

A Unified Approach to IP Segment Routing

draft-bryant-mpls-unified-ip-sr

Stewart Bryant <stewart.bryant@gmail.com>

Xiaohu Xu <xuxiaohu@huawei.com>

Mach Chen <mach.chen@huawei.com>

Adrian Farrel <afarrel@juniper.net>

John Drake <jdrake@juniper.net>

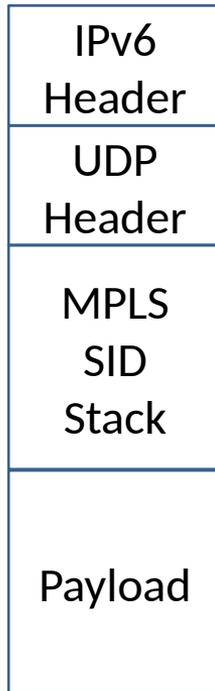
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Objectives

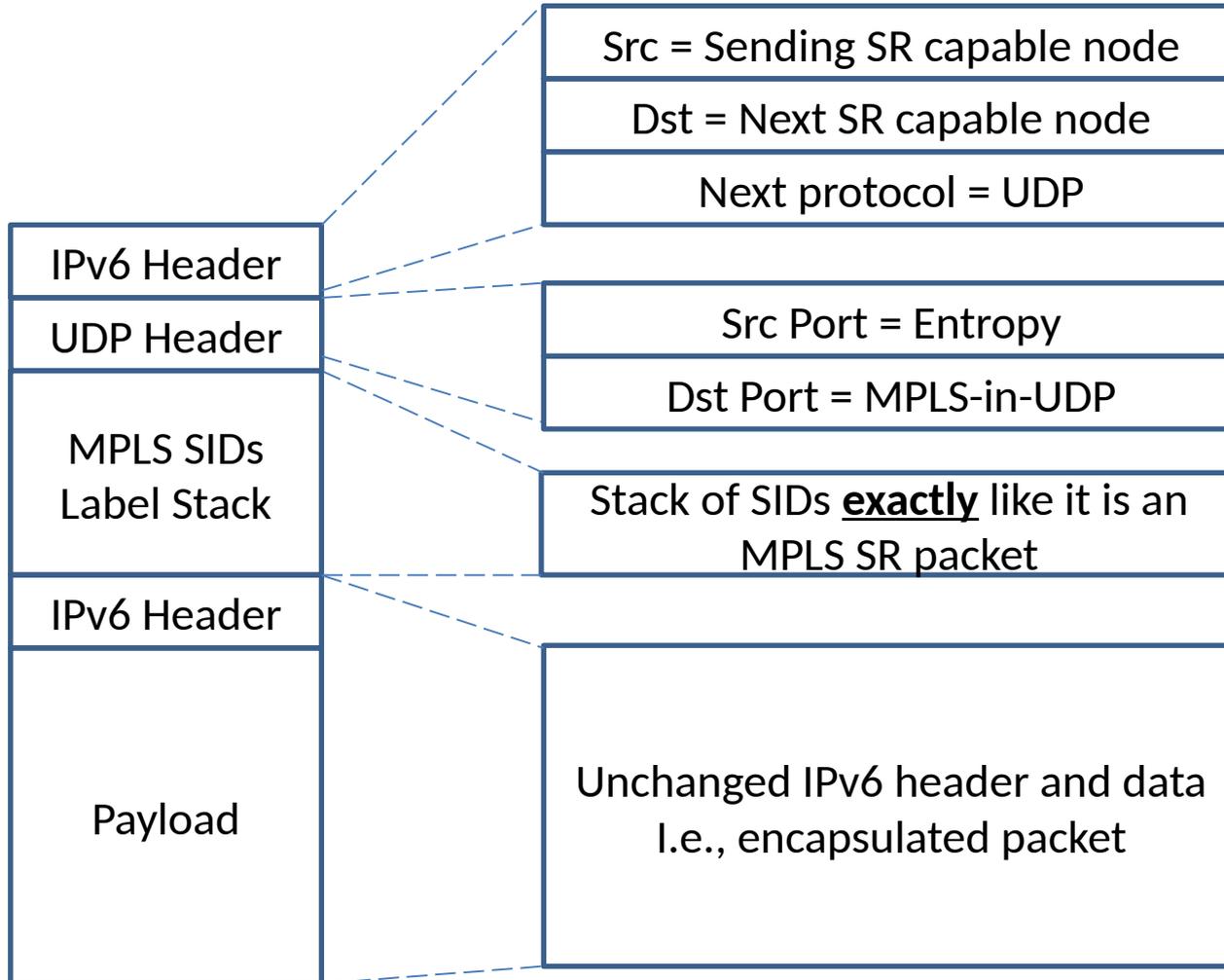
1. Tunnel MPLS-SR over an IP network
 - To connect two MPLS-SR networks (e.g., data centers)
2. Produce a unified approach to SR
 - Option of using same MPLS SID stack in all networks
 - Offer same (similar) processing in silicon
 - Support phased deployment and roll-out
3. Co-exist with MPLS-SR and SRv6
 - We appreciate that different solutions are better in different environments and we would “let the market decide”

Overview

- In summary, this is MPLS-over-UDP as RFC 7510
 - Encapsulate a “normal” MPLS SID stack in UDP in IPv6
 - Address to next SR-capable node in the SR path
 - UDP destination port indicates “MPLS below”



A Little More Detail



Advertising SIDs

- Advertisements are just like for MPLS SR
 - IGP or BGP advertises
 - Address of node or link
 - Associated SID
 - All SID types are supported
 - Nothing new is needed

