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YANG Data Node Self Explanation Tags
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Abstract

This document defines a method to tag data node associated with telemetry data in YANG Modules. This YANG data node tagging method can be used to provide input, instruction, indication to selection filter and filter queries of operational state on a server during a "pub/sub" service for YANG datastore updates and provide multiple dimensional network visibility analysis when the state of all subscriptions of a particular Subscriber to be fetched is huge, so that the amount of data to be streamed out to the destination can be greatly reduced and only targeted to the characteristics data.

An extension statement to be used to indicate YANG data node self explanation tags that SHOULD be added by the module implementation automatically (i.e., outside of configuration).

A YANG module [RFC7950] is defined, which augments Module tag model and provides a list of data node entries to allow for adding or removing of data node self explanation tags as well as viewing the set of self explanation tags associated with a YANG module.

time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on December 3, 2020.

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1. Introduction

As described [I.D-ietf-netmod-module-tags], the use of tags for classification and organization is fairly ubiquitous not only within IETF protocols, but in the internet itself (e.g., "#hashtags"). A module tag defined in [I.D-ietf-netmod-module-tags] is a string associated only with a module name at module level.

At the time of writing this document (2020), there are many data models that have been specified or are being specified by the IETF. They cover many of the networking protocols and techniques. However data objects defined by these technology specific data models might represent a portion of fault, configuration, accounting, performance, security management categories information (e.g., performance metric associated with specific data object type) in various different way, lack the same classification criteria and granularity,e.g., sensor data in hardware model is defined with fine granularity with value scale and value precision while interface model only provides statistics data for specific interface type.

This document defines data node self explanation tags and associates them with data nodes within YANG module, which

- Provide dictionary meaning for each data node;
- Indicate relationship between data nodes within the same YANG module or of different YANG modules;
- Identify key performance metric scale, precision, statistics operation;
- Identify specific service or feature, data source.

The data node self explanation tags can be used by the client to provide input, instruction, indication to selection filter and filter queries of configuration or operational state on a server based on these data node tags,.e.g.,return specific object type operational state related to system-management. NETCONF clients can discover data models with data node self explanation tags supported by a NETCONF server via <get-schema> operation. The data node self explanation tag capability can also be advertised via capability notification Model [I-D.netconf-notification-capabilities] by the NETCONF server or some place where offline document are kept. These

self explanation tags may be registered as well as assigned during the module definition; assigned by implementations; or dynamically defined and set by users.

This document defines a YANG module [RFC7950] which augments module tag model and provides a list of data node entries to allow for adding or removing of self explanation tags as well as viewing the set of self explanation tags associated with a data node within YANG modules.

This document defines an extension statement to be used to indicate self explanation tags that SHOULD be added by the module implementation automatically (i.e., outside of configuration).

The YANG data model in this document conforms to the Network Management Datastore Architecture defined in [RFC8342].

1.1. Data Node tags Use Cases

The following is a list of already implemented and potential use cases.

1.1.1. Multiple Dimensional Performance Measurement Information Tagging

Data node tags can be used to express multiple dimensional performance metric and properties associated with YANG data nodes or data objects modelled with YANG (See Figure 1).

