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A YANG Data Model for Layer 0 Types - Revision 2

Abstract

This document defines a collection of common data types and groupings in the YANG data modeling language, which are used in several YANG modules for wavelength Division multiplexing (WDM) transport networks. The YANG module ietf-layer0-types-ext updates ietf-layer0-types defined in [RFC9093], which has been reduced in scope prior to publication to only cover spectrum management related aspects required for the YANG module ietf-wson-topology defined in [RFC9094].

To be completed

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

YANG [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 as well as non-TE features (e.g., physical network configuration aspect) for Layer 0 optical networks in model(s) defined outside of this document.

1.1. Requirements Language

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 RFC 2119 [RFC2119].

1.2. Terminology

2. Extensions for the Layer 0 Types Module

This document defines YANG module extensions for common Layer 0 types. named ietf-layer0-types-ext. This module can be used for both WSON and Flexi-grid DWDM networks but in particular is adding common types used in the context of optical impairment aware topology model in WSON and SSONs. The ietf-layer0-types-ext module contains the following YANG identities, types and groupings that can be reused in other YANG modules:

transceiver-capabilities:

a YANG grouping to define the transceiver capabilities (also called "modes") needed to determine optical signal compatibility.

standard-mode:

a YANG grouping for ITU-T G.698.2 standard mode that guarantees interoperability.

organizational-mode:

a YANG grouping to define transponder operational mode supported by organizations or vendors.

common-explicit-mode:

a YANG grouping to define the list of attributes related to optical impairments limits in case of transceiver explicit mode. This grouping should be the same used in [I-D.ietf-ccamp-dwdm-if-param-yang].

common-organizational-explicit-mode:

a YANG grouping to define the common capabilities attributes limit range in case of operational mode and explicit mode. Also this grouping should be used in [I-D.ietf-ccamp-dwdm-if-param-yang].

cd-pmd-penalty:

a YANG grouping to define the triplet used as entries in the list optional penalty associated with a given accumulated CD and PMD. This list of triplet cd, pmd, penalty can be used to sample the function penalty = f(CD, PMD).

[Editor's note: There is still stuff from the xml template that needs to be removed]

3. Layer0 Types Revision 2 YANG CODE

The YANG code is developed on GitHub and can also be found in the following CCAMP repository:

