BIER
Bit Indexed Explicit Replication Traffic Engineering
draft-eckert-bier-te-arch-03

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BIER-TE work since Yokohama

- Update -02 -03

  Typos

  Enhanced FRR section

  -> Two new co-authors

- Discus about feedback during Yokohama

BIER-TE FRR

- "Simple" idea:

  1. When BFR sees failure on link L (in bitstring), it triggers FRR.

     Same rule as eg: RSVP/SR-FRR: Local detection.

  2. For FRR, packet gets modified:

     - Add some Bits – that's the equivalent of the "backup path"

     - Remove some bits – that bit where the backup path + primary path (bits) could result in duplicates or even loops

     - Add/Delete Bitset is per-L – eg: failing link

- Challenge:

  - If we want to do node-protection, we need to know which next-next-hops we want to send to.

    - Need Structure: "If L fails", here is set of per next-nexthop bit Add/Delete bitset.

    - Can not simply make per-L Add/Delete bitset send to all next-nexthops because that would create duplicates.

Some example
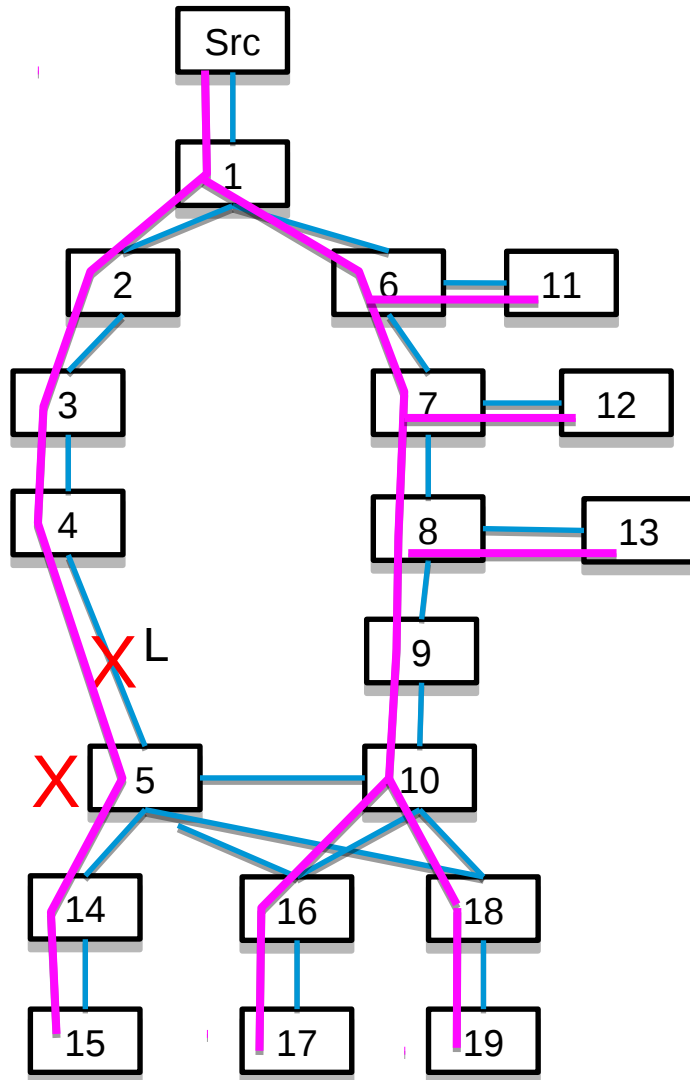
- Consider link failure on L or node failure on 5.

  BFR 4 needs to assume what has happened when it sees L fail. (assume link vs. node failure).

