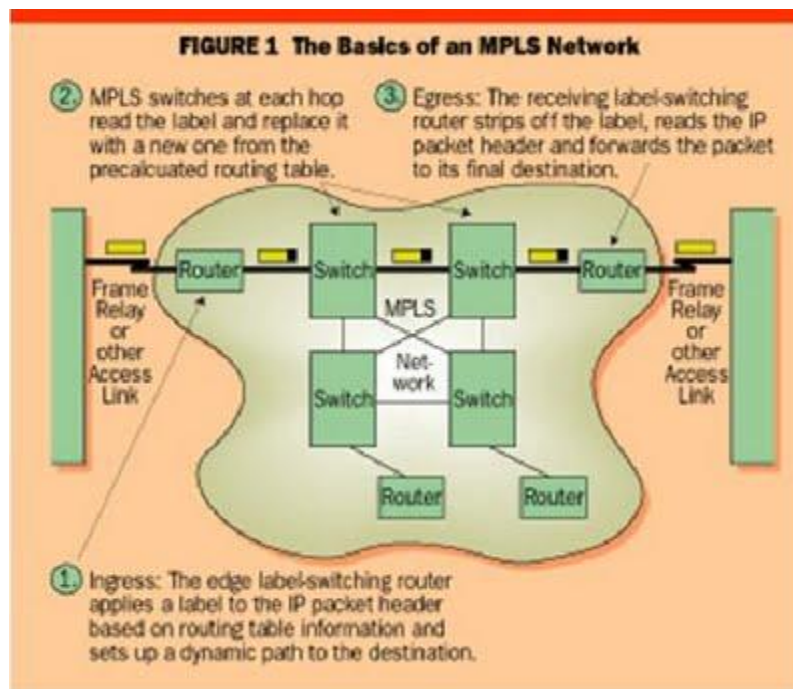


Multi Protocol Label Switching (MPLS)

MULTI PROTOCOL LABEL SWITCHING (MPLS)

It is an standard approved technology for speeding up network traffic flow and making it easier to manage. In MPLS packets are directed over a specific route to traverse the network(called explicit routing). This explicit routing form of routing makes sure that certain types of traffic follow a specific path. Each sequence of packet has specific path, identified by a label put in each packet, thus saving the time needed for a router to look up the address to the next node to forward the packet.

MPLS is a multi protocol because it works with IP, ATM, and frame relay network protocol. It allows most packets to be forwarded at the layer 2 (switching) level rather than at the layer 3 (routing) level.



MPLS Components:

1-LABEL EDGE ROUTER (LER)

LER's are located at the boundaries of the MPLS network. They apply label to packets for transmission across the MPLS network.

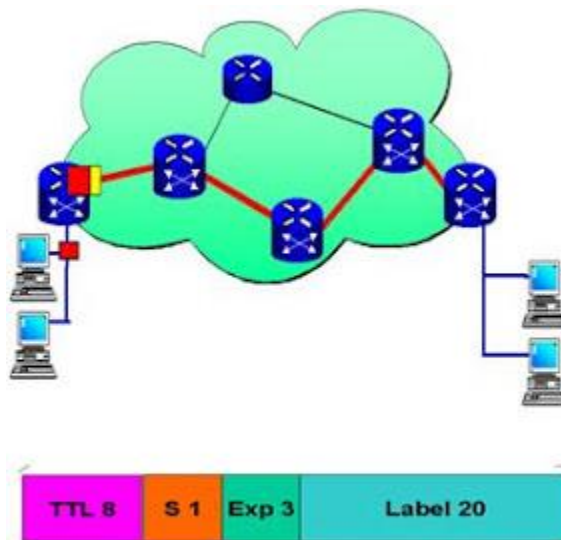
LER's are responsible for classifying incoming IP traffic and relating the traffic to the appropriate label. The LER converts IP packets into MPLS packets, and MPLS packets into IP packets. In MPLS, this classification process is called forward equivalence class (FEC).

