

# LAB 4.5.2: ADVANCED ROUTING

## Routing Protocols and Optimization

**Course:** CCNA - Cisco Certified Network Associate

**Institution:** Collin College (NSA CAE-CD Validated Program)

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**Lab File:** Lab-4.5.2-Advanced-Routing.pkt

## LAB OVERVIEW

Advanced routing laboratory covering multiple protocols, redistribution, and optimization techniques for complex network environments.

## LEARNING OBJECTIVES

- Configure multiple routing protocols
- Implement route redistribution
- Understand routing metrics and administrative distance
- Apply advanced troubleshooting techniques
- Implement route summarization

## SKILLS DEMONSTRATED

- Multiple Routing Protocols
- Route Redistribution
- Administrative Distance
- Routing Metrics
- Advanced Troubleshooting

## EQUIPMENT & TOPOLOGY

- 3-4 Routers
- Complex topology

- Multiple routing domains

## IMPLEMENTATION NOTES

- This laboratory was completed using Cisco Packet Tracer network simulation software.
- All configurations follow Cisco IOS best practices and industry standards.
- Configurations include proper security measures (passwords, enable secret, etc.).
- Network connectivity was verified using ping, traceroute, and show commands.
- Complete command-line configurations are preserved in the .pkt file.
- Lab demonstrates real-world networking scenarios applicable to enterprise environments.

## ACCESSING THE LAB CONFIGURATION

To view the complete network topology, device configurations, and test the lab yourself: 1. Download the Packet Tracer file: **Lab-4.5.2-Advanced-Routing.pkt** 2. Install Cisco Packet Tracer (free with Cisco NetAcad account) 3. Open the .pkt file in Packet Tracer 4. Explore the network topology in the workspace 5. Click on any device to view its configuration 6. Use Simulation Mode to observe packet flow 7. Access CLI on devices to view running configurations All router and switch configurations are fully implemented and tested. You can examine the complete command-line configurations, test connectivity between devices, and explore how the network operates.

## VERIFICATION & TESTING

The lab configuration has been thoroughly tested and verified using: • **show running-config** - Verify device configurations • **show ip interface brief** - Check interface status • **show ip route** - Verify routing tables • **show vlan brief** - Check VLAN configuration (switches) • **ping** and **traceroute** - Test end-to-end connectivity • **show protocols** - Verify routing protocol operation • Packet Tracer Simulation Mode - Observe packet flow All connectivity tests passed successfully, demonstrating proper network operation.



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