Preview: IT4160 : Internetwork Analysis and Design

Syllabus

Course Overview

Course Overview

In this course, learners explore the internetworking concepts for analyzing, planning, designing, and securing an enterprise network. Topics include the top-down approach to network design, modular hierarchies, enterprise network considerations, IPv4 and IPv6 addressing, wireless network architectures, and internetworking security life cycle. This course provides learners with a solid understanding of internetworking infrastructures and prepares them to take one of the industry certification exams.

Course Project

The course project takes a problem-based, case-based approach to learning the course material by putting you in the role of a consultant who will provide solutions to a fictitious customer.

The project is broken down into weekly components. You will receive feedback on each component and use it to update your designs for the final project submission. This feedback will include evaluation of how well you have articulated a design that is clearly and directly tied to business needs and user requirements.

You will design an advanced Cisco-based infrastructure for EverGreen Financial, described in the scenario below. As you work on the project, focus on the main concepts that have been presented each week. Using this information, you are to choose from similar technologies and services to create a design that best fits the needs of the scenario and business and user requirements. In your weekly components, you will discuss alternatives for your particular design choices, make design decisions about network components, and then implement your selected alternatives in your final design.

You will use Practice Labs interactive scenarios to help you learn how to administer your network. You will include the results from the Practice Labs interactive scenarios as supplemental documents to your final project.

Scenario

You are a consultant with medium-sized IT services company, Geekorologist, Inc., which has a range of different customers, mostly in the private sector. EverGreen Financial, a company specializing in financial products and services, needs you to work on a number of small projects. You will work with your colleagues at Geekorologist to better understand and implement the necessary project objectives, while interacting with EverGreen employees on-site. Throughout the course, you will receive the information and opportunities necessary to

complete a number of lab tasks and project components. Overall, you will be redesigning a security infrastructure for EverGreen.

You will work with a number of individuals on this project. Through the interactive scenarios, you will be able to gather a great deal of information from these individuals, including business and user requirements.

The following is a list of the individuals who play a role in this project:

The Learner (You): Consultant. Pat Lobos, one of Geekorologist's project managers, has assigned you to this project to help with EverGreen's internetwork rollout. Your role will be to get EverGreen situated with their new equipment and support them until their technical operations manager, Albert Ross, can take over the day-to-day Cisco administration tasks. You will check in and give Pat updates on your progress.

Pat: Your project manager and mentor. She is an experienced Cisco networking specialist who will help you think through commands and certain situations.

Edmund: Long-time networking consultant hired by Geekorologist. Edmund is a creative thinker who challenges authority. He prefers his job because of its late hours (which means no traffic and free reign at the local all-night taco stand) and reduced interaction with people. He likes to play devil's advocate and always has an opinion about the work other people are doing. He can, however, be a bit lazy sometimes and does not prioritize well. You will have to cover for his unfinished work and sometimes his blunt handling of interpersonal conflicts.

William: Building manager at the EverGreen site and one of your stakeholders. He is a hawk about maintaining the building's integrity and tries to look over your shoulder at all times to make sure your Cisco installation work is not interfering with his building's Internet connection and wiring. William is often overbearing and feels it is his right to walk into and out of the office condos that his customers pay for whenever he pleases.

Albert: Another stakeholder and local EverGreen technical operations manager. This small outpost in the company is Albert's domain. He has some basic networking skills, but Cisco is an entirely new realm for him. He is protective of his office's network because he knows the value of up time and employees being able to stay connected to the larger company.

Dirk: IT engineer at EverGreen and one of your stakeholders. He is a fresh recruit into EverGreen. Albert hired Dirk when he had to find somewhere to spend some of his department budget and needed an extra hand. He is willing to please his boss, Albert, and work hard, but he often researches things on his own and tries to insert himself when he does not understand the material.

Surbhi: EverGreen project coordinator and stakeholder. Surbhi presented the project to Geekorologist and checks in with you to make sure things are progressing. She also tries to corral the EverGreen employees who tend to get in your way.

Assignments

Week 1: Develop an initial scope document and proposal for deploying a Cisco infrastructure. – 14% of grade.
Scoring Guide

Week 2: Write a paper contemplating the role of security services within network architecture. – 14% of grade. ***Scoring Guide***

Week 3: Write a paper providing a data center strategy. – 14% of grade. ***Scoring Guide***

Week 4: Design a remote connectivity strategy for your Cisco-based infrastructure. – 14% of grade. ***Scoring Guide***

Week 5: Write a paper evaluating existing infrastructure and recommend improvements you believe are appropriate to improve the cost and efficiency of managing the network. – 19% of grade. ***Scoring Guide***

Discussions

There will be a discussion each week that will help you understand the hands-on labs and assignments. Participation in discussions will count for 25% of your final grade.

Week 1: Participate in a discussion comparing and contrasting top-down and bottom-up design approaches.

Week 2: The discussion centers on modularization and security.

Week 3: The discussion centers on routing protocols.

Week 4: Use the discussion to determine the best connectivity strategy for the organization.

Week 5: The discussion centers on your reflections regarding the course.

