

## Northeast Wisconsin Technical College

10-150-178 060143 IT:Network:Cisco 3

# Course Design

### Course Information

|  |  |  |
| --- | --- | --- |
|  | Alternate Title | IT:Network:Cisco 3 |
|  | Description | 10-150-178 IT:NETWORK:CISCO 3...configure and troubleshoot routers and switches and resolve common issues with OSPF, EIGRP, STP, AND VTP in both IPv4 and IPv6 networks; implement DHCP and DNS operations in a network. (Prerequisite: 10-150-168, IT:Network: Cisco 2) |
|  | Instructional Level | 10 |
|  | Total Credits | 2.00 |
|  | Total Hours | 54.00 |

### Course Competencies

|  |  |  |
| --- | --- | --- |
| 1. | Explore the scaling of networks | |
|  | Assessment Strategies | |
|  | 1.1. | Netacad chapter activities and homework |
|  | 1.2. | In class lab activity |
|  | 1.3. | Midterm Assessment |
|  | Criteria | |
|  | You will be successful when you: | |
|  | 1.1. | Identify the three layers of the Cisco hierarchal network model. |
|  | 1.2. | Describe the functions performed at each layer of the Cisco hierarchal network model. |
|  | 1.3. | Match features to switch selection criteria. |
|  | 1.4. | Describe recommendations for designing a network that is scalable. |
|  | 1.5. | Describe the types of routers available for small to medium sized business networks. |
|  | 1.6. | Define goals of network design performance. |
|  | 1.7. | Define goals of network design reliability. |
|  | 1.8. | Define goals of network design scalability. |
|  | 1.9. | Define goals of network design redundancy. |
|  | 1.10. | Define goals of network design manageability. |
|  | 1.11. | You define goals of network design maintainability. |
|  | Learning Objectives | |
|  | 1.a. | Identify the layers and features of the Cisco three-layer hierarchal network model. |
|  | 1.b. | Examine different switching topologies and compare the similarities and differences between switches. |
|  | 1.c. | Determine the goals of network design, including performance, reliability, scalability, redundancy, manageability and maintainability. |
| 2. | Configure local area network (LAN) redundancy. | |
|  | Assessment Strategies | |
|  | 2.1. | Netacad chapter activities and homework |
|  | 2.2. | Midterm Assessment |
|  | 2.3. | In class lab activity |
|  | Criteria | |
|  | You will be successful when you: | |
|  | 2.1. | Configure basic settings on a switch. |
|  | 2.2. | Explain the cause of layer 2 loops in a redundant switched network. |
|  | 2.3. | Examine a redundant network design. |
|  | 2.4. | Identify port roles of different spanning tree protocols. |
|  | 2.5. | Build a switched network with redundant links. |
|  | 2.6. | Identify different spanning tree varieties. |
|  | 2.7. | Compare PVST+ and Rapid PVST+. |
|  | 2.8. | Configure PVST+ and Rapid PVST+. |
|  | 2.9. | Configure PortFast and BPDU Guard. |
|  | 2.10. | Troubleshoot STP configurations. |
|  | 2.11. | Identify FHRP terminology. |
|  | 2.12. | Configure first hop redundancy. |
|  | Learning Objectives | |
|  | 2.a. | Configure basic settings on a switch. |
|  | 2.b. | Determine the importance of redundancy and the issues involved within a converged switched network. |
|  | 2.c. | Identify the different spanning tree varieties and their operations, including Per-VLAN Spanning Tree Plus (PVST+) and Rapid PVST+. |
|  | 2.d. | Configure and verify the proper operation of PVST+ and Rapid PVST+ in a switched LAN environment. |
|  | 2.e. | Troubleshoot and optimize STP operations. |
|  | 2.f. | Configure, verify and troubleshoot FHRP protocols, including HSRP and GLBP. |
| 3. | Configure Link Aggregation on a LAN device. | |
|  | Assessment Strategies | |
|  | 3.1. | Netacad chapter activities and homework |
|  | 3.2. | In class lab activity |
|  | 3.3. | Midterm Assessment |
|  | Criteria | |
|  | You will be successful when you: | |
|  | 3.1. | Describe the benefits of EtherChannel. |
|  | 3.2. | Identify the different PAgP modes. |
|  | 3.3. | Identify the different LACP modes. |
|  | 3.4. | Configure PAgP EtherChannel. |
|  | 3.5. | Configure PACP EtherChannel. |
|  | 3.6. | Use show commands to verify EtherChannel configurations. |
|  | 3.7. | Use show commands to troubleshoot EtherChannel configurations. |
|  | Learning Objectives | |
|  | 3.a. | Identify the purpose and advantages of link aggregation. |
|  | 3.b. | Review the features and operations of Etherchannel technology. |
|  | 3.c. | Configure and verify link aggregation on LAN devices. |
|  | 3.d. | Troubleshoot link aggregation operations on switches. |
| 4. | Configure wireless LAN access. | |
|  | Assessment Strategies | |
|  | 4.1. | Netacad chapter activities and homework |
|  | 4.2. | In class lab activity |
|  | 4.3. | Midterm Assessment |
|  | Criteria | |
|  | You will be successful when you: | |
|  | 4.1. | Identify features of different wireless technologies. |
|  | 4.2. | Compare WLAN and LAN technologies. |
|  | 4.3. | Identify WLAN authentication characteristics. |
|  | 4.4. | Plan a wireless router implementation. |
|  | 4.5. | Access the GUI of a router by using a web browser. |
|  | 4.6. | Configure the wireless security settings. |
|  | 4.7. | Configure management access to a wireless router. |
|  | 4.8. | Connect a wireless client to a wireless router. |
|  | 4.9. | Update firmware on a wireless router. |
|  | 4.10. | Configure the IP address of the wireless router. |
|  | Learning Objectives | |
|  | 4.a. | Determine the advantages and disadvantages of using Wireless Local Area Networks (WLAN). |
|  | 4.b. | Review process to configure and verify WLAN operations and functionality on wireless routers and clients. |
|  | 4.c. | Identify WLAN security issues, and implement security mechanisms and procedures to mitigate threats. |
| 5. | Configure Single Area Open Shortest Path First (OSPF) routing concepts and operations. | |
|  | Assessment Strategies | |
|  | 5.1. | Netacad chapter activities and homework |
|  | 5.2. | In class lab activity |
|  | 5.3. | Final Assessment |
|  | Criteria | |
|  | You will be successful when you: | |
|  | 5.1. | Configure single layer OSPF. |
|  | 5.2. | Configure OSPF on a multi-access network. |
|  | 5.3. | Configure and propagate a default route in OSPF. |
|  | 5.4. | Configure OSPF bandwidth utilization |
|  | 5.5. | Configure OSPF timers. |
|  | 5.6. | Configure OSPF authentication. |
|  | 5.7. | Troubleshoot single area OSPF configurations. |
|  | Learning Objectives | |
|  | 5.a. | Review the features and operation of the OSPF routing protocol. |
|  | 5.b. | Review process to configure OSPF on routers. |
|  | 5.c. | Review process to modify OSPF advanced features |
|  | 5.d. | Review process to implement OSPF authentication to ensure secure routing updates. |
|  | 5.e. | Verify and troubleshoot router operations in an OSPF network. |
| 6. | Configure Multi-Area OSPF concepts and operations. | |
|  | Assessment Strategies | |
|  | 6.1. | Netacad chapter activities and homework |
|  | 6.2. | In class lab activity |
|  | 6.3. | Final Assessment |
|  | Criteria | |
|  | You will be successful when: | |
|  | 6.1. | Describe the advantages of using multiarea OSPF. |
|  | 6.2. | Identify OSPF LSA types. |
|  | 6.3. | Configure multiarea OSPF. |
|  | 6.4. | Calculate manual summary routes. |
|  | 6.5. | Configure summary routes on a router. |
|  | 6.6. | Use show commands to verify multiarea OSPF. |
|  | 6.7. | Troubleshoot multiarea OSPF configurations. |
|  | Learning Objectives | |
|  | 6.a. | Identify the purpose, design and function of multi-area OSPF. |
|  | 6.b. | Examine the operation of multi-area OSPF. |
|  | 6.c. | Configure routers in a complex, multi-area OSPF network. |
|  | 6.d. | Calculate and implement route summarization in a multi-area OSPF network. |
|  | 6.e. | Verify, troubleshoot and optimize router operations in multi-area OSPF network. |
| 7. | Configure Enhanced Interior Gateway Routing Protocol (EIGRP). | |
|  | Assessment Strategies | |
|  | 7.1. | Netacad chapter activities and homework |
|  | 7.2. | In class lab activity |
|  | 7.3. | Final Assessment |
|  | Criteria | |
|  | You will be successful when you: | |
|  | 7.1. | Identify and describe the five EIGRP packet types. |
|  | 7.2. | Configure and verify basic EIGRP. |
|  | 7.3. | Inspect EIGRP operations by viewing the results of show commands. |
|  | 7.4. | Configure EIGRP manual route summarization. |
|  | 7.5. | Propagate static and default routes in EIGRP. |
|  | 7.6. | Configure authentication in EIGRP. |
|  | 7.7. | Use the debug command to view how topology changes affect EIGRP routing. |
|  | 7.8. | Troubleshoot EIGRP configurations. |
|  | 7.9. | Configure advanced EIGRP features. |
|  | Learning Objectives | |
|  | 7.a. | Examine the function and operation of the EIGRP routing protocol with its Diffusing Update Algorithm (DUAL) features. |
|  | 7.b. | Describe, examine and calculate the composite metric used by EIGRP. |
|  | 7.c. | Configure routers for EIGRP operation in IPv4 and IPv6 networks. |
|  | 7.d. | Inspect EIGRP operations, including neighbor adjacencies, routing table entries, successors and feasible distance. |
|  | 7.e. | Configure route summarization, and propagating static and default routes in an EIGRP network. |
|  | 7.f. | Configure EIGRP authentication to ensure secure routing updates. |
|  | 7.g. | Configure advanced EIGRP features, including summary routes, auto-summarization, tuning EIGRP interface settings to improve network performance. |
|  | 7.h. | Verify and troubleshoot EIGRP router operations in a complex network. |
| 8. | Manage Cisco IOS® software. | |
|  | Assessment Strategies | |
|  | 8.1. | Netacad chapter activities and homework |
|  | 8.2. | In class lab activity |
|  | 8.3. | Final Assessment |
|  | Criteria | |
|  | You will be successful when you: | |
|  | 8.1. | Use the show version command to view information about your IOS version. |
|  | 8.2. | Decode IOS image names. |
|  | 8.3. | Use a TFTP server to upgrade an IOS image. |
|  | 8.4. | Use a TFTP server to back up an IOS image. |
|  | 8.5. | Use a TFTP server to back up a configuration file. |
|  | Learning Objectives | |
|  | 8.a. | Examine the Cisco Internetwork Operating System (IOS) image file naming conventions, including platform, version and feature set. |
|  | 8.b. | Calculate memory and storage requirements when upgrading an IOS system image. |
|  | 8.c. | Review the licensing process for Cisco IOS software in a small- to medium-sized business network. |
|  | 8.d. | Configure a device to install an IOS software image with license. |
|  | 8.e. | Configure and operating a Trivial File Transfer Protocol (TFTP) file server for updates, backups and recovery. |
|  | 8.f. | Perform IOS and system file transfers from Cisco devices to a TFTP server. |

