A YANG Data Model for Layer 0 Types

draft-ietf-ccamp-layer0-types-00

Abstract

This document defines a collection of common data types and groupings in YANG data modeling language. These derived common types and groupings are intended to be imported by modules that model Layer 0 Traffic Engineering (TE) configuration and state capabilities such as Wavelength Switched Optical Networks (WSONs) and Spectrum Switched optical Networks (SSONs).

Status of this Memo

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1. Introduction

YANG [RFC6020] and [RFC7950] is a data modeling language used to model configuration data, state data, Remote Procedure Calls, and notifications for network management protocols such as NETCONF [RFC6241]. The YANG language supports a small set of built-in data types and provides mechanisms to derive other types from the built-in types.

This document introduces a collection of common data types derived from the built-in YANG data types. The derived types and groupings are designed to be the common types applicable for modeling Traffic Engineering (TE) features for Layer 0 optical networks in model(s) defined outside of this document. Examples of Layer 0 optical
networks are Wavelength Switched Optical Networks (WSONs) [RFC6163] and Spectrum Switched optical Networks (SSONs) [RFC7698].

[G.698.2] defines amplified multichannel Dense Wavelength Division Multiplexing (DWDM) applications with single channel optical interfaces. The YANG data model defined in this document refers to the standard application mode defined in [G.698.2].

1.1. 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.

1.2. Terminology

Refer to [RFC7446] and [RFC7581] for the key terms used in this document.

The terminology for describing YANG data models is found in [RFC7950].

1.3. Prefixes in Data Node Names

In this document, names of data nodes and other data model objects are prefixed using the standard prefix associated with the corresponding YANG imported modules, as shown in Table 1.

<table>
<thead>
<tr>
<th>Prefix</th>
<th>YANG module</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>layer0-type</td>
<td>ietf-layer0-types</td>
<td>[RFCXXXX]</td>
</tr>
</tbody>
</table>

Table 1: Prefixes and corresponding YANG modules

Note: The RFC Editor will replace XXXX with the number assigned to the RFC once this draft becomes an RFC.

YANG module "ietf-layer0-types" (defined in Section 3) references [RFC6163], [RFC7205], and [RFC7698].
3. Overview

This document defines one YANG module for common Layer 0 TE types: ietf-layer0-types for WSON and SSON specific types.

3.1. TE Types Module Contents

The ietf-layer0-types module contains common Layer 0 TE types that are to be imported by layer 0 specific technology such as WSON and SSON.

The ietf-layer0-types module contains the following YANG reusable types and groupings:

Operational-mode:

A type that represents operational-model type as defined in [G.698.2].

Vendor-identifier:

A type that represents vendor identifier as defined in [RFC7581].

layer0-node-type:

A base YANG identity for supported node type as defined in [RFC6163].

wavelength-assignment:

A base YANG identity for allocated wavelength assignment type as defined in [RFC6163].

layer0-grid-type:

A base YANG identity for the node type as defined in [RFC6163] & [RFC7698].

term-type:

A base YANG identity for the supported termination type as defined in [G.709].
layer0-bandwidth-type:
A base YANG identity for the layer0 bandwidth type as defined in [G.709].

dwdm-ch-spc-type:
A base YANG identity for the DWDM channel spacing type as defined in [RFC6205].

cwdm-ch-spc-type:
A base YANG identity for the CWDM channel spacing type as defined in [RFC6205].

FEC-type:
A base YANG identity for the FEC type as defined in [G.709].

wson-path-bandwidth:
A YANG grouping that defines the WSON path bandwidth attributes as defined in [RFC6163].

wson-link-bandwidth:
A YANG grouping that defines WSON link bandwidth attributes as defined in [RFC6163].

wson-link-label:
A YANG grouping that defines the label for WSON links as defined in [RFC6205].

wson-path-label:
A YANG grouping that defines the label for WSON paths as defined in [RFC6205].

layer0-label-restriction:
A YANG grouping that defines the layer 0 label restriction applicable for both WSON and SSON and per priority level as
defined in [RFC3209].

wson-label-step:
A YANG grouping that defines label steps for WSON as defined in [TE-topo].

