VPLS OAM (draft-mohan-l2vpn-vpls-oam)

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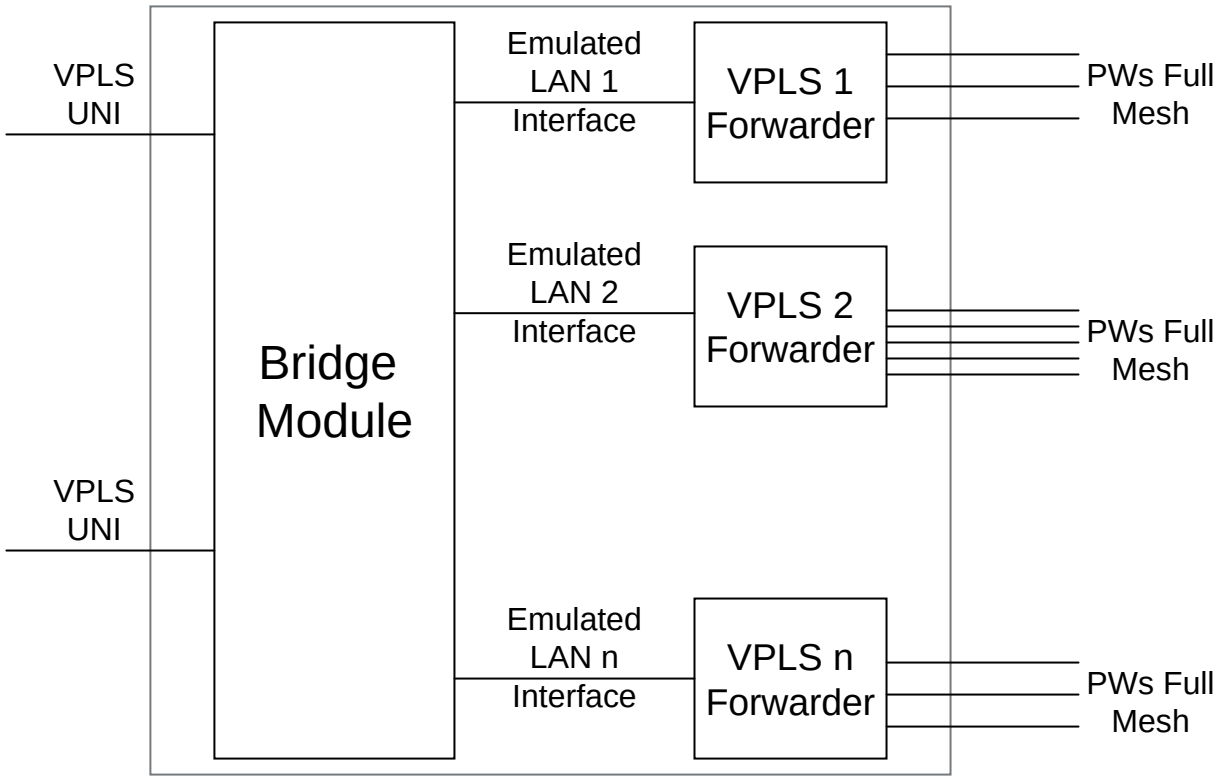
Overview

