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Orange
October 19, 2018

**A Tunnel Extension to the Interface Management YANG Module
draft-boucadair-netmod-softwire-iftunnel-00**

Abstract

This document specifies an extension the Interface Management YANG module.

Editorial Note (To be removed by RFC Editor)

Please update these statements in the document with the RFC number to be assigned to this document:

- o "This version of this YANG module is part of RFC XXXX;"
- o "RFC XXXX: A Tunnel Extension to the Interface Management YANG Module";
- o "reference: RFC XXXX"

Please update the "revision" date of the YANG module.

Status of This Memo

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1. Introduction

This document specifies the initial version of an IANA-maintained module to identify a collection of tunnel types assigned by IANA ([Section 2](#)). Furthermore, the document augments the Interface YANG module [[RFC8343](#)] with a new parameter which is meant to indicate the type of a given tunnel ([Section 3](#)). The tree structure of this extension is shown below:

```

module: ietf-interface-tunnel
  augment /if:interfaces/if:interface:
    +--rw tunnel-type?  identityref

```

Tunnel-specific extensions may be added to the Interface module as a function of the tunnel type. A sample example is provided in [Appendix A](#). It is not the intent of this document to define tunnel-specific extension for every tunnel encapsulation technology; those are discussed in dedicated document such as [[I-D.ietf-softwire-yang](#)].

This document uses the common YANG types defined in [[RFC6991](#)] and adopts the Network Management Datastore Architecture (NMDA).

The terminology for describing YANG modules is defined in [[RFC7950](#)]. The meaning of the symbols in tree diagrams is defined in [[RFC8340](#)].

2. IANA Tunnel Type YANG Module

```
<CODE BEGINS> file "iana-tunnel-type@2018-10-19.yang"
```

```
module iana-tunnel-type {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:iana-tunnel-type";
  prefix iana-tunnel-type;

  import iana-if-type {
    prefix ift;
    reference
      "RFC 7224: IANA Interface Type YANG Module";
  }

  organization
    "IANA";
  contact
    "Internet Assigned Numbers Authority

  Postal: ICANN
    12025 Waterfront Drive, Suite 300
    Los Angeles, CA 90094-2536
    United States of America
  Tel: +1 310 301 5800
  <mailto:iana@iana.org>";

  description
    "This module contains a collection of YANG data types defined
    by IANA and used for tunnel types.

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  This version of this YANG module is part of RFC XXXX; see
```



```
    the RFC itself for full legal notices.";

revision 2018-10-19 {
  description
    "Initial revision.";
  reference
    "RFC XXXX: A Tunnel Extension to the Interface
      Management YANG Module";
}

identity other {
  base ift:tunnel;
  description
    "None of the following values.";
}

identity direct {
  base ift:tunnel;
  description
    "No intermediate header.";
}

identity gre {
  base ift:tunnel;
  description
    "GRE encapsulation.";
}

identity minimal {
  base ift:tunnel;
  description
    "Minimal encapsulation.";
}

identity l2tp {
  base ift:tunnel;
  description
    "L2TP encapsulation.";
}

identity pptp {
  base ift:tunnel;
  description
    "PPTP encapsulation.";
}

identity l2f {
  base ift:tunnel;
  description
    "L2F encapsulation.";
}

identity udp {
  base ift:tunnel;
  description
```

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```
        "UDP encapsulation.";
    }
    identity atmp {
        base ift:tunnel;
        description
            "ATMP encapsulation.";
    }
    identity msdp {
        base ift:tunnel;
        description
            "MSDP encapsulation.";
    }
    identity sixtofour {
        base ift:tunnel;
        description
            "6to4 encapsulation.";
    }
    identity sixoverfour {
        base ift:tunnel;
        description
            "6over4 encapsulation.";
    }
    identity isatap {
        base ift:tunnel;
        description
            "ISATAP encapsulation.";
    }
    identity teredo {
        base ift:tunnel;
        description
            "Teredo encapsulation.";
    }
    identity iphttps {
        base ift:tunnel;
        description
            "IP over HTTPS.";
    }
    identity softwiremesh {
        base ift:tunnel;
        description
            "softwire mesh tunnel.";
    }
    identity dslite {
        base ift:tunnel;
        description
            "DS-Lite tunnel.";
    }
}
}
```


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<CODE ENDS>

3. Tunnel Extension to the Interface YANG Module

The `ietf-interface-tunnel` module imports the modules defined in [\[RFC7224\]](#) and [\[RFC8343\]](#).

<CODE BEGINS> file "ietf-interface-tunnel@2018-10-19.yang"