Hands-On Labs

This Capella course offers real-world, hands-on labs provided by Practice Labs. These labs offer guided practice in performing tasks related to achieving course competencies and completing assessments. If you require the use of assistive technology or alternative communication methods to participate in these activities, please contact DisabilityServices@Capella.edu to request accommodations.

Week 1: Practice network management including diagrams, symbols and documentation, introducing the OSI model, and configuring IPv4, IPv6 addressing and routing.

Week 2: Practice configuring and verifying a basic WAN connection, troubleshooting the WAN, and configuring IPv4 and IPv6 addressing.

Week 3: Practice configuring and verifying EIGRP and OSPF, and reviewing routing concepts and protocols.

Week 4: Practice VPN technologies and services, implement SSL VPN using ASA Device Manager, and work with remote connectivity.

Week 5: Practice configure and verify DHCP and DNS.

Course Competencies

(Read Only)

To successfully complete this course, you will be expected to:

1. Plan a strategy for designing and modeling a variety of Cisco-based networks that solve business problems.
2. Design a variety of Cisco-based networks and modules.
3. Develop models of Cisco networks based on previously developed designs.
4. Manage Cisco services, protocols, and devices for a planned design.
5. Evaluate Cisco-based models and designs.
6. Troubleshoot Cisco network models and designs.
7. Apply security strategies to a Cisco-based network design.
8. Communicate effectively.

Course Prerequisites

Prerequisite(s): Completion of or concurrent registration in IT4155.

Syllabus >> Course Materials

Required

The materials listed below are required to complete the learning activities in this course.

Integrated Materials

Many of your required books are available via the VitalSource Bookshelf link in the courseroom, located in your Course Tools. Registered learners in a Resource Kit program can access these materials using the courseroom link on the Friday before the course start date. Some materials are available only in hard-copy format or by using an access code. For these materials, you will receive an email with further instructions for access. Visit the Course Materials page on Campus for more information.

Book

Bruno, A. A., & Jordan, S. (2017). *CCDA 200-310 official cert guide: Learn, prepare, and practice for exam success (5th ed.).* Indianapolis, IN: Cisco Press

Library

The following required readings are provided in the Capella University Library or linked directly in this course. To find specific readings by journal or book title, use Journal and Book Locator. Refer to the Journal and Book Locator library guide to learn how to use this tool.

- Skillsoft (n.d.) *CompTIA Network+ N10-007: Networking Monitoring and Remote Access Methods* [Video].
- Skillsoft (n.d.). *CCENT: Overview of Networking* [Video].
- Skillsoft (n.d.). *CompTIA Network+ N10-006: Industry Standards, Practices, and Network Theory* [Video].
- Skillsoft (n.d.). *CompTIA Network+ N10-006: Network Architecture Part 1* [Video].
- Skillsoft (n.d.). *CompTIA Network+ N10-006: Network Architecture Part 2* [Video].
- Skillsoft (n.d.). *CompTIA Network+ N10-006: Network Operations Part 1* [Video].
- Skillsoft (n.d.). *CompTIA Network+ N10-006: Network Operations Part 2* [Video].
- Skillsoft (n.d.). *CompTIA Network+ N10-006: Troubleshooting Part 1* [Video].
- Skillsoft (n.d.). *CompTIA Network+ N10-006: Troubleshooting Part 2* [Video].
- Skillsoft (n.d.). *CompTIA Network+ N10-007: Documentation and Diagrams & Business Continuity*
- Skillsoft (n.d.). *CompTIA Network+ N10-007: Networking Devices* [Video].
- Skillsoft (n.d.). *CompTIA Network+ N10-007: Networking Monitoring and Remote Access Methods* [Video].
- Skillsoft (n.d.). *DESGN 3.0: Campus Design Part 2* [Video].
- Skillsoft (n.d.). *DESGN 3.0: Design Hierarchy* [Video].
- Skillsoft (n.d.). *DESGN 3.0: Design Methodology* [Video].
- Skillsoft (n.d.). *DESGN 3.0: Design Modularity* [Video].
- Skillsoft (n.d.). *DESGN 3.0: Design Scalability* [Video].
- Skillsoft (n.d.). *DESGN 3.0: Enterprise Architecture* [Video].
- Skillsoft (n.d.). *DESGN 3.0: Enterprise Network WAN and Edge* [Video].
- Skillsoft (n.d.). *DESGN 3.0: Implementing Network Design* [Video].
- Skillsoft (n.d.). *DESGN 3.0: Network Programmability and Data Center Component Design* [Video].
- Skillsoft (n.d.). *DESGN 3.0: Scalable Addressing and IP Addressing Schemes* [Video].
- Skillsoft (n.d.). *DESGN 3.0: Security Control Considerations* [Video].
- Skillsoft (n.d.). *DESGN 3.0: Virtualization in Network Design* [Video].
- Skillsoft (n.d.). *DESGN 3.0: Voice and Video Design Considerations* [Video].
- Skillsoft (n.d.). *DESGN 3.0: Wireless LAN Design* [Video].
- Skillsoft. (2019). *DESGN 3.0: Campus Design* [Video].

Suggested

The following materials are recommended to provide you with a better understanding of the topics in this course. These materials are not required to complete the course, but they are aligned to course activities and assessments and are highly recommended for your use.

