

Provider Bridges and MMRP

Version 01

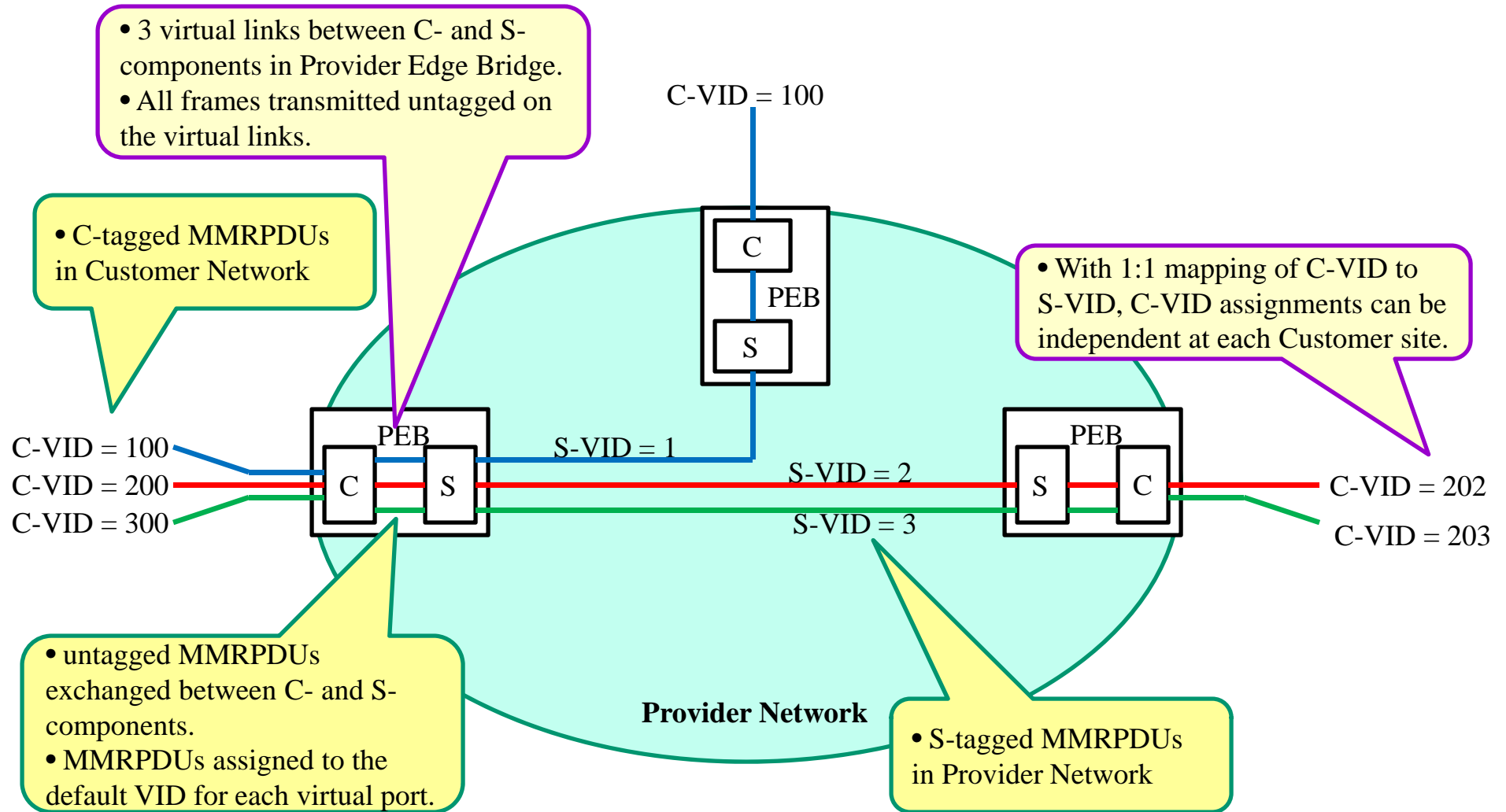
