

Hands-on Session: Essentials of BGP, EBGP, IBGP

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Internet2 Technology Exchange

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Denver, Colorado

Border Gateway Protocol (BGP) Lab Series

Lab Series: Border Gateway Protocol

- Lab 1: Introduction to Mininet
- Lab 2: Introduction to Free Range Routing (FRR)
- Lab 3: Introduction to BGP
- Lab 4: Configure and verify EBGP
- Lab 5: BGP Authentication
- Lab 6: Configure BGP with Default Route
- Lab 7: Using AS_PATH BGP Attribute
- Lab 8: Configuring IBGP and EBGP Sessions, Local Preference, and MED
- Lab 8.1: Configuring OSPF, IBGP and EBGP Sessions, Local Preference, and MED
- Lab 9: IBGP, Next Hop and Full Mesh Topology
- Lab 10: BGP Route Reflection

Introduction to BGP

Lab activities are described in Lab 3, BGP Lab Series

Hands-on Labs on BGP

- Webpage with PowerPoint presentations:

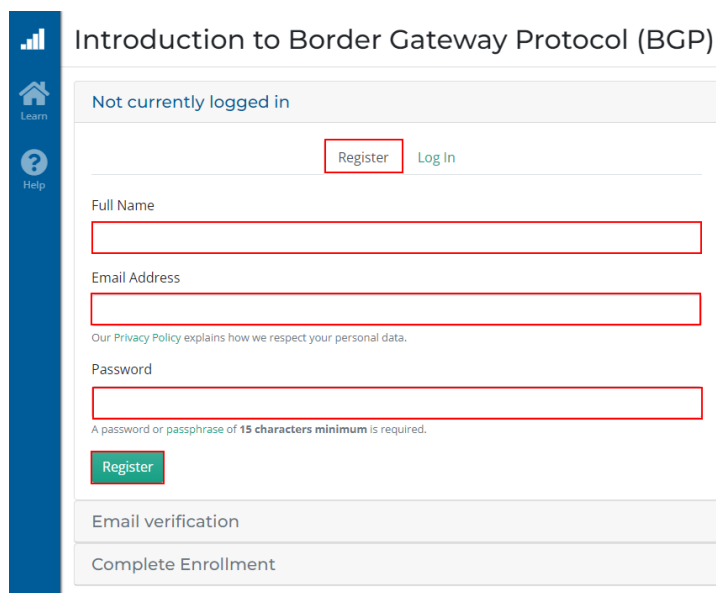
http://ce.sc.edu/cyberinfra/workshop_2022_ie2_bgp.html

- Hands-on session 1 (9:00-9:45pm): to access labs for Session 1 (Essentials of BGP, EBGP, IBGP), register here:

<https://portal.netdevgroup.com/learn/34b2cp/enroll/>

Registering to the Netlab Portal

- Click on the enrollment link: <https://portal.netdevgroup.com/learn/34b2cp/enroll/>
- Register and check your email for the verification key
- Finalize the registration by claiming your free access



Introduction to Border Gateway Protocol (BGP)

Not currently logged in

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Full Name

Email Address

Our Privacy Policy explains how we respect your personal data.

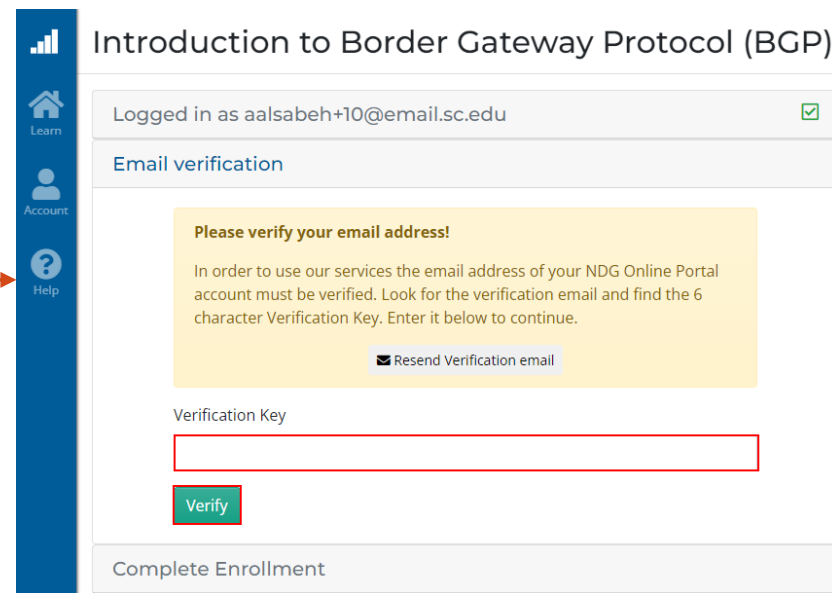
Password

A password or passphrase of 15 characters minimum is required.