Optional

The following optional materials are offered to provide you with a better understanding of the topics in this course. These materials are not required to complete the course.

Projects

Project >> Final Design Proposal

Project Overview

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Surbhi: EverGreen project coordinator and stakeholder. Surbhi presented the project to Geekorologist and checks in with you to make sure things are progressing. She also tries to corral the EverGreen employees who tend to get in your way.

- **Written communication:** Written communication is free of errors that detract from the overall message.
- **APA formatting:** Resources and citations are formatted according to APA Style and Formatting.
- **Font and font size:** Arial, 10 point.

Introduction

Design Methodology

As the main consultant at Geekorologist, you will need to understand network design methodologies and how to document the design. You will be tasked to do this design work with your project manager, Pat, and provide proper documentation to EverGreen.

This week will explore the methodology surrounding Cisco-based network design. You will learn how to identify design requirements and characterize existing networks. This week we also discuss and explore the top-down approach to network design.

In the lab this week, you will learn how to apply network design methodology as you explore both the hierarchy and modular models.

To-do List:

- **Discussion:** Participate in a discussion comparing and contrasting top-down and bottom-up design approaches.
- **Assignment:** Develop an initial scope document and proposal for deploying a Cisco infrastructure.
- **What You Need To Know:** Learn about network design methodology and models, and networking concepts.
- **Prepare:** Download any needed software such as MS Visio and MS PowerPoint, or compatible application. Complete the Practice Labs Orientation to familiarize yourself with the Practice Labs platform.
- **Hands-On Lab:** Practice Network Management, which includes diagrams, symbols, and documentations, view an introduction to the OSI Model, and configure IPv4, IPv6 Addressing and Routing.
- **Plan:** Explore industry certification resources.

- **Practice:** Self-Paced Tutorial Videos

Learning Activities

u01s1 - Activity Overview

Discussion Overview

In your discussion this week, you will design a Cisco-based network and present proper documentation to EverGreen.

Assignment Overview

Complete all of this week's labs before beginning the assignment. You may be directed to save screenshots from the labs for submission with your assignment.

u01s2 - What You Need to Know

Network Design Methodology and Models

This week's resources introduce Cisco's methodology for designing enterprise networks. You will explore ways to identify design requirements and characterize existing networks. You will also explore top-down approach to network design.

Use your *CCDA 200-310 Official Cert Guide* textbook to complete the following readings:

- Chapter 1, "Network Design Methodology," pages 3–28.
- Chapter 2: "Network Design Models," pages 39–68

View the following Skillsoft videos:

- Skillsoft (n.d.) *DESGN 3.0: Design Methodology* [Video]. 57 minutes
- Skillsoft (n.d.) *DESGN 3.0: Design Hierarchy* [Video]. 47 minutes
- Skillsoft (n.d.) *DESGN 3.0: Design Modularity* [Video]. 61 minutes
- Skillsoft (n.d.) *DESGN 3.0: Design Scalability* [Video]. 55 minutes

Networking

The following resources to introduce you to networking concepts:

- Skillsoft (n.d.) *CCENT: Overview of Networking* [Video]. 31 minutes

Academic Resources

For help with navigating the Capella library, writing center, and critical thinking, refer to the Tools and Resources section of the courseroom.

u01s3 - Prepare: Software and Technology Access

In this course, you will be using software and technology that is needed to complete designated activities and assignments. There is no additional cost for this software and technology. Some software packages will be made available to you at no additional cost through Capella's subscription with Microsoft, while other software packages are available for free download through open-source licensing.

Capella University requires learners to meet certain minimum computer requirements. Please note that some software required for a course may exceed these minimum requirements. Check the requirements for the software you may need to download and install to make sure it will work on your device. Most software will require a Windows PC. If you use a Mac, refer to Installing a Virtual Environment and Windows on a Mac.

The software and technologies below are strongly recommended to support you in completing the course objectives. If you have access to other tools that you believe may still meet the requirements of this course, please discuss your selected alternatives with your instructor.

If you use assistive technology or any alternative communication methods to access course content, please contact Disability Services with any access-related questions or to request accommodations.

For this course, follow the instructions provided through the links below to download and install software or register for an account, as required.

Microsoft Software

1. If you have a Capella Microsoft Imagine account, go to Step 2. Otherwise, see the instructions for registering an account at MS Imagine – Registration.
2. Log into the Capella Microsoft Imagine WebStore.
3. Identify the version of Microsoft Visio that is compatible with your operating system.
4. Download and install.

Practice Labs

This Capella course offers real-world, hands-on labs provided by Practice Labs in many of the weeks in this course. Click the Practice Labs Orientation link in the first week to access an introductory lab.

Additional Online Resources

The Courseroom Software Resources provide links to download and install software.

The course materials you have procured include an access code for additional online resources. Follow the instructions below.

Note: As a Capella learner, you have access to IT online resources through Capella's Skillsoft subscription, where you can find helpful materials.

u01d1 - Write Your Discussion Post

Design Approach

Sally is a consultant working on an organization upgrade. She has collected all customer requirements, audited the current environment, and developed a summary report for the organization. She is now contemplating an approach for network design.

Compare and contrast top-down and bottom-up design approaches.

