



# SoX Virtual Training Workshop

## Hands-on Session 2: Using Local Preference and AS\_PATH attributes

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# SoX Virtual Training Workshop

- Webpage with PowerPoint presentations:

[http://ce.sc.edu/cyberinfra/sox\\_workshop\\_2023.html](http://ce.sc.edu/cyberinfra/sox_workshop_2023.html)

- Hands-on sessions: to access labs for the hands-on sessions, use the following link:

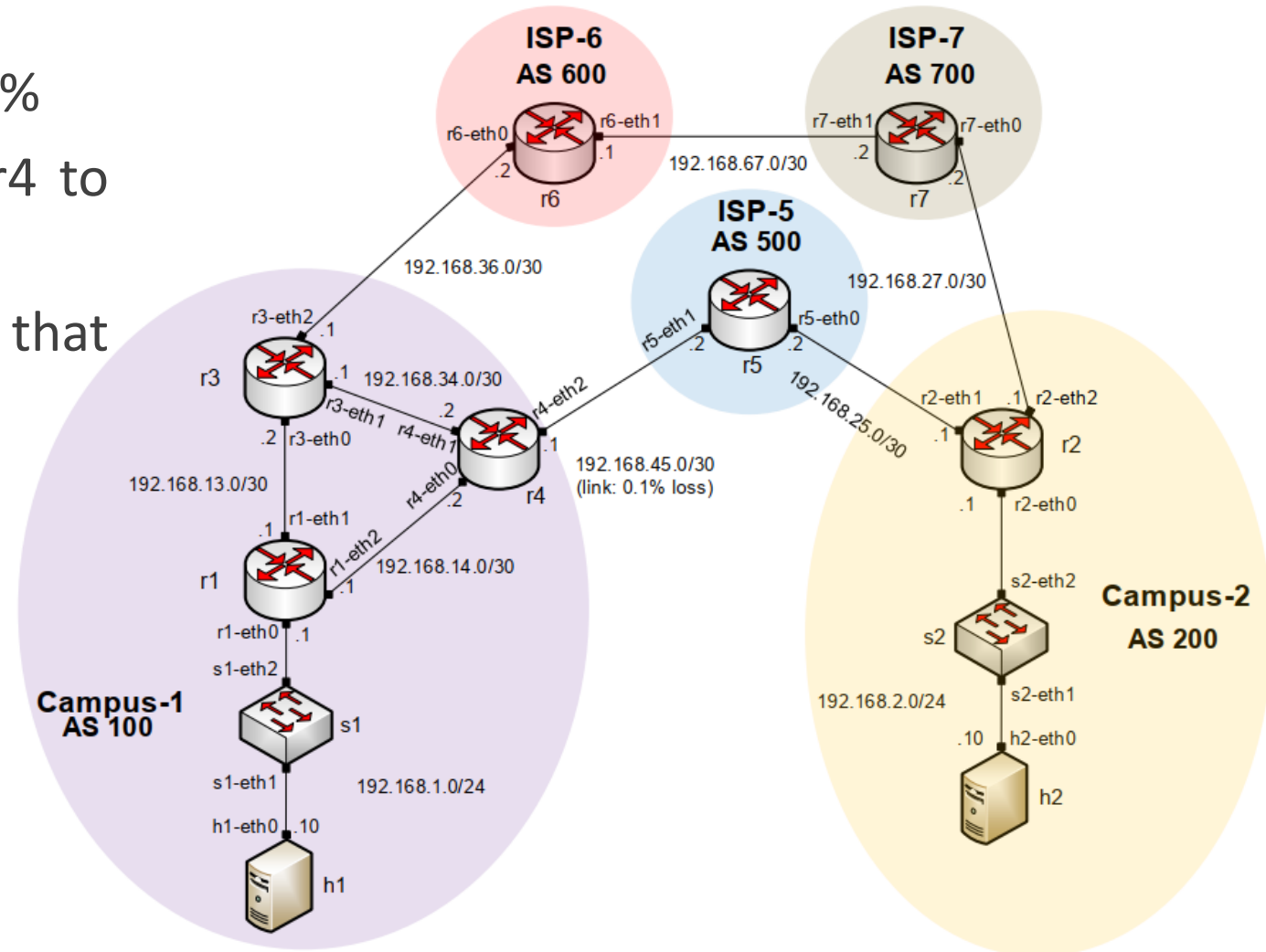
<https://netlab.cec.sc.edu/>

- Username: email used for registration
- Password: nsf2023

# Lab 11: Configuring Local Preference and AS\_PATH Prepending

# Lab Topology

- All links have a capacity of 10Gbps
- Link r4-r5 has a packet loss rate = 0.1%
- Configure LOCAL\_PREF on r3 and r4 to route traffic **out** of AS 100 via r3
- Set AS\_PATH prepending on r4 so that traffic **into** AS 100 occurs via AS 600