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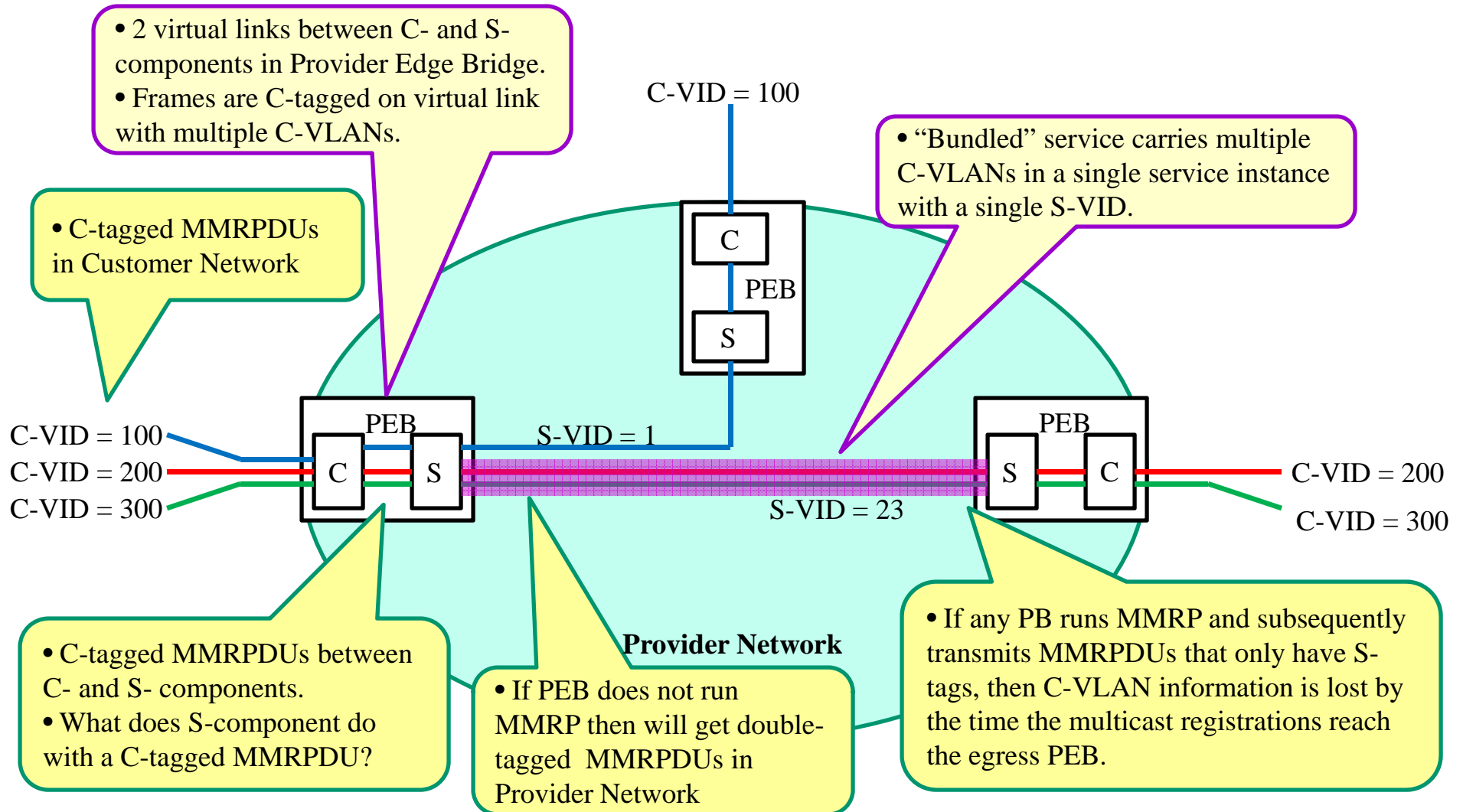
Overview

