

EVPN per multicast flow DF election

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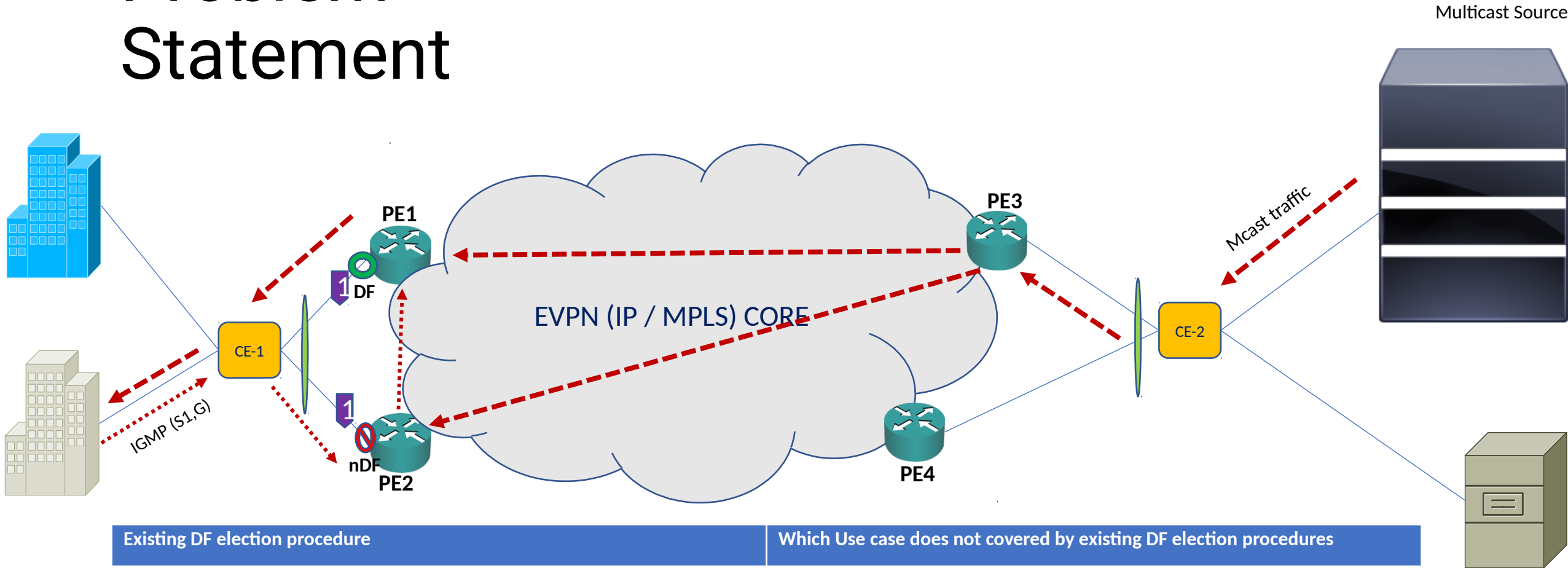
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Problem Statement



Existing DF election procedure

- Default DF election procedure as per RFC 7432: It describes mechanism to elect designated forwarder (DF) at the granularity of (ESI, EVI) which is per VLAN (or per group of VLANs in case of VLAN bundle or VLAN-aware bundle service)
- Enhanced DF election: Framework for EVPN Designated Forwarder Election Extensibility enhances default DF election procedure further and adds HRW hash algorithm for better distribution

