Multicast Forwarding Equivalence Class [MFEC]

draft-guo-mboned-mfec-framework-00.txt

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Motivation

- Bundles of multicast sources and groups are normally deployed centralizedly
- E.g. IPTV try to push all programs to last-hop router by configuring igmp static join
- Most of multicast traffic have to follow same distribution tree
- But router maintains multiple separate (S/*, G)s for same distribution tree

So ……

- Route convergence ?
- Efficiency for protocol's packet exchange ?
- Too much memory occupation ?
- Be subject to attack if terminals request router to create too many (S/*, G)

Purpose

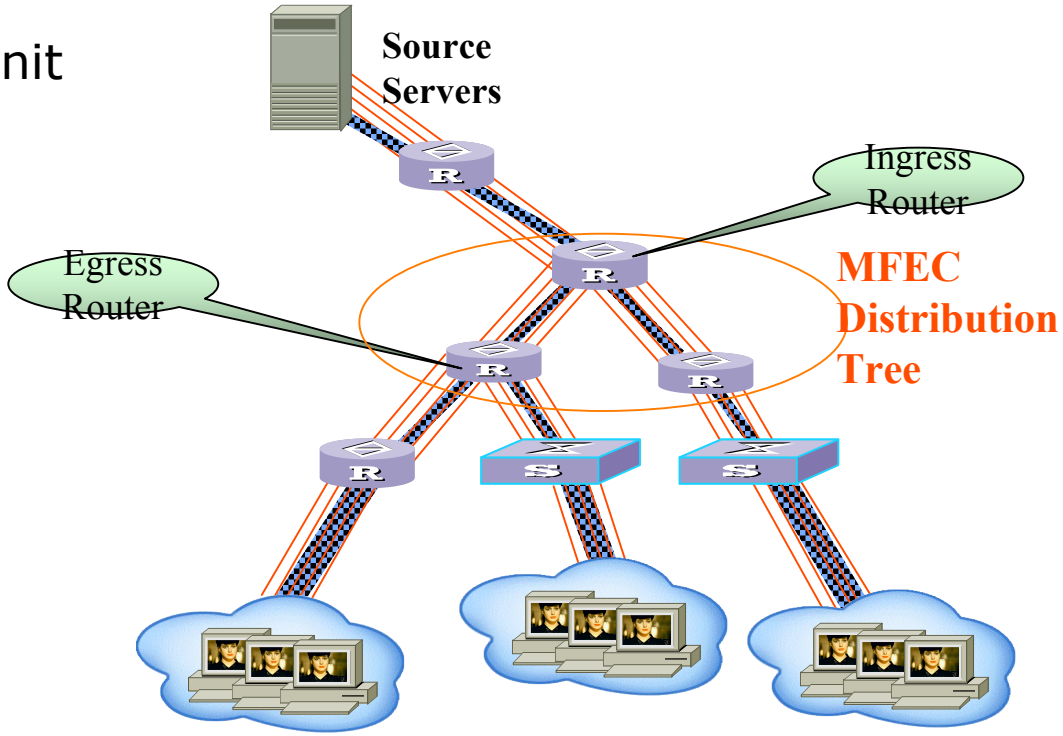
- To provide a generalized framework for merging these redundant states
- Reduce the state information and maintenance cost in the core or intermediate routers
- Increase the state scalability of the multicast and prevent it from easy attacks
- May be a springboard for future work to enhance multicast expansibility and stability

What's MFEC

- Multicast Forwarding Equivalent Class (MFEC): a set of multicast data packets that are forwarded in the same way
- E.g. a set of the data packets that pass the same multicast distribution tree or sub-tree and receive the same forwarding processing. Even also includes same QoS treatment.

