               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 d raft-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.

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

    ISIS: Intermediate System to Intermediate System Routing Protocol (IGP)

    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:

    o configuration,

    o operational status information per protocol instance,

    o RPC operations (clear adjacency, clear isis-database), and

    o 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:

o an RPC to clear a isis-adjacency within a protocol instance for a particular set of interfaces and levels.

o 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 lsdbs 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:

o 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.

o [I-D.wang-i2rs-isis-dm] contains the isis mt-rib which [I-D.litkowski-isis-yang-isis-cfg] lacks.

5. Unique features for I2RS IGP Requirements

    The following are unique features for I2RS IGP requirements:

    o mt-ipv4-rib and mt-ipv6-rib - which is used for transient loop
       avoidance.

    o nbr-list - to aid fast route convergence in the event of the loss
       of a neighbor

    o 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 the 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.

```
        +--rw mt-ipv4-rib* [ipv4-prefix]
        |   +--rw ipv4-prefix                  inet:ipv4-prefix
        |   +--rw nexthop-list* [nexthop]
        |   |  +--rw nexthop     inet:ipv4-prefix
        |   +--rw back-nexthop?                inet:ipv4-prefix
        |   +--rw ipv4-isis-route-para
        |       +--rw metric?                  uint32
        |       +--ro type?                    enumeration
        |       +--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
       +--rw mt-ipv6-rib* [ipv6-prefix]
        |   +--rw ipv6-prefix                  inet:ipv6-prefix
        |   +--rw nexthop-list* [nexthop]
        |   |  +--rw nexthop     inet:ipv6-prefix
        |   +--rw back-nexthop?                inet:ipv4-prefix
        |   +--rw ipv6-isis-route-para
        |       +--rw metric?                  uint32
        |       +--ro type?                    enumeration
        |       +--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 1: draft-i2rs-wang-isis-dm-00 mt-ipv4-rib and mt-ipv6-rib structures

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.

```
            |   +--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 stru
ctures

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.

```
        +--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

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