[Register](#)

Email verification

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Introduction to Border Gateway Protocol (BGP)

Logged in as aalsabeh+10@email.sc.edu

Email verification

Please verify your email address!

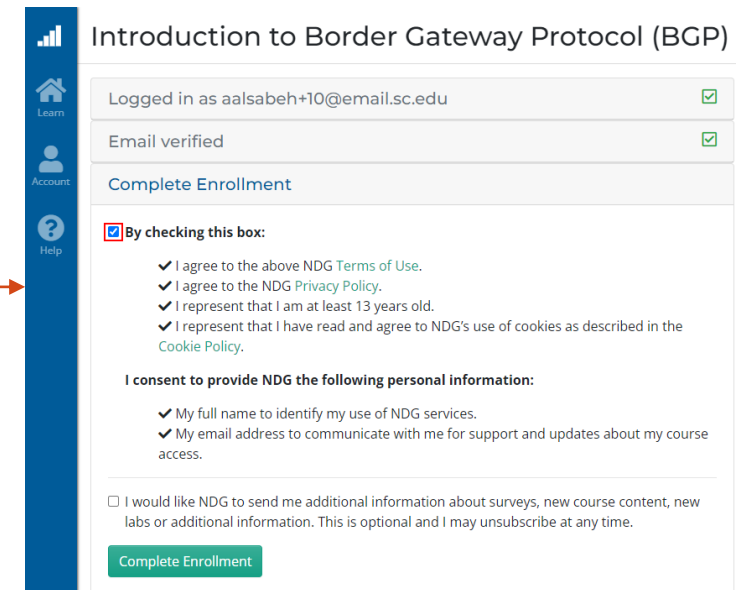
In order to use our services the email address of your NDG Online Portal account must be verified. Look for the verification email and find the 6 character Verification Key. Enter it below to continue.

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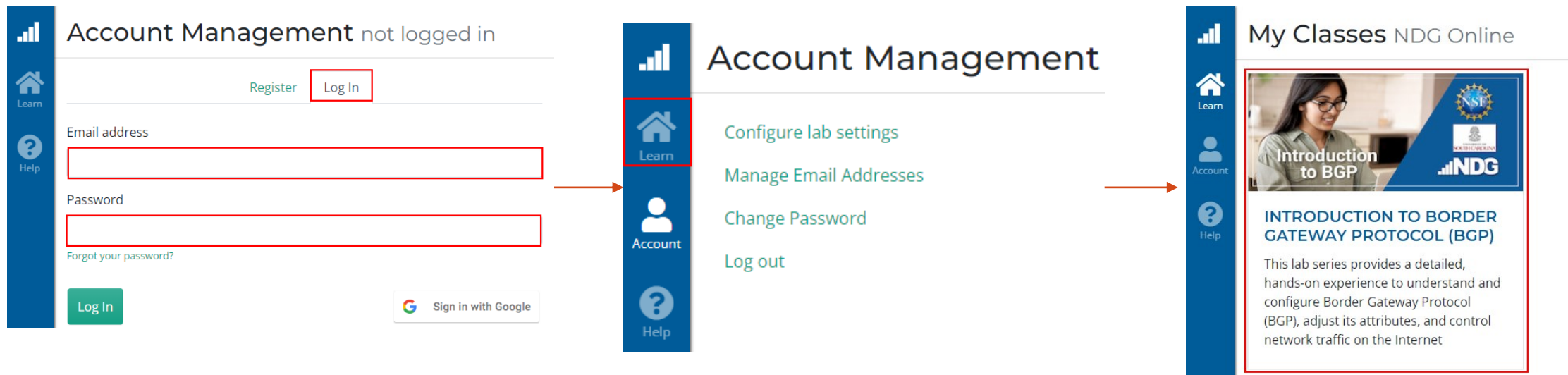
- ✓ My full name to identify my use of NDG services.
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I would like NDG to send me additional information about surveys, new course content, new labs or additional information. This is optional and I may unsubscribe at any time.

