

BIER WG  
Internet-Draft  
Intended status: Standards Track  
Expires: September 1, 2016

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February 29, 2016

BIER TE YANG module  
draft-zhang-bier-te-yang-01

Abstract

This document defines a YANG data model for BIER TE configuration and operation.

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## 1. Introduction

[I-D.eckert-bier-te-arch] introduces an architecture for BIER-TE: Traffic Engineering for Bit Index Explicit Replication (BIER). This document defines a YANG data model for BIER TE. The content is in keeping with the TE architecture draft.

## 2. Design of the Data Model

Instead of using respective sub-domain-id, si and bsl information like in BIER yang draft [I-D.chh-bier-bier-yang], this document tries to group these sub-domain-id, si and bsl information in a new bier-common grouping to simplify the reference. Later yang modules may import the common grouping easily. Further, if this optimization is recognized, then BIER yang draft [I-D.chh-bier-bier-yang] will be updated to group these sub-domain-id, si and bsl information as well.

```

module: ietf-bier-te
augment /rt:routing:
  +--rw bier-te-config
    +--rw te-subdomain* [subdomain-id]
      +--rw subdomain-id      sub-domain-id
      +--rw adj-id* [adjID]
        +--rw adjID          adjid
        +--rw adj-if          uint32
        +--rw (te-adjID-type)
          +--:(p2p)
          +--:(bfer)
          +--:(leaf-bfer)
          +--:(lan)
          +--:(spoke)
          +--:(ring-clockwise)
          +--:(ring-counterclockwise)
          +--:(ecmp)
          +--:(virtual-link)
          +--:(other)
        +--rw te-bsl* [fwd-bsl]
          +--rw fwd-bsl      uint16

```

```

|   +--rw te-si* [si]
|   |   +--rw si          si
|   |   +--rw te-f-index* [te-f-index]
|   |   |   +--rw te-f-index    bit-string
|   |   |   +--rw (te-adj-type)
|   |   |   |   +--:(connected)
|   |   |   |   +--:(routed)
|   |   |   |   +--:(local-decap)
|   |   |   |   +--:(ecmp)
|   |   |   |   +--:(other)
|   |   +--rw f-bm          bit-string
|   |   +--rw f-intf        uint32
|   |   +--rw ecmp?         boolean
|   |   +--rw frr?         boolean
+--rw ecmp-path* [index]
|   +--rw index            uint32
|   +--rw number* [number]
|   |   +--rw number        uint16
|   |   +--rw out-if        uint32
+--rw btaft* [adj-index]
|   +--rw adj-index        uint32
|   +--rw bitposition      bit-string
|   +--rw resetbitmask     bit-string
|   +--rw addbitmask       bit-string
augment /rt:routing:
+--ro bier-te-state
+--ro te-subdomain* [subdomain-id]
+--ro subdomain-id        sub-domain-id
+--ro adj-id* [adjID]
|   +--ro adjID            adjid
|   +--ro adj-if          uint32
+--ro (te-adjID-type)
|   +--:(p2p)
|   +--:(bfer)
|   +--:(leaf-bfer)
|   +--:(lan)
|   +--:(spoke)
|   +--:(ring-clockwise)
|   +--:(ring-counterclockwise)
|   +--:(ecmp)
|   +--:(virtual-link)
|   +--:(other)
+--ro te-bsl* [fwd-bsl]
|   +--ro fwd-bsl          uint16
|   +--ro te-si* [si]
|   |   +--ro si          si
|   |   +--ro te-f-index* [te-f-index]
|   |   |   +--ro te-f-index    bit-string

```

```

|         |--ro (te-adj-type)
|         |   |--:(connected)
|         |   |--:(routed)
|         |   |--:(local-decap)
|         |   |--:(ecmp)
|         |   |--:(other)
|         |--ro f-bm          bit-string
|         |--ro f-intf        uint32
|         |--ro ecmp?         boolean
|         |--ro frr?          boolean
+--ro ecmp-path* [index]
|   |--ro index              uint32
|   |--ro number* [number]
|   |   |--ro number          uint16
|   |   |--ro out-if          uint32
+--ro btaft* [adj-index]
|   |--ro adj-index          uint32
|   |--ro bitposition         bit-string
|   |--ro resetbitmask        bit-string
|   |--ro addbitmask          bit-string
notifications:
+---n bier-te-notification
+--ro adjID-is-zero* [if-index]
+--ro if-index          uint32
+--ro (te-adjID-type)
+--:(p2p)
+--:(bfer)
+--:(leaf-bfer)
+--:(lan)
+--:(spoke)
+--:(ring-clockwise)
+--:(ring-counterclockwise)
+--:(ecmp)
+--:(virtual-link)
+--:(other)

```

### 3. BIER-TE configuration

The BIER-TE information is indexed by the sub-domain ID. Maybe there are some global BIER-TE information, it should be added in later version.

