

# Design Consideration of IPv6 Multicast Source Routing (MSR6)

**Weiqliang Cheng**, China Mobile

**Gyan Mishra**, Verizon

**Zhenbin Li**, Huawei

**Aijun Wang**, China Telecom

**Zhuangzhuang Qin**, China Unicom

**Chi Fan**, New H3C

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# Background & Potential Use Case

Pure IPv6 networks will be / is deployed soon

- More and more applications and the Web sites begin to support IPv6
- Most operators' networks have already support IPv6 well
- IPv6 traffic is growing rapidly around the world. In some countries the annual growth rate even exceeds 10%.

New types of live video traffic in the network bring new opportunities and requirements for multicast solutions.

OTT Live Video  
(Douyin, Taobao, Tik Tok)

- ✓ A person can be a multicast source and the huge number of sources
- ✓ Large number of online viewers and Frequent interaction
- ✓ Multicast As A Service

Video Surveillance

Subway and city security protection: Multiple clients simultaneously monitor live video from a camera.

Financial Securities

AB dual planes for multicast distribution of securities transaction services

Media Asset Network  
(TV station)

New media programs by using the IP technology.

For IPv6 network, Service oriented Multicast Technology is need

Network

Service oriented Point-to-multipoint forwarding effectively reduces redundant network traffic and network load, as well as service guarantee

Platform

Point-to-multipoint applications reduce the server and CPU loads and decouple the impact of the increase in the number of users on the multicast source.

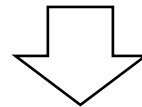
# Background: Existing Work

## Traditional Multicast Solutions

- Request multicast tree-building on control plane
- Maintain end-to-end tree state per flow
- E.g., PIM, P2MP RSVP-TE

## Source Routing Technologies

- Reduce the state of intermediate nodes
- Indicate forwarding behaviors in the ingress nodes
- Simplify deployment and maintenance
- E.g., SRv6, BIER



IPv6 + Multicast + Source Routing

IPv6 multicast source routing (MSR6) solution is requested in the IPv6 network?

# MSR6 Design Consideration

- Support the basic multicast functionalities, including:
  - P2MP Forwarding: replicate and forward multicast packet to the next replication nodes;
  - Multicast Flow Overlay: multicast service, such as MVPN
  - P2MP OAM functions: Ping/Traceroute/BFD
- Meet the need of high quality service with high reliability, including:
  - Traffic Engineering: explicit path specification to satisfy different kinds of requirements
  - FRR
  - E2E Protection
  - Advanced network measurement functions, including: performance measurement and In-situ Flow Information Telemetry, which is the basis for traffic engineering and high quality transport service

# MSR6 Design Consideration-cont.

- The existing IETF work should be reused as much as possible, including:
  - BIER: uses bitstring in the BIER header to indicate leaf nodes which gives an efficient solution for Best Effort multicast flow
  - SRv6: has advantages in indicating explicit paths and the capability of flexible path programming
- The existing and ongoing IPv6 extensions
  - ✓ Existing functionalities, such as fragmentation and security
  - ✓ New network functionalities based on the ongoing IPv6 Extensions, including Network Slicing, Deterministic Networking(DetNet), IOAM
  - ✓ Future possible work based on IPv6 extensions, including Application Aware Network (APN)

# Summary

MSR6 is supposed to have:

- Native IPv6 design to reduce header layers and enable unified processing
- Reuse existing IPv6 capabilities and SRv6 capabilities for multicast
- BIER is able to implement network programming at the ingress nodes in Best Effort scenarios.

MSR6 needs to take advantage of the capabilities in the existing BIER mechanism

- MVPN and Traffic Engineering support are requested

It is the right time to expect a new multicast solution

**Comments?**