### Grading Information

Grading determined by points.  There is no weighting of work.

|  |  |  |
| --- | --- | --- |
| ***Source*** | ***Pts*** | ***% of points*** |
| Quizzes | 80 | 8% |
| Assignments (Online Exams/Online Labs/PATs) | 320 | 32% |
| Midterm Written Exam | 100 | 10% |
| MidTerm Lab Exam | 100 | 10% |
| Final Written Exam | 200 | 20% |
| Final Lab Exam | 200 | 20% |

Grades based on percentage of total points earned:

|  |  |
| --- | --- |
| **% Points Attained** | **Grade** |
| 90-100 | A |
| 80-89 | B |
| 70-79 | C |
| 60-69 | D |
| 00-59 | F |

**Meta Tags**routers, switches, advanced OSPF, EIGRP, spanning tree, STP, Etherchannel

Chapter Homework

### Course Learning Plans and Performance Assessment Tasks

|  |  |  |  |
| --- | --- | --- | --- |
| Type | Title | Source | Status |
| LP | Compare Switches and Routers | Course | WIP |
| PAT | Compare Switches and Routers PAT | Course | WIP |
| LP | Configure a Small LAN | Course | WIP |
| PAT | Configure a Small LAN PAT | Course | WIP |
| LP | Configure Spanning Tree Protocol | Course | WIP |
| PAT | Configure Spanning Tree Protocol PAT | Course | WIP |
| LP | Configure HSRP and GLBP | Course | WIP |
| PAT | Configure HSRP and GLBP PAT | Course | WIP |
| LP | Configure EtherChannel | Course | WIP |
| PAT | Configure EtherChannel PAT | Course | WIP |
| LP | Configure a Wireless Router and Client | Course | WIP |
| PAT | Configure a Wireless Router and Client PAT | Course | WIP |
| LP | Adjust and Troubleshoot OSPF | Course | WIP |
| PAT | Adjust and Troubleshoot OSPF PAT | Course | WIP |
| LP | Configure Multiarea OSPF | Course | WIP |
| PAT | Configure Multiarea OSPF PAT | Course | WIP |
| LP | Configure EIGRP | Course | WIP |
| PAT | Configure EIGRP PAT | Course | WIP |
| LP | Configure Advanced EIGRP | Course | WIP |
| PAT | Configure Advanced EIGRP PAT | Course | WIP |
| LP | IOS Images | Course | WIP |
| PAT | IOS Images PAT | Course | WIP |

Compare Switches and Routers

Overview/Purpose

The goals of network design are to limit the number of devices impacted by the failure of a single network device, provide a plan and path for growth, and create a reliable network.

Target Competencies

|  |  |  |
| --- | --- | --- |
| 1. | Explore the scaling of networks | |
|  | Assessment Strategies | |
|  | 1.1. | Netacad chapter activities and homework |
|  | 1.2. | In class lab activity |
|  | 1.3. | Midterm Assessment |
|  | Criteria | |
|  | You will be successful when: | |
|  | 1.1. | Identify the three layers of the Cisco hierarchal network model. |
|  | 1.2. | Describe the functions performed at each layer of the Cisco hierarchal network model. |
|  | 1.3. | Match features to switch selection criteria. |
|  | 1.4. | Describe recommendations for designing a network that is scalable. |
|  | 1.5. | Describe the types of routers available for small to medium sized business networks. |
|  | 1.6. | Define goals of network design performance. |
|  | 1.7. | Define goals of network design reliability. |
|  | 1.8. | Define goals of network design scalability. |
|  | 1.9. | Define goals of network design redundancy. |
|  | 1.10. | Define goals of network design manageability. |
|  | 1.11. | You define goals of network design maintainability. |
|  | Learning Objectives | |
|  | 1.a. | Identify the layers and features of the Cisco three-layer hierarchal network model. |
|  | 1.b. | Examine different switching topologies and compare the similarities and differences between switches. |
|  | 1.c. | Determine the goals of network design, including performance, reliability, scalability, redundancy, manageability and maintainability. |

### Learning Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Listen to lecture (in person) - Course introduction/Scaling Networks overview | | |
|  | Learning Materials | | |
|  | Lesson Plan 1 | [Cisco 3 LP1(1).docx](https://nwtc.wids.org//PublicDocuments.axd?DocumentID=790d8a16-345b-40f8-acc9-df56dc4ed42c) |
| 2. | Complete in class activity - Lab setup/Selecting switch hardware | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks Lab 1.2.1.8 (Proprietary content) | <https://www.netacad.com/> |
| 3. | Read chapter 1 | | |
| 4. | Complete online lab activity (outside of class) Comparing 2960 and 3560 Switches | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks PKA 1.2.1.7 (Proprietary content) | <https://www.netacad.com/> |
| 5. | Complete chapter 1 online exam (proprietary content) | | |

