Schemes for TRILL’s Directory Assisted RBridge Edge

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Goal

• Reduction in Multi-destination Frames in the Data Center Environment where all (or most) of the configuration is centrally orchestrated.
  – Reduce or eliminate flooding of unknown unicast messages.
  – Reduce or eliminate flooding of ARP/ND messages by responding from the ingress RBridge when possible.

• The mechanism is VLAN scoped.
**Terminologies**

- **TRILL-DIR**: an RBridge which has Directory Server either directly attached or embedded.
  
  - Standalone Directory Server: has Nickname, appear as RBridge to others, but not processing native Ethernet data frames to/from end stations.

- The communication between pure directory server and RBridge (real or dummy) is beyond the scope of this draft.
Push Model

Use ESADI base protocol with some minor changes

• Original ESADI: only advertise local attached MACs

• TRILL-DIR-PUSH: using message format defined by ESADI to send out global mapping entries
  – IPv4, IPv6, MAC, Nickname

  Doesn’t have to be yourself

• ESADI consumer listens

• ESADI provider advertises
  – Local information
  – TRILL-DIR: Global information (attachment nickname can be other than yourself)
Push Model

Use ESADI base protocol with some minor changes

• TRILL-DIR announces (in its LSP) its supported VLANs to all Rbridges:
  
  – One bit for “I am a Push Directory” (Uses ESADI)
  
  – One bit for “I am a Pull Directory” (Uses Query/Response)
  
  – Potentially another bit to indicate that it doesn’t want to receive user data frames in the interested VLANs

• ESADI Consumer: no change
Push Model suggested changes

- TRILL-DIR announces (in its LSP) its supported VLANs to all Rbridges:
  - Section 2.3.6 of RFC 6326 (TRILL uses of IS-IS): Interested VLANs Sub-TLV
    - Interested VLANS: The Interested VLANs field is formatted as shown below.
      - Using BIT#3 to indicate that this is the Push Directory for those VLANs.
      - Using BIT #2 to indicate that it is the Pull Directory for those VLANs
      - (potentially use another bit to indicate that it doesn’t want to receive user data frames in the interested VLANs)
Push Model: Directory server Sending mapping entries

• “Designated TRILL-DIR”
  – When there are multiple TRILL-DIRs for any given VLAN, the TRILL-DIR with the highest system ID is “Designated TRILL-DIR”
  – Only the “Designated TRILL-DIR” sends the full mapping for the VLAN via ESADI.
  – (Same as ESADI, VLAN scoped.)
Pull Model

• Request and Reply use Rbridge Channel syntax
  – TRILL doesn’t require TRILL-DIR to have a MAC address
PULL Request/Response

- **Pull Request:**
  - Target address family (IPv4/IPv6, [MAC/VLAN])
  - Optional: Source Address family (IPv4/IPv6, MAC, VLAN, Source RBridge (Nickname))

- **Pull Response:**
  - Target address family (IP, Target MAC, VLAN) + Egress RBridge (Nickname)
  - Optional “Timeout information”
  - Or Reject:
    - Need Source address family for validation
    - Not allowed
Push-Pull Hybrid Model

• Push model are used for some VIDs, and pull model are used for other VIDs.
  – It can be operator’s decision (i.e. by configuration) on which VIDs’ mapping entries are pushed down from directory (e.g. frequently used) and which VIDs’ mapping entries are pulled (e.g. rarely used).
  – Useful for Gateway nodes where great number of VLANs are enabled.