PIM Assert Message Packing

draft-liu-pim-assert-packing-01

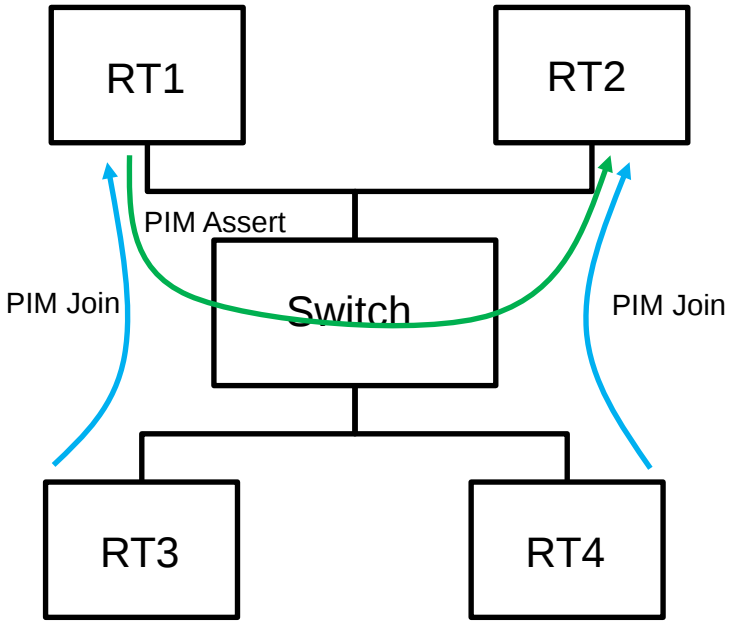
Yisong Liu (Huawei)
Michael McBride (Futurewei)
Toerless Eckert(Futurewei)

IETF106

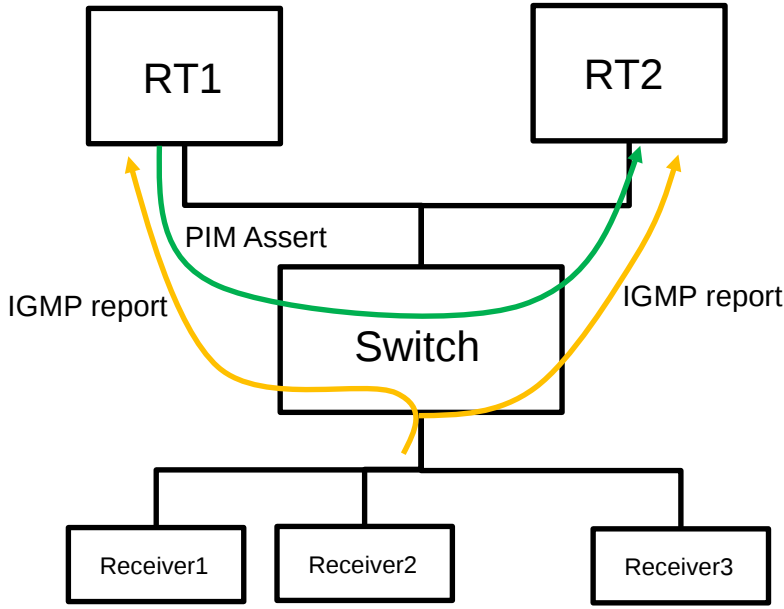
Problem statement

PIM Assert Message

Group Address
Source Address (all 0 means *G)
RPT bit
Metric Preference
Route Metric