### Assessment Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Complete Compare Switches and Routers PAT | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks PKA 1.2.1.7 (Proprietary content) | <https://www.netacad.com/> |
| 2. | Prepare for midterm assessments | | |

Compare Switches and Routers PAT

Directions

Complete in class lab activity (for practice to prepare for online lab activity)  
Complete online chapter exam  
Complete online lab simulator activity

Target Course Competencies

|  |  |
| --- | --- |
| 1. | Explore the scaling of networks |

### Scoring

Rating Scale

|  |  |
| --- | --- |
| Value | Description |
| MET (14-20) | Packet Tracer points are scored by dividing your percentage earned by 5. (Example: 100% divided by 5 is 20/20.) Submit online to Cisco Academy to check score and make corrections as completing work. Aim to achieve 100% accuracy. |
| MET (7-10) | Chapter exams are scored by dividing your percentage earned by 10. (Example: 87% divided by 10 is 8.7/10) Exams can be retaken and resubmitted unlimited times. Aim to achieve 100% accuracy. |

Scoring Standard

A score of 70% in performance assessments demonstrates MET competency criteria.

### Scoring Guide

|  |  |  |
| --- | --- | --- |
|  | Criteria | Ratings |
| 1. | Identify the three layers of the Cisco hierarchal network model. | Met Not Met |
| 2. | Describe the functions performed at each layer of the Cisco hierarchal network model. | Met Not Met |
| 3. | Match features to switch selection criteria. | Met Not Met |
| 4. | Describe recommendations for designing a network that is scalable. | Met Not Met |
| 5. | Describe the types of routers available for small to medium sized business networks. | Met Not Met |
| 6. | Define goals of network design performance. | Met Not Met |
| 7. | Define goals of network design reliability. | Met Not Met |
| 8. | Define goals of network design scalability. | Met Not Met |
| 9. | Define goals of network design redundancy. | Met Not Met |
| 10. | Define goals of network design manageability. | Met Not Met |
| 11. | You define goals of network design maintainability. | Met Not Met |

Configure a Small LAN

Overview/Purpose

The goals of network design are to limit the number of devices impacted by the failure of a single network device, provide a plan and path for growth, and create a reliable network.

Target Competencies

|  |  |  |
| --- | --- | --- |
| 1. | Explore the scaling of networks | |
|  | Assessment Strategies | |
|  | 1.1. | Netacad chapter activities and homework |
|  | 1.2. | In class lab activity |
|  | 1.3. | Midterm Assessment |
|  | Criteria | |
|  | You will be successful when: | |
|  | 1.1. | Identify the three layers of the Cisco hierarchal network model. |
|  | 1.2. | Describe the functions performed at each layer of the Cisco hierarchal network model. |
|  | 1.3. | Match features to switch selection criteria. |
|  | 1.4. | Describe recommendations for designing a network that is scalable. |
|  | 1.5. | Describe the types of routers available for small to medium sized business networks. |
|  | 1.6. | Define goals of network design performance. |
|  | 1.7. | Define goals of network design reliability. |
|  | 1.8. | Define goals of network design scalability. |
|  | 1.9. | Define goals of network design redundancy. |
|  | 1.10. | Define goals of network design manageability. |
|  | 1.11. | You define goals of network design maintainability. |
|  | Learning Objectives | |
|  | 1.a. | Identify the layers and features of the Cisco three-layer hierarchal network model. |
|  | 1.b. | Examine different switching topologies and compare the similarities and differences between switches. |
|  | 1.c. | Determine the goals of network design, including performance, reliability, scalability, redundancy, manageability and maintainability. |

### Learning Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Listen to lecture (in person) -Configuring a small LAN review | | |
|  | Learning Materials | | |
|  | LP2 | [Cisco 3 LP2(1).docx](https://nwtc.wids.org//PublicDocuments.axd?DocumentID=182cd1f6-7132-4256-ace7-ad030d19100f) |
| 2. | Complete in class activity - Final review lab from Cisco 2 | | |
| 3. | Complete online lab activity (outside of class) Packet Tracer – Skills Integration challenge | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks PKA 1.3.1.3 (Proprietary content) | <https://www.netacad.com> |

### Assessment Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Complete final review lab from Cisco 2 (in class) | | |
| 2. | Complete Packet Tracer – Skills Integration challenge online | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks PKA 1.3.1.3 (Proprietary content) | <https://www.netacad.com> |

Configure a Small LAN PAT

Directions

Complete in class lab activity (for practice to prepare for online lab activity) - Review final lab exam from Cisco 2

Complete out of class lab simulator activity - 1.3.1.3 Packet Tracer – Skills Integration challenge

Target Course Competencies

|  |  |
| --- | --- |
| 1. | Explore the scaling of networks |

### Scoring

Rating Scale

|  |  |
| --- | --- |
| Value | Description |
| MET (35-50) | Packet Tracer points are scored by dividing your percentage earned by 2. (Example: 100% divided by 2 is 50/50.) Submit online to Cisco Academy to check score and make corrections as completing work. Aim to achieve 100% accuracy. |

Scoring Standard

A score of 70% in performance assessments demonstrates MET competency criteria.

### Scoring Guide

|  |  |  |
| --- | --- | --- |
|  | Criteria | Ratings |
| 1. | Explore the scaling of networks | Met Not Met |
| 2. | Identify the three layers of the Cisco hierarchal network model. | Met Not Met |
| 3. | Describe the functions performed at each layer of the Cisco hierarchal network model. | Met Not Met |
| 4. | Match features to switch selection criteria. | Met Not Met |
| 5. | Describe recommendations for designing a network that is scalable. | Met Not Met |
| 6. | Describe the types of routers available for small to medium sized business networks. | Met Not Met |
| 7. | Define goals of network design performance. | Met Not Met |
| 8. | Define goals of network design reliability. | Met Not Met |
| 9. | Define goals of network design scalability. | Met Not Met |
| 10. | Define goals of network design redundancy. | Met Not Met |
| 11. | Define goals of network design manageability. | Met Not Met |
| 12. | You define goals of network design maintainability. | Met Not Met |

Configure Spanning Tree Protocol

Overview/Purpose

Multiple cabled paths between switches provide physical redundancy in a switched network. This improves the reliability and availability of the network.

Target Competencies

|  |  |  |
| --- | --- | --- |
| 1. | Configure local area network (LAN) redundancy. | |
|  | Assessment Strategies | |
|  | 1.1. | Netacad chapter activities and homework |
|  | 1.2. | Midterm Assessment |
|  | 1.3. | In class lab activity |
|  | Criteria | |
|  | You will be successful when: | |
|  | 1.1. | Configure basic settings on a switch. |
|  | 1.2. | Explain the cause of layer 2 loops in a redundant switched network. |
|  | 1.3. | Examine a redundant network design. |
|  | 1.4. | Identify port roles of different spanning tree protocols. |
|  | 1.5. | Build a switched network with redundant links. |
|  | 1.6. | Identify different spanning tree varieties. |
|  | 1.7. | Compare PVST+ and Rapid PVST+. |
|  | 1.8. | Configure PVST+ and Rapid PVST+. |
|  | 1.9. | Configure PortFast and BPDU Guard. |
|  | 1.10. | Troubleshoot STP configurations. |
|  | 1.11. | Identify FHRP terminology. |
|  | 1.12. | Configure first hop redundancy. |
|  | Learning Objectives | |
|  | 1.a. | Configure basic settings on a switch. |
|  | 1.b. | Determine the importance of redundancy and the issues involved within a converged switched network. |
|  | 1.c. | Identify the different spanning tree varieties and their operations, including Per-VLAN Spanning Tree Plus (PVST+) and Rapid PVST+. |
|  | 1.d. | Configure and verify the proper operation of PVST+ and Rapid PVST+ in a switched LAN environment. |
|  | 1.e. | Troubleshoot and optimize STP operations. |
|  | 1.f. | Configure, verify and troubleshoot FHRP protocols, including HSRP and GLBP. |

