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

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## Hands-on Workshop on Networking Topics

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# 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

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# Internetwork Routing

- Routers are organized into Autonomous Systems (ASes or ASs)
- What is an AS (RFC 1771)?

"A set of routers under the single technical administration, using an IGP and common metrics to route packets within the AS, and using an EGP to route packets to other ASs."

- What is an Interior Gateway Protocol (IGP)?

A routing protocol used to exchange routing information within an AS (e.g., RIP, OSPF)

- What is an Exterior Gateway Protocol (EGP)?

A routing protocol used to exchange routing information between AS
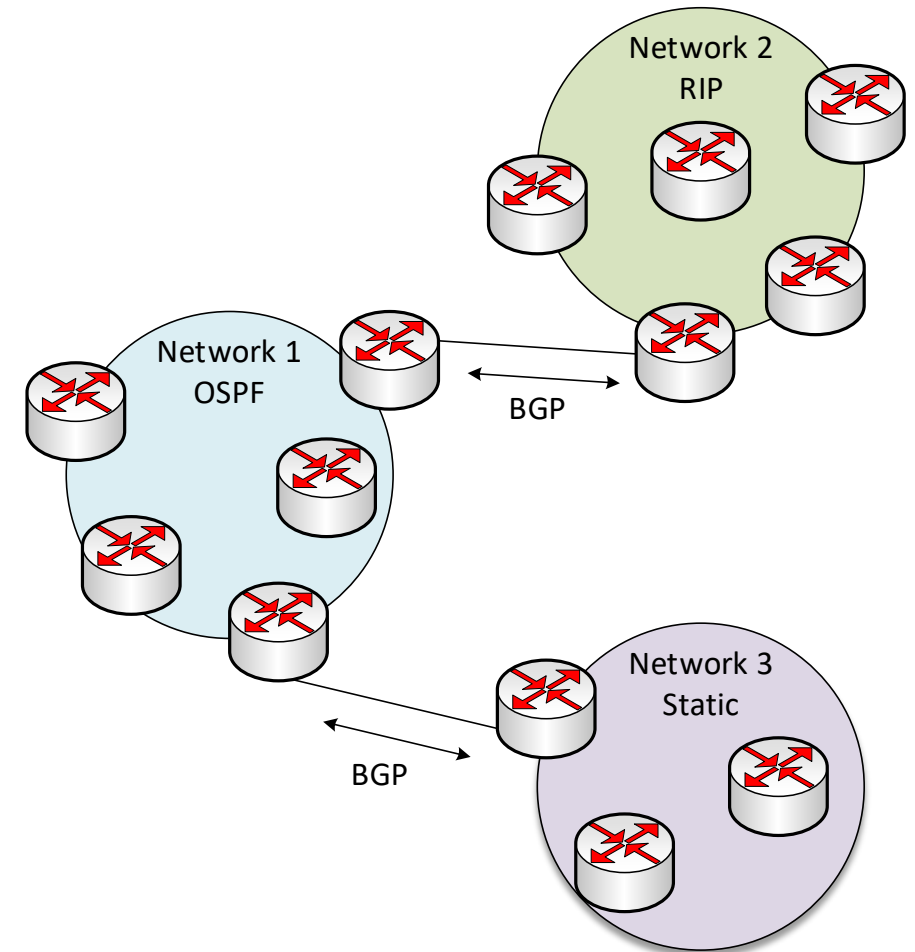
# Why BGP?

- An IGP moves packets as efficiently as possible from the source to the destination within an AS

- A IGP does not worry about politics, i.e., not many routing policies can be enforced in the network
  - ➢ A corporate AS is not willing to carry traffic originating from a foreign AS, i.e., does not want to be a transit AS, however, telephone companies might be willing to carry traffic for their customers
  - ➢ Carrying commercial traffic on the educational network
  - ➢ Traffic starting or ending at Apple should not transit Google, etc.