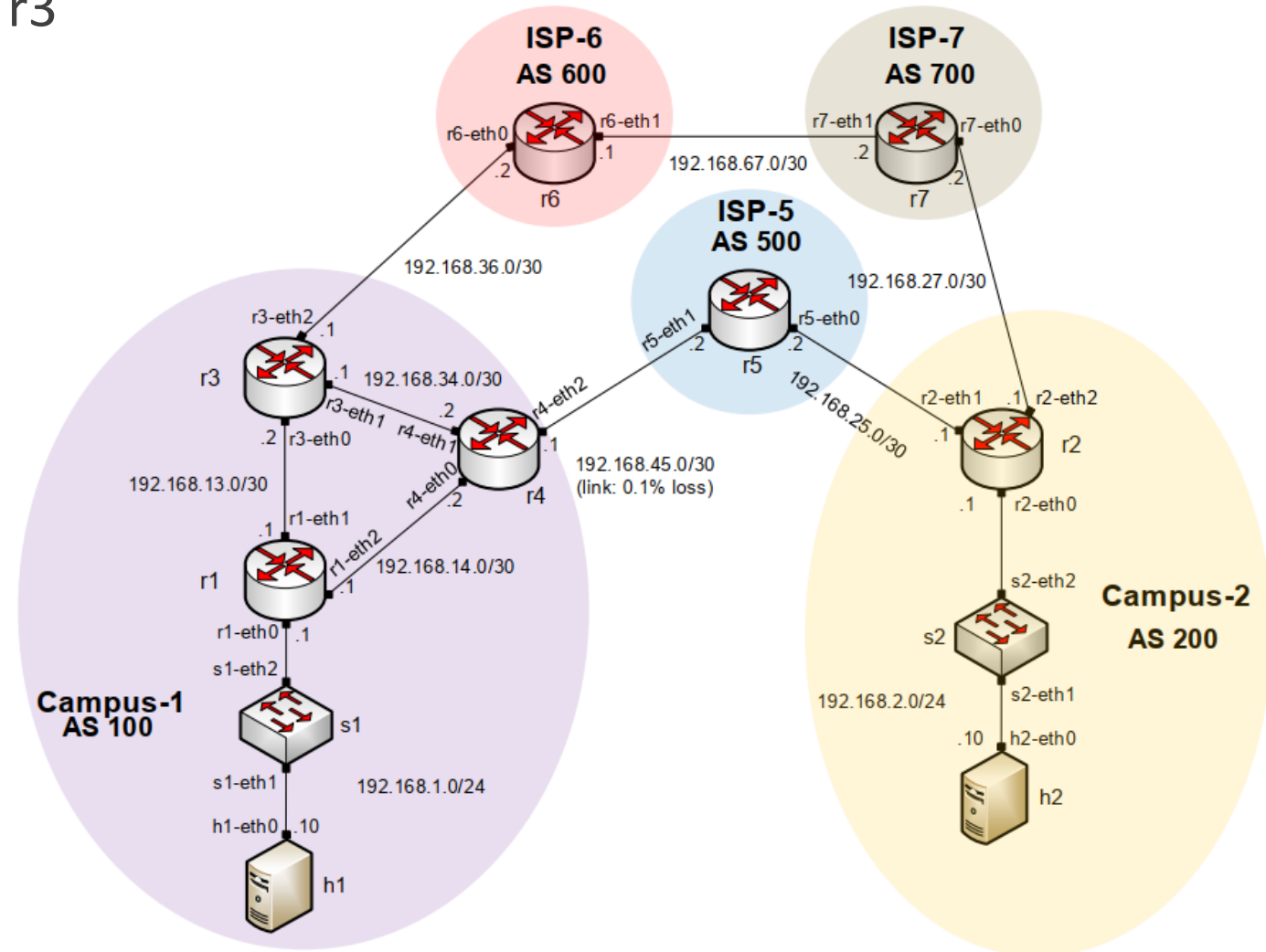


# Lab Topology

- Configure LOCAL\_PREF in routers r3 (150) and r4 (125) (higher is better)
- Outbound traffic via r3

```
"Host: r3"
frr-pc# configure terminal
frr-pc(config)# route-map primary_in permit 10
frr-pc(config-route-map)# set local-preference 150
frr-pc(config-route-map)# exit
frr-pc(config)# router bgp 100
frr-pc(config-router)# neighbor 192.168.36.2 route-map primary_in in
