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YANG Data Model for Configuration Interface of Control-Plane and User-Plane separation BNG
draft-hu-opsawg-cu-separation-yang-model-00.txt

Abstract

This document defines the YANG data model for operation management of Control-Plane and User-Plane separation BNG.

Status of This Memo

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

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1. Introduction

Cloud-based BNG with C/U separated conception is raised by [I-D.gu-nfvrg-cloud-bng-architecture]. The main idea of Control-Plane and User-Plane separation method is to extract and centralize the user management functions of multiple BNG devices, forming an unified and centralized control plane (CP), while the traditional router's Control Plane and forwarding plane are both preserved on BNG devices in the form of a user plane (UP).

The architecture of C/U separated BNG is shown as the following figure[I-D.huang-nvo3-vxlan-extension-for-vbras].

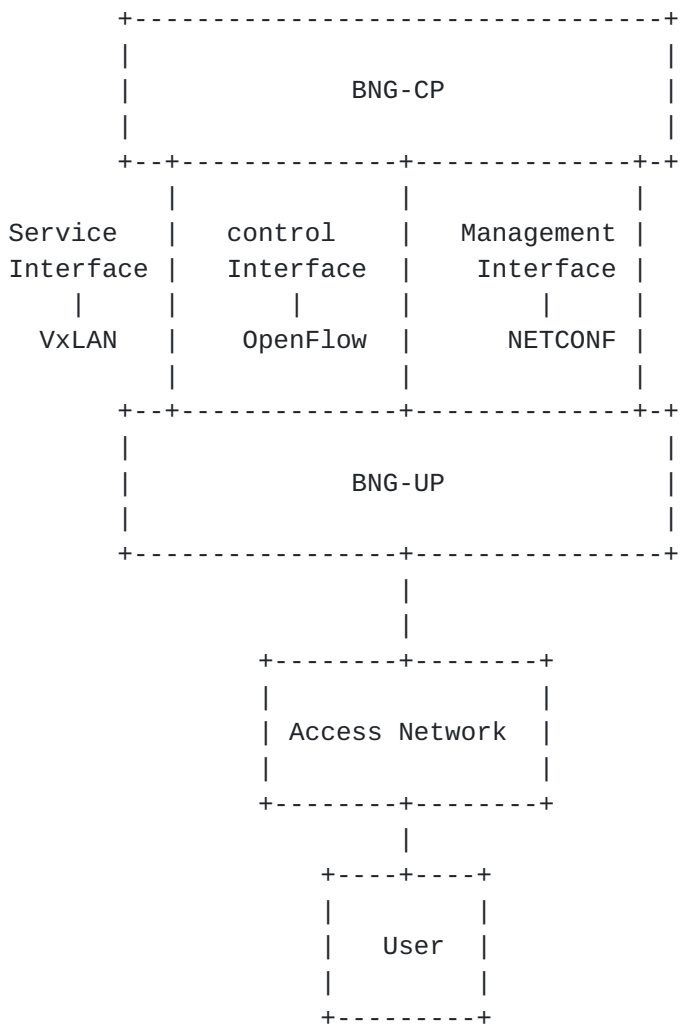

Figure 1: Architecture of C/U separated vBNG

There are three interfaces between BNG-CP and BNG-UP: Service interface , control interface and management interface. The service interface is used to carry PPPoE/IPoE dialup packets between user plane and control plane. The requirement and possible solution is defined in the [I-D.huang-nvo3-vxlan-extension-for-vbras]. Control interface is used for seting forwarding entries of user plane through OpenFlow or other protocols [I-D.wcg-i2rs-cu-separation-infor-model]. Management interface is used by CP to carry out basic configurations of user plane through NETCONF. The YANG data model about the configuration information is defined in this document.

Though BNG-CP and BNG-UP are connected with network management, most of the configuration information for BNG-UP are through the BNG-CP by netconf protocol[RFC6241], which simplifies the implementation of BNG-UP in the C/U separated BNG architecture.

Very few configuration parameters (such as IP address and port number for netconf protocol) for BNG-UP are configured through the network management directly.

2. Concept and Terminology

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].

2.1. Terminology

BNG: Broadband Network Gateway. A broadband remote access server routes traffic to and from broadband remote access devices such as digital subscriber line access multiplexers (DSLAM) on an Internet service provider's (ISP) network.

CP: Control Plane. The CP is a user control management component which support to manage UP's resources such as the user entry and forwarding policy.

UP: User Plane. UP is a network edge and user policy implementation component.

3. Information model

3.1. overview

The vBNG UP or CP part can be a physical or logical network element. We augment [I-D.ietf-rtgwg-lne-model] to define the information model for vBNG CP and UP.

```
module: ietf-vbng
  augment /lne:logical-network-elements/lne:logical-network-element:
    +--rw ietf-vbng
       +--rw vbng-name?         string
           +--rw enable ?            boolean
```

3.2. vBNG interface configuration

The vBNG interface configuration is to cofigure the basic interface informations of vBNG UP element, such as interface name, the VLAN parameters for the sub-interface.

The tree structure for vBNG interface configuration is as following:

```
+--rw interfaces
|  +--rw interface* [name]
|     +--rw name      if:interface-ref
|     +--rw ethernet
|     |  +--rw lacp?   boolean
|     +--rw mac-offset?   uint32
|     +--rw vlans
|        +--rw tag* [index]
|           +--rw index    uint8
|           +--rw tag
|              +--rw tag-type?   string
|              +--rw vlan-id?    vlan-id
```

3.3. Control channel configuration

The control channel configuration is to configure the OpenFlow channel parameters and the VXLAN tunnel parameters.

