

Segment Routing Technology

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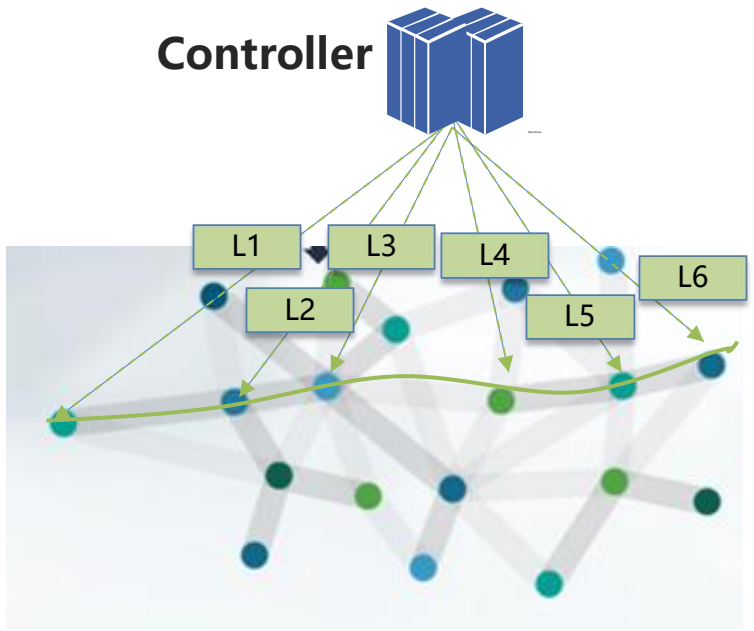
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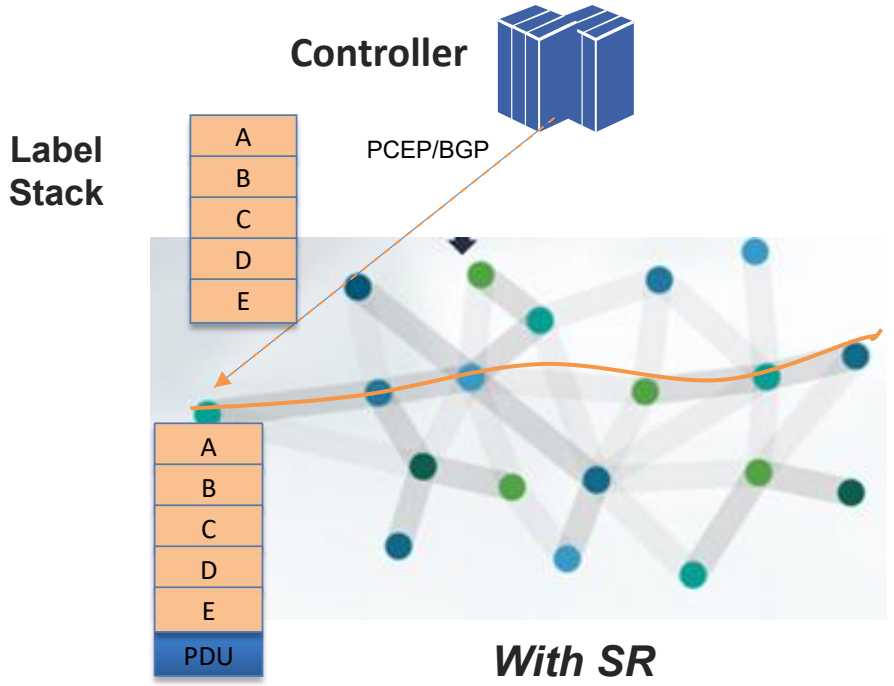
Segment Routing Network Application

SR Build an Flexible & Large-Connection SDN Network



Without SR

- To create a connection in a traditional way, it is necessary to control **multiple key devices** in the path, increase the Touch Point, and make O&M more difficult.
- The device maintains **flow tables** without routing protocols and the device is white-boxed.

