Role based Auto Mesh

draft-li-ccamp-role-based-automesh-00

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Problem Statement

- Auto mesh TE defined in RFC4972

  - The LSRs of a TE mesh-group are connected by a full mesh of TE LSPs

  - IGP (OSPF and ISIS) extensions for membership auto-discovery

  - Largely simplify the configurations and deployments of TE LSPs.

- Full mesh TE LSPs may not necessary for some scenarios

  - In a mobile backhaul network, TE LSPs are normally setup between the Cell Site Gateways(CSGs) and the Radio Network Controller (RNC) Site Gateways(RSGs)

  - The TE LSPs between CSGs and TE LSPs between RSGs may not necessary

  - With the existing Auto-mesh TE

    - Large amount of unnecessary TE LSPs established between CSGs and between RSGs

      - May not scale for the CSG devices and is waste of network resources.

    - Or, extra policies and configurations required to avoid unnecessary TE LSPs

Solution

- Role based Auto mesh TE group
  - TE LSPs setup depends on the roles of the LSRs in a group
- Two types of group introduced:
  - "Hub-Spoke" TE mesh-group
    - Two roles: **Hub** and **Spoke** LSR
    - TE LSPs SHOULD be setup between Spoke and Hub LSRs
    - TE LSPs MUST NOT be setup between/among Spoke LSRs
    - TE LSPs MUST NOT be setup between/among Hub LSRs
  - "Root-Leaf" TE mesh-group
    - Two roles: **Root** and **Leaf** LSR
    - Root LSRs signal P2MP TE LSPs toward all the Leaf LSRs once membership determined
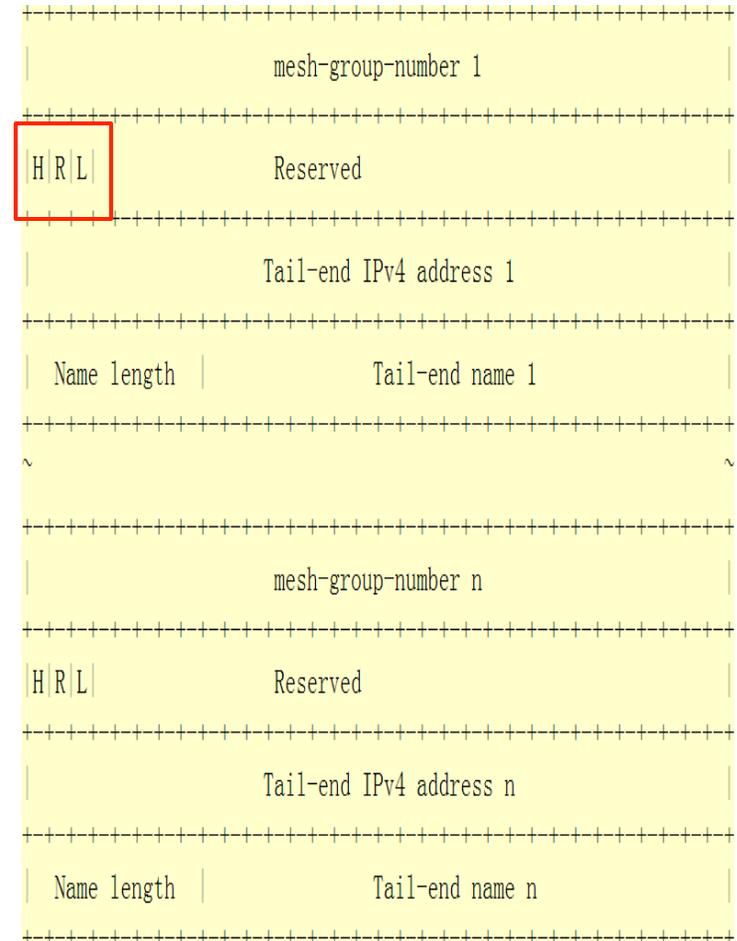
Auto mesh TE

Spoke or Leaf LSRs

Hub or Root LSRs

Role based Auto mesh TE

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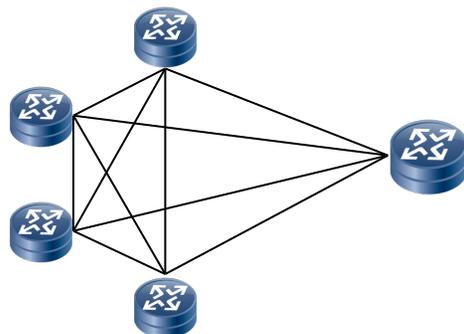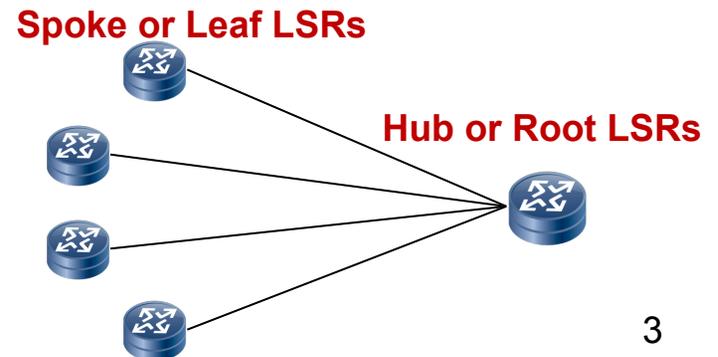
Extensions to OSPF