Source Processing

- Build and impose MPLS-SR stack
- Encapsulate in UDP
 - Dst Port = MPLS-in-UDP
 - Src Port = Entropy
- Encapsulate in IP with
 - Source as this node
 - Destination address of first hop in SR stack
 - Requires look-up to match SID to address
 - At source, this lookup can use RIB, etc.
- FIB lookup and send
- (This all looks a lot like RFC 7510)

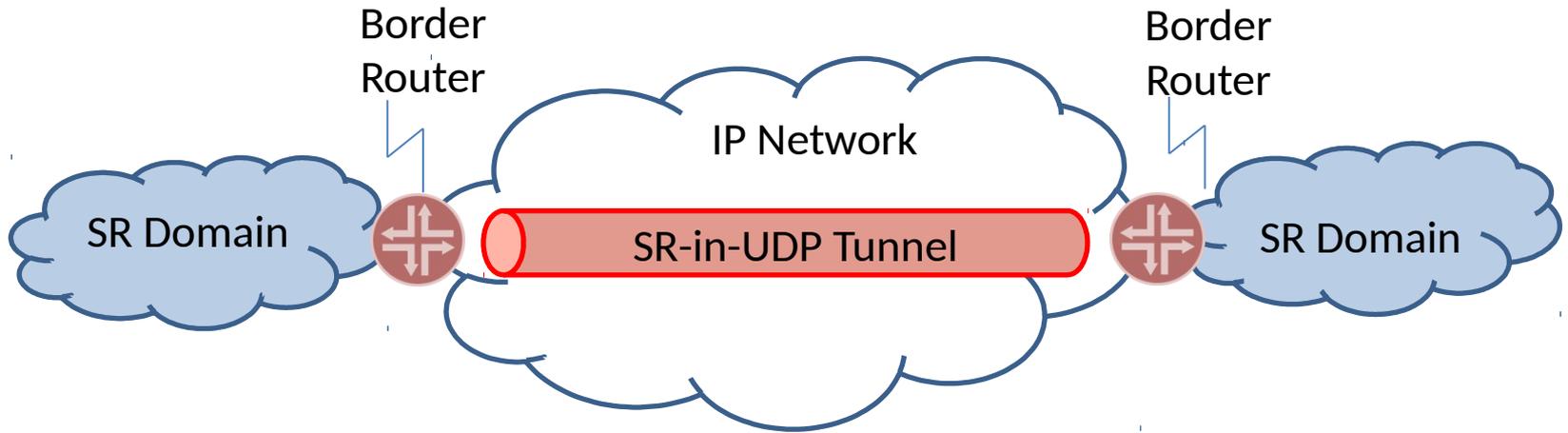
Transit Non-SR Processing

- Important that this mechanism can traverse nodes that are not SR-capable
 - Also, no special processing by SR nodes to which the packet is not addressed
- It's just an IP packet, so forward it
- ECMP entropy is achieved through the UDP source port value set by source
 - Established technique (RFC 7510)
- TTL decrements as usual

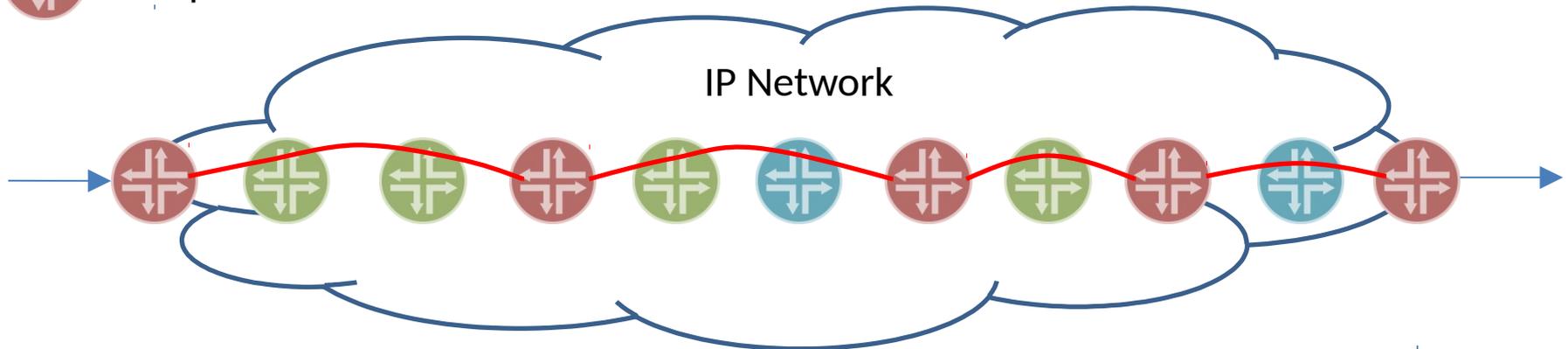
Transit SR Processing

- If the packet is addressed to me
 - Otherwise just forward the packet as normal IP
- Find UDP inside
- Find UDP Dst port is “MPLS-in-UDP”
- Look at top of MPLS SR stack
 - Extract SID and look up “next hop” IP address
 - Pop label stack entry
- Re-encapsulate packet as MPLS-in-UDP-in-IP (just as source did)
 - IP Src = this node
 - IP Dst = next address as found from label lookup
 - UDP Src Port = Entropy (ideally from received packet)
 - UDP Dst Port = MPLS-in-UDP
 - (SID stack is “shorter”)
- FIB lookup and send

Use Cases



-  Legacy IP Router
-  SR-Capable Router Not In SID Stack
-  SR-Capable Router In SID Stack
-  Native IP Forwarding



Next Steps

- This is a -00 draft
 - We know some things need polish
- To the authors it seems “obvious”
 - What do other people think?
- The authors think this is in charter for MPLS
 - But polish and discussion is needed before we ask for adoption