

It is common knowledge that operators are moving towards architectures based on VPN, especially for IPTV services. Infact VPN result particularly interesting for multicast operation in service as live or broadcast TV. Moreover further interest is for VPN with a labelling at “level 2” that can be considered in the framework of a “Carrier Ethernet Service [?]. According to these consideration we implement on test bed the particular VPN method called VPLS that we believe particurlay suitable for HD IPTV services.

Virtual Private Lan Service is a service that realizes Ethernet connections employing MPLS LSPs.

VPLS, also known as a Transparent LAN Service offers a Layer 2 Virtual Private Network; respect to the conventional Layer 2 VPN where the customers are connected in a point to point way, in VPLS customers are connected by a multipoint Ethernet LAN.

The main feature is that users sharing VPLS seem to be in the same LAN, independently by their own geographic position. There are two main documents related to VPLS: RFC 4761[] and RFC 4762[], these documents describe the functions related to VPLS, especially in terms of mechanisms for signaling and rules for forwarding VPLS frames across a packed switched Network. In particular on experimental test bed, RFC 4761 is chosen to implement VPLS, in this way BGP is used for signaling and auto-discovery. VPLS inherits Ethernet and MPLS features as far as simplicity and cost-efficient are concerned. The network elements involved in VPLS are CE (customer Edge) and PE (Provider Edge), the CE is completely unaware of VPLS, it only provides to set “attachment circuit” (VLAN) and it can be a simple switch. PE instead is the real maker of VPLS, it provides to elaborate the original frame Ethernet, and it forwards the packet within the network labeling the incoming packet. PE draws Preamble and FCS out, and it attaches the new VPLS label.

Exploiting VLAN tagging and the broadcast nature of VLAN, it is possible a QoS treatment based on service associated to this field. In the experimental Test Bed in fact, we created several VPLS instances, and for each one we associated a particular CoS. Each VPLS instance corresponds to a particular service that is mapped on an established VLAN. We created a QoS treatment per-service.

In fig. 2 we reported an example of three VPLS instances, the first one we conventionally call best effort, the second one we call Assured forwarding and the last one we call Expedited Forwarding. We used the same names of DiffServ approach, but the way to guarantee QoS is completely different. Anyway the meaning of BE, AF and EF is quite similar to DiffServ.

We overload the link under test with a traffic generator in order to create a packet congestion. In order to show the quality perceived by using different CoSs in fig.3 two screenshot of the same video content are reported. It is clearly shown that video carried on VLAN associated to the EF quality is not depredate with respect the same video carrier on BE class.

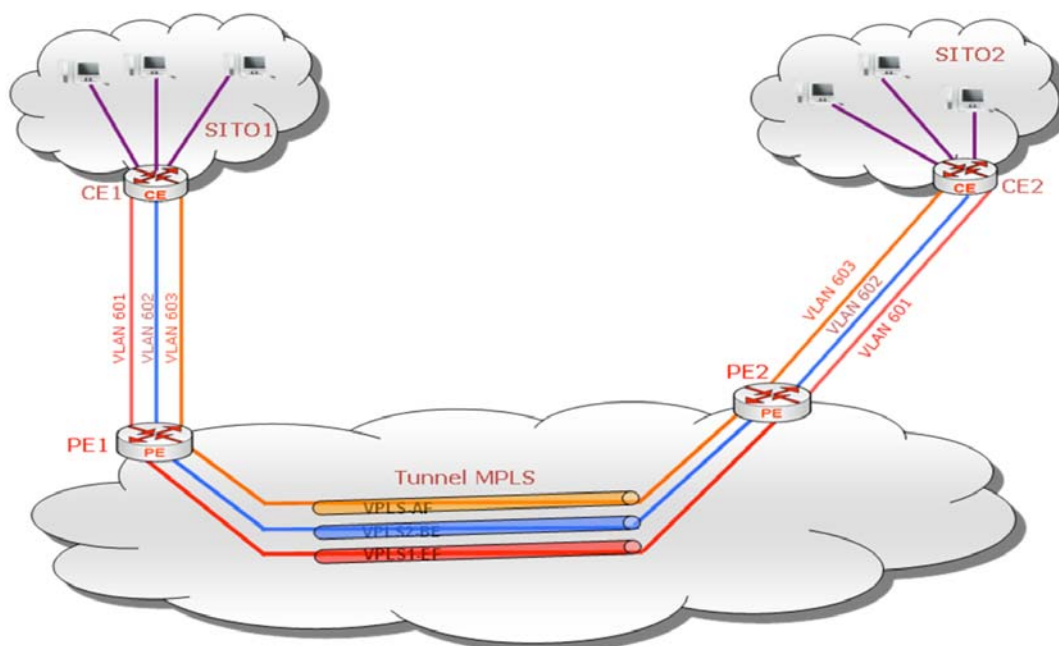


Fig. 2: VPLS tunnel implemented in our test bed.

BE class



EF class



Fig. 3: Screen shot from an HD movie with the two different CoSs BE and EF, defined in the VPLS approach.