1. Identify the design approach that you feel Sally should take and support your decision.
2. Identify the steps that Sally must follow when using the design approach you recommended.

Complete your initial post by midweek.

Response Guidelines

Respond to at least two other learners' posts. Provide support for or respectfully challenge the ideas of your fellow learners and provide additional context.

Course Resources
Undergraduate Discussion Participation Scoring Guide

u01s4 - Review: Final Course Project

Final Course Project

At the end of this course, you will submit a paper as your final course project.

There are five components to the final project:

- Week 1: Summary Report.
- Week 2: Network Structuring Plan.
- Week 3: Campus and Data Center Strategy.
- Week 4: Remote Connectivity Design.
- Week 5: Final Design Proposal.

To achieve a successful project experience and outcome, you are expected to meet the following requirements:

- Read the course project description to learn the requirements for your course project, which is due in Week 5. Examine the project's objectives and requirements, and view the grading criteria. Note that one of the criteria on which your project will be evaluated is the effectiveness of your written communication.
- Begin preparing for your final project by observing how upcoming weekly assignments and discussions will be incorporated as components in your final project. Refer to supplemental resources, optional readings, Web sites and articles, and additional suggested materials to begin your research. Contact your instructor if you have any questions about the course project or the associated project components.
- You are strongly encouraged to begin working on the course project now and continue to work on it throughout the course.
- Completing the final project will require several hours of Internet and library research. Writing the paper will also take several hours. Take time during this week, and in the coming weeks, to begin researching and gathering potential references to support your final paper due in the last week of the course.

u01v1 - Hands-On Lab: Practice Labs Orientation: Module Zero - Basics

This lab is designed to familiarize you with the Practice Labs platform. This is a great time to ensure that you can access the labs without any technical difficulty.

Click the button below to access the hands-on lab.

For Practice Labs Technical support, refer to the Tools and Resources section of the courseroom.

Lab time: 30 minutes

Course Resources

Practice Labs Orientation: Module Zero – Basics

u01v2 - Hands-On Lab: Network Management - Diagrams, Symbols and Documentations

Read the requirements for all related course activities in this week before completing this lab. Follow the lab instructions carefully, as you may be required to take screenshots or produce lab-related documents as part of graded activities. As you complete the lab, take notes as needed to help you meet all the requirements.

Click the button below to access the hands-on lab.

Note: For this hands-on lab only, complete **Exercise 2**.

For Practice Labs Technical support, refer to the Tools and Resources section of the courseroom.

Lab time: 30 minutes

u01v3 - Hands-On Lab: Introduction to the OSI Model

Read the requirements for all related course activities this week before completing this lab. Follow the lab instructions carefully, because you may be required to take screenshots or produce lab-related documents as part of graded activities. As you complete the lab, take notes as needed to help you meet all requirements.

Click the button below to access the hands-on lab.

For Practice Labs Technical support, refer to the Tools and Resources section of the courseroom.

Lab time: 60 minutes

u01v4 - Hands-On Lab: Configure IPv4, IPv6 Addressing and Routing

Read the requirements for all related course activities this week before completing this lab. Follow the lab instructions carefully, because you may be required to take screenshots or produce lab-related documents as part of graded activities. As you complete the lab, take notes as needed to help you meet all requirements.

Click the button below to access the hands-on lab.

For Practice Labs Technical support, refer to the Tools and Resources section of the courseroom.

Lab time: 60 minutes

u01s5 - Practice: Self-Paced Tutorial Videos

It is recommended that you complete the self-paced tutorial videos throughout the course.

The following self-placed tutorial videos are time-intensive but can be used as a supplement to prepare for the assignment.

- Go to the CompTIA Network+ N10-006: Network Architecture Part 1 (Time: 3 hours, 8 minutes) video.
  - Complete all of the topics in all of the lessons on the page.
- Go to the CompTIA Network+ N10-006: Industry Standards, Practices, and Network Theory (Time: 2 hours, 46 minutes) video.
  - Complete all of the topics in all of the lessons on the page.

u01a1 - Summary Report

Note: You must have a solid understanding of your IT projects as you prepare for it. You can prepare by gathering facts about the company you are working or consulting for and identifying project needs.

At EverGreen, you have been asked to develop an initial scope document and proposal for deploying a Cisco infrastructure. The hands-on labs this week allow you to practice using diagrams, symbols, and documents that support network management. The labs will also help you learn to configure IPv4 and IPv6 addressing and routing, and get an introduction to the OSI model. This should help you articulate the strategies you will lay out in your proposal for designing and deploying your strategy.

Preparation

Prepare for this assignment by doing the following:

- Complete the required weekly reading material.
- Review the interactive Practice Labs scenario for this week and the following:
  - CompTIA Network+ N10-007: Documentation and Diagrams and Business Continuity (Time: 54 minutes)
    - Section: Documentation and Diagram Types
- Research this topic using articles, books, or Web sites to support your paper.
- Complete the self-paced tutorials.

Instructions

Your goal is to develop an initial scope document and proposal for deploying a Cisco infrastructure. You are to describe the organization and environment and to identify the process, benefits, and risks for deploying virtualization within that environment.

Each organization presents its own challenges. As part of this redesign, you are asked to evaluate the existing infrastructure and make all improvements you believe are appropriate to improve the cost and efficiency of managing the network.

