# PE Selective MAC Encapsulation

PAR amending P802.1ad to optionally support selective (or asymmetric) MAC encapsulation

Bob Sultan

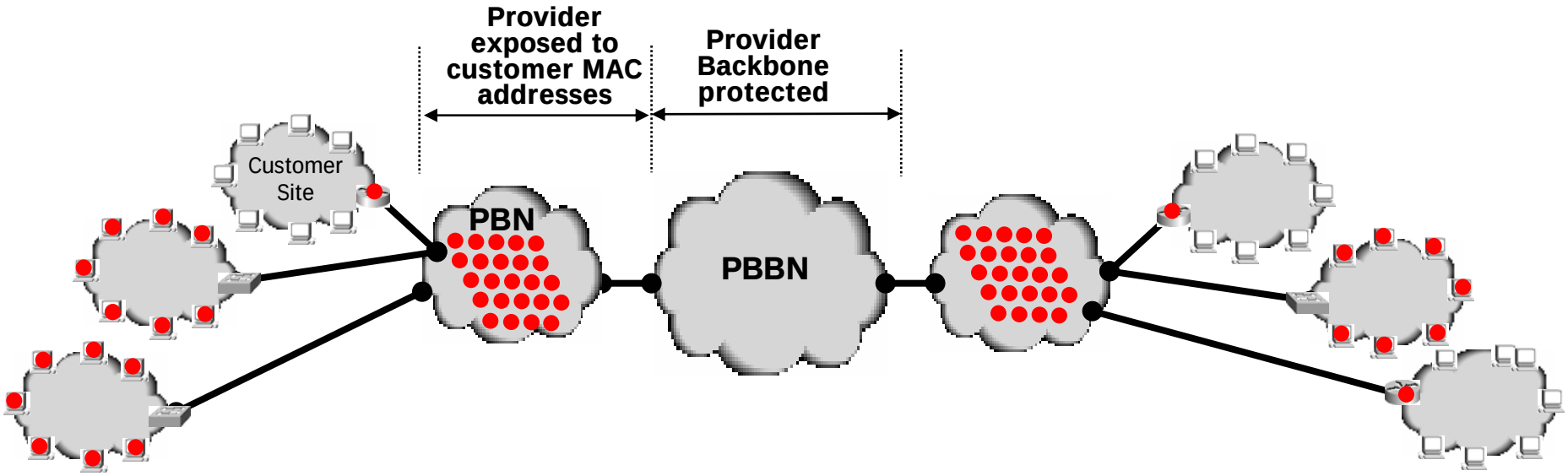
bsultan@futurewei.com

November 2005

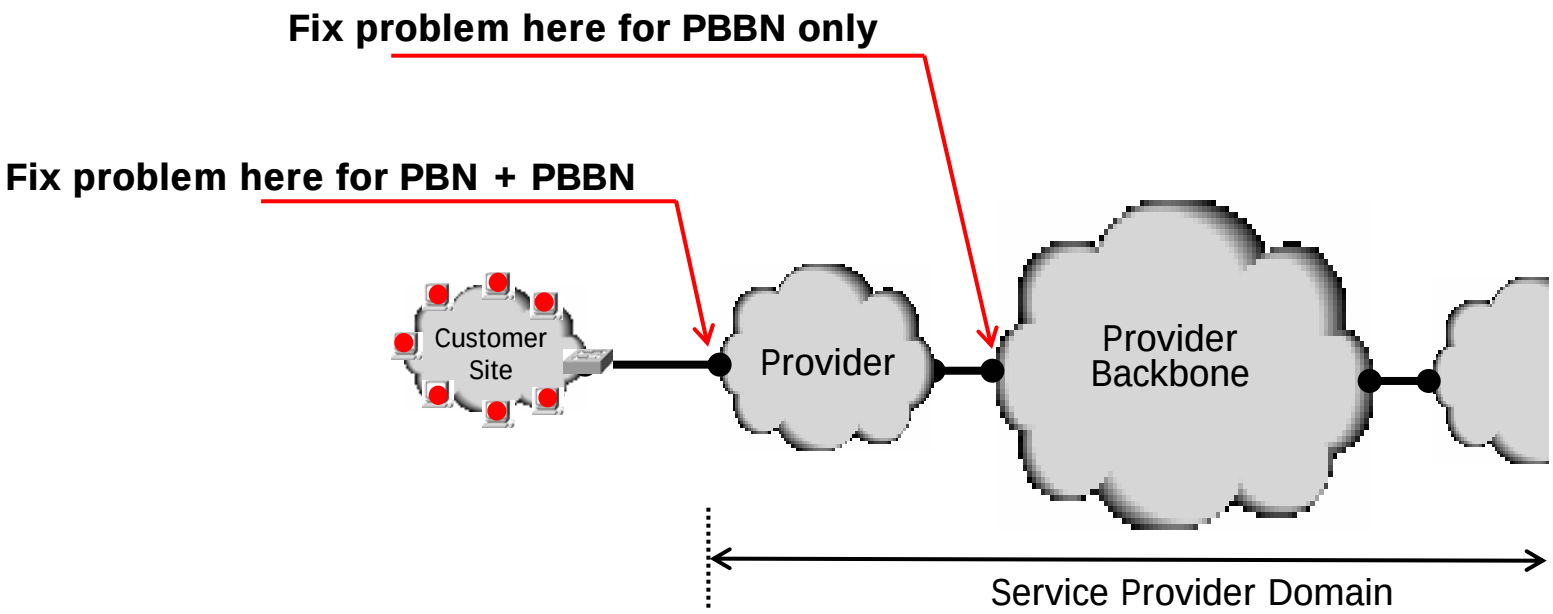
# Why Protect PBBN but leave PBN exposed?