frr-pc(config-router)# end
frr-pc#
```

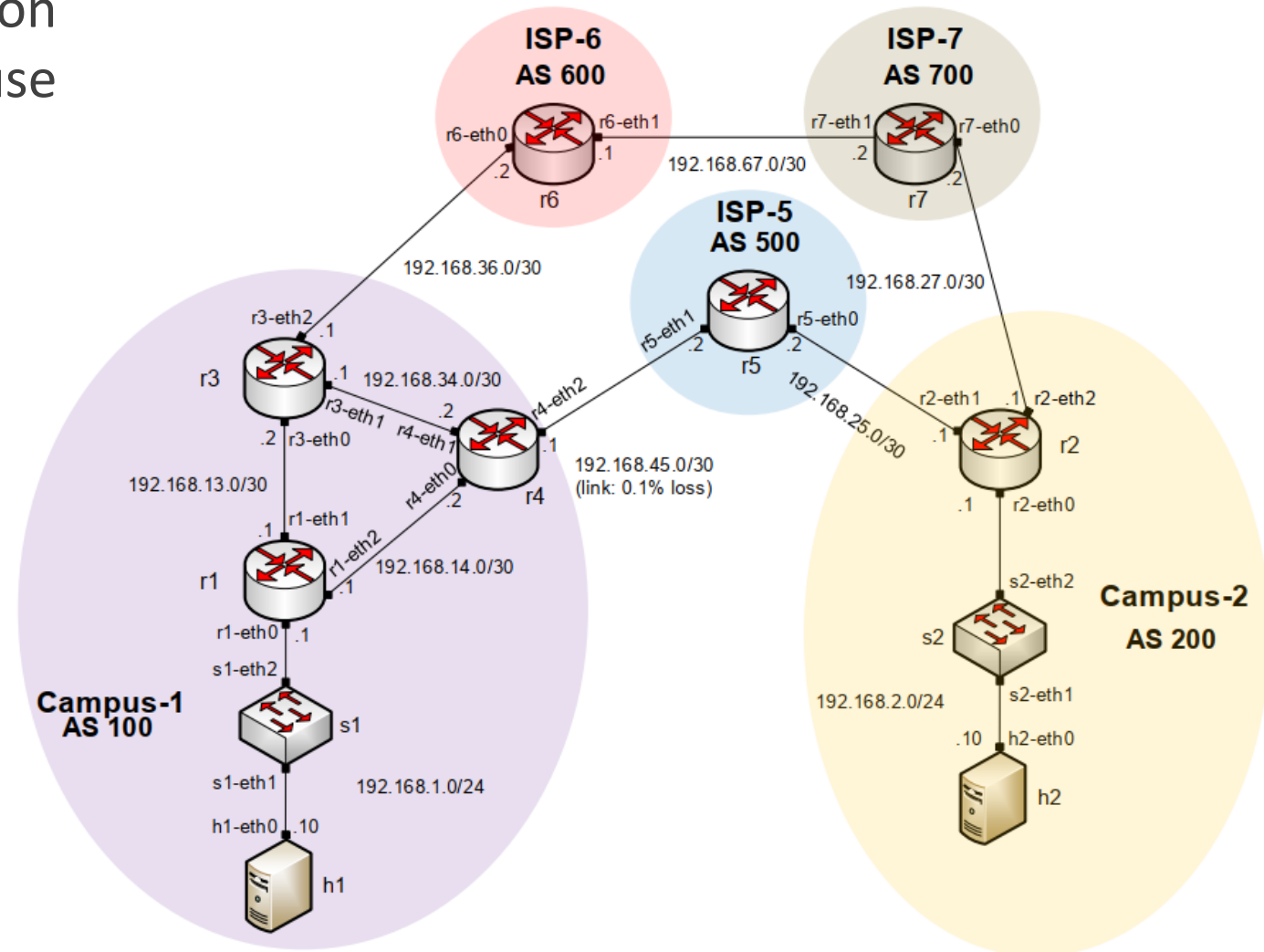
```
"Host: r4"
frr-pc# configure terminal
frr-pc(config)# route-map secondary_in permit 10
frr-pc(config-route-map)# set local-preference 125
frr-pc(config-route-map)# exit
frr-pc(config)# router bgp 100
frr-pc(config-router)# neighbor 192.168.45.2 route-map secondary_in in
frr-pc(config-router)# end
frr-pc#
```