https://github.com/ietf-ccamp-wg/ietf-ccamp-layer0-types-ext

[Editor's note: YANG code below always has to be updated before submitting a new revision!]

```
<CODE BEGINS> file "ietf-layer0-types-ext@2021-10-18.yang"
module ietf-layer0-types-ext {
  namespace "urn:ietf:params:xml:ns:yang:ietf-layer0-types-ext";
  prefix "l0-types-ext";

  organization
    "IETF CCAMP Working Group";
  contact
    "WG Web: <http://tools.ietf.org/wg/ccamp/>
     WG List: <mailto:ccamp@ietf.org>

     Editor: Dieter Beller
       <mailto:Dieter.Beller@nokia.com>

     Editor: Sergio Belotti
       <mailto:Sergio.Belotti@nokia.com>

     Editor: Italo Busi
       <mailto:Italo.Busi@huawei.com>

     Editor: Haomian Zheng
       <mailto:zhenghaomian@huawei.com>";

     // Additional contacts TBA (contributors)

  description
    "Description to be added!!!

     Copyright (c) 2021 IETF Trust and the persons identified
     as authors of the code.  All rights reserved.

     Redistribution and use in source and binary forms, with
     or without modification, is permitted pursuant to, and
     subject to the license terms contained in, the Simplified
     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).

     This version of this YANG module is part of RFC XXXX; see
     the RFC itself for full legal notices.";

  revision "2021-10-18" {
    description
      "Initial Version";
    reference
      "RFC XXXX: A YANG Data Model for Layer 0 Types - Revision 2";
  }

/*
 * Identities
```

```
*/

 identity modulation {
   description "base identity for modulation type";
 }

 identity QPSK {
   base modulation;
   description
     "QPSK (Quadrature Phase Shift Keying) modulation";
 }

 identity DP-QPSK {
   base modulation;
   description
     "DP-QPSK (Dual Polarization Quadrature
      Phase Shift Keying) modulation";
 }

 identity QAM8 {
   base modulation;
   description
     "8QAM (8-State Quadrature Amplitude Modulation) modulation";
 }

 identity QAM16 {
   base modulation;
   description
     "QAM16 (Quadrature Amplitude Modulation)";
 }

 identity DP-QAM8 {
   base modulation;
   description
     "DP-QAM8 (Dual Polarization Quadrature Amplitude Modulation)";
 }

 identity DC-DP-QAM8 {
   base modulation;
   description
     "DC DP-QAM8 (Dual Carrier Dual Polarization Quadrature
      Amplitude Modulation)";
 }

 identity DP-QAM16 {
   base modulation;
   description
     "DP-QAM16 (Dual Polarization Quadrature Amplitude
      Modulation)";
 }
```

```
identity DC-DP-QAM16 {
  base modulation;
  description
    "DC DP-QAM16 (Dual Carrier Dual Polarization Quadrature
     Amplitude Modulation)";
}

identity fec-type {
  description
    "Base identity from which specific FEC
    (Forward Error Correction) type identities are derived.";
}

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";
}

identity reed-solomon {
  base fec-type;
  description
    "Reed-Solomon error correction";
}

identity hamming-code {
  base fec-type;
  description
    "Hamming Code error correction";
}

identity golay {
  base fec-type;
    description "Golay error correction";
}

identity line-coding {
  description
```

```
    "base line-coding class";
  reference
    "ITU-T G.698.2-201811 section 7";
}

identity line-coding-NRZ-2p5G {
  base line-coding;
  description
    "ITU-T G.698.2-201811 section 7 table 8-1";
}

identity line-coding-NRZ-OTU1 {
  base line-coding;
  description
    "ITU-T G.698.2-201811 section 7 table 8-2";
}

identity line-coding-NRZ-10G {
  base line-coding;
  description
    "ITU-T G.698.2-201811 section 7 table 8-3/8-5";
}

identity line-coding-NRZ-OTU2 {
  base line-coding;
  description
    "ITU-T G.698.2-201811 section 7 table 8-4/8-6";
}

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 term-type {
  description
    "Termination type";
  reference
    "ITU-T G.709: Interfaces for the Optical Transport Network";
}

identity term-phys {
  base term-type;
  description
    "Physical layer termination";
}

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 otu-type {
  description
```

```
    "Base identity from which specific OTU identities are derived";
  reference
    "ITU-T G.709: Interfaces for the Optical Transport Network";
}

identity OTU1 {
  base otu-type;
  description
    "OTU1 (2.66 Gb/s)";
}

identity OTU1e {
  base otu-type;
  description
    "OTU1e (11.04 Gb/s)";
}

identity OTU1f {
  base otu-type;
  description
    "OTU1f (11.27 Gb/s)";
}

identity OTU2 {
  base otu-type;
  description
    "OTU2 (10.70 Gb/s)";
}

identity OTU2e {
