Cisco Advanced Routing: Enterprise Networks

DESIGNING A ROUTED ACCESS EIGRP CAMPUS

Nick Russo
NETWORK ENGINEER

@nickrusso42518 www.njrusmc.net

Prerequisite Skills

Strong on IPv4/IPv6 networking (years of experience)

Intermediate skills with IP services/tools (NAT, ping, traceroute, etc.)

Familiarity with Linux and Python

Post-module labbing is strongly encouraged

Agenda

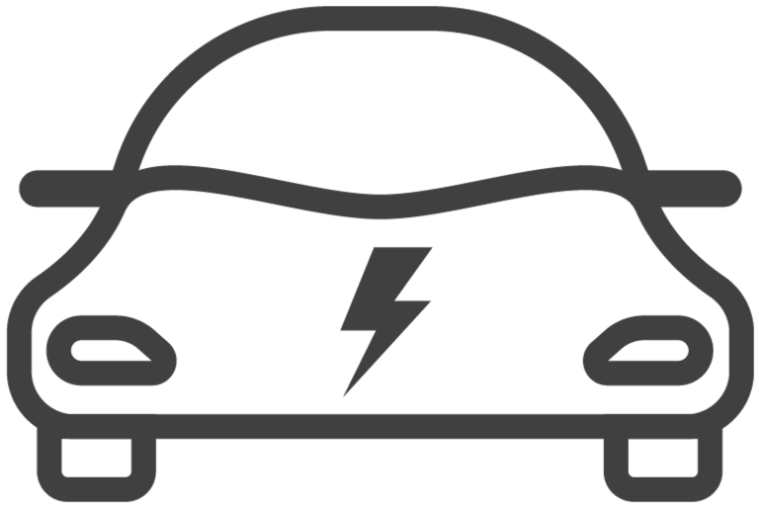
Globomantics business scenario

EIGRP operations

(some) EIGRP optimizations

- Feasible successors
- Route summarization

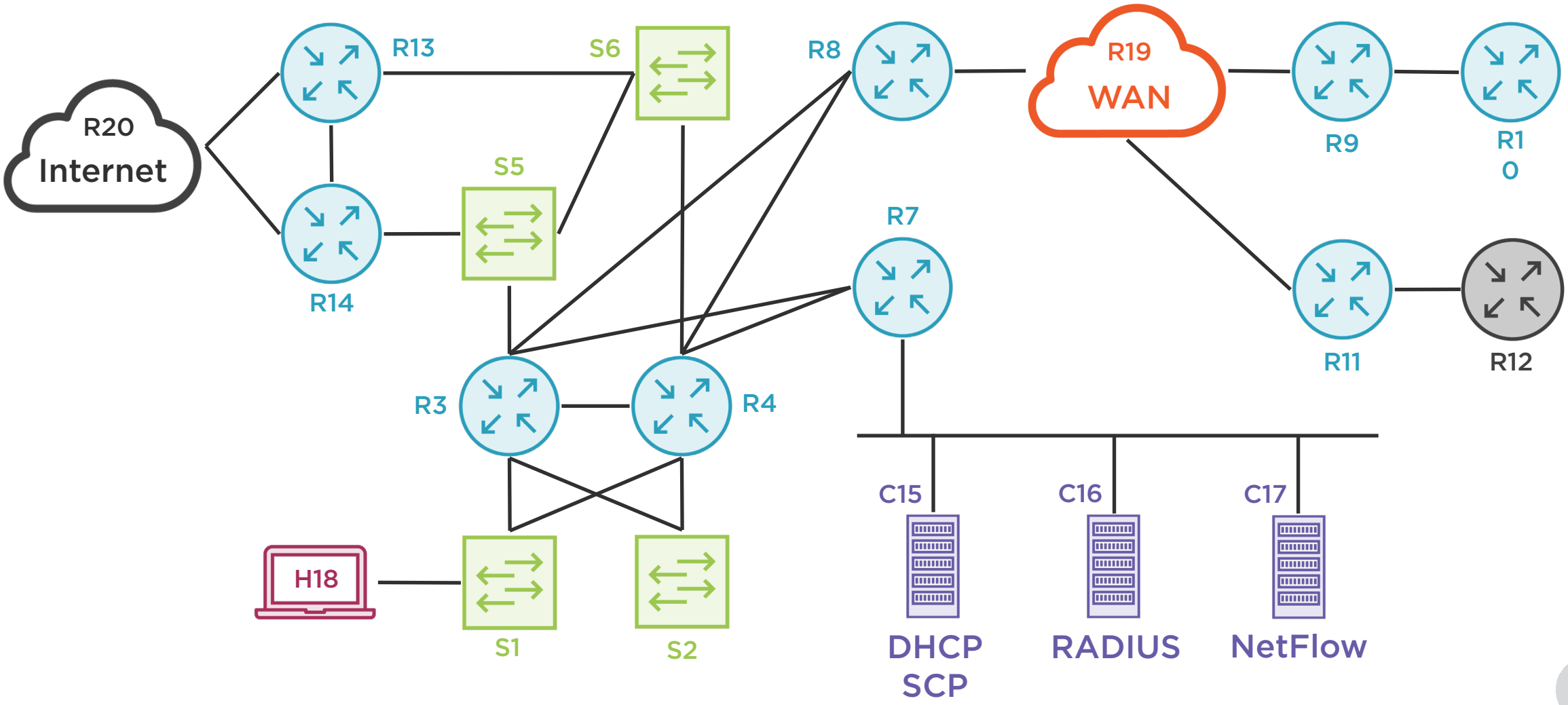
Introducing Globomantics



Globomantics

Senior Network Engineer

The Globomantics Network



Free Packet Captures

http://njrusmc.net/jobaid/jobaid.html

Packet Captures

Packet captures help reveal the ground truth. Use these PCAPs as references when troubleshooting complex issues.

