

Network Working Group
Internet Draft
Intended Status: Informational
Expires: May 2008

Mike McBride
Cisco Systems

November 2007

PIM Refresh Reduction Problem Statement

[draft-mmcbride-pim-refresh-problem-statement-01](#)

Status of this Memo

By submitting this Internet-Draft, each author represents that any applicable patent or other IPR claims of which he or she is aware have been or will be disclosed, and any of which he or she becomes aware will be disclosed, in accordance with [Section 6 of BCP 79](#).

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

The list of current Internet-Drafts can be accessed at <http://www.ietf.org/ietf/lid-abstracts.txt>.

The list of Internet-Draft Shadow Directories can be accessed at <http://www.ietf.org/shadow.html>.

Copyright Notice

Copyright (C) The IETF Trust (2007).

Internet Draft

PIM Refresh Problem Statement

November 2007

Abstract

The PIM Working Group has a PIM refresh reduction charter goal. The solution to this goal will help reduce the periodic join/prune processing in PIM. The L3VPN Working Group identified this periodic messaging of PIM as a potential scaling problem for PIM based MVPNs. This document identifies the issues we are trying to solve with PIM refresh reduction.

Table of Contents

1	Introduction	2
2	History	3
3	Problem	3
4	Solutions	4
5	Security Considerations	4
6	Iana Considerations	5
7	Acknowledgments	5
8	Normative References	5
9	Informative References	5
10	Authors' Addresses	5
11	Full Copyright Statement	6
12	Intellectual Property	6

[1](#). Introduction

PIM Joins are refreshed every 60 seconds by a downstream router to keep multicast state alive at the upstream router. With an increase in state there is an increase in control traffic required for refresh.

The PIM Working Group has a PIM refresh reduction charter goal. The solution to this goal will help reduce the periodic join/prune processing in PIM. The L3VPN Working Group identified this periodic messaging of PIM as a potential scaling problem for PIM based MVPNs. This document identifies the issues we are trying to solve with PIM refresh reduction.

2. History

At the November 2004 IETF, the L3VPN WG identified the effects of periodic Join/Prune processing in PIM as a potential scalability problem for PIM based MVPNs and asked that the PIM WG provide a solution. The PIM WG subsequently created a pim refresh design team to understand the problem area and provide a solution in needed.

Although there were disagreements on certain details, the design team had rough agreement on a Join/Prune acknowledgement solution. But, before recommending any solution, the PIM WG decided to ask the L3VPN WG for a requirements (or similar) document to help determine if this is really an area for which a solution is needed.

The PIM WG continued to discuss the future efforts we wanted to make to PIM. The primary focus, of the working group, at the time was in completing the PIMv2 [[Fenner](#)] draft. There are many enhancements we could make to PIM. Do we refrain from future PIM enhancements and close the working group? Or should we start going down the path of a major PIMv3 revision?

The L3VPN did produce an MVPN requirements document [Morin] which did help to better understand the future scalability requirements of MVPN. But that requirements document didn't help in understanding at what point PIM messaging could cause a scalability problem for PIM based MVPNs.

In 2007, with the PIMv2 draft complete and the PIM WG tasked with a new Charter, it was decided it would be of benefit for the WG to provide enhancements to PIM. The WG has determined there is additional work to be accomplished and is now chartered to standardize extensions to [RFC 4601](#) - Protocol Independent Multicast Version 2 - Sparse Mode. These PIM extensions will include PIM refresh reduction.

[3. Problem](#)

The PIM WG has decided to provide a solution(s) to reduce the effects of the periodic Join/Prune processing in PIM. This solution could help in the future scalability of PIM based MVPN as well as other PIM deployments.

PIM Joins are refreshed every 60 seconds by a downstream router to keep multicast state alive at the upstream router. With an increase in multicast state there is an increase in PIM control traffic required for refresh. Scaling could become an issue with MVPNs where,

McBride

[Page 3]

Internet Draft

PIM Refresh Problem Statement

November 2007

for instance, there could be 1000 MVPNs having 100 mroute entries each along with 10 RPF neighbors. One million entries would then be sent out on the MDT.

Additionally, route changes cause Joins to be sent to the new RPF neighbor. If the Join is lost, there will be disruption of traffic. There is no reliability in the Join/Prune exchange between downstream and upstream routers. Larger values of holdtime in the Join/Prune PDU would reduce the frequency of refreshes, but could also cause larger convergence delays.

[4. Solutions](#)

This is not a solutions draft. Subsequent to this draft, there will be drafts which outline solutions to this problem. The following ideas have been discussed as possible solutions to be further specified:

- + Join/Prune Ack extension to PIM.
- + Hard state (TCP) solution.
- + PIMv3 (strong RPF, explicit tracking, hard state, etc)
- + Include checksums in Hello messages rather than sending periodic JPs.

+ Use long holdtimes.

5. Security Considerations

This document is a problem statement, which describes the reduction of PIM messaging, and does not introduce security considerations by itself. Any potential solution must protect against exploiting PIM as specified in [RFC 4601](#).

McBride

[Page 4]

Internet Draft

PIM Refresh Problem Statement

November 2007

6. Iana Considerations

This document does not require any action on the part of IANA.

7. Acknowledgments

We'd like to thank Dino Farinacci, Suresh Boddapati, Tom Pusateri, Marshall Eubanks, Robert Kebler, Venu Hemige, Yiqun Cai, Yakov Rekhter, Yetik Serbest, Albert Tian, for their work on the pim refresh design team and helping the PIM WG to define a few possible solutions.

8. Normative References

[Fenner] B. Fenner, "Protocol Independent Multicast - Sparse Mode (PIM-SM)". [RFC 4601](#)

[MVPN] "Multicast in MPLS/BGP IP VPNs", Rosen, Aggarwal, July 2007,

9. Informative References

[MORIN] T. Morin, "Requirements for Multicast in L3 Provider-Provisioned VPNs", [RFC 4834](#)

10. Authors' Addresses

Mike McBride
mmcbride@cisco.com

McBride

[Page 5]

Internet Draft

PIM Refresh Problem Statement

November 2007

11. Full Copyright Statement

Copyright (C) The IETF Trust (2007).

This document is subject to the rights, licenses and restrictions contained in [BCP 78](#), and except as set forth therein, the authors retain all their rights.

This document and the information contained herein are provided on an "AS IS" basis and THE CONTRIBUTOR, THE ORGANIZATION HE/SHE REPRESENTS OR IS SPONSORED BY (IF ANY), THE INTERNET SOCIETY, THE IETF TRUST AND THE INTERNET ENGINEERING TASK FORCE DISCLAIM ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

12. Intellectual Property

By submitting this Internet-Draft, each author represents that any applicable patent or other IPR claims of which he or she is aware have been or will be disclosed, and any of which he or she becomes aware will be disclosed, in accordance with [Section 6 of BCP 79](#).

The IETF takes no position regarding the validity or scope of any Intellectual Property Rights or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; nor does it represent that it has made any independent effort to identify any such rights. Information on the procedures with respect to rights in RFC documents can be found in [BCP 78](#) and [BCP 79](#).

Copies of IPR disclosures made to the IETF Secretariat and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementers or users of this specification can be obtained from the IETF on-line IPR repository at <http://www.ietf.org/ipr>.

The IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights that may cover technology that may be required to implement this standard. Please address the information to the IETF at ietf-ipr@ietf.org.