

# MPLS LSP Instant Install

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# Agenda

- Scope/requirements
- Proposed Solution
- Next steps

# Scope

- MPLS RSVP-TE LSP setup - RFC3209
- Traffic non-impacting “make-before-break” LSP procedures – RFC3209

# Background

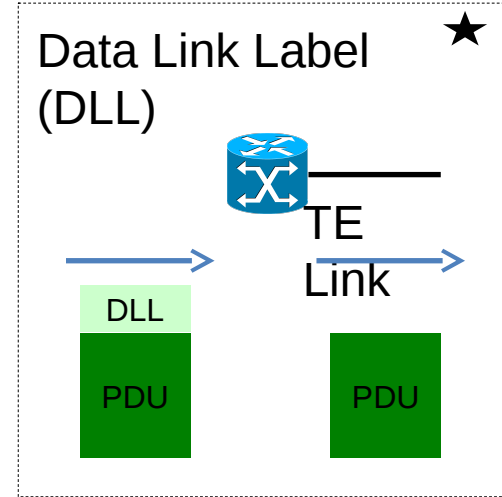
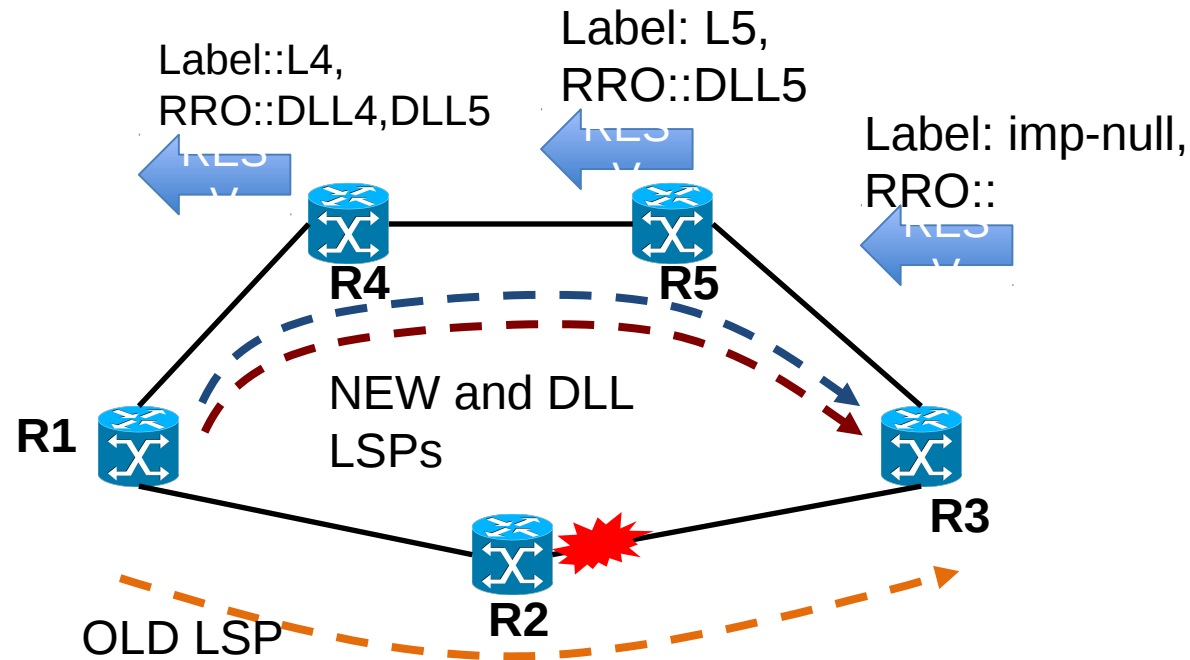
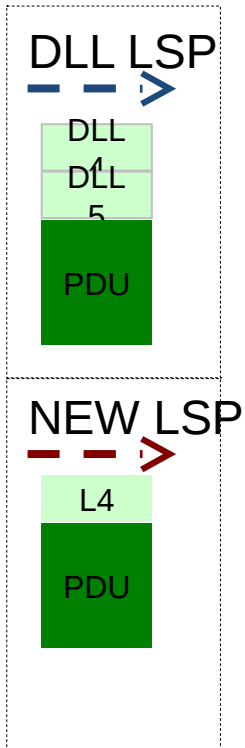
- RSVP-TE implementations permit LSRs to send RESV message upstream before installing forwarding state
  - allows parallel installation of forwarding state on traversed LSRs -> faster LSP setup
- Creates a race condition: by time RESV reaches ingress control plane state reservation is complete but dataplane programming not necessarily complete
- In practice, ingress LSR introduces an LSP installation wait-time before using LSP for forwarding traffic:
  - avoids traffic drop if transitioning traffic before forwarding state is complete on all traversed LSRs
- LSP installation wait-time can be determined:
  - empirically as fixed wait-time
  - by probing the LSP for datapath for validation