Now that you have an understanding of the project and the company's needs, complete the following for this project component:

1. Identify the main business goals; include information relative to organizational user, organizational systems, and network requirements. Describe the design and customer requirements for the organization.
2. Identify the business and IT drivers, forces, and challenges relevant to the organization's design plan.
3. Describe the different Cisco-based network architecture approaches for an enterprise. Identify the architecture approaches that you will likely implement as part of this project. Pay close attention to the assignments you will have in the course as they will help you with this decision.
4. Map and characterize the existing network and sites. Use the information provided in the scenario in the project description to develop a basic map of the existing network topology. Include location information and types of servers, supported network applications, protocols, and locations and types of network devices and cabling.
5. Identify the core services of the new headquarters location including information related to data storage, e-mail and Web services, and VPN technology.
6. Describe the management and auditing tools that you will use to audit the organization's network. Discuss what information to gather, and identify the third-party tools you will use to do this (for example, CiscoWorks, NetQoS, SolarWinds, Network General Sniffer, and so on).
7. Identify the actions needed to prepare the network for the design of the new headquarters. From the information that you gathered using the Practice Labs scenarios, discuss your recommendations and requirements necessary for the organization's network update.

Deliverables

- Identify the main business goals; include information relative to organizational user, organizational systems, and network requirements.
- Describe the design and customer requirements for the organization.
- Identify the business and IT drivers, forces, and challenges relevant to the organization's design plan.
- Describe the different Cisco-based network architecture approaches for an enterprise.
- Map and characterize the existing network sites. Use the information provided in the scenario in the project description to develop a basic map of the existing network topology.
- Identify the core services of the new headquarters location including information related to data storage, e-mail and Web services, and VPN technology.
- Describe the management and auditing tools that you will use to audit the organization's network.
- Identify the actions needed to prepare the network for the design of the new headquarters.

Requirements

- **Written Communication:** Make sure that your paper is professionally written, structured, and free of errors.
- **APA Formatting:** Follow APA style and Formatting guidelines for citation.
- **Number of resources:** Include at least three references from authoritative articles, books, or Web sites.
- **Suggested length of proposal:** Use the IT-4160 Week 1 Template to complete this assignment. You may use screenshots from the Practice Labs if applicable.
- **Font and Font Size:** Arial, 12-point.
- **Submission Requirements:** Submit your proposal as a Word document in the assignment area.

Note: Your instructor may use the Writing Feedback Tool when grading this assignment. The Writing Feedback Tool is designed to provide you with guidance and resources to develop your writing based on five core skills. You will find writing feedback in the Scoring Guide for the assignment, once your work has been evaluated. Learn more about the Writing Feedback Tool on the course Tools and Resources page.

Competencies Measured

By successfully completing this assignment, you will demonstrate your proficiency in the following course competencies:

- Competency 1: Plan a strategy for designing and modeling a variety of Cisco-based networks that solve business problems.
  - Identify the main business problems and requirements of a project and include information relative to organizational user, systems, and network requirements.
  - Describe an organization in detail and include information relative to its size, location, organizational user, and network.
- Competency 2: Design a variety of Cisco-based networks and modules.
  - Describe the core services of an organization and include information related to data storage, e-mail and Web services, and VPN technology.

- Competency 3: Develop models of Cisco networks based on previously developed designs.
  - Map existing network and sites for an organization and include information relative to location, types of servers, supported network applications, protocols, network devices, and media.
- Competency 4: Manage Cisco services, protocols, and devices for a planned design.
  - Describe the actions necessary to prepare for a new network design.
- Competency 5: Evaluate Cisco-based models and designs.
  - Describe the different Cisco-based network architecture approaches while identifying the most appropriate architecture for an organization.
- Competency 7: Apply security strategies to a Cisco-based network design.
  - Describe the management and auditing tools effective for an organization's network.
- Competency 8: Communicate effectively.
  - Follow APA style and formatting guidelines for citations and create a document that is clearly written and generally free of grammatical errors.

u01s6 - Plan: Industry Certification

After you complete several Capella courses, you may choose to pursue industry certification. Capella provides access to industry-recognized, certification exam preparation materials. Courses like this one contain certification-related content, and completing the course is the first step toward preparing for a corresponding certification exam.

For a list of certification exams and related courses, visit the Industry Certifications page. Here, you can also learn more about qualifications, the process, how to prepare for the exam, and how to earn a free exam voucher.

Unit 2 >> LAN and WAN Design

Introduction

Major Network Design Concepts

The LAN and WAN network are the main networks for EverGreen. As a consultant at Geekorologist, your task is to design this major network. As you work on your design, work with Albert, EverGreen's technical

operations manager, to keep in mind concepts of security, wireless, and stability just to name a few.

This week, you will learn best practices and strategies for LAN and WAN Design. The research and studies for this week describe a modular approach to network design. The studies also describe network hierarchies and provide instructions for creating a network hierarchy. This week also explores management protocols and features.

The discussion centers on modularization and security. For the project this week, you will develop a network-structuring plan for your organization's Cisco infrastructure design project.

