

# IP Multicast with PIM-SM over a MPLS TE Core

draft-raggarwa-pim-sm-mpls-te-00.txt

Rahul Aggarwal

Juniper Networks

rahul@juniper.net

# Authors

---

- § Rahul Aggarwal (Juniper)
- § Tom Pusateri (Juniper)
- § Dino Farinacci (Procket)
- § Liming Wei (Redback)

# Agenda

---

- § Problem Statement
- § Motivation
- § Operation Overview
- § Conclusion

# Problem Statement

---

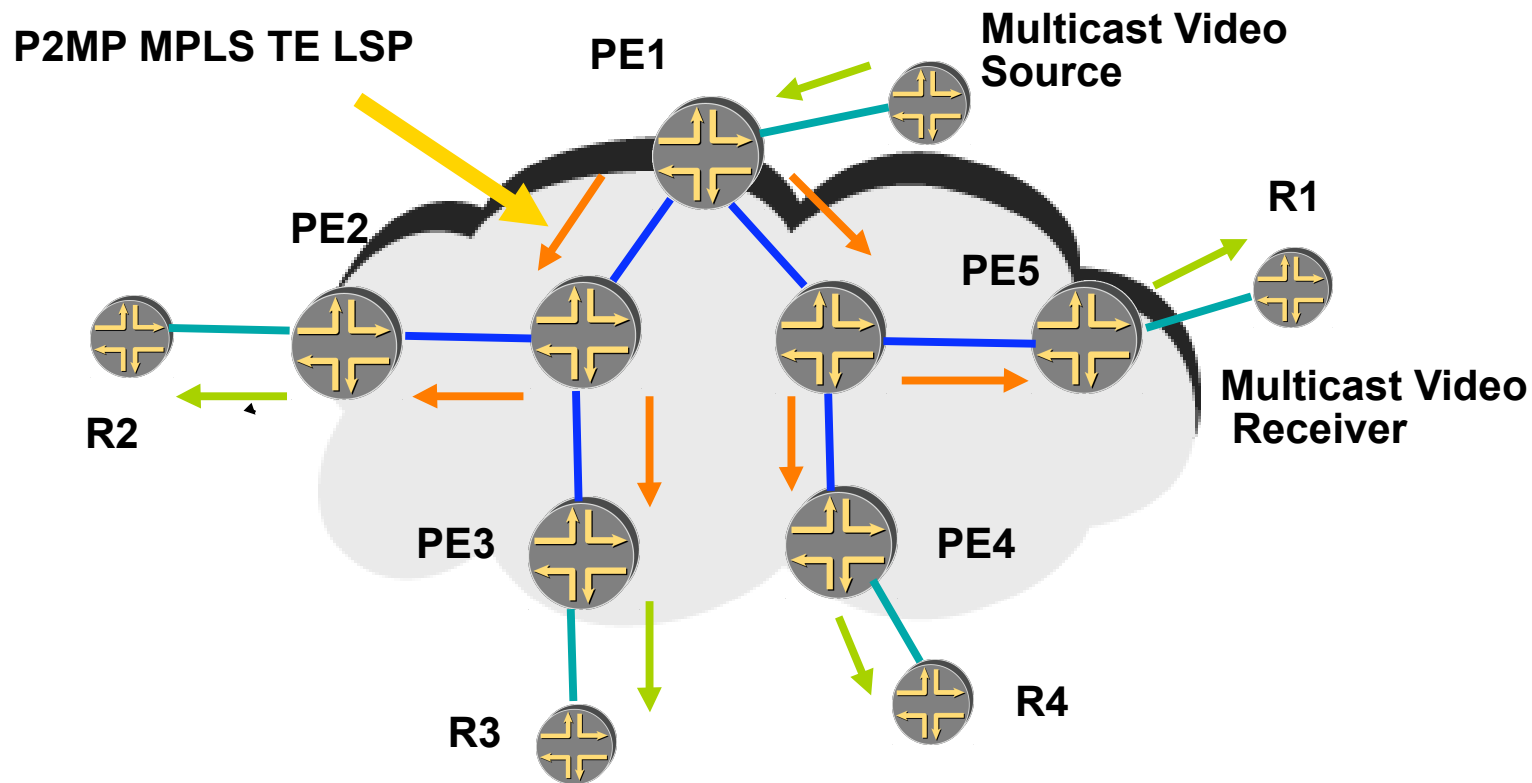
- § How do we provide an IP multicast service over a MPLS core that is multicast free ?
- Edge routers support PIM-SM
  - MPLS core with Point to Multipoint Traffic Engineering LSP