Destination/IP	Port Number	FEC	Next Hop	Label	Instruction
199.50.5.1	80	B	x.x.x.x	80	Push
199.50.5.1	443	A	y.y.y.y	17	push
199.50.5.1	25	IP	z.z.z.z		Do nothing: native IP)

LER Shim Header:

It is a special databox in the LER that matches the destination address to the label. MPLS shim header(as in figure) is attached and the packet is sent on its way.

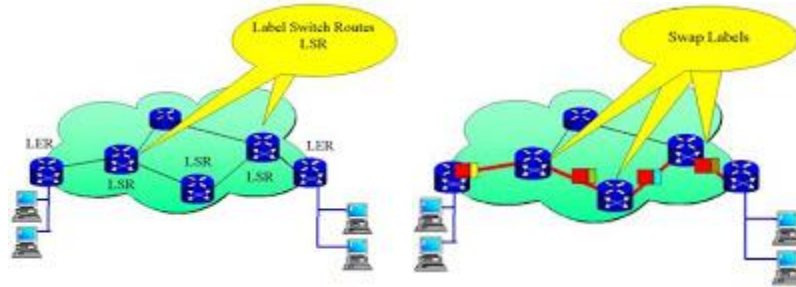
The shim header consists of 32 bits in four parts. 20 are used for the label, 3 bits for experimental function, 1 bit for stack function, and 8 bits for time to live (TTL).



2- LABEL SWITCH ROUTER (LSR):

These devices are routers, and they examine incoming packets, providing that a label is present. The LSR will look up and follow the label instruction and then forward the packet according to the instruction. In general, the LSR performs a label swapping function.

When the packets leave the LER, they are destined for LSR where they are examined for the presence of label. The LSR looks to its forwarding table (called a label information base LIB or a connectivity table) for instructions. The LSR will swap labels according to the LIB instructions.



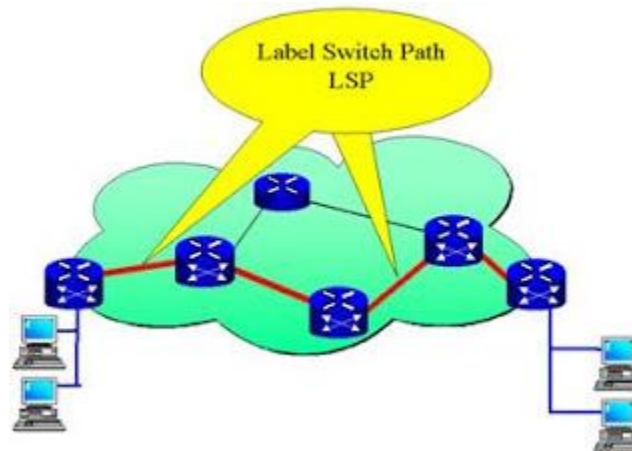
Label In	Port in	Label out	Port out	FEC	Instruction next hop
80	B	40	B	B	Swap
17	A	18	C	A	Swap

3- LABEL SWITCH PATH (LSP):

In between LER and LSR paths are established, these paths are called LSP. The paths are designed for their traffic characteristic; as such, they are very similar to ATM paths.

The traffic handling capabilities of each path is calculated. These characteristics can include peak traffic load, inter-packet variation, and dropped packet percentage calculation.

.



4- LABEL DISTRIBUTION PROTOCOL (LDP):

LDP's are used to distribute label information between LSR's and LER's. It also defines a new protocol, existing protocols, such as BGP and RSVP, have been extended to enable label distribution to be stacked on them.

CONCLUSION:

- It only requires software modifications to existing IP routers.
- For a fraction of the expense of installing a dedicated network, MPLS allows IP traffic to be classified, marked and policed while providing a method of layers two and layers 3 exchanging data.

- Raw IP traffic is presented to the LER, where labels are pushed; these packets are forwarded over LSP to LSR where labels are swapped.
- At the egress to the network, the LER removes the MPLS labels and marks the IP packets for delivery.
- MPLS does not replace IP - it supplements IP so that traffic can be marked, classified and policed. With the use of MPLS, end-to-end quality of service can finally be achieved.

Source:

http://datacombasic.blogspot.in/2011/04/multi-protocol-label-switching-mpls.html?utm_source=BP_recent