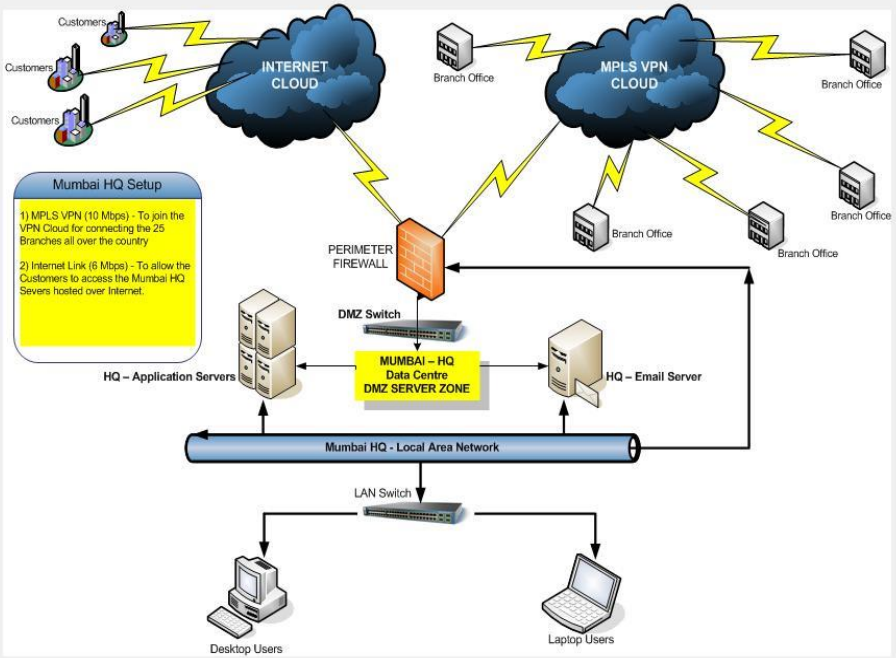
Connecting multiple offices using **MPLS Network**



Project Highlights:

1) Design a WAN Infrastructure using Cisco Routers that will enable 25 Branch Offices to connect the ABC Company's Mumbai HQ using MPLS VPN Network. Servers are located in HQ.

2) Enable Redundant Path between Branch Offices and HQ in the event of main WAN failure – Fail over.

3) Other than Branches the HQ is exposed to their Customers 24x7 – Internet Hosting.

4) Alternate WAN Design.

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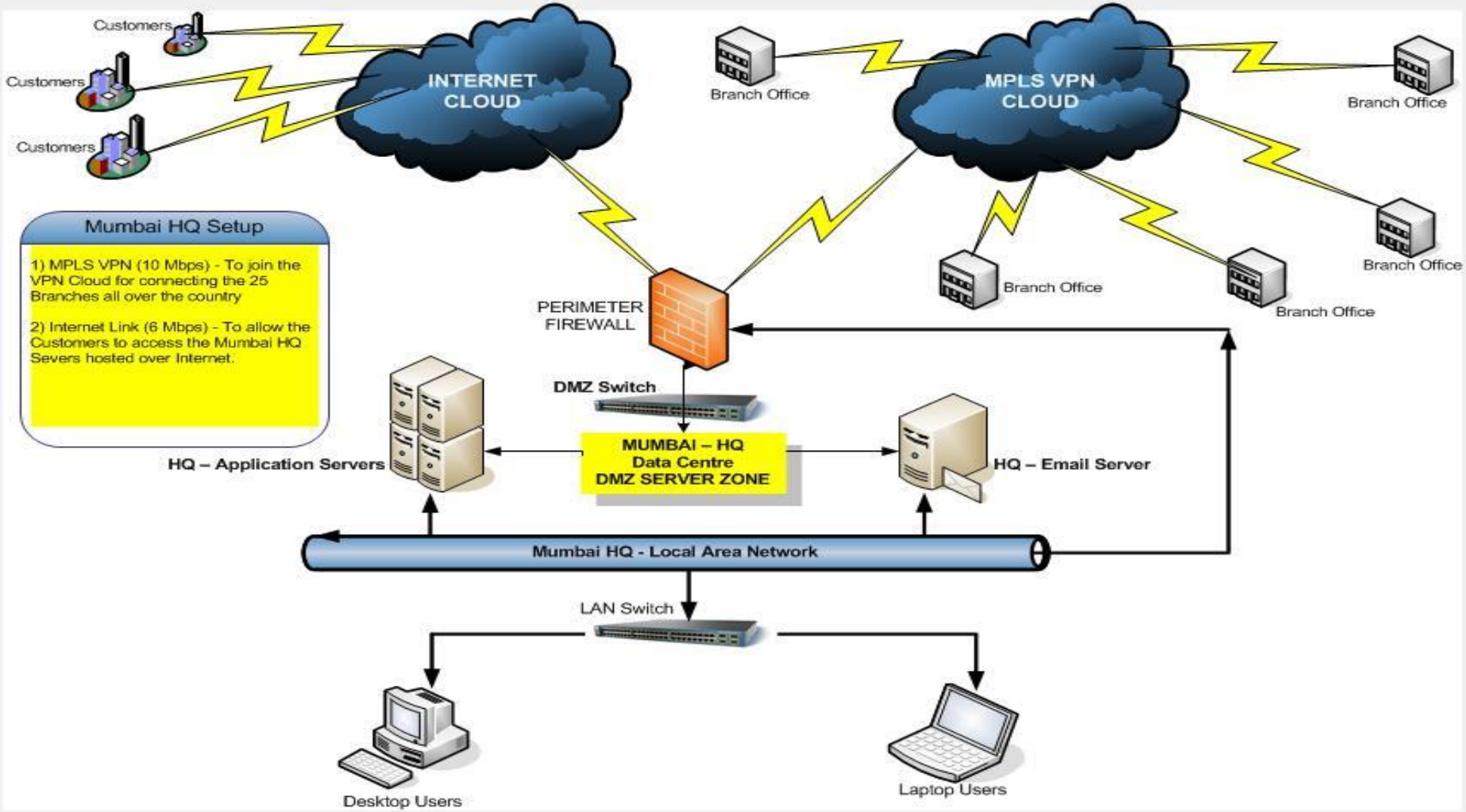
Logical diagram representing the HQ connectivity with multiple branches using MPLS VPN network and customers connecting HQ using INTERNET