  base otu-type;
  description
    "OTU2e (11.09 Gb/s)";
}

identity OTU2f {
  base otu-type;
  description
    "OTU2f (11.31G)";
}

identity OTU3 {
  base otu-type;
  description
    "OTU3 (43.01 Gb/s)";
}

identity OTU3e1 {
  base otu-type;
  description
```

```
      "OTU3e1 (44.57 Gb/s)";
  }

  identity OTU3e2 {
    base otu-type;
    description
      "OTU3e2 (44.58 Gb/s)";
  }

  identity OTU4 {
    base otu-type;
    description
      "OTU4 (111.80 Gb/s)";
  }

  identity OTUCn {
    base otu-type;
    description
      "OTUCn (n x 105.25 Gb/s)";
  }

  identity type-power-mode {
    description
      "power equalization mode used within the
       OMS and its elements";
  }

  identity power-spectral-density {
    base type-power-mode;
    description
      "all elements must use power spectral density (W/Hz)";
  }

  identity carrier-power {
    base type-power-mode;
    description
      "all elements must use power (dBm)";
  }

/*
 * Typedefs
 */

  typedef operational-mode {
    type string;
    description
      "Organization/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-DScW-ytz(v) where all these attributes
     are conformant
     to the ITU-T recomendation";
  reference "ITU-T G.698.2 (11/2018)";
}

typedef organization-identifier {
  type string;
  description
    "vendor/organization identifier that uses a private mode
    out of already defined in G.698.2 ITU-T application-code";
  reference
    "RFC7581: Routing and Wavelength Assignment Information
     Encoding for Wavelength Switched Optical Networks";
}

typedef frequency-thz {
    type decimal64 {
      fraction-digits 6;
    }
    units THz;
    description
      "The DWDM frequency in THz, e.g., 193.112500";
    reference
      "RFC6205: Generalized Labels for
      Lambda-Switch-Capable (LSC) Label Switching Routers";
}
typedef frequency-ghz {
    type decimal64 {
      fraction-digits 3;
    }
    units GHz;
    description
      "The DWDM frequency in GHz, e.g., 193112.500";
    reference
      "RFC6205: Generalized Labels for
      Lambda-Switch-Capable (LSC) Label Switching Routers";
}

typedef dbm-t {
  type int32;
  units ".01dbm";
```

```
    description
      "Amplifiers and Transceivers Power in dBm.";
  }

  typedef snr {
    type decimal64 {
      fraction-digits 2;
    }
    units "dB@0.1nm";
    description
      "(Optical) Signal to Noise Ratio measured over 0.1 nm
      resolution bandwidth";
  }

  typedef fiber-type {
    type enumeration {
      enum G.652 {
      description "G.652 Standard Singlemode Fiber";
      }
      enum G.654 {
        description "G.654 Cutoff Shifted Fiber";
      }
      enum G.653 {
        description "G.653 Dispersion Shifted Fiber";
      }
      enum G.655 {
        description "G.655 Non-Zero Dispersion Shifted Fiber";
      }
      enum G.656 {
        description "G.656 Non-Zero Dispersion for Wideband
               Optical Transport";
      }
      enum G.657 {
        description "G.657 Bend-Insensitive Fiber";
      }
    }
    description
      "ITU-T based fiber-types";
  }

/*
 * Groupings
 */

 /* supported inverse multiplexing capabilities such as
    max. OTSiG:OTSi cardinality
    It is a transponder attribute not transceiver
  */
```

```
/*    leaf multiplexing-cap {
      type uint32;
    config false;
      description "supported inverse multiplexing capabilities
       such as max. OTSiG:OTSi cardinality";
    }
 */

 grouping transceiver-capabilities {
   description
     "This grouping is intended to be use for reporting the
      capabilities of a transceiver.";

   container supported-modes {
     description
       "Transceiver's supported modes.";
     list supported-mode {
       key "mode-id";
       config false;
       description "list of supported transceiver's modes.";
       leaf mode-id {
         type string {
           length "1..255";
         }
         description "ID for the supported transceiver's mode.";
       }
       choice mode {
         mandatory true;
         description
           "Indicates whether the transceiver's mode is a standard
            mode, an organizational mode or an explicit mode.";
         case G.698.2 {
           uses standard-mode;
         }
         case organizational-mode {
           container organizational-mode {
             description
               "The set of attributes for an organizational mode";
             uses organizational-mode;
             uses common-organizational-explicit-mode;
           }  // container organizational-mode