  If node failure, BFR 14/15 become unreachable.
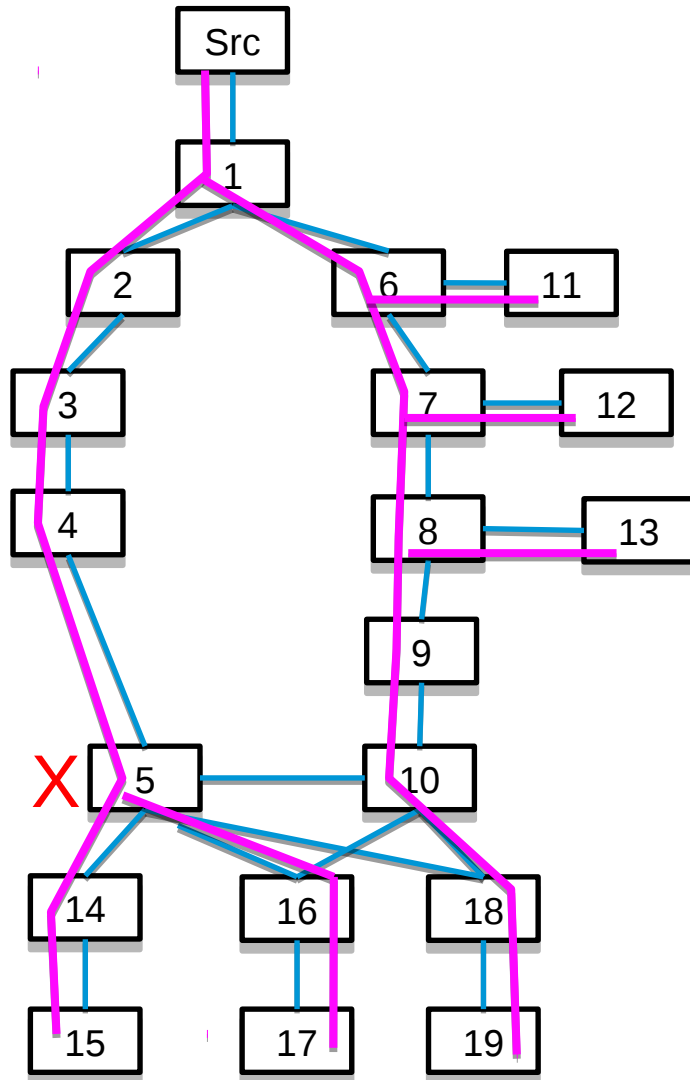
Some example
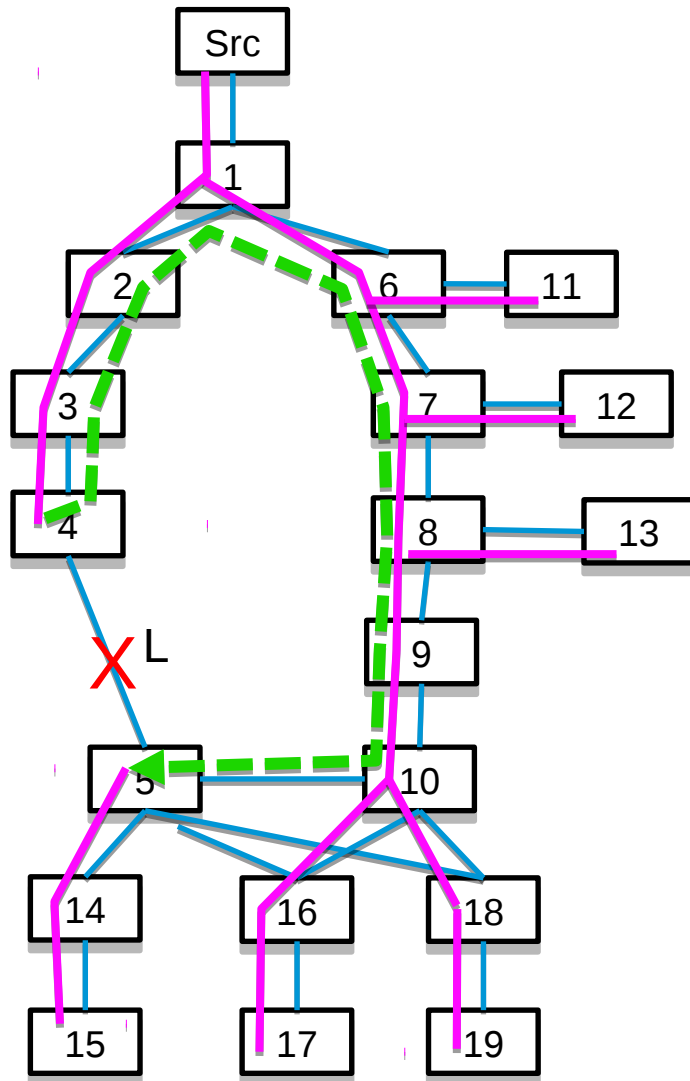
- Consider link failure on L or node failure on 5.

  BFR 4 needs to assume what has happened when it sees L fail. (assume link vs. node failure).

  If node failure, BFR 14/15 become unreachable.

- If 4 assumes link failure…
  - Would have to use some remote forward engineered adjacency to get packet copy to 5.
    - Delete bit to 5 add bit to get remotely to 5.
    - Could not avoid duplicate magenta/green traffic: magenta copy to 6/7/… was made independent of copy to 4.

