

BIER WG
Internet-Draft
Intended status: Standards Track
Expires: December 14, 2017

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June 12, 2017

YANG Data Model for BIER OAM
draft-hu-bier-oam-yang-01.txt

Abstract

This document defines YANG data model for Bit Index Explicit Replication (BIER) Operations, Administration, and Maintenance (OAM). It extends from the basic YANG data model for Layer independent OAM Management defined in [[I-D.ietf-lime-yang-connectionless-oam](#)] with BIER technology specifics. It includes BIER OAM related configuration and state.

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[1.](#) Introduction

YANG [[RFC6020](#)] is a data modeling language used to model configuration and state data manipulated by the Network Configuration Protocol (NETCONF) [[RFC6241](#)], NETCONF remote procedure calls (RPC), and NETCONF notifications. This document defines the YANG data model for Bit Index Explicit Replication (BIER)OAM [[I-D.ietf-bier-ping](#)]. The BIER OAM YANG module involves the OAM configuration, and notifications, etc.

Currently, [[I-D.ietf-lime-yang-connectionless-oam](#)] proposes a basic YANG data model for technology-independent abstraction of key OAM constructs for connectionless protocols. BIER OAM YANG data model can be defined by directly extending the basic model with BIER technology specifics. It can bring some obvious benefits such as unified format, reusable parts, and correlation of defects, faults, network failure at the specific layer.

In addition, various components in the BIER technology specific YANG data model defined in [[I-D.ietf-bier-bier-yang](#)] can be directly reused in this draft to define the BIER OAM YANG data model.

[2.](#) Conventions and Terminology

2.1. Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [[RFC2119](#)].

The following terms are defined in [[RFC6241](#)] and are not redefined here:

- o client
- o configuration data
- o server
- o state data

The following terms are defined in [[RFC6020](#)] and are not redefined here:

- o augment
- o data model
- o data node

The terminology for describing YANG data models is found in [[RFC6020](#)].

The following notations are used within the data tree and carry the meaning as noted below.

Each node is printed as:

<status> <flags> <name> <opts> <type>

<status> is one of:

- + for current
- x for deprecated
- o for obsolete

<flags> is one of:

- rw for configuration data
- ro for non-configuration data
- x for rpcs
- n for notifications

<name> is the name of the node

If the node is augmented into the tree from another module, its name is printed as <prefix>:<name>.

<opts> is one of:

- ? for an optional leaf or choice
- ! for a presence container
- * for a leaf-list or list
- [<keys>] for a list's keys

<type> is the name of the type for leafs and leaf-lists

In this document, these words will appear with that interpretation only when in ALL CAPS. Lower case uses of these words are not to be interpreted as carrying [RFC2119](#) significance.

[2.2.](#) Terminologies

BFR-ID: Bit-Forwarding Router identify [[I-D.ietf-bier-architecture](#)]

BIER: Bit Index Explicit Replication[[I-D.ietf-bier-architecture](#)]

BSL: Bit String Length [[I-D.ietf-bier-architecture](#)]

LIME: Layer Independent OAM Management
[[I-D.ietf-lime-yang-connectionless-oam](#)]

OAM: Operations, Administration, and Maintenance [[RFC6291](#)]

[3.](#) Architecture of OAM YANG Model and Relationship to BIER OAM

Layer independent OAM YANG model
[[I-D.ietf-lime-yang-connectionless-oam](#)] is used as the basis for all the other connectionless OAM YANG models. This allows users to span across OAM tools of different technologies through a uniform API. The following Figure depicts the relationship of BIER OAM YANG model to the Layer Independent OAM YANG Model.