         }
         case explicit-mode {
           container explicit-mode {
              description
                "The set of attributes for an explicit mode";
             container supported-modes {
               description
                 "Container for all the standard and organizational
```

```
                modes supported by the transceiver's explicit
                mode.";
              leaf-list supported-application-codes {
                type leafref {
                  path "../../../mode-id";
                }
                must "../../../../"
                   + "supported-mode[mode-id=current()]/"
                   + "standard-mode" {
                  description
                    "The pointer is only for application codes
                     supported by transceiver.";
                }
                description
                  "List of pointers to the application codes
                   supported by the transceiver's explicit mode.";
              }
              leaf-list supported-organizational-modes {
                type leafref {
                  path "../../../mode-id";
                }
                must "../../../../"
                   + "supported-mode[mode-id=current()]/"
                   + "organizational-mode" {
                  description
                    "The pointer is only for organizational modes
                     supported by transceiver.";
                }
                description
                  "List of pointers to the organizational modes
                   supported by the transceiver's explicit mode.";
              }
            }  // container supported-modes
            uses common-explicit-mode;
            uses common-organizational-explicit-mode;
          }  // container explicit-mode
        } // end of case explicit-mode
      } // end of choice
    }  // list supported-modes
  }  // container supported-modes
}  // grouping transceiver-capabilities

grouping standard-mode {
  description
    "ITU-T G.698.2 standard mode that guarantees interoperability.
     It must be an string with the following format:
     B-DScW-ytz(v) where all these attributes are conformant
     to the ITU-T recomendation";
```

```
  leaf standard-mode {
    type standard-mode;
    config false;
    description
      "G.698.2 standard mode";
  }
}

grouping organizational-mode {
  description
    "Transponder operational mode supported by organizations or
     vendor";

  leaf operational-mode {
    type operational-mode;
    config false;
    description
      "configured organization- or vendor-specific
       application identifiers (AI) supported by the transponder";
  }
  leaf organization-identifier {
    type organization-identifier;
    config false;
    description
    "organization identifier that uses organizational
       mode";
  }
}

grouping cd-pmd-penalty {
  description "entries of table; triplet chromatic
  dispersion, polarization mode dispersion and
  associated penalty";

  leaf chromatic-dispersion {
    type decimal64 {
      fraction-digits 2;
      range "0..max";
    }
    units "ps/nm";
    config false;
    mandatory true;
    description "chromatic dispersion";
  }
  leaf polarization-mode-dispersion {
    type decimal64 {
      fraction-digits 2;
      range "0..max";
    }
```

```
      units "ps";
      config false;
      mandatory true;
      description "Polarization mode dispersion";
    }
    leaf penalty {
      type decimal64 {
        fraction-digits 2;
        range "0..max";
      }
      units "dB";
      config false;
      mandatory true;
      description "Associated penalty on the receiver";
    }
  }

  grouping pdl-penalty {
    description
      "entries of table; pair of values polarization dependent loss
      and associated penalty";

    leaf max-polarization-dependent-loss {
      type decimal64 {
        fraction-digits 2;
      }
      units "dB";
      config false;
      mandatory true;
      description
        "Maximum acceptable accumulate polarization dependent loss";
    }
    leaf penalty {
      type uint8;
      units "dB";
      config false;
      mandatory true;
      description "Associated penalty on the receiver";
    }
  }

/*
 * This grouping represent the list of attributes related to
 * optical impairment limits for explicit mode
 * (min OSNR, max PMD, max CD, max PDL, Q-factor limit, etc.)
 * In case of standard and operational mode the attributes are
 * implicit
 */
```

```