flex-grid-node-attributes:
A YANG grouping that defines Flex-grid node attributes as defined in [RFC7698].

flex-grid-path-bandwidth:
A YANG grouping that defines flex-grid path bandwidth attributes as defined in [RFC7698].

flex-grid-link-bandwidth:
A YANG grouping that defines flex-grid link bandwidth attributes as defined in [RFC7698].

flex-grid-link-label:
A YANG grouping that defines flex-grid link label attributes as defined in [RFC7698].

flex-grid-channel:
A YANG grouping that defines flex-grid channel as defined in [RFC7698].

flex-grid-path-label:
A YANG grouping that defines flex-grid path label for both single channel and multiple carriers [RFC7698].

flex-grid-label-restriction:
A YANG grouping that defines flex-grid label restrictions and per priority level as defined in [RFC3209].

flex-grid-label-step:
A YANG grouping that defines flex-grid label steps as defined in [TE-topo].
2. IETF-Layer0-Types YANG Module

module ietf-layer0-types {
  namespace "urn:ietf:params:xml:ns:yang:ietf-layer0-types";
  prefix "layer0-types";

  organization
    "IETF CCAMP Working Group";
  contact
    "WG Web: <http://tools.ietf.org/wg/ccamp/>
    WG List: <mailto:ccamp@ietf.org>
    Editor: Aihua Guo
    <mailto:aihuaguo@huawei.com>
    Editor: Young Lee
    <mailto:leeyoung@huawei.com>
    Editor: Italo Busi
    <mailto:Italo.Busi@huawei.com>";

  description
    "This module defines Optical Layer 0 types. This module
    provides groupings that can be applicable to Layer 0
    Fixed Optical Networks (e.g., CWDM (Coarse Wavelength
    Division Multiplexing) and DWDM (Dense Wavelength Division
    Multiplexing)) and Flexi-grid Optical Networks.

  Copyright (c) 2018 IETF Trust and the persons identified
  as authors of the code. All rights reserved.

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  or without modification, is permitted pursuant to, and
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  BSD License set forth in Section 4.c of the IETF Trust’s
  Legal Provisions Relating to IETF Documents
  (http://trustee.ietf.org/license-info).

  revision "2019-05-09" {
    description
      "Initial Version";
    reference
  }
typedef operational-mode {
    type string;
    description "Vendor-specific mode that guarantees interoperability.";
    reference "ITU-T G.698.2 (11/2018)";
}

typedef standard-mode {
    type string;
    description "ITU-T G.698.2 standard mode that guarantees interoperability. It must be an string with the following format: B-DSnW-ysz(v) where all these attributes are conformant to the ITU-T recomendation";
    reference "ITU-T G.698.2 (11/2018)";
}

typedef vendor-identifier {
    type string;
    description "vendor identifier that uses vendor-specific mode";
    reference "RFC7581: Routing and Wavelength Assignment Information Encoding for Wavelength Switched Optical Networks";
}

typedef frequency-thz {
    type decimal64 {
        fraction-digits 5;
    }
    units THz;
    description "The DWDM frequency in THz, e.g., 193.12500";
    reference "RFC6205: Generalized Labels for Lambda-Switch-Capable (LSC) Label Switching Routers";
}

typedef frequency-ghz {
    type decimal64 {
        fraction-digits 5;
    }
}
units GHz;
description
"The DWDM frequency in GHz, e.g., 193125.00";
reference
"RFC6205: Generalized Labels for Lambda-Switch-Capable (LSC) Label Switching Routers";
}

identity layer0-node-type {
  description
  "layer0 node type.";
  reference
  "RFC6163: Framework for GMPLS and Path Computation Element (PCE) Control of Wavelength Switched Optical Networks (WSONs)";
}

identity flex-grid-node {
  base layer0-node-type;
  description
  "Flex Grid node";
}

identity wson-node-foadm {
  base layer0-node-type;
  description
  "Fixed OADM (Optical Add-Drop Multiplexer) node";
}

identity wson-node-roadm {
  base layer0-node-type;
  description
  "ROADM (Reconfigurable Optical Add-Drop Multiplexer) or OXC (Optical Cross Connect) node";
}