### Learning Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Listen to lecture (in person) – LAN Redundancy Part 1 | | |
|  | Learning Materials | | |
|  | LP3 | [Cisco 3 LP3(1).docx](https://nwtc.wids.org//PublicDocuments.axd?DocumentID=853cba5c-39e9-4938-b71e-1bb30f8b7c12) |
| 2. | Complete in class activity - Configuring Rapid PVST+, BPDU Guard and Portfast | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks Lab 2.3.2.3 (Proprietary content) | <https://www.netacad.com> |
| 3. | Complete online lab activity (outside of class) Packet Tracer – Configuring Rapid PVST/PVST+ | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks PKA 2.3.2.2 (Proprietary content) | <https://www.netacad.com> |
| 4. | Read chapter 2 | | |

### Assessment Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Complete Configure Spanning Tree Protocol PAT | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks PKA 2.3.2.2 (Proprietary content) | <https://www.netacad.com> |
| 2. | Prepare for midterm assessments | | |

Configure Spanning Tree Protocol PAT

Directions

Complete in class lab activity (for practice to prepare for online lab activity) - Lab 2.3.2.3 Configuring Rapid PVST+, BPDU Guard and Portfast  
Complete out of class lab simulator activity - 2.3.2.2 Packet Tracer – Configuring Rapid PVST/PVST+

Complete quiz on chapters 1 and 2

Target Course Competencies

|  |  |
| --- | --- |
| 1. | Configure local area network (LAN) redundancy. |

### Scoring

Rating Scale

|  |  |
| --- | --- |
| Value | Description |
| MET (14-20) | Packet Tracer points are scored by dividing your percentage earned by 5. (Example: 100% divided by 5 is 20/20.) Submit online to Cisco Academy to check score and make corrections as completing work. Aim to achieve 100% accuracy. |
| MET (14-20) | The quiz has 10 questions worth 2 points for each correct answer. |

Scoring Standard

A score of 70% in performance assessments demonstrates MET competency criteria.

### Scoring Guide

|  |  |  |
| --- | --- | --- |
|  | Criteria | Ratings |
| 1. | Configure local area network (LAN) redundancy. | Met Not Met |
| 2. | Configure basic settings on a switch. | Met Not Met |
| 3. | Explain the cause of layer 2 loops in a redundant switched network. | Met Not Met |
| 4. | Examine a redundant network design. | Met Not Met |
| 5. | Identify port roles of different spanning tree protocols. | Met Not Met |
| 6. | Build a switched network with redundant links. | Met Not Met |
| 7. | Identify different spanning tree varieties. | Met Not Met |
| 8. | Compare PVST+ and Rapid PVST+. | Met Not Met |
| 9. | Configure PVST+ and Rapid PVST+. | Met Not Met |
| 10. | Configure PortFast and BPDU Guard. | Met Not Met |
| 11. | Troubleshoot STP configurations. | Met Not Met |
| 12. | Identify FHRP terminology. | Met Not Met |
| 13. | Configure first hop redundancy. | Met Not Met |

Configure HSRP and GLBP

Overview/Purpose

One way to prevent a single point of failure at the default gateway, is to implement a virtual router. To implement this type of router redundancy, multiple routers are configured to work together to present the illusion of a single router to the hosts on the LAN.

Target Competencies

|  |  |  |
| --- | --- | --- |
| 1. | Configure local area network (LAN) redundancy. | |
|  | Assessment Strategies | |
|  | 1.1. | Netacad chapter activities and homework |
|  | 1.2. | Midterm Assessment |
|  | 1.3. | In class lab activity |
|  | Criteria | |
|  | You will be successful when: | |
|  | 1.1. | Configure basic settings on a switch. |
|  | 1.2. | Explain the cause of layer 2 loops in a redundant switched network. |
|  | 1.3. | Examine a redundant network design. |
|  | 1.4. | Identify port roles of different spanning tree protocols. |
|  | 1.5. | Build a switched network with redundant links. |
|  | 1.6. | Identify different spanning tree varieties. |
|  | 1.7. | Compare PVST+ and Rapid PVST+. |
|  | 1.8. | Configure PVST+ and Rapid PVST+. |
|  | 1.9. | Configure PortFast and BPDU Guard. |
|  | 1.10. | Troubleshoot STP configurations. |
|  | 1.11. | Identify FHRP terminology. |
|  | 1.12. | Configure first hop redundancy. |
|  | Learning Objectives | |
|  | 1.a. | Configure basic settings on a switch. |
|  | 1.b. | Determine the importance of redundancy and the issues involved within a converged switched network. |
|  | 1.c. | Identify the different spanning tree varieties and their operations, including Per-VLAN Spanning Tree Plus (PVST+) and Rapid PVST+. |
|  | 1.d. | Configure and verify the proper operation of PVST+ and Rapid PVST+ in a switched LAN environment. |
|  | 1.e. | Troubleshoot and optimize STP operations. |
|  | 1.f. | Configure, verify and troubleshoot FHRP protocols, including HSRP and GLBP. |

### Learning Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Listen to lecture (in person) – LAN Redundancy- Part 2 | | |
|  | Learning Materials | | |
|  | LP4 | [Cisco 3 LP4(1).docx](https://nwtc.wids.org//PublicDocuments.axd?DocumentID=4fb4b782-d2e5-4ffd-8a6c-cf2fb9e3324f) |
| 2. | Complete in class activity - Configuring Rapid PVST+, BPDU Guard and Portfast | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks Lab 2.4.3.4 (Proprietary content) | <https://www.netacad.com> |
| 3. | Complete chapter 2 online exam (proprietary content) | | |

### Assessment Activities

|  |  |
| --- | --- |
| 1. | Complete Configure HSRP and GLBP PAT |
| 2. | Prepare for midterm assessments |

Configure HSRP and GLBP PAT

Directions

Complete in class lab activity (for practice to prepare for online lab activity) - Lab 2.4.3.4 Configuring HSRP and GLBP  
Complete chapter 2 online exam

Target Course Competencies

|  |  |
| --- | --- |
| 1. | Configure local area network (LAN) redundancy. |

### Scoring

Rating Scale

|  |  |
| --- | --- |
| Value | Description |
| MET (7-10) | Chapter exams are scored by dividing your percentage earned by 10. (Example: 87% divided by 10 is 8.7/10) Exams can be retaken and resubmitted unlimited times. Aim to achieve 100% accuracy. |

Scoring Standard

A score of 70% in performance assessments demonstrates MET competency criteria.

### Scoring Guide

|  |  |  |
| --- | --- | --- |
|  | Criteria | Ratings |
| 1. | Configure local area network (LAN) redundancy. | Met Not Met |
| 2. | Configure basic settings on a switch. | Met Not Met |
| 3. | Explain the cause of layer 2 loops in a redundant switched network. | Met Not Met |
| 4. | Examine a redundant network design. | Met Not Met |
| 5. | Identify port roles of different spanning tree protocols. | Met Not Met |
| 6. | Build a switched network with redundant links. | Met Not Met |
| 7. | Identify different spanning tree varieties. | Met Not Met |
| 8. | Compare PVST+ and Rapid PVST+. | Met Not Met |
| 9. | Configure PVST+ and Rapid PVST+. | Met Not Met |
| 10. | Configure PortFast and BPDU Guard. | Met Not Met |
| 11. | Troubleshoot STP configurations. | Met Not Met |
| 12. | Identify FHRP terminology. | Met Not Met |
| 13. | Configure first hop redundancy. | Met Not Met |

Configure EtherChannel

Overview/Purpose

EtherChannel technology was developed as a LAN switch-to-switch technique of grouping several Fast Ethernet or Gigabit Ethernet ports into one logical channel in order to increase bandwidth without upgrading equipment.

