Thoughts on VDP in a PE Environment

Joe Pelissier

br-pelissier-pevdp-thoughts.pdf

Background

- **Early on it was agreed that VDP is applicable in both an EVB environment and a PE environment**

  - Therefore, it was agreed to split VDP from the emerging PE CSP, place it in P802.1Qbg, and use it for both

- **Current thinking is to use a 2-port ER to support VDP in a PE environment**
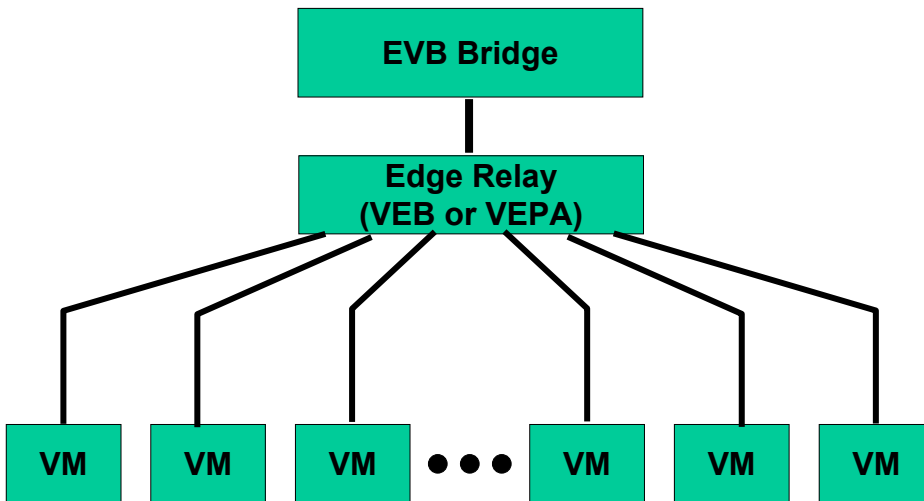
  - Upon subsequent reflection, this approach imposes significant scalability challenges in the PE environment

- **This presentation**

  - Describes the issue

  - Proposes a simple solution

VDP in an EVB environment

- **ECP executes in ER**
  - **Single instance of ECP for all subordinate VMs**
    - Single ACK timer
    - One reserved buffer per ER
- **VDP executes in ER**
  - **VDP association TLVs packed into single ECPDU**
    - Including keep-alives

VDP in an PE environment (current model)

- **ECP executes in ER**

   An independent instance required for each VM

   Explodes by orders of magnitude the number of ECPDUs that the CB must process

   Separate ACK timers

   Difficult to provide timely acks with the possibility of ECPDU "storms"

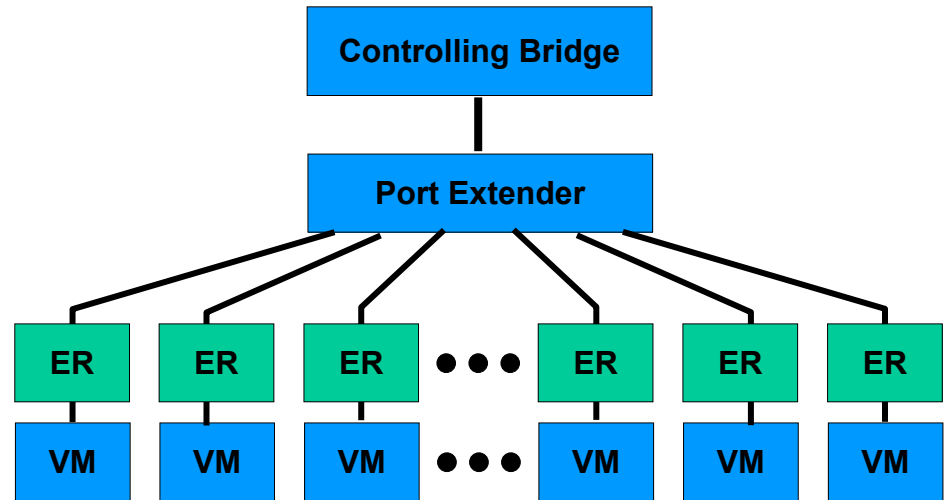   Separate reserved buffers

   Multiple megabytes of buffer in the CB could be required

- **VDP executes in ER**

   One VDP association TLV per ECPDU

   The ability to pack multiple associations per ECPDU is a key feature for scalability