identity wson-node-ila {
  base layer0-node-type;
  description
  "ILA (In-Line Amplifier) node";
}

identity wavelength-assignment {
  description
}
"Wavelength selection base";
reference
"RFC6163: Framework for GMPLS and Path Computation Element (PCE) Control of Wavelength Switched Optical Networks (WSONs)";
}

identity unspecified-wavelength-assignment {
  base wavelength-assignment;
  description
    "No method specified";
}

identity first-fit-wavelength-assignment {
  base wavelength-assignment;
  description
    "All the available wavelengths are numbered, and this WA (Wavelength Assignment) method chooses the available wavelength with the lowest index";
}

identity random-wavelength-assignment {
  base wavelength-assignment;
  description
    "This WA method chooses an available wavelength randomly";
}

identity least-loaded-wavelength-assignment {
  base wavelength-assignment;
  description
    "This WA method selects the wavelength that has the largest residual capacity on the most loaded link along the route (in multi-fiber networks)";
}

identity layer0-grid-type {
  description
    "Layer0 grid type.";
  reference
    "RFC7698: Framework and Requirements for GMPLS-Based Control of Flexi-Grid Dense Wavelength Division Multiplexing (DWDM) Networks & RFC6163: Framework for GMPLS and Path Computation Element (PCE) Control of Wavelength Switched Optical Networks";
(WSONs)";
}

identity flex-grid-dwdm {
  base layer0-grid-type;
  description
    "Flex grid";
}

identity wson-grid-dwdm {
  base layer0-grid-type;
  description
    "DWDM grid";
}

identity wson-grid-cwdm {
  base layer0-grid-type;
  description
    "CWDM grid";
}

identity term-type {
  description
    "Termination type.";
}

identity term-phys {
  base term-type;
  description
    "Physical Layer Termination";
  reference
    "G.709: Interfaces for the Optical Transport Network (OTN)";
}

identity term-otu {
  base term-type;
  description
    "OTU (Optical Transport Unit) Termination";
}

identity term-odu {
  base term-type;
  description
    "ODU (Optical Data Unit) Termination";
}
identity term-opu {
    base term-type;
    description
        "OPU (Optical Payload Unit) Termination";
}

identity term-section {
    base term-type;
    description
        "Section Layer Termination";
}

identity layer0-bandwidth-type {
    description
        "Bandwidth type carried by a single wavelength channel";
    reference
        "G.709: Interfaces for the Optical Transport Network (OTN)";
}

identity bw-otu1 {
    base layer0-bandwidth-type;
    description
        "OTU1 (2.66G)";
}

identity bw-otule {
    base layer0-bandwidth-type;
    description
        "OTU1e (11.04G)";
}

identity bw-otulf {
    base layer0-bandwidth-type;
    description
        "OTU1f (11.27G)";
}

identity bw-otu2 {
    base layer0-bandwidth-type;
    description
        "OTU2 (10.70G)";
}

identity bw-otu2e {
base layer0-bandwidth-type;
description
  "OTU2e (11.09G)";
}

identity bw-otu2f {
  base layer0-bandwidth-type;
  description
  "OTU2f (11.31G)";
}

identity bw-otu3 {
  base layer0-bandwidth-type;
  description
  "OTU3 (43.01G)";
}

identity bw-otu3e1 {
  base layer0-bandwidth-type;
  description
  "OTU3e1 (44.57G)";
}

identity bw-otu3e2 {
  base layer0-bandwidth-type;
  description
  "OTU3e2 (44.58G)";
}

identity bw-otu4 {
  base layer0-bandwidth-type;
  description
  "OTU4 (111.80G)";
}

identity bw-otucn {
  base layer0-bandwidth-type;
  description
  "OTUCn (beyond 100G)";
}

identity dwdm-ch-spc-type {
  description
  "DWDM channel spacing type";
  reference

identity dwdm-100ghz {
  base dwdm-ch-spc-type;
  description "100GHz channel spacing";
}

identity dwdm-50ghz {
  base dwdm-ch-spc-type;
  description "50GHz channel spacing";
}

identity dwdm-25ghz {
  base dwdm-ch-spc-type;
  description "25GHz channel spacing";
}

