

Use Cases for Using PCE as the Central Controller(PCECC) of LSPs

[draft-zhao-pce-central-controller-user-cases-01.txt](#)

Quintin Zhao, Katherine Zhao, Robin Li

Huawei Technology

Zekun Ke

Tencent Holdings Ltd.

Quick Review: Motivations

□ In certain networks deployment scenarios, users like to keep all the existing MPLS functionalities in both MPLS and GMPLS network and at the same time, to satisfy the following requirements:

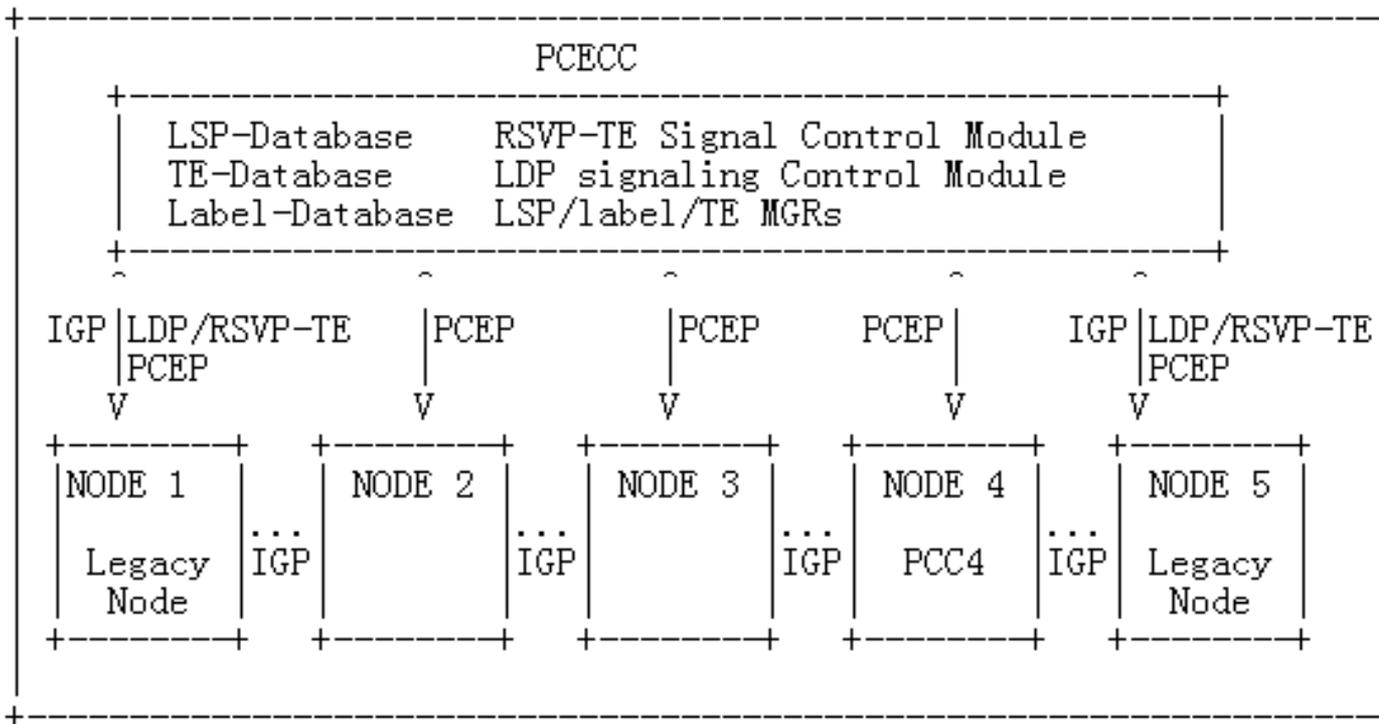
- ① Removing the complexity of configurations on each device;
- ② removing the complexity of existing signaling protocols such as LDP and RSVP-TE;
- ③ Reduce the number of LSP states on each device especially on core devices;
- ④ Dynamically compute and optimize LSPs by the centralized controller to satisfy TE requirements from users.

□ Advantages Using the PCE as the Central Controller of LSP:

- ① All the MPLS features can be supported including both the P2P and P2MP/MP2MP LSPs for IPv4/ipv6/vpn/pw;
- ② Backward compatibility can be kept by using the central controller as the proxy of the LSP' control plane for the new nodes centrally controlled along the LSP;
- ③ LSP's states are maintained only for TE LSP and P2MP/MP2MP LSPs so that fewer LSP states need to be maintained within each device especially for the core router.