One interface can be used in different sub-domain, so the BIER TE adjacency information is managed by BIER TE other than by interface.

Because the BIER-TE is controlled by controller now, the information about IGP is not defined. If in the future the IGP is used to carry

the information about BIER-TE, the IGP extension will be added in this document.

#### 4. Notifications

If the adjacency id of one adjacency is set to zero, the value is invalid. The notification should be sent to controller and network manager.

#### 5. BIER TE YANG module

```
<CODE BEGINS> file "ietf-bier-te.yang"
module ietf-bier-te {

    namespace "urn:ietf:params:xml:ns:yang:ietf-bier-te";

    prefix bier-te;

    import ietf-routing {
        prefix "rt";
    }
    /* import bier-common {
        prefix "bier-common";
    } */

    organization " IETF BIER(Bit Indexed Explicit Replication ) Working Group";
    contact
        "WG List: <mailto:bier@ietf.org>
        WG Chair: Tony Przygienda
                <mailto:tonysietf@gmail.com>
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                <mailto:gjshep@gmail.com>

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        ";

    description
        "This module contains a collection of YANG definitions for
        managing BIER TE information.";

    revision 2016-03-01 {
```

```
    description
      "Initial version.";
    reference "https://tools.ietf.org/html/draft-zhang-bier-te-yang";
  }

  grouping te-adj-type {
    description "The collection of all possible adjacency type.";
    choice te-adj-type {
      mandatory true;
      case connected {
        description "The type of adjacency is connected. Mostly connecte
d interfaces.";
      }
      case routed {
        description "The type of adjacency is routed. Mostly not connect
ed interfaces.";
      }
      case local-decap {
        description "Means that the packet should be decapsulated and fo
rward out BIER domain.";
      }
      case ecmp {
        description "There is more than one path in the adjacency with e
qual cost.";
      }
      case other {
        description "Means that the packet should be discarded.";
      }
    }
    description "The collection of all possible adjacency type.";
  }

  grouping te-adjID-type {
    description "The collection of all possible adjacency type.";
    choice te-adjID-type {
      mandatory true;
      case p2p {
        description "Describes p2p adjacency.";
      }
      case bfer {
        description "Describes bfer adjacency.";
      }
      case leaf-bfer {
        description "Describes leaf-bfer adjacency. There is no next BFR
that the packet should be forwarded.";
      }
      case lan {
        description "Describes lan adjacency..";
      }
      case spoke {
        description "Describes spoke adjacency of hub-and-spoke.";
      }
      case ring-clockwise {
```

```
        description "Describes clockwise adjacency in ring.";
    }
    case ring-counterclockwise {
        description "Describes counterclockwise adjacency in ring.";
    }
    case ecmp {
        description "Describes ecmp adjacency.";
    }
    case virtual-link {
        description "Describes virtual adjacency between two indirect co
nnect nodes.";
    }
    case other {
        description "Describes other id type of adjacency.";
    }
    description "The collection of all possible adjacency type.";
}

typedef bsl {
    type enumeration{
        enum 64-bit{
            description "bitstringlength is 64";
        }
        enum 128-bit{
            description "bitstringlength is 128";
        }
        enum 256-bit{
            description "bitstringlength is 256";
        }
        enum 512-bit{
            description "bitstringlength is 512";
        }
        enum 1024-bit{
            description "bitstringlength is 1024";
        }
        enum 2048-bit{
            description "bitstringlength is 2048";
        }
        enum 4096-bit{
            description "bitstringlength is 4096";
        }
    }
    description "The bitstringlength type for imposition mode.";
}

typedef adjid {
    type uint32;
    description "The type for adjacency ID.";
```

```
    }

    /* The definition of si/sub-domain-id/bit-string will be deleted later. */
    typedef si {
        type uint16;
        description "The type for set identifier";
    }

    typedef sub-domain-id {
        type uint16;
        description "The type for sub-domain-id";
    }

    typedef bit-string {
        type uint16;
        description "The bit mask of one bitstring.";
    }

    /* The bier-common grouping will be moved to BIER yang. */
    grouping bier-common {
        description "Common information in BIER";
        leaf subdomain-id {
            type sub-domain-id;
            description "ID of the sub domain.";
        }
        leaf si {
            type si;
            description "The value of the set identifier.";
        }
        leaf bsl {
            type bsl;
            description "The BitStringLength supported by this node.";
        }
        leaf bit-string {
            type bit-string;