identity dwdm-12p5ghz {
  base dwdm-ch-spc-type;
  description "12.5GHz channel spacing";
}

identity flex-ch-spc-type {
  description "Flex-grid channel spacing type";
  reference "RFC7581: Routing and Wavelength Assignment Information Encoding for Wavelength Switched Optical Networks";
}

identity flex-ch-spc-6p25ghz {
  base flex-ch-spc-type;
  description "6.25GHz channel spacing";
}

identity flex-slot-width-granularity {
  description "Flex-grid slot width granularity";
}
reference
"RFC7581: Routing and Wavelength Assignment Information
Encoding for Wavelength Switched Optical Networks";
}

identity flex-swg-12p5ghz {
  base flex-slot-width-granularity;
  description
    "12.5GHz slot width granularity";
}

identity cwdm-ch-spc-type {
  description
    "CWDM channel spacing type";
  reference
    "RFC6205: Generalized Labels for Lambda-Switch-Capable (LSC)
    Label Switching Routers";
}

identity cwdm-20nm {
  base cwdm-ch-spc-type;
  description
    "20nm channel spacing";
}

identity fec-type {
  description
    "FEC (Forward Error Correction) type";
  reference
    "G.709: Interfaces for the Optical Transport Network (OTN)";
}

identity g-fec {
  base fec-type;
  description
    "G-FEC (Generic-FEC)";
}

identity e-fec {
  base fec-type;
  description
    "E-FEC (Enhanced-FEC)";
}

identity no-fec {
  base fec-type;
  description
    "No-FEC";
}
"No FEC";
}

/* Groupings. */

grouping wson-path-bandwidth {
  description "WSON (Wavelength Switched Optical Network) path bandwidth attributes";
  reference
    "RFC6163";
  leaf bandwidth-type {
    type identityref {
      base layer0-bandwidth-type;
    }
    description "WSON bandwidth type";
  }
}


grouping wson-link-bandwidth {
  description "WSON link bandwidth attributes";
  reference
    "RFC6163";
  leaf-list supported-bandwidth-list {
    type identityref {
      base layer0-bandwidth-type;
    }
    description "WSON bandwidth type";
  }
}


grouping wson-link-label {
  description "Generic label for WSON links";
  reference
    "RFC6205";
  choice grid-type {
    description "Label for DWDM or CWDM grid";
    case dwdm {
      leaf dwdm-n {
        type int16;
        description "N is used to determine the Nominal Central Frequency. The set of nominal central frequencies can be built using the following expression:
        \[ f = 193.1 \text{ THz} + N \times 0.00625 \text{ THz}, \]"
    }
  }
}
where 193.1 THz is ITU-T ‘anchor frequency’ for transmission over the C band, \( N \) is a positive or negative integer including 0.

reference
"RFC6205: Generalized Labels for Lambda-Switch-Capable (LSC) Label Switching Routers"

```
case cwdm {
  leaf cwdm-n {
    type int16;
    description
    "\( N \) is a two’s-complement integer to take either a positive, negative, or zero value. This value is used to compute the channel wavelength as such in G.694.2:
    Wavelength (nm) = 1471 nm + \( N \) * 20 nm"
    reference
    "RFC6205: Generalized Labels for Lambda-Switch-Capable (LSC) Label Switching Routers"
  }
}
```

grouping wson-path-label {
  description
  "Generic label for WSON paths"
  reference
  "RFC6205"
  choice grid-type {
    description
    "Label for DWDM or CWDM grid"
    case dwdm {
      choice single-or-super-channel {
        description "single or super channel"
        case single {
          leaf dwdm-n {
            type int16;
            description
            "\( N \) is used to determine the Nominal Central Frequency. The set of nominal central frequencies can be built using the following expression
            \[ f = 193.1 \text{ THz} + \( N \) \times 0.00625 \text{ THz}, \]"
where 193.1 THz is ITU-T ’anchor frequency’
for transmission over the C band, N is a positive or
negative integer including 0.";