   Exacerbated by the fact that keep-alives must also be processed
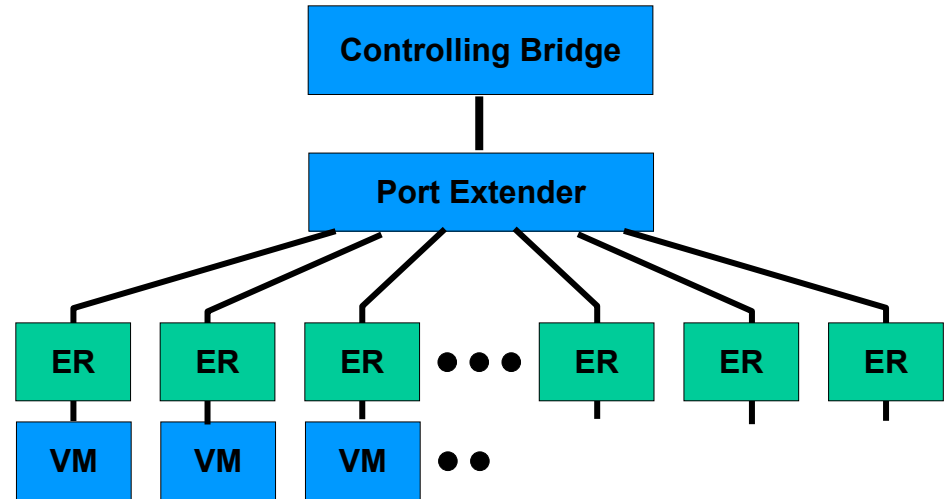
VDP in an PE environment (current model)

- **Pre-associate without resource reservation gets really weird**
  - **For each pre-association, a separate ER must be instantiated to provide the request**
    - Along with all of the E-channels and virtual ports
  - **This ER, along with all of the virtual ports, E-channels, etc., must be maintained indefinitely, otherwise a VDP timeout occurs and the pre-association is lost**
  - **Requires reservation of significant resources even though resource reservation was not requested**

```
                    Controlling Bridge
                           |
                      Port Extender
        _____|_____
       |      |      |           |      |      |
      ER     ER     ER   ● ● ●   ER     ER     ER
       |      |      |
      VM     VM     VM   ● ●
```

Some notes on the VDP Specification

- **For the Bridge actions, VDP is specified in terms of an EVB Bridge**

  This works fine… an Extended Bridge that supports VDP conforms to the requirements of an EVB Bridge

- **For the EVB-S, VDP is specified in terms of a VDP Station state machine**

  There appears to be nothing ER specific

- **The conformance clause for an EVB-S simply states:**

  "Support the station role of VDP for each URP of each ER (Clause 41)."

