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A YANG Data Model for Interface Reference Topology

Abstract

This document defines a YANG data model to provide a reference from a termination point in a topology model to interface management information.

Discussion Venues

This note is to be removed before publishing as an RFC.

Source for this draft and an issue tracker can be found at <https://github.com/ietf-ccamp-wg/draft-ietf-ccamp-mw-topo-yang>.

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1. Introduction

This document defines a YANG data model to provide a reference from a termination point in a topology model to interface management information. It introduces a way to reference the information in a YANG data model for interface management [[RFC8343](#)] that could be useful for all types of termination points. The model augments "YANG Data Model for Traffic Engineering (TE) Topologies" defined in [[RFC8795](#)], which is based on "A YANG Data Model for Network Topologies" defined in [[RFC8345](#)].

The interface reference model is expected to be used between a Provisioning Network Controller (PNC) and a Multi Domain Service Coordinator(MDSC) [[RFC8453](#)]. Different use cases require access to different attributes and in order not to restrict what use cases can be supported, all attributes supported by the interface management model is with this model made accessible from the topology model.

1.1. Terminology and Definitions

The following acronyms are used in this document:

PNC Provisioning Network Controller

MDSC Multi Domain Service Coordinator

1.2. Tree Structure

A simplified graphical representation of the data model is used in chapter 3.1 of this document. The meaning of the symbols in these diagrams is defined in [[RFC8340](#)].

2. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [[RFC2119](#)] [[RFC8174](#)] when, and only when, they appear in all capitals, as shown here.

3. Termination Point to Interface Reference YANG Data Model

3.1. YANG Tree

```
module: ietf-tp-interface-reference-topology

augment /nw:networks/nw:network/nw:node/nt:termination-point/tet:te:
  +-rw tp-to-interface-path?    -> /if:interfaces/interface/name
```

3.2. Termination Point to Interface Reference YANG Data Module

```

<CODE BEGINS> file "ietf-tp-interface-reference-topology.yang"

module ietf-tp-interface-reference-topology {
    yang-version "1.1";
    namespace
    "urn:ietf:params:xml:ns:yang:ietf-tp-interface-reference-topology";
    prefix "ifref";

    import ietf-network {
        prefix "nw";
        reference "RFC 8345: A YANG Data Model for Network Topologies";
    }

    import ietf-network-topology {
        prefix "nt";
        reference "RFC 8345: A YANG Data Model for Network Topologies";
    }

    import ietf-te-topology {
        prefix "tet";
        reference "RFC 8795: YANG Data Model for Traffic Engineering
                    (TE) Topologies";
    }

    import ietf-interfaces {
        prefix if;
        reference
        "RFC 8343";
    }

organization
    "Internet Engineering Task Force (IETF) CCAMP WG";
contact
    "WG List: <mailto:ccamp@ietf.org>

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                <mailto:jonas.ahlberg@ericsson.com>
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                <mailto:daniela.spreafico@nokia.com>
    ";

```

```

description
"This is a module for defining a reference from a termination
point in a te topology to a list element in interfaces
as defined in RFC 8343.

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(https://trustee.ietf.org/license-info).

This version of this YANG module is part of RFC XXXX
(https://tools.ietf.org/html/rfcXXXX); see the RFC itself for
full legal notices.";

revision 2023-02-15 {
    description
    "First rough draft.";
    reference "";
}

/*
 * Groupings
 */
grouping tp-to-interface-ref {

    description
    "Grouping used for reference between a termination point and
     an interface.";
    leaf tp-to-interface-path {
        type leafref {
            path '/if:interfaces/if:interface/if:name';
        }
        description
        "Leafref expression referencing a list element, identified
         by its name, in interfaces as defined in RFC 8343.";
    }
}

/*
 * Data nodes
*/
augment "/nw:networks/nw:network/nw:node/nt:termination-point/"

```

```
    + "tet:te" {
description
    "Augmentation to add possibility to reference an element
     in the list of interfaces as defined by RFC 8343.";
uses tp-to-interface-ref;
}
}
```

<CODE ENDS>

4. Security Considerations

The YANG modules specified in this document define schemas for data that is designed to be accessed via network management protocols such as NETCONF [[RFC6241](#)] or RESTCONF [[RFC8040](#)]. The lowest NETCONF layer is the secure transport layer, and the mandatory-to-implement secure transport is Secure Shell (SSH) [[RFC6242](#)]. The lowest RESTCONF layer is HTTPS, and the mandatory-to-implement secure transport is TLS [[RFC8446](#)].

The NETCONF access control model [[RFC8341](#)] provides the means to restrict access for particular NETCONF or RESTCONF users to a preconfigured subset of all available NETCONF or RESTCONF protocol operations and content.

The YANG module specified in this document imports and augments the ietf-network and ietf-network-topology models defined in [[RFC8345](#)]. The security considerations from [[RFC8345](#)] are applicable to the module in this document.

