [IGP-REQ-04] and [IGP-REQ-05], [IGP-REQ-06], [IGP-REQ-07], and [IGP-REQ-08] in [I-D.ietf-i2rs-usecase-reqs-summary] may aid in detecting the condition.

Under the scenario of where I2RS and IGP information model are deployed, it is RECOMMENDED that the adjacency data of the other end side can be removed simultaneously or LSP can be updated directly by I2RS Agent when IS-IS is disabled or detached on one side. The configuration of [IGP-REQ-02] can aid in configuring. The authors
suggest this as a beginning step, but there are additional steps to support fast-convergence when an ISIS neighbor changes.

```mermaid
diagram flow
  root
    | +--rw l1-nbr-list* [l1nbr-system-id]
    |   | +--rw l1nbr-system-id    isis-system-id-def
    |   | +--rw snpa?              uint32
    |   | +--ro nbr-status?        nbr-status-def
    |   | +--ro nbr-down-reason?   nbr-down-reason-def
    |   | +--ro nbr-type?          nbr-type-def
    | +--rw l2-nbr-list* [l2nbr-system-id]
    |   | +--rw l2nbr-system-id    isis-system-id-def
    |   | +--rw snpa?              uint32
    |   | +--ro nbr-status?        nbr-status-def
    |   | +--ro nbr-down-reason?   nbr-down-reason-def
    |   | +--ro nbr-type?          nbr-type-def
```

Figure 2 draft-i2rs-wang-isis-dm-00 l1-nbr-list and l2-nbr-list structures

5.3. state information for route change and neighbor change

The following are additions that [I-D.wang-i2rs-isis-dm] adds to support route state querying.

```mermaid
diagram flow
  root
    | +--rw mt-ipv4-rib* [ipv4-prefix]
    |   | +--rw ipv4-prefix
    |   | +--rw next-hop-list*
    |     | +--rw next-hop  inet:ipv4-prefix
    |   | +--rw back-nexthop?  inet:ipv4-prefix
    | +--rw ipv4-isis-route-para
    |   | +--rw metric ?
    |   | +--rw type?
    |   | +--ro route-current-state?    route-state-def
    |   | +--ro route-previous-state?   route-state-def
    |   | +--rw lsp-id?                 isis-lsp-id-def
    |   | +--ro route-chg-reason?       enumeration
```

figure 3 draft i2rs-wang-isis-dm-00 route status information

6. Merge Suggestions

[I-D.litkowski-isis-yang-isis-cfg] and [I-D.wang-i2rs-isis-dm] cover two separate areas: configuration and ephemeral state. These two drafts need to align the definitional part of the drafts (groupings, typedefs, etc.) to allow implementations to choose configuration or configuration plus I2RS
7. IANA Considerations

This draft includes no request to IANA.

8. Security Considerations

None since this is just an analysis draft

9. Informative References

[I-D.ietf-i2rs-architecture]

[I-D.ietf-i2rs-rib-info-model]

[I-D.ietf-i2rs-usecase-reqs-summary]

[I-D.litkowski-isis-yang-isis-cfg]

[I-D.wang-i2rs-isis-dm]
Wang, L., Hares, S., and N. Wu, "Yang Data model I2RS to IS-IS protocol", draft-wang-i2rs-isis-dm-00 (work in progress), September 2014.

[I-D.wu-i2rs-isis-info-model]


Authors’ Addresses

Susan Hares
Huawei
7453 Hickory Hill
Saline, MI  48176
USA

Email: shares@ndzh.com

Lixing Wang
Huawei
Huawei Bld., No.156 Beiqing Rd.
Beijing  10095
China

Email: wanglixing@huawei.com