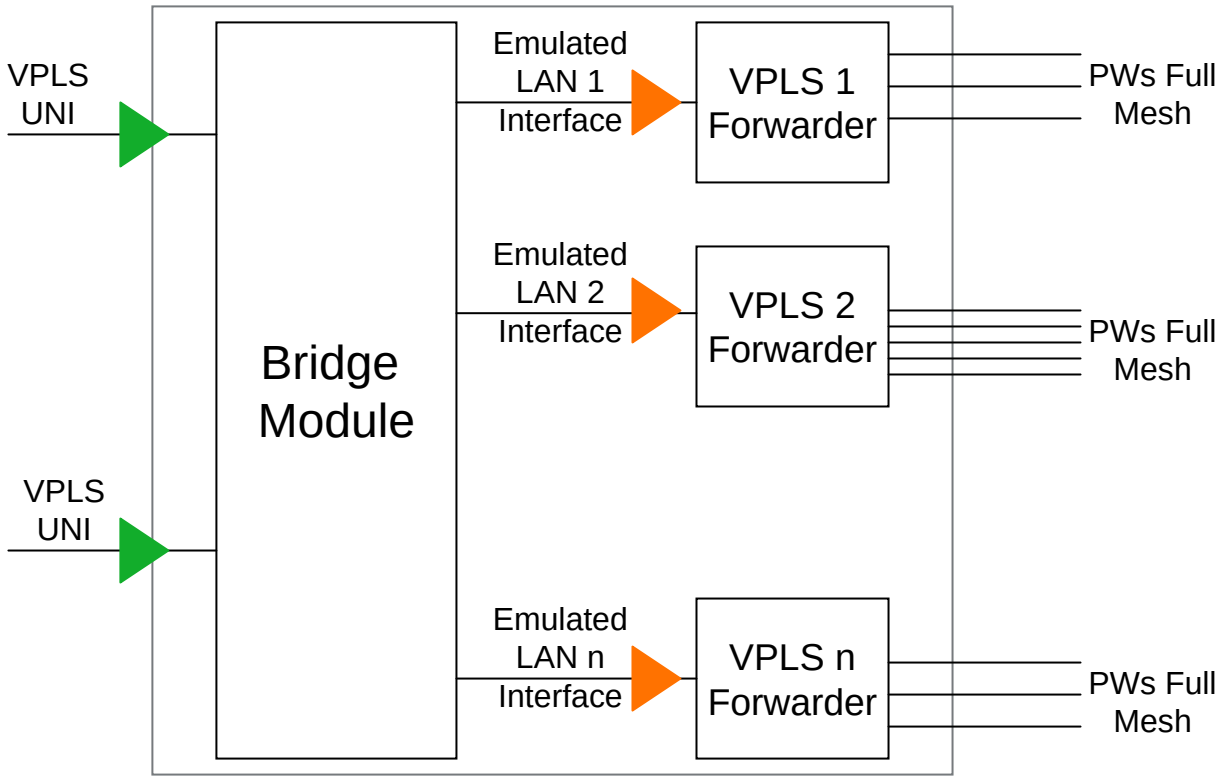
- L2VPN OAM Requirements & Framework is currently in IESG last call
- draft-mohan-l2vpn-vpls-oam-00.txt has recently been submitted
- This presentation takes a look at the proposed VPLS OAM solution and its functional coverage

What is a VPLS PE?



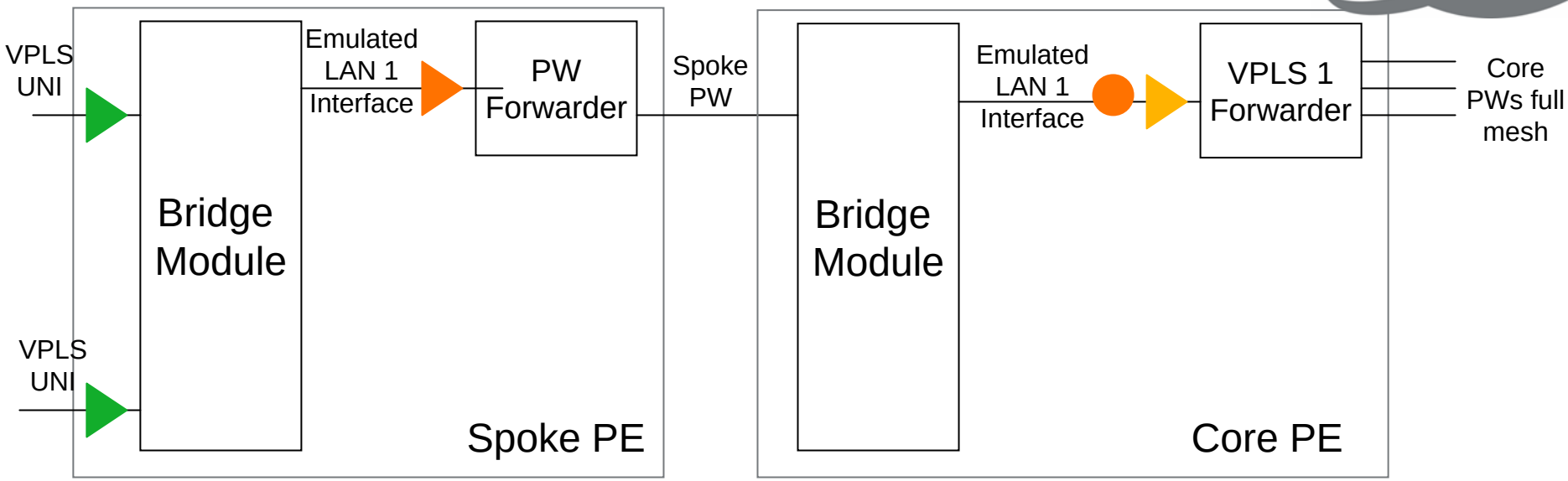
- VPLS PE offers end-to-end VPLS Service as visible across VPLS UNI
- VPLS PE implements Emulated LAN using full mesh of PWs
  - Emulated LAN allows PEs to offer end-to-end VPLS Service