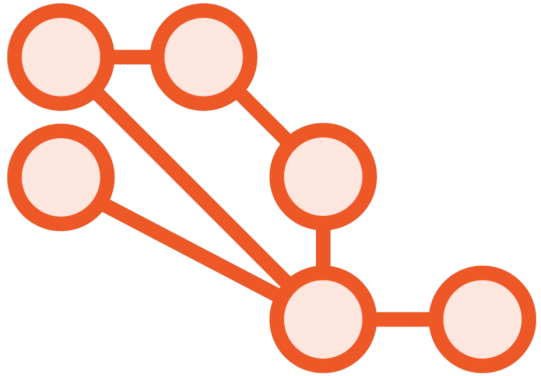
Layer-2 and Below

- Layer-2 Encapsulations Ethernet, PPP, PPPoE, HDLC, ATM-AAL5, and frame-relay captures.
- Common Non-IP Protocols ARP, CDP, LLDP, VTP, PAgP, LACP, DTP, and UDLD captures.
- Legacy Protocols AppleTalk, CLNS, DECnet, DLSw (SNA), and IPX captures.
- STP Original (PVST), rapid (RPVST), and multiple spanning tree (MST) captures.
- FHRP HSRP, VRRP, GLBP, IRDP, and IPv6 LAN anycast captures.
- BFD Mix of single/multi hop, authentication, and echo captures.
- Wireless LAN Includes many clients, QoS settings, authentication flows, roaming tests, etc.

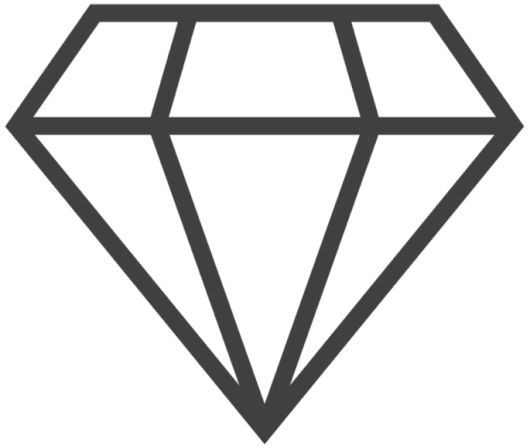
... and many more

Basic EIGRP Information

Cisco proprietary until RFC 7868



IP Protocol 88



Underrated!

