Role based Auto Mesh

draft-li-ccamp-role-based-automesh-02

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Problem Statement Review

- Auto mesh TE defined in RFC 4972

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

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

  - TE mesh-groups simplify the configuration and deployment of TE LSPs.

- Full mesh TE LSPs may be not necessary for some scenarios

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

  - The TE LSPs between Cell Sites and TE LSPs between RNC Sites may be not used at all

  - With the existing Auto-mesh TE

    - Large amount of unnecessary TE LSPs established among Cell Sites
      - May not scale for the CSG devices and is waste of network resources

Solution Review

- Role based Auto mesh TE group
  - TE LSPs setup defined based on the roles of the LSRs in a group

- "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
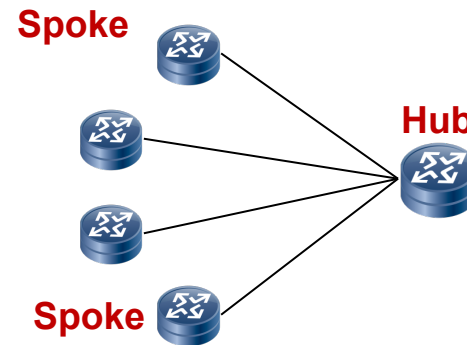
Scale Improvement

- Take "Hub-Spoke" TE mesh-group as an example

Auto mesh TE
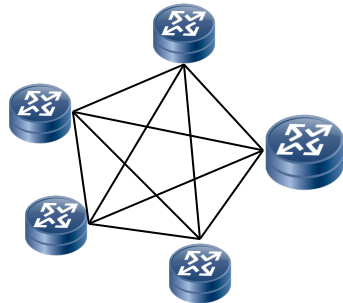
Role based Auto mesh TE

- Total TE LSP numbers = n(n-1)/2
- TE LSP numbers (per-LSR) = n-1
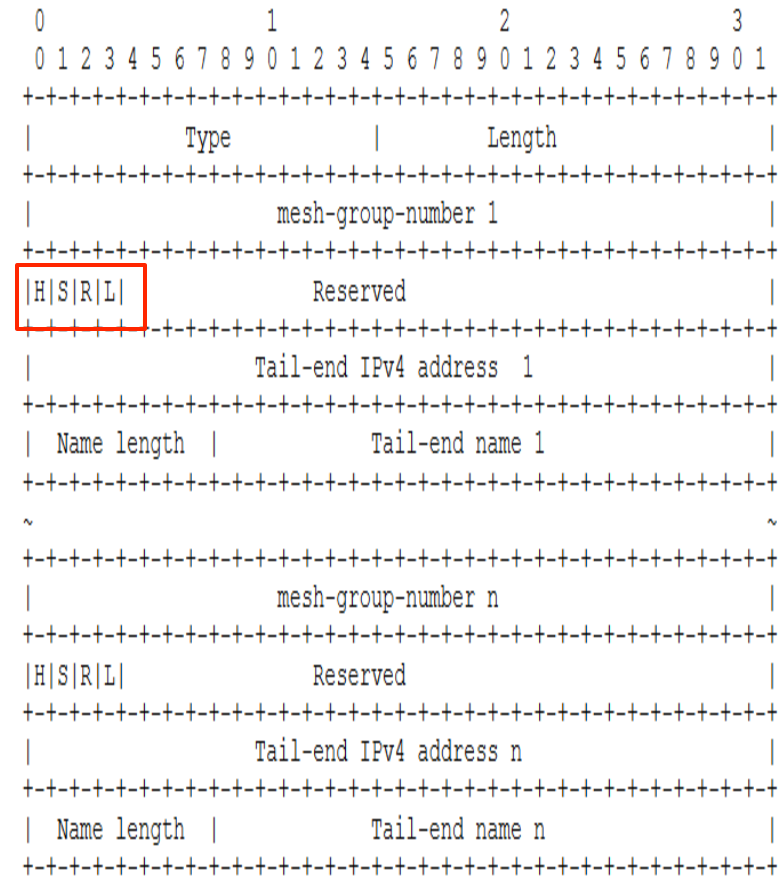
- Total TE LSP numbers = n-1
- TE LSP numbers (per-LSR) = 1

Extensions to ISIS

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

  – H (Hub) bit

  – S (Spoke) bit

  – R (Root) bit

  – L (Leaf) bit

- 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

- There are similar extensions to OSPF

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 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
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|              Type             |             Length            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                       mesh-group-number 1                     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|H|S|R|L|                     Reserved                          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                     Tail-end IPv4 address 1                   |
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| Name length   |              Tail-end name 1                  |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
~                                                               ~
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                       mesh-group-number n                     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|H|S|R|L|                     Reserved                          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                     Tail-end IPv4 address n                   |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Name length   |              Tail-end name n                  |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Updates since 00-version

- Changes to "Hub-Spoke" TE mesh-group roles
    - 00-ver
        - An LSR can only be either a Hub and Spoke in a group, but can not be both at the same time
    - 01-ver
        - An LSR can have both the Hub and Spoke role at the same time, it gives more options to plan the TE mesh group (for example, there are more than one Hubs in one group and hope to setup TE LSPs between Hubs)
- Add a Terminology section
- Lots of rephrasing for better readability
- Greg Mirsky joined as a co-author

Next Steps

- Address the comments from Dan

- Get more comments from the WG

- WG adoption?