Proposal for PE

- **In BR, describe a model similar to an Edge Relay:**

  - **VDP executes in the PE**

    - One instance of ECP for all subordinate VMs

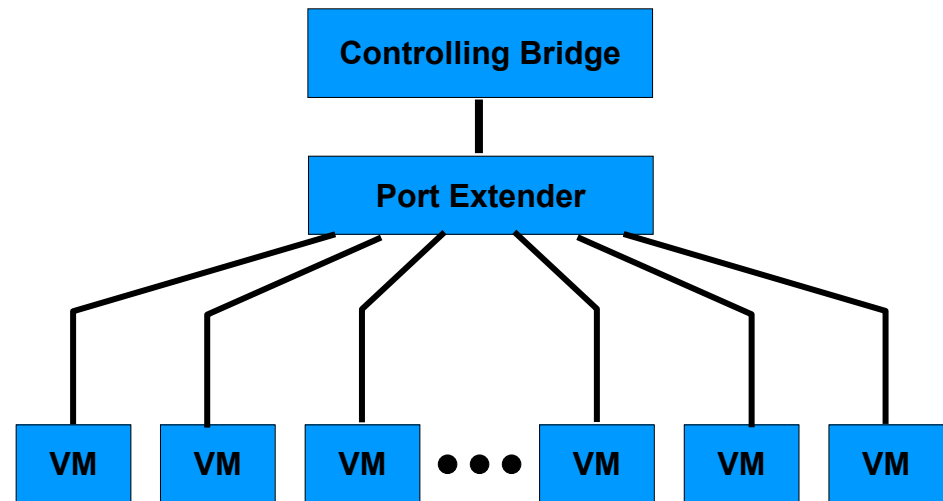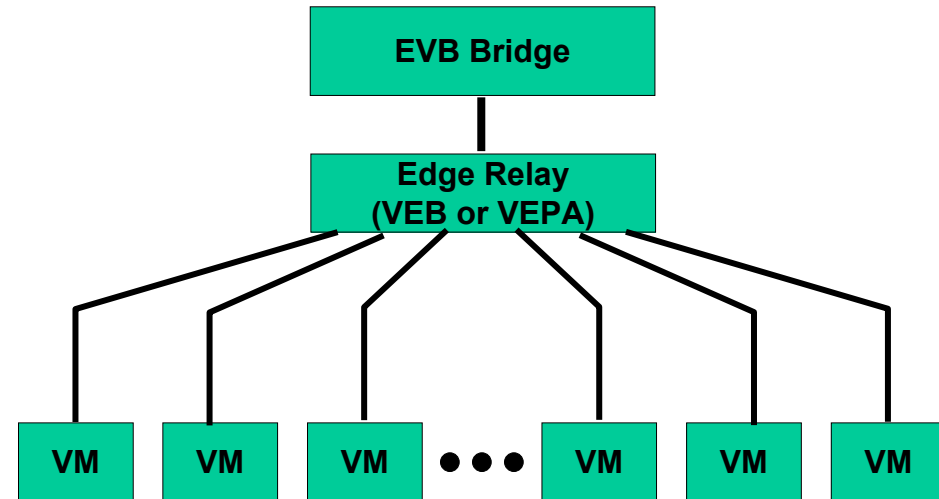   - VDP association TLVs are aggregated

    - VDP keep-alives are aggregated

- **PE utilizes similar conformance statement:**

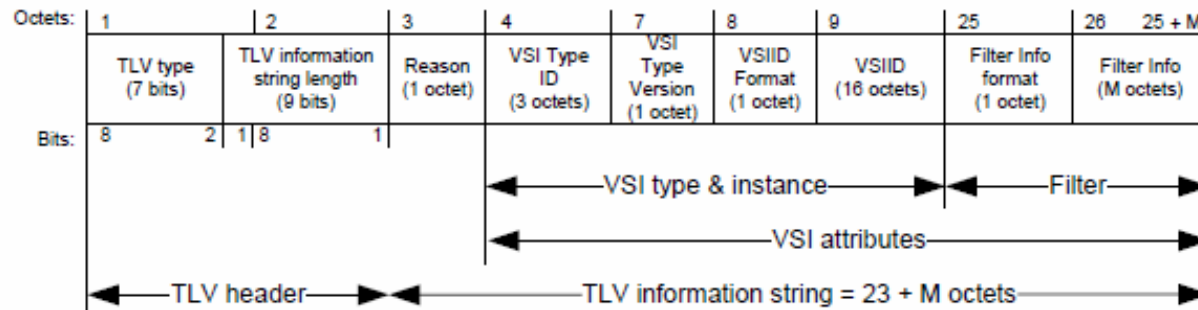 - (Optional) Support the station role of VDP on the Upstream Port (IEEE Std 802.1Q Clause 41)

    - (and associated ECP statements)

- **In BR, define a PE association TLV (next slide)**

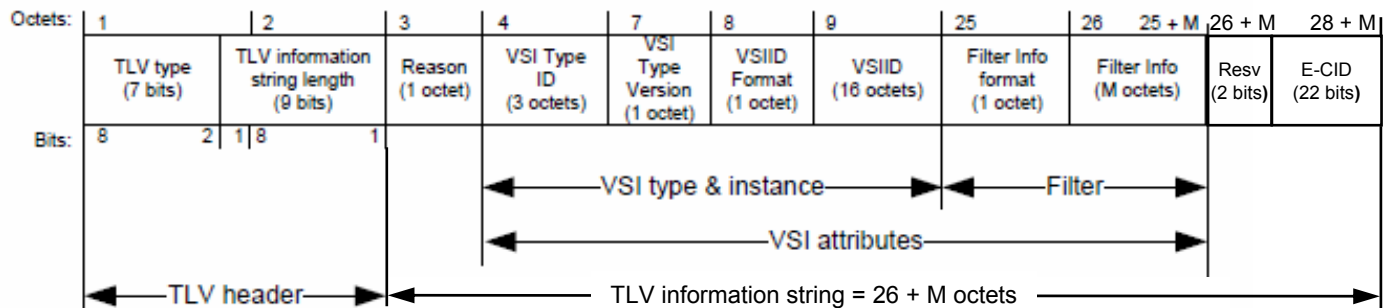- **In Qbg, reserve a VDP TLV type for use by BR (perhaps)**