grouping common-explicit-mode {
  description "Attributes capabilities related to
  explicit mode of an optical transceiver";

  leaf line-coding-bitrate {
    type identityref {
      base line-coding;
    }
    config false;
    description "Bit rate/line coding of optical tributary signal";
    reference
      "ITU-T G.698.2 section 7.1.2";
  }
  leaf max-polarization-mode-dispersion {
    type decimal64 {
      fraction-digits 2;
      range "0..max";
    }
    units "ps";
    config false;
    description
      "Maximum acceptable accumulated polarization mode
       dispersion on the receiver";
  }
  leaf max-chromatic-dispersion {
    type decimal64 {
      fraction-digits 2;
      range "0..max";
    }
    units "ps/nm";
    config false;
    description
      "Maximum acceptable accumulated chromatic dispersion
       on the receiver";
  }
  list chromatic-and-polarization-dispersion-penalty {
    config false;
    description
      "Optional penalty associated with a given accumulated
       CD and PMD.
       This list of triplet cd, pmd, penalty can be used to
       sample the function penalty = f(CD, PMD).";
    uses cd-pmd-penalty ;
  }
  leaf max-diff-group-delay  {
         type int32;
         config false;
         description "Maximum Differential group delay of this mode
                      for this lane";
```

```
}
list max-polarization-dependent-loss-penalty {
  config false;
  description
    "Optional penalty associated with the maximum acceptable
    accumulated polarization dependent loss.
     This list of pair pdl and penalty can be used to
     sample the function pdl = f(penalty).";
  uses pdl-penalty ;
}
leaf available-modulation-type {
  type identityref {
  base modulation;
  }
  config false;
  description
    "Modulation type the specific transceiver in the list
     can support";
}
leaf  min-OSNR {
  type snr;
  config false;
  description "min OSNR measured over 0.1 nm
  resolution bandwidth:
  if received OSNR at minimum Rx-power is lower than MIN-OSNR,
  an increased level of bit-errors post-FEC needs
  to be expected.";
  // change resolution BW from 12.5 GHz to 0.1 nm
}
leaf  min-Q-factor {
  type int32;
  units "dB";
  config false;
  description "min Qfactor at FEC threshold";
}
leaf available-baud-rate {
  type uint32;
  units Bd;
  config false;
  description
    "Baud-rate the specific transceiver in
    the list can support.
     Baud-rate is the unit for
     symbol rate or modulation rate
     in symbols per second or
     pulses per second.
     It is the number of distinct symbol
     changes (signal events) made to the
     transmission medium
```

```
     per second in a digitally
     modulated signal or a line code";
}
leaf roll-off {
  type decimal64 {
    fraction-digits 4;
    range "0..1";
  }
  config false;
  description
    "the roll-off factor (beta with values from 0 to 1)
    identifies how the real signal shape exceed
    the baud rate. If=0 it is exactly matching
    the baud rate.If=1 the signal exceeds the
    50% of the baud rate at each side.";
}
leaf min-carrier-spacing {
  type frequency-ghz;
  config false;
  description
    "This attribute specifies the minimum nominal difference
    between the carrier frequencies of two homogeneous OTSis
    (which have the same optical characteristics but the central
    frequencies) such that if they are placed next to each other
    the interference due to spectrum overlap between them can be
    considered negligible.

    In case of heterogeneous OTSi it is up to path computation
    engine to determine the minimum distance between the carrier
    frequency of the two adjacent OTSi.";
}
leaf available-fec-type {
  type identityref {
    base fec-type;
  }
  config false;
  description "Available FEC";
}
leaf fec-code-rate {
  type decimal64 {
    fraction-digits 8;
    range "0..max";
  }
  config false;
  description "FEC-code-rate";
}
leaf fec-threshold {
  type decimal64 {
    fraction-digits 8;
```

```
        range "0..max";
      }
      config false;
      description
        "Threshold on the BER, for which FEC
         is able to correct errors";
    }
  } // grouping common-explicit-mode

  grouping common-organizational-explicit-mode {
    description "Common capability attributes limit range
    in case of operational mode and explicit mode.
    These attributes are supported separately in
    case of application codes";

/* transmitter tuning range (f_tx-min, f_tx-max) */

    leaf min-central-frequency {