PIM Assert in Network Side



PIM Assert in Host Side

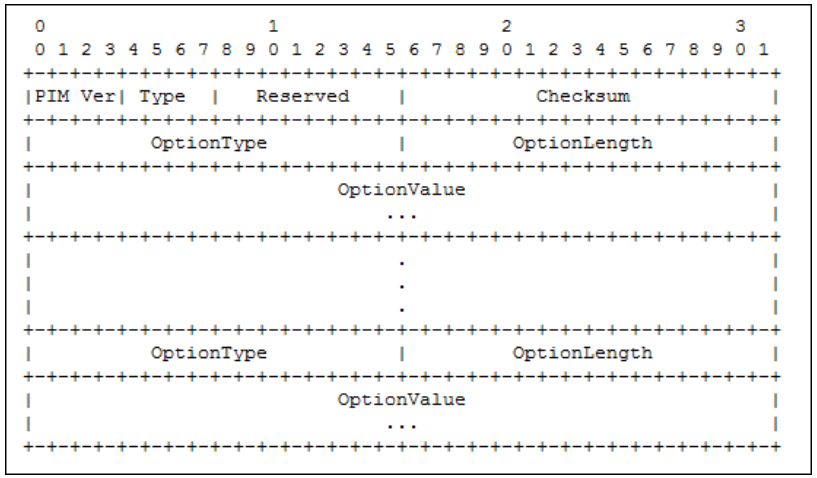
- As the multicast service becomes widely deployed, the number of multicast entries increases, and a large number of assert messages may be sent in a very short period when multicast data packets trigger PIM assert process in the shared networks. The PIM routers need to process a large number of PIM assert small packets in a very short time.
- As a result, the device load is very large. The assert packet may not be processed in time or even is discarded, thus extending the time of traffic duplication in the network.

Solution Overview

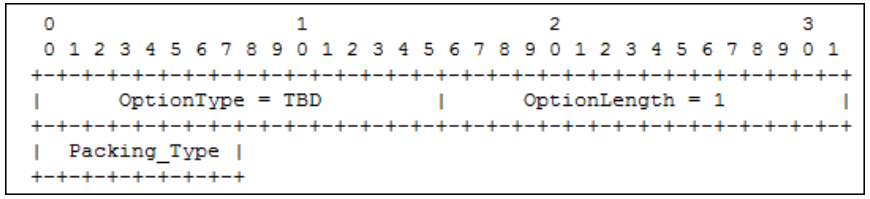
- No change to the PIM Assert state machine
- PIM Hello Option extension for Assert packing
  - Negotiation of the assert packing capability
- PIM Assert Simple packing solution
- PIM Assert Aggregating packing solution

PIM Hello Option Extension Format

PIM Hello Message Format



PIM Assert Packing Hello Option



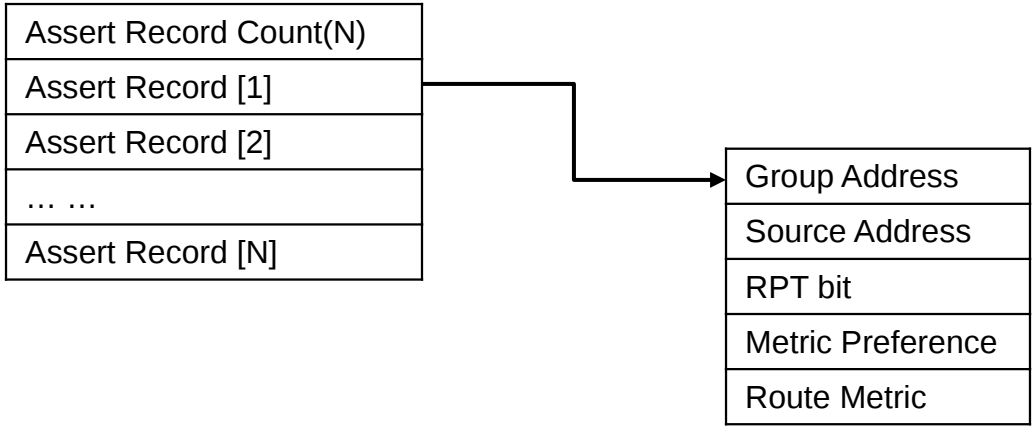
- The newly defined Hello Option is used by a router to negotiate the assert packet packing capability. It can only be used when all PIM routers in the same shared network support this capability.
- The specific packing mode is determined by the value of the Packing_Type field:

✓ 1 : simple packing type;

✓ 2 : aggregating packing type;

