

IETF 118th Prague

Generic Multicast Router Election on LAN's draft-wijnands-bier-mld-lan-election-01.txt

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Problem statement

- When PIM is not deployed in the network, who takes care of Designated Router (DR) and Designated Forwarder (DF) election on LANs?
- DR/DF election is only in PIM
- Is it desirable to run PIM just for DR/DF election?
- PIM DF election is based on the RP, does not work for BIER.
- What if there is a mix of protocols?

From rfc2236 (IGMPv2)

The IGMPv2 spec now specifies a querier election mechanism. In IGMPv1, the querier election was left up to the multicast routing protocol, and different protocols used different mechanisms. This could result in more than one querier per network, so the election mechanism has been standardized in IGMPv2.

- Due to multiple protocols, querier is added into IGMPv2 to avoid multiple forwarders.
- Same problem applies to DR/DF election ☐

Proposed solution

- Add DR/DF election in IGMP!
- No need to add DR/DF election in each Transport or Overlay protocol.
- The elected DR/DF can determine the Overlay to use.

Implementation details

- IGMP querier election is loosely defined. This will probably not be good enough to service as DR/DF.
- There is also a need for Holdtime advertisement and per Group DR/DF election.
- Election will only be done between routers.
- The DR and DF is the same router, from now on, we only refer to the DF, but is also the DR.

Group based election mechanism

- Each router creates a list of Candidate DF's (CDF).
- The router with the highest Random Weight for a particular Group address is the DF.

$$\text{Weight}(G, \text{CDF}) = (1103515245((1103515245.G+12345)\text{XOR CDF})+12345)(\text{mod } 2^{31})$$

- Candidate DF's are now load-split among multiple candidate routers.
- **If the List is consistent, the Candidate DF election is!**
- How do we make sure the Candidate DF list is consistent?

IGMP Hello mechanism

- Introduce an IGMP Hello message to discover each other.
- Based on the IGMP Hello's we create a neighbor List.
- Attributes can be added to the IGMP Hello's
- There is a Learn flag to learn neighbors quickly.
- Creating a Candidate DF list on the IGMP hello is not robust enough...

What happens if Hello's are missed, how to recover.

What happens if neighbors time out.

IGMP Designated Announcer

- Elect a Designated Announcer (DA) using the Hello List.
- The DA creates a list of Candidate DF's, called the Designated Announcer List (DAL).
- All candidates MUST use the DAL for Group based DF election.
- There is an Acknowledgement and retry mechanism to allow an IGMP Neighbor to recover from a missed DAL.

IGMP Designated Announcer

- Since there is a single router responsible for advertising the DAL, it is very likely the same on all the routers.
- Every router on the LAN receives the DAL (more or less) at the same.
- During inconsistency, we choose drops over potential duplication of loops.

What else..

- Add packet formats to the draft in next revision.
- This work is driven by the BIER requirement, hence it is submitted as a BIER WG document.
- Feedback from the WG (PIM and BIER)
- Contribution to the draft is welcome.

Questions?