Target Competencies

|  |  |  |
| --- | --- | --- |
| 1. | Configure Link Aggregation on a LAN device. | |
|  | Assessment Strategies | |
|  | 1.1. | Netacad chapter activities and homework |
|  | 1.2. | In class lab activity |
|  | 1.3. | Midterm Assessment |
|  | Criteria | |
|  | You will be successful when: | |
|  | 1.1. | Describe the benefits of EtherChannel. |
|  | 1.2. | Identify the different PAgP modes. |
|  | 1.3. | Identify the different LACP modes. |
|  | 1.4. | Configure PAgP EtherChannel. |
|  | 1.5. | Configure PACP EtherChannel. |
|  | 1.6. | Use show commands to verify EtherChannel configurations. |
|  | 1.7. | Use show commands to troubleshoot EtherChannel configurations. |
|  | Learning Objectives | |
|  | 1.a. | Identify the purpose and advantages of link aggregation. |
|  | 1.b. | Review the features and operations of Etherchannel technology. |
|  | 1.c. | Configure and verify link aggregation on LAN devices. |
|  | 1.d. | Troubleshoot link aggregation operations on switches. |

### Learning Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Listen to lecture (in person) – Configuring Etherchannel | | |
|  | Learning Materials | | |
|  | LP5 | [Cisco 3 LP5.docx](https://nwtc.wids.org//PublicDocuments.axd?DocumentID=0ced7980-ea2f-4403-b186-7952b92dc9ab) |
| 2. | Complete in class activity - Configuring Etherchannel | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks Lab 3.2.1.4 (Proprietary content) | <https://www.netacad.com> |
| 3. | Complete online lab activity (outside of class) Packet Tracer – Troubleshooting Etherchannel | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks PKA 3.2.2.3 (Proprietary content) | <https://www.netacad.com> |
| 4. | Read chapter 3 | | |
| 5. | Complete chapter 3 online exam (proprietary content) | | |

### Assessment Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Complete Configure Etherchannel PAT | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks PKA 3.2.2.3 (Proprietary content) | <https://www.netacad.com> |
| 2. | Prepare for midterm assessments | | |

Configure EtherChannel PAT

Directions

Complete in class lab activity (for practice to prepare for online lab activity) - Lab 3.2.1.4 Configuring Etherchannel  
Complete out of class lab simulator activity - 3.2.2.3 Packet Tracer – Troubleshooting Etherchannel  
Complete chapter 3 online exam   
Complete quiz on chapters 1-3

Target Course Competencies

|  |  |
| --- | --- |
| 1. | Configure Link Aggregation on a LAN device. |

### Scoring

Rating Scale

|  |  |
| --- | --- |
| Value | Description |
| MET (14-20) | Packet Tracer points are scored by dividing your percentage earned by 5. (Example: 100% divided by 5 is 20/20.) Submit online to Cisco Academy to check score and make corrections as completing work. Aim to achieve 100% accuracy. |
| MET (7-10) | Chapter exams are scored by dividing your percentage earned by 10. (Example: 87% divided by 10 is 8.7/10) Exams can be retaken and resubmitted unlimited times. Aim to achieve 100% accuracy. |
| MET (14-20) | Quiz has ten questions worth 2 points for each correct answer. |

Scoring Standard

A score of 70% in performance assessments demonstrates MET competency criteria.

### Scoring Guide

|  |  |  |
| --- | --- | --- |
|  | Criteria | Ratings |
| 1. | Configure Link Aggregation on a LAN device. | Met Not Met |
| 2. | Describe the benefits of EtherChannel. | Met Not Met |
| 3. | Identify the different PAgP modes. | Met Not Met |
| 4. | Identify the different LACP modes. | Met Not Met |
| 5. | Configure PAgP EtherChannel. | Met Not Met |
| 6. | Configure PACP EtherChannel. | Met Not Met |
| 7. | Use show commands to verify EtherChannel configurations. | Met Not Met |
| 8. | Use show commands to troubleshoot EtherChannel configurations. | Met Not Met |

Configure a Wireless Router and Client

Overview/Purpose

Wireless networks can provide client mobility, the ability to connect from any location and at any time, and the ability to roam while staying connected.

Target Competencies

|  |  |  |
| --- | --- | --- |
| 1. | Configure wireless LAN access. | |
|  | Assessment Strategies | |
|  | 1.1. | Netacad chapter activities and homework |
|  | 1.2. | In class lab activity |
|  | 1.3. | Midterm Assessment |
|  | Criteria | |
|  | You will be successful when: | |
|  | 1.1. | Identify features of different wireless technologies. |
|  | 1.2. | Compare WLAN and LAN technologies. |
|  | 1.3. | Identify WLAN authentication characteristics. |
|  | 1.4. | Plan a wireless router implementation. |
|  | 1.5. | Access the GUI of a router by using a web browser. |
|  | 1.6. | Configure the wireless security settings. |
|  | 1.7. | Configure management access to a wireless router. |
|  | 1.8. | Connect a wireless client to a wireless router. |
|  | 1.9. | Update firmware on a wireless router. |
|  | 1.10. | Configure the IP address of the wireless router. |
|  | Learning Objectives | |
|  | 1.a. | Determine the advantages and disadvantages of using Wireless Local Area Networks (WLAN). |
|  | 1.b. | Review process to configure and verify WLAN operations and functionality on wireless routers and clients. |
|  | 1.c. | Identify WLAN security issues, and implement security mechanisms and procedures to mitigate threats. |

### Learning Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Listen to lecture (in person) – Wireless networking | | |
|  | Learning Materials | | |
|  | LP6 | [Cisco 3 LP6(1).docx](https://nwtc.wids.org//PublicDocuments.axd?DocumentID=2f7e8201-d627-40c3-9b44-dd305352b12e) |
| 2. | Complete in class activity - Configuring a Wireless Router and Client | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks Lab 4.4.2.3 (Proprietary content) | <https://www.netacad.com> |
| 3. | Complete online lab activity (outside of class) Packet Tracer – Configuring Wireless LAN access | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks PKA 4.4.2.2 (Proprietary content) | <https://www.netacad.com> |
| 4. | Read chapter 4 | | |
| 5. | Complete chapter 4 online exam (proprietary content) | | |

### Assessment Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Complete Configure a Wireless Router and Client PAT | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks PKA 4.4.2.2 (Proprietary content) | <https://www.netacad.com> |
| 2. | Prepare for midterm assessments | | |

Configure a Wireless Router and Client PAT

Directions

Complete in class lab activity (for practice to prepare for online lab activity) - Lab 4.4.2.3 Configuring a Wireless Router and Client  
Complete out of class lab simulator activity - Lab 4.4.2.3 Configuring a Wireless Router and Client  
Complete chapter 4 online exam

Target Course Competencies

|  |  |
| --- | --- |
| 1. | Configure wireless LAN access. |

### Scoring

Rating Scale

|  |  |
| --- | --- |
| Value | Description |
| MET (14-20) | Packet Tracer points are scored by dividing your percentage earned by 5. (Example: 100% divided by 5 is 20/20.) Submit online to Cisco Academy to check score and make corrections as completing work. Aim to achieve 100% accuracy. |
| MET (7-10) | Chapter exams are scored by dividing your percentage earned by 10. (Example: 87% divided by 10 is 8.7/10) Exams can be retaken and resubmitted unlimited times. Aim to achieve 100% accuracy. |

Scoring Standard

A score of 70% in performance assessments demonstrates MET competency criteria.

### Scoring Guide

|  |  |  |
| --- | --- | --- |
|  | Criteria | Ratings |
| 1. | Configure wireless LAN access. | Met Not Met |
| 2. | Identify features of different wireless technologies. | Met Not Met |
| 3. | Compare WLAN and LAN technologies. | Met Not Met |
| 4. | Identify WLAN authentication characteristics. | Met Not Met |
| 5. | Plan a wireless router implementation. | Met Not Met |
| 6. | Access the GUI of a router by using a web browser. | Met Not Met |
| 7. | Configure the wireless security settings. | Met Not Met |
| 8. | Configure management access to a wireless router. | Met Not Met |
| 9. | Connect a wireless client to a wireless router. | Met Not Met |
| 10. | Update firmware on a wireless router. | Met Not Met |
| 11. | Configure the IP address of the wireless router. | Met Not Met |

Adjust and Troubleshoot OSPF

Overview/Purpose

OSPF is a popular link state routing protocol that can be fine-tuned in many ways.