VPLS OAM Scope



- Monitor end-to-end VPLS Service across VPLS UNIs
- Monitor VPLS Emulated LAN

H-VPLS OAM Overview



- Monitor end-to-end VPLS Service across VPLS UNIs – same as VPLS (non-hierarchical case)
- Monitor VPLS Emulated LAN
  - Spoke VPLS PE (U-PE) implements MEP
  - Core VPLS PE (N-PE) implements MIP (MD Level same as Spoke PE MEP) and its own MEP (MD Level lower than Spoke PE MEP)

VPLS OAM Requirements & Conformance

OAM Requirement	draft-mohan	Comments
Discovery	Multicast LBM (on-demand) CCMs may be used (proactive)	Validate OAM monitoring end-points for a VPLS service Instance
Fault Detection	CCMs are used – different periodicity is allowed (e.g. 10ms to 10min)	Fault detection is a proactive operation Used to detect failure in continuity between VPLS Service Endpoints and also between VPLS Forwarders
Fault Verification	Unicast LBMs – VPLS forwarder treat these frames as data frames	Connectivity between two monitoring points can be established

VPLS OAM Requirements & Conformance

OAM Requirement	draft-mohan	Comments
MTU Verification and data pattern diagnostics	Unicast LBMs with Data or Test TLV	To exercise different MTU sizes or exercise different bit patterns in payload
Fault Localization	LTM/LTR for detecting issues at Ethernet Layer, once a problem has been isolated to specific PW in MPLS domain, MPLS domain mechanism to be used	Localize the fault as close to its occurrence as possible
Frame Loss Ratio	Using statistical sampling described in Y.1731	Determine frame loss performance metric, an integral component of SLAs
Frame Delay/Variation	Y.1731 mechanisms can be applied	Determine frame delay and frame delay variation performance metric, integral components of SLAs

draft-mohan Operational Steps

- Monitor VPLS Service via Ethernet OAM
- Monitor VPLS LAN Emulation via Ethernet OAM
  - Does not impose n-square issues unlike monitoring full mesh of PWs individually
- Upon detecting failure in specific segment, use native OAM capabilities available within this segment, e.g. VCCV/BFD for MPLS/IP PWs
  - Individual node is identified where the problem lies
  - Information available on the individual node can be used to further diagnose the problem, e.g. mapping tables etc.

Backup

Comparison with some alternate solutions

VPLS OAM Requirements & Conformance

OAM Requirement	draft-mohan	draft-stokes	Comments
Discovery	Multicast LBM (on-demand) CCMs may be used (proactive)	Proposes new control plane (LDP) extensions to convey IP Address and MAC information of all spoke and core VPLS nodes	Validate OAM monitoring end-points for a VPLS service Instance
Fault Detection	CCMs are used – different periodicity is allowed (e.g. 10ms to 10min)	Keeplives are marked outside the scope Indicates that CCMs may be used which is same as draft-mohan Periodic VPLS Pings are onerous as has been established in past	Fault detection is a proactive operation Used to detect failure in continuity between VPLS Service Endpoints and also between VPLS Forwarders
Fault Verification	Unicast LBMs – VPLS forwarder treat these frames as data frames	Requires new extensions (L2-specific Sub-TLV) in MPLS Ping, MPLS ping requires processing at each VPLS forwarder	Connectivity between two monitoring points can be established

VPLS OAM Requirements & Conformance

OAM Requirement	draft-mohan	draft-stokes	Comments
MTU Verification and data pattern diagnostics	Unicast LBMs with Data or Test TLV	Uses the MPLS Ping Pad field, same issues with MPLS ping	To exercise different MTU sizes or exercise different bit patterns in payload
Fault Localization	LTM/LTR for detecting issues at Ethernet Layer, once a problem has been isolated to specific PW in MPLS domain, MPLS domain mechanism to be used	Proposes new variant of MPLS Traceroute	Localize the fault as close to its occurrence as possible
Frame Loss Ratio	Using statistical sampling described in Y.1731	Does not specifically address PM Refers to using Y.1731, which is same as draft-mohan	Determine frame loss performance metric, an integral component of SLAs
Frame Delay/Variation	Y.1731 mechanisms can be applied	Does not specifically address PM Refers to using Y.1731, which is same as draft-mohan	Determine frame delay and frame delay variation performance metric, integral components of SLAs

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