Thoughts on VDP in a PE Environment

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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 and 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
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!