# Lab Topology

- Configure AS\_PATH prepending on router r4 to influence router r2 to use the long path
- Inbound traffic from AS 200 via r3

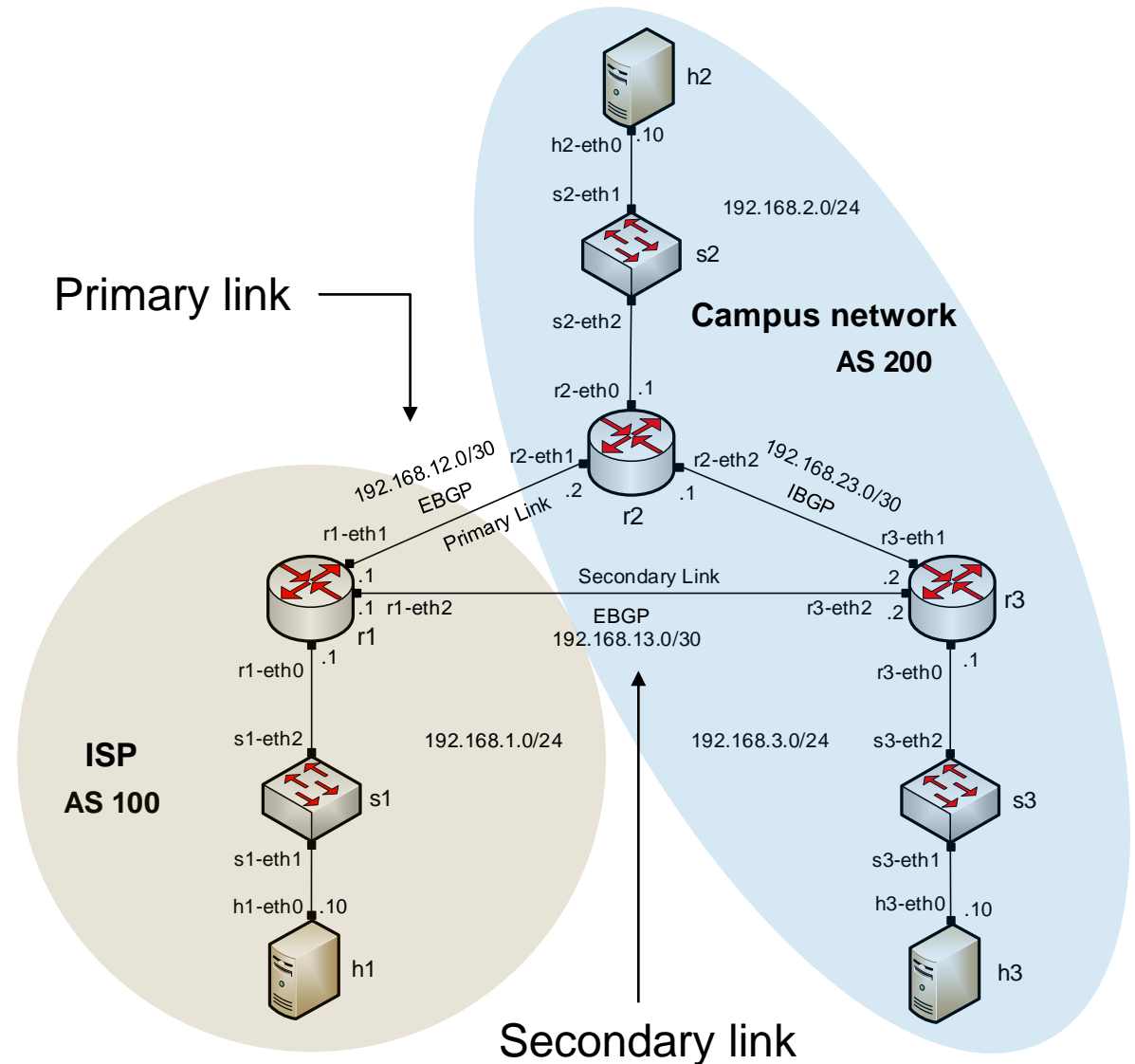
```
"Host: r4"
frr-pc# configure terminal
frr-pc(config)# route-map prepend_out permit 10
frr-pc(config-route-map)# set as-path prepend 100 100
frr-pc(config-route-map)# exit
frr-pc(config)# router bgp 100
frr-pc(config-router)# neighbor 192.168.45.2 route-map prepend_out out
frr-pc(config-router)# end
frr-pc#
```



