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

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module: ietf-bier
   augment /rt:routing:
      +-rw bier
         +-rw encapsulation-type? identityref
         +-rw bsl? enumeration
         +-rw bfr-id? uint16
         +-rw bfr-prefix? inet:ip-prefix
         +-rw sub-domain* [sub-domain-id address-family]
            +-rw sub-domain-id uint16
            +-rw address-family identityref
            +-rw bfr-prefix? inet:ip-prefix
            +-rw underlay-protocol-type? enumeration
            +-rw mt-id? uint16
            +-rw bfr-id? uint16
            +-rw bsl? enumeration
            +-rw igp-algorithm? uint8
            +-rw bier-algorithm? uint8
            +-rw load-balance-num? uint8
            +-rw encapsulation* [bsl encapsulation-type]
               +-rw bsl uint16
               +-rw encapsulation-type identityref
               +-rw max-si? uint16
               +-rw bift-id-base? uint32
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augment /rt:routing/rt:control-plane-protocols/rt:control-plane-protocol/ospf:ospf:
  +-rw bier-ospf-cfg
      +-rw mt-id? uint16
    +-rw bier
       +-rw enable? boolean
       +-rw advertise? boolean
       +-rw receive? boolean

augment /rt:routing/rt:control-plane-protocols/rt:control-plane-protocol/isis:isis:
  +-rw bier-isis-cfg
    +-rw mt-id? uint16
    +-rw bier
    +-rw enable? boolean
    +-rw advertise? boolean
    +-rw receive? boolean

notifications:
  +++-n bfr-id-collision
     |  +++-ro bfr-id? uint16
     |  +++-n bfr-zero
     |  |  +++-ro ipv4-bfr-prefix? inet:ipv4-prefix
     |  |  +++-ro ipv6-bfr-prefix? inet:ipv6-prefix
     |  +++-n sub-domain-id-collision
     |     |  +++-ro sub-domain-id? uint16
     |     |  +++-ro mt-id? uint16

3. Configuration

This Module augments the "/rt:routing:" with a BIER container. This Container defines all the configuration parameters related to BIER for this particular routing.

The BIER configuration contains global configuration.

The global configuration includes BIER encapsulation type, BitStringLengths, BFR-id, BFR-prefixes, and parameters associated with bier sub-domain.

4. Control plane configuration


This Module supports ISIS ([RFC8401]) and OSPF ([RFC8444]) as control plane for BIER.
5. Notification

This Module includes bfr-id-collision, bfr-zero, and sub-domain-id-collision.

6. BIER YANG Data Model

<CODE BEGINS> file "ietf-bier@2019-05-14.yang"
module ietf-bier {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:ietf-bier";
  prefix "bier";

  import ietf-routing {
    prefix "rt";
  }

  import ietf-inet-types {
    prefix "inet";
  }

  import ietf-isis {
    prefix "isis";
  }

  import ietf-ospf {
    prefix "ospf";
  }

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

  contact  
    "WG List:  <mailto:bier@ietf.org>

    WG Chair: Tony Przygienda
<mailto:tonyisietf@gmail.com>

    WG Chair: Greg Shepherd
<mailto:gjshep@gmail.com>

    Editor: Ran Chen
<mailto:chen.ran@zte.com.cn>

    Editor: Fangwei Hu  
<mailto:hu.fangwei@zte.com.cn>

    Editor: Zheng Zhang
<mailto:zhang.zheng@zte.com.cn>
description
"The YANG module defines a generic configuration model for BIER.”;

revision 2019-05-14{
description
"latest revision”;
reference "RFC XXXX: YANG Data Model for BIER Protocol.”;
}

revision 2018-09-29{
description
"04 revision”;
reference "RFC XXXX: YANG Data Model for BIER Protocol.”;
}

revision 2018-02-07{
description
"03 revision”;
reference "RFC XXXX: YANG Data Model for BIER Protocol.”;
}

revision 2017-08-10{
description
"02 revision”;
reference "RFC XXXX: YANG Data Model for BIER Protocol.”;
}

revision 2017-01-20{
description
"01 revision”;
reference "RFC XXXX: YANG Data Model for BIER Protocol.”;
}

revision 2016-07-23{
description
"00 revision”;
reference "RFC XXXX: YANG Data Model for BIER Protocol.”;
}
revision 2016-05-12{
  description
    "04 revision";
  reference "RFC XXXX: YANG Data Model for BIER Protocol.";
}

revision 2016-03-16 {
  description
    "03 revision";
  reference "RFC XXXX: YANG Data Model for BIER Protocol.";
}

revision 2015-12-03 {
  description
    "02 revision";
  reference "RFC XXXX: YANG Data Model for BIER Protocol.";
}

revision 2015-10-16 {
  description
    "01 revision.";
  reference "RFC XXXX: YANG Data Model for BIER Protocol.";
}

revision 2015-06-22 {
  description
    "Initial revision.";
  reference "RFC XXXX: YANG Data Model for BIER Protocol.";
}

/* Identities */
identity bier-encapsulation{
  description
    "Base identity for BIER encapsulation.";
}
identity bier-encapsulation-mpls {
  base bier-encapsulation;
  description
    "This identity represents MPLS encapsulation for bier.";
}
identity bier-encapsulation-ipv6 {
  base bier-encapsulation;
  description
    "This identity represents ipv6 encapsulation for bier.";
}
identity bier-encapsulation-ethernet {
  base bier-encapsulation;
  description

