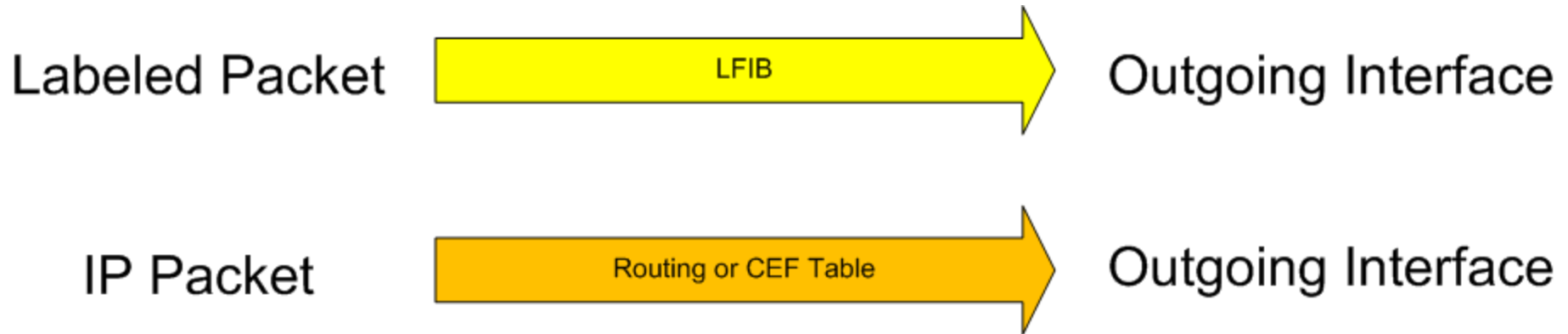MPLS Basics – Penultimate Hop Popping
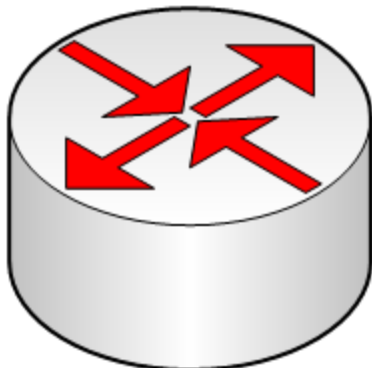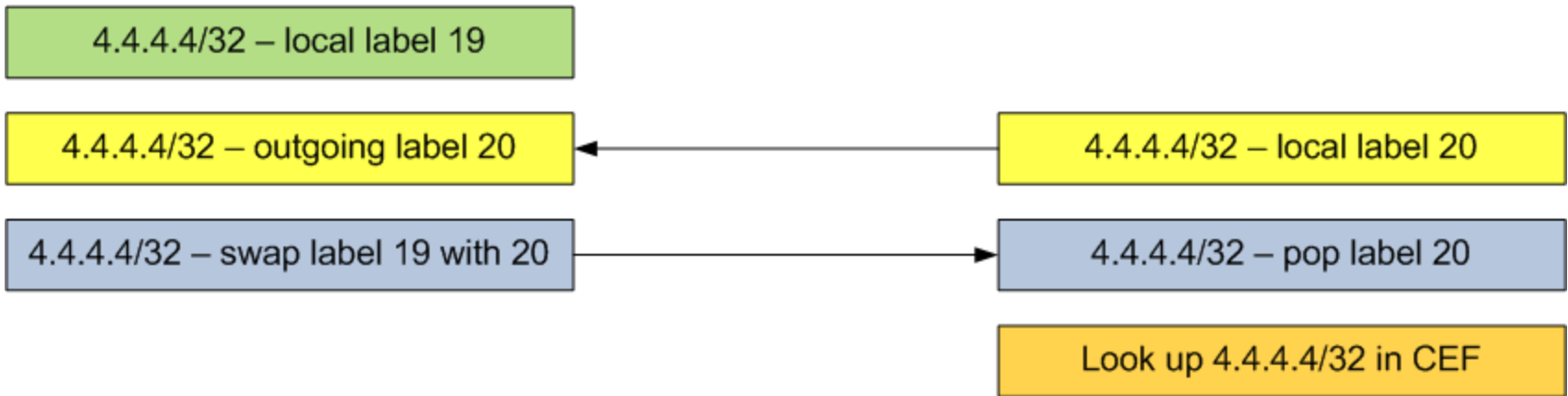
How a router determines the outgoing interface:

Labeled Packet ▸ LFIB ▸ Outgoing Interface

IP Packet ▸ Routing or CEF Table ▸ Outgoing Interface

Last Hop Router Without PHP

4.4.4.4/32 – local label 19

4.4.4.4/32 – outgoing label 20 ← 4.4.4.4/32 – local label 20

4.4.4.4/32 – swap label 19 with 20 → 4.4.4.4/32 – pop label 20

Look up 4.4.4.4/32 in CEF
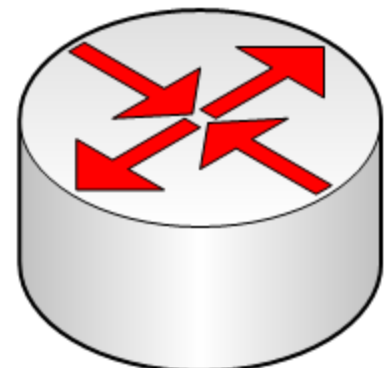
r3   r4

Pentagramatical Body Popping?

