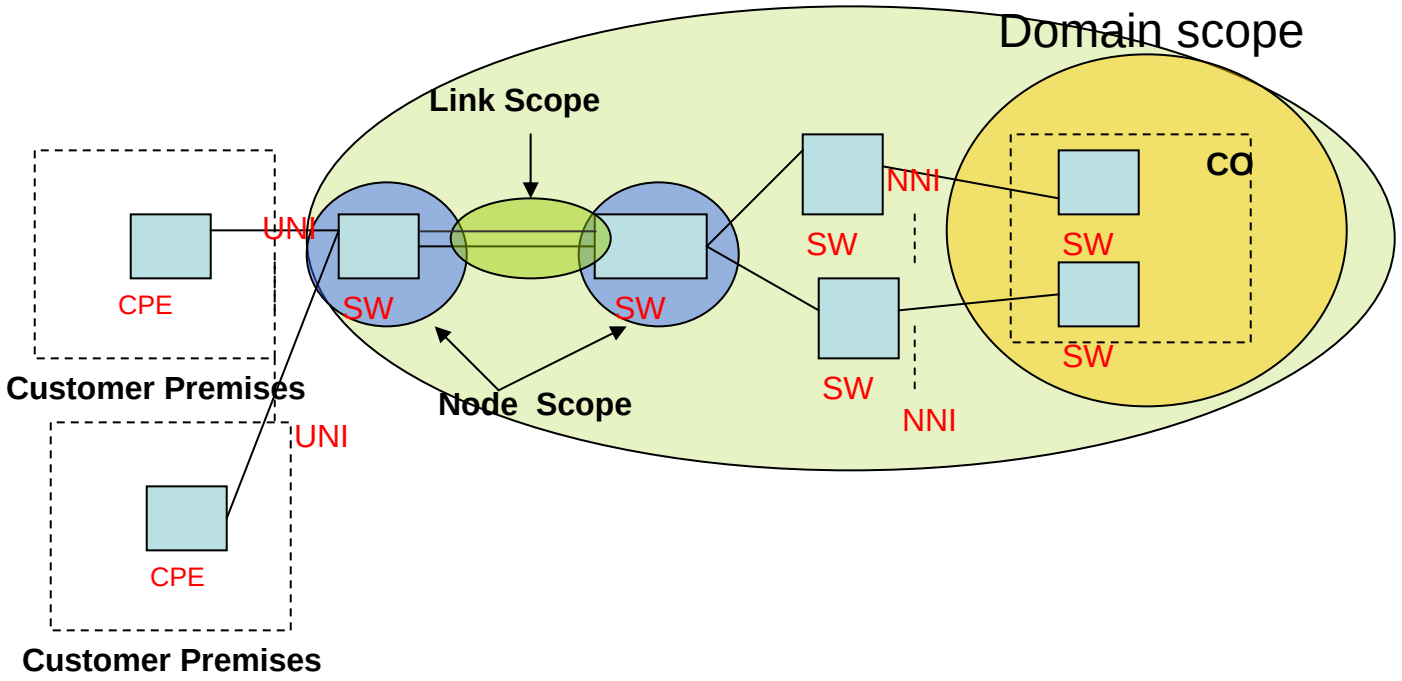
UNI & NNI Protection

Glenn Parsons, Marc Holness, Janos Farkas

November 2009

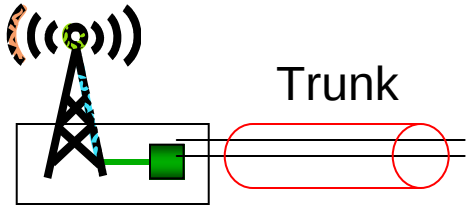
Problem Statement

- 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.



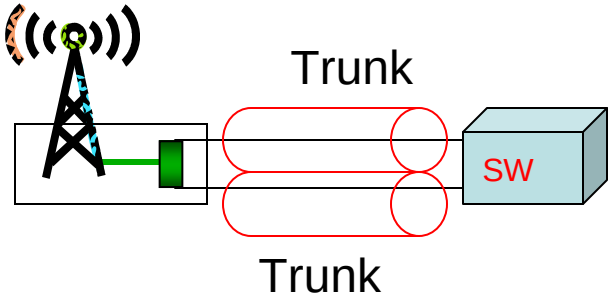
Protection is not end-to-end and is only for the UNI or NNI 'segment'