**If exposure to customer MAC is a problem at the PBB…**

- **why isn't it a problem at the PE as well?**



# Protecting the Service Provider Domain

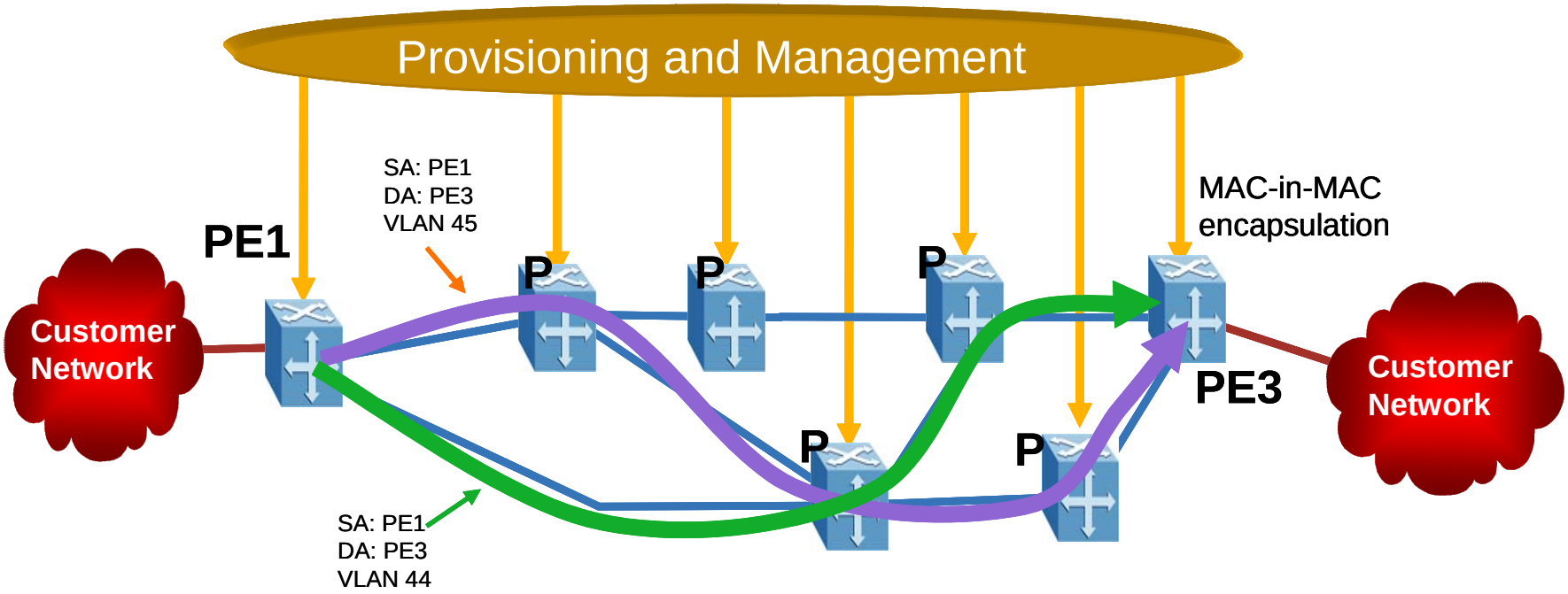



Note 1: Encapsulation at the PE increases the number of provider MAC addresses visible to switches within the PBBN. If the number of Provider MAC addresses approaches the PBBN FDB size (seems very unlikely), then the PBBN should perform the encapsulation. Similarly, if the PBBN does not want visibility to PBN MAC addresses then the PBBN should perform the encapsulation.