Basic Framework

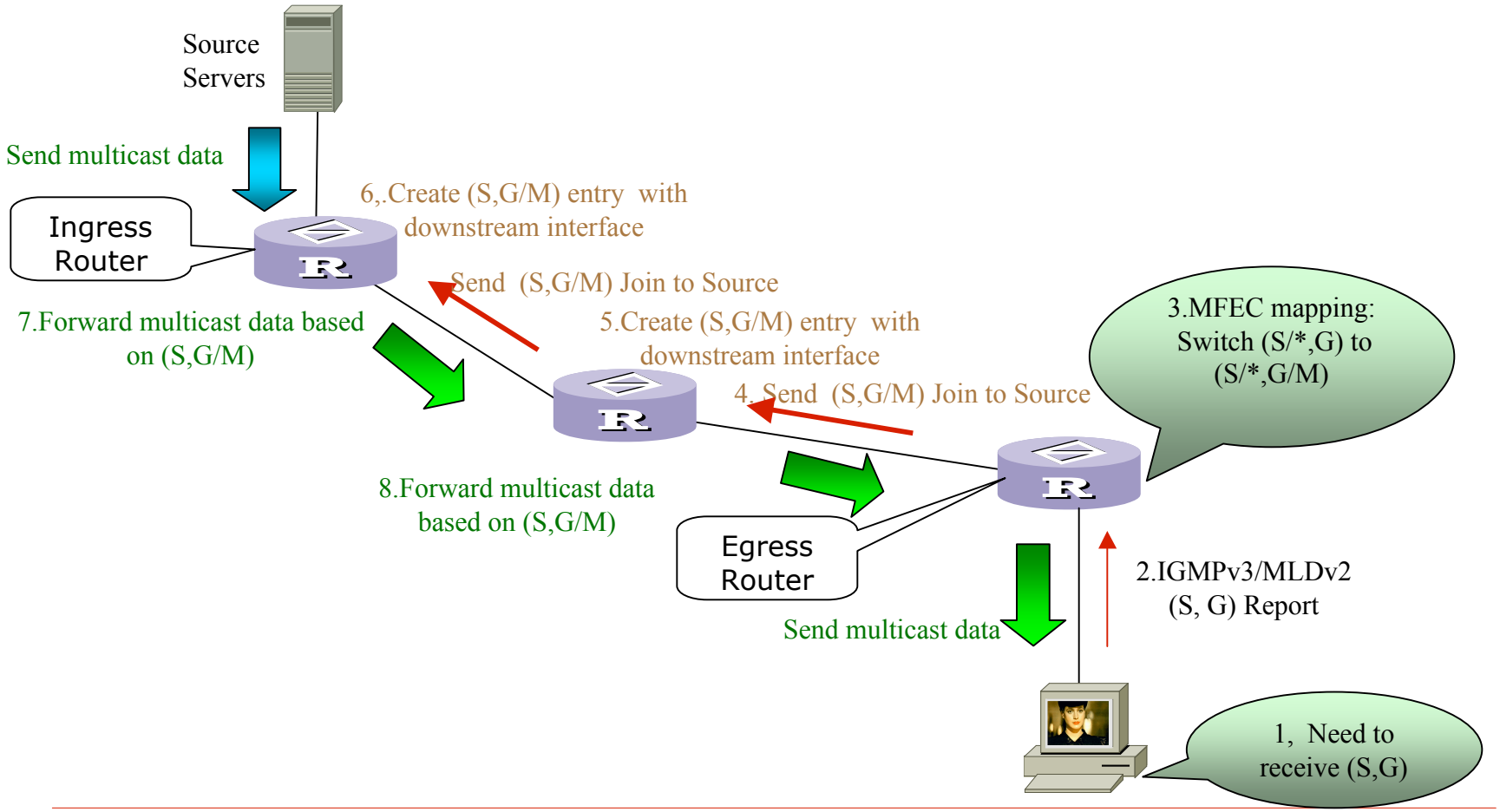
- to make data flow that passes the same distribution tree or sub-tree to use the same MFEC status from ingress router to egress router.
- To take mfec as min unit
- MFEC can be
  (S/*, G/M),
  (S/M, G),
  (S/M, G/M) etc
- Dynamic MFEC or Static MFEC



