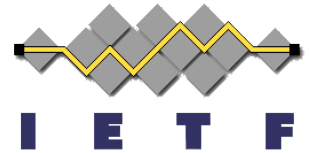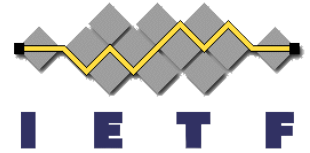# BGP Remote Next-Hop

draft-vandevelde-idr-remote-next-hop

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R. Raszuk, R. Bush

I E T F

90nd IETF - Toronto, USA
22 July 2014

What is BGP Remote Next Hop?

- New generic attribute for encapsulation related signaling for BGP NLRIs

- Each attribute carries one or more tunnel end-points for an NLRI

- Tunnel encapsulation information is included in attribute

- One or more remote-next-hops supported for an NLRI

- Directly attached to NLRI of any address-family
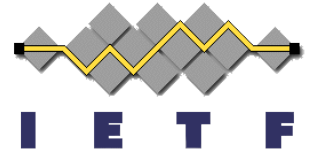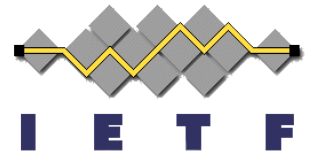
Applicable Use-cases

- Build dynamic overlay infrastructure
- Multi-homing for IPv6 support
- Virtualization and mobility signaling

Brief history

- First presented at IETF85, Atlanta, Nov 2012
- Added new use-cases (vEPC, NFV)
- Added new sub-TLVs
- Incorporated additional feedback
- Current version -07

rNH Highlights

- Optional Transitive Attribute

- Composed of a set of TLV encodings

- Supports signaling of multiple tunnel end-points

- Additional data for each end-point

- Re-uses RFC5512 Tunnel Parameters sub-TLV

- Works for iBGP and eBGP

- Graceful global non-flag day insertion supported

  - When rNH not supported, traditional routing will happen

  - When rNH supported, local policy may use associated information

- Optional RPKI validation can be used for security

TLV Format

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|       Tunnel Type (2 Octets)      |             Length       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Addr len      |        Tunnel Address (IPv4 or IPv6)         |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                         AS Number                            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                      Tunnel Parameters                       |
~                                                              ~
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- Tunnel types, sub-TLVs defined for:
 - L2TPv3 over IP, MPLS-in-GRE, IP-in-IP, VxLAN, NVGRE, GTP

Benefits

- Simplifies automatic tunnel signaling for prefixes inside and between AS's

- Supports per-prefix granularity

- No need to enable new address-family between speakers

- Consistent, extensible method across variety of use-cases

- Applicable across multiple address-families

Next steps

- Add text to reflect recent updates
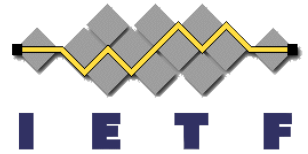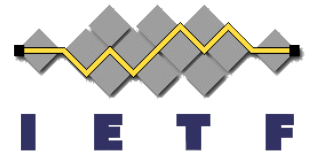 - new use-case, comments
- Ready for WG adoption
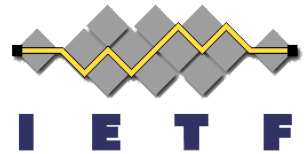
draft-vandevelde-idr-remote-next-hop

THANK YOU!

Backup slides

tbc

BGP Extensions

- Sub-TLV types
  - Existing:
    - L2TPv3 over IP [RFC3931]: Tunnel Type = 1
    - GRE [RFC2784]: Tunnel Type = 2
    - IP in IP [RFC2003] [RFC4213]: Tunnel Type = 7
  - Proposed:
    - VXLAN: Tunnel Type = 8
    - NVGRE: Tunnel Type = 9
    - GTP: Tunnel Type = 10
    - MPLS-in-GRE: Tunnel Type = 11
  - Suggested to be added to draft (suggestion from WG member)
    - Transmit tunnel endpoint [RFC5566]: Tunnel Type = 3
    - IPsec in Tunnel-mode [RFC5566]: Tunnel Type = 4
    - IP in IP tunnel with IPsec Transport Mode [RFC5566]: Tunnel Type = 5
    - MPLS-in-IP tunnel with IPsec Transport Mode [RFC5566]: Tunnel Type = 6