Hands-on Workshop on Network Technologies

Hands-on session 1: Essentials of BGP, EBGP, IBGP
Lab 3 - BGP Lab Series

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https://research.cec.sc.edu/cyberinfra/

Tuesday, Jul 28, 2026
Online

Lab Series: Border Gateway Protocol

- Lab experiments
  - 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
  - Lab 11: Configuring BGP Local Preference, and AS_PATH Prepending
  - Lab 11.1: Configuring BGP Local Preference, and AS_PATH Prepending
  - Lab 12: Hot Potato Routing and BGP LOCAL_PREF Attribute
  - Lab 13: Configuring Local Preferences on a Per Route Basis

Organization of the labs

Each lab starts with a section *Overview*

- Objectives
- Lab topology
- Lab settings: passwords, device names
- Roadmap: organization of the lab

Section 1

- Background information of the topic being covered (e.g., fundamentals of BGP)
- Section 1 is optional (i.e., the reader can skip this section and move to lab directions)

Section 2… n

- Step-by-step directions

Introduction to BGP

Lab activities are described in Lab 3, BGP Lab Series

Hands-on Labs on BGP

- Webpage with PowerPoint presentations:

  https://research.cec.sc.edu/cyberinfra/NT_2026

Hands-on session 1 (1:40PM-2:10PM): to access labs for Session 1 (Essentials of BGP, EBGP, IBGP).

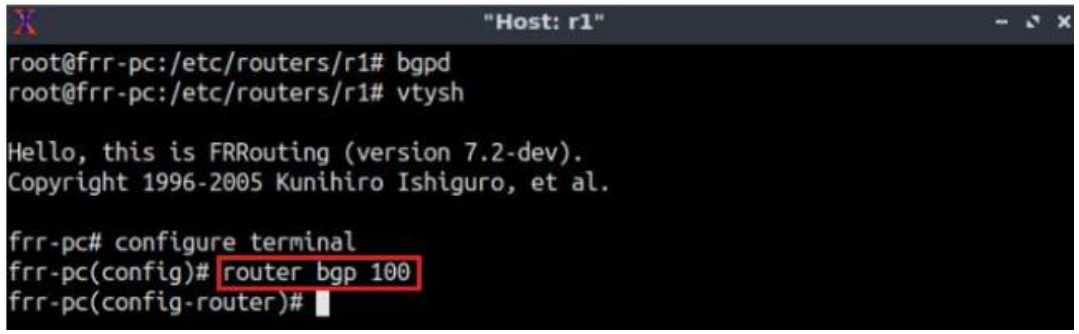
The virtual platform (Netlab) is reachable through the following link:

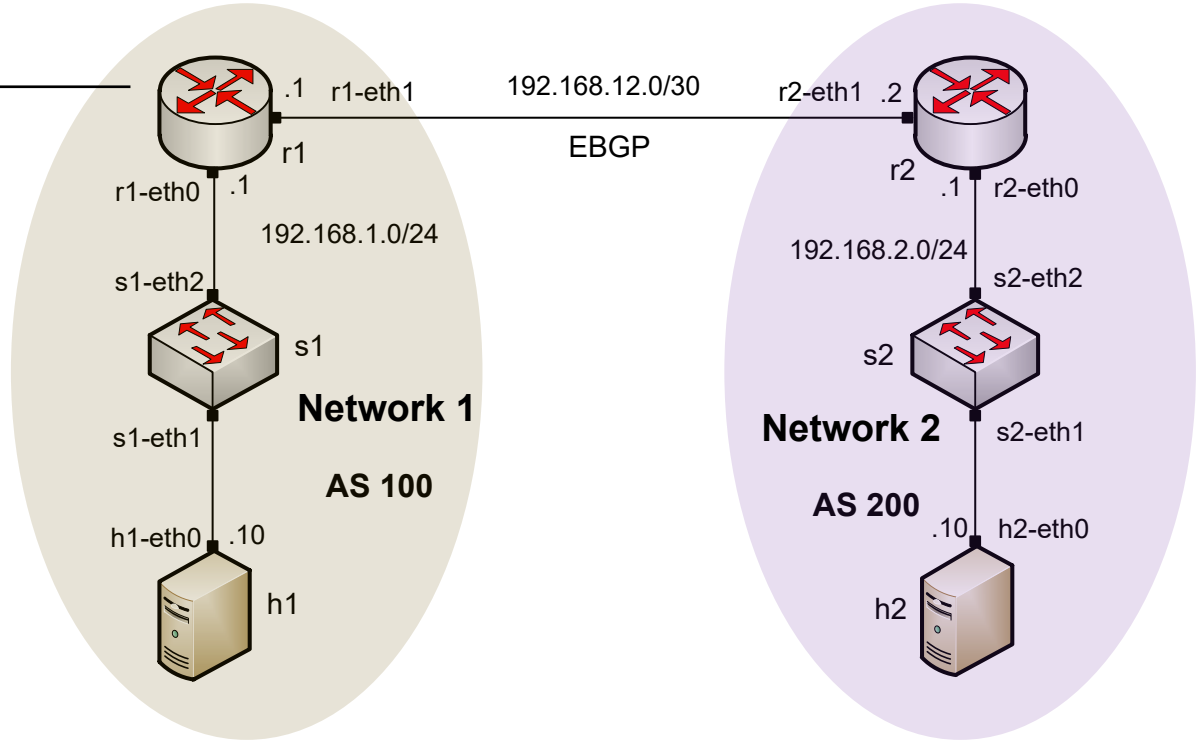
https://netlab.cec.sc.edu

Lab Topology

- Enable the BGP process

Router r1

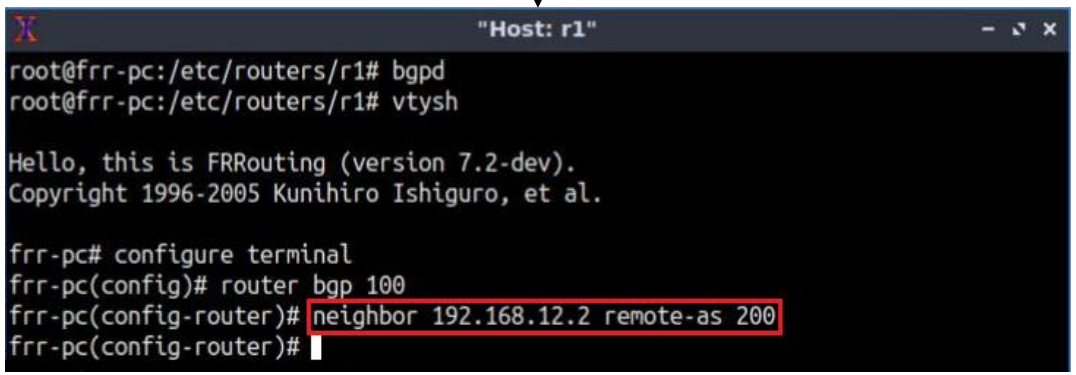


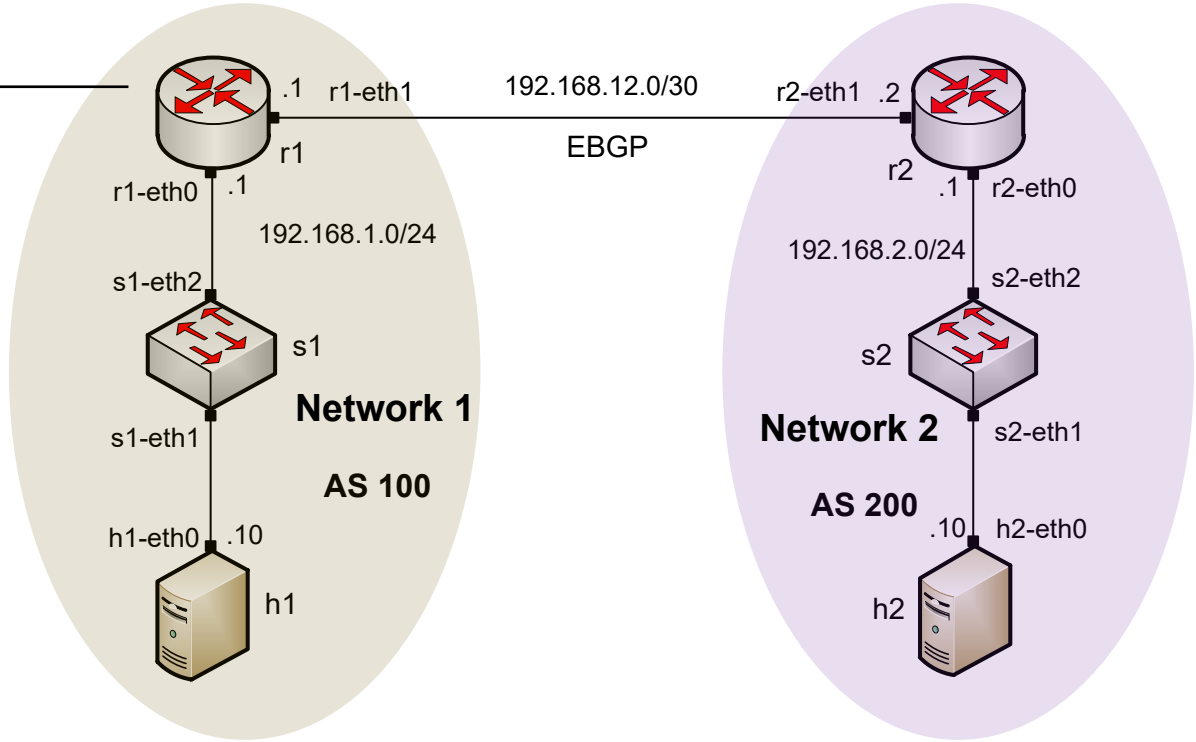


Lab Topology

