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BIER TE YANG module  
draft-zhang-bier-te-yang-05

## Abstract

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

## Status of This Memo

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## [1.](#) Introduction

[I-D.ietf-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. In addition, this YANG data model contains BIER TE frr items of [[I-D.eckert-bier-te-frr](#)].

## [2.](#) Design of the Data Model

Because BIER-TE technology can be used independently, the common elements reference from BIER YANG ( [[I-D.ietf-bier-bier-yang](#)] ) is not suitable, such as subdomain-id, bitstringlength, set identifier, and so on. These common elements should be defined in general BIER YANG model or in each YANG model respectively. The BIER TE YANG model includes BIER TE forwarding items configuration. Some features can also be used to enhance BIER TE function, like ECMP and FRR.

```
module: ietf-bier-te
  augment /rt:routing:
    +--rw bier-te
      +--rw subdomain* [subdomain-id]
      +--rw subdomain-id    uint16
      +--rw bsl* [fwd-bsl]
      | +--rw fwd-bsl    uint16
      | +--rw si* [si]
      | | +--rw si          uint16
      | | +--rw te-bift-id
      | | | +--rw type?    enumeration
      | | | +--rw value    rt-types:mpls-label
      | +--rw fwd-items* [te-bp]
      | | +--rw te-bp      uint16
      | | +--rw bp-type?   enumeration
      | | +--rw (fwd-type)
      | | | +--:(connected)
      | | | +--:(routed)
      | | | +--:(local-decap)
      | | | +--:(other)
      | +--rw out-info
      | | +--rw fwd-intf      if:interface-ref
      | | +--rw te-out-bift-id
      | | | +--rw type?    enumeration
      | | | +--rw value    rt-types:mpls-label
      | +--rw te-frr {bier-te-frr}?
      | | +--rw frr-index?    uint16
      | | +--rw resetbitmask* [bitmask]
      | | | +--rw bitmask    bit-string
      | +--rw te-ecmp* [out-if] {bier-te-ecmp}?
      | | +--rw out-if        if:interface-ref
      | | +--rw te-out-bift-id
      | | | +--rw type?    enumeration
      | | | +--rw value    rt-types:mpls-label
      +--rw te-frr-items {bier-te-frr}?
      | +--rw btaft* [frr-index]
```

```

+--rw frr-index      uint16
+--rw frr-si         uint16
+--rw frr-bsl        uint16
+--rw addbitmask* [bitmask]
    +--rw bitmask     bit-string

```

notifications:

```

+---n bier-te-notification
    +--ro bp-is-zero* [if-index]
        +--ro if-index    if:interface-ref
        +--ro bp-type?    enumeration

```

### [3.](#) BIER-TE configuration

The BIER-TE forwarding item is indexed by the combination of sub-domain-id, BitStringLength and set identifier. Maybe there are some global BIER-TE configurations, they can 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 function other than by interface itself.

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.](#) RPCs

TBD.

### [6.](#) BIER TE YANG module

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

```

module ietf-bier-te {

  yang-version 1.1;

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

  prefix bier-te;

  import ietf-routing {
    prefix "rt";
    reference "RFC8022";
  }

  import ietf-interfaces {
    prefix "if";
    reference "RFC7223";
  }

  import ietf-routing-types {

```

```

    prefix "rt-types";
    reference "RFC8294";
  }

  organization " IETF BIER(Bit Indexed Explicit Replication ) Working Group";
  contact
    "WG Web:  <http://tools.ietf.org/wg/bier/>
    WG List:  <mailto:bier@ietf.org>

    Editor:   Zheng Zhang
              <mailto:zhang.zheng@zte.com.cn>
    Editor:   Cui Wang
              <mailto:wang.cui1@zte.com.cn>
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    Editor:   Fangwei Hu
              <mailto:hu.fangwei@zte.com.cn>
    Editor:   Mahesh Sivakumar
              <mailto:masivaku@cisco.com>

  ";

  description

```

" The module defines the YANG definitions for BIER TE.

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(<http://trustee.ietf.org/license-info>).

This version of this YANG module is part of [RFC 3618](#); see  
the RFC itself for full legal notices.";

```
revision 2018-11-30 {  
  description  
    "Initial revision.";  
  reference  
    "draft-ietf-bier-te-arch-01: Traffic Engineering for Bit Index Explic  
}  
  
/*  
 * Features  
 */  
feature bier-te-frr {  
  description
```

```
    "Support Fast Re-route feature in BIER TE.";  
}  
feature bier-te-ecmp {  
  description  
    "Support ECMP feature in BIER TE.";  
}  
  
typedef bit-string {  
  type uint16;  
  description "The bit mask of one bit-string.";  
}  
  
grouping te-frr {  
  description "The TE fast re-route information.";  
  list btaft {
```

```

    key "frr-index";
    description "The index of the frr paths. This item can be used for
leaf frr-index {
    type uint16;
    mandatory true;
    description "The frr item index.";
}
leaf frr-si{
    type uint16;
    mandatory true;
    description "The set identifier of this forwarding item.";
}
leaf frr-bsl {
    type uint16;
    mandatory true;
    description "The value of bitstringlength.";
}
list addbitmask {
    key "bitmask";
    description "The adding bitmask of the forwarding item.";
    leaf bitmask {
        type bit-string;
        description "The adding bitmask of the forwarding item. Thi
    }
}
}

grouping fwd-type {
    description "The collection of all possible forwarding type.";
    choice fwd-type {
        mandatory true;
        case connected {

