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                      Use of IP Tunnels In IP VPNs
                      draft-zmw-bess-tunnel-vpn-00

Abstract

   This document updates [RFC6513], [RFC6514] and
   [I-D.ietf-idr-tunnel-encaps] to provide additional details about
   using GRE tunnels for IP VPN, and using IP tunnels for Multicast VPN
   (MVPN).

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 RFC2119.

Status of This Memo

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[1](#). Terminology

   This document uses terminologies defined in [[RFC6513](#)], [[RFC6514](#)].

[2](#). Introduction

   [RFC4364] specifies protocol and procedures for providing IP Virtual
   Private Network (IP VPN) service using BGP signaling and MPLS data
   plane, often referred to as BGP/MPLS VPN. Along with the great
   success of BGP/MPLS VPN, use of IP tunneling instead of MPLS has been
   growing significantly, especially in Data Centers or where MPLS
   infrastructure is not available.

   IP tunnels typically include GRE, VXLAN, VXLAN-GPE, and NVGRE. Both
   VXLAN and NVGRE are targeted at Layer 2 Overlay services and the
   payload after the VXLAN or NVGRE header is Ethernet. For GRE
   [[RFC2784](#)] and VXLAN-GPE, the payload could be either IP or Ethernet
   or others. [[I-D.ietf-idr-tunnel-encaps](#)] specifies how these tunnels

can be used for VPNs, and [RFC6513] describes how GRE tunnels can be
used for Multicast VPNs (MVPN).

However, existing documents do not fully cover some deployment
scenarios as listed below.

   o Use of GRE tunnel for IP VPN: GRE tunnel is currently not listed
      as one of the three tunnel types whose encapsulation header
      includes a Virtual Network Identifier (VNI), even though an
      optional key in GRE header can be used as a VNI. As a result,
      currently there is no document specifies the use of GRE tunnel for
      IP VPN unicast, while it may be desired in certain situations.
      For example, multicast GRE tunnels are already widely used for
      MVPNs. If IP tunnels are preferred over MPLS tunnels for unicast,
      then it is better to use GRE (vs. VXLAN-GPE) for unicast as well
      as for multicast. Another reason to use GRE instead of VXLAN-GPE
      is that in certain public provider networks UDP packets are more
      susceptible to packet losses.

   o While [RFC6513] has descriptive text (section 12.1.1) on using
      unicast GRE tunnel for Ingress Replication, [RFC6514] (the
      specification companion of [RFC6513]) only covers MPLS tunnels.

   o To use IP tunnels for Ingress Replication in MVPN, appropriate
      Tunnel Encap Attribute (TEA) needs to be attached relevant MVPN
      PMSI/Leaf A-D routes, however that is declared as out of scope for
      [I-D.ietf-idr-tunnel-encaps].

3. Specification

   This document specifies the details for missing coverage (as desribed
   above) in existing documentations.

3.1. GRE Considered as a Tunnel Type Whose Encapsulation Includes VNI
      field

   This document updates Section "8. Use of Virtual Network Identifiers
   and Embedded Labels when Imposing a Tunnel Encapsulation" of
   [I-D.ietf-idr-tunnel-encaps] as following:

   o A GRE tunnel whose encapsulation does not set the K bit in the GRE
      header is considered as without a Virtual Network Identifier

Field, and section 8.1 applies.

o A GRE tunnel whose encapsulation does set the K bit in the GRE
   header is considered as having a Virtual Network Identifier Field,
   and section 8.2 applies. When applying the rules in section 8.2,
   the condition "the TLV identifying the tunnel contains an
   Encapsulation sub-TLV whose V bit is set" is considered met as
   long as the TEA includes a GRE Encapsulation Sub-TLV.

3.2. Attach Tunnel Encap Attribute to MVPN PMSI/Leaf A-D Routes

   If IP tunnels are used for MVPN Ingress Replication, a TEA SHOULD be
   attached to MVPN Inclusive-PMSI A-D routes and Leaf A-D routes to
   specify the IP tunnel used for the originating router to receive
   traffic. The label field in the A-D route's PMSI Tunnel Attribute
   (PTA) is set to the VNI assigned by the originating router. When an
   ingress router sends traffic, the label value in the PTA of
   Inclusive-PMSI or Leaf A-D route originated from the receiving router
   is copied into the VNI field of the tunnel encapsulation header.
   Note that in case of GRE tunnel, the VNI field is the Key field in
   the GRE header and the K bit MUST be set.

4. IANA Considerations

   This document makes no requests for IANA action.

5. Security Considerations

   There is no further security requirements in this document.

6. Acknowledgement

   The authors would like to thank Jeffrey Zhang for his valuable
   discussion and suggestion.

7. Normative References

   [I-D.ietf-idr-tunnel-encaps]

          Rosen, E., Patel, K., and G. Velde, "The BGP Tunnel
          Encapsulation Attribute", draft-ietf-idr-tunnel-encaps-10
          (work in progress), August 2018.

   [RFC2784] Farinacci, D., Li, T., Hanks, S., Meyer, D., and P.
              Traina, "Generic Routing Encapsulation (GRE)", RFC 2784,
              DOI 10.17487/RFC2784, March 2000,
              <https://www.rfc-editor.org/info/rfc2784>.

   [RFC4364] Rosen, E. and Y. Rekhter, "BGP/MPLS IP Virtual Private
              Networks (VPNs)", RFC 4364, DOI 10.17487/RFC4364, February
              2006, <https://www.rfc-editor.org/info/rfc4364>.

   [RFC6513] Rosen, E., Ed. and R. Aggarwal, Ed., "Multicast in MPLS/
              BGP IP VPNs", RFC 6513, DOI 10.17487/RFC6513, February
              2012, <https://www.rfc-editor.org/info/rfc6513>.

   [RFC6514] Aggarwal, R., Rosen, E., Morin, T., and Y. Rekhter, "BGP
              Encodings and Procedures for Multicast in MPLS/BGP IP
              VPNs", RFC 6514, DOI 10.17487/RFC6514, February 2012,
              <https://www.rfc-editor.org/info/rfc6514>.

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