- Establish BGP neighborhood

Router r1

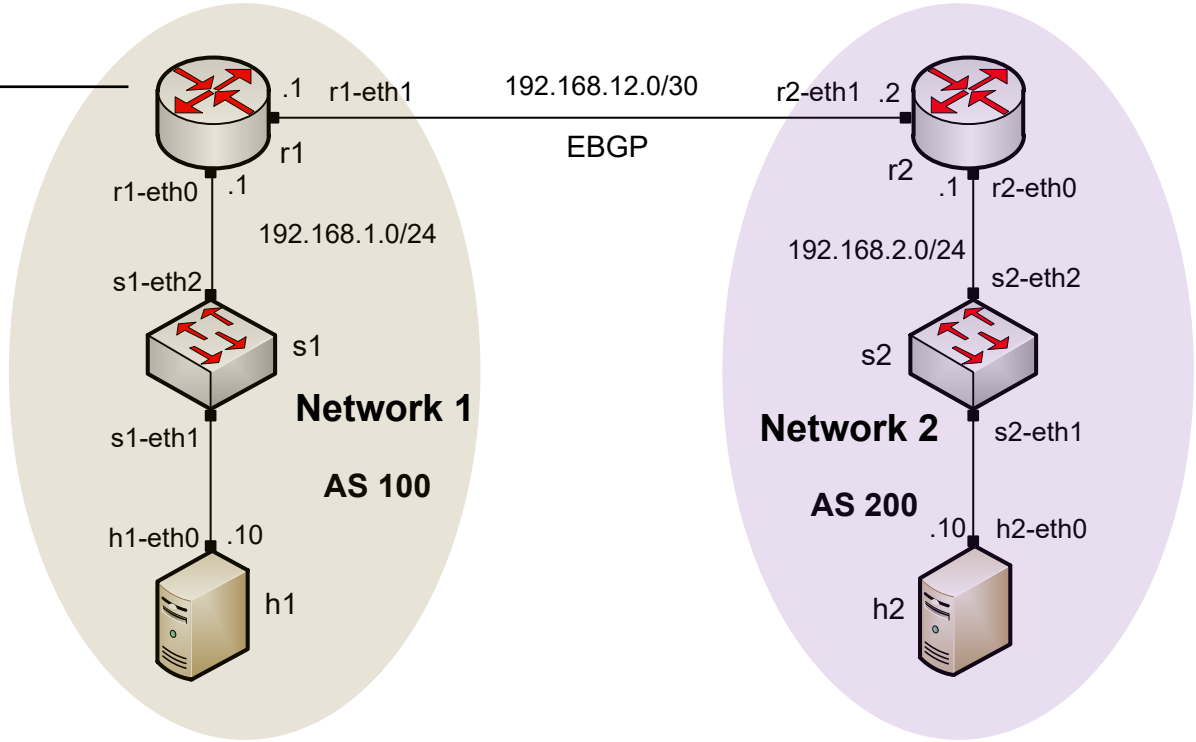




Lab Topology

- Advertise a network in BGP

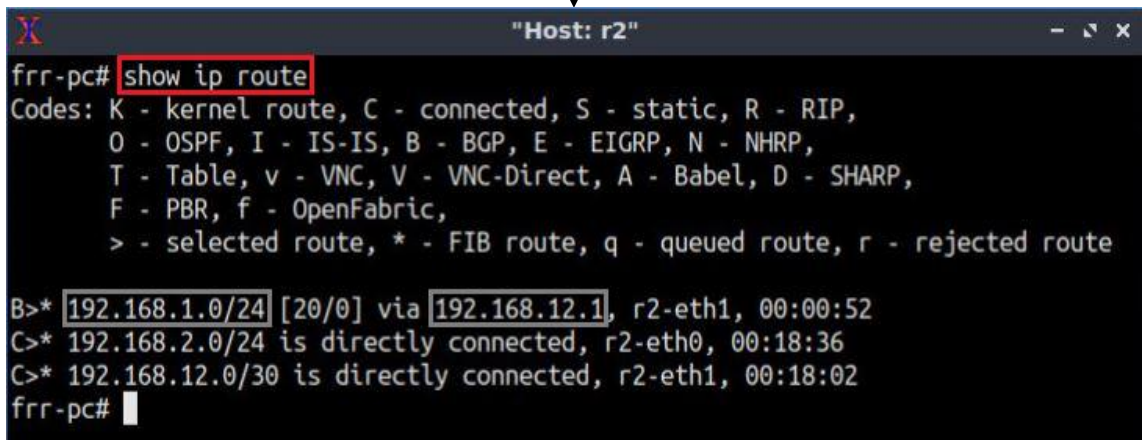
Router r1

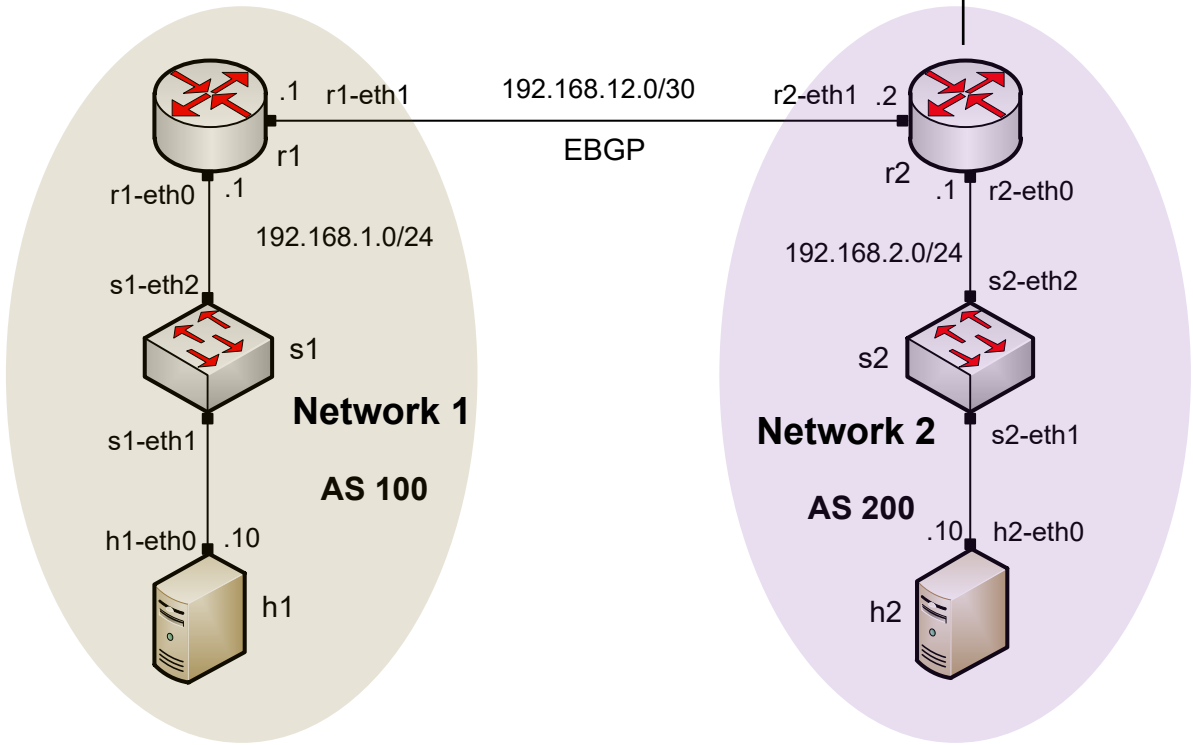


Lab Topology