Expressing E-CID in VDP association TLV

- **The VDP association TLV has the following format:**

- **The PE association TLV has same format except that it appends an E-CID to the frame:**

An Alternative

- **Recall that our TLV rules allow us to append additional information to the end of a TLV**

- **Therefore the PE association TLV could just be an extension of the VDP association TLV**

  No new TLV

  No new type code

  No changes to P802.1Qbg

Summarizing

- **In P802.1BR:**

    As an optional compliance, an external Port Extender may:
    Support the station role of VDP on the Upstream Port
    (IEEE Std 802.1Q Clause 41).

    > If it does, it shall support the PE association TLV
    > (or the E-CID extension to the VDP association TLV)

    A Controlling Bridge supporting VDP shall support the PE association TLV
    (or the E-CID extension to the VDP association TLV)

    Add a new clause describing the PE association TLV
    (or the E-CID extension to the VDP association TLV)

    Update the informative annex C to state that VDP runs in the PE rather
    than in a 2-port ER

    Add additional informative material in annex C describing how VDP works
    with an ER attached to a PE (next slide)

- **In P802.1Qbg**

    If we extend the VDP association TLV, do nothing!

    If we define a PE association TLV, add a VDP type code reserved for BR
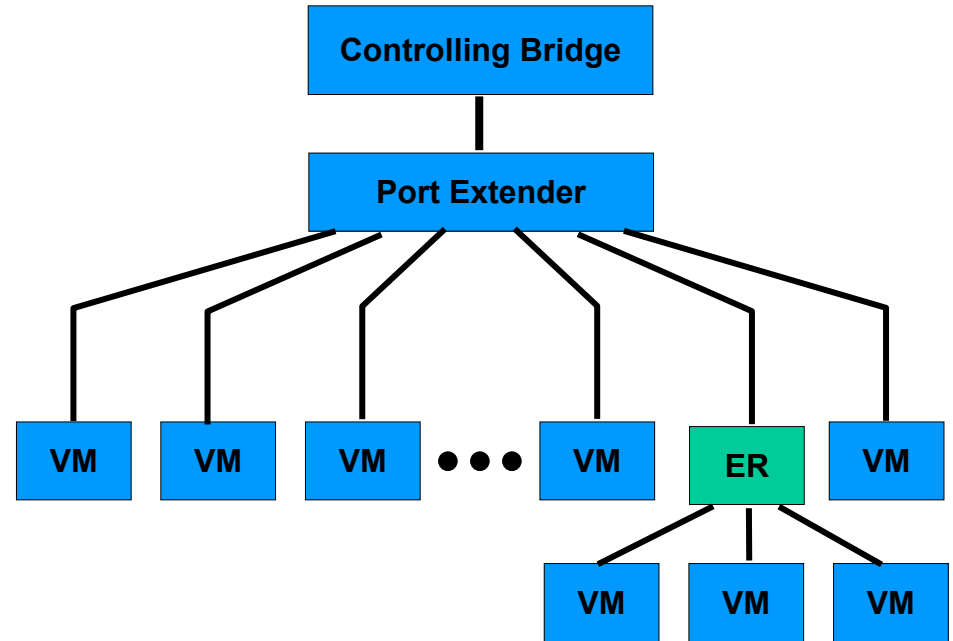
VDP, PE, and ER

- **This configuration continues to operate**

  The PE executes VDP only for the VMs directly attached to it

  The traffic flows on the E-channel associated with the PE's Control and Status agent

  The ER's VDP traffic is segregated from the PE's VDP traffic on a separate E-channel

  From the C-VLAN component point-of-view, the ER and VDP appears like any other connected ER

Thank You!