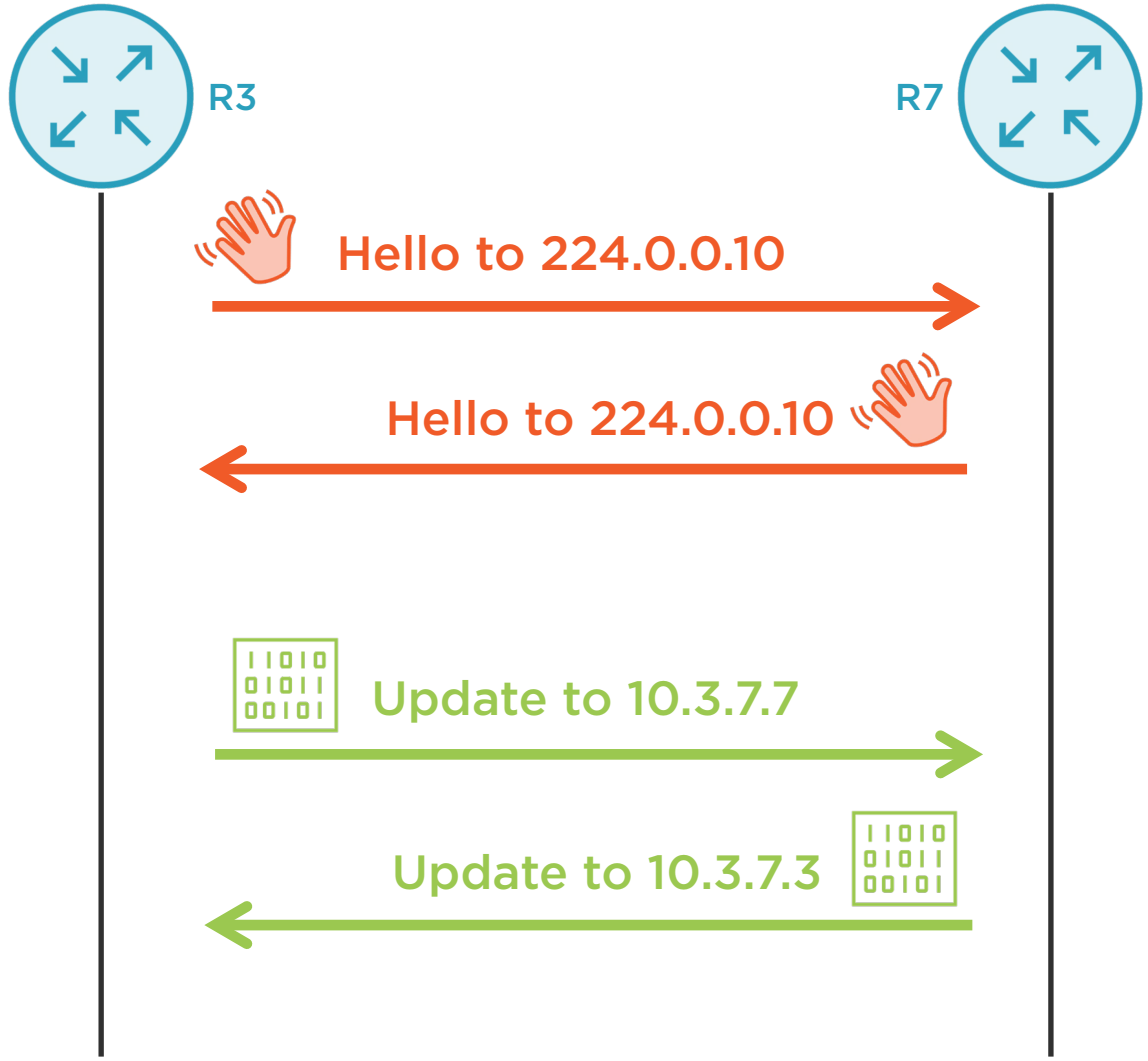
Forming EIGRP Neighbors

AS number:
65000

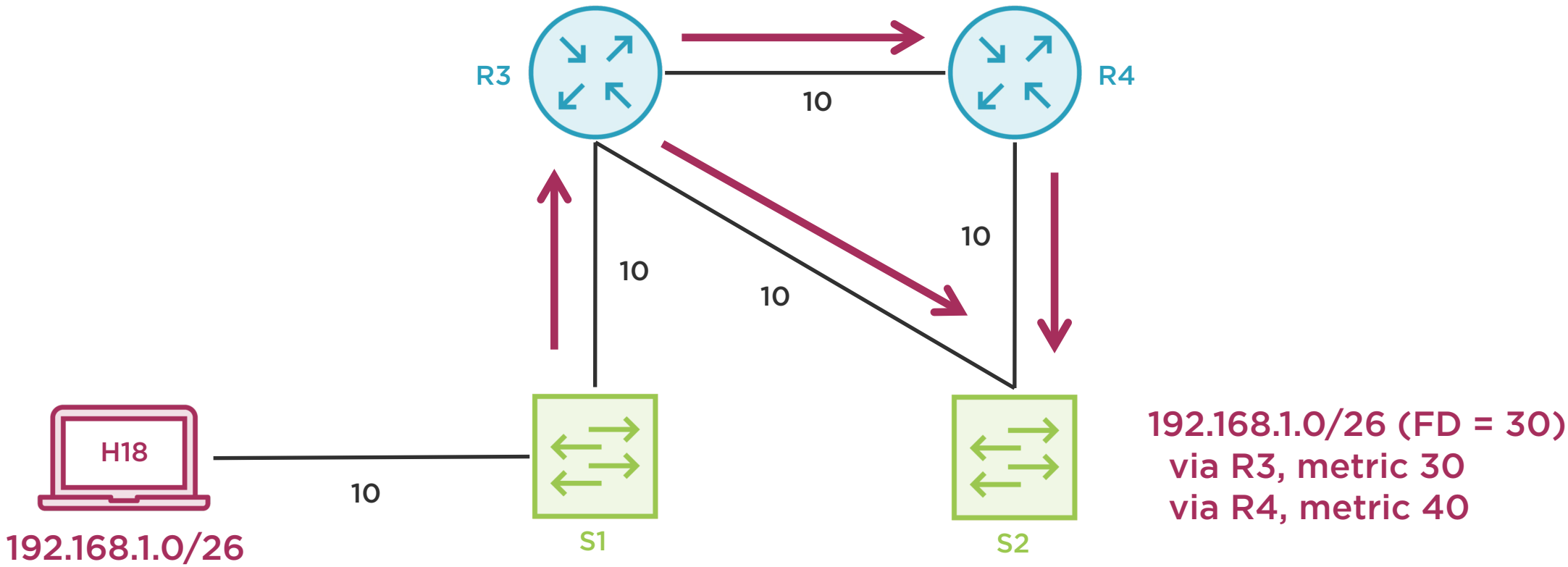
Hold time:
15 seconds
(no match)