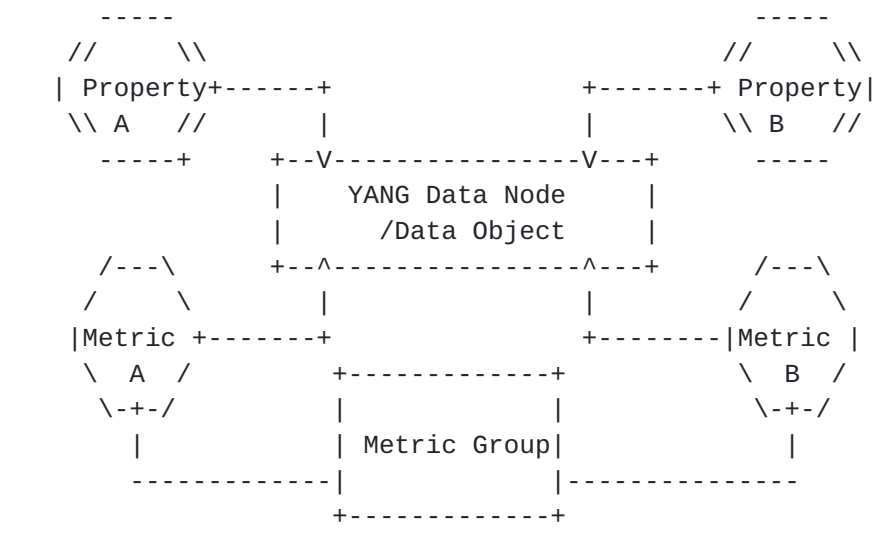


Figure 1

The use of data node tags would be to help filter different discrete categories of YANG data nodes across YANG modules supported by a

device. If data nodes across YANG modules are suitably tagged and learnt by the client from a live server, then an XPath query can be used by the client to list all related data nodes supported by a device with the same characteristics. Data node tags can also be used to help coordination when clients are interacting with various different devices with the same categories of YANG data node across different YANG modules. For example, one management client could mark some specific data node across modules implemented in various different devices with the same metric group tag, so consistent representation and reporting can be provided for YANG data nodes belonging to the same metric group (see Figure 2).

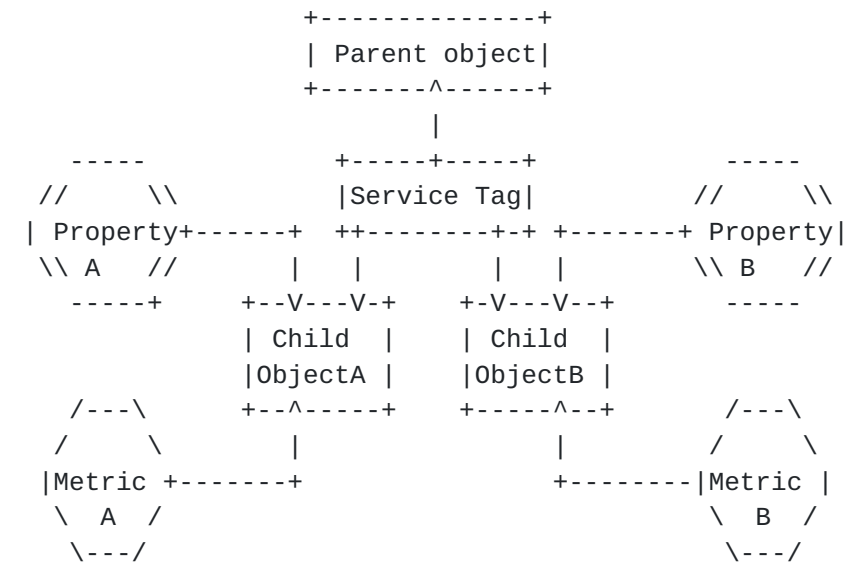
Object Name	Property Name	Metric Group	Metric Name	Module
tunnel-svc	name	-	-	tunnel
tunnel-svc	create-time	-	-	tunnel
tunnel-svc	modified-time	-	-	
tunnel-svc	-	lsp-ping-pm	avg-latency	tunnel-pm
tunnel-svc	-	lsp-ping-pm	packet-loss	tunnel-pm
tunnel-svc	-	lsp-ping-pm	min-latency	tunnel-pm
tunnel-svc	-	lsp-ping-pm	max-latency	tunnel-pm
tunnel-svc	-	lsp-ping-pm	transmitted -packet	tunnel-pm

Metric Group	Metric Name	Metric Precision	Metric Scale	Metric Unit
lsp-ping-pm	avg-latency	1	1	ms
lsp-ping-pm	packet-loss	1	1	percentile
lsp-ping-pm	min-latency	1	1	ms
lsp-ping-pm	max-latency	1	1	ms
lsp-ping-pm	transmitted	1	1	

Figure 2

1.1.2. Correlated Information Tagging

Another example is the management client could mark some data node across different level of YANG modules implemented in the device, the management system with the same service tag (e.g., L3VPN Service), so root cause can be identified efficiently during service-level agreements and performance monitoring or network failure troubleshooting.