Target Competencies

|  |  |  |
| --- | --- | --- |
| 1. | Configure Single Area Open Shortest Path First (OSPF) routing concepts and operations. | |
|  | Assessment Strategies | |
|  | 1.1. | Netacad chapter activities and homework |
|  | 1.2. | In class lab activity |
|  | 1.3. | Final Assessment |
|  | Criteria | |
|  | You will be successful when: | |
|  | 1.1. | Configure single layer OSPF. |
|  | 1.2. | Configure OSPF on a multi-access network. |
|  | 1.3. | Configure and propagate a default route in OSPF. |
|  | 1.4. | Configure OSPF bandwidth utilization |
|  | 1.5. | Configure OSPF timers. |
|  | 1.6. | Configure OSPF authentication. |
|  | 1.7. | Troubleshoot single area OSPF configurations. |
|  | Learning Objectives | |
|  | 1.a. | Review the features and operation of the OSPF routing protocol. |
|  | 1.b. | Review process to configure OSPF on routers. |
|  | 1.c. | Review process to modify OSPF advanced features |
|  | 1.d. | Review process to implement OSPF authentication to ensure secure routing updates. |
|  | 1.e. | Verify and troubleshoot router operations in an OSPF network. |

### Learning Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Listen to lecture (in person) – Advanced OSPF | | |
|  | Learning Materials | | |
|  | LP7 | [Cisco 3 LP7(1).docx](https://nwtc.wids.org//PublicDocuments.axd?DocumentID=cbea7270-3993-427f-9b77-fe7a12a11390) |
| 2. | Complete in class activity - Configuring OSPFv2 on a Multi-access Network | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks Lab 5.1.2.13 (Proprietary content) | <https://www.netacad.com> |
| 3. | Complete online lab activity (outside of class) Packet Tracer – Configuring OSPF Advanced Features | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks Lab 5.1.5.8 (Proprietary content) | <https://www.netacad.com> |
| 4. | Read chapter 5 | | |
| 5. | Complete chapter 5 online exam (proprietary content) | | |

### Assessment Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Complete Adjust and Troubleshoot OSPF PAT | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks Lab 5.1.5.8 (Proprietary content) | <https://www.netacad.com> |
| 2. | Prepare for final assessments | | |

Adjust and Troubleshoot OSPF PAT

Directions

Complete in class lab activity (for practice to prepare for online lab activity) - Lab 5.1.2.13 Configuring OSPFv2 on a Multi-access Network  
Complete out of class lab simulator activity - Lab 5.1.2.13 Configuring OSPFv2 on a Multi-access Network

Complete chapter 5 online exam

Target Course Competencies

|  |  |
| --- | --- |
| 1. | Configure Single Area Open Shortest Path First (OSPF) routing concepts and operations. |

### Scoring

Rating Scale

|  |  |
| --- | --- |
| Value | Description |
| MET (14-20) | Packet Tracer points are scored by dividing your percentage earned by 5. (Example: 100% divided by 5 is 20/20.) Submit online to Cisco Academy to check score and make corrections as completing work.  Aim to achieve 100% accuracy. |
| MET (7-10) | Chapter exams are scored by dividing your percentage earned by 10. (Example: 87% divided by 10 is 8.7/10) Exams can be retaken and resubmitted unlimited times. Aim to achieve 100% accuracy. |

Scoring Standard

A score of 70% in performance assessments demonstrates MET competency criteria.

### Scoring Guide

|  |  |  |
| --- | --- | --- |
|  | Criteria | Ratings |
| 1. | Configure Single Area Open Shortest Path First (OSPF) routing concepts and operations. | Met Not Met |
| 2. | Configure single layer OSPF. | Met Not Met |
| 3. | Configure OSPF on a multi-access network. | Met Not Met |
| 4. | Configure and propagate a default route in OSPF. | Met Not Met |
| 5. | Configure OSPF bandwidth utilization | Met Not Met |
| 6. | Configure OSPF timers. | Met Not Met |
| 7. | Configure OSPF authentication. | Met Not Met |
| 8. | Troubleshoot single area OSPF configurations. | Met Not Met |

Configure Multiarea OSPF

Overview/Purpose

Multiarea OSPF is used to divide a large OSPF network. Too many routers in one area increase the load on the CPU and create a large link-state database.

Target Competencies

|  |  |  |
| --- | --- | --- |
| 1. | Configure Multi-Area OSPF concepts and operations. | |
|  | Assessment Strategies | |
|  | 1.1. | Netacad chapter activities and homework |
|  | 1.2. | In class lab activity |
|  | 1.3. | Final Assessment |
|  | Criteria | |
|  | You will be successful when: | |
|  | 1.1. | Describe the advantages of using multiarea OSPF. |
|  | 1.2. | Identify OSPF LSA types. |
|  | 1.3. | Configure multiarea OSPF. |
|  | 1.4. | Calculate manual summary routes. |
|  | 1.5. | Configure summary routes on a router. |
|  | 1.6. | Use show commands to verify multiarea OSPF. |
|  | 1.7. | Troubleshoot multiarea OSPF configurations. |
|  | Learning Objectives | |
|  | 1.a. | Identify the purpose, design and function of multi-area OSPF. |
|  | 1.b. | Examine the operation of multi-area OSPF. |
|  | 1.c. | Configure routers in a complex, multi-area OSPF network. |
|  | 1.d. | Calculate and implement route summarization in a multi-area OSPF network. |
|  | 1.e. | Verify, troubleshoot and optimize router operations in multi-area OSPF network. |

### Learning Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Listen to lecture (in person) – Multi-area OSPFv2 | | |
|  | Learning Materials | | |
|  | LP8 | [Cisco 3 LP8(1).docx](https://nwtc.wids.org//PublicDocuments.axd?DocumentID=c4f928d5-1350-4a88-9963-13a5593b1725) |
| 2. | Complete in class activity - Configuring Multi-area OSPFv2 | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks Lab 6.2.3.8 (Proprietary content) | <https://www.netacad.com> |
| 3. | Complete online lab activity (outside of class) Packet Tracer – Configuring Multi-area OSPFv3 | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks PKA 6.2.3.7 (Proprietary content) | <https://www.netacad.com> |
| 4. | Read chapter 6 | | |
| 5. | Complete chapter 6 online exam (proprietary content) | | |

### Assessment Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Complete Configuring Multi-area OSPF PAT | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks PKA 6.2.3.7 (Proprietary content) | <https://www.netacad.com> |
| 2. | Prepare for final assessments | | |

Configure Multiarea OSPF PAT

Directions

Complete in class lab activity (for practice to prepare for online lab activity) - Lab 6.2.3.8 Configuring Multi-area OSPFv2  
Complete out of class lab simulator activity - Lab 6.2.3.7 Configuring OSPFv2 on a Multi-access Network  
Complete chapter 6 online exam

Target Course Competencies

|  |  |
| --- | --- |
| 1. | Configure Multi-Area OSPF concepts and operations. |

### Scoring

Rating Scale

|  |  |
| --- | --- |
| Value | Description |
| MET (14-20) | Packet Tracer points are scored by dividing your percentage earned by 5. (Example: 100% divided by 5 is 20/20.) Submit online to Cisco Academy to check score and make corrections as completing work.  Aim to achieve 100% accuracy. |
| MET (7-10) | Chapter exams are scored by dividing your percentage earned by 10. (Example: 87% divided by 10 is 8.7/10) Exams can be retaken and resubmitted unlimited times. Aim to achieve 100% accuracy. |

Scoring Standard

A score of 70% in performance assessments demonstrates MET competency criteria.