Metrics:
- k1: 1
- k2: 0
- k3: 1
- k4: 0
- k5: 0
- k6: 0

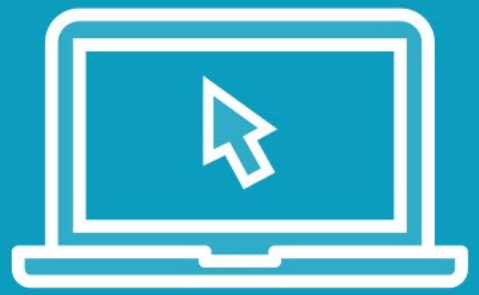
Routes:
192.0.2.0/24
203.0.113.0/24



Calculating EIGRP Paths

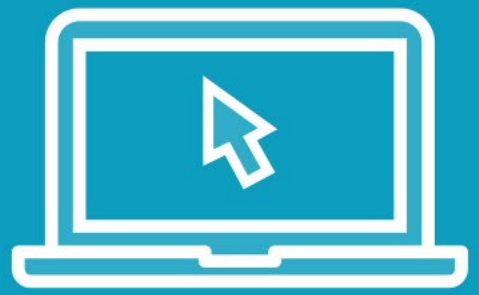


Demo



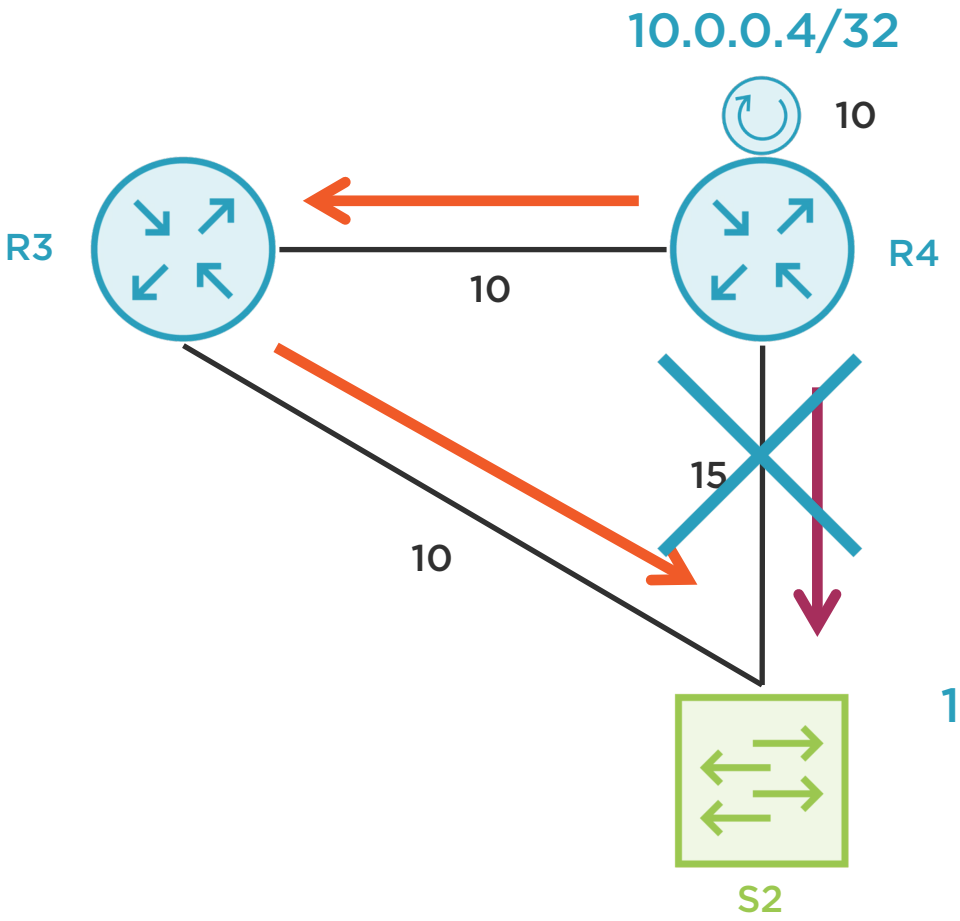
EIGRP operations within Globomantics