✓ 3-255 : reserved for future

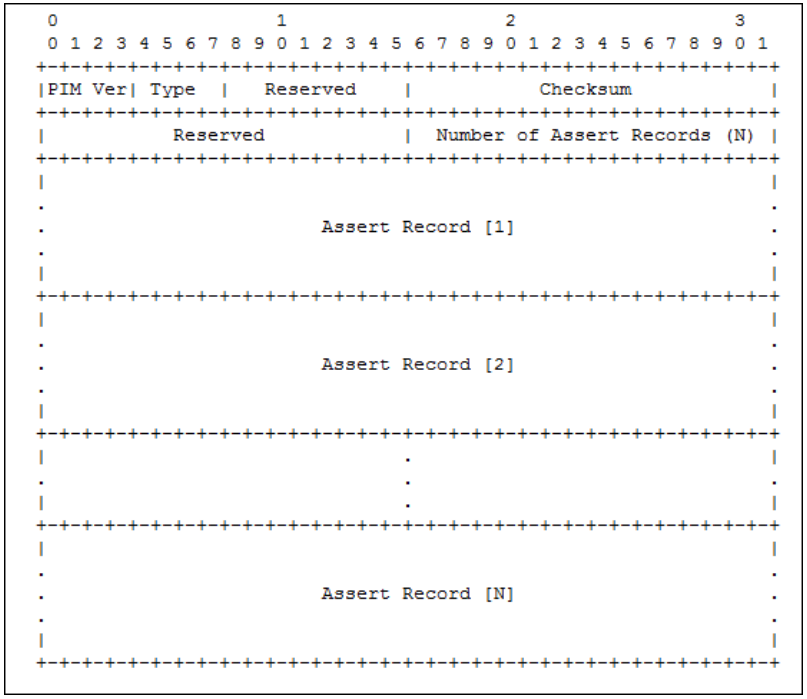
PIM Assert Simple Packing Solution



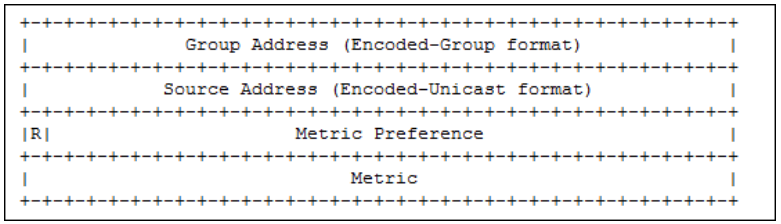
- Solution: The original Assert message body is used as a record. The newly defined Assert message can carry multiple Assert records and identify the number of records.
- Advantages: simple extension from the original assert packet
- Disadvantages: Because the multicast service deployment often uses a small number of sources and RPs, there may be a large number of Assert records with the same Metric Preference/Route Metric field, which wastes the payload of the transmitted message.