MPLS VPN:

MPLS is a family of methods for harnessing the power of Multi Protocol Label Switching (**MPLS**) to create Virtual Private Networks (VPNs). MPLS VPN gives network engineers the flexibility to transport and route several types of network traffic using the technologies of a **MPLS** backbone.

The "**Virtual**" in **VPN** is that the individual services have the appearance of being distinct, but are in fact built on a single shared infrastructure – the **MPLS** network. The advantage to the service provider is that they can build a portfolio of services to attract a range of customers, without significantly increasing their capital investment or operational expenses.

For "**Private**" part of **VPN** not only must services remain distinct even though they are supported over a single **MPLS** network, but individual customer's networks must remain securely separated from each other.

Types of MPLS VPN:

There are three types of MPLS VPNs deployed in networks today:

- Point-to-point (Pseudowire)
- Layer 2 (VPLS - Virtual Private LAN Service)
- Layer 3 (VPRN- Virtual Private Routed Network)

MPLS can provide the required tunneling mechanism – MPLS can be used to provide traffic engineered through (Provider Edge)PE–CE(Customer Edge) tunnels. An additional MPLS label can also used to associate packets with a VPN.

The basic layout depicted in the first diagram is established using MPLS VPN Network for connecting the 25 branch offices located in the various cities in India. A MPLS VPN Cloud is established for connecting the 25 Branches as well as the Head Quarters (HQ) which is located in Mumbai.

The Basic Steps To Be Followed:

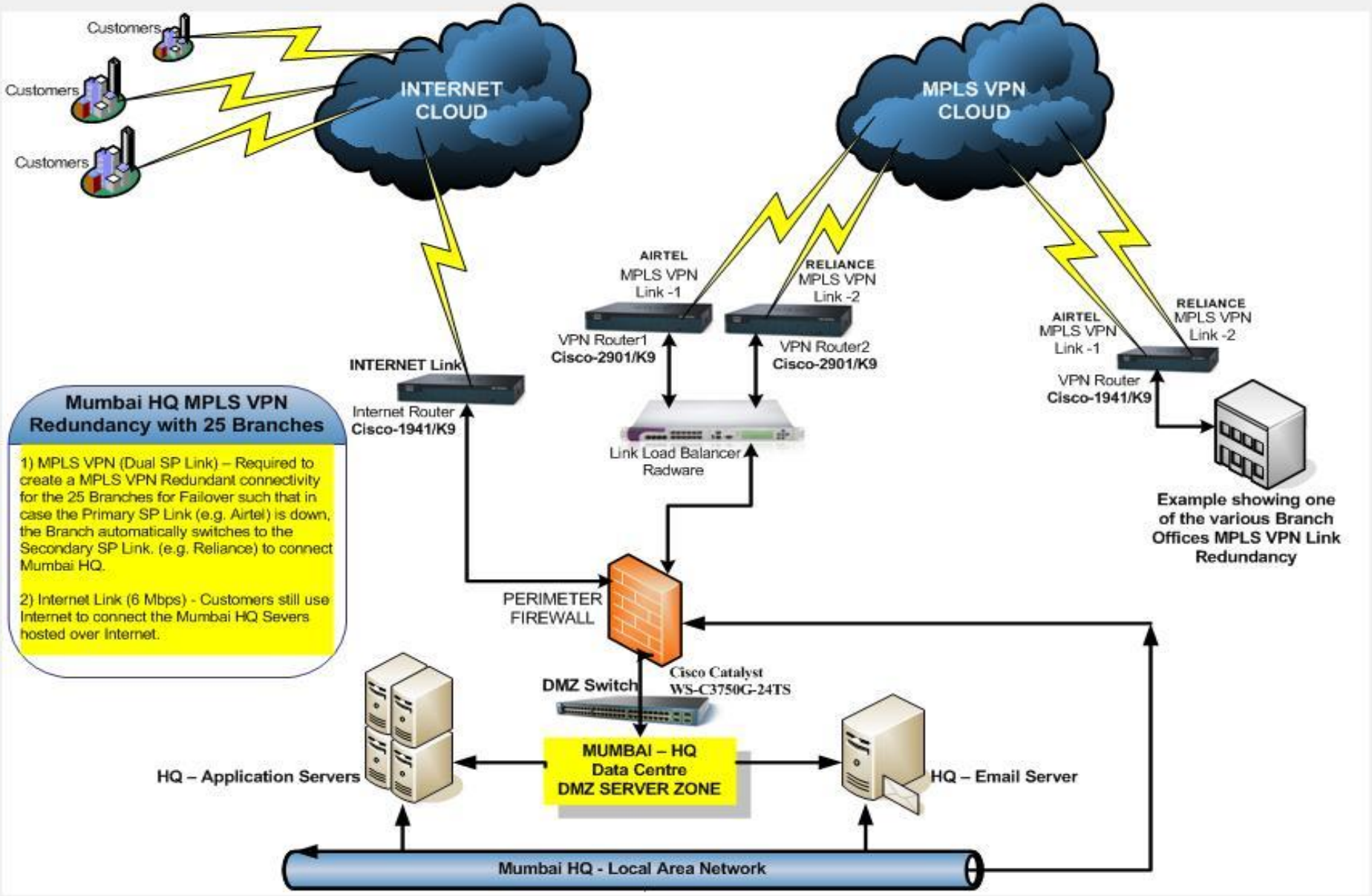
Wide Area Network (WAN) basically forms a Virtual Private Cloud..
This virtual private cloud is again a part of the MPLS..

A Virtual Private Network (VPN) Cloud is formed using the technology called VRF (Virtual Routing & Forwarding) within the individual MPLS Clouds of the Service Providers like Airtel, Sify, Tata, Reliance and many such other companies.

Here the 25 branch offices present in various cities are basically connected to the individual MPLS (Multi Protocol Label Switching) cloud of the Service Provider(SP) using VRF technology to form their own Corporate VPN Cloud with end to end traffic separation.

The Mumbai HQ is also connected to this MPLS cloud. Thus forming its separate corporate full mesh network. The HQ located in Mumbai consists of various Application Servers & Data Resources and thus forms the Corporate Data Center.

