6MAN WG

Segment Routing IPv6

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IETF92 – Dallas, March 2015

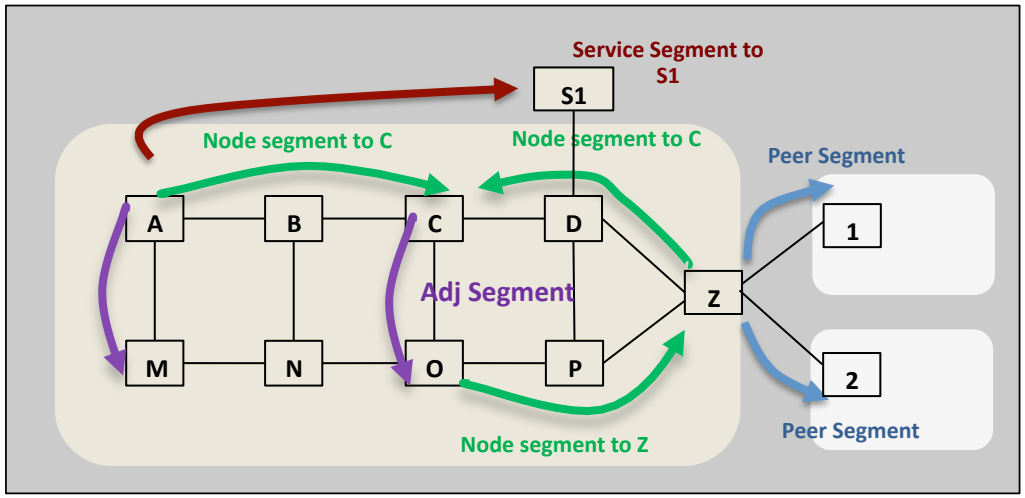
Current SR-IPv6 Drafts

- draft-ietf-spring-ipv6-use-cases (SPRING WG)
  - describes the SR-IPv6 use cases
- draft-previdi-6man-segment-routing-header (6MAN WG)
  - describes a new type of the Routing Header (SRH)
- draft-vyncke-6man-segment-routing-security (6MAN WG)
  - describes the security mechanisms applied to the SRH

Segment Routing for IPv6 Dataplane

- A Segment is identified through its IPv6 address
  - No mapping needed between SIDs and node's addresses
  - Simplifies signaling of nodes and prefixes SIDs
- New Routing Extensions Header type
  - Segment Routing Header (SRH)
  - Contains Segment List, Policy List, HMAC and flags

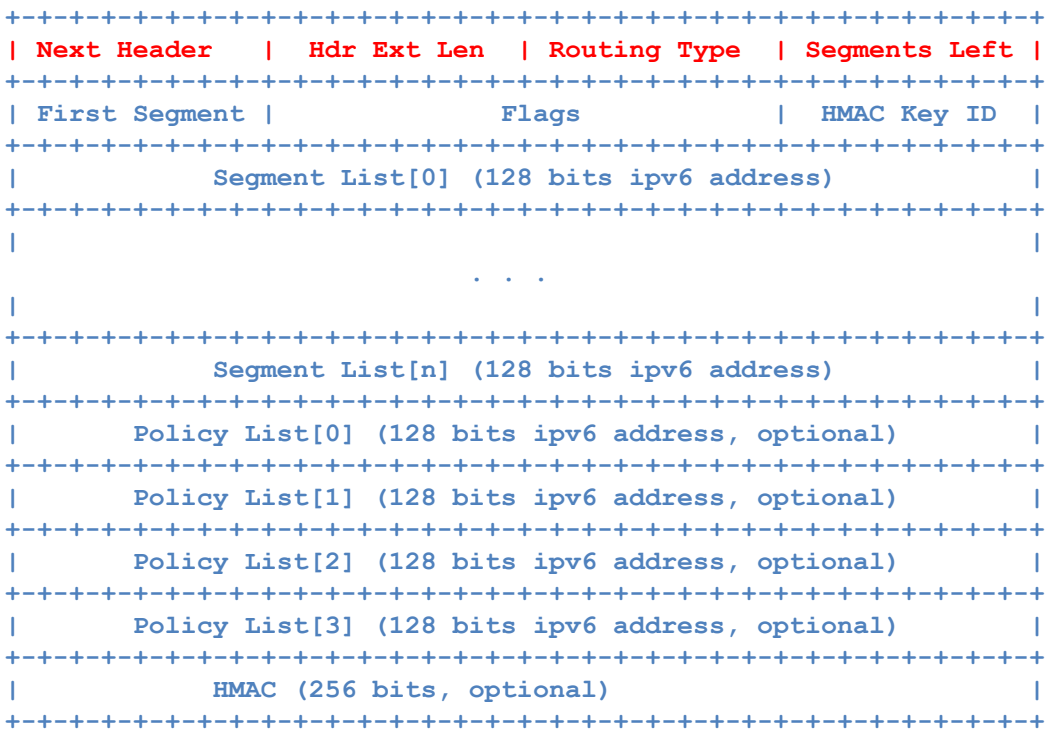
Segment Routing and the Source Based Routing Model