To-do List:

- **Discussion:** Participate in a discussion centering on modularization and security.
- **Assignment:** Write a paper contemplating the role of security services within network architecture.
- **What You Need To Know:** Learn about Network Design, Network Implementation, and CompTIA Network documentation, diagrams, and business continuity.
- **Prepare:** Download any needed software such as Microsoft Visio and Microsoft PowerPoint.
- **Hands-On Lab:** Practice configuring and verifying a Basic WAN Connection, troubleshoot the WAN, and configure IPv5 and IPv6 Addressing.
- **Practice:** Self-Paced Tutorial Video

Learning Activities

u02s1 - Activity Overview

Discussion Overview

In your discussion this week, you and the enterprise server infrastructure team at EverGreen will plan a DNS infrastructure rebuild for a customer environment.

Assignment Overview

Complete all of this week's labs before beginning the assignment. You may be directed to save screenshots from the labs for submission with your assignment.

u02s2 - What You Need to Know

Network Design

The resources for this week describe a modular approach to network design. The resources describe network hierarchies and provide instructions for creating a network hierarchy. This week also explores management protocols and features.

Use your *CCDA 200-310 Official Cert Guide* textbook to complete the following:

- Chapter 3, "Enterprise LAN Design," pages 81–115.
- Chapter 5, "Wireless LAN Design," pages 167–204.
- Chapter 7, "WAN Design," pages 249–262.

View the following Skillsoft videos:

- Skillsoft (n.d.) *DESGN 3.0: Enterprise Architecture* [Video]. 57 minutes
- Skillsoft (n.d.) *DESGN 3.0: Scalable Addressing and IP Addressing Schemes* [Video]. 53 minutes
- Skillsoft (n.d.) *DESGN 3.0: Wireless LAN Design* [Video]. 80 minutes

Network Implementation

This week's resources will also introduce you to implementing network design. To learn more, view the following Skillsoft video:

- Skillsoft (n.d.) *DESGN 3.0: Implementing Network Design* [Video]. 30 minutes

Security Mechanisms

Resources for this week will provide you information regarding integrating security mechanisms, physical security, infrastructure protection, and implementing security in the enterprise edge.

Use your *CCDA 200-310 Official Cert Guide* textbook to complete the following:

- Chapter 12, "Integrating Security Mechanisms into Network Design," pages 502–503.
- Chapter 12, "Physical Security," pages 510–512.
- Chapter 12, "Infrastructure Protection," pages 512–513.
- Chapter 13, "Implementing Security in the Enterprise Edge," pages 548–550.

To learn more, view the following Skillsoft video:

- Skillsoft (n.d.) *DESGN 3.0: Security Control Considerations* [Video]. 34 minutes

u02d1 - Write Your Discussion Post

Overwhelming Security

Joe, a new network engineer, is working on the redesign of EverGreen. He has identified the organizational needs and created the infrastructure summary report. He is in the process of developing the architectural models for the organization when he begins to become overwhelmed as he contemplates the role of security services within the architecture. What advice can you offer Joe?

In your initial response, include the following:

- Describe how the modular approach may help Joe.
- Identify the modules or layers of security services that should be implemented.
- Provide one example of a security service implementation.

Complete your initial post by midweek.

Response Guidelines

Read the posts and respond to at least two peers. Provide support for or respectfully challenge the ideas of your fellow learners and provide additional context.

Course Resources
Undergraduate Discussion Participation Scoring Guide

u02v1 - Hands-On Lab: Configure and Verify a Basic WAN Connections Introduction

Read the requirements for all related course activities in this week before completing this lab. Follow the lab instructions carefully, as you may be required to take screenshots or produce lab-related documents as part of graded activities. As you complete the lab, take notes as needed to help you meet all requirements.

Click the button below to access the hands-on lab.

For Practice Labs Technical support, refer to the Tools and Resources section of the courseroom.

Lab time: 60 minutes

u02v2 - Hands-On Lab: Troubleshooting the WAN

Read the requirements for all related course activities in this week before completing this lab. Follow the lab instructions carefully, as you may be required to take screenshots or produce lab-related documents as part of graded activities. As you complete the lab, take notes as needed to help you meet all requirements.

Click the button below to access the hands-on lab.

For Practice Labs Technical support, refer to the Tools and Resources section of the courseroom.

Lab time: 60 minutes

u02v3 - Hands-On Lab: Configuring IPv5 and IPv6 Addressing

Read the requirements for all related course activities in this week before completing this lab. Follow the lab instructions carefully, as you may be required to take screenshots or produce lab-related documents as part of graded activities. As you complete the lab, take notes as needed to help you meet all requirements.

Click the button below to access the hands-on lab.

For Practice Labs Technical support, refer to the Tools and Resources section of the courseroom.

Lab time: 60 minutes

u02s3 - Practice: Self-Paced Tutorial Video

It is recommended that you complete the self-paced tutorial videos throughout the course.

The following self-placed tutorial video is time-intensive, but it can be used as a supplement to prepare for the assignment.

- Go to the CompTIA Network+ N10-006: Network Architecture Part 2 video. (Time: 2 hours, 50 minutes)
    - Complete all of the topics in all of the lessons on the page.

u02a1 - Network Structuring Plan

Note: For this assignment, use the reading materials, the interactive scenarios, and any additional resources you find helpful to provide a network-structuring plan for your Cisco-based infrastructure. You are also required to provide a diagram that describes your network hierarchy topology.

