VPLS: Case Study

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MPLS 2004

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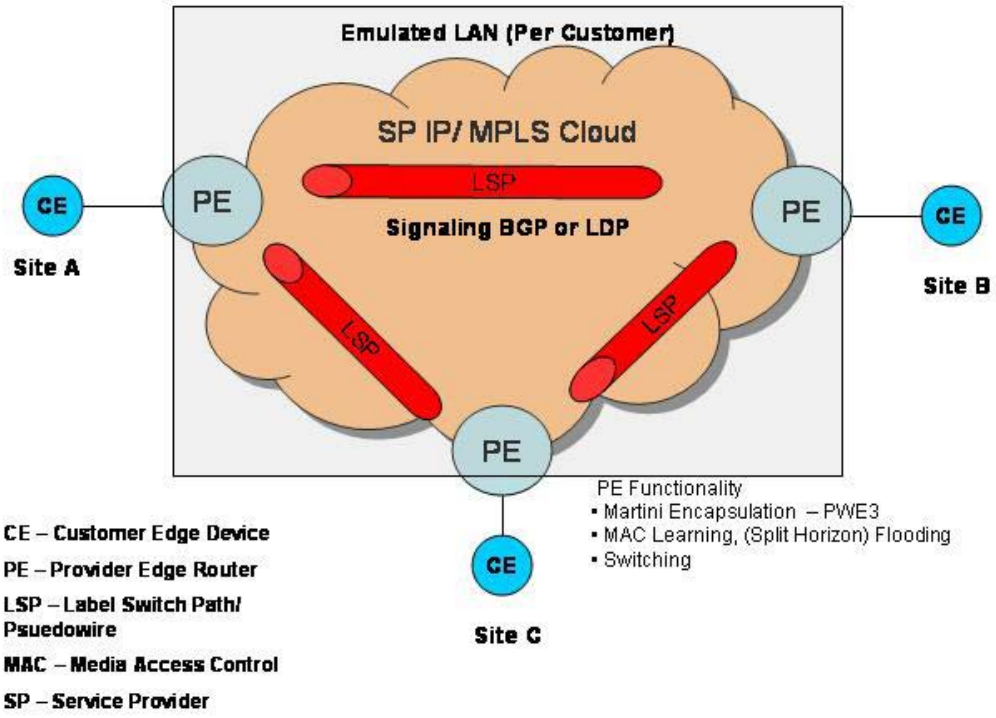
What is VPLS

- Virtual Private LAN Service
  - Layer 2 service that emulates LAN across an IP and an MPLS-enabled IP network, allowing standard Ethernet devices to communicate with each other as if they were connected to a common LAN segment. (l2vpn – ietf working group)

What is VPLS? - cont'd

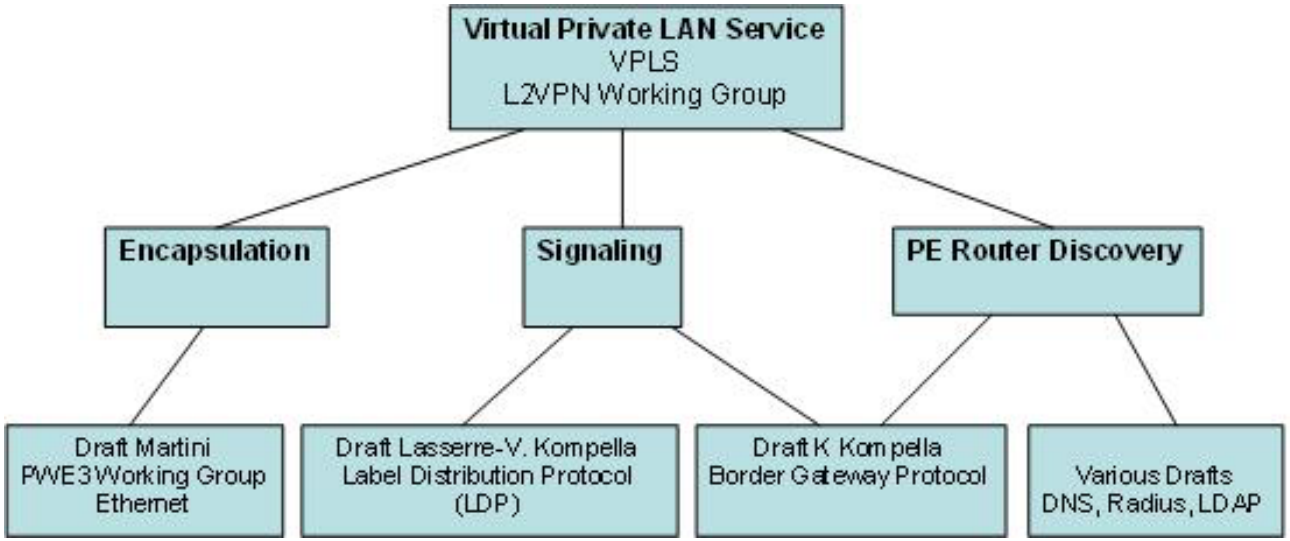


Why is it popular with Enterprises?