Demo



Digging deeper into the EIGRP topology

EIGRP Feasibility Condition

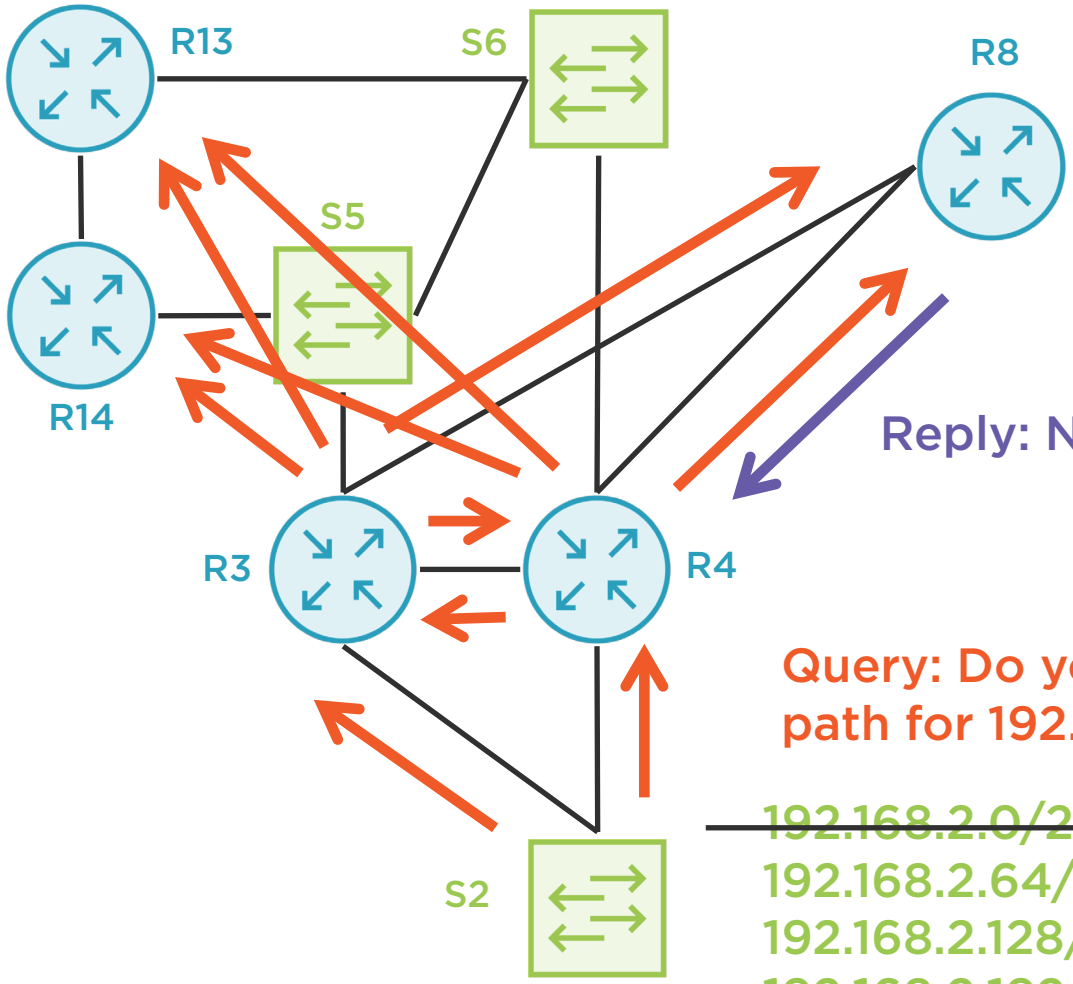


Feasibility condition:
Non-successor RD < prefix FD

Feasible successor!

10.0.0.4/32 (FD = 25)
via R4 (CD = 25 / RD = 10)
via R3 (CD = 30 / RD = 20)