## **Additional Slides - Lab 8: Configuring IBGP and EBGP Sessions, Local Preference, and MED**

# Lab Topology

- Configure IBGP within AS 200
- Configure EBGP between AS 100 and AS 200
- Configure LOCAL\_PREF and MED attributes to favor the primary link over the secondary one



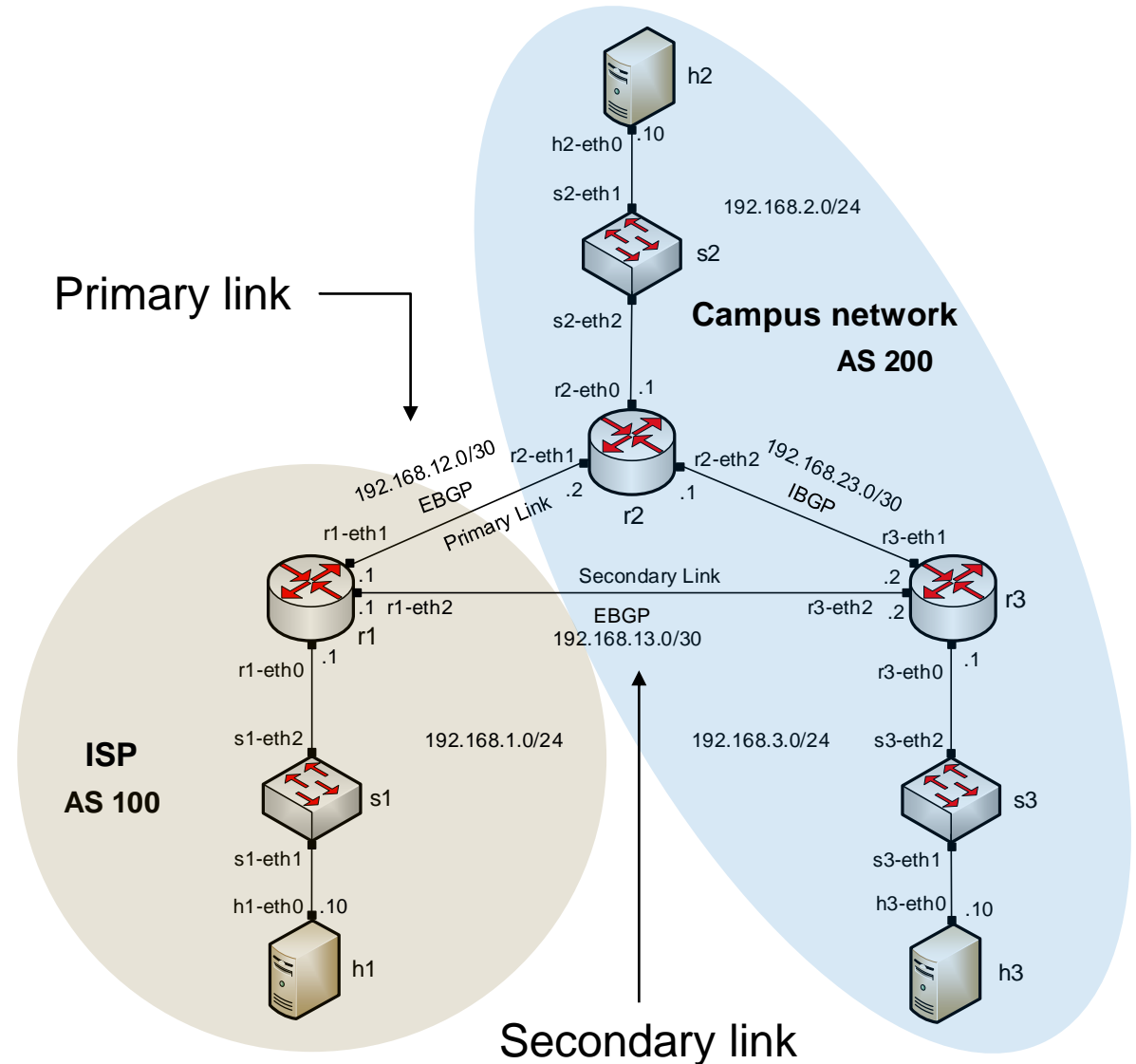


# Lab Topology

- Local\_PREF attribute configuration on routers r2 and r3
  - Configure a route-map
  - Set the LOCAL\_PREF attribute
  - Assign the route-map to the BGP neighbor

```
Host: r2
frr-pc# configure terminal
frr-pc(config)# route-map primary_in permit 10
frr-pc(config-route-map)# set local-preference 150
frr-pc(config-route-map)# exit
frr-pc(config)# router bgp 200
frr-pc(config-router)# neighbor 192.168.12.1 route-map primary_in in
frr-pc(config-router)#
```

```
Host: r3
frr-pc# configure terminal
frr-pc(config)# route-map secondary_in permit 10
frr-pc(config-route-map)# set local-preference 125
frr-pc(config-route-map)# exit
frr-pc(config)# router bgp 200
frr-pc(config-router)# neighbor 192.168.13.1 route-map secondary_in in
frr-pc(config-router)# end
```



