

# Unified Source Routing Instructions using MPLS Label Stack

**draft-xu-mpls-unified-source-routing-instruction-04**

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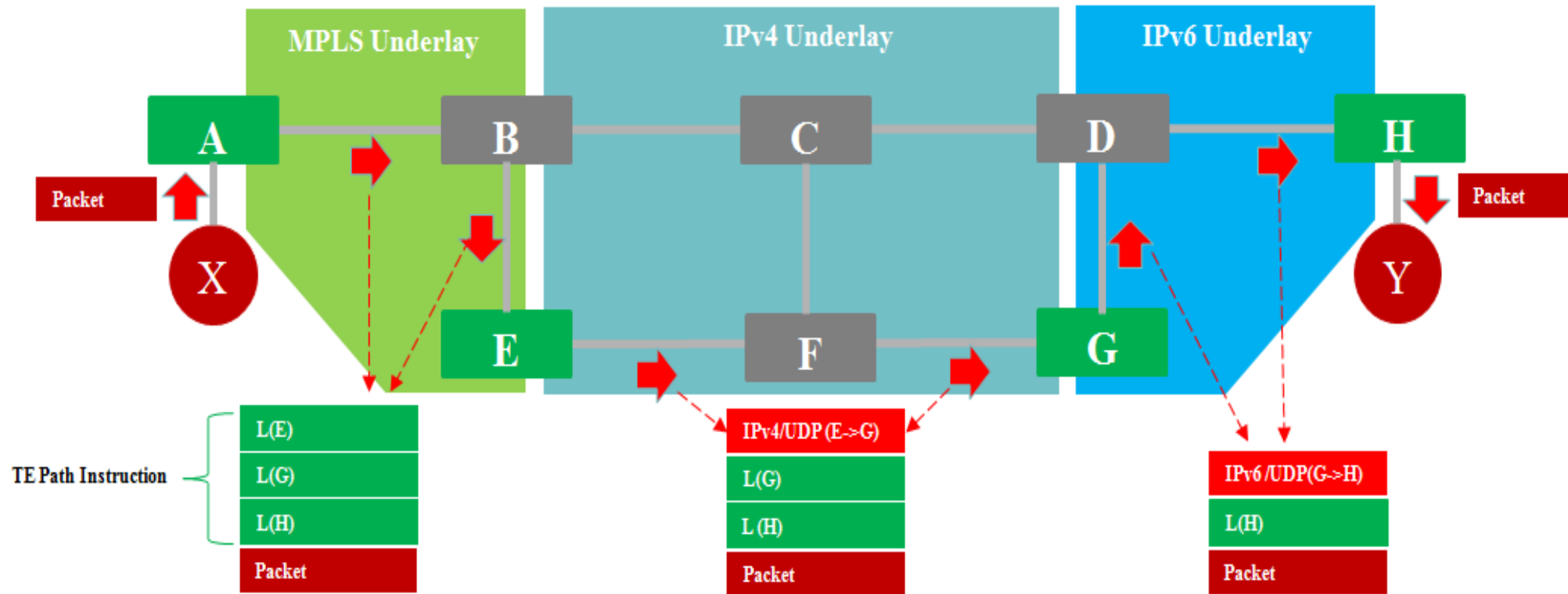
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# Changes since -03 version

- The following co-authors are moved to contributor list so as to meet the co-author number limit.
  - Clarence Filsfils (Cisco)/Robert Raszuk (Bloomberg) /Uma Chunduri (Huawei) /Luis M. Contreras (Telefonica I+D) /Luay Jalil (Verizon) /Gunter Van De Velde (Nokia) /Tal Mizrahi (Marvell).
- Add some text to clarify how to avoid re-performing hash on the whole packet when re-encapsulating the packet with an IP- based tunnel header (e.g., a UDP tunnel header):
  - when the encapsulator could not obtain at least one entropy label due to some reasons (e.g., 1) there is no EL at all in the label stack; 2) the encapsulator couldn't recognize the EL; 3) the encapsulator could not read the EL due to the RLD limit), it's RECOMMENDED that the entropy value contained in the packet (e.g., the UDP source port value) is kept when stripping the IP-based tunnel header (e.g., the UDP tunnel header).
  - As such, the entropy value could be directly copied to the entropy field (e.g., the source port of the UDP tunnel header) when re-encapsulating the packet with an IP-based tunnel header (e.g., a UDP tunnel header).