Which Use case does not covered by existing DF election procedures

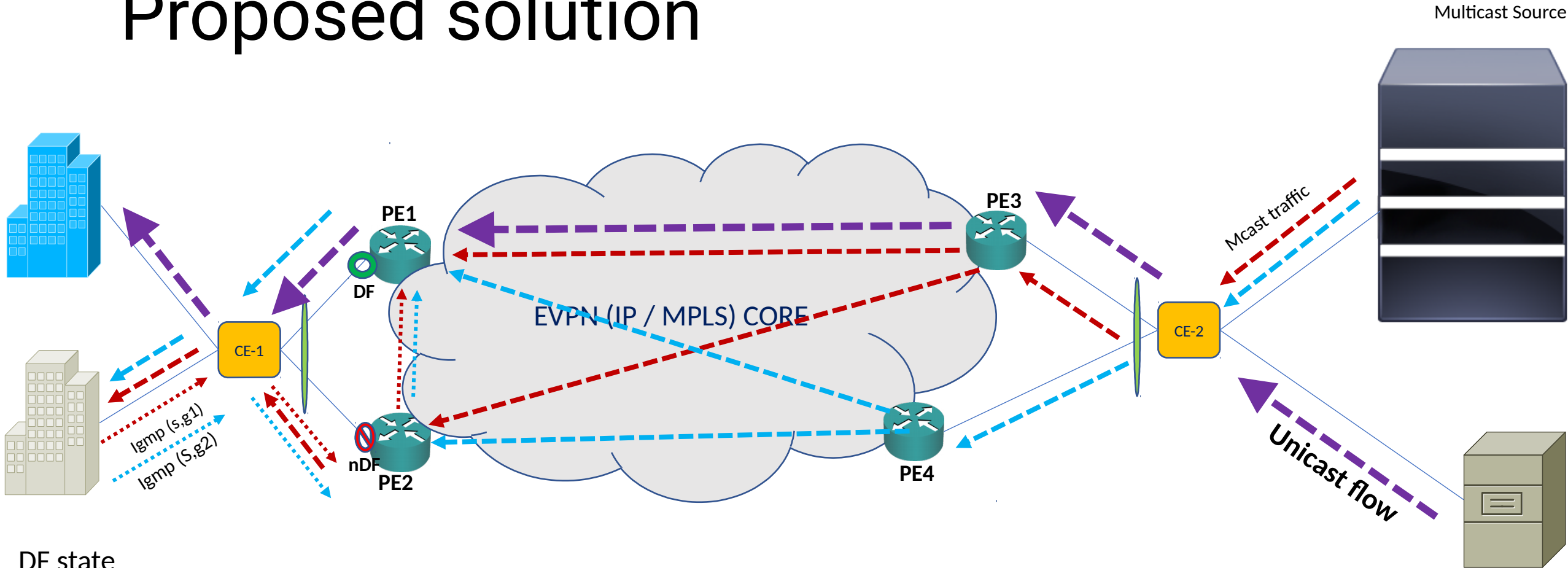
There are service providers where residential deployment requires all of multicast flows in one Vlan. For those case each of existing DF election mechanism does not help, As both of the existing procedure going to pick only one of the PE as DF for all of the multicast flow. So there is need for new mechanism which can still load balance multicast flows between redundancy group of PE's.

File/
Application
Server

Requirements to handle new use case

- Solution should be able to provide better distribution of multicast flows between PE's participating in all active multi-homing redundancy if all multicast flows are in single Vlan .
- Should be applicable for IGMP V2, V3 and MLD V1, V2 receivers. **IGMP V1 is not considered as it does not have any practical deployment.**
- New DF election procedure should have backward compatibility, it means it should not be breaking RFC 7432.

Proposed solution



DF state

PE1	PE2
(s,g2):DF	(s,g2):nDF
(s,g1): nDF	(s,g1):DF
Default : DF	Default: nDF

Proposed solution

- Each multicast flows can be distinguished by (S,G) or (*,G). These characteristic of multicast flows can be utilized to perform DF election.
- Proposed solution is to consider (S,G) or (G) along with (EVI,ESI) to perform DF election.
- The DF is the PE who has maximum affinity for (S,G, VLAN ID,ESI). The affinity of PE(i) to (S,G,VLAN ID,ESI) is calculated by function, affinity (S,G,VLAN ID, ESI, Address(i)), where $0 < i \leq N$, PE(i) is the PE at ordinal i, address(i) is the IP address of PE at ordinal i.
- The affinity function is based on Highest Random Weight as described in - "A Name Based Mapping Scheme for Rendezvous, Thaler and Ravishankar".

- Proposed solution is an extension to draft "Framework for EVPN Designated Forwarder Election Extensibility"

which proposes HRW base hash technique.

- Modified hash algorithm by this draft for IGMP V3 (S,G) membership request is

- $\text{affinity}(S, G, V, \text{ESI}, \text{Address}(i)) = (1103515245 \cdot ((1103515245 \cdot \text{Address}(i) + 12345) \text{ XOR } D(S, G, V, \text{ESI})) + 12345) \pmod{2^{31}}$

- $D(S, G, V, \text{ESI}) = \text{CRC}_{32}(S, G, V, \text{ESI})$

- And for IGMP V2 (*,G) membership request is

- $\text{affinity}(G, V, \text{ESI}, \text{Address}(i)) = (1103515245 \cdot ((1103515245 \cdot \text{Address}(i) + 12345) \text{ XOR } D(G, V, \text{ESI})) + 12345) \pmod{2^{31}}$

- $D(G, V, \text{ESI}) = \text{CRC}_{32}(G, V, \text{ESI})$

Questions ?