IEEE 802.1Qbf: Infrastructure Segment Protection

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Outline

1. Provider Bridged Network (PBN)

2. Provider Backbone Bridged Network (PBBN)
   - Backbone for PBNs
   - Traffic Engineering in PBBN-PBB-TE

3. Infrastructure Segment Protection (ISP)

4. Standardization process of ISP

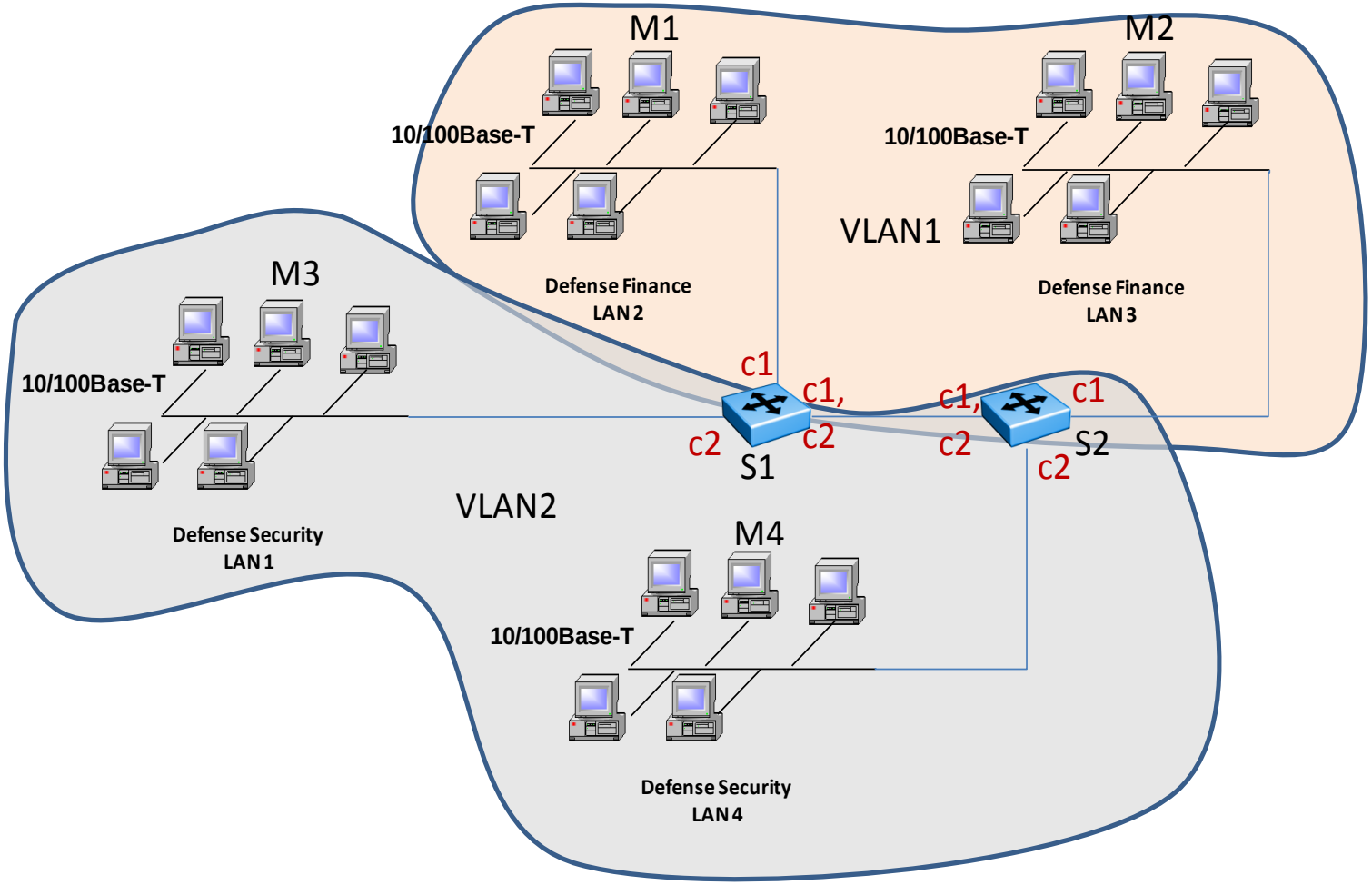
Provider Bridged Network

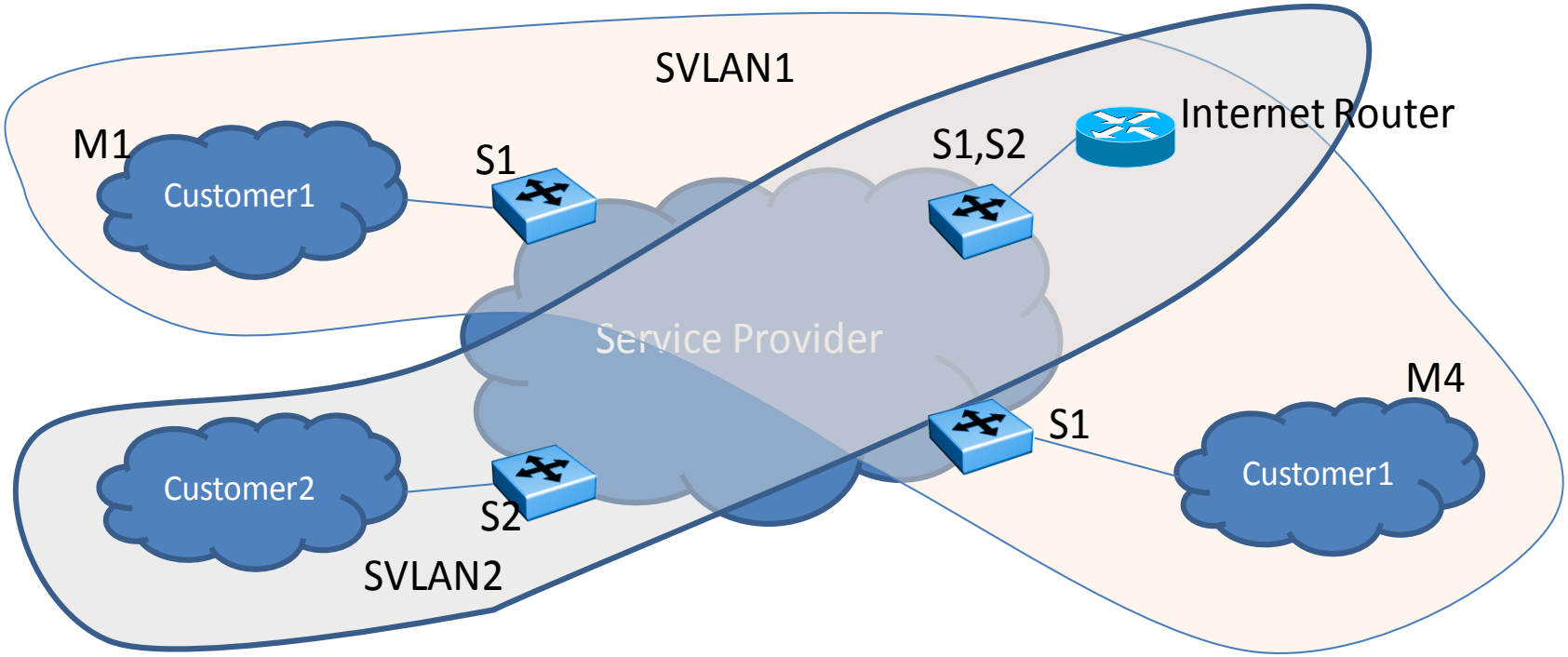
