MSR6 WG – Solution Overview

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Toerless Eckert (Futurewei USA), tte@cs.fau.de

How do we specify MSR6 solutions in the IETF

- Assume there is enough support to work on MSR solutions
  - because native IPv6 could use better multicast
  - Or whichever use-case spurs your interest to collaborate/contribute!

- There would surely be already a single IETF WG that we could just bring the work to, right ?
  - There are already so many working groups, just pick the right one!

Network centric (core) MSR6 architecture

Terminology:

- MSR: MSR6/IPv6 Router , SP P node, ~ BIER BFR
- MSIR: MSR6/IPv6 Ingres Router, SP ingres PE node, ~ BIER BFIR
- MSER: MSR6/IPv6 Egres Router, SP egres PE node, ~ BIER BFER
- R: IPv6 router without MSR6 support
- MSR domain: MSIR ... MSER

Strict and loose MSR6 hops (loose: MSR6-R1-MSR3)

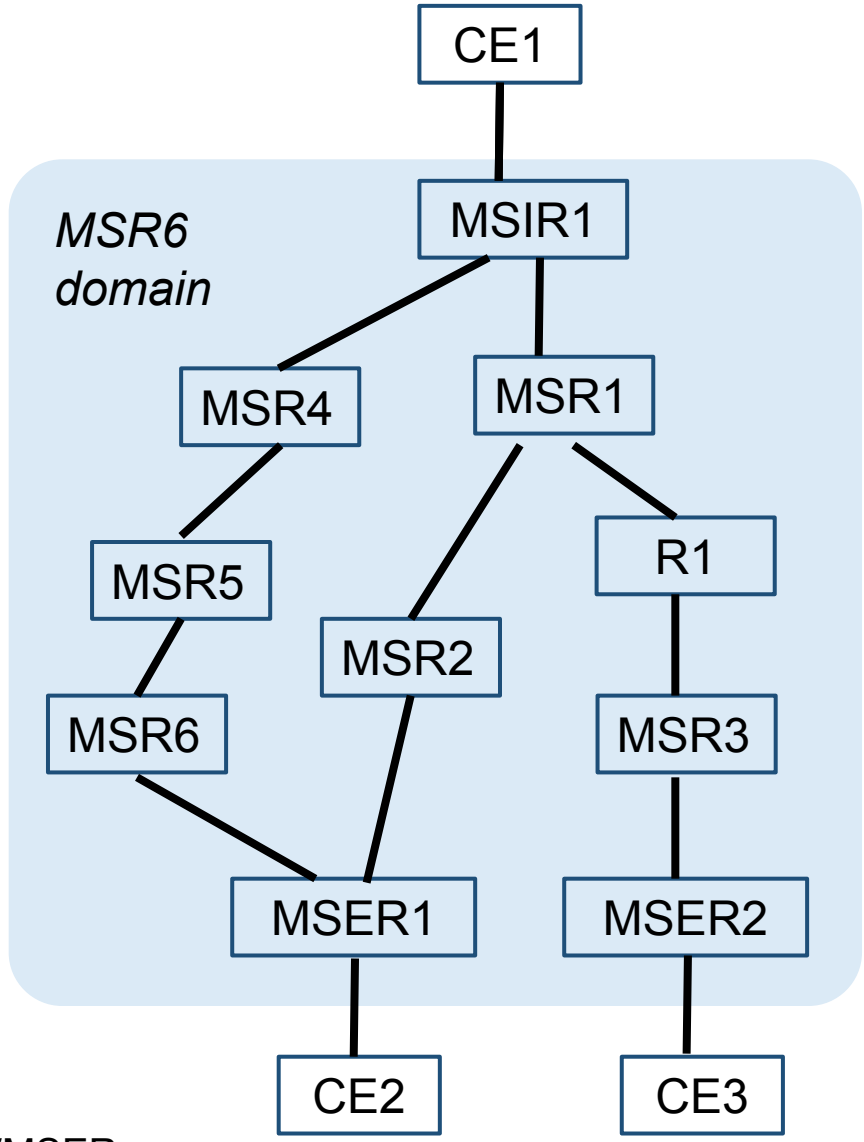
Shortest path and steered path (MSIR1-MSR4-MSR5-MSR1-MSER1)

IPv6 packet with MSR6 routing header (MRH) from MSIR to MSER

- BE MRH option: header indicates only set of MSER for packet
- TE ("traffic engineering"): header indicates MSER and intermediate MSR hops

Services

- CE – CE: IPv6 multicast
  - CE-MSER/MSIR: IPv6 multicast (MLD signaling, if CE are routers then also PIM
  - IPv6 into IPv6 encap/decap on MSIR/MSER, e.g.: MVPN [I/S]PMSI mapping
  - Mapping onto specific MSR domain service options
  - E.g: DetNet – latency, throughput guarantees, path diversity PEROF on MSIR/MSER.



End-to-End MSR6 architecture
"Host based"

Terminology:

- MH: MSR6/IPv6 Host (or router) with Application.
  No MSIR/MSER used.
- Can be option in existing network centric architecture

Use-case Example:

- IPTV Server -> Caches/Streamers in metro SP
- Data-Center IPv6 Multicast (stateless on DCN switches!)