PIM Assert Simple Packing Format

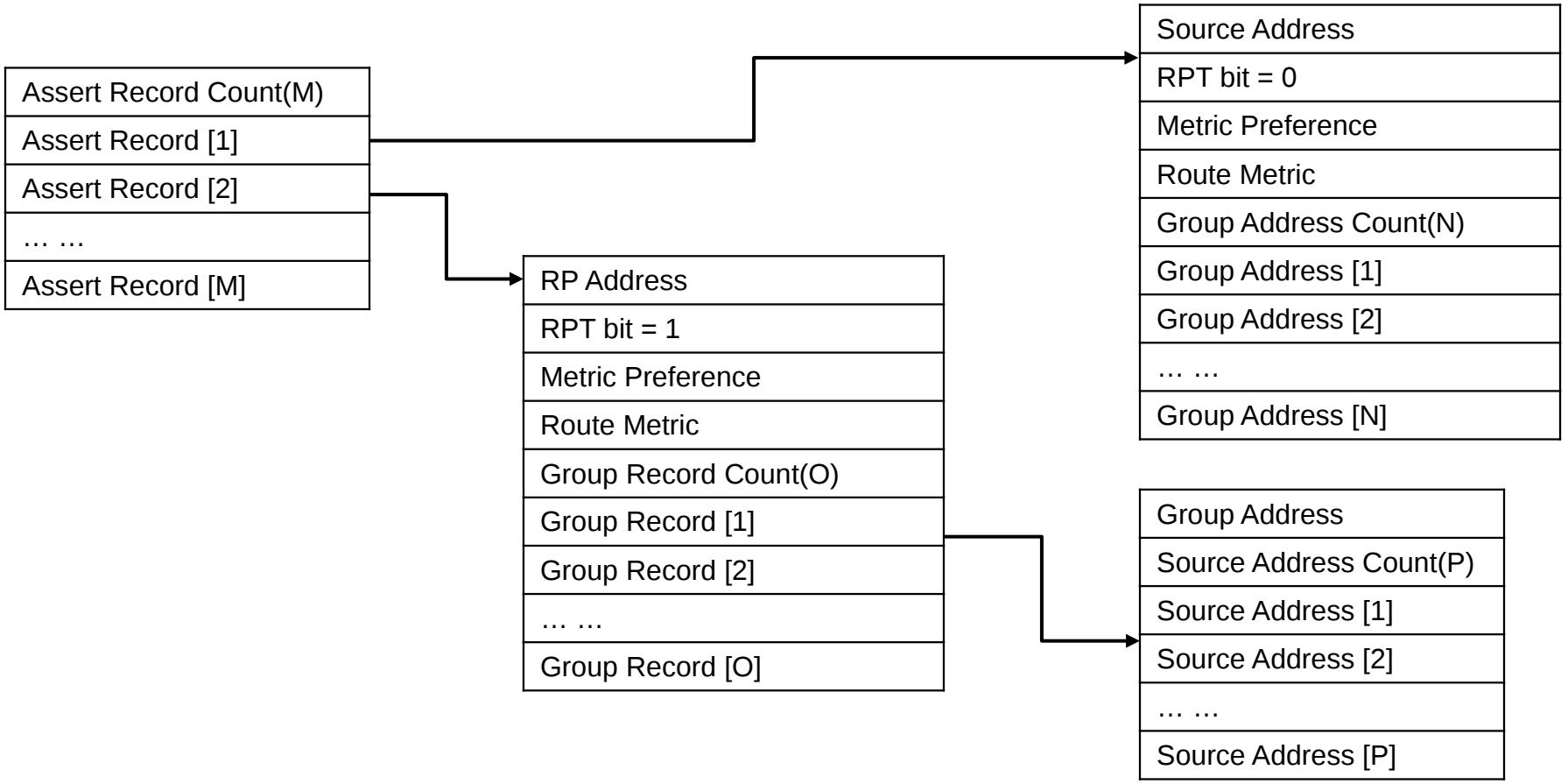
PIM Assert Packet Format



Each Assert Record Format



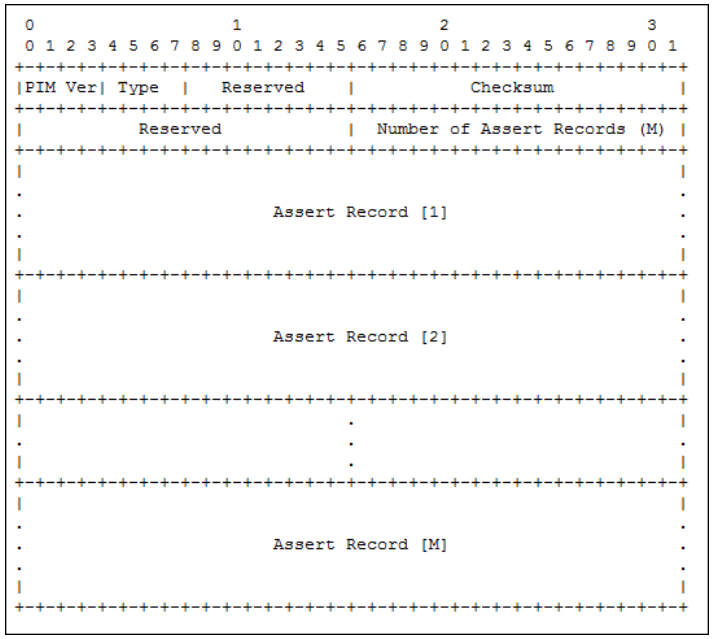
PIM Assert Aggregating Packing Solution



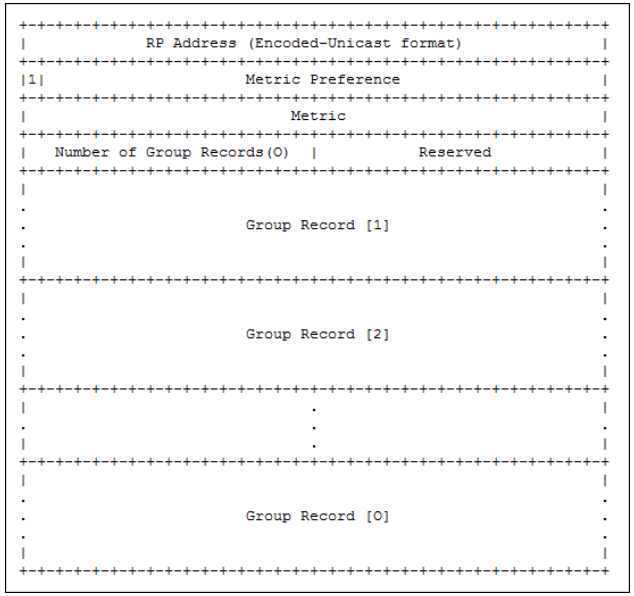
- Solution: Combine the records related to the same source address or RP address in the Assert message.
- ✓ (S, G) Assert is aggregated according to the same source address, and all SPT (S,G) entries corresponding to the source address are merged into one Assert record.
- ✓ (*, G) Assert is aggregated according to the same RP address, and all (*,G) and RPT (S,G) entries corresponding to the RP address are merged into one Assert record.