Provider Bridged Network

1. Service identifier:
   - C-Tag : Application identification (802.1Q)
   - S-Tag : Customer identification (802.1ad)

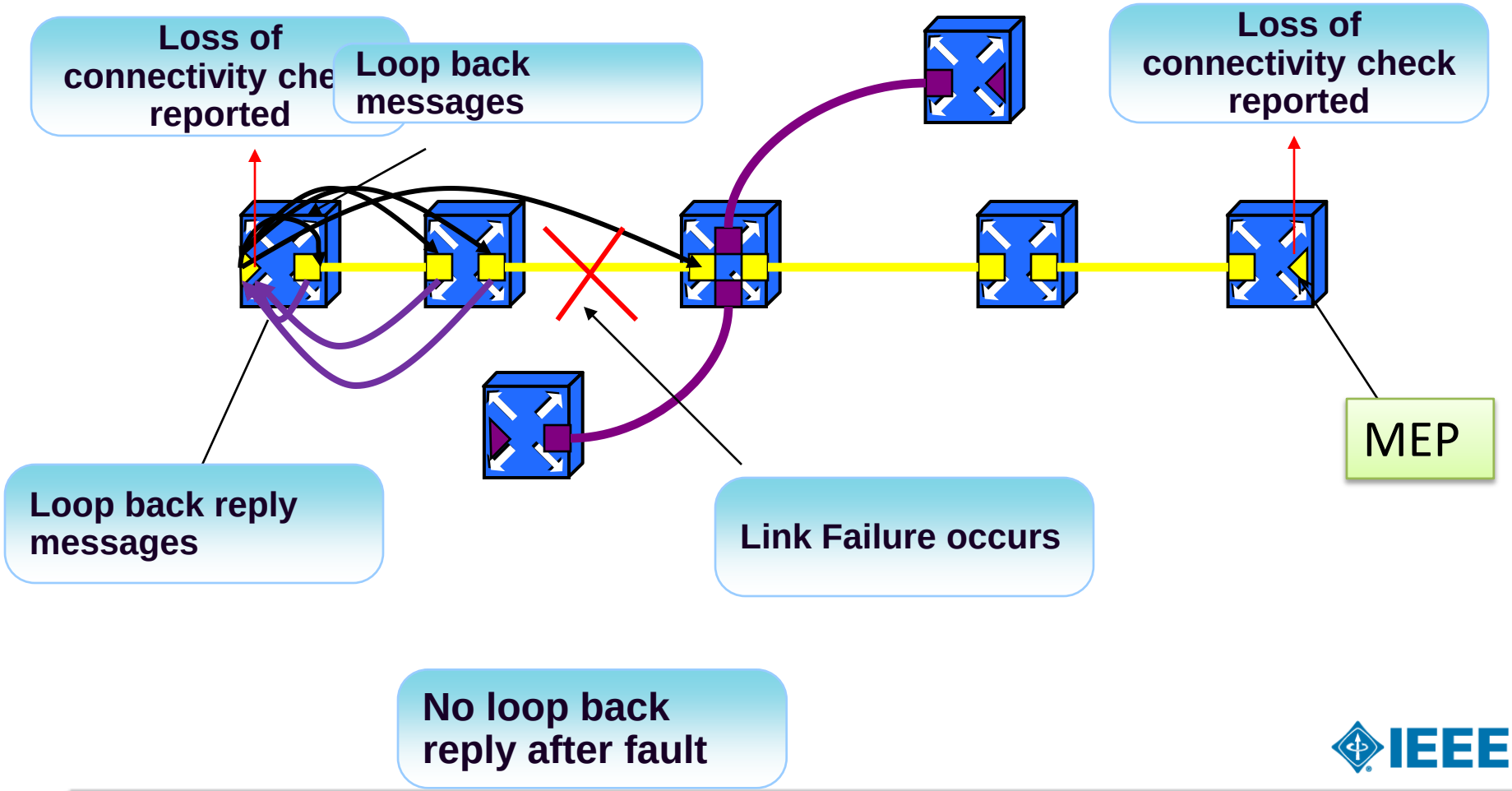
2. Connectivity Fault Management (IEEE 802.1ag)