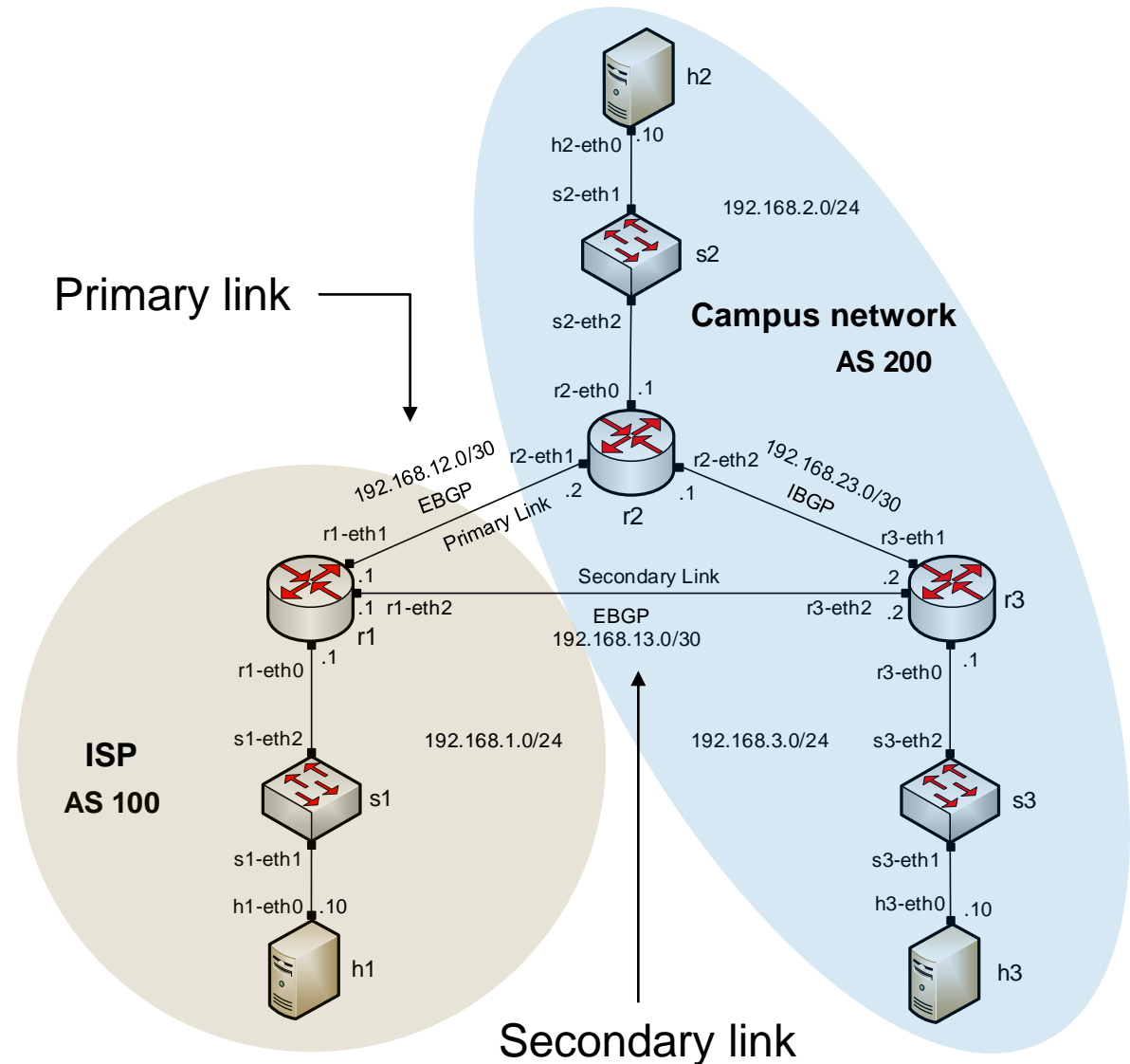
# Lab Topology

- BGP table of router r3 after configuring the LOCAL\_PREF attribute

```
Host: r3
frr-pc# show ip bgp
BGP table version is 6, local router ID is 3.3.3.3, vrf id 0
Default local pref 100, local AS 200
Status codes: s suppressed, d damped, h history, * valid, > best, = multipath,
               i internal, r RIB-failure, S Stale, R Removed
Next hop codes: @NNN next hop's vrf id, < announce-nh-self
Origin codes: i - IGP, e - EGP, ? - incomplete

  Network          Next Hop      Metric LocPrf Weight Path
  *>i192.168.1.0/24 192.168.12.1  0      150    0 100 i
  *                 192.168.13.1  0      125    0 100 i
  *>i192.168.2.0/24 192.168.23.1  0      100    0  i
  *> 192.168.3.0/24 0.0.0.0       0       32768  i
  *>i192.168.12.0/30 192.168.23.1  0      100    0  i
  *> 192.168.13.0/30 0.0.0.0       0      32768  i

Displayed 5 routes and 6 total paths
frr-pc#
```