The OpenFlow channel parameters include: ofls-name, dpid, of-port. The tree structure for OpenFlow channel configuration parameters are as following:

```
+--rw openflow-channel
|  +--rw ofls-name?   string
|  +--rw dpid?        uint32
|  +--rw of-port?     uint32
```

The static VXLAN tunnelis is suggested to be used for vBNG CP and UP. The VXLAN tunnel parameters include: tunnel-source-ip,tunnel-destination-ip, vxlan-id, vxlan-tunnel-id, vxlan-tunnel-name,etc.

```
+--rw vxlan-channel* [vxlan-tunnel-id]
   +--rw vxlan-tunnel-id      uint32
   +--rw vxlan-tunnel-name?   string
   +--rw address-family* [af]
      +--rw af                       address-family-type
      +--rw tunnel-source-ip?        address-family-type
      +--rw tunnel-destination-ip?   address-family-type
      +--rw bind-vxlan-id* [vxlan-id]
         +--rw vxlan-id    vxlan-id
```

3.4. Acl Configuration

The acl information for BNG-UP is configured through netconf from BNG-CP. The ACL information includes ipv4-acl,ipv6-acl,link-acl,etc. The YANG data model for ACL can refer to [I-D.ietf-netmod-acl-model]

3.5. QoS Configuration

The QoS information for BNG-UP is also configured through netconf from BNG-CP. The vBNG support QoS information includes IP-DSCP, MPLS,VPLS, VPWS etc. The YANG data model for QoS refer to [I-D.asechoud-rtgwg-qos-model]

4. vBNG YANG Data Model

```
<CODE BEGINS> file "ietf-vbng@2017-06-29.yang"
 module ietf-vbng{
 namespace "urn:ietf:params:xml:ns:yang:ietf-vbng";
 prefix "vbng";


 import ietf-interfaces {
   prefix if;
  }

 import ietf-logical-network-element {
       prefix lne;
     }

/*
 import ietf-yang-types {
    prefix yang;
  }
*/

 organization
   "IETF NETCONF Working Group";

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

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

     ";

 description
    "The YANG module defines a generic configuration
     model for vbng";

 revision 2017-06-29 {
   description "Initial revision";
```

```
      reference
         "draft-hu-opsawg-cu-separation-yang-model-00";
    }



   /* Typedefs  */

       typedef vlan-id {
      type uint16 {
           range "0..4094";
          }
      description
        "Typedef for VLAN ID.";
    }

       typedef vxlan-id {
      type uint32;
      description
        "Typedef for VxLAN ID.";
    }

       typedef address-family-type {
     type enumeration {
       enum ipv4 {
         description
           "IPv4";
       }
       enum ipv6 {
         description
           "IPv6";
       }
     }
     description
       "Typedef for address family type.";
   }

    /* Configuration Data */

    augment /lne:logical-network-elements/lne:logical-network-element {
     container ietf-vbng{
        leaf vbng-name  {
                  type string;
                  description "configure vbng name";
                 }

                leaf enable  {
                  type boolean;
```

```
                  description "'true' to support vbng control plane and user
plane separation";
                 }

        container interfaces {
                  list interface {
                    key name;
                        leaf name {
                           type if:interface-ref;
                           description "interface name";
                          }
                        container ethernet {
              leaf lacp {
               type boolean;
               description "enable lacp function";
               }
                            description "configure ethernet interface";
                           }
            leaf mac-offset {
               type uint32;
               description "configure mac offset";
              }

                        container vlans {
                 list tag {
                                key index;
                                    max-elements 2;
                     leaf index {
                        type uint8 {
                                         range "0..1";
                                             }

                                      must ". = 0 or
                        count(../../tag[index = 0]/index) > 0" {
                        error-message "An inner tag can only be specified if an
                                 outer tag has also been specified";
                      description "Ensure that an inner tag cannot be
                                specified without an outer tag'";
                      }

                     description "The index into the tag stack, outermost tag
                            assigned index 0";
                    }

                                    container tag{
                                      leaf tag-type {
                                         type string;
                                             description "tag type";
```

```
}
```

```
                                        leaf vlan-id {
                                          type vlan-id;
                                          description "vlan id value";
                                         }

                    description "tag";
                 }
                description "tag list";
              }
            description "vlans";
                    }
                 description "interfaces list";
          }
         description "interface container";
        }

          container openflow-channel {
            leaf ofls-name {
              type string;
                  description "openflow logical name";
                  }
            leaf dpid {
              type uint32;
                  description "dpid value";
                  }
            leaf of-port {
        type uint32;
        description "openflow channel udp port number";
       }
              description "configure openflow channel value";
             }

        list vxlan-channel{
            key vxlan-tunnel-id;
            leaf vxlan-tunnel-id {
               type uint32;
               description
                     "Static VxLAN tunnel ID.";
            }

            leaf vxlan-tunnel-name {
               type string;
               description
               "Name of the static VxLAN tunnel.";
            }

            list address-family {
               key "af";
```

```
              leaf af {
                type address-family-type;
                description
                "Address family type value.";
              }

              leaf tunnel-source-ip {
                type address-family-type;
                description
                "Source IP address for the static VxLAN tunnel";
              }

              leaf tunnel-destination-ip {
                 type address-family-type;
                 description
                  "Destination IP address for the static VxLAN tunnel";
              }

              list bind-vxlan-id {
                 key vxlan-id;
                 leaf vxlan-id {
                   type vxlan-id;
                   description
                      "VxLAN ID.";
                 }
                 description
                    "VxLAN ID list for the VTEP.";
              }

               description
                  "Per-af params.";
            }
           description
             "Configure the VxLAN channel";
       }


         description "ietf-vbng configuration!";
    }
   description "augment lne model";
 }
}
 <CODE ENDS>
```

5. Security Considerations

6. Acknowledgements

7. IANA Considerations

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

8. References

8.1. Normative References

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8.2. Informative References

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