3. Service and transport/path are coupled: One ID for both Service identification and forwarding-path


M1
M2
10/100Base-T
10/100Base-T
VLAN1
Defense Finance
LAN 2
Defense Finance
LAN 3
M3
10/100Base-T
c1
c1,
c1,
c1
c2
c2
c2
c2
S1
S2
VLAN2
Defense Security
LAN 1
M4
10/100Base-T
Defense Security
LAN 4


SVLAN1
M1
Customer1
S1
S1,S2
Internet Router
Service Provider
M4
S1
Customer2
S2
Customer1
SVLAN2

Connectivity Fault Isolation: IEEE 802.1ag



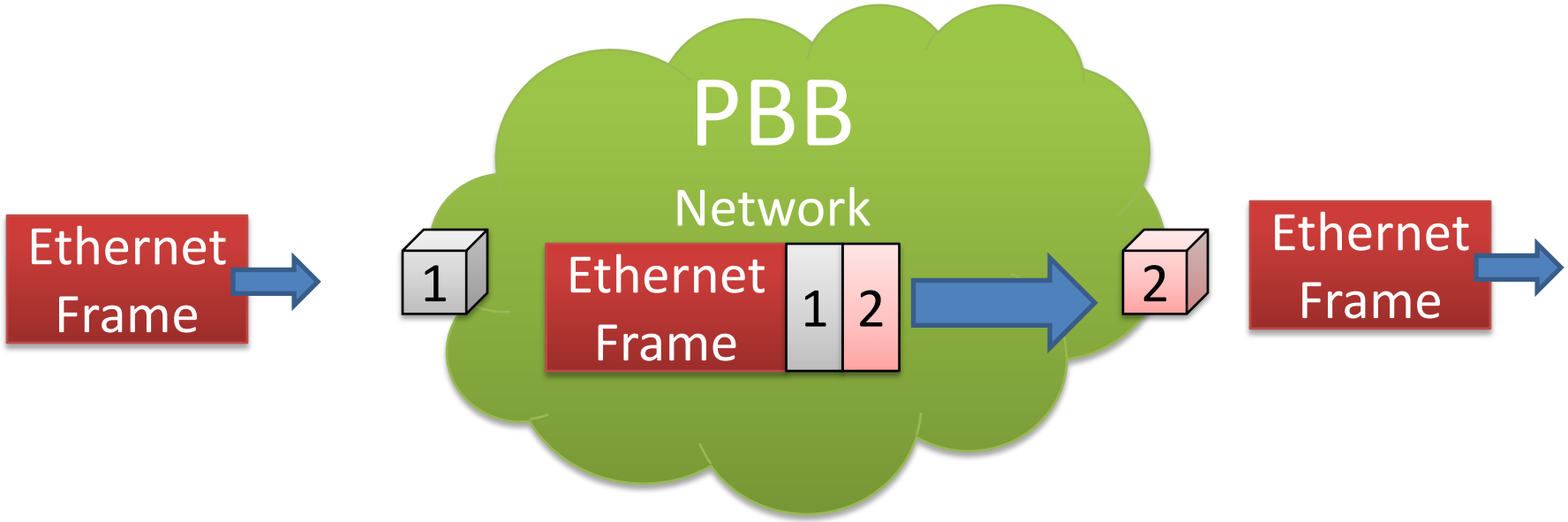
Provider Backbone Bridged Network

Provider Backbone Bridged Network

- Encapsulates incoming frame with
  - Backbone MAC addresses
  - Backbone Service ID
  - Backbone Tag: B-Tag
- Benefits:
  - Separation of service and transport
  - MAC-in-MAC prevents MAC address table explosion
  - Forms backbone of PBNs
  - Only backbone edge bridges (BEB)change
  - Backbone core bridges (BCB) are Provider Bridges

Operation of PBB

PBB => IEEE 802.1ah
PBB-TE => IEEE 802.1Qay



PBB to PBB-TE:

