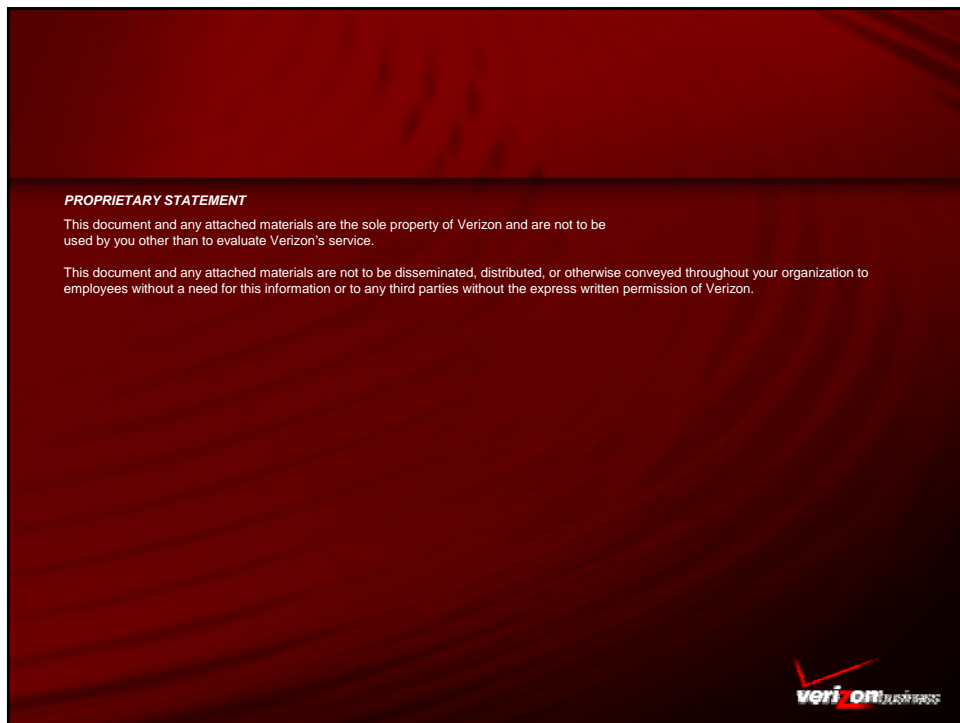




VPLS: A New Way of Networking


Alla Reznik
Verizon Business Product Marketing



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Enterprise Customer Requirements: a WAN Solution Fit for 21st Century

- **Ultimate WAN solution that combines the proven success of MPLS with the ease of use and familiarity of Ethernet**
 - Must offer the same advantages as IP VPN:
 - EFFICIENCY, QoS, SECURITY, RESILIENCY, FLEXIBILITY
 - Granular flexible bandwidth choices
 - Convergence of services
 - Must span across large geography
 - Flat-rate monthly billing
 - Solution must allow customer to maintain control over IP routing



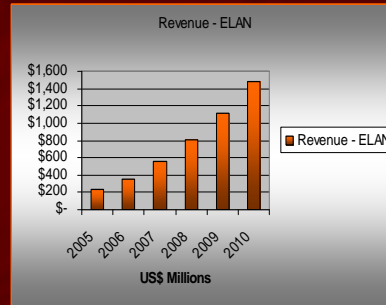
VPLS from Enterprise Customer Perspective

- Layer 2 Ethernet VPN
- Layer 3 protocol-independent
- Multipoint topology
- CPE can operate at L2 or L3
- Bandwidth scales from Mbps to Gbps
- Common Ethernet Access can be shared with other network services to control costs
- Spans across metro areas
- Scalable to support thousands of sites
- QoS allows customers to add new and manage existing applications efficiently
- Multicast and Broadcast supported
- Easy to add new sites



Market Outlook for VPLS

- ELAN Type of services are expected to grow at a rate higher than ELINE services
- Growth in ELAN services will depend upon extended availability, cost effectiveness, ease of manageability and increased options for premise access
- ELAN service revenues are projected to grow at a CAGR of 45% from 2006-2010



Source: In-Stat, 10/06

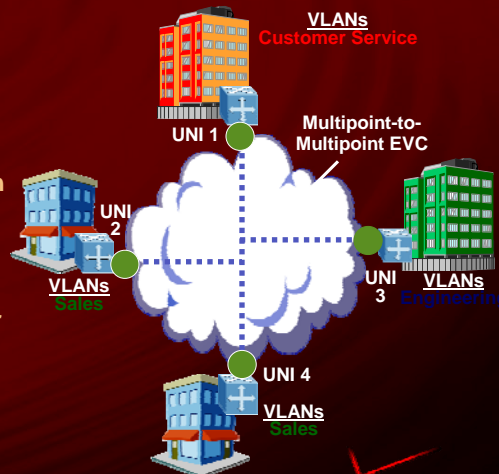
"VPLS is a major new growth area for Ethernet. Customers are already very familiar with Ethernet in their local area networks. Extending to the wide area network is a natural progression, especially for those business and government customers seeking a clear IP migration path to enable convergence of their multiple legacy networks."