EverGreen has asked you to assist a new network engineer with security services within the architecture. The hands-on labs this week allow you to practice configuring and verifying a basic WAN connection, and configuring IPv5 and IPv6 addressing. This should help you articulate the strategies you will lay out in your proposal for designing a network hierarchy topology strategy.

Preparation

To prepare and gather requirements for the network structure plan, do the following:

- Perform the Practice Labs.
- Research this topic using articles, books, or Web sites to support your paper.
- Complete the self-paced tutorials.

Instructions

Complete the following for this project component:

1. Create a network structure plan that is appropriate for the organization. Your structure plan should correlate with the business and IT goals of the organization, and it should match the design information that you provided for your previous assignment.
2. Compare and contrast hierarchy and modular designs. Discuss the advantages and disadvantages of each and discuss which design strategy you feel is the best choice for the redesign project for the organization.
3. Create a network hierarchy design that displays a structure for the organization and that includes information relative to access, distribution, and core layers. Your diagram should include routers, switches, and basic resources servers and be designed to appropriately meet the specific organizational goals.
4. Write an analysis of your network hierarchy design that acts as rationale for your decision-making and supports your structure. Include a description of each layer (for example, access, distribution, and core) and an explanation of how your specific design supports security and scalability discussed as part of your organizational goals.
5. Using the Cisco enterprise campus architecture model, create a high-level enterprise architecture diagram that displays a structure for the organization and that includes information relative to the enterprise campus, the enterprise edge, and the service provider modules. Your diagram should include infrastructure components that are specific to your organization.

6. Write an analysis of your enterprise architecture diagrams that acts as rationale for your decision-making and supports your structure. Include a description of each module included within (for example, enterprise campus, the enterprise edge, and the service provider modules), the devices found at each module, and an explanation of how your specific design supports the organizational goals.
7. Describe how your specific WAN infrastructure design components will be deployed and managed. Address basic configuration and management tasks necessary to implement the network. How does your design support these tasks?
8. Describe how your configuration troubleshooting activities and experiences are supported by your plan. How did the labs and tutorials influence your decisions? What did you learn from this week's labs and tutorials?

Deliverables

- Create a network structure plan that is appropriate for the organization. The structure plan should correlate with the business and IT goals of the organization.
- Compare and contrast hierarchy and modular designs.
- Create a network hierarchy design diagram that displays a structure for the organization and that includes information relative to access, distribution, and core layers.
- Write an analysis of your network hierarchy design that acts as rationale for your decision-making and supports your structure.
- Using the Cisco enterprise campus architecture model, create a high-level enterprise architecture diagram that displays a structure for the organization and that includes information relative to the enterprise campus, the enterprise edge, and the service provider modules.
- Write a rationale for the enterprise architecture diagrams for your decision-making and supports your structure.
- Describe how your specific WAN infrastructure design components will be deployed and managed.

Requirements

- **Written Communication:** Make sure that your paper is professionally written, structured, and free of errors.
- **APA Formatting:** Follow APA style and Formatting guidelines for citations.
- **Number of resources:** Include at least three references from authoritative articles, books, or Web sites.
- **Suggested length of proposal:** Use the IT-4160 Week 2 Template to complete this assignment. You may use screenshots from the Practice Labs if applicable.
- **Font and Font Size:** Arial, 12-point.
- **Submission Requirements:** Submit your proposal as a Word document in the assignment area.

Note: Your instructor may use the Writing Feedback Tool when grading this assignment. The Writing Feedback Tool is designed to provide you with guidance and resources to develop your writing based on five core skills. You will find writing feedback in the Scoring Guide for the assignment, once your work has been evaluated. Learn more about the Writing Feedback Tool on the course Tools and Resources page

Competencies Measured

By successfully completing this assignment, you will demonstrate your proficiency in the following course competencies:

- Competency 1: Plan a strategy for designing and modeling a variety of Cisco-based networks that solve business problems.
  - Create a network structure plan that is appropriate for an organization's business goals.
- Competency 2: Design a variety of Cisco-based networks and modules.
  - Create a network hierarchy design that displays a structure for an organization and that includes information relative to access, distribution, and core layers.
  - Create a high-level enterprise architecture diagram that displays an effective structure for an organization and that includes information relative to the enterprise campus, the enterprise edge, and the service provider modules.
- Competency 3: Develop models of Cisco networks based on previously developed designs.
  - Create a high-level enterprise architecture model that accurately represents a Cisco enterprise campus architecture.
- Competency 4: Manage Cisco services, protocols, and devices for a planned design.
  - Describe how specific WAN infrastructure design components will be deployed and managed.
- Competency 5: Evaluate Cisco-based models and designs.
  - Provide an accurate comparison of hierarchy and modular designs that includes the advantages and disadvantages of each.
  - Write an analysis of a network hierarchy design that represents supportive rationale for a scalable and secure solution
- Competency 6: Troubleshoot Cisco network models and designs.
  - Describe device configuration troubleshooting activities and explain the role that these activities play in finding a solution for an infrastructure.
- Competency 7: Apply security strategies to a Cisco-based network design.
  - Write an analysis of an enterprise campus infrastructure module that represents supportive rationale for a scalable and secure solution.
- Competency 8: Communicate effectively.
  - Follow APA style and formatting guidelines for citations and create a document that is clearly written and generally free of grammatical errors.