```
module ietf-interface-tunnel {
  yang-version 1.1;

  namespace "urn:ietf:params:xml:ns:yang:ietf-interface-tunnel";
  prefix ietf-interface-tunnel;

  import ietf-interfaces {
    prefix if;
    reference
      "RFC 8343: A YANG Data Model for Interface Management";
  }

  import iana-if-type {
    prefix ift;
    reference
      "RFC 7224: IANA Interface Type YANG Module";
  }

  organization "IETF xxx Working Group";

  contact

    "WG Web: <https://datatracker.ietf.org/wg/xxxx/>
    WG List: <mailto:xxxx@ietf.org>

    Editor: Mohamed Boucadair
           <mailto:mohamed.boucadair@orange.com>";

  description
    "This module is a YANG module for associating a tunnel type with
    tunnel interfaces.

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

```

revision 2018-10-19 {
  description
    "Initial revision.";
  reference
    "RFC XXXX: A Tunnel Extension to the Interface
      Management YANG Module";
}

augment "/if:interfaces/if:interface" {
  when 'derived-from(if:type, "ift:tunnel)';
  description
    "Augments Interface module with tunnel-specific parameters.

    IANA interface types are maintained at this registry:
    https://www.iana.org/assignments/ianaifttype-mib/ianaifttype-mib.

    tunnel (131),      -- Encapsulation interface";

  leaf tunnel-type {
    type identityref {
      base ift:tunnel;
    }
    description
      "Indicates the type of the tunnel. It corresponds
      to the IANAtunnelType.

      IANA tunnel types are maintained at this registry:
      https://www.iana.org/assignments/ianaifttype-mib/ianaifttype-mib.";
  }
}
}
<CODE ENDS>

```

4. Security Considerations

The YANG module defined in this document 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.

All data nodes defined in the YANG module which can be created, modified and deleted (i.e., config true, which is the default) are considered sensitive. Write operations (e.g., edit-config) applied to these data nodes without proper protection can negatively affect network operations.

5. IANA Considerations

This document requests IANA to register the following URIs in the "IETF XML Registry" [[RFC3688](#)]:

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

URI: urn:ietf:params:xml:ns:yang:iana-tunnel-type
Registrant Contact: IANA.
XML: N/A; the requested URI is an XML namespace.

This document requests IANA to register the following YANG modules in the "YANG Module Names" registry [[RFC7950](#)].

name: ietf-interface-tunnel
namespace: urn:ietf:params:xml:ns:yang:ietf-interface-tunnel
prefix: ietf-interface-tunnel
reference: RFC XXXX

name: iana-tunnel-type
namespace: urn:ietf:params:xml:ns:yang:iana-tunnel-type
prefix: iana-tunnel-type
reference: RFC XXXX

This document defines the initial version of the IANA-maintained iana-tunnel-type YANG module. IANA is requested to add this note:

Tunnel type values must not be directly added to the iana-tunnel-type YANG module. They must instead be respectively added to the "tunnelType" sub-registry (under "ifType definitions" registry).

When an tunnel type is added to the "tunnelType" registry, a new "identity" statement must be added to the iana-tunnel-type YANG module. The name of the "identity" is the same as the corresponding

enumeration in the IANAifType-MIB. The following substatements to the "identity" statement should be defined:

"base": Contains the value of the tunnel type in lowercase.

"description": Replicate the description from the registry.

"reference": Replicate the reference from the registry and add the title of the document.

Unassigned or reserved values are not present in the module.