- Simplicity
  - Ubiquity of Ethernet
- Transparency
  - Unlike 2547, the Service Provider does not need to be aware of routing.
  - Look and feel like a LAN
- Multipoint
  - Allows for ease of communication

Technical Difficulties

- Two approaches



Technical Difficulties

- So which approach? Depends…
  - Goal: Multi Services Edge using existing devices
    - Simple Solution:
      - Cisco only supports Lasserre - V Kompella
      - Juniper only supports K Kompella draft.
  - Goal: Greenfield Approach
    - Focus on non-draft issues that such as:
      - $$$$, OAM, other abilities of the devices.
- Ultimate, the standard will be settled upon and will be supported by all vendors.
  - Real question: Opportunity Cost of waiting

Technical Difficulties

- Having the network act like a virtual switch has inherited problems
  - MAC table size
  - MAC aging
  - Flooding
  - STP
  - MTU Scalability
- Network Scalability
  - Route Reflector
  - VLAN limitations

Operational Difficulties

- Testing and turn up requirements
  - How to verify services before handing over product to customers?
- Troubleshooting
  - LSP
  - CoS/QoS
  - Traffic Types
  - Flooding

Operational Difficulties

- Sales
  - How to sell this as a complimentary services to VPWS, 2547bis, and IPSec?
- Billing and Pricing
  - What do we charge?

Service Type	VPWS	2547	IPSec	VPLS
Connection Type	Point-to-Point	Multi-Point	Point-to-Point	Multi-Point
Routing Involvement by SP	No	Yes	No	No
Protocol Support	Any	IP Only	IP Only	Any

Testing - VPLS

- Functional Requirement
  - Must support the existing TWTC Metro Services
    - Untagged
    - Tagged/Multi-Tagged
    - Q-in-Q
  - Traffic type
    - Unicast
    - Multicast
    - Broadcast
  - Service Support
    - VoIP
    - Gaming – Interactive Traffic
    - etc

Testing - VPLS

- Performance Metrics
  - Throughput
  - Load
  - Latency
  - Max MAC table size
  - Frame Loss
- Lab and Field Testing was performed

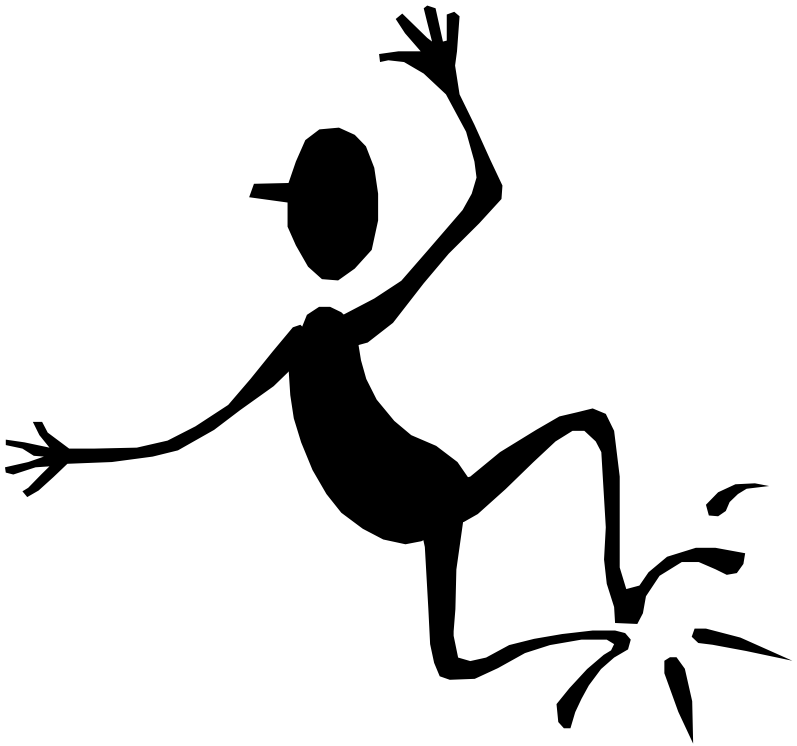
Issues and Operational aspects of running a VPLS Network

- Managing the Finite Resources
  - Customer Broadcasts
  - MAC Table Size
- VLAN management
  - Global significant or Rewrite
- Network Scaling
  - Route Reflectors

Issues and Operational aspects of running a VPLS Network

- Testing and Turn Up
  - Provisioning
  - Pre-service Testing
- Operational Troubleshooting
  - LSP Ping
  - Segmentation
  - Clearing ARP entries
  - On-site Testing
  - etc

Customer Reactions



VPLS

- This technology is here to stay!!
- Low Maintenance once service is up
- Juniper has been a great partner in the deployment of this technology.

Where to now?

- You’re only as good as your reach!
  - TWTC has a great presences in 44 markets…but what about … ?
    - EoTDM into VPLS
    - Frame/ATM into VPLS
    - Inter-Provider VPLS
- Customer CoS recognition by provider.
- OAM tools

Thank You