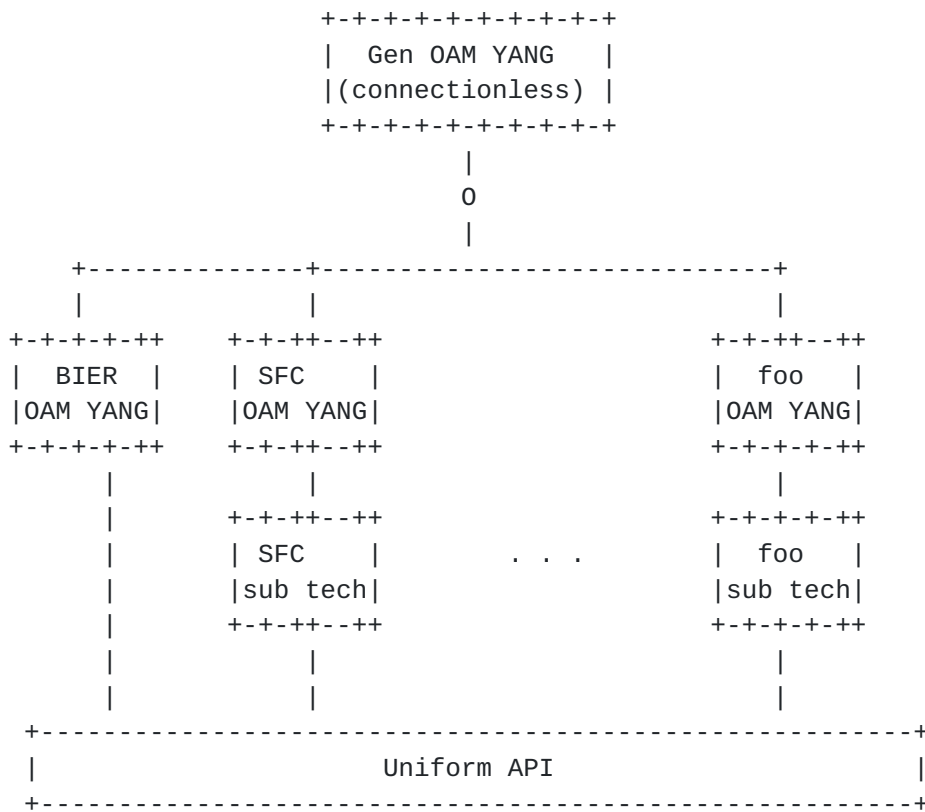


Figure 1 Relationship of BIER OAM YANG model to Layer independent OAM YANG model

4. BIER Extensions to LIME connectionless YANG Model

4.1. Test Point Locations

BIER protocol uses BSL ,sub-domain id and BFR-id for the forwarding indicators. So we augment the definition of BSL,sub-domain id and BFR-id from BIER yang data model as the test point locations for BIER OAM YANG data model.

5. BIER OAM YANG Data Design


```
module: ietf-bier-oam
  augment /nd:networks/nd:network/nd:node/coam:location-type/coam:ip-prefix-
location-type/coam:test-point-ip-prefix-location-list/coam:test-point-
locations:
  +--rw bier-test-point-location-list
    +--rw test-point-locations* [bier-bsl bier-subdomainid bier-bfrid]
      +--rw bier-bsl          bier-bsl
      +--rw bier-subdomainid  bier-subdomainid
      +--rw bier-bfrid        bier-bfrid
  augment /nd:networks/nd:network/nd:node/coam:location-type/coam:ip-prefix-
location-type/coam:test-point-ip-prefix-location-list/coam:test-point-
locations/coam:technology:
  +--:(bier-oam-string)
    +--rw bier-icmp?  string
```

6. BIER OAM YANG model

```
<CODE BEGINS> file "ietf-bier-oam@2017-06-13.yang"
module ietf-bier-oam {
  namespace "urn:ietf:params:xml:ns:yang:ietf-bier-oam";
  prefix bieroam;

  import ietf-bier {
    prefix bier;
  }

  import ietf-connectionless-oam {
    prefix coam;
  }

  import ietf-network{
    prefix nd;
  }

  organization
    "IETF BIER(Bit Indexed Explicit Replication ) Working Group";

  contact
    "WG List:  <mailto:bier@ietf.org>
    WG Chair: Tony Przygienda
               <mailto:tonysietf@gmail.com>
    WG Chair: Greg Shepherd
               <mailto:gjshep@gmail.com>
    Editor:   Fangwei Hu
               <mailto:hu.fangwei@zte.com.cn>
    Editor:   Ran Chen
               <mailto:chen.ran@zte.com.cn>
    Editor:   Rong Gu
```

<mailto:gurong@chinamobile.com>
";
description

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```
"The YANG module defines BIER OAM data model.";

revision 2016-12-05{
  description
    "00 revision";
  reference
    "draft-hu-bier-oam-yang-00";
}

revision 2017-06-12{
  description
    "01 revision, remove the OAM Layer part.";
  reference
    "draft-hu-bier-oam-yang-01";
}

typedef bier-bsl {
  type leafref {
    path "/bier:bier/bier:bier-global/bier:sub-domain/
bier:bitstringlength";
  }
  description "bsl type";
}

typedef bier-subdomainid {
  type leafref {
    path "/bier:bier/bier:bier-global/bier:sub-domain/bier:sub-
domain-id";
  }
  description "sub-domain-id type";
}

typedef bier-bfrid {
  type leafref {
    path "/bier:bier/bier:bier-global/bier:sub-domain/bier:bfr-id";
  }
  description "bfr-id type";
}

identity bier-type {
  base coam:tp-address-type;
  description "bier type";
}

augment "/nd:networks/nd:network/nd:node/coam:location-type/coam:ip-
prefix-location-type"
  +"/coam:test-point-ip-prefix-location-list/coam:test-point-
locations" {
```

```
container bier-test-point-location-list {  
  list test-point-locations {  
    key "bier-bsl bier-subdomainid bier-bfrid";
```

```
        leaf bier-bsl {
            type bier-bsl;
            description "bier bsl";
        }

        leaf bier-subdomainid {
            type bier-subdomainid;
            description "bier sub-domain id";
        }

        leaf bier-bfrid {
            type bier-bfrid;
            description "bfr id";
        }

        description "test point locations list ";
    }
    description "bier-test-point-location-list";
}
description "bier-location-type";
}

    augment "/nd:networks/nd:network/nd:node/coam:location-type/coam:ip-
prefix-location-type"
    +"/coam:test-point-ip-prefix-location-list/coam:test-point-locations/
coam:technology" {
        case bier-oam-string{
            leaf bier-icmp{
                type string;
                description
                    "bier icmp";
            }
            description "bier oam icmp case.";
        }
        description "bier icmp technology.";
    }
}
<CODE ENDS>
```

7. Security Considerations

TBD.

8. Acknowledgements

TBD.

9. IANA Considerations

TBD.

10. Normative References

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