- BGP is designed to handle all these cases and enforce routing policies between ASes

A. Tanenbaum, and D. Wetherall, "Computer Networks," Prentice-Hall international Edition, 2011

# Introduction to BGP

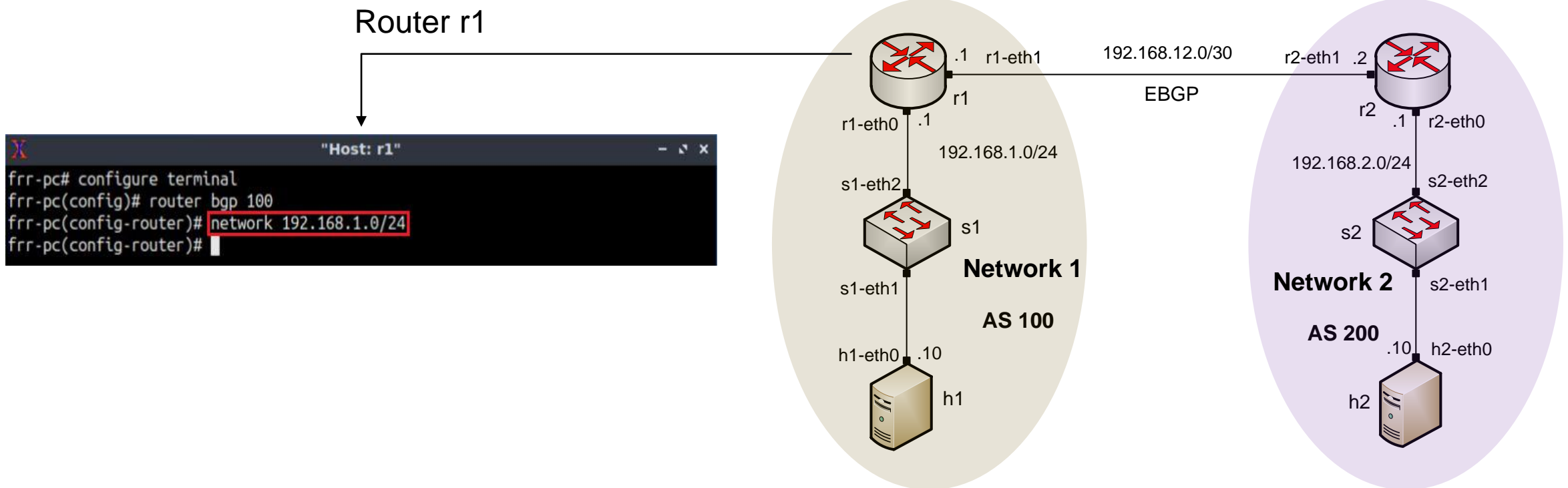Lab activities are described in Lab 3, BGP Lab Series