# Motivation

---

- § How do we provide multicast service over a deployed MPLS core that is multicast free ?
  - Provider wants to keep BGP routes out of the core that are needed for RPF: hence unable to run PIM-SM in the core
  - Provider may want to keeping multicast routing state out of the core
- § Added benefit is Traffic Engineering for multicast traffic
  - QoS for content distribution
  - MPLS protection schemes can be used (fast reroute)
- § BGP is not needed for multicast RPF in the core
  - The core may be BGP free for unicast
  - Possible to have a truly BGP free core
- § Can increase deployment of IP multicast !

# IP Multicast Over P2MP MPLS TE



# Terminology

---

- § Spe: Source PE connected to the multicast traffic source
- § Rpe: PE connected to one or more receivers

# Operation Overview

---

- § PIM-SM control state exchange between PEs
- § MPLS P2MP LSP endpoint discovery i.e. Rpe discovery by the Spe
- § Mapping IP multicast traffic at the Spe to a P2MP LSP
- § RPF interface determination at the Rpe



# PIM-SM Between PEs

---

- § Edge routers need to exchange PIM-SM routing information
  - Have to support the PIM-SM extensions
- § For a (S, G) Rpe resolves S onto the Spe (BGP next-hop) advertising S
- § Rpe initiates a “remote” PIM-SM adjacency with Spe
  - Draft-raggarwa-pim-sm-remote-nbr-00.txt
- § Rpe sends Join/Prune messages to the Spe

## P2MP LSP Endpoint Discovery / Setup

---

- § Spe can treat a Rpe as a P2MP LSP leaf on receiving a (S, G) join
  - Dynamic discovery
- § Spe associates the (S, G) Join with a P2MP LSP
  - If needed Spe adds the Rpe as a new leaf to the P2MP LSP
  - Draft-raggarwa-mpls-p2mp-te-00.txt

# Mapping IP Multicast Traffic to a P2MP LSP

---

- § Spe creates a multicast forwarding entry for a (S, G) or (\*, G) with the P2MP LSP as an OIF
- § P2MP LSP selection at the Spe
  - Local matter