Redundancy & Diversity



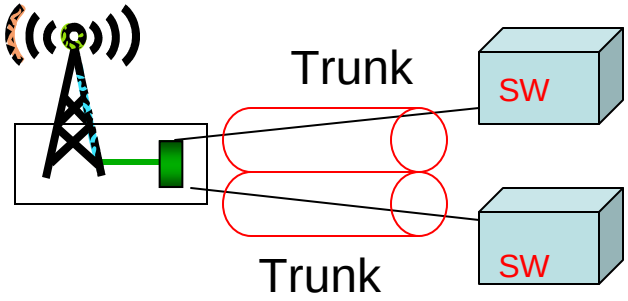
Link Redundancy

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.*

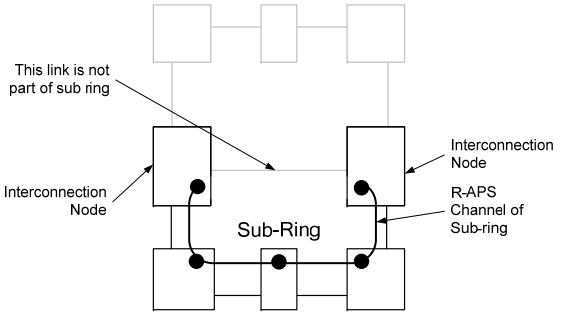
Suggestions

- 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!!