# Lab Topology

- Establish BGP neighborhood
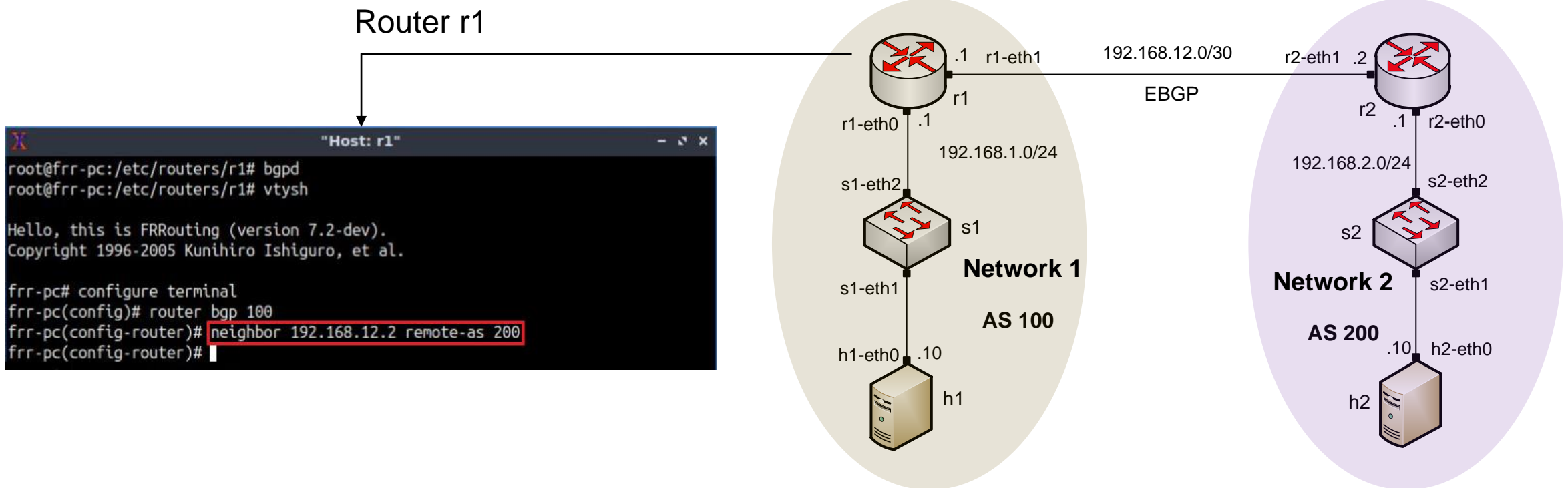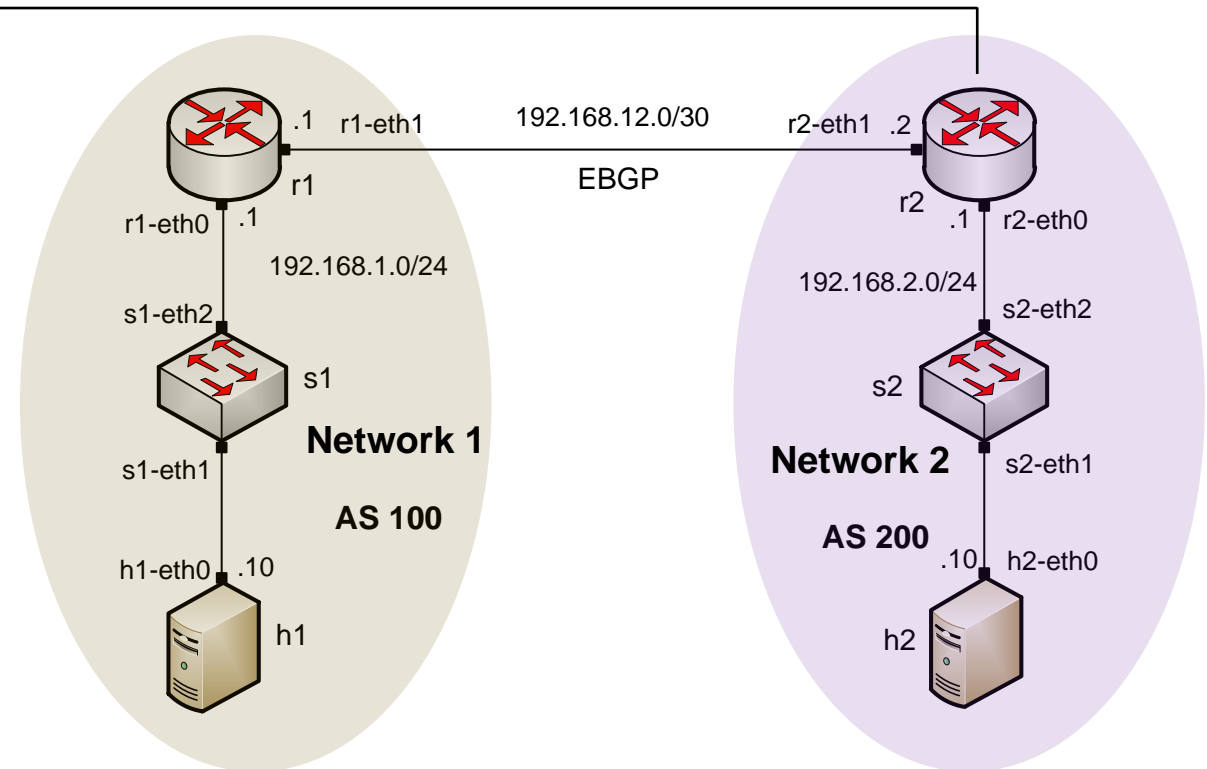
# Lab Topology

- Advertise a network in BGP

# Lab Topology

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

# Lab Topology

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