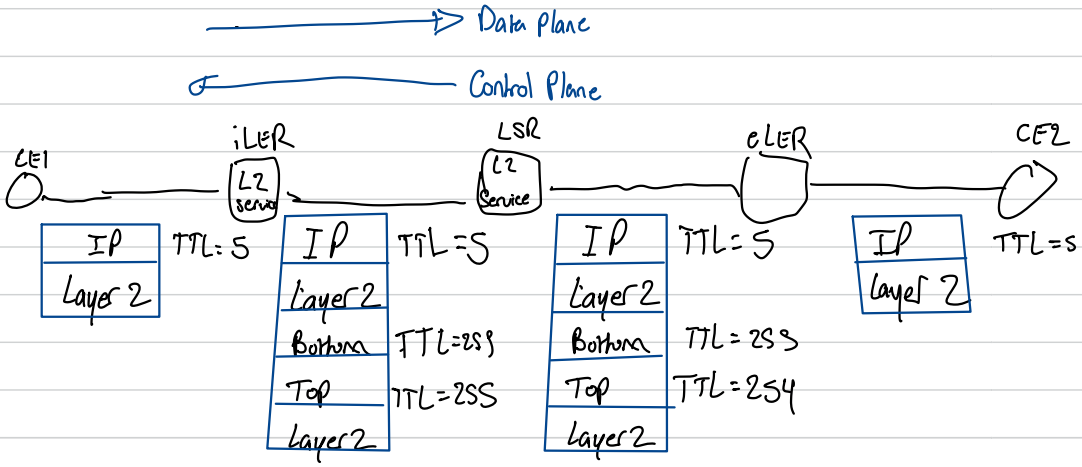
TTL Processing For Layer 2 VPN Services in Pipe Mode



- TTL in customer packet is intact
- MPLS TTL inside the top label is decremented at each LSR
- Control Plane ALWAYS goes in the opposite direction of the data plane

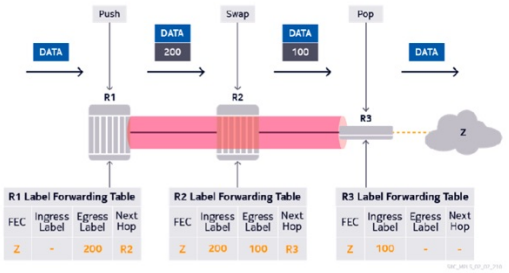
Requirement for IP/MPLS Control processes

MPLS Special Use Labels

Label values 0-15 are reserved for special uses

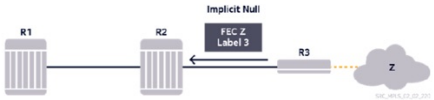
Label Value	Label Usage
0	IPv4 Explicit Null
1	Router Alert
2	IPv6 Explicit Null
3	Implicit Null
4-15	Reserved for future use

Before Implicit Null - Normal Operation



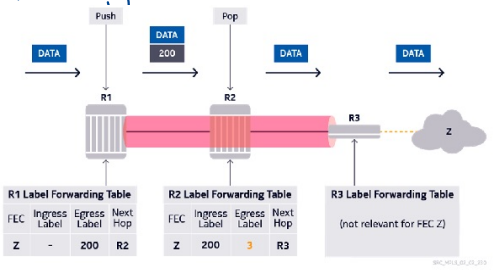
Router R3 receives packets destined for FEC Z with a label of 100 and always pops them

MPLS Implicit Null



- On router R3, the result of the label lookup process for packets destined for FEC Z is always a "pop" action.
- If router R3 wants to save some processing resources, it can request the penultimate router (router R2) to send the packets with no transport label.
- Router R3 expresses this desire by advertising a label binding for FEC Z with a value of 3.

Penultimate Hop Popping (Result of Implicit Null Advertisement)



- The penultimate hop (router R2) honors the request of router R3 and pops the transport label.
- Although the egress label value is displayed as 3, this value can never exist in the MPLS label of a data packet.

↳ R2 now has an egress label of 3 for FEC z

↳ R2 will not swap incoming data packets with a label value of 3.

↳ Since value 3 never appears in encapsulation header, remains unlabeled as its forwarded to R3

↳ R3 still acts as LER

↳ R3 = last hop

↳ R2 = Penultimate hop... pops the label

Primary benefit to using PHP is that it enables