Applications and Procedures for Unknown MAC Route in EVPN (draft-sajassi-bess-evpn-umr-mobility-03.txt)

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Significant Additions

- First, special thanks to Jorge and Alex for their significant contributions to this rev
- The scope of the work has expended significantly as reflected in the new title
- The draft changed from UMR mobility-focused to a more general draft covering different aspects of UMR.

Significant Additions – Cont.

- The expansion covers the following new topics:
- Baseline UMR Mechanism (new - sec 3)
- UMR Mix-Mode Operation (new - sec 4)
- Impact of UMR on EVPN Use Cases (new – sec 6)

3. Baseline UMR Mechanism

1. Advertisement Procedures
   - Advertised by gateways per RFC9014
   - Advertisement can be UMR alone or UMR + MAC/IP routes (per local config)
   - It is advertised to local domain ONLY by gateways
   - It is advertised with an I-ESI

3. Baseline UMR Mechanism – Cont.

1. Processing Procedures
   - PEs that process the UMR route, forward unknown unicast traffic to the GWs that advertised UMR
   - If a PE receives multiple UMR, it selects UMR based on multi-homing procedure and best-path selection
   - PEs that don't support UMR, fall back to handling unknown unicast traffic per [RFC7432bis]

4. UMR Mix-mode Operation

- Layer-2 ONLY
  - GW advertise UMR to local domain to represent MACs in remote domains
  - If ARP suppression of non-local hosts is required on the PEs, then GWs need to advertise UMR along with remote MAC/IP routes
- Layer-3 ONLY
  - There is no requirement for L2 stretch across domains or ARP suppression of non-local hosts

4. UMR Mix-mode Operation – Cont.

- IRB Operation
  - For symmetric IRB mode of operation, GW is required to advertise both UMR and remote hosts MAC/IP routes to the local domain
  - PEs capable of UMR, install UMR in their L2 RIBs & FIBs and install MAC & IP in their ARP tables. They also install IP routes in their L3 RIBs & FIBs.
  - PEs that are NOT capable of UMR, install remote MACs in their L2 RIBs & FIBs, install MAC & IP in their ARP tables, and install IP

6. Impact of UMR on EVPN Use Cases

- UMR and EVPN Proxy ARP/ND
  - If Proxy ARP/ND is required on PEs to suppress ARP/ND flooding, then it conflicts with UMR objective of not advertising remote host MAC/IP addresses. Two options:
  - a) Advertise both UMR and remote host MAC/IP routes into the domain but do not program them into L2 FIB
  - b) Advertise UMR only and perform ARP/ND suppression on the GWs

6. Impact of UMR on EVPN Use Cases – Cont.

- The decision for a GW to advertise only UMR or UMR & MAC/IP routes can be based on local configuration, or it can be done dynamically
- If performed dynamically, the PEs advertise a UMR capability flag in their IMET routes. If all PEs within a domain are UMR capable, then the GWs can advertise UMR or UMR + MAC/IP routes per local configuration; however, if some PEs are not UMR capable, then the GW MUST advertise UMR + MAC/IP routes

6. Impact of UMR on EVPN Use Cases – Cont.

- UMR & Silent Hosts
  - In a domain that UMR is supported, when PE1 receives an ARP request from its local host H1 for a host H2 behind PE2 in the same domain, it floods the ARP request within its domain.
  - H2 sends an ARP response to H1
  - ARP response is received and forwarded by PE1 before PE1 learns H2 MAC/IP addresses in control plane
  - When PE1 receives packets destined to H2, because H2 is still unknown, it gets forwarded to GWs and is dropped there
  - This packet drop persists till PE2 learns H2 MAC/IP

MAC Mobility Procedures for UMR – No changes since last revision

```
   PE11      PE12      GW1               GW2        PE22       PE21

    |         |         |                 |           |          |
    |AD(M1)   |         |                 |           |          |
1)  X-------->|         |AD(M1)           |           |          |
    |---------|-------->|---------------->|           |          |
    |         |         |                 |           |          |
    |         |         |                 |           |          |
    | AD(M1,1)|AD(M1,1) |                 |           |          |
    |<--------X-------->|                 |           |          |
    |         |         |                 |           |          |
2)  |WD(M1)   |         |                 |           |          |
    |-------->|         |                 |           |          |
    |---------|-------->|                 |           |          |
    |         |         |                 |           |          |
    |         |         |                 |           |    AD(M1)X
    |         | AD(M1,2)|         AD(M1,1)|     AD(M1)|<---------|
    |         |<--------|<----------------|<----------|----------|
    |<--------|---------|                 |           |          |
    |         |         |                 |           |          |
    |   WD(M1)|WD(M1)   |                 |           |          |
3)  |<--------|-------->|WD(M1)           |           |          |
    |         |<--------|---------------->|           |          |
    |<--------|---------|                 |           |          |
    |         |         |                 |   AD(M1,1)|AD(M1,1)  |
    |         |         |                 |<----------X--------->|
    |         |         |                 |           |          |
4)  |         |         |                 |           |    WD(M1)|
    |         |         |                 |           |<---------|
    |         |         |                 |<----------|----------|
```

MAC Mobility Procedures for UMR – Cont.

- With UMR, MAC addresses of remote DCs are not propagated to local DCs
- MAC move from remote DC to local DC appears as first-time appearance and not ”move” thus breaking mobility procedures
- To address this issue, two MAC counters are kept in the gateways – one for local DC and the other for DCI network
- These two counters get incremented independently – i.e., a local MAC move (Intra DC) does not affect the DCI counter

Next Step

- It is already supported by multiple vendor
- Authors would like to ask for a WG call

THANK YOU!