Note 2: It is understood that an encapsulating PE would not be backward-compatible with an 802.1ad PE. The suggestion is that a provider may require MAC encapsulation but may not wish to deploy all the functions of 802.1ah.

# Further motivation….

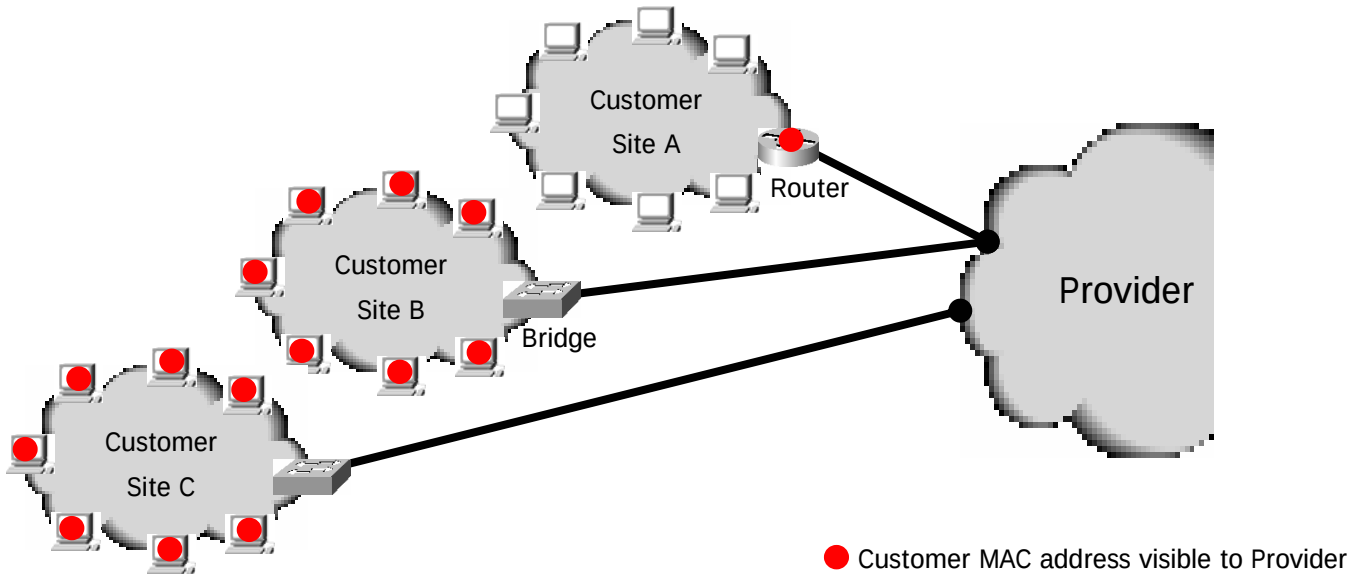
- **PBT (BT ITU Proposal) utilizes MAC encapsulation at the PE.**



# Not quite the end

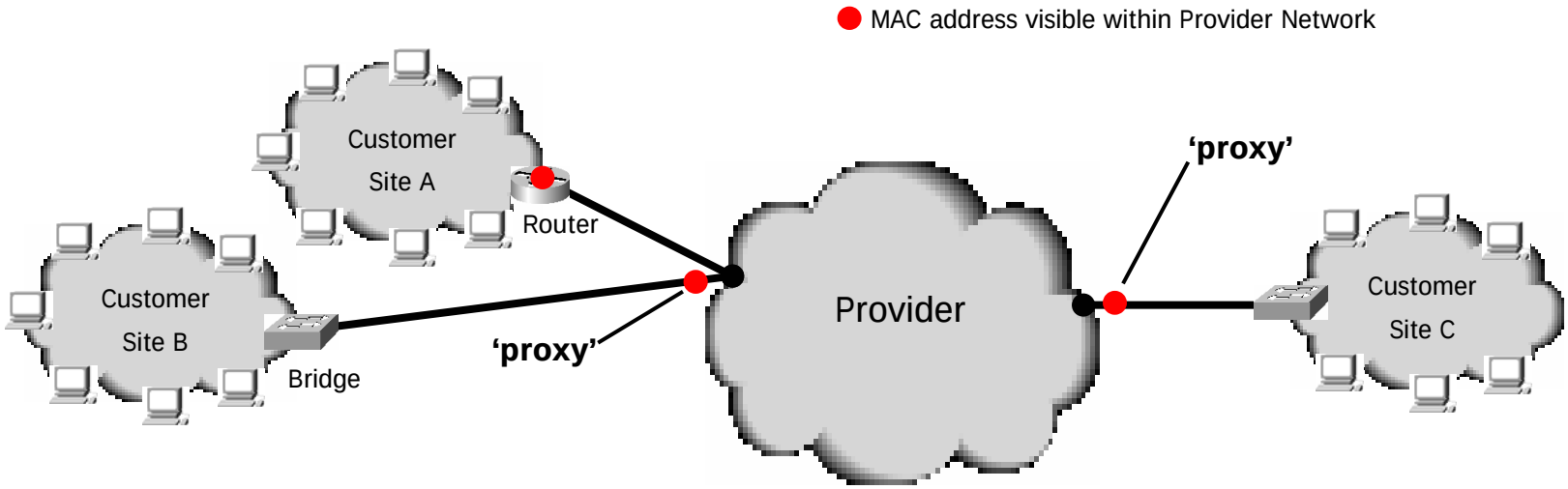
- **Requirements for encapsulation not exactly the same in PB as in PBB**