Service Tag	Metric Group	Metric Name	Module	Level
L3VPN	L3VPN	maximum-routes	L3VPN	Service
L3VPN	OSPF-Process	total-active routes	OSPF	Device
L3VPN	RIP-Process	total-active routes	RIP	Device
L3VPN	BGP-Process	total-active routes	BGP	Device

1.2. Terminology

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.

2. Data Node Tag Values

All data node tags SHOULD begin with a prefix indicating who owns their definition. An IANA registry (Section 7.1) is used to support registering data node tag prefixes. Currently 3 prefixes are defined.

No further structure is imposed by this document on the value following the registered prefix, and the value can contain any YANG type 'string' characters except carriage-returns, newlines and tabs. Therefore, designers, implementers, and users are free to add or not add any structure they may require to their own tag values.

2.1. IETF Tags Prefix

An IETF tag is a data node tag that has the prefix "ietf:". All IETF data node tags are registered with IANA in a registry defined later in this document (Section 7.2).

2.2. Vendor Tags Prefix

A vendor tag is a tag that has the prefix "vendor:". These tags are defined by the vendor that implements the module, and are not registered; however, it is RECOMMENDED that the vendor include extra identification in the tag to avoid collisions such as using the enterpise or organization name following the "vendor:" prefix (e.g., vendor:vendor-defined-classifier).

2.3. User Tags Prefix

A user tag is any tag that has the prefix "user:". These tags are defined by the user/administrator and are not meant to be registered. Users are not required to use the "user:" prefix; however, doing so is RECOMMENDED as it helps avoid prefix collisions.

2.4. Reserved Tags Prefix

Any tag not starting with the prefix "ietf:", "vendor:" or "user:" is reserved for future use. These tag values are not invalid, but simply reserved in the context of specifications (e.g., RFCs).

3. Data Node Tag Management

Tags can become associated with a data node within YANG module in a number of ways. Tags may be defined and associated at module design time, at implementation time without the need of live server, or via user administrative control . As the main consumer of data node tags are users, users may also remove any tag from a live server, no matter how the tag became associated with a data node within a YANG module.

3.1. Module Design Tagging

A data node definition MAY indicate a set of data node tags to be added by the module implementer. These design time tags are indicated using the node-tag extension statement.

If the data node is defined in an IETF standards track document, the data node tags MUST be IETF Tags (2.1). Thus, new data node can drive the addition of new IETF tags to the IANA registry defined in Section 7.2, and the IANA registry can serve as a check against duplication.

3.2. Implementation Tagging

An implementation MAY include additional tags associated with data node within a YANG module. These tags SHOULD be IETF Tags (i.e., registered) or vendor specific tags.

3.3. User Tagging

Data node tags of any kind, with or without a prefix, can be assigned and removed by the user from a live server using normal configuration mechanisms. In order to remove a data node tag from the operational datastore, the user adds a matching "masked-tag" entry for a given data node within the ietf-data-node-tags Module.