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

Router r2

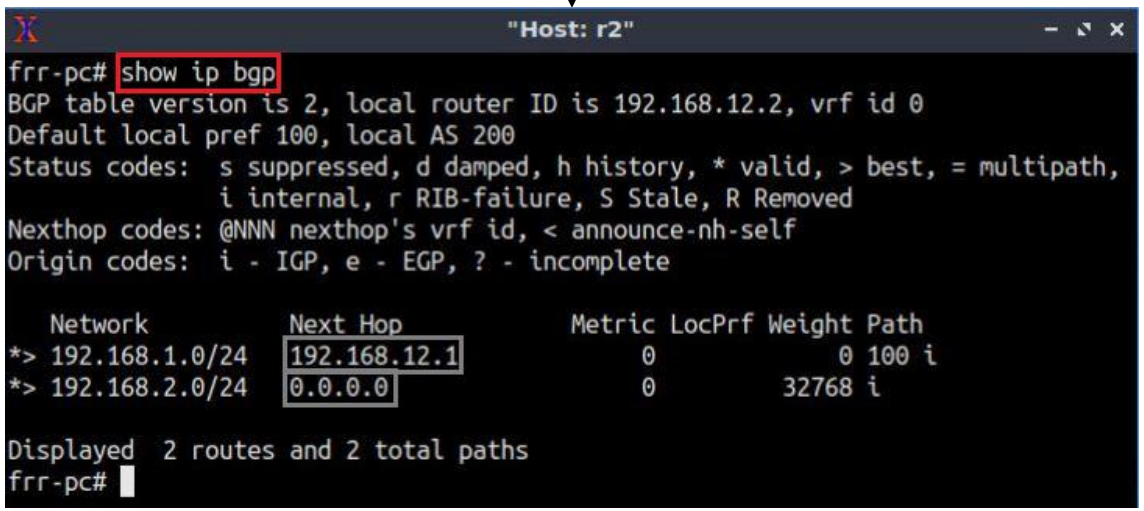


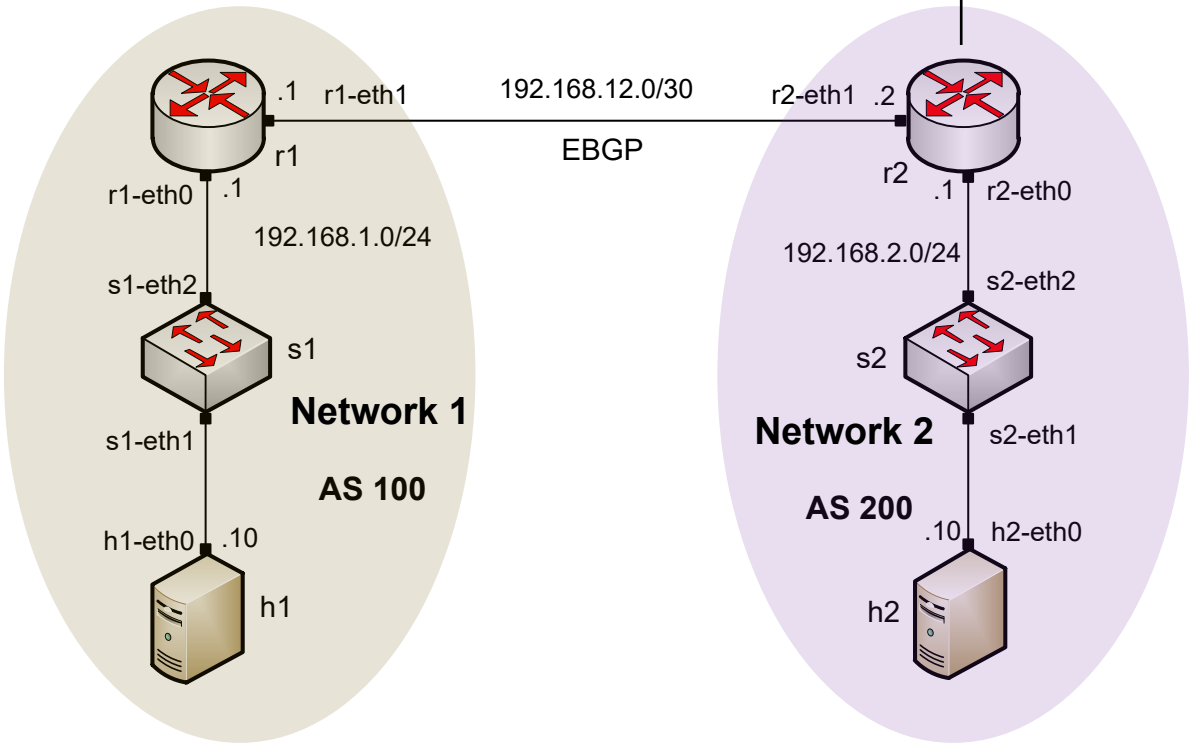


Lab Topology

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

