I2RS working group
Internet-Draft
Intended status: Standards Track
Expires: May 14, 2015

S. Hares
L. Wang
Huawei

November 10, 2014

Comparison Between 2 OSPF Yang Drafts
draft-hares-i2rs-ospf-compare-yang-00

Abstract

This document contains a comparison of two OSPF yang models: draft-yeung-netmod-ospf-02 and draft-wang-i2rs-ospf-dm. The yang model in draft-yeung-netmod-ospf-02 is model focused on configuration. The yang model in draft-wang-i2rs-ospf-dm-00 is focused on the status and ephemeral state changes needed for the I2RS interface. The conclusion of comparison is that there little overlap except the definitions of common ospf structures. The draft-wang-i2rs-ospf-dm-00 is necessary to fulfil a majority of the requirement drawn from the IGP use cases in the I2RS use cases.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at http://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on May 14, 2015.

Copyright Notice

Table of Contents

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 OSPF yang models: [I-D.yeung-netmod-ospf], and [I-D.wang-i2rs-ospf-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-ospf-dm] is available in the [I-D.wu-i2rs-ospf-info-model].

At this time the I2RS chairs have determined that the IGP use cases found in the [I-D.ietf-i2rs-usecase-reqs-summary] are out of scope.

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-yeung-netmod-ospf-01 with draft-wang-ospf-dm-00

The draft-yeung-netmod-ospf-01 has substantial differences with [I-D.wang-i2rs-ospf-dm]. However, these differences are most mostly configuration, in which the configurations utilize different views: ospf-view (protocol), ospf-area-view, and ospf-interface-view. [I-D.wang-i2rs-ospf-dm] has a similar structure for the following group and type definitions: ospf ,ospf-area, ospf interface and TE information. In the draft [I-D.wang-i2rs-ospf-dm] this information is just for the definitions in order to attach the necessary status status. The draft [I-D.wang-i2rs-ospf-dm] does not provide any configuration. The real-time status information provided by [I-D.wang-i2rs-ospf-dm] includes: ospf-mt, ospf-rib, ospf-neighbor, ospf-lsa-database, ospf state, and ospf status and state information which is not included in draft-yeung-netmod-ospf-01.

The difference to these two documents is appropriate for the configuration versus I2RS split.

4. Comparison of draft-yeung-netmod-ospf-02 with draft-wang-ospf-dm-00

[I-D.yeung-netmod-ospf] was released on October 14, 2014. This draft more closely aligns with [I-D.wang-i2rs-ospf-dm]. [I-D.yeung-netmod-ospf] adds ospf-mt, ospf lsa database, ospf-TE, and ospf status and state information which was included in [I-D.wang-i2rs-ospf-dm]. The [I-D.yeung-netmod-ospf] has the following three parts:

- configuration with the multi-topology view (write/read)
- protocol state and ospf-lsa-database (read only)
- notification on events (read-only)

Parts 2 and 3 of [I-D.yeung-netmod-ospf] to and provide more comprehensive support for status information. The authors of [I-D.wang-i2rs-ospf-dm] support these additions since this draft brings the definitions of OSPF config and OSPF I2RS closer.

5. Differences between the drafts

the remaining difference are the following:

- The nodes of [I-D.wang-i2rs-ospf-dm] are mostly read/write. This includes the ospf-ls-database and the ospf-neighbor. In [I-D.yeung-netmod-ospf] nodes are only readable.
- [I-D.wang-i2rs-ospf-dm] contains the ospf-rib which [I-D.yeung-netmod-ospf] does not have.
- [I-D.wang-i2rs-ospf-dm] has special nodes for I2RS OSPF use cases which draft-yeung-netmod-ospf-02 do not have. These nodes are: router-number and route-info-list.

6. Unique features for I2RS IGP Requirements

The following are unique features for I2RS IGP requirements:

- mt-rib - which is used for transient loop avoidance.
- nbr-list - to aid fast route convergence in the event of the loss of a neighbor
- router-number - which is used for router number monitoring
- route-info-list - which is used for router-ID conflict recovery

o route state information for subscribing for notification of route changes and neighbor changes

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

6.1. mt-rib

Link-state protocols may need to reconverge 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-rib
|       |  +--rw route* [prefix]
|       |     +--rw prefix              inet:ipv4-prefix
|       |     +--rw nexthop-list
|       |     |  +--rw nexthop* [ospf-nexthop]
|       |     |     +--rw ospf-nexthop    inet:ipv4-prefix
|       |     +--rw back-nexthop?       inet:ipv4-prefix
|       |     +--rw metric?             uint32
|       |     +--rw type?               ospf-route-type-def
|       |     +--rw route-state-info
|       |        +--rw metric?                 uint32
|       |        +--rw route-current-state?    ospf-route-state-def
|       |        +--rw route-previous-state?   ospf-route-state-def
|       |        +--rw route-chg-reason?       route-chg-reason-def
|       |        +--rw lsid?                   inet:ip-address
|       |        +--rw lsa-type?               lsa-type-def
|       |        +--rw advertiser?             inet:ip-address
```

Figure 1: draft-i2rs-wang-ospf-dm-00 mt-rib structure

6.2. nbr-list

The ospf 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 ospf nodes. Without the deployment of fast detection techniques, one node has to wait for several seconds before it

realized the adjacency had broken. This kind of issue can cause one device is cut off from its network and lose connectivity completely. No matter planned or accidentally it may cause traffic blackhole 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 I2RS and IGP information model 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 neighbor’s change.