} } case super {
leaf-list subcarrier-dwdm-n {
  type int16;
  description
  "List of subcarrier channels for super channel.
  Each of the channels is represented by an
  integer, n, a two’s-complement integer to take
  either a positive, negative, or zero value.
  This value is used to compute the frequency as
  such in G.694.1:
  Frequency (THz) =
  193.1 THz + n * channel spacing (THz)"
} }

case cwdm {
  leaf cwdm-n {
    type int16;
    description
    "Represented by an integer, n, a two’s-complement
    integer to take either a positive, negative, or
    zero value. This value is used to compute the
    channel wavelength as such in G.694.2:
    Wavelength (nm) = 1471 nm + n * 20 nm"
    reference
    "RFC6205:Generalized Labels for Lambda-Switch-Capable
    (LSC) Label Switching Routers";

  } }
}

} }

grouping layer0-label-restriction {
  description
  "layer0 label restriction.";
  reference
  "RFC3209";

}
leaf grid-type {
    type identityref {
        base layer0-grid-type;
    }
    description "Grid type";
}
leaf priority {
    type uint8;
    description "priority";
}

grouping wson-label-step {
    description "Label step information for WSON";
    reference "draft-ietf-teas-yang-te-topo-20";
    choice layer0-grid-type {
        description "Grid type: DWDM, CWDM, etc.";
        case dwdm {
            leaf wson-dwdm {
                type identityref {
                    base dwdm-ch-spc-type;
                }
                description "Label-step is the channel-spacing (GHz), e.g., 100, 50, 25, or 12.5 GHz for DWDM";
                reference "RFC6205: Generalized Labels for Lambda-Switch-Capable (LSC) Label Switching Routers";
            }
        }
        case cwdm {
            leaf wson-cwdm {
                type identityref {
                    base cwdm-ch-spc-type;
                }
                description "label-step is the channel-spacing (nm), i.e., 20 nm for CWDM, which is the only value defined for CWDM";
                reference "RFC6205: Generalized Labels for Lambda-Switch-Capable (LSC) Label Switching Routers";
            }
        }
    }
}
grouping flex-grid-node-attributes {
  description "Flex-grid node attributes";
  reference "RFC7698";
  container flex-grid-node {  
    description "Flex-grid node attributes";
    leaf node-type {  
      type identityref {  
        base layer0-node-type;
      }  
      description "Flex-grid node type";
    }
  }
}

grouping flex-grid-path-bandwidth {  
  description "Flex-grid path bandwidth attributes";
  reference "RFC7698";
  leaf bandwidth-type {  
    type identityref {  
      base layer0-bandwidth-type;
    }  
    description "Flex-grid bandwidth type";
  }
}

grouping flex-grid-link-bandwidth {  
  description "flex-grid link bandwidth attributes";
  reference "RFC7698";
  leaf-list supported-bandwidth-list {  
    type identityref {  
      base layer0-bandwidth-type;
    }  
    description "Flex-grid bandwidth type";
  }
}

grouping flex-grid-link-label {  
}

description "Flex-grid link label.";
reference
 "RFC7698";
leaf flex-n {
  type uint16;
description
  "N is used to determine the Nominal Central Frequency.
  The set of nominal central frequencies can be
  built using the following expression
  \( f = 193.1 \text{ THz} + N \times 0.00625 \text{ THz}, \)
  where 193.1 THz is ITU-T 'anchor frequency'
  for transmission over the C band, N is a positive or
  negative integer including 0.";
reference
 "RFC7698: Framework and Requirements for GMPLS-Based
  Control of Flexi-Grid Dense Wavelength Division Multiplexing
  (DWDM) Networks";
}
}
grouping flex-grid-channel {
  description "Flex-grid channel grouping.";
  reference
   "RFC7698";
  uses flex-grid-link-label;
leaf flex-m {
  type uint16 {
    range "1..max";
  }
description
  "M is used to determine the slot width. A slot width is
  constrained to be M x SWG (that is, M x 12.5 GHz),
  where M is an integer greater than or equal to 1.";
reference
 "RFC7698: Framework and Requirements for GMPLS-Based
  Control of Flexi-Grid Dense Wavelength Division Multiplexing
  (DWDM) Networks";
}
}
grouping flex-grid-path-label {
  description "Flex-grid path label.";
  reference
   "RFC7698";
  choice single-or-super-channel {