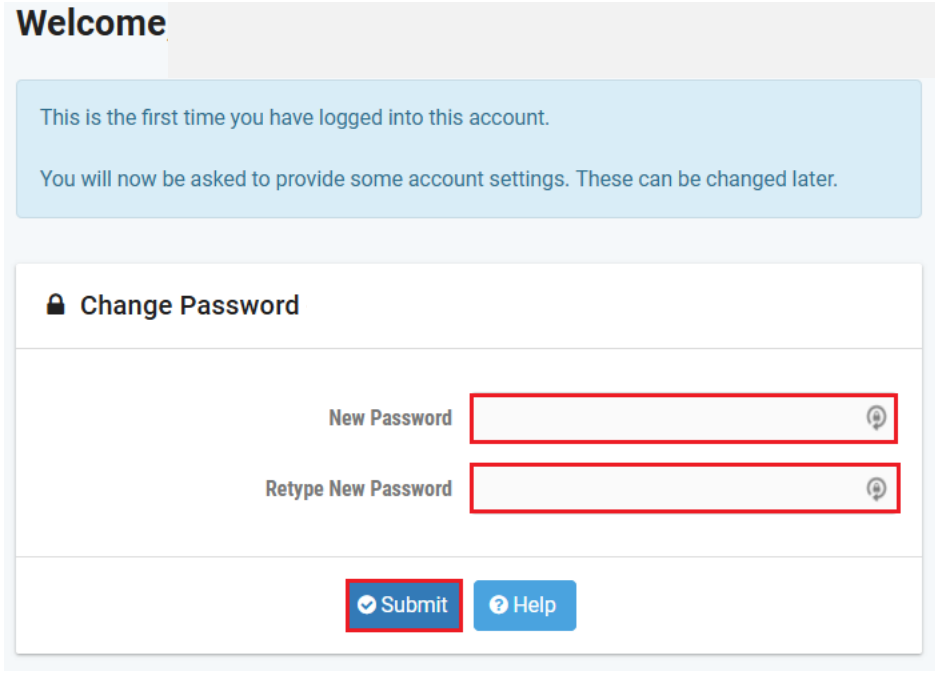
Router r2





Accessing the Platform

- Please use the following link to access the platform:
  - https://netlab.cec.sc.edu/
- Login using your credentials
- **Username:** <email address used for the registration>