4. Tags Module Structure

4.1. Tags Module Tree

The tree associated with the "ietf-data-node-tags" module follows. The meaning of the symbols can be found in [RFC8340].

```
        module: ietf-data-node-tags
        augment /tags:module-tags/tags:module:
          +--rw self-explanation-node-tags
             +--rw self-explanation-node* [node-name]
                +--rw node-name            nacm:node-instance-identifier
                +--rw opm-tag              tags:tag
                +--rw metric-precision     tags:tag
                +--rw metric-scale         tags:tag
                +--rw operation-type       tags:tag
                +--rw service-tag*         tags:tag
                +--rw task-tag*            tags:tag
                +--rw parent-tag           tags:tag
                +--rw data-source          tags:tag
```

5. YANG Module

```
<CODE BEGINS> file "ietf-self-explanation-node-tags@2019-05-03.yang"
    module ietf-self-explanation-node-tags {
     yang-version 1.1;
     namespace "urn:ietf:params:xml:ns:yang:ietf-self-explanation-node-tags";
     prefix ntags;
     import ietf-netconf-acm  { prefix nacm; }
     import ietf-module-tags  { prefix tags; }
     organization
       "IETF NetMod Working Group (NetMod)";
     contact
       "WG Web:  <https://tools.ietf.org/wg/netmod/>
        WG List: <mailto:netmod@ietf.org>
        Editor:  Ran Tao <mailto:taoran20@huawei.com>
        Editor:  Qin Wu <mailto:bill.wu@huawei.com>
        Editor:  Benoit Claise <mailto:bclaise@cisco.com>
        Editor:  Liang Geng <mailto:gengliang@chinamobile.com>
        Editor:  Zongpeng Du <mailto:duzongpeng@chinamobile.com>";
     // RFC Ed.: replace XXXX with actual RFC number and
     // remove this note.

     description
       "This module describes a mechanism associating self-explanation
        tags with YANG data node within YANG modules. Tags may be IANA
        assigned or privately defined.

        Copyright (c) 2020 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
        (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.";

    // RFC Ed.: update the date below with the date of RFC publication
    // and RFC number and remove this note.

    revision 2019-05-03 {
      description
        "Initial revision.";
      reference "RFC XXXX: YANG Data Node Tags";
    }
  typedef tag {
    type string {
      length "1..max";
      pattern '[a-zA-Z_][a-zA-Z0-9\-_]*:[\S ]+';
    }
    description
      "A tag value is composed of a standard prefix followed by any type
       'string' value that does not include carriage return, newline or
       tab characters.";
  }
    typedef metric-precision {
      type int8 {
        range "-8 .. 9";
      }
      description
        "A node using this data type represents a sensor value
         precision range.

         A node of this type SHOULD be defined together with nodes of
         type measurement-units and type measurement-scale.  Together,
         associated nodes of these three types are used to identify the
         semantics of a node of type sensor-value.

         If a node of this type contains a value in the range 1 to 9,
         it represents the number of decimal places in the fractional
         part of an associated sensor-value fixed-point number.
         If a node of this type contains a value in the range -8 to -1,
         it represents the number of accurate digits in the associated
         sensor-value fixed-point number.

         The value zero indicates the associated sensor-value node is
         not a fixed-point number.
```

```
         Server implementers must choose a value for the associated
         sensor-value-precision node so that the precision and accuracy
         of the associated sensor-value node is correctly indicated.

         For example, a component representing a temperature sensor
         that can measure 0 to 100 degrees C in 0.1 degree
         increments, +/- 0.05 degrees, would have a
         sensor-value-precision value of '1', a sensor-value-scale
         value of 'units', and a sensor-value ranging from '0' to
         '1000'.  The sensor-value would be interpreted as
         'degrees C * 10'.";
      reference
        "RFC 3433: Entity Sensor Management Information Base -
                   EntitySensorPrecision";
    }

    typedef metric-scale {
      type enumeration {
        enum yocto {
          value 1;
          description
            "Measurement scaling factor of 10^-24.";
        }
        enum zepto {
          value 2;
          description
            "Measurement scaling factor of 10^-21.";
        }
        enum atto {
          value 3;
          description
            "Measurement scaling factor of 10^-18.";
        }