- MMRP creates a common, flat control plane for pruning multicast trees across Customer Networks and Provider Networks.
 - This is unlike xSTP and MVRP that use different Reserved DAs to create separate, hierarchical control planes for Customer Networks and Provider Networks.
- This works when there is a one-to-one map between a C-VID in the Customer Network and an S-VID in the Provider Network.
- It only sort-of works when there is a many-to-one map of C-VIDs to S-VID.
 - It can be made to work with actions that are local to each individual bridge (don't require changes to the PDUs exchanged), but
 - The standard is silent on how to do this so it must be discovered by each implementer independently.
 - It requires saving Customer state in the core of the Provider Network.
 - There may be better solutions if we are willing to make changes to the standard.

1:1 mapping of C-VID to S-VID works



“Bundled” Services Are Problematic:



Three promising approaches

1. Provider MMRP processes double-tagged MMRPDUs, keeps attribute state per S-VID and C-VID, transmits double-tagged MMRPDUs.
 - I think this works, but keeping state per C-VID in Provider Core is ugly.
2. Provider MMRP forwards double-tagged MMRPDUs and also processes them ignoring the C-tag, keeps state per S-VID only, transmits S-tagged MMRPDUs.
 - This might work. Seems ok for join operations, but there are (solvable?) issues with leave operations.
3. MMRP at CNPs forwards and processes double-tagged MMRPDUs, keeps state per S-VID and C-VID, transmits C-tagged MMRPDU to Customer Network and S-tagged MMRPDU toward Provider Network. MMRP in Provider Core simply forward double-tagged MMRPDUs.
 - Seems promising. Keeps Customer state isolated to edge of Provider Network at the expense of special processing at CNPs.
- None of these require changes to the PDUs, protocol operations or state machines, although number 3 may work better if Provider and Customer MMRP used different reserved DAs.

1. C-VLAN state in Provider Core

- Virtually no change to standard; just an “interpretation” of the MAP context.
 - A Provider Bridge supports a MAP context of “per S-VLAN” using S-tagged MMRPDUs **and** a MAP context of “per S-VLAN per C-VLAN” using double-tagged MMRPDUs.
- Advantages and Disadvantages:
 - Maintaining Customer specific state in the core of a Provider Network is a significant disadvantage.
 - When the Customer state is present, it allows a Provider Bridge to filter data frames based on both S-VID and C-VID.
 - Filtering multicast using both S-VID and C-VID was requested in ballot comments during 802.1ad. The comments were rejected because there was a strong desire not to require Provider Bridges to process both tags. Having the Customer MMRP (and MVRP?) state would allow this level of filtering without requiring it.

3. C-VLAN state at Provider Edge

- Customer specific state contained to the edge of PBN by having CNPs “snoop” ingress Customer MMRPDUs.
 - “Snoop” means the original frame is forwarded, but the MMRP application also processes it and keeps C-VLAN specific state. CNPs do not generate MMRPDUs(?)
 - Applies to all Customer Network Ports at Port-Based Service Interfaces and C-tagged Service Interfaces. Other ports in Provider Network (PNPs) keep only S-VLAN specific state, and generate only S-tagged MMRPDUs
- Advantages and Disadvantages
 - No Customer specific state in the core of the Provider Network.
 - If MMRP is supported anywhere in Provider Network then must be supported at all CNPs(?)

Interoperability with current implementations

- Depends upon what current implementations do with double-tagged MMRPDUs
 - A. If Provider MMRP simply discards C-tagged MMRPDUs:
 - Customer and Provider MMRP is defeated: Registration information is not propagated within Provider Network or between the Customer Network sites.
 - B. If Provider MMRP simply forwards C-tagged MMRPDUs:
 - Customer MMRP works but Provider MMRP is defeated: Registration information is propagated between Customer Network sites, but not within the Provider Network.
 - Will data frames with the group address get through the Provider Network?
 - C. If Provider MMRP processes MMRPDU ignoring C-tag:
 - Customer MMRP is defeated, but Provider MMRP might work.
 - Provider MMRP “registration” operations will work, but will “leave” operations?

Back-Up Slides

What should an S-VLAN component do with MMRPDUs containing C-tags?