There is a data node defined in this YANG module that is writable/creatable/deletable (i.e., config true, which is the default). This data node may be considered sensitive or vulnerable in some network environments. Write operations (e.g., edit-config) to this data node without proper protection can have a negative effect on network operations. This is the subtrees and data node and its sensitivity/vulnerability:

*tp-to-interface-path: A malicious client could set an arbitrary path that could allow a client to retrieve incorrect information. Troubleshooting would be difficult because the bad path would not be detectable until the client tries to use the leaf to identify to radio link terminal.

5. IANA Considerations

IANA is asked to assign a new URI from the "IETF XML Registry" [[RFC3688](#)] as follows:

URI: urn:ietf:params:xml:ns:yang:ietf-tp-interface-reference-topology
Registrant Contact: The IESG
XML: N/A; the requested URI is an XML namespace.

It is proposed that IANA should record YANG module names in the "YANG Module Names" registry [[RFC6020](#)] as follows:

Name: ietf-tp-interface-reference-topology
Maintained by IANA?: N
Namespace:
urn:ietf:params:xml:ns:yang:ietf-interface-reference-topology
Prefix: ifref
Reference: RFC XXXX

6. References

6.1. Normative References

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[RFC8795] Liu, X., Bryskin, I., Beiram, V., Saad, T., Shah, H., and O. Gonzalez de Dios, "YANG Data Model for Traffic Engineering (TE) Topologies", RFC 8795, DOI 10.17487/RFC8795, August 2020, <<https://www.rfc-editor.org/rfc/rfc8795>>.

6.2. Informative References

[RFC8340] Bjorklund, M. and L. Berger, Ed., "YANG Tree Diagrams", BCP 215, RFC 8340, DOI 10.17487/RFC8340, March 2018, <<https://www.rfc-editor.org/rfc/rfc8340>>.

[RFC8453] Ceccarelli, D., Ed. and Y. Lee, Ed., "Framework for Abstraction and Control of TE Networks (ACTN)", RFC 8453, DOI 10.17487/RFC8453, August 2018, <<https://www.rfc-editor.org/rfc/rfc8453>>.

Appendix A. Examples of the Interface Reference Topology Model

This appendix provides some examples and illustrations of how the Interface Reference Topology Model can be used. There is one extended tree to illustrate the Model and a JSON based instantiation of the Interface Reference Model for a small network example.

A.1. A tree for a complete Interface Reference Topology Model

The tree below shows the leafs for extending a Network Topology Model defined in [RFC8345], Traffic Engineering (TE) Topologies model defined in [RFC8795] with a possibility to reference interface management information.

```
module: ietf-network
  +-rw networks
    +-rw network* [network-id]
      +-rw network-id                  network-id
    +-rw node* [node-id]
      +-rw node-id                    node-id
      +-rw nt:termination-point* [tp-id]
        +-rw nt:tp-id                 tp-id
      +-rw tet:te!
        +-rw ifref:tp-to-interface-path?\
          -> /if:interfaces/interface/name
```

A.2. A JSON example

```
{
  "ietf-interfaces:interfaces": {
    "interface": [
      {
        "name": "L2Interface1",
        "description": "'Ethernet Interface 1'",
        "type": "iana-if-type:ethernetCsmacd"
      },
      {
        "name": "L2Interface2",
        "description": "'Ethernet Interface 2'",
        "type": "iana-if-type:ethernetCsmacd"
      }
    ]
  },
  "ietf-network:networks": {
    "network": [
      {
        "network-id": "L2-network",
        "network-types": {
          "ietf-te-topology:te-topology": {
            "ietf-eth-te-topology:eth-tran-topology": {}
          }
        },
        "node": [
          {
            "node-id": "L2-N1",
            "ietf-network-topology:termination-point": [
              {
                "tp-id": "L2-N1-TP1",
                "ietf-te-topology:te-tp-id": "10.10.10.1",
                "ietf-te-topology:te": {
                  "ietf-tp-interface-reference-topology:tp-to-interface-path": {
                    "L2Interface1"
                  }
                }
              }
            ]
          },
          {
            "node-id": "L2-N2",
            "ietf-network-topology:termination-point": [
              {
                "tp-id": "L2-N2-TP2",
                "ietf-te-topology:te-tp-id": "10.10.10.2",
                "ietf-te-topology:te": {
                  "ietf-tp-interface-reference-topology:tp-to-interface-path": {
                    "L2Interface2"
                  }
                }
              }
            ]
          }
        ]
      }
    ]
  }
}
```

```
        ],
    },
],
"ietf-network-topology:link": [
    {
        "link-id": "L2-N1-N2",
        "source": {
            "source-node": "L2-N1",
            "source-tp": "L2-N1-TP1"
        },
        "destination": {
            "dest-node": "L2-N2",
            "dest-tp": "L2-N2-TP2"
        }
    }
]
}
```

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The authors would like to thank ...

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