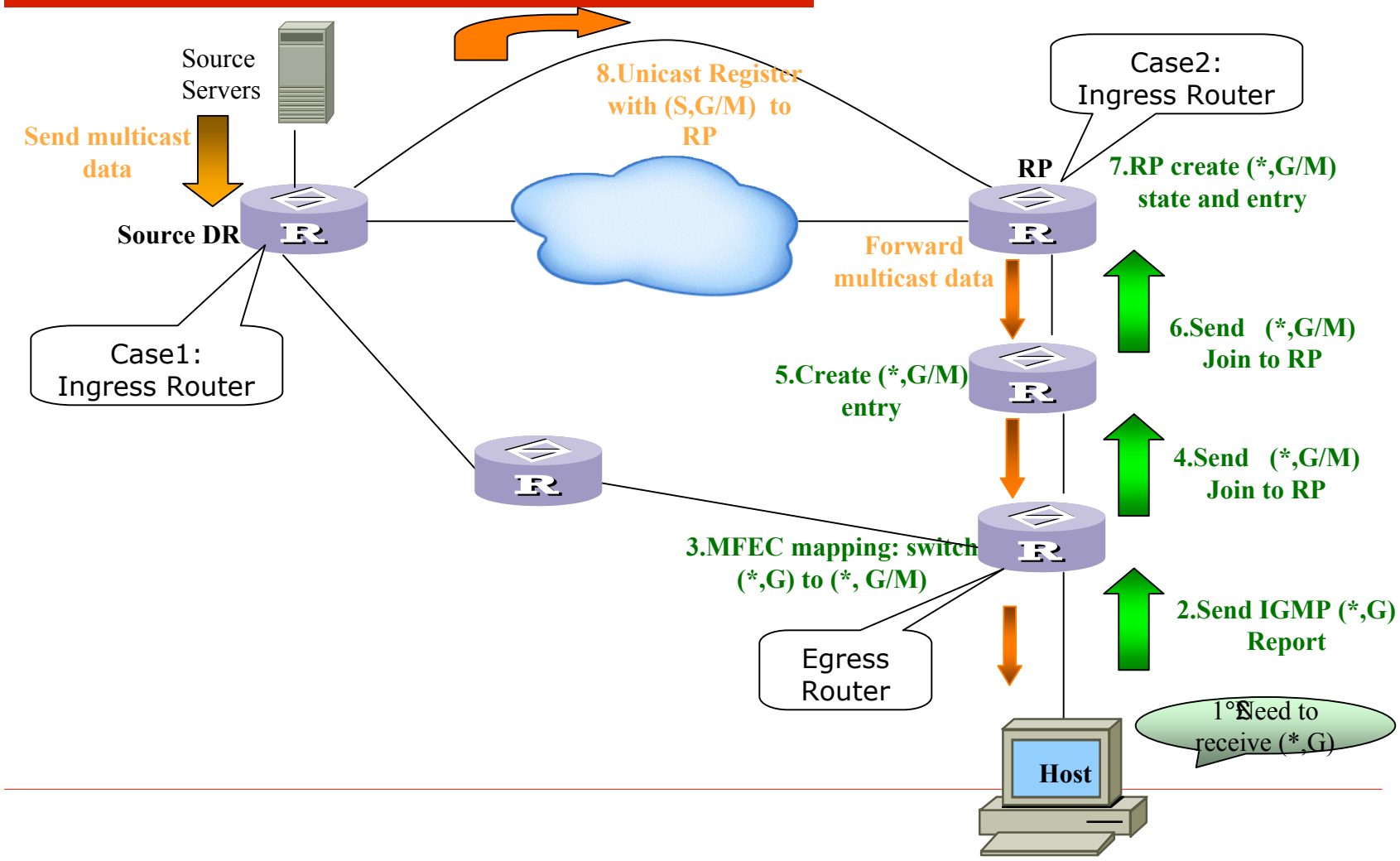
MFEC's principles

- 1) Downstream per-interface (S, G/M) state machine: In the protocol-packets, MFEC is used to replace (S, G) or (*, G). If the data of (S, G/M) belongs to an MFEC, the G segment in (S, G) Join/Prune message is filled in with M.
- 2) Multicast routing table: MFEC replace (S, G) or (*, G) in multicast routing table
- 3) Multicast forwarding table: MFEC replace (S, G) or (*,G) in multicast forwarding table
- 4) Mapping from (S/*, G) to MFEC: Ingress router
- 5) Mapping of MFEC to (S/*, G): Egress router