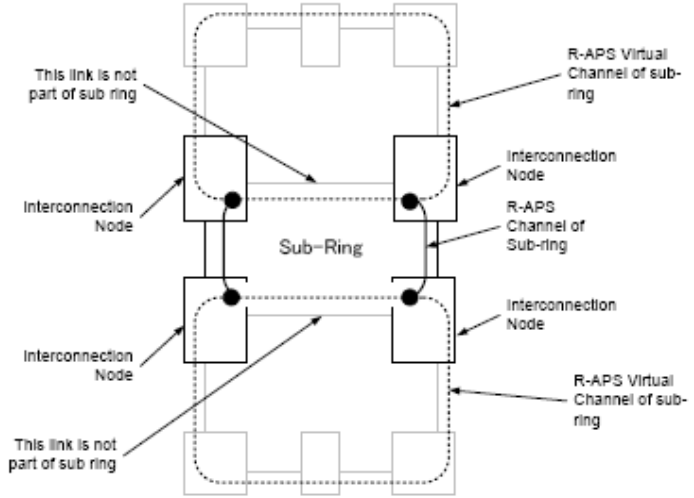
Solution A: G.8032 ring or subring

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



e) Sub-ring entity without R-APS virtual channel

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

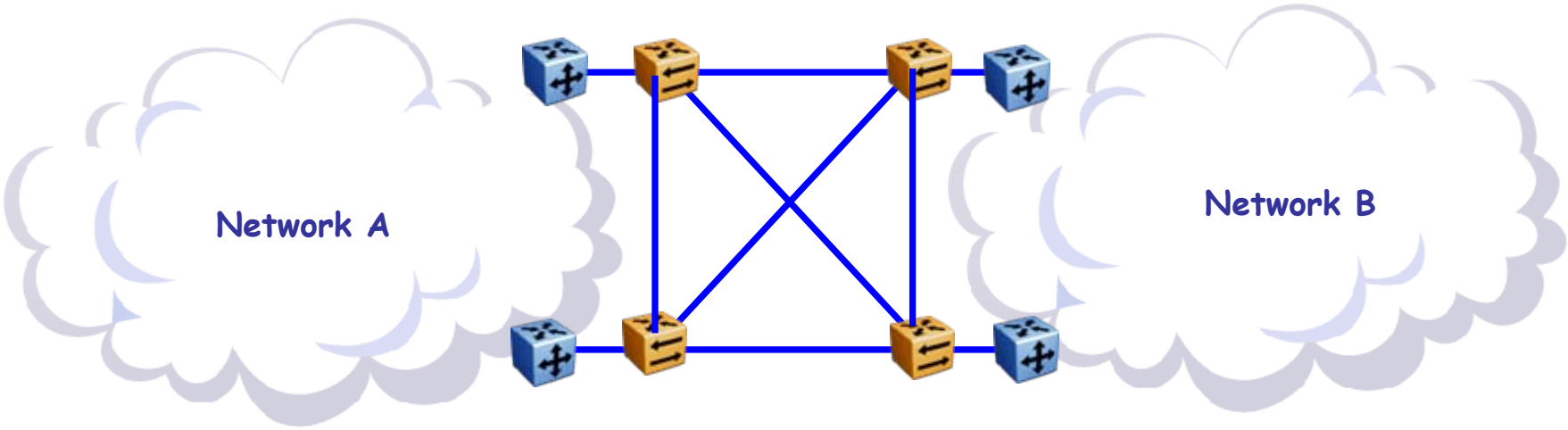


e) Sub-ring entities with R-APS virtual channel

Figures from G.8032 v2

