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BGPv4 Tunnel Encapsulation Attribute

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## **3. Abstract**

This document defines a new BGP attribute called the Tunnel Encapsulation Attribute. This attribute is used to carry Tunnel encapsulations, capabilities and other relevant information about a Tunnel.

## **4. Introduction**

In case of MPLS-VPNs, the reachability to the nexthop is provided via LDP, which provides information about the LSP Tunnel endpoint. However, if the reachability were to be via a Tunnel, then there is no mechanism to be provide that reachability dynamically. One could manually configure Tunnels on each PE and use policy to specify what Tunnel to use for reaching what BGP nexthop. However this is too complex and unmanageable. What is needed is a way to send the Tunnel Encapsulation information dynamically.

This document defines a new BGP attribute called the Tunnel Encapsulation Attribute which will be used to carry Tunnel Encapsulations with BGP updates. The value part of the Tunnel Encapsulation attribute can contain one or more Tunnel Encapsulation TLVs. The TLVs can carry Tunnel Encapsulations for one or more Tunnel types originating on a given router. The Type in the TLV identifies what kind of Tunnel it is.

Also, unlike the fixed length (8 octets) extended community types, the Tunnel encapsulation TLV is a variable length entity, so it can carry data of any length, as required by the specific type of a Tunnel Encapsulation TLV.

## **5. Format of the Tunnel Encapsulation Attribute**





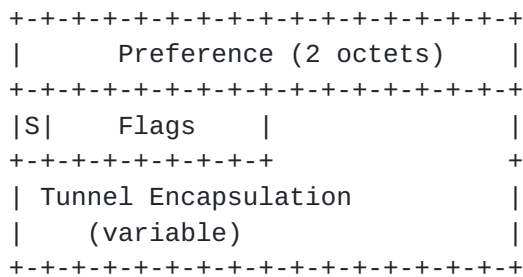


If the 'T' bit has a value of 1, it implies that the Tunnel type is transitive across ASes. If the 'T' bit has a value of 0, it implies that the Tunnel type is non-transitive across ASes.

Remaining 15 bits: Indicate the type of the TLV.

Length: The Length is 2 octets long and indicates the length of the Value field.

Value: The Value fields for all Tunnel TLVs, will carry the following fields :



where

Preference - Preference is a 2 Octet field containing a Preference associated with the TLV. The Preference value indicates a preferred ordering of tunneling encapsulations according to the sender (i.e. egress PE). The recipient of the information SHOULD take the sender's preference into account in selecting which encapsulation it will use. A higher value indicates a higher preference.

Flags - Flags is a 1 Octet field containing flag-bits. The leftmost bit indicates whether Sequence numbering is to be used or not. The remaining bits are reserved for future use.

Tunnel Encapsulation: The Tunnel Encapsulation field will carry the tunnel encapsulation information, specific for this particular tunnel 'Type'.

The Value field will have a fixed part and an optional variable part as specified by the respective Tunnel Types. The variable part when present will contain Sub-TLVs encoded as follows :

- Sub-Type Field: 1 octets
- Length Field : 1 octets
- Value Field : Variable



## **6. Operation**

A BGP speaker that supports the Tunnel Encapsulation Attribute, MUST accept all Tunnel Encapsulation TLV types. If the Tunnel Encapsulation TLV is transitive, The BGP speaker MUST forward it even if it does not understand it. This attribute MUST only be carried with the BGP Tunnel SAFI [BGP-TUN-SAFI].

If this attribute is carried with another BGP SAFI, the receiving BGP Speaker MUST ignore this attribute.

A Capability has not been defined for this attribute intentionally. The presence of the Tunnel SAFI implies the Capability to understand this Tunnel Encapsulation attribute.

## **7. Security Considerations**

This extension to BGP does not change the underlying security issues.

## **8. Acknowledgements**

We would like to thank Dan Tappan and Jim Guichard for their significant contributions. We would also like to thank Francois LeFaucher, Arjun Sreekantiah, Shyam Suri and John Scudder for their comments and suggestions.

## **9. Normative References**

[BGP-4] Rekhter, Y. and T. Li (editors), "A Border Gateway Protocol 4 (BGP-4)", Internet Draft [draft-ietf-idr-bgp4-26.txt](#), April 2005.

[BGP-CAP] Chandra, R., Scudder, J., "Capabilities Advertisement with BGP-4", [draft-ietf-idr-rfc2842bis-02.txt](#), April 2002.

[IANA-AFI] <http://www.iana.org/assignments/address-family-numbers>.

[IANA-SAFI] <http://www.iana.org/assignments/safi-namespace>.

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