### Scoring Guide

|  |  |  |
| --- | --- | --- |
|  | Criteria | Ratings |
| 1. | Configure Multi-Area OSPF concepts and operations. | Met Not Met |
| 2. | Describe the advantages of using multiarea OSPF. | Met Not Met |
| 3. | Identify OSPF LSA types. | Met Not Met |
| 4. | Configure multiarea OSPF. | Met Not Met |
| 5. | Calculate manual summary routes. | Met Not Met |
| 6. | Configure summary routes on a router. | Met Not Met |
| 7. | Use show commands to verify multiarea OSPF. | Met Not Met |
| 8. | Troubleshoot multiarea OSPF configurations. | Met Not Met |

Configure EIGRP

Overview/Purpose

Enhanced Interior Gateway Routing Protocol (EIGRP) is an advanced distance vector routing protocol developed by Cisco Systems. EIGRP is a distance vector routing protocol that includes features found in link-state routing protocols and is suited for many different topologies and media.

Target Competencies

|  |  |  |
| --- | --- | --- |
| 1. | Configure Enhanced Interior Gateway Routing Protocol (EIGRP). | |
|  | Assessment Strategies | |
|  | 1.1. | Netacad chapter activities and homework |
|  | 1.2. | In class lab activity |
|  | 1.3. | Final Assessment |
|  | Criteria | |
|  | You will be successful when: | |
|  | 1.1. | Identify and describe the five EIGRP packet types. |
|  | 1.2. | Configure and verify basic EIGRP. |
|  | 1.3. | Inspect EIGRP operations by viewing the results of show commands. |
|  | 1.4. | Configure EIGRP manual route summarization. |
|  | 1.5. | Propagate static and default routes in EIGRP. |
|  | 1.6. | Configure authentication in EIGRP. |
|  | 1.7. | Use the debug command to view how topology changes affect EIGRP routing. |
|  | 1.8. | Troubleshoot EIGRP configurations. |
|  | 1.9. | Configure advanced EIGRP features. |
|  | Learning Objectives | |
|  | 1.a. | Examine the function and operation of the EIGRP routing protocol with its Diffusing Update Algorithm (DUAL) features. |
|  | 1.b. | Describe, examine and calculate the composite metric used by EIGRP. |
|  | 1.c. | Configure routers for EIGRP operation in IPv4 and IPv6 networks. |
|  | 1.d. | Inspect EIGRP operations, including neighbor adjacencies, routing table entries, successors and feasible distance. |
|  | 1.e. | Configure route summarization, and propagating static and default routes in an EIGRP network. |
|  | 1.f. | Configure EIGRP authentication to ensure secure routing updates. |
|  | 1.g. | Configure advanced EIGRP features, including summary routes, auto-summarization, tuning EIGRP interface settings to improve network performance. |
|  | 1.h. | Verify and troubleshoot EIGRP router operations in a complex network. |

### Learning Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Listen to lecture (in person) – Configuring Basic EIGRP | | |
|  | Learning Materials | | |
|  | LP9 | [Cisco 3 LP9(1).docx](https://nwtc.wids.org//PublicDocuments.axd?DocumentID=5686f96d-c39c-4294-ae13-3e99363b5939) |
| 2. | Complete in class activities - Lab 7.2.2.5 Configuring Basic EIGRP for IPv4 and Lab 7.4.3.5 Configuring Basic EIGRP for IPv6 | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks Lab 7.4.3.5 (Proprietary content) | <https://www.netacad.com> |
|  | CCNA Routing and Switching: Scaling Networks Lab 7.2.2.5 (Proprietary content) | [www.netacad.com](file:///C:\Users\Tessa\Downloads\www.netacad.com) |
| 3. | Complete online lab activity (outside of class) Packet Tracer – Configuring Basic EIGRP for IPv6 Routing | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks PKA 7.4.3.4 (Proprietary content) | <https://www.netacad.com> |
| 4. | Read chapter 7 | | |
| 5. | Complete chapter 7 online exam (proprietary content) | | |

### Assessment Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Complete Configuring EIGRP PAT | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks PKA 7.4.3.4 (Proprietary content) | <https://www.netacad.com> |
| 2. | Prepare for final assessments | | |

Configure EIGRP PAT

Directions

Complete in class lab activity (for practice to prepare for online lab activity) - Lab 7.2.2.5 Configuring Basic EIGRP for IPv4  
Complete in class lab activity (for practice to prepare for online lab activity) - Lab 7.4.3.5 Configuring Basic EIGRP for IPv6  
Complete out of class lab simulator activity -   7.4.3.4 Packet Tracer – Configuring Basic EIGRP for IPv6 Routing   
Complete chapter 7 online exam   
Complete quiz in class on chapters 1-6

Target Course Competencies

|  |  |
| --- | --- |
| 1. | Configure Enhanced Interior Gateway Routing Protocol (EIGRP). |

### Scoring

Rating Scale

|  |  |
| --- | --- |
| Value | Description |
| MET (14-20) | Packet Tracer points are scored by dividing your percentage earned by 5. (Example: 100% divided by 5 is 20/20.) Submit online to Cisco Academy to check score and make corrections as completing work.  Aim to achieve 100% accuracy. |
| MET (7-10) | Chapter exams are scored by dividing your percentage earned by 10. (Example: 87% divided by 10 is 8.7/10) Exams can be retaken and resubmitted unlimited times. Aim to achieve 100% accuracy. |
| MET (14-20) | Quiz has ten questions worth 2 points for each correct answer. |

Scoring Standard

A score of 70% in performance assessments demonstrates MET competency criteria.

### Scoring Guide

|  |  |  |
| --- | --- | --- |
|  | Criteria | Ratings |
| 1. | Configure Enhanced Interior Gateway Routing Protocol (EIGRP). | Met Not Met |
| 2. | Identify and describe the five EIGRP packet types. | Met Not Met |
| 3. | Configure and verify basic EIGRP. | Met Not Met |
| 4. | Inspect EIGRP operations by viewing the results of show commands. | Met Not Met |
| 5. | Configure EIGRP manual route summarization. | Met Not Met |
| 6. | Propagate static and default routes in EIGRP. | Met Not Met |
| 7. | Configure authentication in EIGRP. | Met Not Met |
| 8. | Use the debug command to view how topology changes affect EIGRP routing. | Met Not Met |
| 9. | Troubleshoot EIGRP configurations. | Met Not Met |
| 10. | Configure advanced EIGRP features. | Met Not Met |

Configure Advanced EIGRP

Overview/Purpose

EIGRP is a versatile routing protocol that can be fine-tuned in many ways. Two of the most important tuning capabilities are the ability to summarize routes and the ability to implement load balancing. Other tuning capabilities include being able to propagate a default, fine-tune timers, and implement authentication between EIGRP neighbors to increase security.

Target Competencies

|  |  |  |
| --- | --- | --- |
| 1. | Configure Enhanced Interior Gateway Routing Protocol (EIGRP). | |
|  | Assessment Strategies | |
|  | 1.1. | Netacad chapter activities and homework |
|  | 1.2. | In class lab activity |
|  | 1.3. | Final Assessment |
|  | Criteria | |
|  | You will be successful when: | |
|  | 1.1. | Identify and describe the five EIGRP packet types. |
|  | 1.2. | Configure and verify basic EIGRP. |
|  | 1.3. | Inspect EIGRP operations by viewing the results of show commands. |
|  | 1.4. | Configure EIGRP manual route summarization. |
|  | 1.5. | Propagate static and default routes in EIGRP. |
|  | 1.6. | Configure authentication in EIGRP. |
|  | 1.7. | Use the debug command to view how topology changes affect EIGRP routing. |
|  | 1.8. | Troubleshoot EIGRP configurations. |
|  | 1.9. | Configure advanced EIGRP features. |
|  | Learning Objectives | |
|  | 1.a. | Examine the function and operation of the EIGRP routing protocol with its Diffusing Update Algorithm (DUAL) features. |
|  | 1.b. | Describe, examine and calculate the composite metric used by EIGRP. |
|  | 1.c. | Configure routers for EIGRP operation in IPv4 and IPv6 networks. |
|  | 1.d. | Inspect EIGRP operations, including neighbor adjacencies, routing table entries, successors and feasible distance. |
|  | 1.e. | Configure route summarization, and propagating static and default routes in an EIGRP network. |
|  | 1.f. | Configure EIGRP authentication to ensure secure routing updates. |
|  | 1.g. | Configure advanced EIGRP features, including summary routes, auto-summarization, tuning EIGRP interface settings to improve network performance. |
|  | 1.h. | Verify and troubleshoot EIGRP router operations in a complex network. |

