Policy based routing (PBR)

Policy based routing & TE

- Normal routing decision is based on destination network longest match
- PBR allows decisions based on different parameters:
  - ✓ Source address
  - ✓ Incoming interface
  - ✓ Applications
  - ✓ QoS marking
- Classification is done normally using extended ACL or interface
- Problem is that it is manual, and heavy on resources of the router (hardware acceleration is necessary)

Configuring

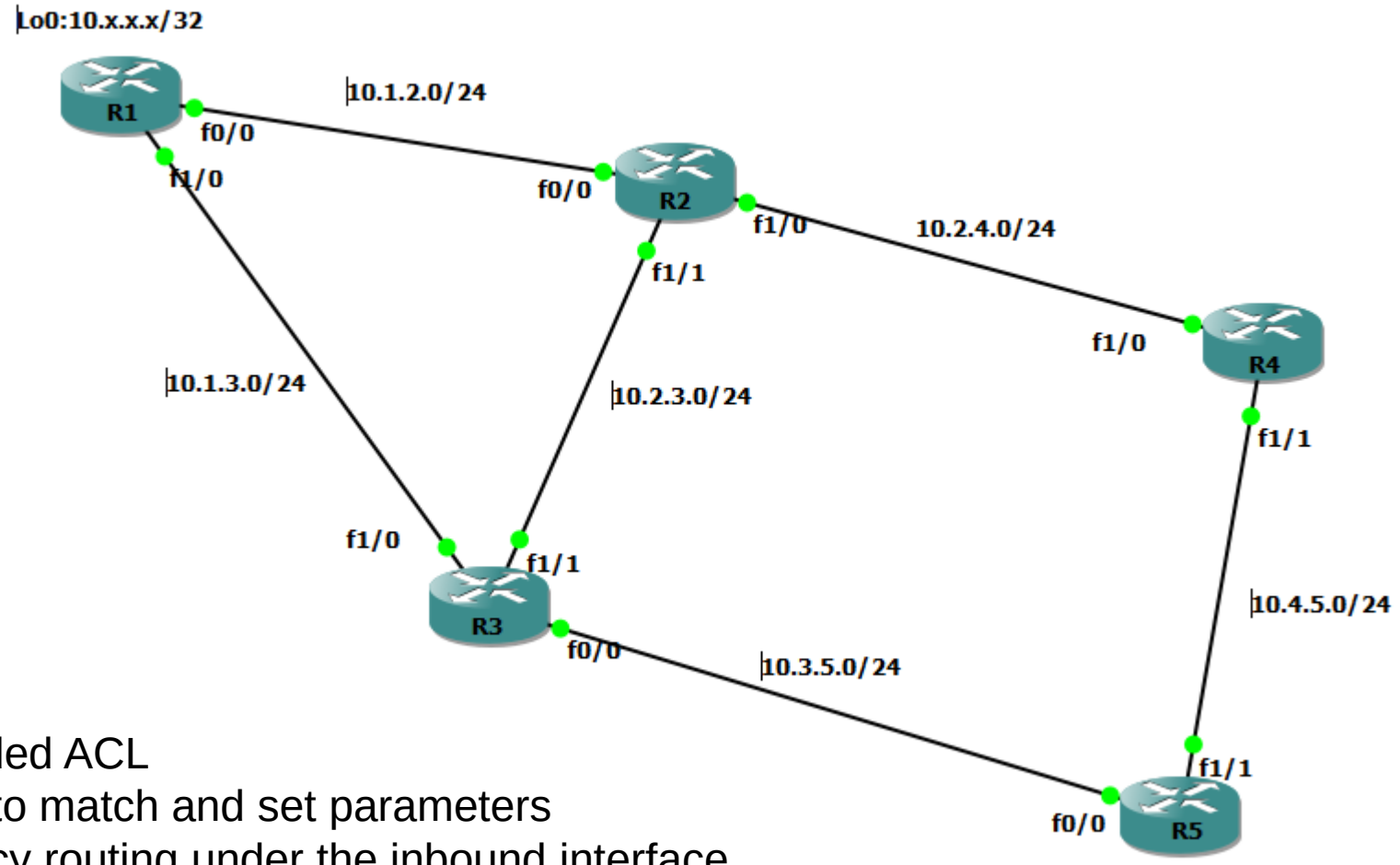
- Route-map defines match and set criteria
  - ✓ Match incoming interface or ACL
  - ✓ Set ip next-hop, interface, default ip next-hop or default interface
- Route-map applies to
  - ✓ incoming interface with ip policy command
  - ✓ Locally generated traffic with ip local policy command
- Order of operations:
  - If set ip next-hop or interface
  - ✓ Check route-map first, then routing table (most often)
  - If set ip default next-hop or default interface
  - ✓ Check routing table forst then route-map
- PBR is allways inbound