- Advantages: Optimize the payload of the transmitted message by merging the same field content
- Disadvantages: Add the complexity of the packet encapsulation and parsing

PIM Assert Aggregating Packing Format

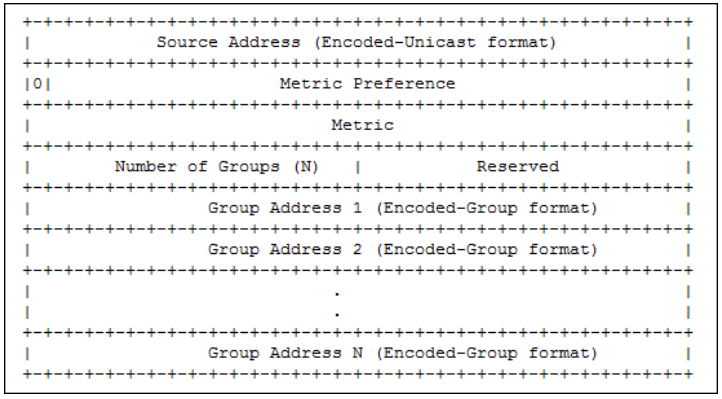
PIM Assert Packet Format



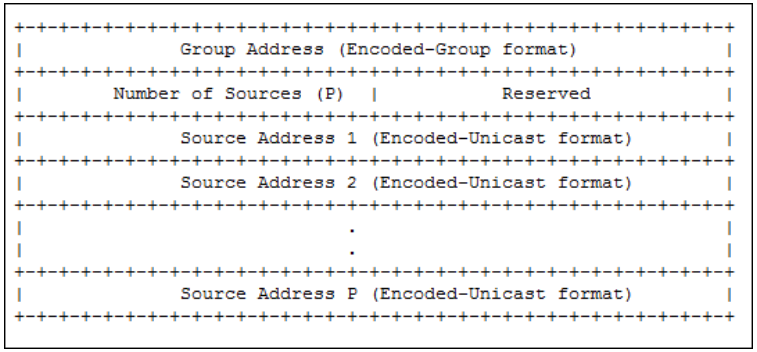
Each (*,G) Assert Record Format (RPT bit = 1)



Each (S,G) Assert Record Format (RPT bit = 0)



Each Group Record Format



All 0 in source address means (*,G)

Next Step

- Worth pursuing or leave assert alone?
  - replace asserts?
  - don't do asserts and live with duplicates?
  - optimize asserts (this draft)?