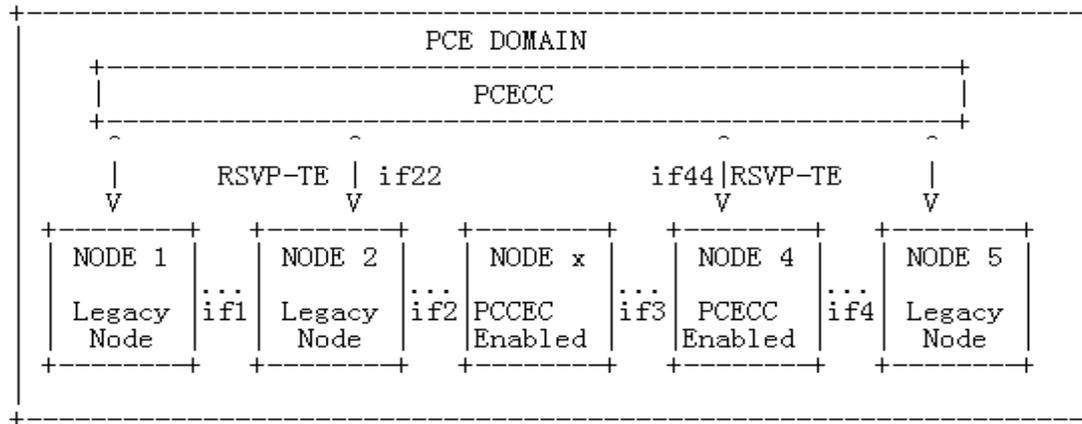
Quick Review:

Global/Local Label Negotiation & Assignments and In/Out Segments of LSP Download



- Global and local labels are negotiated and assigned for tech nodes in the network through PCE central controller.
- LSP's in/out segments are downloaded into the forwarding plane through PCECC directly for TE LSP and P2MP/MP2MP LSPs.

Quick Review: Migration Use Case



□ In this example, there are five nodes for the TE LSP from head end (node1) to the tail end (node5), where the nodes between node2 and node4 are represented as Node-X are central controlled and other nodes are legacy nodes.

- ① Node1 sends a path request message for the setup of LSP designating to Node5.
- ② PCECC sends a reply message for LSP setup with path (node1, if1), (node2, if22), (node-PCECC, if44), (node4, if4), Nnode5.
- ③ Node1, Node2, Node-PCECC, Node 5 will setup the LSP to Node5 normally using the local label
- ④ Then the PCECC will program the out segment of Node2, the in segment of Node4, and the in-segment/out-segment for Node-X.

Updates in this New Version

□ New Use Cases Are Added:

- ① Source Routing Based TE LSP where the forwarding path is explicitly specified completely or partially from the source to the destination using the SR encapsulation from the source node;

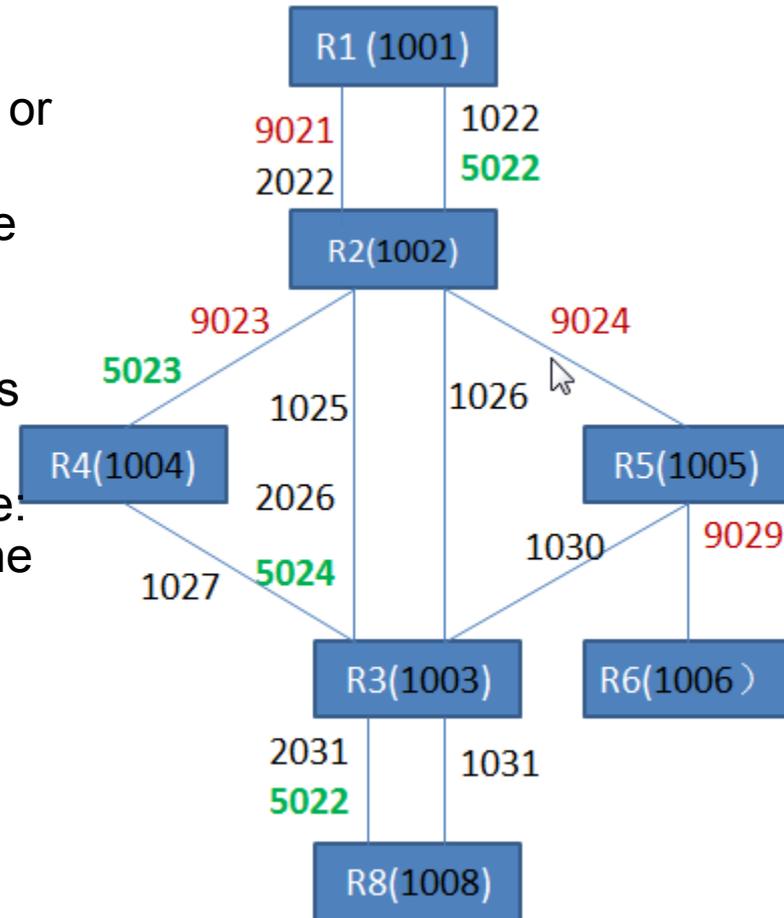
Example: encoded path for traffic to p8 {1002, 2006, 1008} where all the labels are global labels (**black labels**).

- ② Best Effort P2P similar to the LDP LSP: Example. encoded path for traffic to R8 {1008} where all the labels are global labels.

- ③ TE P2P LSP similar to the TE setup through RSVP-TE using the local labels; (**green labels**)

- ④ Multicast TE LSP similar to the LSP setup by using mLDP and RSVP-TE P2MP using local labels (**red labels**);

- ⑤ Local and End-to-End Protections using either local labels or global labels;



Next Step

- ❑ An implementation is under development to verify the performance and the efficiency this solution comparing to other alternatives
- ❑ If you would like to see a demo, please contact us.
- ❑ Your comments and suggestions are welcome.

Thank You.