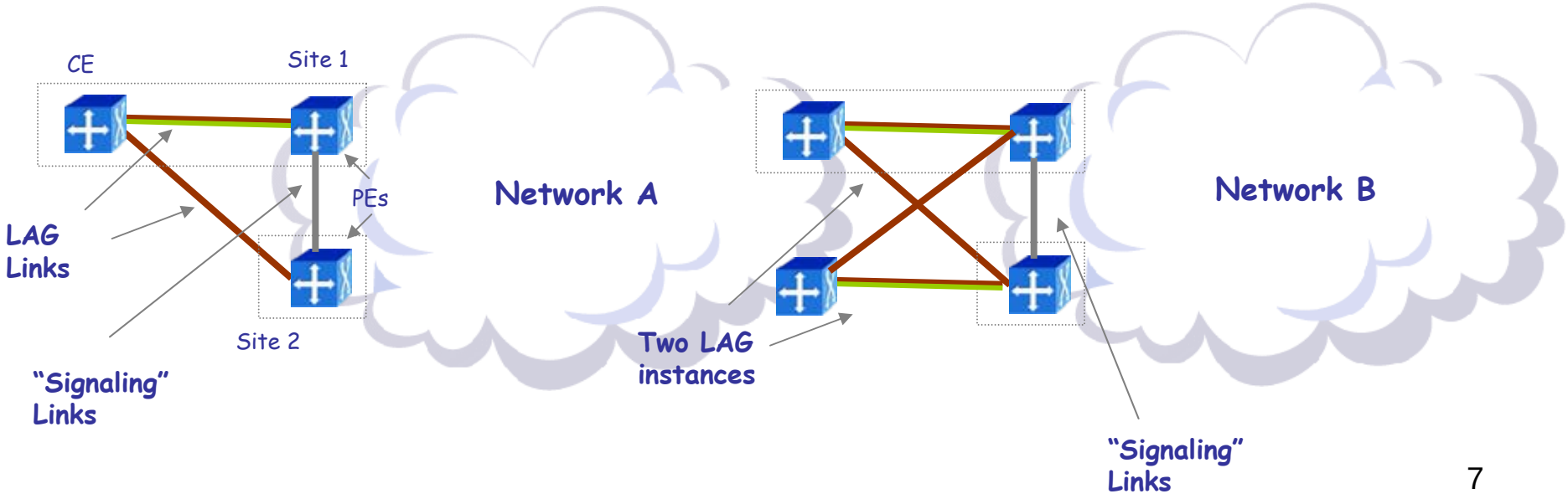
Solution B: xSTP over interface

- 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



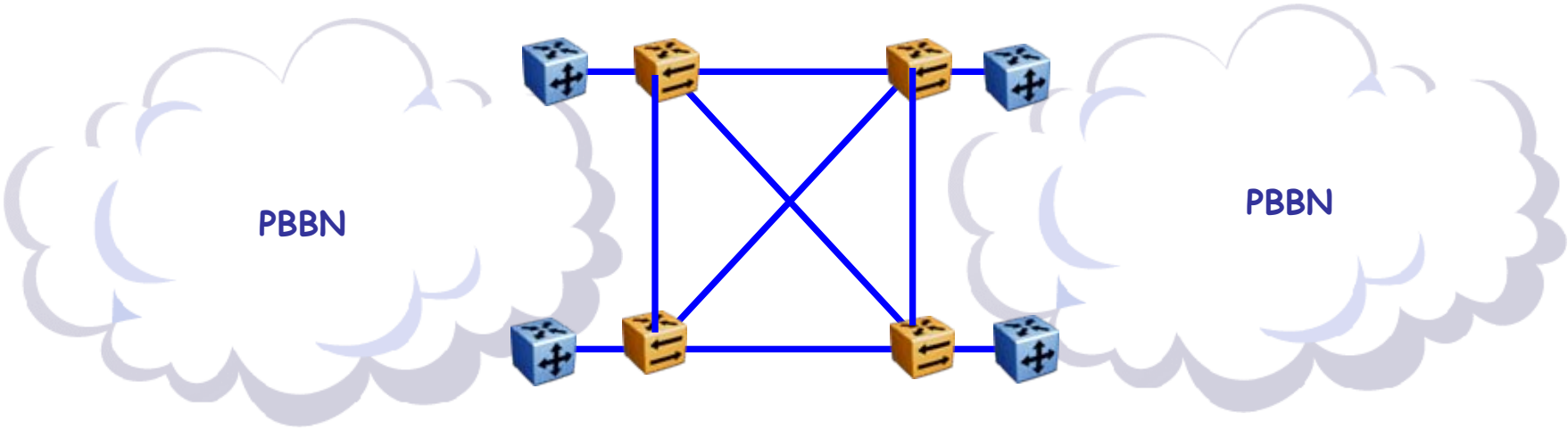
Solution C: 802.1AX LAG extension

- 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

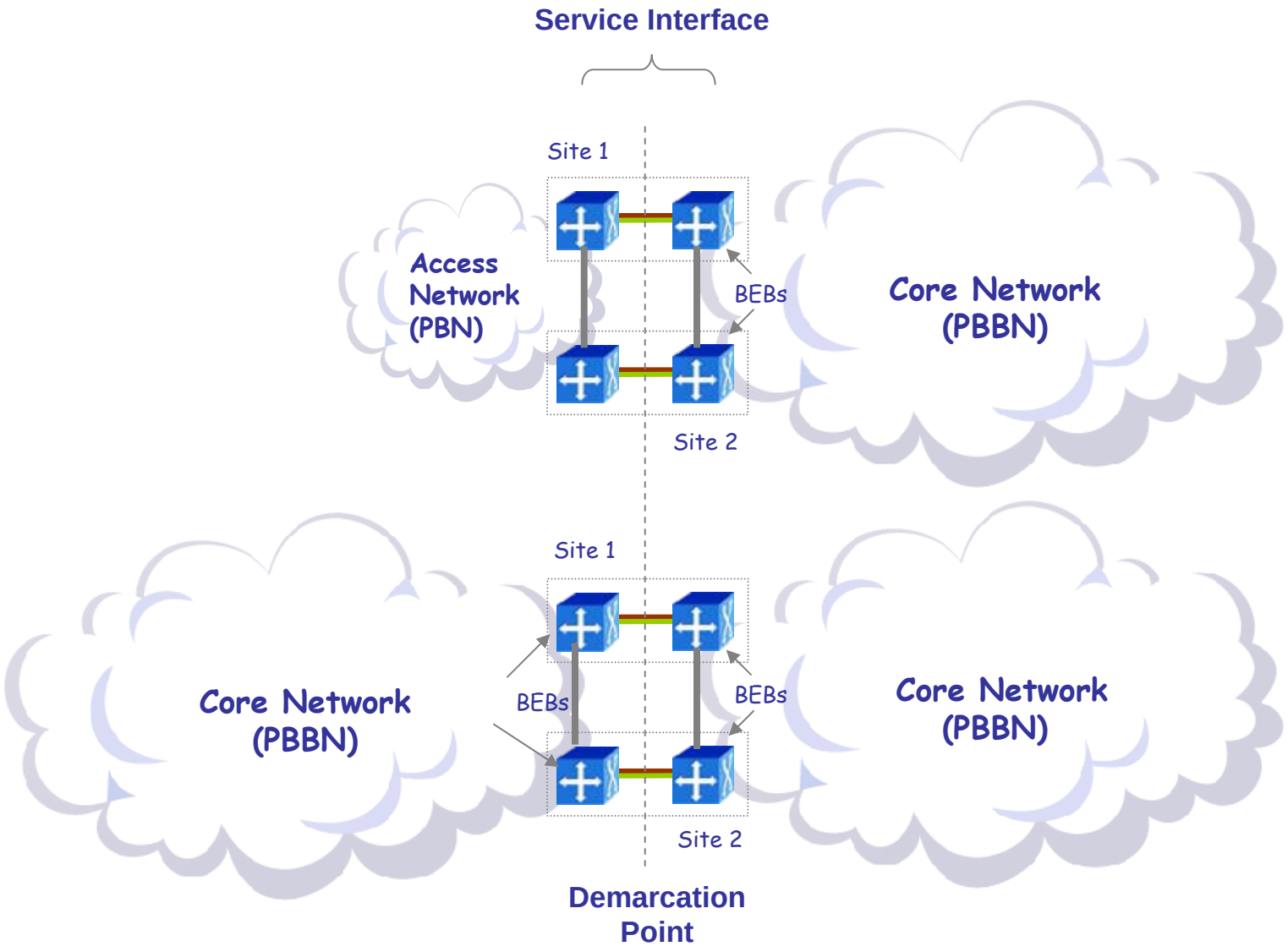


Solution D: SPB NNIs

- 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”