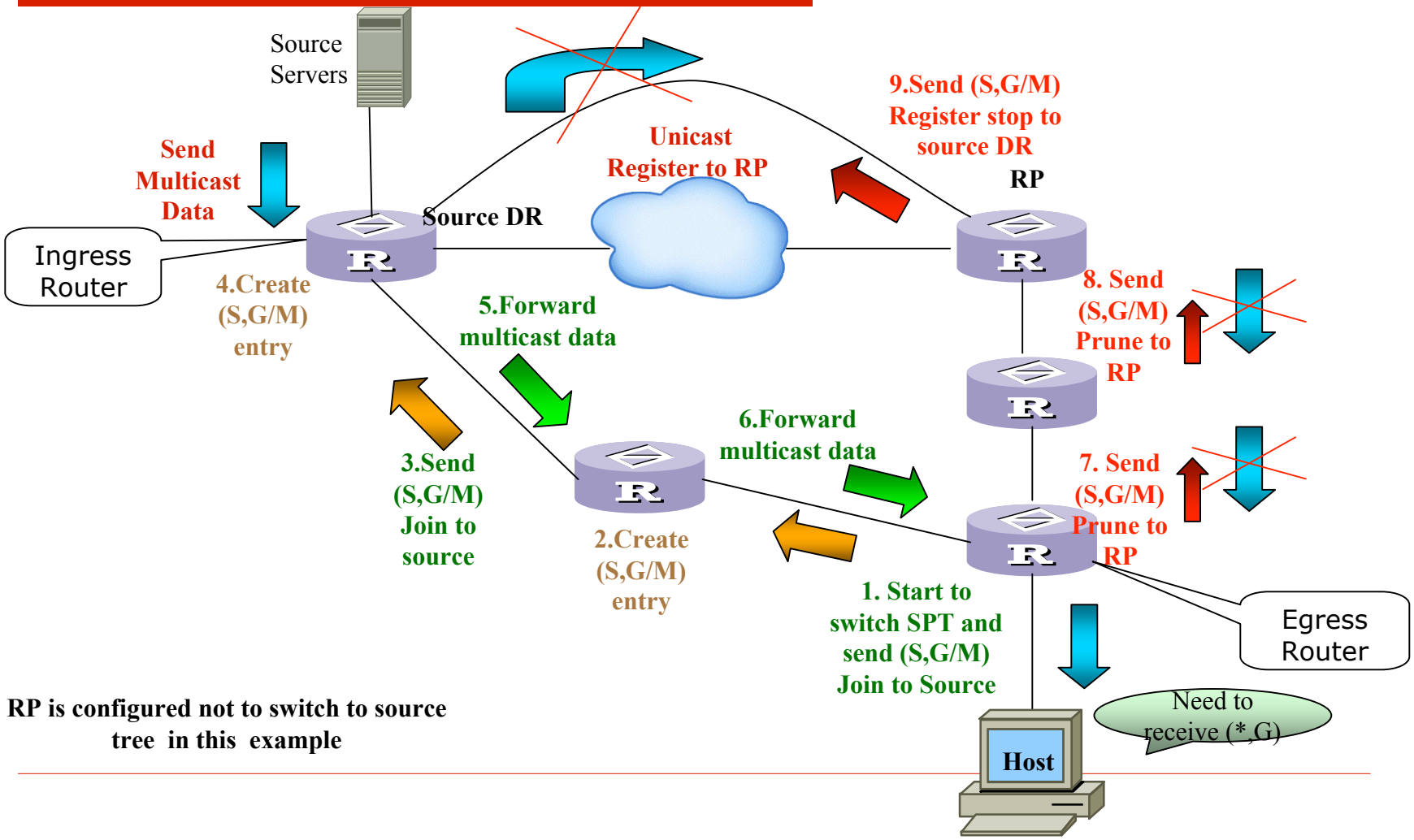
Procedure of PIM-SSM MFEC



Procedure of PIM-SM MFEC



PIM-SM MFEC: RPT to SPT



Next Steps

- in the mail list, some discuss and clarification has been done . More comments are welcome!
- the implementation of prototype is underway.
- To propose the detail enhancement based on the idea of MFEC
- Accept this draft as a WG I-D?
- MFEC can be also adopted in other relative applications such as multicast VPN

Q&A in mail list

- Q: Pull model is better, the subscriber can dynamically request IP multicast TV content like request web content by unicast.
- Clarification: the last-hop router are statically configured, because:
- multicast pull model requests from end-users impact on control plane of routers ,and this could introduce flapping of multicast TIB. but under unicast scenario, no impact on control plane of routers.
- Since usually thousands of active end-users under each BRAS equipment, by pull model each BRAS would have all of the groups joined(such as IPTV scenarios). mfec would make the control plane of routers much more stable. For core routers, this benefit would be even more obvious .

- Q: 'static' router based setup of IP multicast trees should be outside the scope of IETF work
- Clarification: mfec trees are still built dynamically and could cope with the topology dynamic changes

- Q: To automatically create groups with mask-length of < /32 on received joins is complexity and hard to implement.
- Clarification: this draft doesn't mean forcible automatically aggregation , but according to mapping rules and triggered by statically configuring a group set joining . Sometime by putting less intelligence to the protocol, the improvement would be easily to implement.

- Q: limited applications?
- Clarification: consider the scenario of each BRAS with thousands of end-users, and each IPTV source server with 500 to 1000 channels.

Thanks!