IP SLA and Traffic Engineering

- IP Service Level Agreement adds application level awareness to Enhanced Object Tracking
- Enhanced Object can be called from features such as:
  - ✓ FHRP
  - ✓ PBR
  - ✓ Static routing
- Used if we have multiple connection to other networks (eg. ISP)

- For point-to-point interfaces use interface argument
- For point-to-multipoint interfaces use next-hop

IP SLA and Traffic Engineering (TE)

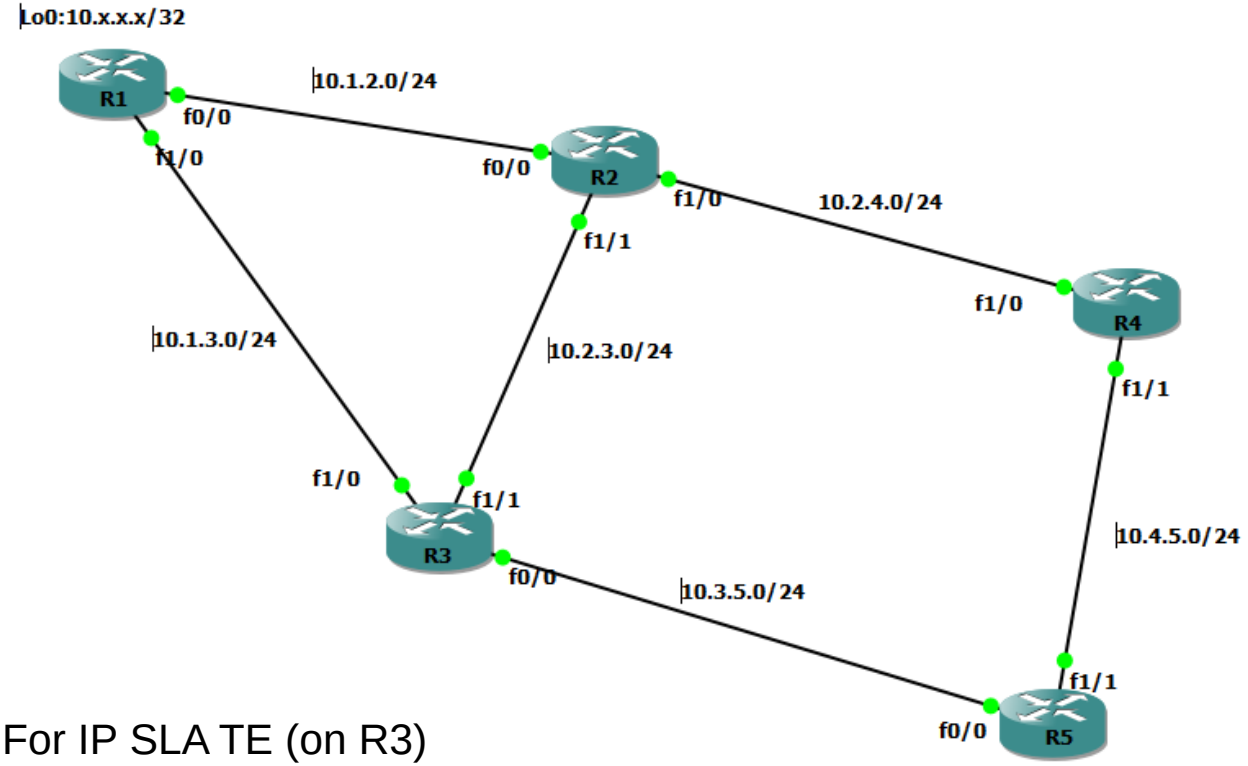


For TE (on R3):

1. Configure extended ACL
2. Use Route-map to match and set parameters
3. Configure ip policy routing under the inbound interface