- **Temporary Password:** nsf-2026



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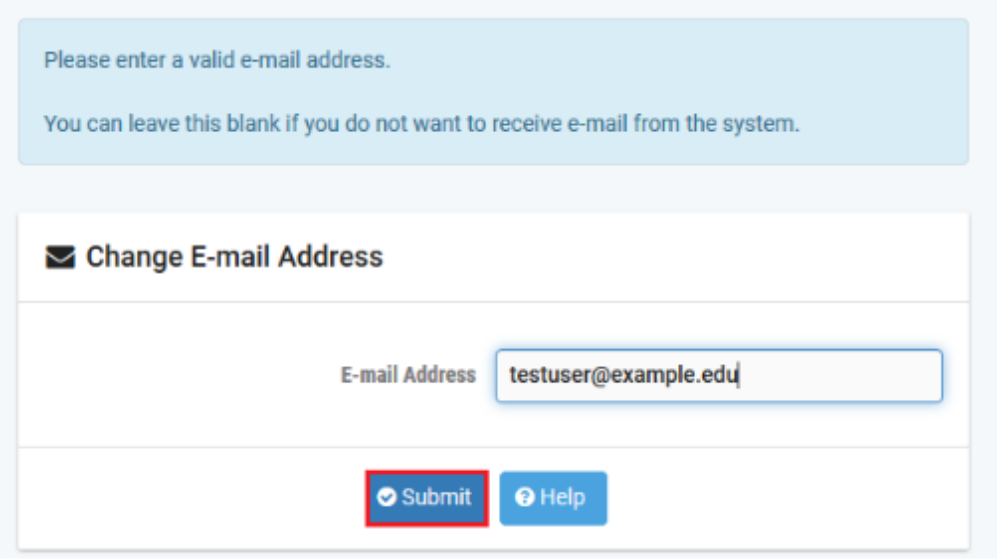
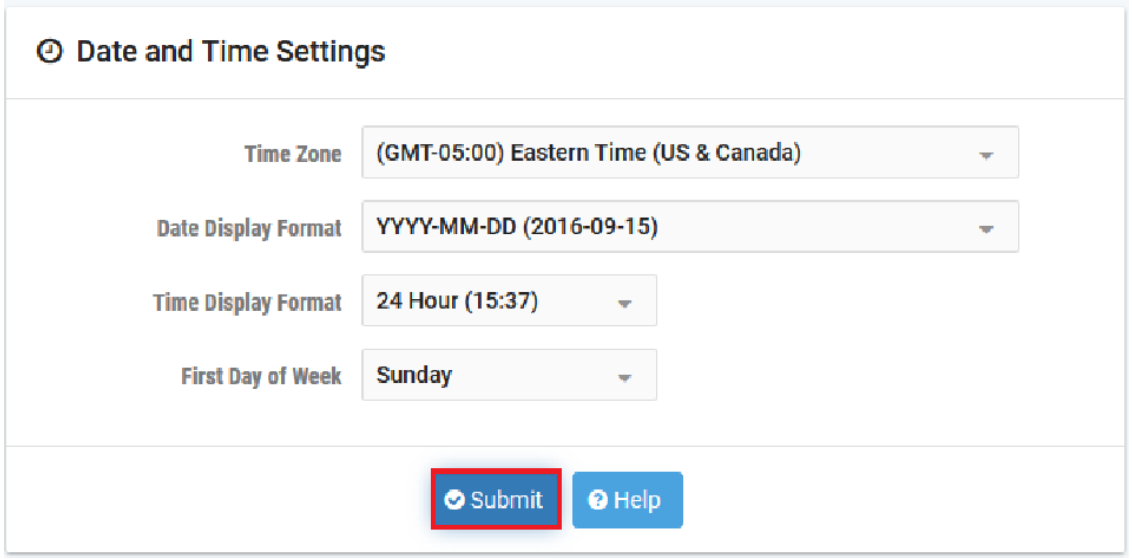
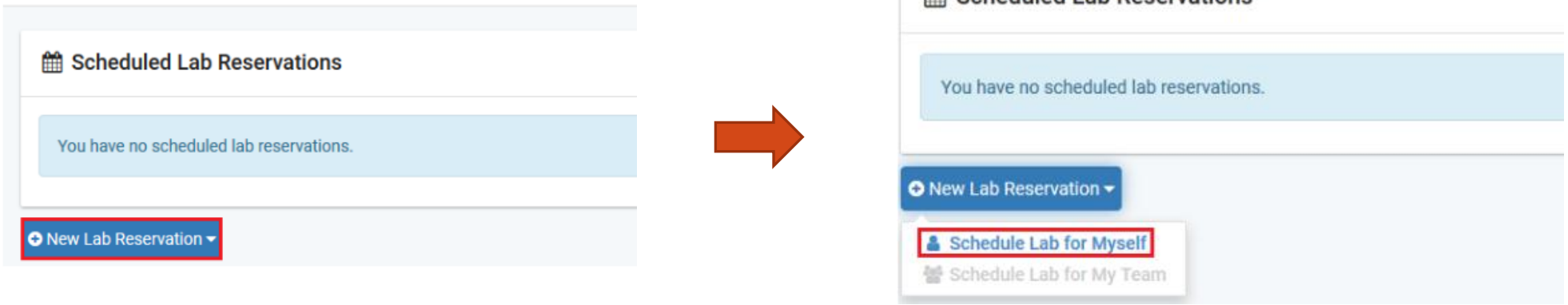