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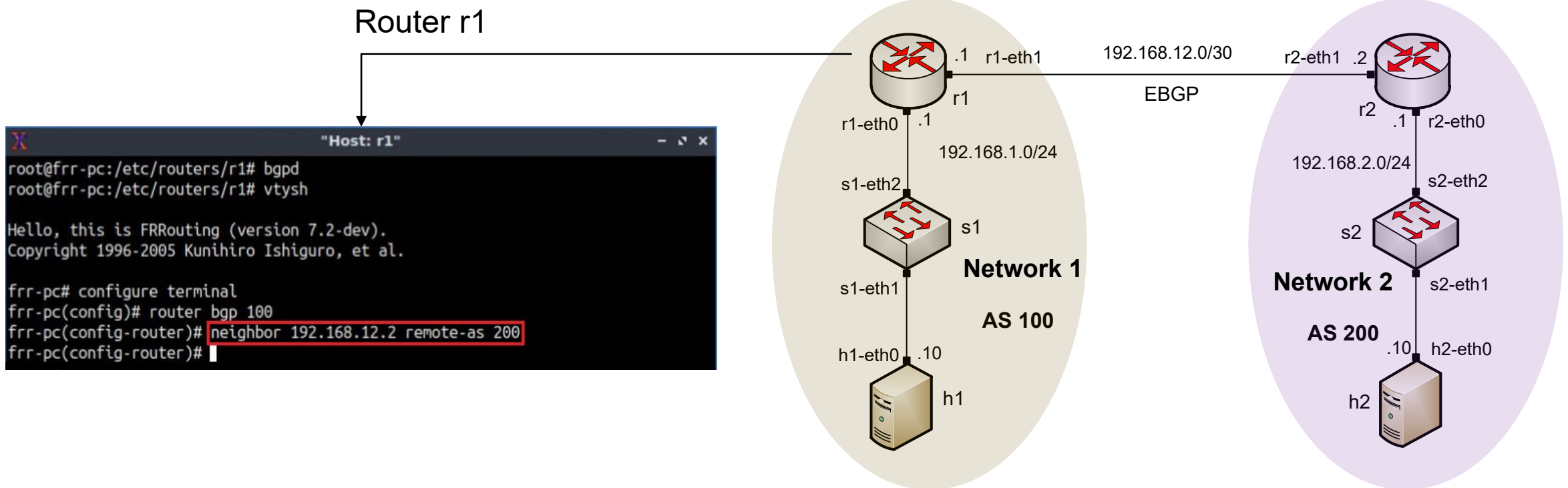
Accessing the Virtual Labs

- If already registered, login to the portal: <https://portal.netdevgroup.com/account/login>
- Click on the course “Introduction to Border Gateway Protocol (BGP)”
- Select the lab you want to run (e.g., Lab 3)