# Unified SR: TE/Source-Routing as Overlay

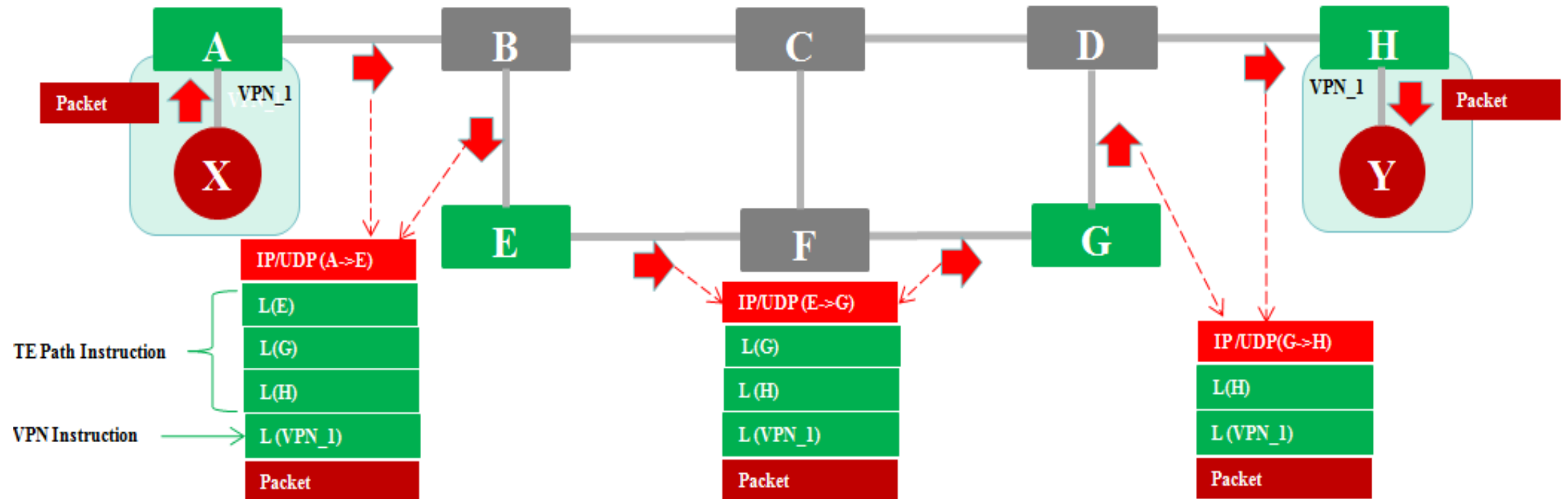
UDP as example, GRE and other tunnels also work



- Unified SR leverages MPLS-SR by MPLS-in-UDP or MPLS-in-GRE and therefore it works across IPv4 and IPv6 underlying networks.
  - Combines the best of two worlds (e.g., the simplicity of IP and the flexible programming capability of MPLS).

# Unified SR: VPN+TE as Overlay

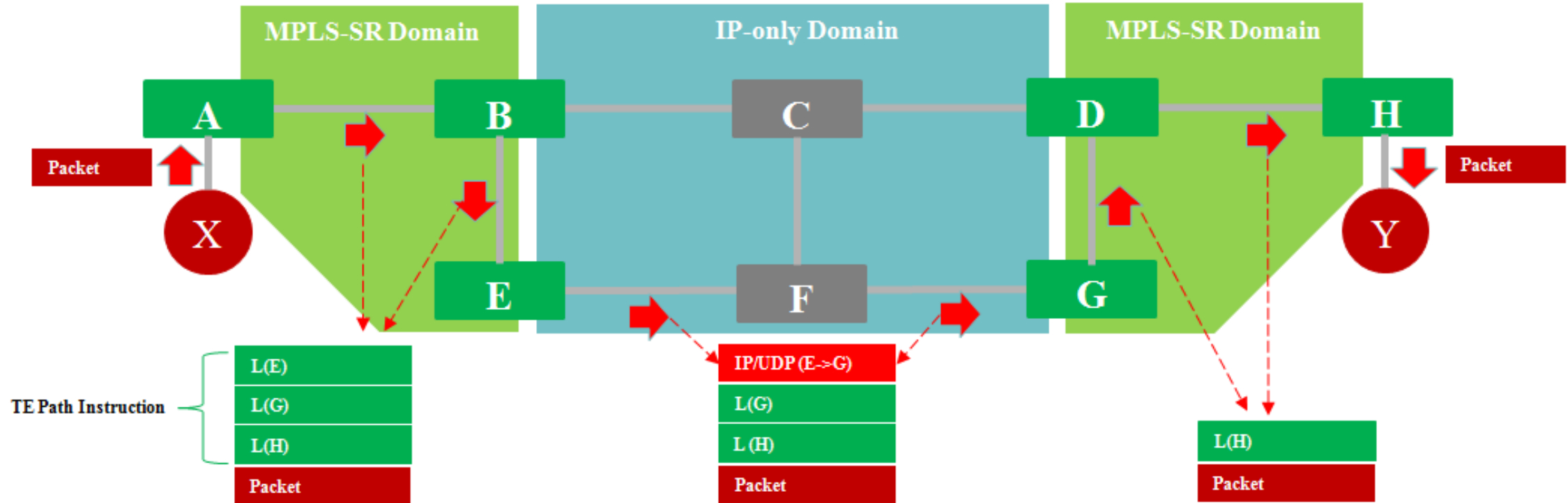
UDP as example, GRE and other tunnels also work



- Unified SR can be seamlessly integrated with the existing MPLS-VPN technologies by using consistent programming instructions (i.e., MPLS label stack).

# Unified SR: Seamless Interworking with MPLS-SR

UDP as example, GRE and other tunnels also work



- Unified SR can be seamlessly interworking with the existing MPLS-SR technologies which greatly facilitates the incremental deployment of MPLS-SR (e.g., in the Egress Peer Engineering (EPE) case).

# Values of Unified SR

- Leverage the existing hardware capabilities (e.g., MPLS-SR forwarding capability and MPLS-in-UDP tunneling capability)
- Facilitate the incremental deployment of MPLS-SR.
- Overcome the load-balancing dilemma encountered by MPLS-SR due to the maximum Readable Label-stack Depth (RLD) limitation (see draft-ietf-mpls-spring-entropy-label ) and the Maximum SID Depth (MSD) hardware limitations (see draft-ietf-ospf-segment-routing-msd).
- Seamless integration with the existing MPLS VPN technologies.
- Works for both IPv4 and IPv6 underlying networks.

# Implementation Status Report

- Nokia have implemented it.
- Juniper planed to implement it in multiple platforms.
- Cisco has developed a demo.
- Huawei has listed it on the roadmap.

# Next Steps

- Comments and Suggestions?