        enum femto {
          value 4;
          description
            "Measurement scaling factor of 10^-15.";
        }
        enum pico {
          value 5;
          description
            "Measurement scaling factor of 10^-12.";
        }
        enum nano {
          value 6;
          description
            "Measurement scaling factor of 10^-9.";
        }
```

```
        enum micro {
          value 7;
          description
            "Measurement scaling factor of 10^-6.";
        }
        enum milli {
          value 8;
          description
            "Measurement scaling factor of 10^-3.";
        }
        enum units {
          value 9;
          description
            "Measurement scaling factor of 10^0.";
        }
        enum kilo {
          value 10;
          description
            "Measurement scaling factor of 10^3.";
        }
        enum mega {
          value 11;
          description
            "Measurement scaling factor of 10^6.";
        }
        enum giga {
          value 12;
          description
            "Measurement scaling factor of 10^9.";
        }
        enum tera {
          value 13;
          description
            "Measurement scaling factor of 10^12.";
        }
        enum peta {
          value 14;
          description
            "Measurement scaling factor of 10^15.";
        }
        enum exa {
          value 15;
          description
            "Measurement scaling factor of 10^18.";
        }
        enum zetta {
          value 16;
          description
```

```
            "Measurement scaling factor of 10^21.";
        }
        enum yotta {
          value 17;
          description
            "Measurement scaling factor of 10^24.";
        }
      }
      description
        "A node using this data type represents a data scaling factor,
         represented with an International System of Units (SI) prefix.
         The actual data units are determined by examining a node of
         this type together with the associated sensor-value-type.

         A node of this type SHOULD be defined together with nodes of
         type sensor-value-type and type sensor-value-precision.
         Together, associated nodes of these three types are used to
         identify the semantics of a node of type sensor-value.";
      reference
        "RFC 3433: Entity Sensor Management Information Base -
                   EntitySensorDataScale";
    }

   identity metric-unit {
       description
        "Base identity for measurement unit.";
     }

     identity ac-volts {
      base metric-unit;
       description
        "Identity for a measure of electric potential (alternating current).";
     }
     identity dc-volts {
      base metric-unit;
       description
        "Identity for a measure of electric potential (direct current).";
     }
     identity amperes {
      base metric-unit;
       description
        "Identity for a measure of electric current.";
     }
     identity power {
      base metric-unit;
       description
        "Identity for a measure of power.";
     }
```

```
     identity hertz {
      base metric-unit;
       description
        "Identity for a measure of frequency.";
     }
     identity celsius {
      base metric-unit;
       description
        "Identity for a measure of temperature.";
     }
     identity rpm {
      base metric-unit;
       description
        "Identity for a measure of shaft revolutions per minute.";
     }
 extension opm-tag {
       argument tag;
       description
         "The argument 'tag' is of type 'tag'. This extension statement
          is used by module authors to indicate the opm tags that SHOULD be
          added automatically by the system. As such the origin of the
          value for the pre-defined tags should be set to 'system'
          [RFC8342].";
     }
 extension metric-scale{
       argument tag;
       description
         "The argument 'tag' is of type 'tag'.The metric-scale can be
         used to provide an additional metric scale (e.g., Measurement
         scaling factor of 10^0, 10^-3,10^3) information associated with
         the performance metric data node tag.";
     }
 extension metric-precision {
       argument tag;
       description
         "The argument 'tag' is of type 'tag'.The metric-precision can be
         used to provide an additional metric precision (e.g., the range -8 to
-1,
         0, the range 1 to 9) information associated with the performance
metric
         data node tag.";
     }

 extension statistics-operation {
       argument tag;
       description
         "The argument 'tag' is of type 'tag'.The statistics-operation can be
         used to provide an additional statistics operation type(e.g., sum,