- OSPF Role-based TE-MESH-GROUP TLV

  - H (Hub-spoke) bit

    - 1 : Hub LSR, 0 : Spoke LSR

  - R (Root) bit

  - L (Leaf) bit

- Carried within the OSPF Routing Information LSA

- Originate new LSA whenever the content of any of the advertised TLV changes

  - Join/Leave a group

  - Role changed

- Area or routing domain scope

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+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                 mesh-group-number 1                     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|H|R|L|                   Reserved                        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                 Tail-end IPv4 address 1                 |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Name length |            Tail-end name 1               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
~                                                         ~
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                 mesh-group-number n                     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|H|R|L|                   Reserved                        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                 Tail-end IPv4 address n                 |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Name length |            Tail-end name n               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Extensions to ISIS

- ISIS Role-based TE-MESH-GROUP sub-TLV

  - Same format as the OSPF Role-based TE-MESH-GROUP TLV

- Carried within the IS-IS Router CAPABILITY TLV

- Originate a new IS-IS LSP whenever the content of any of the advertised sub-TLV changes

  - Join/Leave a group

  - Role changed

- Area/level or entire routing domain scope

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+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                    mesh-group-number 1                        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|H|R|L|                    Reserved                             |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                   Tail-end IPv4 address 1                     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Name length |                Tail-end name 1                 |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
~                                                               ~
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                    mesh-group-number n                        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|H|R|L|                    Reserved                             |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                   Tail-end IPv4 address n                     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Name length |                Tail-end name n                 |
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```

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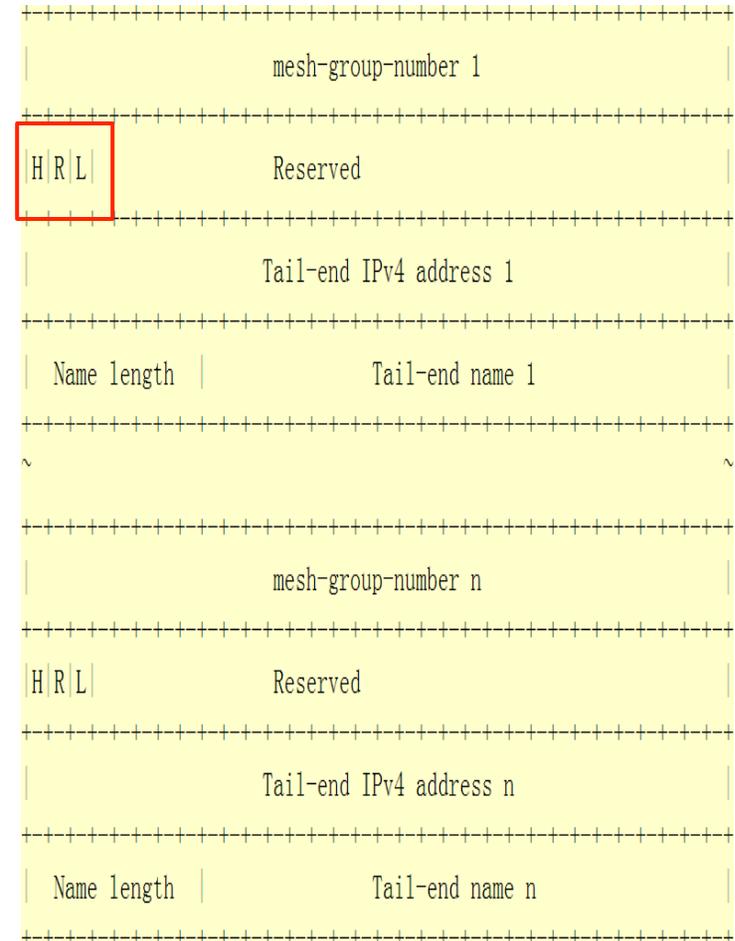
Comments from the list

- Mesh-group type (Thanks Gregory Mirsky)

    – One way is to explicitly encode the mesh-group type in the TLV.

    – Another way is to implicitly identify the mesh-group type by comparing the received TE mesh-group number with the TE mesh-group number of local configured TE mesh-groups (used in the current draft).

    – **Which way does the WG prefer to ?**

Next Steps

- Solicit comments and refine the draft.

- Would like to request to adopt this document as WG document.