1. Disable learning
2. Provision the MAC table
3. Discard unknown destination

Traffic Engineering

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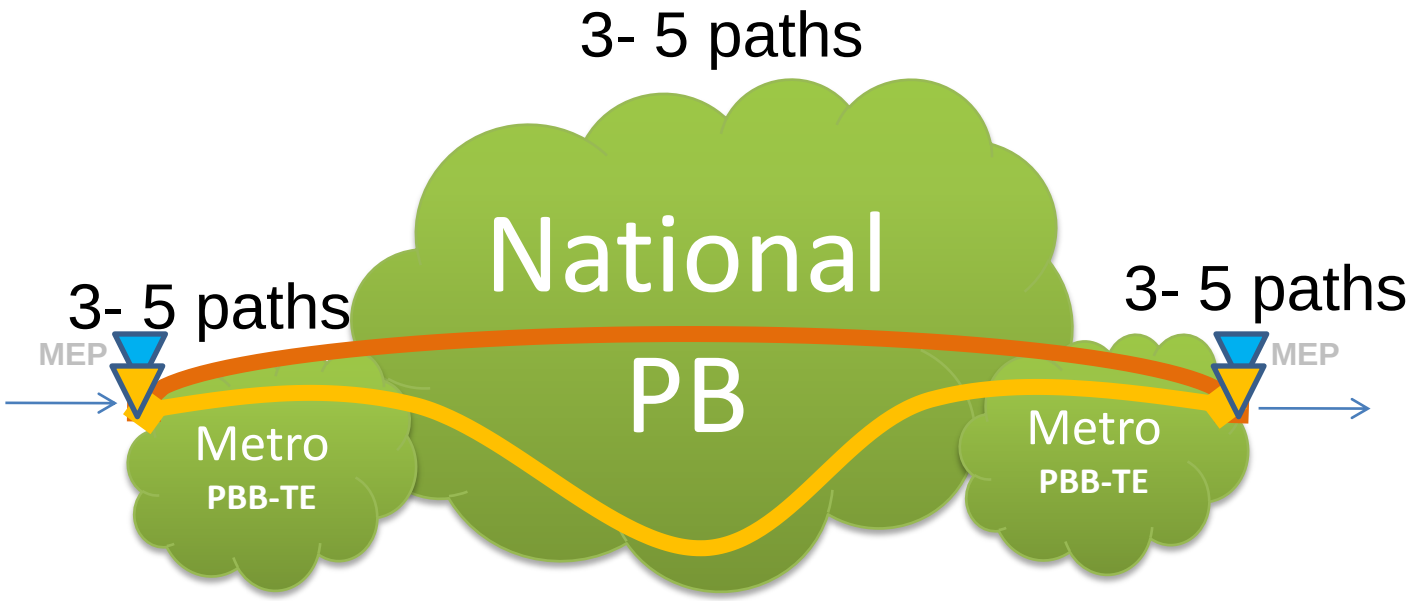
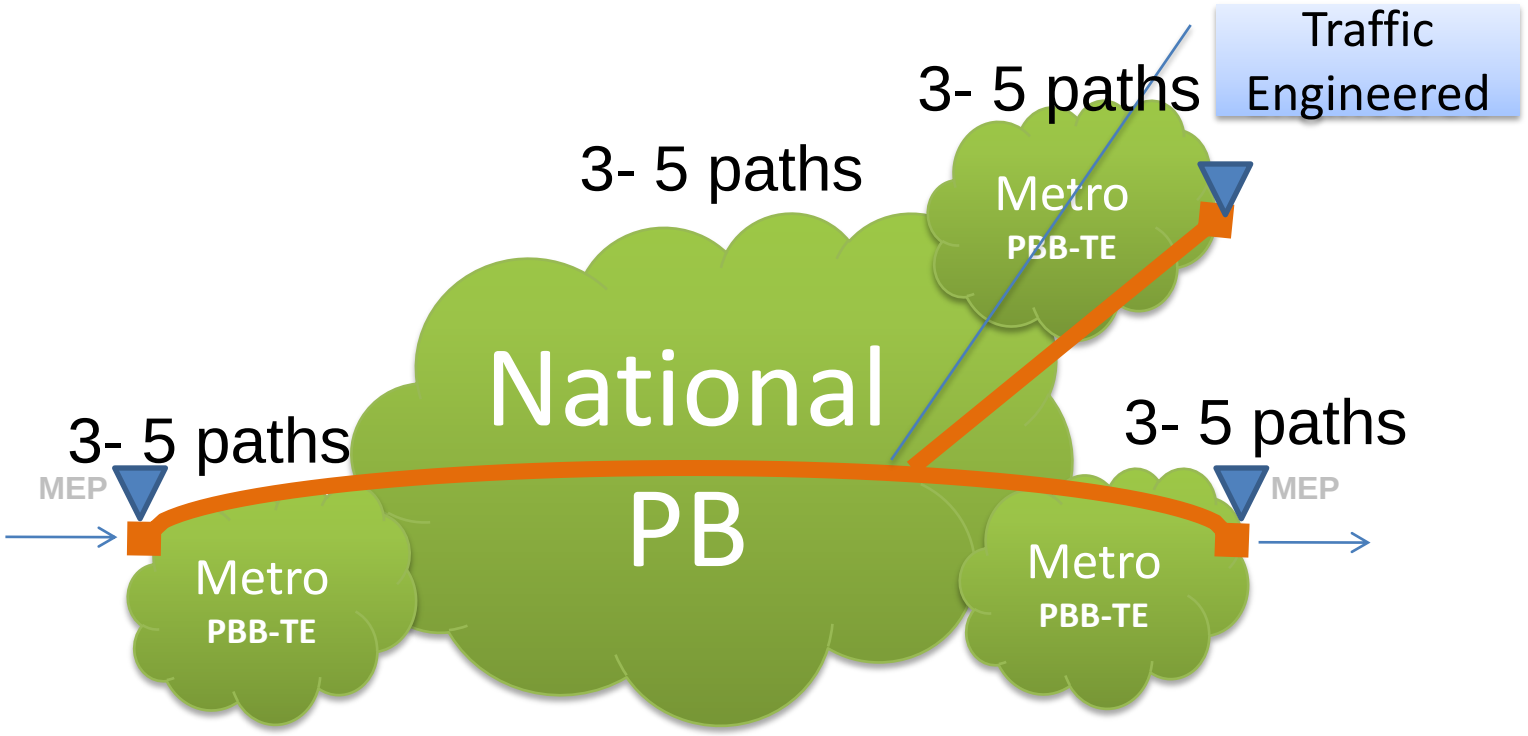
Provider Backbone Bridged Network w/ Traffic Engg