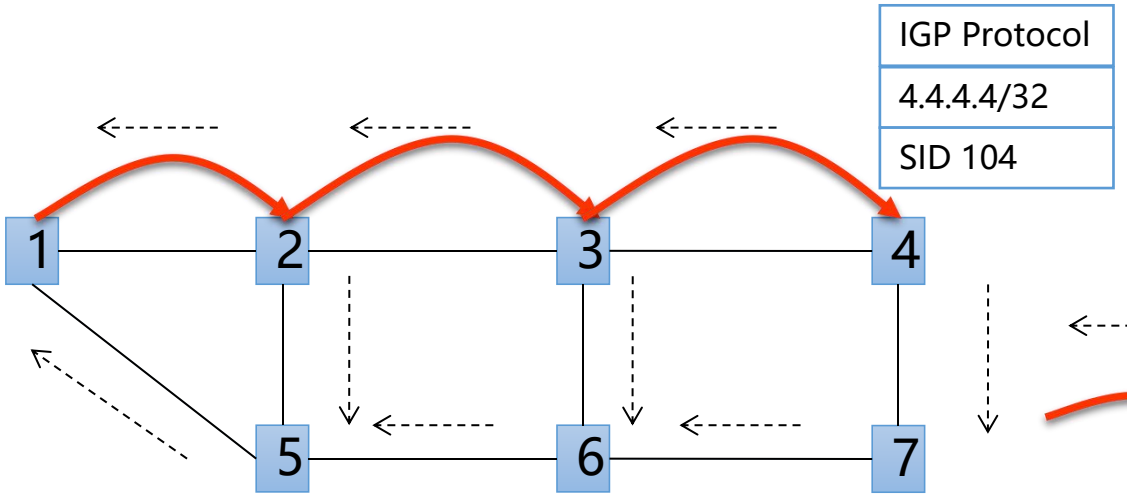


With SR

- With the **source routing technology** (Segment routing), the SDN controller only needs to communicate with the **source node**. Complete path information has been defined on the source node **in the form of label stack**. There is only **one Touch Point** in the network.
- The equipment only needs to maintain the **topology information** and does not need to maintain the path information. It can easily implement million-level connection and keep the core equipment in no connection status(PE Intelligence, Stateless P).

With SR, when a forwarding path is delivered, the number of times that the controller operates the NE is reduced from N*M to N, where N is the number of connections and M is the average number of nodes passing through each connection.

SR Key Concept: Prefix/Node Segment

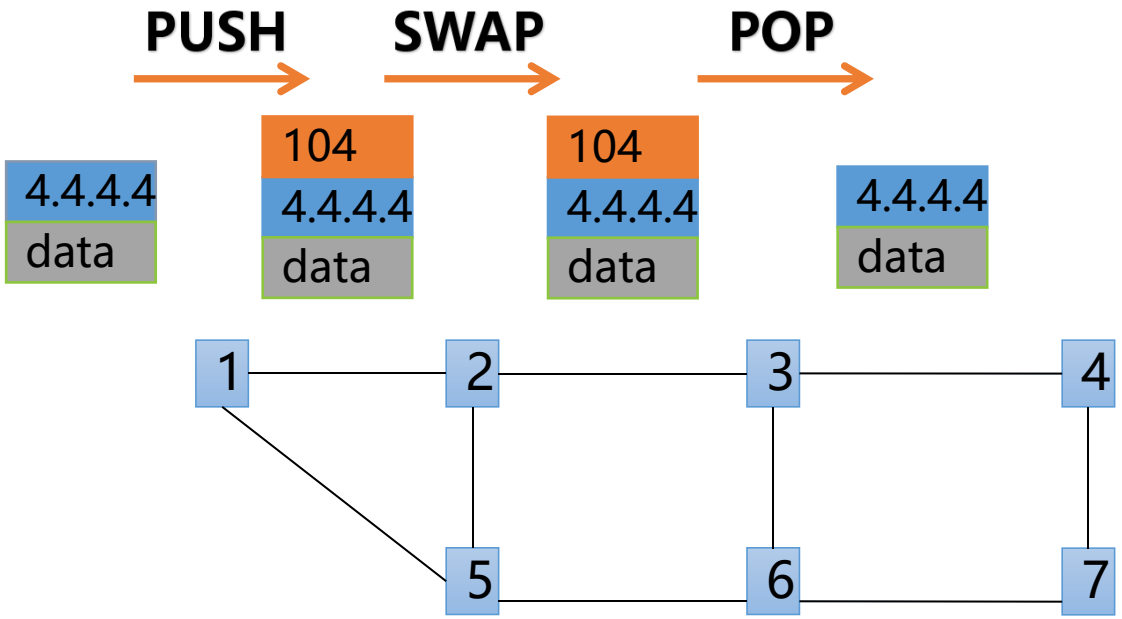


node 4 loopback address is 4.4.4.4

① node 4 configures Node-SID 104 for address 4.4.4.4/32

② IGP Protocols advertise 4.4.4.4/32 route with Node-SID 104

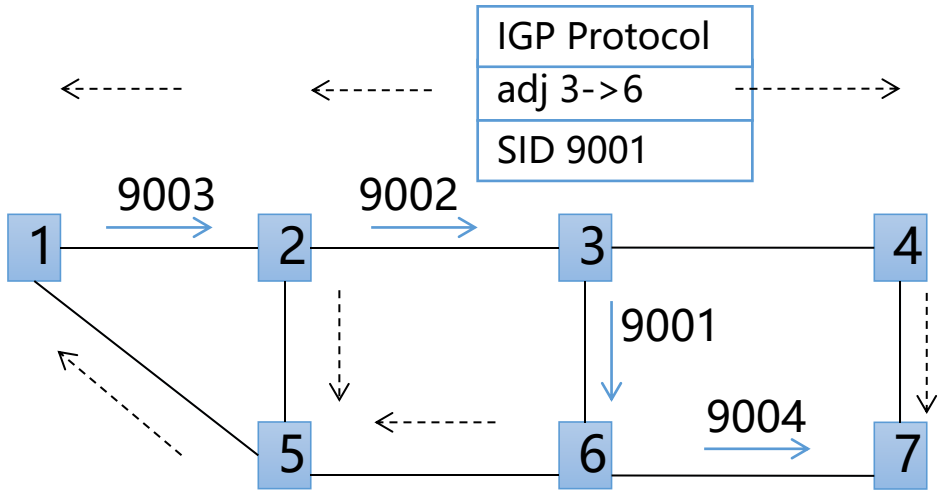
③ The SPF algorithm of each node calculates the path to 4.4.4.4/32, The path from node 1 to node 4 is shown by the red arrow.