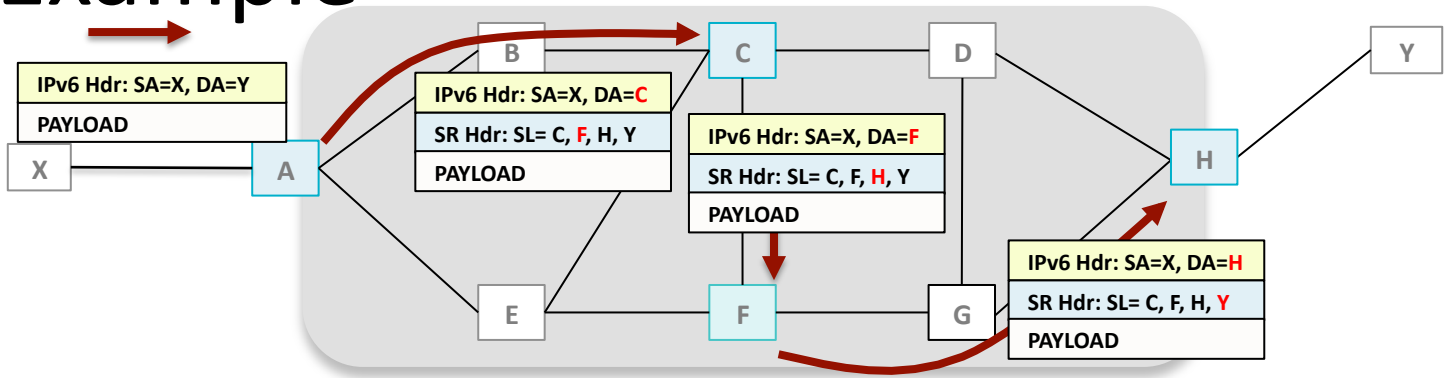
- Segment Routing Leverages the source routing model as defined in RFC2460…
- Segment Routing basic component is called “segment” and consists of an instruction with an identifier
  - E.g.: send packet towards this node address following IGP Shortest Path
  - E.g.: send this packet through this specific link of this specific node regardless what the IGP shortest path to destination
  - E.g.: send this packet to this specific service instance
- Segments can represent any type of instruction
  - IGP-based, BGP-based, local adjacency, service/app, location, context, …

Changes in -05

- Segment List is reversed: first segment of the path is last segment of the list.
- Compliant with rfc2460 on “segmentsLeft ==0”
- First Segment points to end of the segment list/array (i.e.: first segment of the path)



SR-IPv6 Example



- At ingress, the Segment Routing Header (SRH) contains
  - **Segment List**: C,F,H,Y (original destination address is encoded as last segment of the path)
  - **Segments Left**: points to the current segment of the path (C)
  - **DA** is set as the address of the first segment: C
- Packet is sent towards its DA (representing the segment)
  - Packet can travel across non SR nodes who will just ignore the SRH
  - RFC2460 mandates only the node in the DA must examine the SRH
- When packet reaches the segment endpoint the following process is executed:
  - Segments-Left is inspected, decremented and DA is updated
  - Packet is sent towards its DA

Implementations

- Multiple implementations exist and interoperability has been demonstrated during IETF90, IETF91, IETF92 and other places/occasions
  - Based on draft-previdi-6man-segment-routing-header-05.txt
  - Cisco,
    Comcast,
    Ecole Polytechnique (Paris),
    UCLouvain (LLN, Belgium)
- Demonstrated interoperability between multiple, independent IPv6 Segment Routing implementations (routers and hosts)
- Illustrate interoperability between SR and non-SR capable routers and hosts
- Illustrate how SR can be leveraged for video content delivery through SR capable caches

Adoption ?

- Due to:
  - stage of SR-IPv6 protocol extension
  - interoperable implementations
  - use cases being addressed
  - interest from network operators
- The authors, would like the WG to consider the adoption as WG item:
  - draft-previdi-6man-segment-routing-header
  - draft-vyncke-6man-segment-routing-security

Questions?

Thanks!