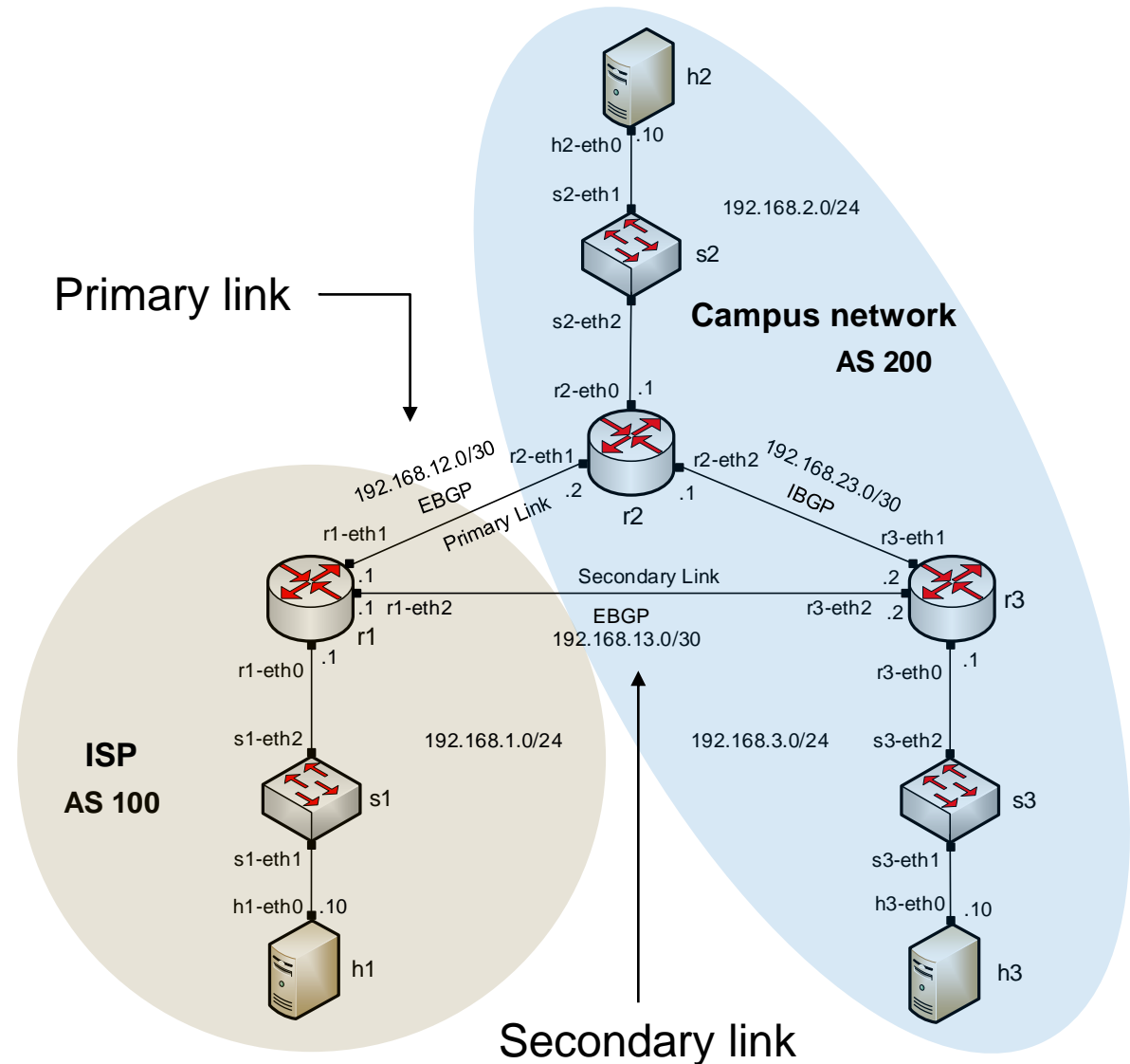


# Lab Topology

- MED attribute configuration on routers r2 and r3
  - Configure a route-map
  - Set the MED attribute
  - Assign the route-map to the BGP neighbor

```
Host: r2
frr-pc# configure terminal
frr-pc(config)# route-map primary_med_out permit 10
frr-pc(config-route-map)# set metric 50
frr-pc(config-route-map)# exit
frr-pc(config)# router bgp 200
frr-pc(config-router)# neighbor 192.168.12.1 route-map primary_med_out out
frr-pc(config-router)#
```

```
Host: r3
frr-pc# configure terminal
frr-pc(config)# route-map secondary_med_out permit 10
frr-pc(config-route-map)# set metric 75
frr-pc(config-route-map)# exit
frr-pc(config)# router bgp 200
frr-pc(config-router)# neighbor 192.168.13.1 route-map secondary_med_out out
frr-pc(config-router)# end
frr-pc#
```



# Lab Topology

- BGP table of router r1 after configuring the MED attribute

```
Host: r1
frr-pc# show ip bgp
BGP table version is 17, local router ID is 1.1.1.1, vrf id 0
Default local pref 100, local AS 100
Status codes: s suppressed, d damped, h history, * valid, > best, = multipath,
              i internal, r RIB-failure, S Stale, R Removed
Nexthop codes: @NNN nexthop's vrf id, < announce-nh-self
Origin codes: i - IGP, e - EGP, ? - incomplete

   Network        Next Hop        Metric LocPrf Weight Path
*> 192.168.1.0/24  0.0.0.0          0       32768 i
* 192.168.2.0/24  192.168.13.2     75        0 200 i
*> 192.168.3.0/24 192.168.12.2     50        0 200 i
* 192.168.12.0/30 192.168.13.2     75        0 200 i
*> 192.168.13.0/30 192.168.12.2     50        0 200 i
* 192.168.13.0/30 192.168.13.2     75        0 200 i

Displayed 5 routes and 9 total paths
frr-pc#
```