# Requirements

- Traffic non-impacting transition from an OLD to a new LSP for “make-before-break” scenarios
- Minimal or no wait-time to transition traffic on the path of newly signaled LSP
  - extra wait-time increases chances of congestion drop on the old LSP path - e.g. in post convergence FRR, soft-preemption, etc.
- Parallel installation of forwarding state on LSR(s) traversed by signaled LSP

# Proposed Solution

## LSP Instant Install



### In ACTION:

For example, consider an event (e.g. soft-preemption, or protected link failure) triggered on OLD LSP path

Step 1) Ingress computes new path and signals NEW LSP (requests DLL collection)

Step 2) Traversed LSRs add DLL information as part of the RSVP RRO

Step 3) On completion of LSP signaling, ingress extracts DLL(s) from the RRO, installs forwarding state with outgoing label stack of DLL(s); transitions traffic onto DLL LSP

→ *traffic flows on NEW path without further wait time (no wait time after signaling completion)*

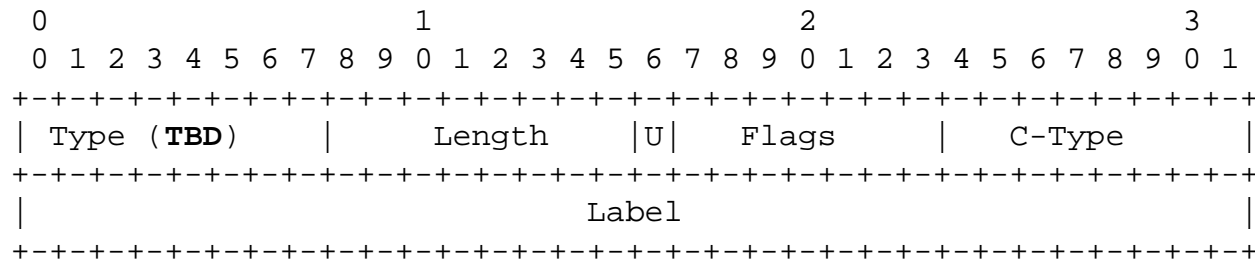
Step 4) Ingress transitions to NEW LSP when its dataplane is successfully validated (using existing mechanisms)

# LSP Instant Install Procedures

## Signaling Extensions

- Ingress LSR
  - New flag in Attribute Flags TLV to indicate DLL collection
- Other LSR(s)
  - inserts the DLL information in the new RRO DLL sub-object  
-- whenever DLL collection is requested

New DLL RRO sub-object is defined as follows:



# LSP Instant Install Procedures

## LSR(s) Behavior

- Any LSR
  - allocates a Data Link Label (DLL) and bind it to a TE link and install the forwarding state -- POP and forward on the respective TE link
  - pops DLL label from an incoming MPLS packet and forwards it on the associated TE link
- Ingress LSR
  - on signaling completion of a new LSP, programs DLL LSP outgoing forwarding state with using collected DLL(s) as out label stack
  - continues to verify new LSP (using existing mechanisms)
  - transitions traffic from DLL LSP to new LSP upon validation of new LSP datapath



# Next Steps

- Welcome comments from WG
- Request to make this a WG document

# Thank You