"This identity represents ethernet encapsulation for bier."
}
identity address-family {
    description
    "Base identity from which identities describing address families are derived.";
}
identity ipv4 {
    base address-family;
    description
    "This identity represents an IPv4 address family."
}
identity ipv6 {
    base address-family;
    description
    "This identity represents an IPv6 address family."
}

/*grouping*/
grouping bier-protocol-extensions{
    description
    "Defines protocol extensions.";
    leaf mt-id{
        type uint16;
        description
        "Multi-topology associated with bier sub-domain.";
    }
    container bier {
        leaf enable {
            type boolean;
            default false;
            description
            "Enables bier protocol extensions.";
        }
        leaf advertise {
            type boolean;
            default true;
            description
            "Enable to advertise the parameters associated with bier.";
        }
        leaf receive {
            type boolean;
            default true;
            description
            "Enable to receive the parameters associated with bier.";
        }
    }
    description
grouping bsl {
  description "The bitstringlength type.";
  leaf 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";
      }
    }
    default "256-bit";
    description "list of the bitstringlength type to be supported.";
  }
}
enum "isis" {
    "isis protocol;
}

enum "ospf" {
    "ospf protocol;
}

enum "bgp" {
    "bgp protocol;
}

description "list of the underlay protocol to be supported.;"

 grouping encapsulation {
    description "Bit Index Forwarding Table. When MPLS is used as the transport, the Bit Indexed Forwarding Table (BIFT) is identified by a MPLS Label. When non-MPLS transport is used, the BIFT is identified by a 20bit value.;"
    leaf bsl {
        type uint16;
        description "The value of the bitstringlength.;"
    }
    leaf encapsulation-type {
        type identityref {
            base bier-encapsulation;
        }
        description "Dataplane to be used.;"
    }
    leaf max-si {
        type uint16;
        description "Maximum Set Identifier.;"
    }
    leaf bift-id-base {
        type uint32;
        description "The value of the bift id.;"
    }
    description "Different dataplane, different value of the bift-id.;"
grouping sub-domain {
  description "The parameters of the sub domain.";
  list sub-domain {
    key "sub-domain-id address-family";
    leaf sub-domain-id {
      type uint16;
      description "The type for sub-domain-id";
    }
    leaf address-family {
      type identityref {
        base address-family;
      }
      mandatory true;
      description "Address family.";
    }
  }
  leaf bfr-prefix {
    type inet:ip-prefix;
    description "the bfr prefix.";
  }
  uses underlay-protocol-type;
  leaf mt-id {
    type uint16;
    description "The type for multi-topology identifier";
  }
  leaf bfr-id {
    type uint16;
    description "The type for bfr identifier";
  }
  uses bsl;
  leaf igp-algorithm {
    type uint8;
    description "The type for igp algorithm";
  }
  leaf bier-algorithm {
    type uint8;
    description "The type for bier algorithm";
  }
}
leaf load-balance-num {
    type uint8;
    description
    "The multicast load balance num.";
}

uses encapsulation;
    description
    "list the parameters of the sub domain.";
}

augment "/rt:routing" {
    description
    "This augments routing-instance configuration with bier.";
    container bier{
        description
        "bier global configuration.";
        leaf encapsulation-type {
            type identityref {
                base bier-encapsulation;
            }
            description
            "Dataplane to be used.";
        }
        uses bsl;
        leaf bfr-id {
            type uint16;
            description
            "The type for bfr identifier";
        }
        leaf bfr-prefix {
            type inet:ip-prefix;
            description
            "the bfr prefix.";
        }
        uses sub-domain;
    }
}

augment "/rt:routing/rt:control-plane-protocols/" + "/rt:control-plane-protocol/ospf:ospf" {
    when "../rt:type = 'ospf:ospfv2' or ../rt:type = 'ospf:ospfv3'" {
        description
        "This augments the ospf routing protocol when used";
    }
    description
    "This augments the ospf routing protocol when used";
}
"This augments ospf protocol configuration with bier."
  container bier-ospf-cfg{
    uses bier-protocol-extensions;
    description "Control of bier advertisement and reception.";
  }
}

augment "/rt:routing/rt:control-plane-protocols/"
  "rt:control-plane-protocol/isis:isis"{
    when "/rt:routing/rt:control-plane-protocols/"
      "rt:control-plane-protocol/rt:type = 'isis:isis'" {
      description "This augment ISIS routing protocol when used";
      }
    }
    description "This augments ISIS protocol configuration with bier."
  container bier-isis-cfg{
    uses bier-protocol-extensions;
    description "Control of bier advertisement and reception.";
  }
}

/* Notifications */
notification bfr-id-collision{
  leaf bfr-id{
    type uint16;
    description "The type for bfr identifier";
  }
  description "BFR ID received in the controlplane that caused BFR ID collision.";
}

notification bfr-zero{
  leaf ipv4-bfr-prefix{
    type inet:ipv4-prefix;
    description "BIER ipv4 bfr prefix";
  }
  leaf ipv6-bfr-prefix{
    type inet:ipv6-prefix;
  }
}

7. Security Considerations

TBD.

8. Acknowledgements

We would like to thank IJsbrand Wijnands, Reshad Rahman, Giles Heron, Senthil Dhanaraj, and Jingrong Xie for their comments and support of this work.

9. IANA Considerations

This document requires no IANA Actions. Please remove this section before RFC publication.

10. Normative references

[I-D.ietf-isis-yang-isis-cfg]
[I-D.ietf-mpls-base-yang]

[I-D.ietf-mpls-static-yang]

[I-D.ietf-netmod-routing-cfg]

[I-D.ietf-ospf-yang]


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