      type frequency-thz;
      config false;
      description
        "This parameter indicates the minimum frequency for the
        transmitter tuning range.";
    }
    leaf max-central-frequency {
      type frequency-thz;
      config false;
      description
        "This parameter indicates the maximum frequency for the
        transmitter tuning range.";
    }

/* transmitter-tunability-grid */

    leaf central-frequency-step {
      type frequency-ghz;
      config false;
      description
        "This parameter indicates the transmitter tunability grid as
        the distance between two adjacent carrier frequencies of
        the transmitter tuning range.";
    }

/* supported transmitter power range [p_tx-min, p_tx_max] */

    leaf tx-channel-power-min {
      type dbm-t;
      config false;
      description "The minimum output power of this interface";
```

```
    }
    leaf tx-channel-power-max {
      type dbm-t;
      config false;
      description "The maximum output power of this interface";
    }

/* supported receiver power range [p_rx-min, p_rx_max] */

     leaf rx-channel-power-min {
      type dbm-t;
      config false;
      description "The minimum input power of this interface";
    }
    leaf rx-channel-power-max {
      type dbm-t;
      config false;
      description "The maximum input power of this interface";
    }

    leaf rx-total-power-max {
      type dbm-t;
      config false;
      description "Maximum rx optical power for
      all the channels";
    }

  } // grouping common-organizational-explicit-mode

/* This grouping represent the list of configured parameters */
/* values independent of operational mode */

  grouping common-transceiver-configured-param {
    description "Capability of an optical transceiver";

    leaf otsi-carrier-frequency {
        type frequency-thz;
         description
           "OTSi carrier frequency, equivalent to the
           actual configured transmitter frequency";
    }
    leaf tx-channel-power {
        type dbm-t;
        description "The current channel transmit power";
    }
    leaf rx-channel-power {
        type dbm-t;
        config false;
        description "The current channel received power ";
```

```
  }
  leaf rx-total-power {
      type dbm-t;
      config false;
      description "Current total received power";
  }
} // grouping for configured attributes out of mode

grouping l0-tunnel-attributes {
  description
    "Parameters for Layer0 (WSON or Flexi-Grid) Tunnels.";
  leaf fec-type {
    type identityref {
      base fec-type;
    }
    description
      "FEC type.";
  }
  leaf termination-type {
    type identityref {
      base term-type;
    }
    description
      "Termination type.";
  }
  leaf bit-stuffing {
    type boolean;
    description
      "Bit stuffing enabled/disabled.";
  }
}

grouping l0-path-constraints {
  description
    "Global named path constraints configuration
     grouping for Layer0 (WSON or Flexi-Grid) paths.";
  leaf wavelength-assignment {
    type identityref {
      base wavelength-assignment;
    }
    description "Wavelength Allocation Method";
  }
}

grouping frequency-range {
  description
    "The parameters that define a frequency range.";
  leaf lower-frequency {
    type frequency-thz;
```

```
      mandatory true;
      description
        "The lower frequency boundary of the
        frequency range.";
    }
    leaf upper-frequency {
      type frequency-thz;
      must '. > ../lower-frequency' {
        error-message
          "The upper frequency must be greater than the lower
          frequency.";
      }
      mandatory true;
      description
        "The upper frequency boundary of the
        frequency range.";
    }
  }
}
<CODE ENDS>
```

Figure 1

4. Acknowledgements

To be added if any.

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6. IANA Considerations

This memo includes no request to IANA.

All drafts are required to have an IANA considerations section (see Guidelines for Writing an IANA Considerations Section in RFCs [RFC5226] for a guide). If the draft does not require IANA to do anything, the section contains an explicit statement that this is the case (as above). If there are no requirements for IANA, the section will be removed during conversion into an RFC by the RFC Editor.

7. Security Considerations

All drafts are required to have a security considerations section. See RFC 3552 [RFC3552] for a guide.

8. References

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