Some example

- Assume node failure of 5.
  - If Bitstring has Link 5/16:
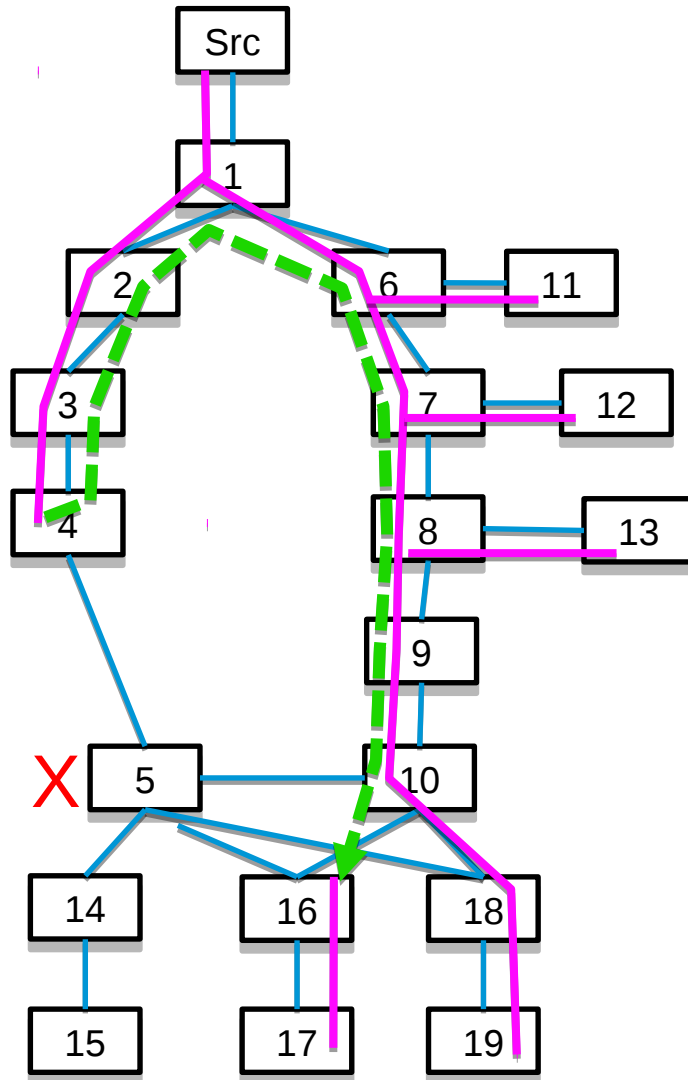   - BFR 4 needs to send copy over to BFR 16.
    - Necessary in this example.
  - If Bitstring has Link 5/18:
    - BFR 4 needs to send copy over to BFR 17
    - Aka: not in this example

Some example

- Assume node failure of 5.
  - If Bitstring has Link 5/16:
    - BFR 4 needs to send copy over to BFR 16.
    - Necessary in this example.
  - If Bitstring has Link 5/18:
    - BFR 4 needs to send copy over to BFR 17
    - Aka: not in this example

- Can not rely on using existing branch 1/6/7/8/9/10:
  - Copies where created from 1 independent of branch of tree to

Some FRR thoughts

- Topology example is showing "worse case"

  Resulting traffic paths during FRR not better than with older FRR solutions.

- Would like feedback how important this standard FRR paradigm is

- How about using instead end-to-end path protection

  Eg: live-live. Algorithms exist, BIER-TE makes path engineering simple

- Or changing the signaling paradigm.

  Past solutions where proposing fast propagation of failure to points that could make better FRR decisions.

  Eg: BFD from BFR 4 to BFR 1 (BFIR). BFIR could make immediately optimal new Tree decisions.

Subdomains, SI

- Summary, discus Yokohama / afterwards:

  BIER-TE -02 define use of subdomains/SI with goal:

  - Make operator experience easy

  - Maximum reuse of "overlay" solution between BIER / BIER-TE

    - Without new work to make it work for BIER-TE

  BIER arch author concerned about applying SI to TE:

  - SI BIER specific part of automatic assignment of BFR-ID

    - And resulting forwarding in BIER network

      - Sequential assignemnt of BFR-ID in randomn places in network possible

        - BIER-TE:

          Not all bits can be assigned to BFER
          Assignment of Bits needs to take location into account
          "need to have all bits for one region in one bitstring, not just "randomn".

  Conclusion

  - New terminology for TE, no SI, improve comparison/differences explanation

  - Analyse if different/improved label binding for BIER-TE required/beneficial.

Subdomains, SI

- Target Operator / Overlay experience:

    Single instance of an overlay service (eg: L3VPN) is bound to one subdomain

    So any overlay signaling that is signaling subdomains can get away just signaling the subdomain. And operator can just "configure" subdomain

    - Overlay service uses sub-part of possible BFR and links

    - If total number of links + BFR > Bitstring length: would need multiple subdomains. To stick with one subdomain / make operator life easy::

        - Subdomains has "sub-subdomains". Propose to call them "slices"

        - Each slice = 1 bitstring within the subdomain.

        - BIER-TE SDN controller needs to help allocate bits for BFR and links into the slices to minimum number of slices is needed and replication efficiency is best.

        - Labels are bound to (subdomain,slice)

- Functionally, above is same as what was intended with -02/03 text, but want to avoid implying that Slices inherit any features that Sis have, but which are unique to BIER (see previous slide).

Bead inside rim creates turbulence to release flavor and aromas as beer enters mouth.

Narrowing the glass at the top retains the hop aroma and sustains the head.

Rounded shape collects aromas.

Laser etchings on bottom create bubbles for constant aroma release.

Outward turned lip delivers beer to front of tongue where sweetness (malt) is tasted.

Thinner walls and rounded shape maintain proper beer temperature longer.

BIER

TE

Questions ?

Improved recovery

will get you a new glass when yours breaks.