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A YANG Model for Managing IPv6 Tunneling
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Abstract

This document describes a data model of tunneling for managing IPv6-over-IPv4 tunneling, which is used to support the transition from IPv4-only networks to integrated IPv4-based and IPv6-based networks.

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Table of Contents

1.	Introduction	2
2.	Requirements Language and Terminology	2
3.	Design of the IPv6-over-IPv4 Tunneling Model	3
4.	IPv6-over-IPv4 Tunneling YANG Model	3
5.	Security Considerations	5
6.	IANA Considerations	5
7.	Acknowledgements	5
8.	References	6
8.1.	Normative References	6
8.2.	Informative References	6
	Author's Address	6

[1.](#) Introduction

An IPv6-over-IPv4 tunnel encapsulates IPv6 packets in IPv4 packets for delivery across an IPv4 infrastructure (a core network or the Internet). By using these tunnels, nodes in different isolated IPv6 networks could communicate with each other without upgrading the IPv4 infrastructure between them. These tunnels can be configured between border routers or between a border router and a host; however, both tunnel endpoints must support both IPv4 and IPv6 protocol stacks.

The following types of overlay tunneling mechanisms are normally supported by vendors:

- o Manual
- o 6to4
- o Generic Routing Encapsulation (GRE)
- o IPv4-compatible
- o Intra-Site Automatic Tunnel Addressing Protocol (ISATAP)

The definition of this YANG model reference several correspond RFCs which include [[RFC4213](#)], [[RFC3056](#)], and [[RFC5214](#)].

[2.](#) Requirements Language and 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 [\[RFC2119\]](#) when they appear in ALL CAPS. When these words are not in ALL CAPS (such as "should" or "Should"), they have their usual

English meanings, and are not to be interpreted as [\[RFC2119\]](#) key words.

Terminology:

- o IP: Internet Protocol
- o IPv4: Internet Protocol version 4
- o IPv6: Internet Protocol version 6

[3.](#) Design of the IPv6-over-IPv4 Tunneling Model

This document defines a YANG [\[RFC6020\]](#) configuration data model that may be used to configure the IPv6-over-IPv4 Tunneling on a system.

The model includes the general attributes of current vendors which support IPv6-over-IPv4 Tunneling feature.

This draft addresses the common leafs between almost all vendors, if necessary it can be augmented with proprietary features.

This model consists of tunnel interface name, source interface, source IP address, destination IP address and the tunnel mode. The IPv6-over-IPv4 Tunneling feature depend on the IPv6 feature.

```
module: tunnel64
  +--rw tunneling-for-IPv6
    +--rw Tunnel* [tunnel-name]
      +--rw tunnel-name          string
      +--ro tunnel-interface-name? if:interface-ref
      +--rw tunnel-type?         enumeration
      +--rw source-ip-address?    inet:ipv4-address
      +--rw source-interface?     if:interface-ref
      +--rw destination-ip-address? inet:ipv4-address
```

[4.](#) IPv6-over-IPv4 Tunneling YANG Model

<CODE BEGINS> file "tunnel64.yang"

```
module tunnel64 {
    namespace "urn:ietf:params:xml:ns:yang:ietf-tunnel64";
    prefix tunnel64;

    import ietf-inet-types {
        prefix inet;
    }
```

Zheng

Expires November 23, 2015

[Page 3]

Internet-Draft

6over4 Tunneling YANG Model

May 2015

```
    import ietf-interfaces{
        prefix if;
    }
    organization "Internet Area Working Group (intarea)";
    contact
    "WG List: <mailto:intarea@ietf.org>"

    Author:   Guangying Zheng
             <mailto:zhengguangying@huawei.com>;

    description
    "This module contains a collection of YANG definitions
    of tunneling for IPv6 configuration.";

    revision 2015-05-21 {
        description
        "Initial Revision";
        reference
        "This model references RFC2893, RFC3056, RFC4214.";
    }

    feature tunneling-for-IPv6 {
        description
        "This feature represents the feature of tunneling for IPv6.";
    }

    container tunneling-for-IPv6 {

        list Tunnel{
```

```

key tunnel-name;
min-elements 0;
max-elements unbounded;

leaf tunnel-name {
    config true;
    type string;
}
leaf tunnel-interface-name {
    config false;
    type if:interface-ref;
}
leaf tunnel-type {
    config true;
    type enumeration {
        enum manual {
            value 0;

```

```

        description "a manual IPv6 tunnel";
    }
    enum 6to4 {
        value 1;
        description "a 6to4 tunnel";
    }
    enum auto-tunnel {
        value 2;
        description "an IPv4-compatible IPv6 tunnel";
    }
}
leaf source-ip-address {
    config true;
    type inet:ipv4-address;
}
leaf source-interface {
    config true;
    type if:interface-ref;
}
}

```

```

        leaf destination-ip-address {
            config true;
            type inet:ipv4-address;
        }
    }
}

```

<CODE ENDS>

[5.](#) Security Considerations

TBD.

[6.](#) IANA Considerations

This draft does not request any IANA action.

[7.](#) Acknowledgements

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Zheng

Expires November 23, 2015

[Page 5]

Internet-Draft

6over4 Tunneling YANG Model

May 2015

This document was produced using the xml2rfc tool [[RFC2629](#)].

[8.](#) References

[8.1.](#) Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC2629] Rose, M., "Writing I-Ds and RFCs using XML", [RFC 2629](#), June 1999.
- [RFC3056] Carpenter, B. and K. Moore, "Connection of IPv6 Domains via IPv4 Clouds", [RFC 3056](#), February 2001.

- [RFC4213] Nordmark, E. and R. Gilligan, "Basic Transition Mechanisms for IPv6 Hosts and Routers", [RFC 4213](#), October 2005.
- [RFC5214] Templin, F., Gleeson, T., and D. Thaler, "Intra-Site Automatic Tunnel Addressing Protocol (ISATAP)", [RFC 5214](#), March 2008.
- [RFC6020] Bjorklund, M., "YANG - A Data Modeling Language for the Network Configuration Protocol (NETCONF)", [RFC 6020](#), October 2010.

[8.2.](#) Informative References

- [RFC6241] Enns, R., Bjorklund, M., Schoenwaelder, J., and A. Bierman, "Network Configuration Protocol (NETCONF)", [RFC 6241](#), June 2011.
- [RFC6242] Wasserman, M., "Using the NETCONF Protocol over Secure Shell (SSH)", [RFC 6242](#), June 2011.

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