```

```

        description "The forwarding type is connected. Mostly connected
    }
    case routed {
        description "The forwarding type is routed. Mostly not connecte
    }
    case local-decap {
        description "Means that the packet should be decapsulated and f
    }

```

```

        /*case ecmp {
            description "There is more than one path in the forwarding item
        }*/
        case other {
            description "Means that the packet should be discarded.";
        }
        description "The collection of all possible forwarding type.";
    }
}

grouping bp-type {
    description "The collection of all possible adjacency type.";

    leaf bp-type {
        type enumeration {
            enum p2p {
                description "Describes p2p adjacency.";
            }
            enum bfer {
                description "Describes bfer adjacency.";
            }
            enum leaf-bfer {
                description "Describes leaf-bfer adjacency. There is no nex
            }
            enum lan {
                description "Describes lan adjacency..";
            }
            enum spoke {
                description "Describes spoke adjacency of hub-and-spoke.";
            }
            enum ring-clockwise {
                description "Describes clockwise adjacency in ring.";
            }
            enum ring-counterclockwise {
                description "Describes counterclockwise adjacency in ring."
            }
            enum ecmp {
                description "Describes ecmp adjacency. When the type is set
                           the corresponding ecmp entry should be used to
            }
        }
    }
}

```

```

enum virtual-link {

```

```

        description "Describes virtual adjacency between two indire
    }
    enum other {
        description "Describes other id type of adjacency.";
    }
}
description "The collection of all possible adjacency type.";
}
}

grouping te-bift-id {
    description "The index of BIER forwarding items. It usually represents
    leaf type {
        type enumeration {
            enum mpls {
                description "The bift-id value is represent the BIER TE mpl
            }
            enum eth {
                description "The bift-id value is represent the BIER TE eth
                    It is an index of ethernet encapsulation.";
            }
            enum other {
                description "Describes other type of te-bift-id.";
            }
        }
        description "The types of BIER TE bift-id. If this type is not set,
    }
    leaf value {
        type rt-types:mpls-label;
        mandatory true;
        description "The bift-id value of the forwarding item. It can be a
            which is used to represent specific combination of [SD
            the same range (20bits) as mpls label.";
    }
}

grouping te-items {
    description "The BIER TE forwarding items collection.";
    uses fwd-type;

    container out-info {
        description "The information of out forwarding packets. Includes th
        leaf fwd-intf {
            type if:interface-ref;
            mandatory true;
            description "The out interface of this forwarding item.";
        }
    }
}

```

```
        container te-out-bift-id {
            description "The bift-id information corresponding to a specific
            uses te-bift-id;
        }
    }

    container te-frr {
        if-feature bier-te-frr;
        leaf frr-index {
            type uint16;
            description "The index of this frr path.";
        }
        list resetbitmask {
            key "bitmask";
            description "The deleting bitmask of the forwarding item.";
            leaf bitmask {
                type bit-string;
                description "The deleting bitmask of the forwarding item.";
            }
        }
        description "If this link is protected, frr items can be used to forward traffic."
    }
}

grouping fwd-items {
    list si {
        key "si";
        description "The forwarding items of one set identifier.";
        leaf si {
            type uint16;
            mandatory true;
            description "The set identifier of this forwarding item.";
        }
        container te-bift-id {
            description "The bift-id which is used to locate the specific forwarding item."
            uses te-bift-id;
        }
    }

    list fwd-items {
        key "te-bp";
        description "The forwarding information of one BIER TE item.";
        leaf te-bp {
            type uint16;
            mandatory true;
            description "The bit index of a BIER TE forwarding item.";
        }
    }
}
```

uses bp-type;

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```
    uses te-items;

    list te-ecmp {
        if-feature bier-te-ecmp;
        key "out-if";
        leaf out-if {
            type if:interface-ref;
            description "The outgoing interface.";
        }
        container te-out-bift-id {
            description "The bift-id info for a specific out interf";
            uses te-bift-id;
        }
        description "The list of the ecmp paths. When the type of B
            should be used to balance the load on each int";
    }
}
description "The forwarding items in one combination of SD, BSL and SI.
}

grouping te-info {
    description "The BIER TE forwarding information.";
    list subdomain {
        key "subdomain-id";
        description "The forwarding items of one sub-domain.";
        leaf subdomain-id {
            type uint16;
            description "The sub-domain-id of this sub-domain.";
        }
    }

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

```

    }

    container te-frr-items {
        if-feature bier-te-frr;
        uses te-frr;
        description "The TE fast re-route items for protective forwarding"
    }
}
}

```

```

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

/*
 * Notifications
 */
notification bier-te-notification {
    description
        "This notification is sent when a condition changes in BIER TE.";
    list bp-is-zero {
        key "if-index";
        description "The adjacency id is zero. Zero is invalid for BIER TE.";
        leaf if-index {
            type if:interface-ref;
            description "The adjacency id of this interface is zero.";
        }
        uses bp-type;
    }
}
}
<CODE ENDS>

```

## [7.](#) IANA Considerations

The IANA is requested to assign two new URIs from the IETF XML registry ([[RFC3688](#)]). Authors are suggesting the following URI:

URI: urn:ietf:params:xml:ns:yang:ietf-bier-te

Registrant Contact: BIER WG

XML: N/A, the requested URI is an XML namespace

This document also requests one new YANG module name in the YANG Module Names registry ([[RFC6020](#)]) with the following suggestion:

name: ietf-bier-te

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

prefix: bier-te

reference: RFC XXXX

## [8.](#) Acknowledgement

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## [9.](#) Normative References

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