OSPFv3 as a PE-CE Routing Protocol

http://www.ietf.org/internet-drafts/draft-pillay-esnault-moyer-ospfv3-pece-00.txt

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Agenda

- OSPFv2 as a PE-CE Protocol
- Differences between RFC 4577 and this I-D
  - New BGP Extended Community
  - Support for Multiple OSPFv3 Instances per VRF
- Next Steps

OSPFv2 as a PE-CE Protocol

- Specification detailed in RFC 4577 and RFC 4576
- Motivations include
  - Offloading BGP requirements (support, management) from customer sites
  - Path preference (backdoor path vs. VPN path) for multi-homed customer networks
  - Provide the MPLS-VPN service to customers without having to radically change their IGP network with the MPLS-VPN Backbone acting as a super-backbone
  - Keep the basic premises of OSPF the same :
    - Type-1 and Type-3 LSAs for internal information
    - Type-5 and Type-7 LSAs for external information
- Routing services offered
  - Inter-area routing connectivity between VPN sites
    - BGP Extended Community Attributes carry OSPFv2 specific information
    - Type 3/5/7 LSAs can be originated based on the contents of the extended communities
  - Intra-area routing connectivity between VPN sites (sham links)
    - A sham link creates a pt-pt intra-area link between VRFs
    - LSAs are flooded across the sham link

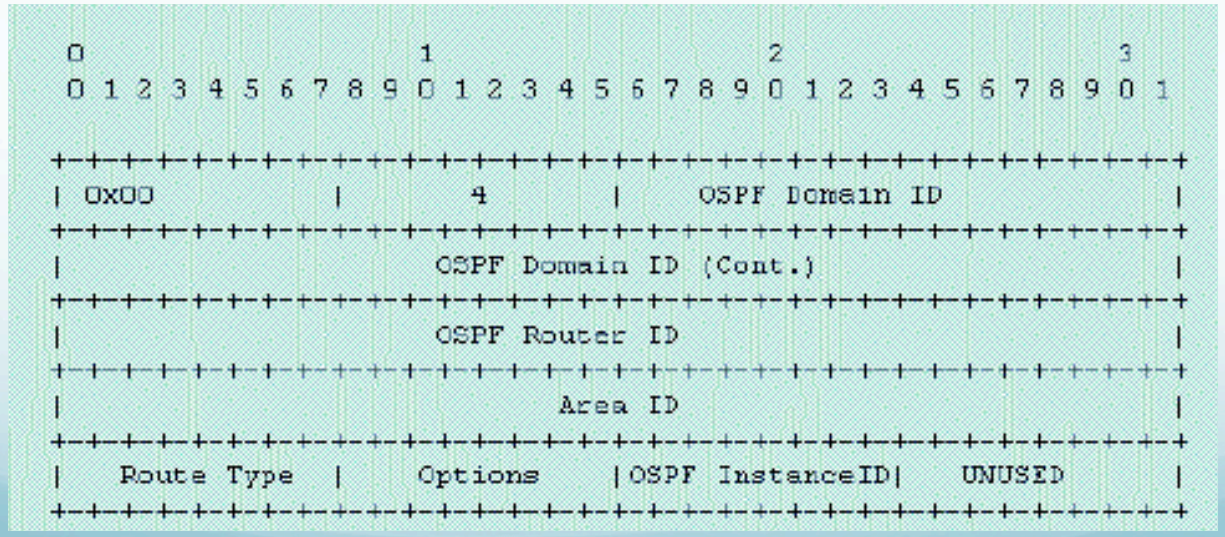
OSPFv3 as a PE-CE protocol has similar requirements as specified in RFC 4577. It has consistent behavior and format with OSPFv2 where applicable

Differences between RFC 4577 and this Draft

- New BGP extended community encodings for OSPFv3 Route Types
  - Intra-area-prefix LSA (0x2009) carries the prefixes which were previously carried by Type 1 and Type 2 LSAs in OSPFv2
- Multiple OSPFv3 protocol instances can be established over a single link. (rfc5340 section 2.4)
  - All instances defined on a link consequently belong to the same vrf.
- Assignment of Domain IDs on a per-VRF or a per-OSPFv3 instance basis
  - <Domain ID, Instance ID> tuple is used for demultiplexing
- Multiple OSPFv3 instances can be established across the sham link to support multiple intra-area connections across the same sham link
  - Instance ID within the OSPFv3 header is used to distinguish between multiple OSPFv3 instances

BGP OSPFv3 Route Extended Community

- Allocated from the IPv6 Address Specific BGP Extended Communities Attribute
  - *draft-rekhter-v6-ext-communities-02*
- Extended community allocation contains same fields as OSPFv2; however all fields are now packed into a single attribute
  - DomainID, RouterID, AreaID, and Options field formats remain identical to RFC 4577
  - Route Type field contains new LSA encodings
- Addition of an OSPF Instance ID field



Next Steps

- Find a home/working group that is interested in the document
  - Most likely L3VPN (home of rfc4577) in Minneapolis
  - Multiple address families support using instance-id

Comments welcome!

OSPFv3 Address Families – Instance ID

- The OSPFv3 Instance ID values have been assigned as follows in draft-ietf-ospf-af-alt-06.txt
  - Instance ID # 0 - # 31 IPv6 unicast AF
  - Instance ID # 32 - # 63 IPv6 multicast AF
  - Instance ID # 64 - # 95 IPv4 unicast AF
  - Instance ID # 96 - # 127 IPv4 multicast AF
  - Instance ID # 128 - # 255 Unassigned
- The Instance ID is used to de-multiplex the address family if multiple address families are supported
- The BGP v6 route attribute carries all the needed info for support of ipv4 AF.

Support for Multiple OSPFv3 Instances Per VRF

- Instance ID for Inter-area links between PEs
  - Instance(s) on PE-CE link are mapped to an Instance ID associated with the PE-PE link
  - Instance ID of the PE-PE link is encoded in the OSPFv3 Route Extended Community
  - <Domain ID, Instance ID, Route Type> is used to determine the Lsa Type for imported prefixes.
- Instance ID for Intra-area links between PEs
  - Sham link is established between two VRFs similar to rfc 4577
  - Multiple OSPFv3 instances may be established across this sham link
  - Each intra-area link is associated with an Instance ID within the OSPFv3 header as specified in RFC 5340