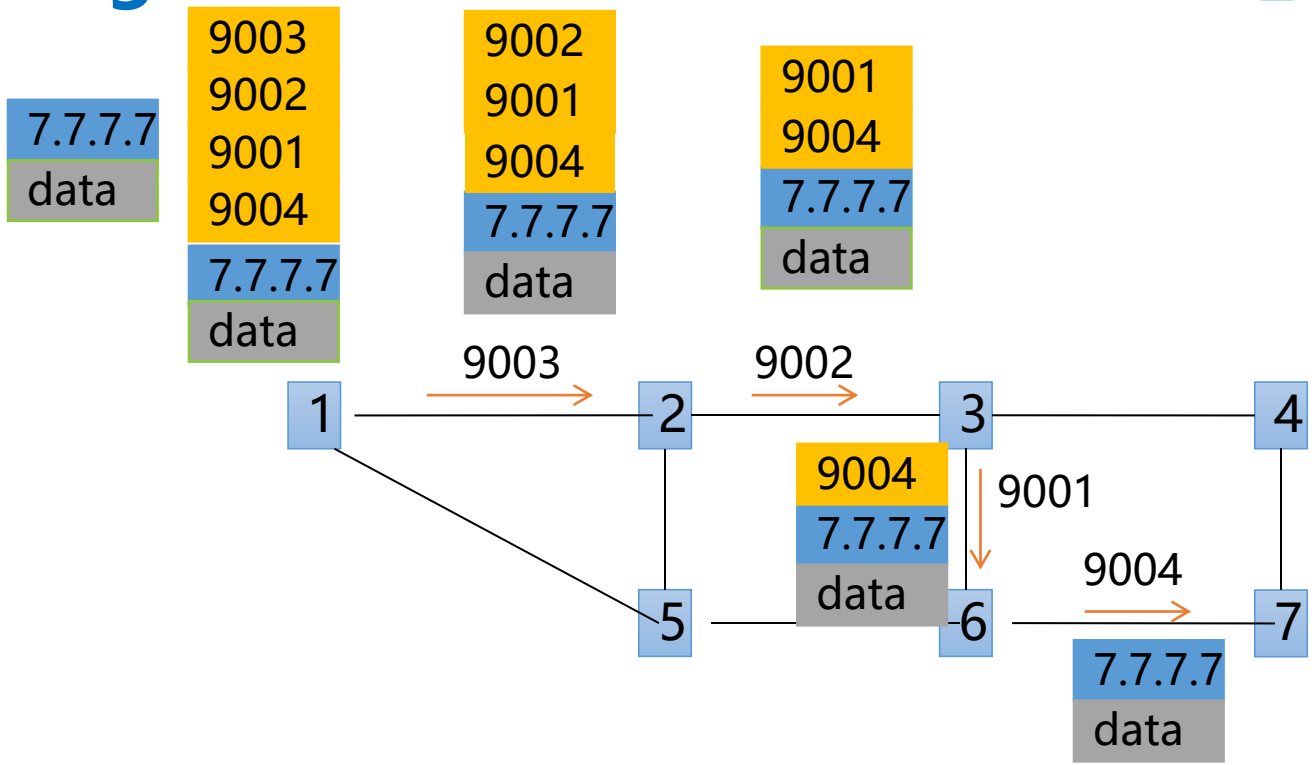


The packet whose destination IP is 4.4.4.4 reaches node 1, goes up the shortest path through route matching, and marks it with Node-SID 104. Node 2 receives the node-SID and continues to forward the packet according to the SID, and keeps the SID active. Node 3 POPs 104 to continue forwarding.

Prefix Segment Essential: Forwarding packets in the shortest path to the destination, globally visible, globally valid

SR Key Concept: Adjacency Segment





① ⟶ indicates that the node assigns Adj-SID to all the IGP outgoing adjacency. For example, node 3 automatically assigns 9001 to the link 3->6. Node 1 automatically allocates 9003 to link 1->2. All nodes will allocate corresponding Adj-SID to their outgoing adjacency.

② <----- indicates that the IGP protocol advertises the link state information, and carries the corresponding Adj-SID.

③ Assume that all the paths of an SR tunnel (destination node 7) of node 1 are specified manually and strictly, and the links pass through 1->2->3->6->7 one by one, then the SID list formed by them is {9003,9002,9001,9004}. All paths are specified, but there may be too many SID layers.

Adjacency Segment essence: Forwarding packets via specific interface, globally visible, local valid.

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