1:1 Point-to-Point PBB-TE



PBB-TE supports only 1:1 P2P

Point-to-Multipoint PBB-TE



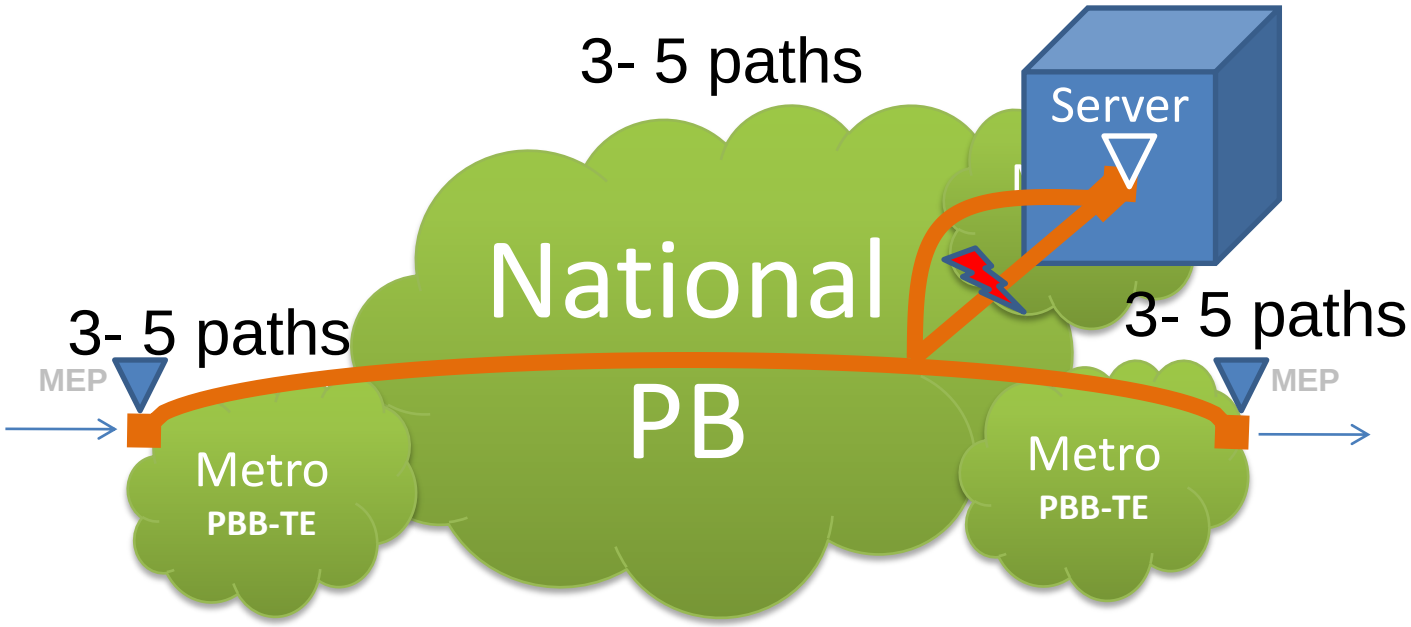
There is no P2MP protection mechanism in PBB-TE

Infrastructure Segment Protection

Indian Scenario

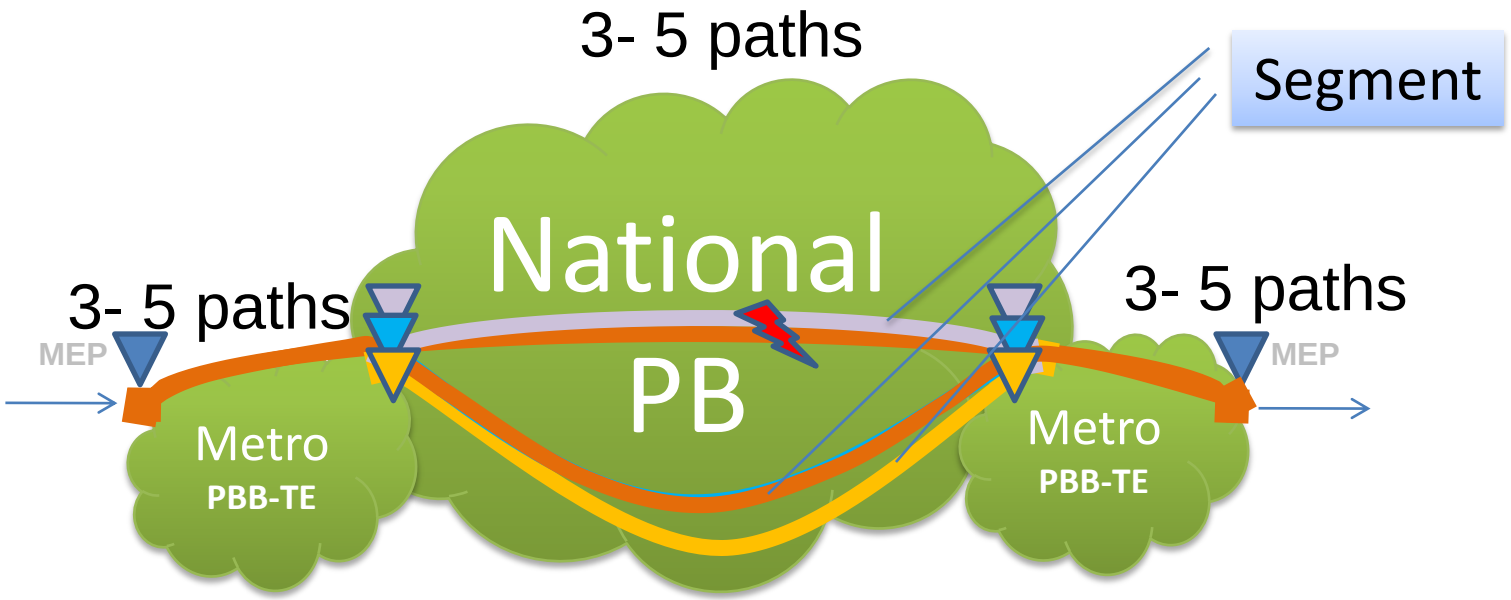
- Metro
  - 13 Fibre cuts per 1000 km per annum
- Long Haul
  - 4 Fibre cuts per 1000 km per annum
- Maximum cuts
  - 30 to 50 Fibre cuts per 1000km per month
- Alternate paths
  - 3 to 5 path in metro and core
  - Providers want to use these paths!