```

```
        min, max,last) information associated with the performance metric
        data node tag.";
```

```
    }
 extension service-tag {
       argument tag;
       description
         "The argument 'tag' is of type 'tag'.The service-tag can be
         used to provide a service classification information (e.g., tunnel,
         l3vpn,l2vpn) information associated with YANG data node.";
    }

 extension task-tag {
       argument tag;
       description
         "The argument 'tag' is of type 'tag'.The task-tag can be
         used to provide a task classification information (e.g., fault
management,
         performance measurement) information associated with YANG data node.";
    }
 extension data-source {
       argument tag;
       description
         "The argument 'tag' is of type 'tag'.The data-source-type can be
         used to provide an additional data source type (e.g., connectivity,
         resource, hardware,qos,policy) information associated with
         the performance metric data node tag.";
    }
 extension parent-tag {
       argument tag;
       description
         "The argument 'tag' is of type 'tag'.The parent-tag can be
         used to provide an additional multiple source aggregation
         information associated with the performance metric data node
         or interface related data node.";
    }

  augment "/tags:module-tags/tags:module" {
    description
      "Augment the Tags module with data node tag attributes";
     container self-explanation-node-tags {
       description
         "Contains the list of data nodes and their associated tags";
       list self-explanation-node {
         key "node-name";
         description
           "A list of self-explanation nodes and their associated tags";
         leaf node-name {
           type nacm:node-instance-identifier;
           mandatory true;
           description
```

```
            "The YANG data node name.";
```

```
        }
        leaf opm-tag {
          type tags:tag;
          description
            "Tags associated with the data node within YANG module. See
             the IANA 'YANG Data Node Tag Prefixes' registry for reserved
             prefixes and the IANA'IETF YANG Data Node Tags' registry for
             IETF tags.

             The 'operational' state [RFC8342] view of this list is
             constructed using the following steps:

             1) System tags (i.e., tags of 'system' origin) are added.
             2) User configured tags (i.e., tags of 'intended' origin)
             are added.
             3) Any tag that is equal to a masked-tag is removed.";
        }
        leaf metric-precision {
          type tags:tag;
          description
            "The numeric expression precision of performance
             metric related data node.";
        }
       leaf metric-scale {
           type tags:tag;
           description
            "The measurement scale of performance
             metric related data node.";
        }
        leaf operation-type{
         type tags:tag;
         description
          "Statistics operation of performance metric related
          data node.";
        }
        leaf service-tag {
         type tags:tag;
         description
          "The node-service-tag can be used to provide a service
          classification information (e.g., tunnel, l3vpn,l2vpn)
          information associated with YANG data node.";
        }
        leaf task-tag {
         type tags:tag;
         description
          "The node-task-tag can be used to provide a task
          classification information (e.g., fault management,
          performance measurement) information associated with
```

```
           YANG data node.";
         }
        leaf parent-tag {
            type tags:tag;
            description
             "The parent tag can be used to identify multiple source
              aggregation tye(e.g., line card,member link in an aggregated
              Ethernet interface) related to performance metric related
              data node or interface related to data node). Two source
              aggregation source types are supported, one is aggregation
              which groups data from two or multiple different data objects,
              the other is membership which identitfy each data object(e.g.,
              linecard, member link from multiple source aggregation.";
         }
        leaf data-source {
            type tags:tag;
            description
             "The data source type (e.g., connectivity,resource, hardware
             ,qos,policy) associated with the performance metric data node
             within YANG module.";
         }
       }
      }
     }
  }
<CODE ENDS>
```