When the iana-tunnel-type YANG module is updated, a new "revision" statement must be added in front of the existing revision statements.

IANA is requested to add this note to "tunnelType" registry:

When this registry is modified, the YANG module iana-tunnel-type must be updated as defined in [RFCXXXX].

6. Acknowledgements

Many thanks to Tom Petch.

7. References

7.1. Normative References

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- [RFC3688] Mealling, M., "The IETF XML Registry", [BCP 81](#), [RFC 3688](#), DOI 10.17487/RFC3688, January 2004, <<https://www.rfc-editor.org/info/rfc3688>>.
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- [RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in [RFC 2119](#) Key Words", [BCP 14](#), [RFC 8174](#), DOI 10.17487/RFC8174, May 2017, <<https://www.rfc-editor.org/info/rfc8174>>.
- [RFC8341] Bierman, A. and M. Bjorklund, "Network Configuration Access Control Model", STD 91, [RFC 8341](#), DOI 10.17487/RFC8341, March 2018, <<https://www.rfc-editor.org/info/rfc8341>>.
- [RFC8343] Bjorklund, M., "A YANG Data Model for Interface Management", [RFC 8343](#), DOI 10.17487/RFC8343, March 2018, <<https://www.rfc-editor.org/info/rfc8343>>.
- [RFC8446] Rescorla, E., "The Transport Layer Security (TLS) Protocol Version 1.3", [RFC 8446](#), DOI 10.17487/RFC8446, August 2018, <<https://www.rfc-editor.org/info/rfc8446>>.

7.2. Informative References

- [I-D.ietf-softwire-yang]
Cui, Y., Farrer, I., Boucadair, M., Sun, Q., Sun, L., Zechlin, S., and R. Asati, "YANG Modules for IPv4-in-IPv6 Address plus Port Softwires", [draft-ietf-softwire-yang-06](#) (work in progress), June 2018.
- [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/info/rfc8340>>.

Appendix A. Example

The following example illustrate how the interface YANG module can be augmented with tunnel-specific paramters. In this example, the module is augmented with 'remote-endpoint' of the tunnel. A tree structure is also provided below:

```
module: ietf-extension-example
  augment /if:interfaces/if:interface:
    +-rw remote-endpoint?  inet:ipv6-address
```

The 'extension-example' module imports the modules defined in [[RFC6991](#)] and [[RFC8343](#)] in addition to the those defined in this document.

<CODE BEGINS> file "ietf-extension-example@2018-10-19.yang"

```
module ietf-extension-example {
  yang-version 1.1;

  namespace "urn:ietf:params:xml:ns:yang:ietf-extension-example";
  prefix example;

  import ietf-inet-types {
    prefix inet;
    reference
      "Section 4 of RFC 6991";
  }

  import ietf-interfaces {
    prefix if;
    reference
      "RFC 8343: A YANG Data Model for Interface Management";
  }

  import iana-tunnel-type {
    prefix iana-tunnel-type;
    reference
      "RFC XXXX: A Tunnel Extension to the Interface Management
        YANG Module";
  }

  import ietf-interface-tunnel {
    prefix ift;
    reference
      "RFC XXXX: A Tunnel Extension to the Interface Management
        YANG Module";
  }
}
```


organization "IETF xxxx Working Group";

contact

"WG Web: <<https://datatracker.ietf.org/wg/xxx/>>
WG List: <<mailto:xxx@ietf.org>>

Editor: Mohamed Boucadair
<<mailto:mohamed.boucadair@orange.com>>;

description

"This is an exampel YANG module.

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

revision 2018-10-19 {

description

"Initial revision.";

reference

"RFC XXXX: A Tunnel Extension to the Interface Management YANG Module";

}

augment "/if:interfaces/if:interface" {

when "derived-from(ift:tunnel-type, 'iana-tunnel-type:gre')";

description

"Augments Interface module with specific tunnel parameters.";

leaf remote-endpoint {

type inet:ipv6-address;

description

"IPv6 address of the local GRE endpoint.";

}

}

}

<CODE ENDS>

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