```
   |              |     +--rw nbr-list
   |              |        +--rw nbr* [router-id]
   |              |           +--rw router-id              inet:ip-address
   |              |           +--rw interface-index?       uint64
   |              |           +--rw interface-name?        string
   |              |           +--rw nbr-status?            nbr-status-def
   |              |           +--rw nbr-previous-status?   nbr-status-def
   |              |           +--rw nbr-down-reason?       nbr-down-reason-d
ef
   |              |           +--rw nbr-address?           inet:ipv4-address
   |              |           +--rw ip-address?            inet:ipv4-address
```

Figure 2 draft-i2rs-wang-ospf-dm-00 ospf-nbr-list structure

6.3. router-number

Customers complain regarding the limits on the number of routers routers should be deployed in one area. The answer for this question is not clear in vendor’s guide since the product specification provide limits that guarantee operations. For operations people looking to see the real limits, the field engineers use words like "usually", "roughly" or "most of the time". As the consequence, the customers may simply deploy all routers in one OSPF area, and deal with the scaling issues after the network grows.

With the help of OSPF information model and I2RS interfaces, it is possible to give such deployment warnings when the limits will be hit in the real-time manner. Based on the statistics of router number and system resource consuming, plus the ratio relationship between them, one notification or warning can be sent to I2RS Client. From

there decision can be made to expand safely or have to shrink for precaution.

```
    +--rw area-list
    |          +--rw area* [area-id]
    |             +--rw area-id            uint16
    |             +--rw router-number?     uint32
```

Figure 3 draft-i2rs-wang-bgp-dm-00 router-id

6.4. route-info-list

It is become more common that networks have router-ID conflict in networks both intra and inter area, especially after different area have merged. It is time-consuming and troublesome to detect the places where this trouble happened. The frequently used solution is to rename one of the conflicted router-ID to a new one then reboot the involved OSPF instance to force all adjacencies to rebuild and re-synchronize the LSDB.

It MAY be possible to alleviate this issue with the help of OSPF information model and programmatic I2RS interfaces. With the help of the router-info-list, this conflict can be detected automatically. When one substantial conflict is on the horizon, no need to wait for mutual re-origination happened, ID conflict can be found in router-info-list with help of their coordinate information, no matter the conflict routers come from the same area or not. What is more, through I2RS interfaces and Agent, it is possible to rewrite one of the conflicted router-ID into a new one then reboot the routing-protocol.

```
        +--rw route-info-list* [route-info-index]
        |  +--rw route-info-index    uint32
        |  +--rw router-id           inet:ipv4-address
        |  +--rw ip-address-list* [ip-address]
        |  |  +--rw ip-address    inet:ipv4-address
```

Figure 4 - OSPF route information

6.5. ospf route status information

The following yang top-level diagram shows additional status for each ospf route:

```
|        +--rw mt-rib
|        |     +--rw route-state-info
|        |        +--rw metric?                  uint32
|        |        +--rw route-current-state?     ospf-route-state-def
|        |        +--rw route-previous-state?    ospf-route-state-def
|        |        +--rw route-chg-reason?        route-chg-reason-def
|        |     +--rw nbr-list
|        |        +--rw nbr* [router-id]
|        |           +--rw router-id               inet:ip-address
|        |           +--rw interface-index?        uint64
|        |           +--rw interface-name?         string
|        |           +--rw nbr-status?             nbr-status-def
|        |           +--rw nbr-previous-status?    nbr-status-def
|        |           +--rw nbr-down-reason?        nbr-down-reason-def
```

Figure 5 ospf route and neighbor additions.

7. Merge Suggestions

[I-D.yeung-netmod-ospf] and [I-D.wang-i2rs-ospf-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

8. IANA Considerations

This draft includes no request to IANA.

9. Security Considerations

None since this is just an analysis draft

10. Informative References

[I-D.ietf-i2rs-architecture]
Atlas, A., Halpern, J., Hares, S., Ward, D., and T. Nadeau, "An Architecture for the Interface to the Routing System", draft-ietf-i2rs-architecture-05 (work in progress), July 2014.

[I-D.ietf-i2rs-rib-info-model]
Bahadur, N., Folkes, R., Kini, S., and J. Medved, "Routing Information Base Info Model", draft-ietf-i2rs-rib-info-model-03 (work in progress), May 2014.

[I-D.ietf-i2rs-usecase-reqs-summary]
Hares, S. and M. Chen, "Summary of I2RS Use Case Requirements", draft-ietf-i2rs-usecase-reqs-summary-00 (work in progress), November 2014.

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

[I-D.wu-i2rs-ospf-info-model]
Wu, N., Wang, L., and S. Hares, "I2RS Information Model for OSPF protocol", draft-wu-i2rs-ospf-info-model-00 (work in progress), September 2014.

[I-D.yeung-netmod-ospf]
Yeung, D., Qu, Y., Zhang, J., Bogdanovic, D., and K. Sreenivasa, "Yang Data Model for OSPF Protocol", draft-yeung-netmod-ospf-02 (work in progress), October 2014.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC3060] Moore, B., Ellesson, E., Strassner, J., and A. Westerinen, "Policy Core Information Model -- Version 1 Specification", RFC 3060, February 2001.

[RFC3460] Moore, B., "Policy Core Information Model (PCIM) Extensions", RFC 3460, January 2003.

[RFC3644] Snir, Y., Ramberg, Y., Strassner, J., Cohen, R., and B. Moore, "Policy Quality of Service (QoS) Information Model", RFC 3644, November 2003.

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