- Show route-map
- Debug ip policy

IP SLA and Traffic Engineering



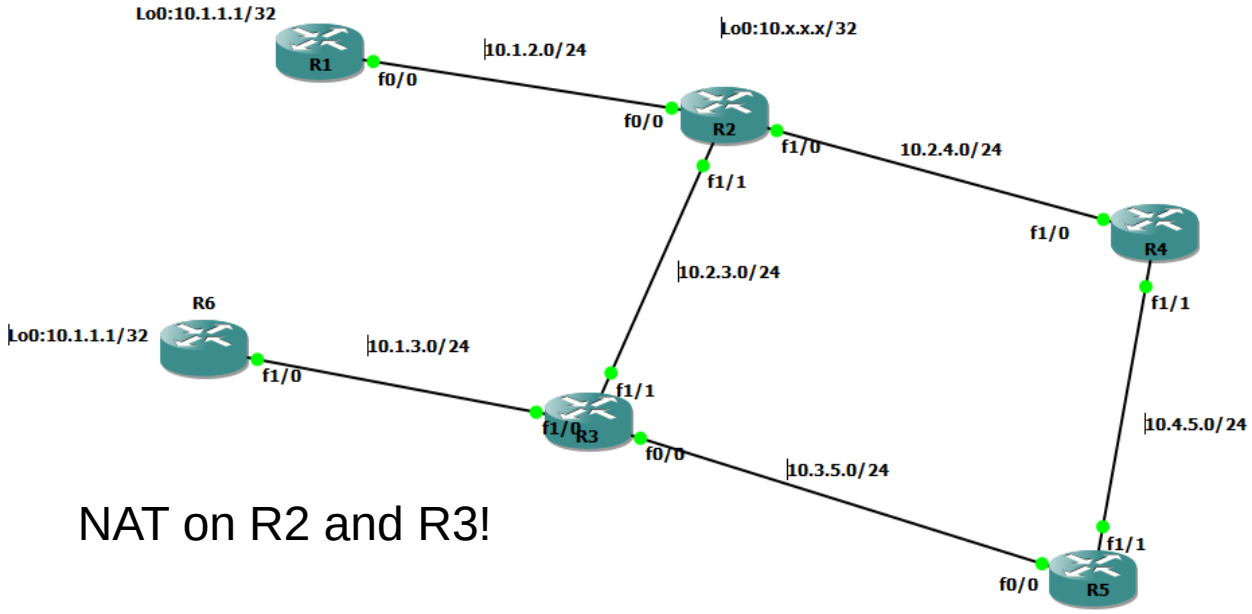
For IP SLA TE (on R3)

- Configure extended ACL matching interesting src to dst traffic
- Configure IP SLA probe
- Use Route-map to match ACL and set next-hop verify-use track object
- Configure ip policy routing under the inbound interface
- Show route-map
- Show track

```
!
track 1 ip sla 1 reachability
!
ip sla 1
 icmp-echo 10.5.5.5 source-ip 10.3.3.3
 threshold 500
 timeout 600
 frequency 1
ip sla schedule 1 life forever start-time now
!
route-map MAP permit 10
 match ip address ACL_TRACK
 set ip next-hop verify-availability 10.2.3.2 1 track 1
!

interface FastEthernet0/0
 ip address 10.3.5.3 255.255.255.0
 ip policy route-map MAP
 duplex half
```

IP SLA and Traffic Engineering-static routing



NAT on R2 and R3!

For IP SLA TE (on R3)

- Configure IP SLA to track icmp-echo lo on R1
- Configure track object that uses IP SLA probe for reachability
- Create two static routes (one to R1 with track object) the other to R3 to be floating
- Redistribute static routes into EIGRP using same metric
- Show ip route
- Ping from R4 to lo0 on R1

```
!
track 1 ip sla 1 reachability
!
router eigrp 1
 network 10.2.4.0 0.0.0.255
 redistribute static metric 100000 10 255 1 1500
!
ip route 0.0.0.0 0.0.0.0 10.1.2.1 track 1
ip route 0.0.0.0 0.0.0.0 10.2.3.3 2
!
ip access-list extended NAT_ACL
 permit ip 10.0.0.0 0.255.255.255 any
!
ip sla 1
 icmp-echo 10.1.1.1
 threshold 100
 timeout 200
 frequency 1
ip sla schedule 1 life forever start-time now
!
!
```

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