# RPF Interface at the Rpe

---

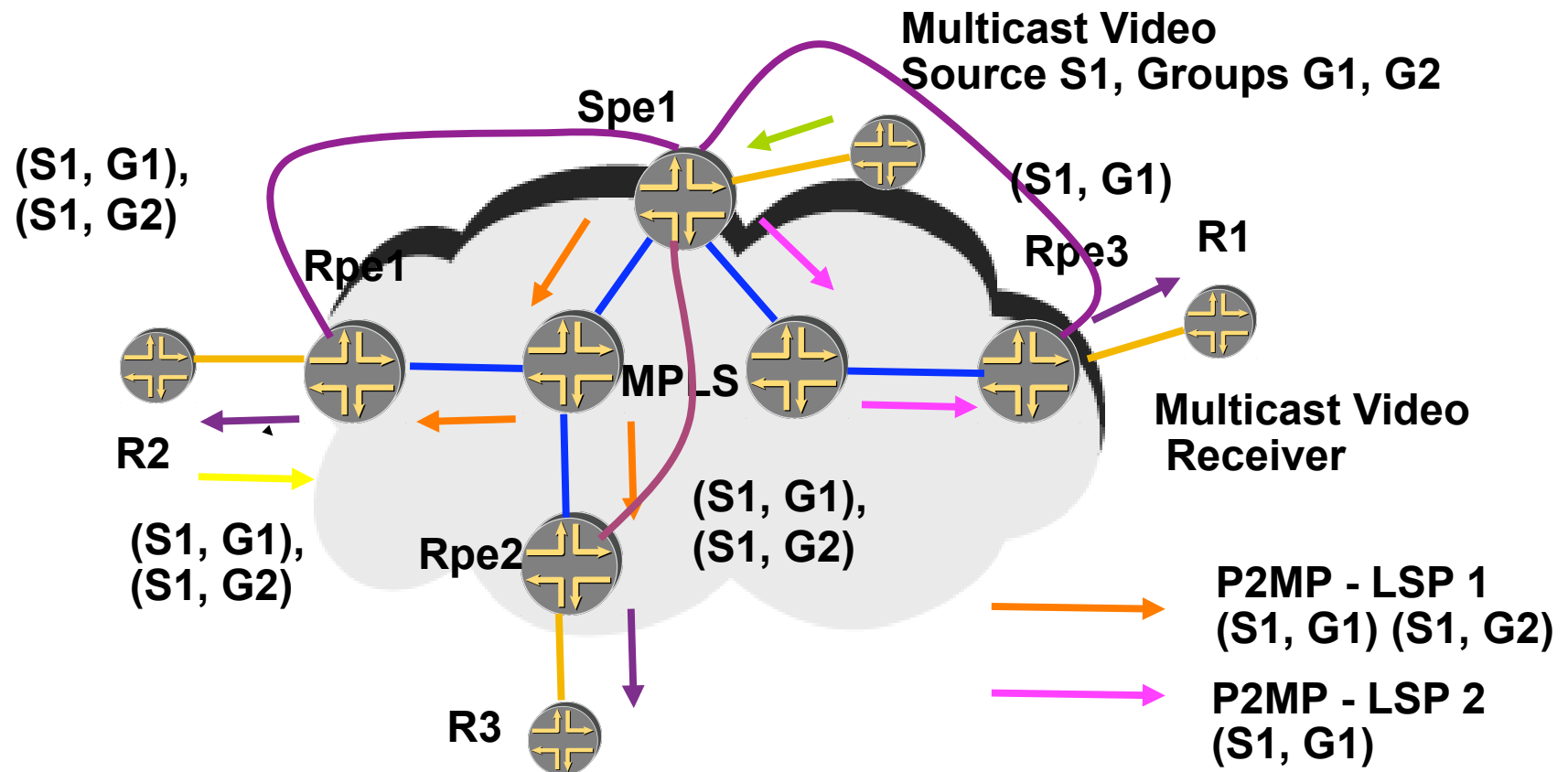
- § Rpe uses a P2MP LSP as the RPF interface for a given (S, G) pair
  - Must be the same as the P2MP LSP used by the Spe for that (S, G)
- § Spe needs to communicate the (S, G) entry to P2MP LSP mapping to the Rpe
- § Join Ack Message
  - Propagates the Group Set associated with a P2MP LSP to the Rpe

# Join Ack Message

---

- § Needed for RPF interface determination at the Receiver PE
- § Propagates the Group Sets – P2MP LSP association to the Receiver PE
- § Can have a list of route attributes
- § Associates the Group Sets in the message with the route attribute list
- § A route attribute is a TLV with an attribute value
- § A route attribute is defined for carrying the P2MP LSP identifier

# IP Multicast over P2MP MPLS TE Procedures: Example



# Conclusion

---

- § MPLS WG to work on the P2MP LSP setup
  - P2MP LSP setup is in the charter
  - Requirements and solutions being discussed
- § PIM-SM WG to do the PIM-SM extensions
- § Comments ?
- § WG taking on this work ?
- § <http://www.ietf.org/internet-drafts/draft-raggarwa-pim-sm-mpls-te-00.txt>

**Thank You**