PIM DR Load Balancing

draft-ietf-pim-drlb-06
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Agenda

• History of draft & Current status
• Problem Statement
• Solution Overview and Applicability
• Protocol Change
• Changes from draft-ietf-pim-drlb-05
History of draft & Current status

• draft-hou-pim-drlb presented at IETF 82, Taipei, accepted as WG draft-ietf-pimdrlb-00
• draft-ietf-pim-drlb-01 presented at IETF 83, Paris
• draft-ietf-pim-drlb-02 IETF 86, Orlando
• draft-ietf-pim-drlb-05 reviewed by AD and comment provided before calling for last call
• draft-ietf-pim-drlb-06 address all of the comment by AD and presented in IETF-100
Problem Statement

• PIM DR is elected based on DR priority or IP address (per RFC4601)
• In the last hop LAN, only one router, the DR, is responsible for forwarding
• Forwarding load is not distributed
• This leads to issue, where aggregated bandwidth will be limited what PIM DR (R1) can handle towards receiver interface.
Problem Statement – continued

• Failover takes longer time
  • All forwarding states must be rebuilt on the new DR after a failover
  • All of the groups get impacted in case of failure
Solution Overview

• Elect multiple forwarders on the last hop LAN
  • Each is called a GDR (Group DR)
  • Hashing is used to determine which candidate GDR becomes the GDR

• Forwarding load is now distributed
• During a failover only a subset of the forwarding states need to be rebuilt
Applicability

• Last hop only
  • First hop router is determined by incoming Join not DR state
  • The complexity of supporting this at FHR outweighs the benefits of distributing load for sending registers
• SM/SSM/DM only
• Bidir Not scope of this draft
Protocol Change

PIM behavior changed (From first version of draft). But changes did not get added in this version of draft.

• GDR Election
  • DR election procedures remain unchanged
  • A router announces hash masks in new Hello Option TLV to indicate its capability
    • Hash masks include RP, Group, Source
  • All candidate GDRs must have the same DR priority as the DR
  • DR announces the list of candidate GDRs and the hash masks to be used on this LAN
Protocol Change

• Creating forwarding states
  • Upon receiving IGMP reports, a candidate GDR runs a hash algorithm to determine if it is the GDR for the RP of the group, the group and/or source
  • If it is, it becomes the forwarder on the LAN
  • Forwarding states are recalculated if the list of the candidate GDR changes or the hash masks change (per announcement by DR)
Protocol Change

• GDR Assert
  • Used to reduce packet loss during GDR state change
  • A GDR becoming non-GDR MAY choose not to remove the oif immediately
    • This will lead to Assert
  • GDR state is preferred before using IP address as a tie-breaker
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AD review comment draft-ietf-pim-drlb-05

• Section 6.2 need clear specification about router supporting this capabilities. It should clearly mention different scenario and how does router behave

• Section 6.2 need text describing when GDR receives IGMP join, what are steps it need to perform.

• Detail comments can be looked at https://mailarchive.ietf.org/arch/msg/pim/K61q4--5ZBb9RTMkeud-5MnmuOw
Questions ??