EIGRP Query Domain



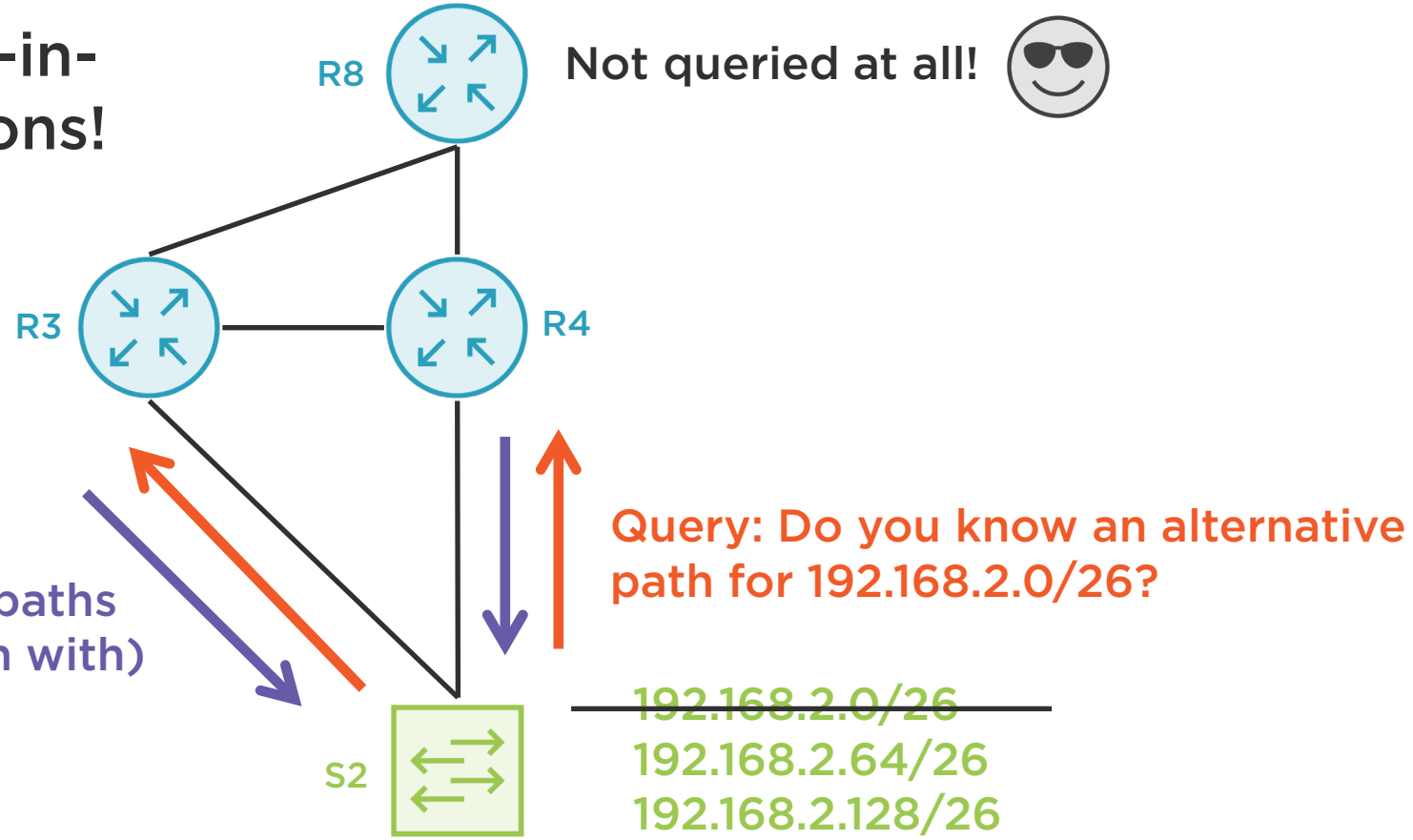
Reply: No alternative paths

Query: Do you know an alternative path for 192.168.2.0/26?

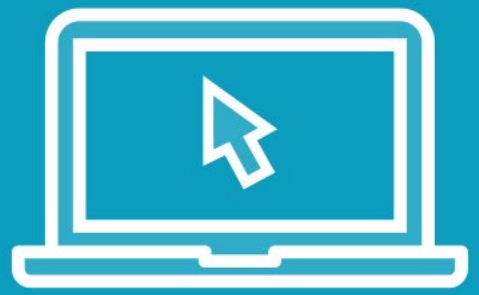
~~192.168.2.0/26~~
192.168.2.64/26
192.168.2.128/26
192.168.2.192/26

EIGRP Query Domain with Summaries

*** Helps avoid stuck-in-active (SIA) situations!**

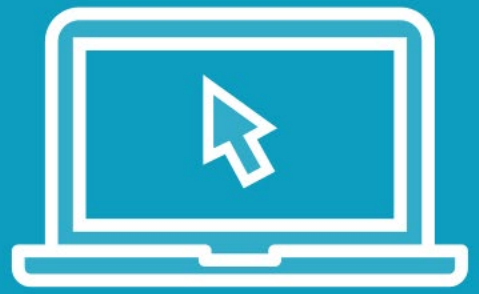


Demo



EIGRP feasible successors

Demo



Summarizing routes in EIGRP

Summary

Basic EIGRP operations

EIGRP feasible successors

Controlling EIGRP queries