6. Guidelines to Model Writers

This section updates [RFC8407].

6.1. Define Standard Tags

A module MAY indicate, using node-tag extension statements, a set of tags that are to be automatically associated with it (i.e., not added through configuration).

```
 module example-module-A {
        //...
        import ietf-data-node-tags { prefix ntags; }
        container top {
         ntags:opm-tag "ietf:object-type";
         list X {
          leaf foo {
           ntags:opm-tag "ietf:property";
          }
        }
       container Y {
        ntags:opm-tag "ietf:metric";
       leaf bar {
        ntags:statistics-operation "ietf:avg";
        ntags:metric-scale "ietf:milli";
        }
      }
    }
  // ...
 }
```

The module writer can use existing standard tags, or use new tags defined in the model definition, as appropriate. For IETF standardized modules new data node tags MUST be assigned in the IANA registry defined below, see Section Section 7.2.

7. IANA Considerations

7.1. YANG Data Node Tag Prefixes Registry

IANA is asked to create a new registry "YANG Data Node Tag Prefixes" grouped under a new "Protocol" category named "YANG Data Node Tag Prefixes".

This registry allocates tag prefixes. All YANG data node tags SHOULD begin with one of the prefixes in this registry.

Prefix entries in this registry should be short strings consisting of lowercase ASCII alpha-numeric characters and a final ":" character.

The allocation policy for this registry is Specification Required [RFC8126]. The Reference and Assignee values should be sufficient to identify and contact the organization that has been allocated the prefix.

The initial values for this registry are as follows.

Prefix	Description	Reference	Assignee
ietf:	IETF Tags allocated in the IANA IETF YANG Data Node Tags registry	[This document]	IETF
vendor:	Non-registered tags allocated by the module implementer.	[This document]	IETF
user:	Non-registered tags allocated by and for the user.	[This document]	IETF

Other standards organizations (SDOs) wishing to allocate their own set of tags should allocate a prefix from this registry.

7.2. IETF YANG Data Node Tags Registry

IANA is asked to create four new registries "IETF YANG Data Node Tags","IETF Metric Precision Tags","IETF Statistics Operation Tags","Node Service Tag" grouped under a new "Protocol" category "IETF YANG Data Node Tags". These four registries should be included below "YANG Data Node Tag Prefixes" when listed on the same page.

Four registries allocate tags that have the registered prefix "ietf:". New values should be well considered and not achievable through a combination of already existing IETF tags.

The allocation policy for these four registries is IETF Review [RFC8126].

The initial values for these eight registries are as follows.

Data Node Tag	Description	Reference
ietf:object-type	Relates to object type (e.g., interfaces).	[This document]
ietf:metric	Relates to performance metric info (e.g., ifstatistics).	[This document]
ietf:metric-group	Represent metric group (e.g., flow statistics).	[This document]
ietf:property	Represents a object	[This

	property	document]
	(e.g.,ifindex).	

Metric Precision	Description	Reference
ietf:minus-eight	Relates to metric precision of performance metric	[This document]
ietf:minus-seven	Relates to metric precision of performance metric	[This document]
ietf:minus-sixe	Relates to metric precision of performance metric	[This document]
ietf:minus-five	Relates to metric precision of performance metric	[This document]
ietf:minus-four	Relates to metric precision of performance metric	[This document]
ietf:minus-three	Relates to metric precision of performance metric	[This document]
ietf:minus-two	Relates to metric precision of performance metric	[This document]
ietf:minus-one	Relates to metric precision of performance metric	[This document]
ietf:zero	Relates to metric precision of performance metric	[This document]
ietf:one	Relates to metric precision of performance metric	[This document]
ietf:two	Relates to metric precision of performance metric	[This document]
ietf:three	Relates to metric precision of performance metric	[This document]
ietf:four	Relates to metric precision of performance metric	[This document]
ietf:five	Relates to metric precision of performance metric	[This document]

ietf:six	Relates to metric precision of performance metric	[This document]
ietf:seven	Relates to metric precision of performance metric	[This document]
ietf:eight	Relates to metric precision of performance metric	[This document]
ietf:nine	Relates to metric precision of performance metric	[This document]

Metric scale	Description	Reference
ietf:yocto	Relates to metric scale of performance metric	[This document]
ietf:zepto	Relates to metric scale of performance metric	[This document]
ietf:atto	Relates to metric scale of performance metric	[This document]
ietf: femto	Relates to metric scale of performance metric	[This document]
ietf: pico	Relates to metric scale of performance metric	[This document]
ietf: nano	Relates to metric scale of performance metric	[This document]
ietf: micro	Relates to metric scale of performance metric	[This document]
ietf: milli	Relates to metric scale of performance metric	[This document]
ietf: units	Relates to metric scale of performance metric	[This document]
ietf: kilo	Relates to metric scale of performance metric	[This document]
ietf: mega	Relates to metric scale of performance metric	[This document]

ietf: giga	Relates to metric scale of performance metric	[This document]
ietf: tera	Relates to metric scale of performance metric	[This document]
ietf: peta	Relates to metric scale of performance metric	[This document]
ietf: exa	Relates to metric scale of performance metric	[This document]
ietf: zetta	Relates to metric scale of performance metric	[This document]
ietf: yotta	Relates to metric scale of performance metric	[This document]