Host is router

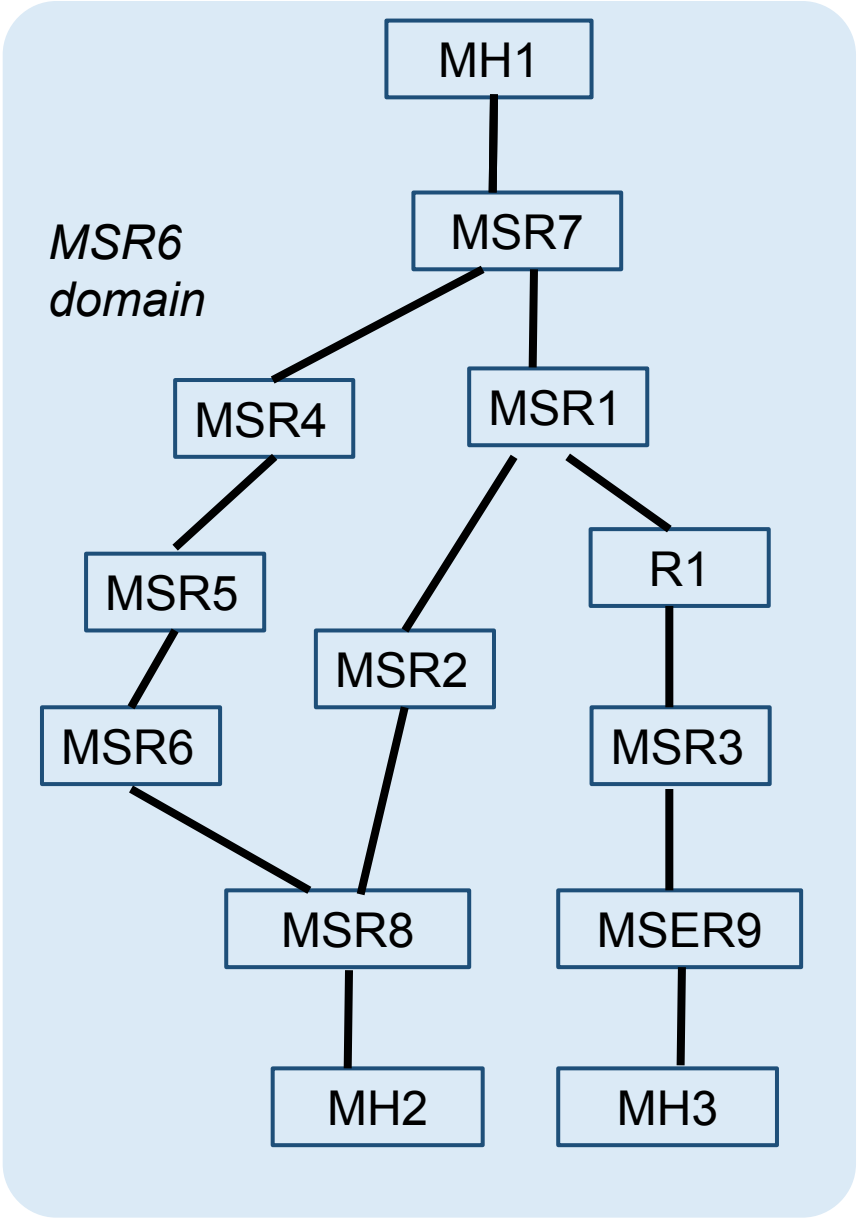
- DC-Server but running all necessary routing (BGP, IGP)
- Common option in DCN servers now
  E.g.: trusted in Hypervisor,
  not third-party container/VM application side!)

Host is not router

- Lightweight non-SP/DCN use cases ?! IoT (MANET/ROLL ?), Industrial,
- E.g.: New PCE<->Host signaling to determine MSH to use

Host is or is not router (most exciting option):

- Native MSR6 application service: No IPv6 multicast



Architecture – further core points

Control Plane architecture – various options

- IGP-only for BE. Even for TE mode, e.g.: MSIR based PCE (e.g.: with LSP IGP)
- Central PCE based for TE mode.

Native MSR6 service

- Significant application benefits, e.g.: adaptive streaming
- May require abstract API specification (e.g.: like MLDv2 API or TAPS for transport)

TBD: Integration / support for DetNet

- If/when IPv6 unicast agrees on extension header for DetNet (currently only MPLS based)
- (almost) Strict path usually required to guarantee latency, throughput, loss -> TE mode

- May want to integrate TBD native DetNet IPv6 extension header elements into MRH
  - Especially when requiring per-hop DetNet functionality – no multiple routing headers!

Integration / Use in existing unicast architectures

- (IMHO): Not mandatory to deploy MSR6, but part of alignment if network uses it
- SRv6, ROLL/RPL ...

Core dependency (6man): MSR6 Routing Header (MRH)

New IPv6 Routing Header

MRH Sub-type:

- support different encoded
  - BE (list of MSER)
  - TE (steered tree) information.

IPv6 Multicast support:

- Need to carry IPv6 destination address to support the native IPv6 multicast model / existing MVPN signaling for IPv6
- *In IPv6 source routing, IPv6 destination address is rewritten on every source routed hop with address derived from routing header, derived from MRH Sub-Type specific data*
- Current spec: RBS draft has it as part of RBS Sub-type data. But ideally part of common MRH header
- *Not included/used when mapping services from BIER (which may or may not be desired in IPv6 control plane solution).*

TLV:

- Same/similar type of TLV functionality as SRv6 SRH

DetNet integration ?

- TBD