description "single of super channel";
case single {
  uses flex-grid-channel;
}
case super {
  list subcarrier-flex-n {
    key flex-n;
    uses flex-grid-channel;
    description
      "List of subcarrier channels for flex-grid super channel."
  }
}
}
grouping flex-grid-label-restriction {
  description
    "Flex Grid-specific label restriction";
  reference
    "RFC7698 & RFC3209";
  uses layer0-label-restriction;
}
container flex-grid {
  description "flex-grid definition";
  leaf nominal-central-frequency-granularity {
    type identityref {
      base flex-ch-spc-type;
    }
    default flex-ch-spc-6p25ghz;
    description
      "It is the spacing between allowed nominal central frequencies. Default is 6.25 GHz";
    reference
      "RFC7698: Framework and Requirements for GMPLS-Based Control of Flexi-Grid Dense Wavelength Division Multiplexing (DWDM) Networks";
  }
  leaf slot-width-granularity {
    type identityref {
      base flex-slot-width-granularity;
    }
    default flex-swg-12p5ghz;
description
"Minimum space between slot widths. Default is
12.5 GHz";
reference
"RFC7698: Framework and Requirements for GMPLS-Based
Control of Flexi-Grid Dense Wavelength Division Multiplexing
(DWDM) Networks";
}

leaf min-slot-width-factor {
  type uint16 {
    range "1..max";
  }
default 1;
description
"Minimum slot width is calculated by:
Minimum slot width (GHz) =
min-slot-width-factor * slot-width-granularity";
reference
"RFC8363: GMPLS OSPF-TE Extensions in Support of Flexi-Grid
Dense Wavelength Division Multiplexing (DWDM) Networks";
}

leaf max-slot-width-factor {
  type uint16 {
    range "1..max";
  }
description
"Maximum slot width is calculated by:
Maximum slot width (GHz) =
max-slot-width-factor * slot-width-granularity";
reference
"RFC8363: GMPLS OSPF-TE Extensions in Support of Flexi-Grid
Dense Wavelength Division Multiplexing (DWDM) Networks";
}

grouping flex-grid-label-step {
description "Label step information for flex grid";
reference
"draft-ietf-teas-yang-te-topo-20";
}
leaf flex {
  type identityref {
    base flex-ch-spc-type;
  }
  default flex-ch-spc-6p25ghz;
  description
   "Label-step is the nominal central frequency
    granularity (GHz), e.g., 6.25 GHz";
  reference
   "RFC7698: Framework and Requirements for GMPLS-Based
    Control of Flexi-Grid Dense Wavelength Division Multiplexing
    (DWDM) Networks";
}
}

3. Security Considerations

The YANG module specified in this document defines a schema 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 [RFC6536] provides the means to restrict access for particular NETCONF users to a preconfigured subset of all available NETCONF protocol operations and content. The NETCONF Protocol over Secure Shell (SSH) [RFC6242] describes a method for invoking and running NETCONF within a Secure Shell (SSH) session as an SSH subsystem. The Network Configuration Access Control Model (NACM) [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 in this document defines optical layer0 type definitions (i.e., typedef, identity and grouping statements) in YANG data modeling language to be imported and used by other layer 0 specific modules. When imported and used, the resultant schema will have data nodes that can be writable, or readable. The access to such data nodes may be considered sensitive or vulnerable in some
network environments. Write operations (e.g., edit-config) to these data nodes without proper protection can have a negative effect on network operations.

The security considerations spelled out in the YANG 1.1 specification [RFC7950] apply for this document as well.

4. IANA Considerations

This document registers the following namespace URIs in the IETF XML registry [RFC3688]. Following the format in [RFC3688], registration is requested to be made as follows:

```
 Registrant Contact: The IESG.
 XML: N/A, the requested URI is an XML namespace.
```

This document registers the following YANG module in the YANG Module Names registry [RFC7950] & [RFC6020]:

```
name:         ietf-layer0-types
prefix:       layer0-types
reference:    RFC XXXX (TDB)
```

5. References

5.1. Normative References


5.2. Informative References


6. Contributors

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