Dan O'Connell, Research Director
Gartner



VPLS from Service Provider Perspective

- New offering leveraging existing MPLS infrastructure
- MAC address routing
- Advanced traffic engineering of MPLS allows us to offer SLAs with confidence
- Support of multiple VLANs on a common access allows us to offer additional network services: IP, IP VPN, EVPL
- VLAN management allows us to make changes to customer network remotely
- Defined by the Internet Engineering Task Force (IETF)



Key VPLS Features

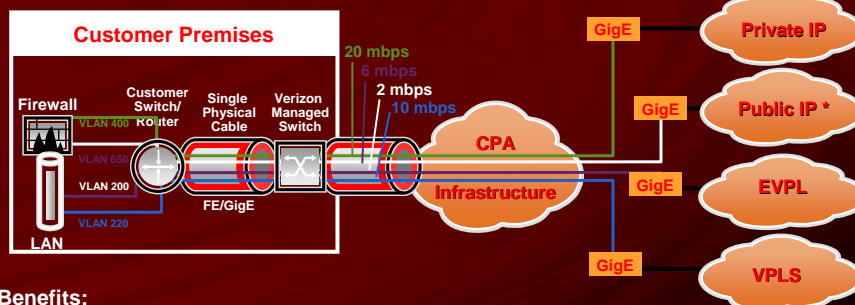
Key Features	
QoS	<ul style="list-style-type: none"> Multiple Classes of Service supported Real Time Data, Priority Data, Business Data, Basic Data
Multiple Domains	<ul style="list-style-type: none"> Customer can choose to set multiple or single Domain to separate traffic per department
Broadcast Traffic	<ul style="list-style-type: none"> Unicast Multicast Broadcast
Transparency	<ul style="list-style-type: none"> Customers can choose transparent VPLS Flow which will preserve VLAN settings
Convergence	<ul style="list-style-type: none"> Combine several services over one common Ethernet Access Add Internet Access, IP VPN connection or a point-to-point EVC

New locations may be added to / removed from the VPLS Customer Domain with ****LIMITED**** impact to the existing VPLS Flow attachment circuits



Delivering Converged Ethernet Access

- Verizon Business uses Converged Packet Architecture to support Multi-service Ethernet Access
- Multiple Ethernet Services to be delivered over a single Ethernet Access connection
- VLAN tagging is used to provide traffic separation



Benefits:

- Reduced intervals when adding new services to an existing connection
- Streamlined per site cost (single CPE device and lower per meg price)
- Increased purchasing power for enterprise customers

*CEA to Public IP planned for 2H2007



Granularity and Flexibility of Bandwidth: VPLS Speeds

- The following VPLS Flow bandwidths are available

Mbps				Gbps
1 Mbps	9 Mbps	45 Mbps	200 Mbps	1 Gbps * Future releases will support bandwidths to 10 Gbps
2 Mbps	10 Mbps	50 Mbps	300 Mbps	
3 Mbps	15 Mbps	60 Mbps	400 Mbps	
4 Mbps	20 Mbps	70 Mbps	500 Mbps	
5 Mbps	25 Mbps	80 Mbps	600 Mbps	
6 Mbps	30 Mbps	90 Mbps	700 Mbps	
7 Mbps	35 Mbps	100 Mbps	800 Mbps	
8 Mbps	40 Mbps	150 Mbps	900 Mbps	

- Premium QoS (Real Time Data) is available in the above speeds, in addition to the following increments
 - 64 Kbps, 128 Kbps, 192 Kbps, 256 Kbps, 384 Kbps, 512 Kbps, 768 Kbps and 896 Kbps
 - Premium QoS bandwidth must be less than or equal to the VPLS Flow bandwidth



Stringent Service Level Agreements (SLAs)

- SLA measurements are based on the test traffic between probes located at each Verizon Business VPLS switch site

Metric	Measurement
Availability	On-Net Ethernet Access: 100% Off-Net Ethernet Access: 99.9%
MTTR	On-Net Ethernet Access: 2 Hours Off-net Ethernet Access: 4 hours
Round Trip Delay (RTD) *	100 ms round trip**
Data Delivery Ratio (DDR) *	Real Time Data: 99.995% Priority & Business Data: 99.99% Basic Data: 99.5%
Frame Jitter *	5 ms **

* between Verizon Business VPLS switch sites

**RT class of service only

Note: All measurements provided are for US Domestic 48 contiguous states

TERMS AND CONDITIONS APPLY. PLEASE SEE YOUR VERIZON BUSINESS REPRESENTATIVE FOR DETAILS.



VPLS Appeals to a Wide-Range of Industries

Financial

- Reliable secure solution supported by stringent SLAs
- Prioritize mission critical data – Ex: on-line trading
- Reach locations across the US
- Maintain routing control for additional traffic management

Retail

- Cost effective solution: use Ethernet CPE for WAN connectivity
- Flat-rate distance insensitive pricing
- One access to support Internet and WAN
- Scale bandwidth: bandwidth as low as 1-10 Meg available for small retail sites
- Add sites without any disruption to existing network

Service Industries

- Ex: Health Care, Law Firm, Government
- Prioritize delay sensitive applications: digital imaging, voice
- Set up separate domains to separate traffic of one internal department from another or for extranets
- Use invoicing per VPLS Flow to assign costs by department

Manufacturing

- Prioritize traffic using CoS
- Support IP and non-IP protocols
- Allow Engineering to share information securely with separate Domain option
- Scale bandwidth – up to 1GigE is available for large plants and headquarters



WAN Solution Ready for the Future

▪ VPLS is a firm foundation to satisfy enterprise customer requirements in changing business environment

- Reduce the need to transition to another technology in the future
 - VPLS supports multiple protocols
 - New applications are easy to integrate using multiple service classes
 - New sites can be added easily
 - Flexibility for highly-distributed workforce
 - Increase bandwidth gradually without a need to upgrade CPE
 - Control over IP routing maintained
- Utilize MPLS qualities in such a way that a customer feel like they never left the corporate headquarters