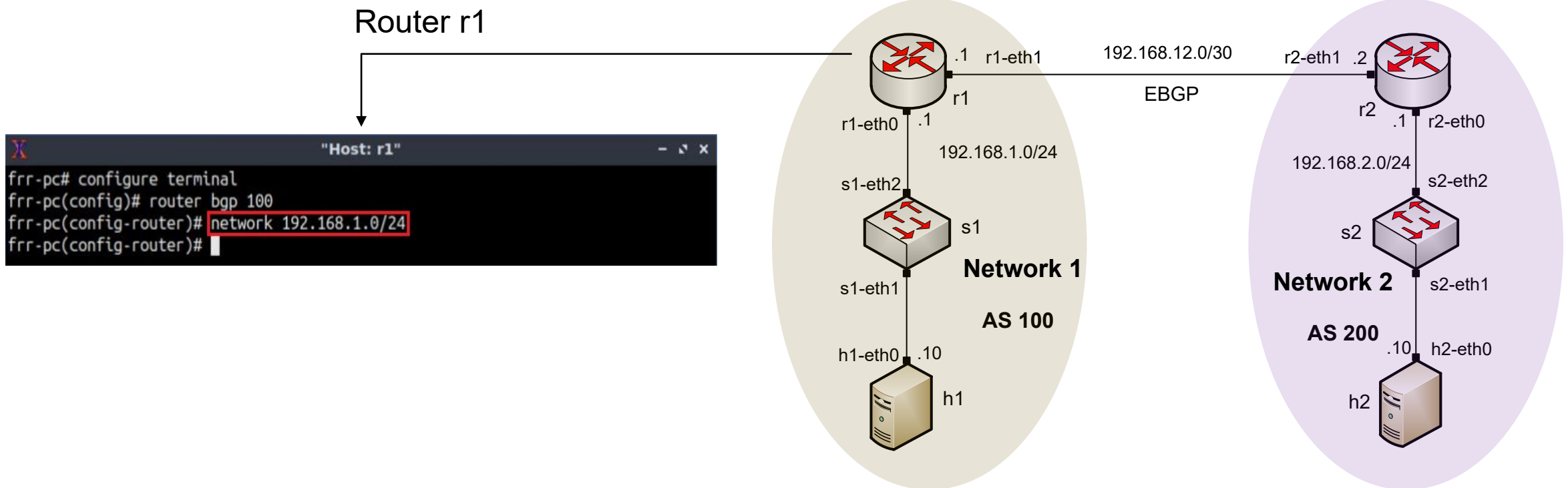
Lab Topology

- Establish BGP neighborhood



Lab Topology

- Advertise a network in BGP

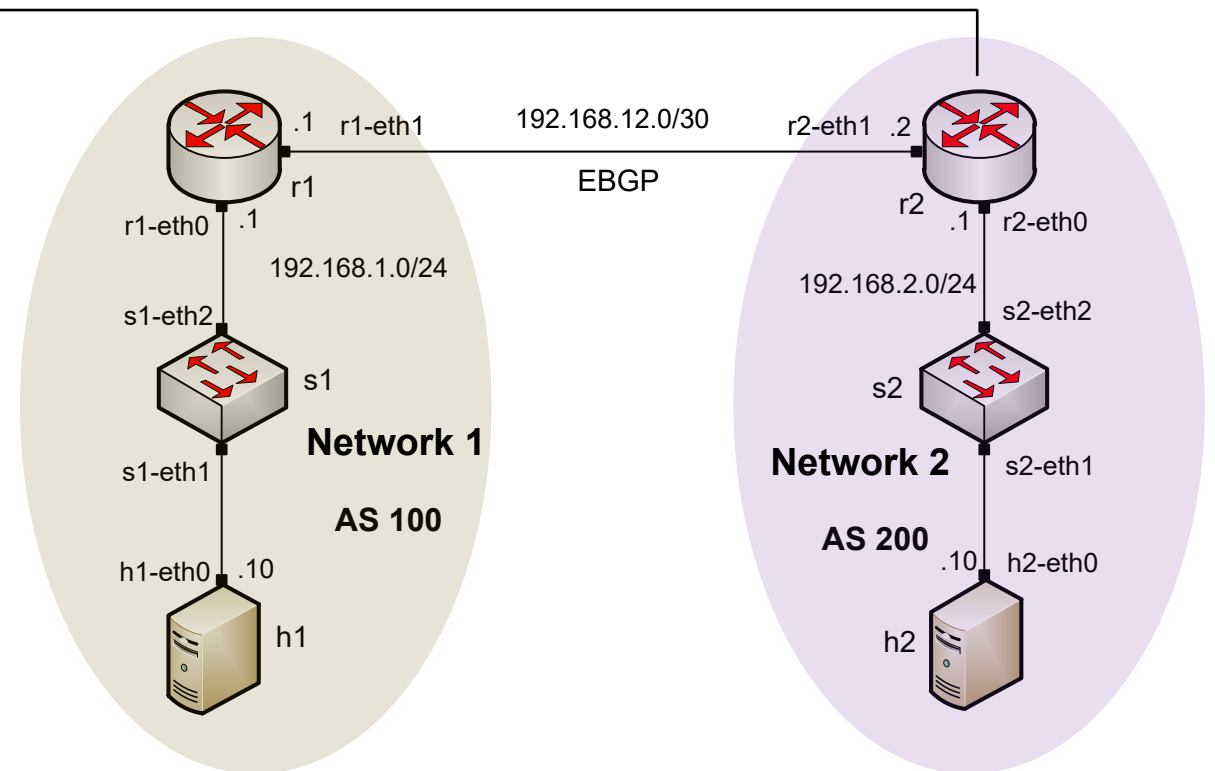


Lab Topology

- Routing table: lists the routes learned from different routing protocols

Router r2

```
Host: r2
frr-pc# show ip route
Codes: K - kernel route, C - connected, S - static, R - RIP,
       O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,
       T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP,
       F - PBR, f - OpenFabric,
       > - selected route, * - FIB route, q - queued route, r - rejected route
B>* 192.168.1.0/24 [20/0] via 192.168.12.1, r2-eth1, 00:00:52
C>* 192.168.2.0/24 is directly connected, r2-eth0, 00:18:36
C>* 192.168.12.0/30 is directly connected, r2-eth1, 00:18:02
frr-pc#
```



Lab Topology

- BGP table: lists the routes learned from BGP routing protocol

Router r2

```
Host: r2
frr-pc# show ip bgp
BGP table version is 2, local router ID is 192.168.12.2, 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
*> 192.168.1.0/24  192.168.12.1      0         0   100  i
*> 192.168.2.0/24  0.0.0.0          0         0  32768  i

Displayed 2 routes and 2 total paths
frr-pc#
```

