Updates on VPN Prefix ORF Solutions

draft-wang-idr-vpn-prefix-orf

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Motivation of This Presentation & Summary of Updates & Issues resolved

✓ Describes the updates on draft-wang-idr-vpn-prefix-orf after last adoption call:

• The PERMIT-ALL mechanism is defined via set Sequence to 0xFFFFFFFF and set RD to 0.

• Trigger of VPN Prefix ORF mechanism has been clarified.

• Operational process of VPN Prefix ORF on receiver has been updated to now use a 3-tuple \{RD, Source PE, RT\} of the VPN route extracted from BGP update.

• Source PE TLV is defined to identify the source of the VPN routes where it is set to next-hop for Option-C or intra-domain scenario and set to Source PE Extended community for Option-B where the next hop is changed to preserve the next hop at the inter-as boundary.

• Route Target TLV is defined to identify the RT of the offending VPN route so that RT & RD can be used together to filter VPN routes when the source VRF contains multiple RTs assigned to different VRF on the receiver.
PERMIT-ALL mechanism of VPN Prefix ORF solution

Due to the default behavior of ORF mechanism is “DENY”, the device which support VPN Prefix ORF mechanism needs to send an “PERMIT-ALL” entry to its peers to ensure it can receive non-offending VPN routes.

This entry should be sent before the other VPN Prefix ORF entries. The Sequence field is set to 0xFFFFFFFF so that the “PERMIT-ALL” entry can be stored as the last entry in ORF-Policy table. The RD is set to 0 specifies all VPN routes are permitted, no additional Optional TLV is required.
The trigger of VPN Prefix ORF mechanism

The operation of VPN Prefix ORF mechanism on each device is independent. On a PE, each VRF has a prefix limit, and routes associated with each <RD, source PE, RT> 3-tuple has a pre-configurated quota.

- Receive VPN routes with <RD1, source PE1> tuple
  - NO
  - PE checks whether <RD1, source PE1> tuple past the quota or not?
    - YES
    - PE checks whether the prefix limit of VRF is exceeded or not?
      - NO
      - PE sends warnings to the operator. The VPN Prefix ORF mechanism should not be triggered.
      - YES
      - PE checks whether there are other VRFs need VPN routes with this tuple or not?
        - NO
        - PE triggers the VPN Prefix ORF mechanism {RD, Source PE, RT}. PE sends an alarm information to network operator.
        - YES
        - PE drops the VPN routes.
Comments & Next Steps for Adoption Call

• Comments?
• Does the updates address all concerns?
• If so, request an additional adoption call.

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Backup Slides
 Scenario-1 and Solution  
(Intra-AS, Different RD, one RT )

1. Shared BGP session between RR and PE for VRFs
   ① RD is allocated per VPN/per PE
   ② PE3 send excessive VPN routes with RT1
   ③ PE1, PE2 will be influenced with the excessive VPN routes

2. PE/RR should have some mechanisms to identify and control the advertisement of specified excessive VPN routes.

Proposed Solution

① Once PE1 detects the VPN1 VRF is overflowed, and:
   ✓ The excessive VPN routes has RD31, associated RT is RT1
   ✓ No other VRFs on it to import the VPN routes with RT1
   PE1 triggers the RD-ORF message to RR(RD field is set to RD31)

② Once PE2 detects the VPN1 VRF is overflowed, and:
   ✓ The excessive VPN routes has RD31, associated RT is RT1
   ✓ There is other VRF on it to import the VPN routes with RT1
   PE2 triggers the RD-ORF message to RR(RD field is set to RD31) only when all the VRFs that import RT1 are overflowed. Else, it discards the overflowed VPN routes locally.
**Scenario-2 and Solution**
*(Intra-AS, Different RD, Multiple RTs)*

1. RD is allocated per VPN/per PE
2. **Multiple RTs** are associated with such VPN routes, and be imported into different VRFs in other devices (PE1)
3. PE3 sends excessive VPN routes with RT1, RT2.

**Proposed Solution**

1. Once PE1 detects the VPN1 VRF is overflowed, and:
   - ✓ The excessive VPN routes has RD31, associated with RT1, RT2
   - ✓ There are **different VRFs** on it import the VPN routes respectively with RT1, RT2
2. PE1 triggers the RD-ORF message to RR (RD field is set to RD31) only when all these VRFs are overflowed; else, it discards the overflowed VPN routes locally.
3. In this example, PE1 will not trigger RD-ORF, only PE2 will trigger RD-ORF(RD31).