UNI & NNI Protection

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Problem Statement

• Redundancy and diversity for both link and node (e.g., network element or line card) are requirements in both access and network interconnect protection scenarios.

Protection is not end-to-end and is only for the UNI or NNI ‘segment’
Redundancy & Diversity

Link Redundancy
No Diversity in links or nodes

Link Redundancy & Diversity
No Diversity in Node

Link Redundancy & Diversity
Node Diversity

ACCESS scenario applies to both CPE and Router hand-off scenarios.
Suggestions

• Need to break down the potential solutions based upon Access protection and Network protection

• Access (UNI) Protection
  a) G.8032 (i.e., 3 node sub-ring)
  b) xSTP for an 802.1Q connection sub-network
  c) LAG distributed over diverse PE systems

• Network (NNI) Protection
  a) G.8032 (i.e., sub-ring with multiple virtual channels)
  b) xSTP for an 802.1Q connection sub-network
  c) Multiple LAG instances distributed over diverse systems
  d) SPB over a meshed connectivity model connecting diverse Networks
  e) PBB Class IV Service Interface

*Inter-network protocol interactions need to be worked out!!*
Solution A: G.8032 ring or subring

- **UNI** – 3 node (or more) G.8032 v2 sub-ring with virtual charts.

- **NNI** – Sub-ring with virtual channel connecting “major rings” that represent the disparate networks connected by an E-NNI

*Figures from G.8032 v2*
Solution B: xSTP over interface

- If the NNI (or even the UNI for some topologies) was a region, xSTP could be defined over a full or partial mesh for just the NNI
Solution C: 802.1AX LAG extension

- The diverse PEs need to know which is the “working” link.
- The FDB needs to be flushed or transferred on switch.
- Two (or more) LAG instances could be overlayed for an NNI.
Solution D: SPB NNIs

• If the NNI was a region, SPB could be defined over a full or partial mesh for just the NNI
Solution E: PBB Class IV interface

See 802.1 presentation Sept 2008 - Multi-Homed NNIs
Conclusion

• Some solutions do not need any work as they are already essentially defined:
  – A – G.8032
  – B – xSTP per clause 13 of 802.1Q
  – D – 802.1aq – SPB

• Some solutions could be the basis for new work:
  – E – PBB Class IV service interface
  – C – LAG extension

A LAG extension seems to be “low hanging fruit”