MPLS VPN CONNECTION WITH REDUNDANT WAN LINK

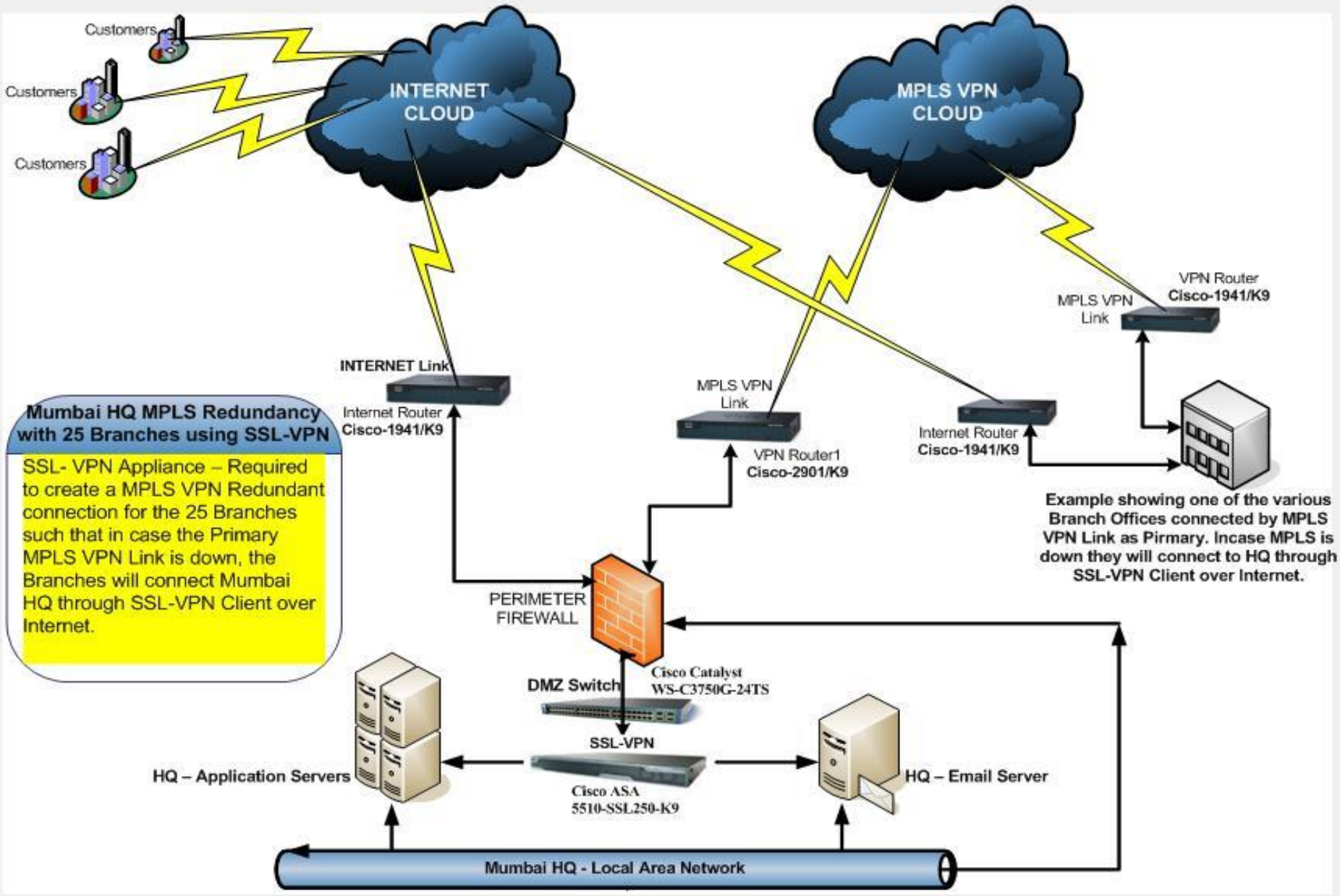


MPLS VPN REDUNDANCY

- MPLS VPN Dual Service Provider (SP) links are used to provide the redundancy so that the Branches can have a Fail over connectivity with HQ.
- Failover at the Branch level means that in case the Primary SP link gets down the Secondary SP Link would immediately takeover & start operating at the Branch Office.
- As a result of this, either one of the connections or networks are always active at the Branches. It basically provides an Active-Passive connection at Branch Level.
- Now, as we can see, in case of Mumbai HQ both the MPLS VPN Dual SP links must be in active-active mode. This is required because, if both the links are not active at HQ and if in any of the Branches the Primary link goes down, it cannot switch or start communicating with the HQ using the Secondary SP link , unless that is also in Active mode.
- This is only possible with the help of the Link Load Balancer which provides an Active-Active connection at HQ end.
- This kind of configuration can be achieved using a Device (Radware) which provides the necessary link load balancer feature such that both the links are active at HQ. It depends on the company and the amount of cost its ready to bear, such that we can use these load balancers for Branch Level Link Load Balancing also, to provide Active-Active connection at Branches too.
- The Customers can get 24*7 connection if they are connected to the Internet cloud with the HQ.

- Thus in a nutshell we can say that a MPLS VPN Cloud is required for the 25 offices all over India to connect to the Mumbai HQ with Dual SP Links for Redundancy.
- Whereas we require the Internet for establishing connection between the HQ and Customers 24*7.

Alternate WAN Design



Alternate WAN Design using SSL VPN

- **SSL VPN** Appliance can be used at Mumbai HQ as a redundant mode of connection to Branches such that in case the MPLS VPN Link at any branch goes down, it can use the SSL Client to connect HQ using their INTERNET Link and establish an active connection for accessing the Servers at the Mumbai HQ.
- Such redundancy is applicable for all the 25 branch offices as well. In case the MPLS Link is disconnected they would connect HQ through the INTERNET Link via the SSL VPN Client.
- Thus a alternate WAN design of redundant connection is established between the branch offices and the HQ, in case the MPLS VPN network fails.

THANK YOU