Penultimate Hop Popping

Fancy-pants definition:

In order to save an additional lookup on an egress Label Switch Router, the egress Label Switch Router assigns the implicit NULL label to a Forwarding Equivalence Class, thereby requesting the upstream Label Switch Router to perform a pop operation. Penultimate Hop Popping is enabled by default in Cisco IOS.

Last Hop Router With PHP
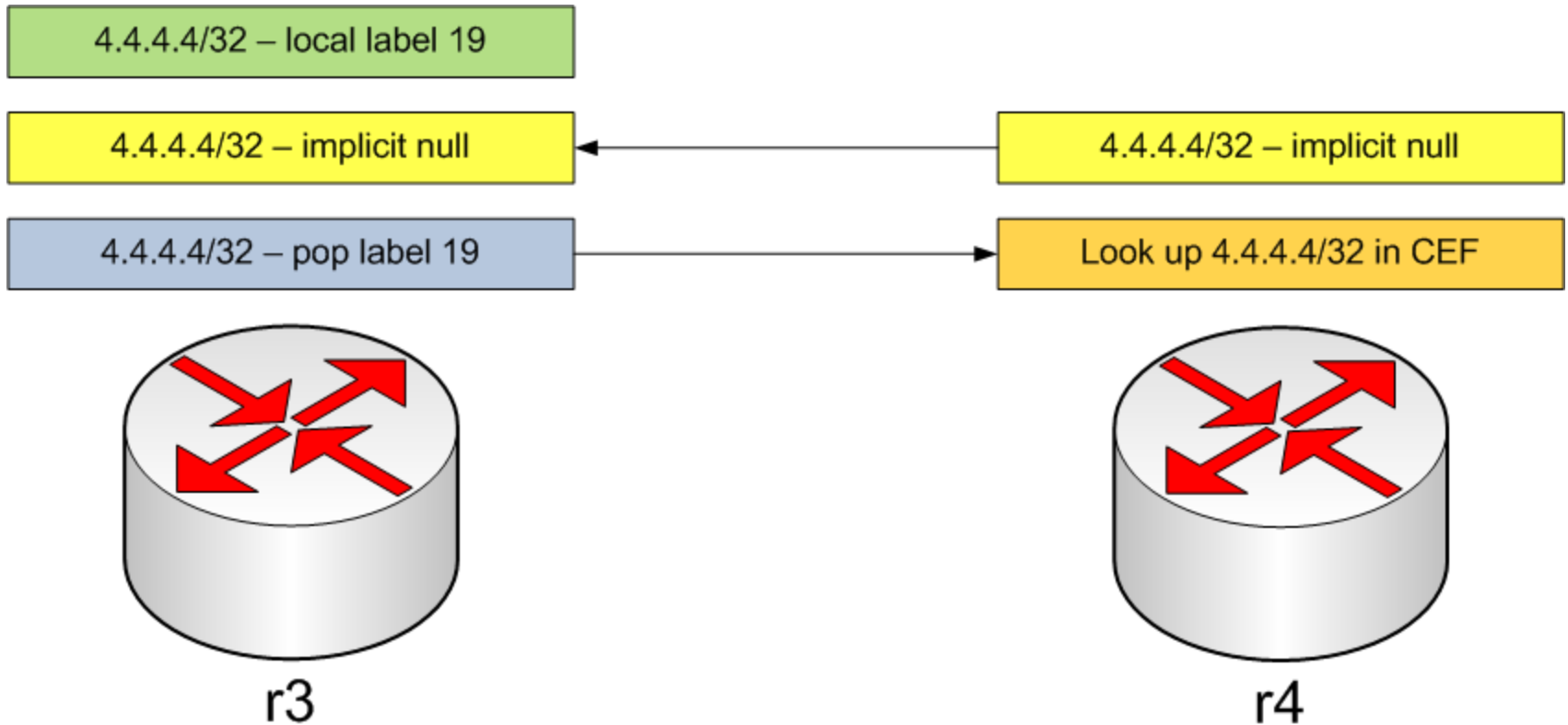
PHP Overview

- Saves an additional lookup on the last hop router in an LSP
- Instead of assigning a local label and advertising that label, the last hop router advertises an "Implicit NULL" for all connected and summarized prefixes in its routing table
- An Implicit NULL label has a value of 3 (MPLS reserved label)
- The next-to-last (penultimate) router pops the label of any packets for which it has received an Implicit NULL for that prefix