            description "The bit-string of BIER forwarding.";
        }
    }

    grouping te-adjID {
        list adj-id {
            key "adjID";
            description "This ID information of one adjacency.";
            leaf adjID {
                type adjid;
                mandatory true;
                description "The adjacency id.";
            }
        }
    }
```



```
        leaf adj-if {
            /* type if:if-index; */
            type uint32; /* for compilation */
            mandatory true;
            description "The corresponding interface of this adjacency.";
        }
        uses te-adjID-type;
    }
    description "This group presents adjacency ID information for BIER TE.";
}

grouping te-ecmp {
    description "The ecmp information.";
    list ecmp-path {
        key "index";
        description "The index of the ecmp paths.";
        leaf index {
            type uint32;
            mandatory true;
            description "The ecmp index.";
        }
        list number {
            key "number";
            description "The list of the ecmp paths.";
            leaf number {
                type uint16;
                mandatory true;
                description "The number of the ecmp paths.";
            }
        }
        leaf out-if {
            /* type if:if-index; */
            type uint32; /* for compilation */
            mandatory true;
            description "The outgoing interface.";
        }
    }
}

grouping te-frr {
    description "The TE fast reroute information.";
    list btaft {
        key "adj-index";
        description "The adjacency index of the frr paths.";
        leaf adj-index {
            type uint32;
            mandatory true;
            description "The frr adjacency index.";
        }
    }
}
```

```
    }
    leaf bitposition {
        type bit-string;
        mandatory true;
        description "The bitposition information.";
    }
    leaf resetbitmask {
        type bit-string;
        mandatory true;
        description "The deleting bitmask of the forwarding item.";
    }
    leaf addbitmask {
        type bit-string;
        mandatory true;
        description "The adding bitmask of the forwarding item.";
    }
}

grouping te-items {
    description "The BIER TE forwarding items collection.";
    uses te-adj-type;
    leaf f-bm {
        type bit-string;
        mandatory true;
        description "The bitmask of the forwarding item.";
    }
    leaf f-intf {
        /* type if:if-index; */
        type uint32; /* for compilation */
        mandatory true;
        description "The out interface of this forwarding item.";
    }
    leaf ecmp {
        type boolean;
        description "The capability of ecmp paths.";
    }
    leaf frr {
        type boolean;
        description "The capability of fast re-route.";
    }
}

grouping te-fwd-item {
    list te-si {
        key "si";
        description "The forwarding items of one set identifier.";
        leaf si{
```

```
        type si;
            mandatory true;
            description "The set identifier of this forwarding item.";
        }
        list te-f-index {
            key "te-f-index";
            description "The forwarding information of one BIER TE item.";
            leaf te-f-index {
                type bit-string;
                mandatory true;
                description "The bit index of BIER TE forwarding item.";
            }
            uses te-items;
        }
    }
    description "The forwarding items in one set identifier.";
}

grouping te-info {
    description "The BIER TE forwarding information.";
    list te-subdomain {
        key "subdomain-id";
        description "The forwarding items of one sub-domain.";
        leaf subdomain-id {
            type sub-domain-id;
            description "The sub-domain-id of this sub-domain.";
        }
    }
    uses te-adjID;

    list te-bsl {
        key "fwd-bsl";
        description "The forwarding items in one bitstringlength.";
        leaf fwd-bsl {
            type uint16;
            description "The value of bitstringlength.";
        }
        uses te-fwd-item;
    }
    uses te-ecmp;
    uses te-frr;
}

augment "/rt:routing" {
    description "The BIER TE information.";
    container bier-te-config {
        description "The BIER TE information container.";
        uses te-info;
    }
}
```

```
    }  
  }  
  
  augment "/rt:routing" {  
    description "The read-only BIER TE information.";  
    container bier-te-state {  
      config false;  
      description "The BIER TE information in nodes.";  
      uses te-info;  
    }  
  }  
  
  notification bier-te-notification {  
    description  
      "This notification is sent when a condition changes in BIER TE.";  
    list adjID-is-zero {  
      key "if-index";  
      description "The adjacency id is zero.";  
      leaf if-index {  
        type uint32;  
        description "The adjacency id of this interface is zero.";  
      }  
      uses te-adjID-type;  
    }  
  }  
}  
<CODE ENDS>
```

## 6. Normative References

### [I-D.chh-bier-bier-yang]

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