### Learning Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Listen to lecture (in person) – Configuring Advanced EIGRP | | |
|  | Learning Materials | | |
|  | LP10 | [Cisco 3 LP10(1).docx](https://nwtc.wids.org//PublicDocuments.axd?DocumentID=370376ad-3ec9-42d1-b2da-ffc17440f50b) |
| 2. | Complete in class activities - Configuring Advanced EIGRP for IPv4 Features | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks Lab 8.1.5.5 (Proprietary content) | <https://www.netacad.com> |
| 3. | Complete online lab activity (outside of class) Packet Tracer – Troubleshooting EIGRP for IPv4 | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks PKA 8.2.3.5 (Proprietary content) | <https://www.netacad.com> |
| 4. | Read chapter 8 | | |
| 5. | Complete chapter 8 online exam (proprietary content) | | |

### Assessment Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Complete Configure Advanced EIGRP PAT | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks PKA 8.2.3.5 (Proprietary content) | <https://www.netacad.com> |
| 2. | Prepare for final assessments | | |

Configure Advanced EIGRP PAT

Directions

Complete in class lab activity (for practice to prepare for online lab activity) - Lab 8.1.5.5 Configuring Advanced EIGRP for IPv4 Features

Complete out of class lab simulator activity - 8.2.3.5 Packet Tracer – Troubleshooting EIGRP for IPv4

Complete chapter 8 online exam

Complete in class quiz on chapters 1-8

Target Course Competencies

|  |  |
| --- | --- |
| 1. | Configure Enhanced Interior Gateway Routing Protocol (EIGRP). |

### Scoring

Rating Scale

|  |  |
| --- | --- |
| Value | Description |
| MET (14-20) | Packet Tracer points are scored by dividing your percentage earned by 5. (Example: 100% divided by 5 is 20/20.) Submit online to Cisco Academy to check score and make corrections as completing work.  Aim to achieve 100% accuracy. |
| MET (7-10) | Chapter exams are scored by dividing your percentage earned by 10. (Example: 87% divided by 10 is 8.7/10) Exams can be retaken and resubmitted unlimited times. Aim to achieve 100% accuracy. |

Scoring Standard

A score of 70% in performance assessments demonstrates MET competency criteria.

### Scoring Guide

|  |  |  |
| --- | --- | --- |
|  | Criteria | Ratings |
| 1. | Configure Enhanced Interior Gateway Routing Protocol (EIGRP). | Met Not Met |
| 2. | Identify and describe the five EIGRP packet types. | Met Not Met |
| 3. | Configure and verify basic EIGRP. | Met Not Met |
| 4. | Inspect EIGRP operations by viewing the results of show commands. | Met Not Met |
| 5. | Configure EIGRP manual route summarization. | Met Not Met |
| 6. | Propagate static and default routes in EIGRP. | Met Not Met |
| 7. | Configure authentication in EIGRP. | Met Not Met |
| 8. | Use the debug command to view how topology changes affect EIGRP routing. | Met Not Met |
| 9. | Troubleshoot EIGRP configurations. | Met Not Met |
| 10. | Configure advanced EIGRP features. | Met Not Met |

IOS Images

Overview/Purpose

Cisco IOS (originally Internetwork Operating System) is software used on most Cisco routers and switches. Understanding the Cisco portfolio of feature sets is helpful in selecting the proper IOS to meet the needs of an organization.

Target Competencies

|  |  |  |
| --- | --- | --- |
| 1. | Manage Cisco IOS® software. | |
|  | Assessment Strategies | |
|  | 1.1. | Netacad chapter activities and homework |
|  | 1.2. | In class lab activity |
|  | 1.3. | Final Assessment |
|  | Criteria | |
|  | You will be successful when: | |
|  | 1.1. | Use the show version command to view information about your IOS version. |
|  | 1.2. | Decode IOS image names. |
|  | 1.3. | Use a TFTP server to upgrade an IOS image. |
|  | 1.4. | Use a TFTP server to back up an IOS image. |
|  | 1.5. | Use a TFTP server to back up a configuration file. |
|  | Learning Objectives | |
|  | 1.a. | Examine the Cisco Internetwork Operating System (IOS) image file naming conventions, including platform, version and feature set. |
|  | 1.b. | Calculate memory and storage requirements when upgrading an IOS system image. |
|  | 1.c. | Review the licensing process for Cisco IOS software in a small- to medium-sized business network. |
|  | 1.d. | Configure a device to install an IOS software image with license. |
|  | 1.e. | Configure and operating a Trivial File Transfer Protocol (TFTP) file server for updates, backups and recovery. |
|  | 1.f. | Perform IOS and system file transfers from Cisco devices to a TFTP server. |

### Learning Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Listen to lecture (in person) – IOS Images | | |
|  | Learning Materials | | |
|  | LP11 | [Cisco 3 LP11(1).docx](https://nwtc.wids.org//PublicDocuments.axd?DocumentID=fd59104d-6a68-4519-a8be-178f0f4126b5) |
| 2. | Complete in class activities - IOS Detection | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks Lab 9.0.1.2 (Proprietary content) | <https://www.netacad.com> |
| 3. | Complete online lab activity (outside of class) Packet Tracer – Using a TFTP Server to upgrade a Cisco IOS | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks PKA 9.1.2.5 (Proprietary content) | <https://www.netacad.com> |
| 4. | Read chapter 9 | | |
| 5. | Complete chapter 9 online exam (proprietary content) | | |

### Assessment Activities

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Complete IOS Images PAT | | |
|  | Learning Materials | | |
|  | CCNA Routing and Switching: Scaling Networks PKA 9.1.2.5 (Proprietary content) | <https://www.netacad.com> |
| 2. | Prepare for final assessments | | |

IOS Images PAT

Directions

Complete in class lab activity (for practice to prepare for online lab activity) - Lab 9.0.1.2 IOS Detection

Complete out of class lab simulator activity - 9.1.2.5 Packet Tracer – Using a TFTP Server to upgrade a Cisco IOS  
Complete chapter 9 online exam

Target Course Competencies

|  |  |
| --- | --- |
| 1. | Manage Cisco IOS® software. |

### Scoring

Rating Scale

|  |  |
| --- | --- |
| Value | Description |
| MET (14-20) | Packet Tracer points are scored by dividing your percentage earned by 5. (Example: 100% divided by 5 is 20/20.) Submit online to Cisco Academy to check score and make corrections as completing work.  Aim to achieve 100% accuracy. |
| MET (7-10) | Chapter exams are scored by dividing your percentage earned by 10. (Example: 87% divided by 10 is 8.7/10) Exams can be retaken and resubmitted unlimited times. Aim to achieve 100% accuracy. |
| MET (14-20) | Quiz has ten questions worth 2 points for each correct answer. |

Scoring Standard

A score of 70% in performance assessments demonstrates MET competency criteria.

### Scoring Guide

|  |  |  |
| --- | --- | --- |
|  | Criteria | Ratings |
| 1. | Manage Cisco IOS® software. | Met Not Met |
| 2. | Use the show version command to view information about your IOS version. | Met Not Met |
| 3. | Decode IOS image names. | Met Not Met |
| 4. | Use a TFTP server to upgrade an IOS image. | Met Not Met |
| 5. | Use a TFTP server to back up an IOS image. | Met Not Met |
| 6. | Use a TFTP server to back up a configuration file. | Met Not Met |

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