Accessing the Platform

- Click on New Lab Reservation
- Click on Schedule Lab for Myself

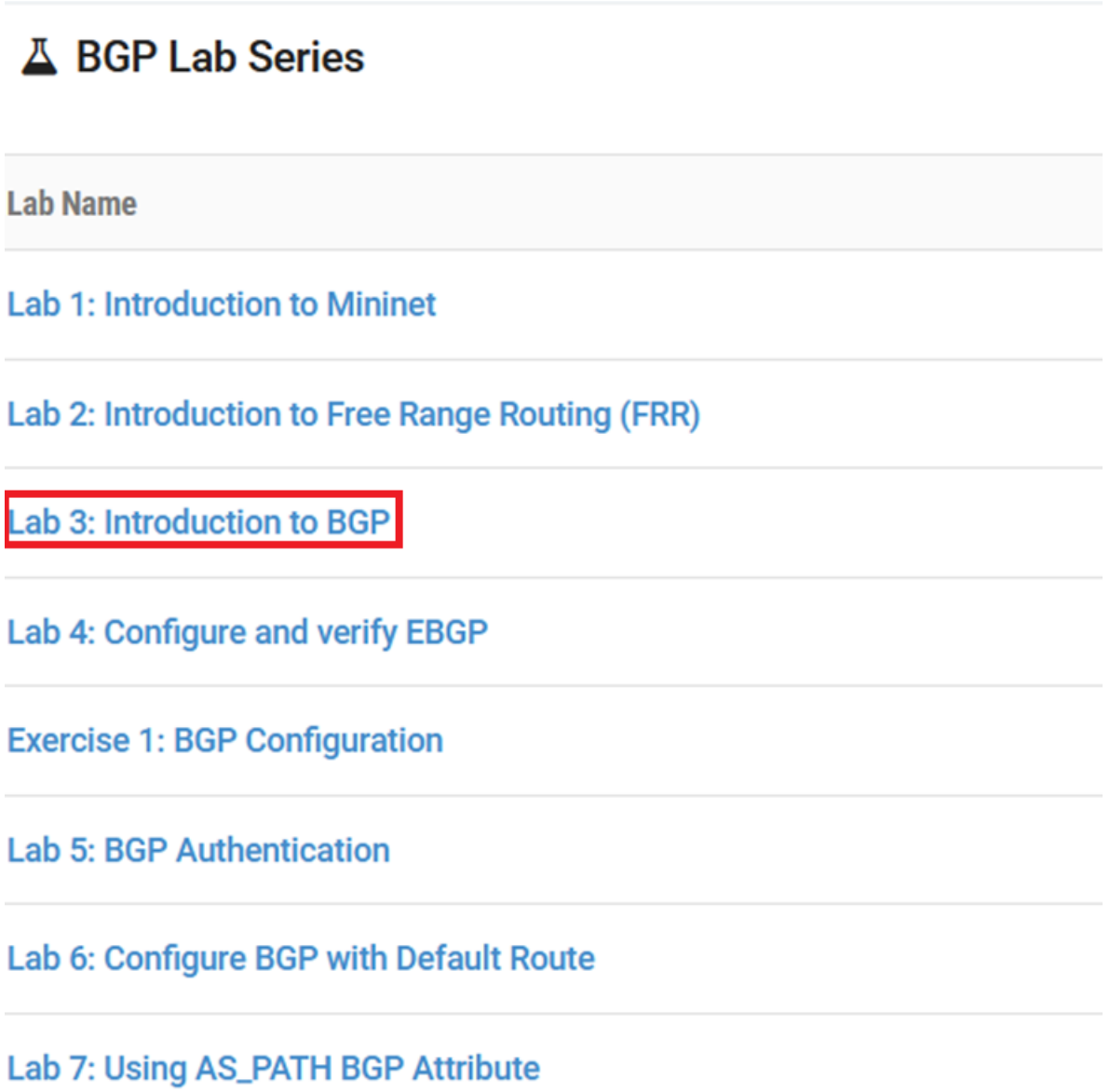


Accessing the Platform

- Select the course
- For this session, we will use “BGP Lab Series”

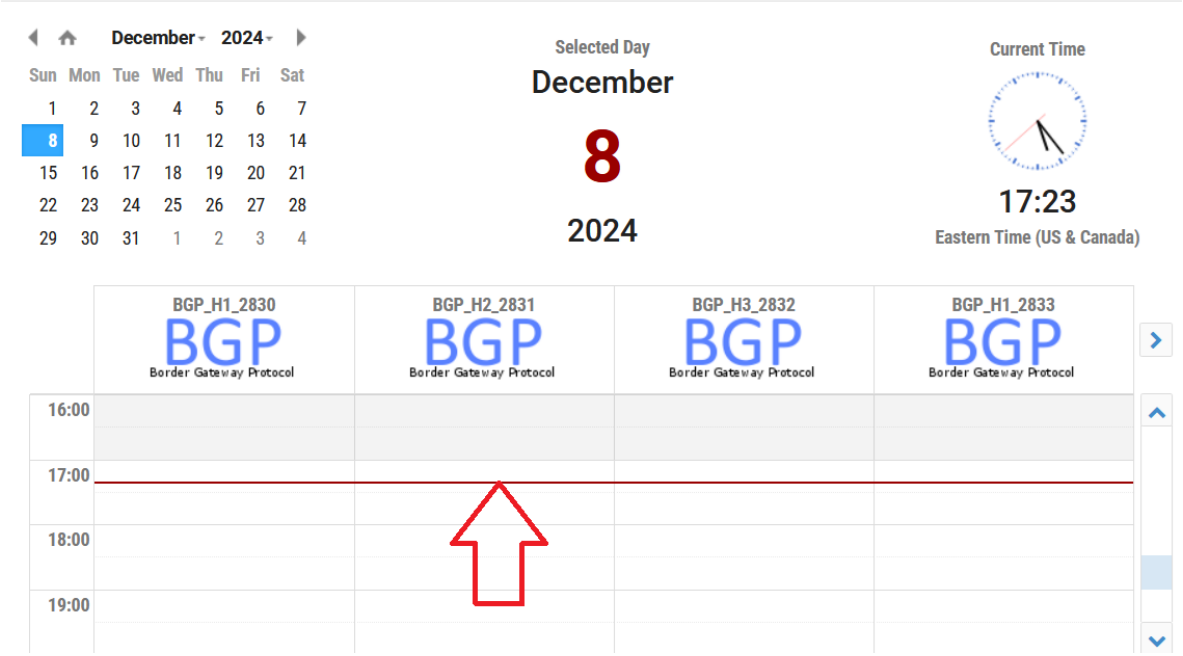
Accessing the Platform

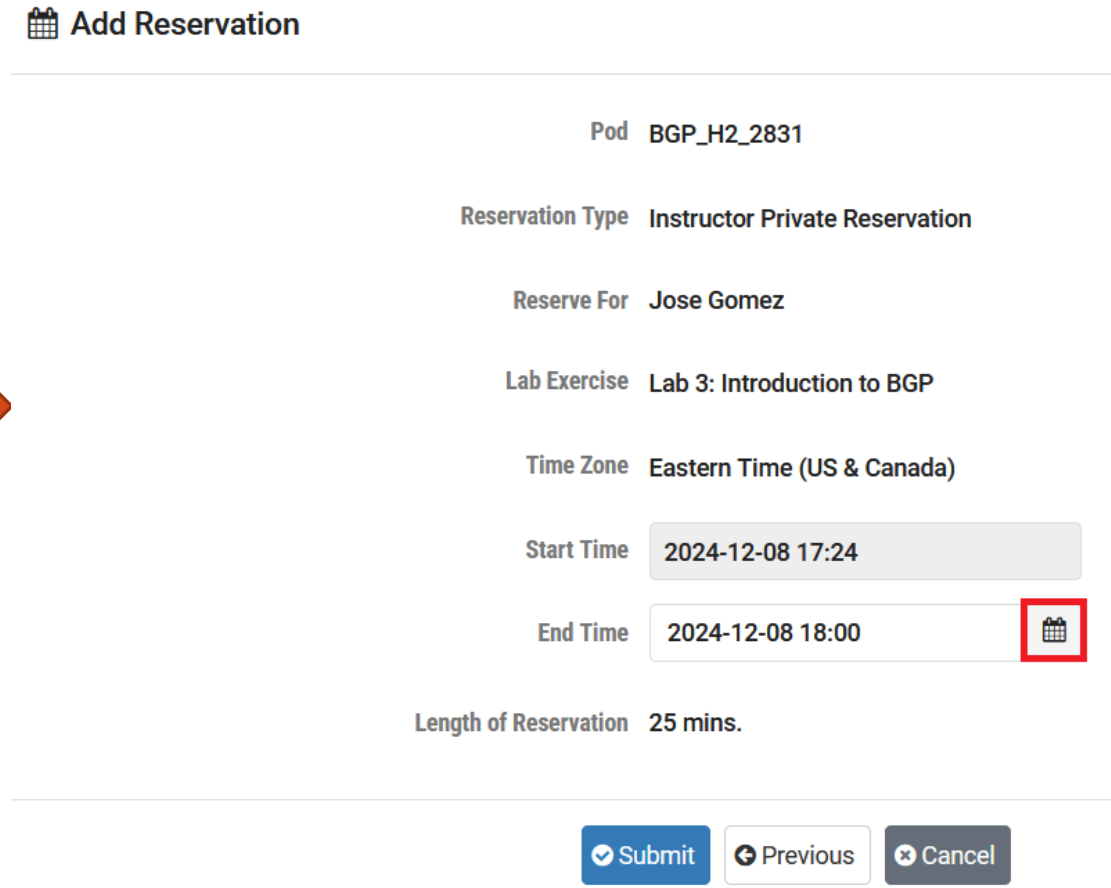
- Select the Lab
- For this session, we will run:
  - Lab 3: Introduction to BGP