I. S-VLAN Component does not run MMRP

MMRPDU is forwarded on the S-VLAN

II. S-VLAN Component runs MMRP

MMRPDU is intercepted (relay filters; MMRP application processes)

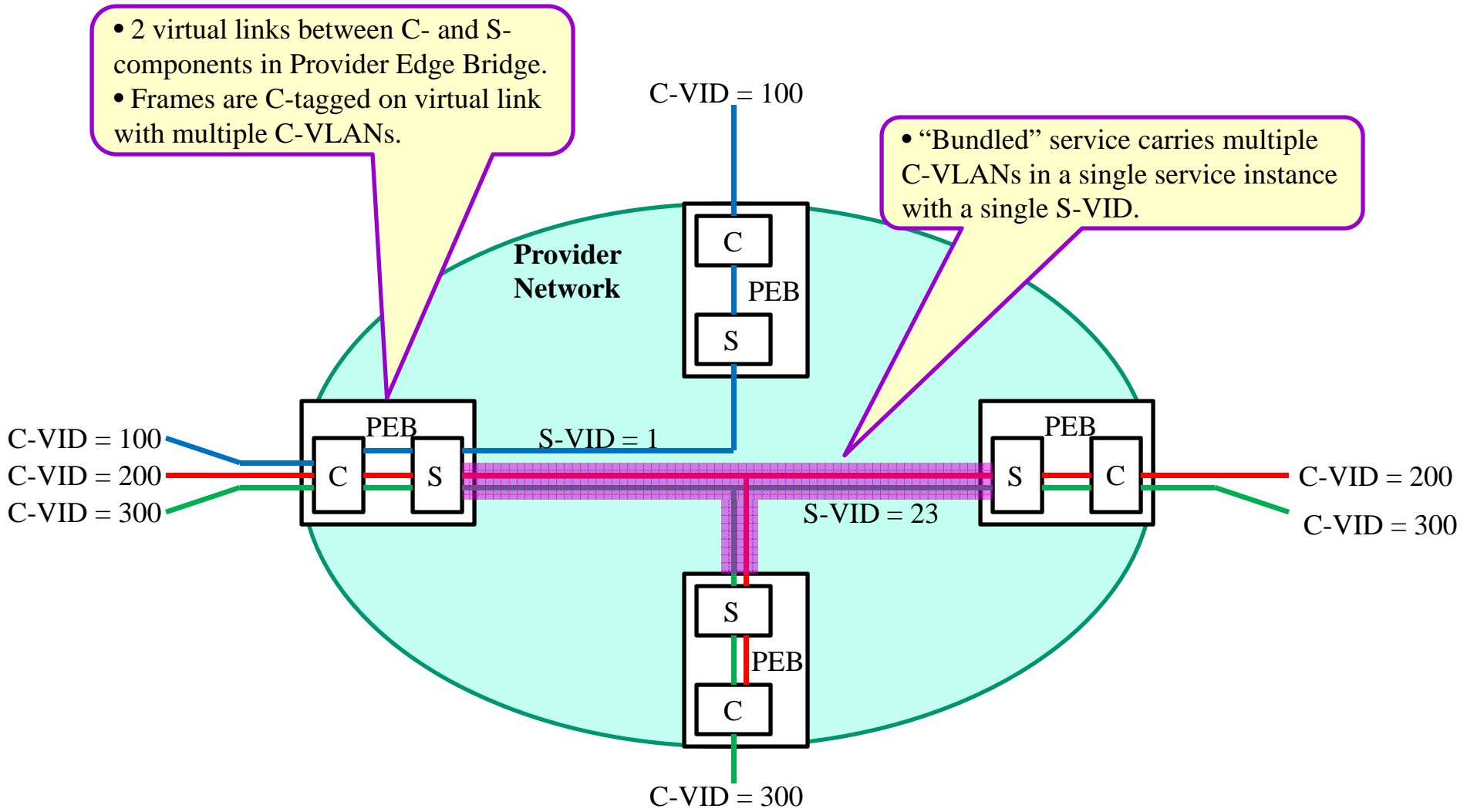
A. If MMRP does not handle state per C-VLAN, options are:

1. MMRP discards the PDU
2. MMRP forwards the PDU
3. MMRP processes the PDU ignoring the C-tag, and generates MMRPDUs without C-tags.
4. MMRP forwards and processes the PDU ignoring the C-tag (and generates MMRPDUs without C-tags?)

B. If MMRP handles state per C-VLAN

1. MMRP processes the PDU including the C-tag, and generates MMRPDUs with C-tags.
2. MMEP forwards and processes the PDU including the C-tag (and generates MMRPDUs without C-tags?)

Most likely to work.



Thank You

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