Statistics Operation Tag	Description	Reference
ietf:avg	Relates to statistics operation(e.g.,average, min, max, sum,etc)	[This document]
ietf:sum	Relates to statistics operation(e.g.,average, min, max, sum,etc)	[This document]
ietf:min	Relates to statistics operation(e.g.,average, min, max, sum,etc)	[This document]
ietf:max	Relates to statistics operation(e.g.,average, min, max, sum,etc)	[This document]
ietf:threshold	Relates to statistics operation(e.g.,average, min, max, threshold,etc)	[This document]

Parent Tag	Description	Reference
ietf:member	Relates to multiple source aggregation type(e.g., lag, linecard, sub inf)	[This document]
ietf:agg	Relates to multiple source aggregation type(e.g.,agg)	[This document]

Data Source	Description	Reference
ietf:service-flow	Relates to data source type(e.g., microburst).	[This document]
ietf:topo	Relates to data source type(e.g., topology).	[This document]
ietf:resource	Relates to data source type info (e.g., interface,queue).	[This document]
ietf:policy	Relates to data source type info (e.g., acl, routing policy	[This document]
ietf:hardware	Relates to data source type (e.g.,optical module).	[This document]

Service Tag	Description	Reference
ietf:l3vpn	Relates to service offering(e.g.,l3vpn l2vpn,tunnel,etc)	[This document]
ietf:l2vpn	Relates to service offering(e.g.,l3vpn l2vpn,tunnel,etc)	[This document]
ietf:te-tunnel	Relates to service offering(e.g.,l3vpn l2vpn,tunnel,etc)	[This document]

Task Tag	Description	Reference
ietf:vpn-diag	Relates to vpn serivce diagonostic function	[This document]
ietf:vpn-fullfilment	Relates to vpn service fullfillment function	[This document]
ietf:vpn-assurance	Relates to vpn service assurance function	[This document]

7.3. Updates to the IETF XML Registry

This document registers a URI in the "IETF XML Registry" [RFC3688]. Following the format in [RFC3688], the following registration has been made:

```
URI:
   urn:ietf:params:xml:ns:yang:ietf-self-explaination-node-tags
Registrant Contact:
   The IESG.
XML:
   N/A; the requested URI is an XML namespace.
```

7.4. Updates to the YANG Module Names Registry

This document registers one YANG module in the "YANG Module Names" registry [RFC6020]. Following the format in [RFC6020], the following registration has been made:

```
name:
   ietf-self-explaination-node-tags
namespace:
   urn:ietf:params:xml:ns:yang:ietf-self-explaination-node-tags
prefix:
   ntags
reference:
   RFC XXXX (RFC Ed.: replace XXX with actual RFC number and remove
   this note.)
```

8. Security Considerations

The YANG module defined in this memo is designed to be accessed via the NETCONF protocol [RFC6241]. The lowest NETCONF layer is the secure transport layer and the mandatory-to-implement secure transport is SSH [RFC6242].

This document adds the ability to associate data node tag meta-data with YANG modules. This document does not define any actions based on these associations, and none are yet defined, and therefore it does not by itself introduce any new security considerations.

Users of the data node tag-meta data may define various actions to be taken based on the data node tag meta-data. These actions and their definitions are outside the scope of this document. Users will need to consider the security implications of any actions they choose to define.

9. References

9.1. Normative References

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9.2. Informative References

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