Multi Level/Topology TRILL

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MULTI LEVEL/TOPOLOGY TRILL DRAFT STATUS

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TRILL Multi-Level/Topology
Draft Status

• Past WG Last Call - informational
  • draft-ietf-trill-rbridge-multilevel-01

• WG Drafts
  • draft-ietf-trill-rbridge-multi-topology-01
  • draft-ietf-trill-multilevel-single-nickname-01

• New Personal Draft
  • draft-zhang-trill-multilevel-unique-nickname-00
Multi-Level Drafts

• draft-ietf-trill-rbridge-multilevel-01
  – Informational: Advantages of and options for TRILL support of multi-level (IS-IS) routing.
  – Main option is unique RBridge nicknames across the campus versus aggregated nicknames for Level 1 areas.
    • Unique nicknames simpler for border RBridges. OK for smaller campuses but can exhaust nicknames in a huge campus
    • Aggregated nicknames solve nickname exhaustion but probably requires fast path changes in border Rbridges.
    • This draft recommends supporting hybrid use of both unique and aggregated nicknames in a campus.
Standards Track Drafts

• draft-ietf-trill-multilevel-single-nickname-01
  – Proposed Standard: Specifies a method of aggregation with Level 1 areas identified by the set of border RBRidges.

• draft-zhang-trill-multilevel-unique-nickname-00
  – Proposed Standard: Specifies a multilevel method with unique nicknames across Level 1 areas and the level 2 area.

• draft-ietf-trill-rbridge-multi-topology-01
  – Proposed Standard. Specifies a method of applying IS-IS multi-topology to TRILL.
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TRILL Multilevel

• The major issue of TRILL multilevel is how to manage RBridge nicknames.
  – Unique nickname approach
    • No nickname duplication across L1/L2.
Nickname announcement

• The border RBridge needs to announce nicknames
  – In L1, as if it owns all nicknames outside this area
  – In L2, as if it owns all nicknames inside the area
• A route to a nickname in another area will be calculated “segment by segment”.

[L1 Segment] RB27->RBx->RBz->RB2

[L2 Segment] RB2->RBb->RBc->RBd->RBe->RB3

[L1 Segment] RB3->RBk->RB44
Unitcast routing

- **RB27**
  - Learned D is attached to RB44
  - Encapsulates the packet [ingress=27, egress=44]
  - Routes to RB2 since RB2 announced in Area X it also owns RB44

- **RB2**
  - Routes to RB3 in L2 since RB3 announced in L2 it owns RB44

- **RB3**
  - Routes to RB44 in Area Y

- **RB44**
  - Decapsulates and learn S is attached to RB27
Multicast routing

• Local distribution tree
  – With an L1 root nickname, advertised by the border RBridge with the highest root priority.
  – Multicast routing as specified in RFC 6325
  – A multi-destination packet on a local tree MUST NOT be leaked into Level 2

• Global distribution tree
  – With an L2 root nickname, also advertised by the border RBridge with the highest root priority.
  – The global distribution is calculated “segment by segment”.
Global distribution tree, different views

**RB27’s view**
- Root
  - RB3
    - RB2
      - RBz
    - RBx
  - RB27

**RB2’s view**
- Root
  - RB3
    - RBe
      - RBd
        - RBc
      - RBb
    - RB2
  - RB27

**RB3’s view**
- Root
  - RB3
    - RBe
      - RBd
        - RBc
  - RBk
  - RB44

**RB44’s view**
- Root
  - RB3
  - RBk
  - RB44
  - RB27
  - RBx
  - RBz
  - RB2
  - RBb
  - RBc
  - RBd
  - RBe
Multicast forwarding

- RB27
  - Produces a multi-destination packet \([M = 1, \text{ingress}=27,\text{egress}=3]\)
  - Floods the packet using the segment in Area X.

- RB2
  - Floods the packet using the segment in Level 2.

- RB3
  - Floods the packet using the segment in Area Y.

- RB44
  - As a multicast listener, RB44 decapsulates the multi-destination packet.
  - Learns that S is attached to nickname 27.
Mix Unique/Aggregated Areas

• We know
  – Nickname reuse is allowed between aggregated areas.
  – Nickname reuse is NOT allowed between unique areas.

• Question
  – Whether nickname reuse is allowed between unique and aggregated areas?
  – The answer is NO!!
Next steps

• Ask for WG adoption of draft-zhang-trill-multilevel-unique-nickname
• Incorporate comments we receive.
END

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