# Customer Access Via Bridge




- **Provider could see thousands of customer MAC addresses per site**
- **Result is much broadcast as FDB fills**

# Provider Port ‘represents’ Customer Site




- **When site accesses WAN via router**
  - **One MAC address is exposed to provider (no scaling problem).**
- **Same result achieved if PE customer-facing-port MAC ‘represents’ site.**
- **FDB size requirement within PBN reduced to number of customer sites.**

# Allow ‘selective’ encapsulation

No encapsulation

| CUSTOMER MAC DA or BROADCAST MAC (6 OCTETS) |
|---|
| CUSTOMER MAC SA (6 OCTETS) |
| CUSTOMER ETHERTYPE |
| CUSTOMER PAYLOAD |
| PAD (0-32 OCTETS) |
| FCS (4 OCTETS) |

DA encapsulation

| PROXY MAC DA or PROVIDER MULTICAST MAC (6 OCTETS) |
|---|
| CUSTOMER MAC SA (6 OCTETS) |
| NEW ETHERTYPE = PROXY DA |
| CUSTOMER MAC DA or BROADCAST MAC (6 OCTETS) |
| CUSTOMER ETHERTYPE |
| CUSTOMER PAYLOAD |
| PAD (0-32 OCTETS) |
| RE-CALCULATED FCS (4 OCTETS) |

SA encapsulation

| CUSTOMER MAC DA or BROADCAST MAC (6 OCTETS) |
|---|
| PROXY MAC SA (6 OCTETS) |
| NEW ETHERTYPE = PROXY SA |
| CUSTOMER MAC SA (6 OCTETS) |
| CUSTOMER ETHERTYPE |
| CUSTOMER PAYLOAD |
| PAD (0-32 OCTETS) |
| RE-CALCULATED FCS (4 OCTETS) |

DASA encapsulation

| PROXY MAC DA or PROVIDER MULTICAST MAC (6 OCTETS) |
|---|
| PROXY MAC SA (6 OCTETS) |
| NEW ETHERTYPE = PROXY DA SA |
| CUSTOMER MAC DA or BROADCAST MAC (6 OCTETS) |
| CUSTOMER MAC SA (6 OCTETS) |
| CUSTOMER ETHERTYPE |
| CUSTOMER PAYLOAD |
| PAD (0-32 OCTETS) |
| RE-CALCULATED FCS (4 OCTETS) |

Note: Same encapsulation used by current 802.1ah MAC-in-MAC

# Encapsulation Cases

| Frame Transmission Type | Local provider-edge is ‘proxy’ | Remote provider-edge is ‘proxy’ | Encapsulation at local provider-edge (decapsulation at remote provider-edge) |
|---|---|---|---|
| unicast (known) | N | N | NONE |
| | N | Y | DA |
| | Y | N | SA |
| | Y | Y | DASA |
| unicast (unknown) broadcast/multicast | N | - | NONE |
| | Y | - | SA |

# PAR for Selective Encapsulation at PE

1. **Some providers will want to encapsulate in PBN.**
2. **Do not want SVID/ISID mapping and BVID when not needed.**
3. **Do not want to deploy 802.1 PBB (edge) just to get encapsulation.**
4. **802.1ah draft does not allow selective encapsulation**
   - **Useful at PE but not in PBB**
5. **Alternative is to make SVID/ISID mapping and and BVLAN MUX optional in 802.1ah.**