Critical Link or Node Protection



Segment Protection Switching

PBB => IEEE 802.1ah
PBB-TE => IEEE 802.1Qay
PBB-TE ISP => 802.1Qbf



M=2

Ref: bf-vinod-CoordinationBetweenSegProtandPBBTE-0110-v01.pptx

Benefits of ISP (Bulletize)

- Service Provider can locally and cost-effectively protect a group of TESIs
- Faster compared to protecting individual TESIs end-to-end
- Enable protection of certain branches of P2MP TESI
- No modifying of TESI identifier
- M:1 prioritized protection switching
- Load balancing over the M segments.

Standardization Process

- Eilat (May Interim) - Abhay presents SPS as means to solve P2MP protection
  - ay-Abhay-Protection-Switching-for-P2MP-0508.ppt
- Denver (July Plenary) – Jointly by Abhay, Bob and John
  - new-sultan-fast-reroute-te-0708-v02.pdf
- Seoul (Sept Interim) - Bob presents interpretations and observations, Dave presents issues to address and Vinod presents case for SPS
  - new-sultan-segment-protection-scaling-0908-v01.pps
  - new-martin-PBB-TE-segment-prot-0908-v01.pdf
  - new-Protection-Vinod-Case-for-Segment-Protection-0908-v1.pps
- Dallas (Nov Plenary) -Vinod uploads document on case for SPS and No new work prez due to Lack of time
  - new-Vinod-SegmentProtectionSwitching-1108-v01.doc
  - new-martin-PBB-TE-segment-prot-1108-v00.pdf
  - new-sultan-segment-protection-requirements-1108-v02.pdf
- New Orleans (Jan Interim) – Dave presents client-server method, Wei presents 3-tupple translation, Bob presents segment protection for infrastructure, and Vinod presents four distinct methods
  - new-martin-PBB-TE-segment-prot-0109-v00.pdf
  - new-weiyh-segment-protection-0109-v00.pdf
  - new-sultan-segment-protection-technical-proposal-0109-v01.pdf
  - new-vinod-SPS-modeling-0109-v1.ppt
- Vancouver (Mar Plenary) – PAR for segment protection
  - new-Vinod-Segment-Protection-PAR-0309-v02.ppt
  - new-irene-segment-protection-requirements-0309-v02.ppt
  - new-sultan-segment-protection-requirements-0309.pdf
- Pittsburgh (May Interim) – Preparation of terminology, PAR and 5C
  - new-Vinod-Segment-Protection-Terminology-0509-v02.pptx
  - new-sultan-infrastructure-segprot-proposed-par-0509-v05.pdf
- **July (July Plenary) – PAR voted for by the IEEE voting members!**
- **11 Sept 2009 - PAR approved by IEEE-SA**

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THANK YOU