Accessing the Platform

- Select the next available POD and allocate time





Accessing the Platform

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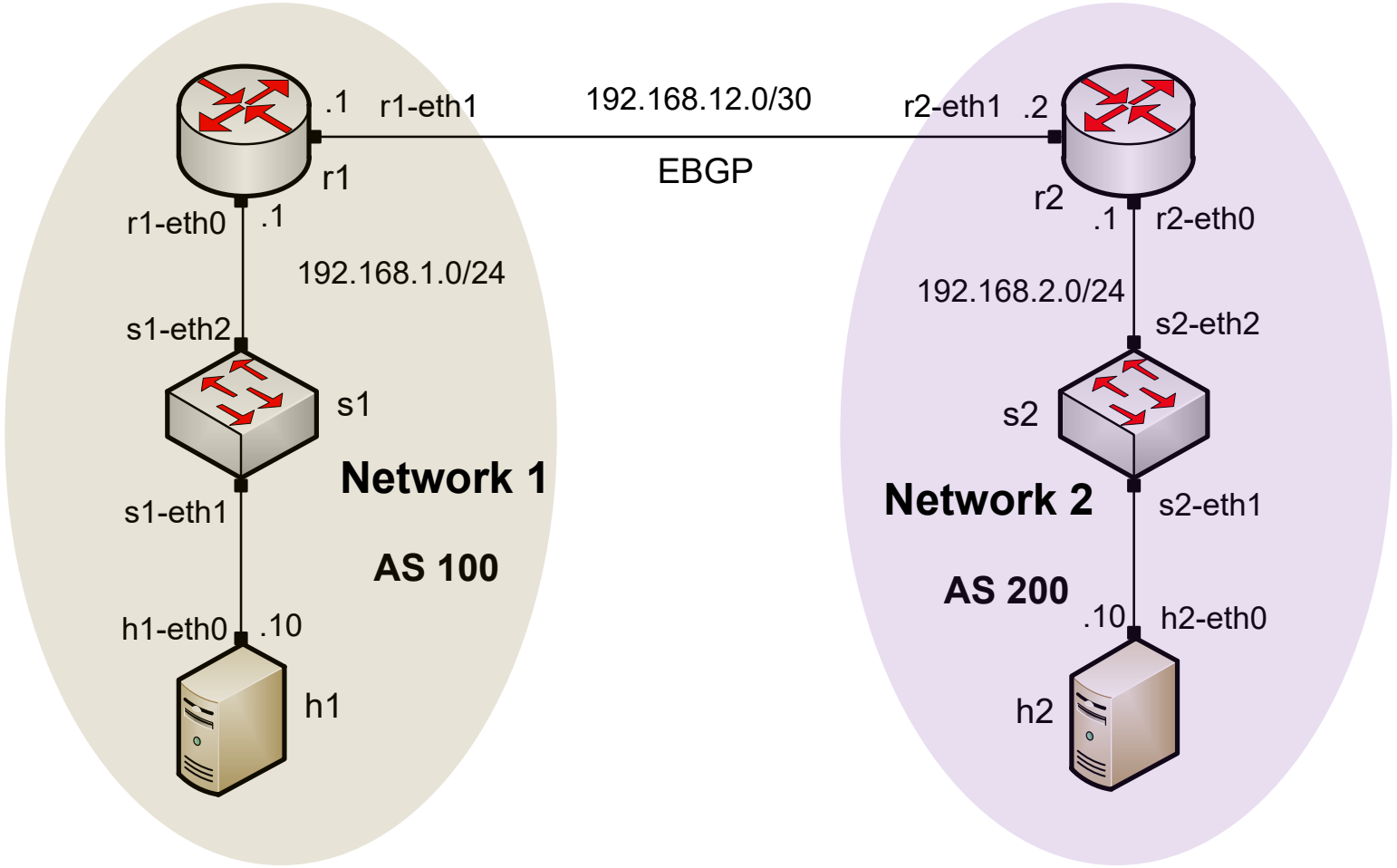
Additional Slides

Lab Topology



Free Range Routing (FRR) Architecture (Lab 2)