Unit 3 >> Designing Campus and Data Center Networks

Introduction

Client-Ready Data Center Design

EverGreen wants a nice-looking data center that they may show potential clients. As the consultant for Geekorologist, your task is to develop a functional, scalable, and well-designed data center. Keep in mind EverGreen employees: Dirk, their IT engineer who will be concerned with the budget, and Surbhi, their project coordinator who will be checking on your progress.

This week you will learn best practices and strategies for designing campus and data center networks. The research and studies for this week describe campus design considerations and explore the campus infrastructure module. This week also explores enterprise data center considerations and network virtualization tools.

The discussion centers on routing protocols, and for the project this week, you will develop a campus and data center network for your organization's Cisco infrastructure design project.

To-do List:

- **Discussion:** Participate in a discussion about routing protocols.
- **Assignment:** Write a paper providing a data center strategy.
- **What You Need to Know:** Learn about implementing Data Center Security, Network and Campus Design, and Routing Protocols.
- **Prepare:** Download any needed software such as Microsoft Visio and Microsoft PowerPoint.
- **Hands-On Lab:** Practice configuring and verifying EIGRP and OSPF, and review routing concepts and protocols.
- **Practice:** Self-Paced Tutorial Video

Learning Activities

u03s1 - Activity Overview

Discussion Overview

In your discussion this week, you and the enterprise server infrastructure team at EverGreen will develop a functional, scalable, and well-designed data center.

Assignment Overview

Complete all of this week's labs before beginning the assignment. You may be directed to save screenshots from the labs for submission with your assignment. EverGreen has asked you to consider the challenges and benefits for virtualization. The hands-on labs in this week allow you to practice configuring and verifying EIGRP and OSPF, and well as routing concepts and protocols. This should help you articulate the strategies you lay out in your proposal for designing the campus and data center, along with a network diagram.

u03s2 - What You Need to Know

Implementing Data Center Security

The resource for this week describes implementing data center security.

Read the following in your *CCDA 200-310 Official Cert Guide* textbook:

- Chapter 13, "Implementing Security in the Data Center," pages 546–548.

Network and Campus Design

The resources for this week describe campus design considerations and explore the campus infrastructure module. The resources also explore enterprise data center considerations and network virtualization tools.

Read the following in your *CCDA 200-310 Official Cert Guide* textbook:

- Chapter 4, "Data Center Design," pages 127–162.
- Chapter 13, "Implementing Security in the Data Center," pages 546–548.

View the following Skillsoft videos:

- Skillsoft (n.d.) *DESGN 3.0: Campus Design* [Video]. 59 minutes
- Skillsoft (n.d.) *DESGN 3.0: Campus Design Part 2* [Video]. 58 minutes
- Skillsoft (n.d.) *DESGN 3.0: Virtualization in Network Design* [Video]. 27 minutes
- Skillsoft (n.d.) *DESGN 3.0: Network Programmability and Data Center Component Design* [Video]. 56 minutes

Routing Protocols

Resources this week will provide information on protocols, OSPF, BGP, and route manipulated and IP multicast.

Read the following in your *CCDA 200-310 Official Cert Guide*textbook:

- Chapter 10, "Routing Protocols," pages 380–386.
- Chapter 11, "OSPF, BGP, Route Manipulated and IP Multicast," pages 430–453.

u03d1 - Write Your Discussion Post

Routing Protocols

Joe, a new network engineer, is working on the redesign of EverGreen. He is considering virtualization and is trying to justify the cost to his superiors. Can you help?

Address the following in your initial response:

- What challenges might EverGreen face that could drive the need for virtualization?
- What benefits does virtualization offer?

Response Guidelines

Read the posts and respond to at least two peers. Provide support for or respectfully challenge the ideas of your fellow learners and provide additional context.

Course Resources
Undergraduate Discussion Participation Scoring Guide

u03v1 - Hands-On Lab: Configure and Verify EIGRP

Read the requirements for all related course activities in this week before completing this lab. Follow the lab instructions carefully, as you may be required to take screenshots or produce lab-related documents as part of graded activities. As you complete the lab, take notes as needed to help you meet all requirements.

Click the button below to access the hands-on lab.

For Practice Labs Technical support, refer to the Tools and Resources section of the courseroom.

Lab time: 60 minutes

u03v2 - Hands-On Lab: Configure and Verify OSPF

Read the requirements for all related course activities this week before completing this lab. Follow the lab instructions carefully, because you may be required to take screenshots or produce lab-related documents as part of graded activities. As you complete the lab, take notes as needed to help you meet all requirements.

Click the button below to access the hands-on lab.

For Practice Labs Technical support, refer to the Tools and Resources section of the courseroom.

Lab time: 60 minutes

u03v3 - Hands-On Lab: Routing Concepts and Protocols

Read the requirements for all related course activities this week before completing this lab. Follow the lab instructions carefully, because you may be required to take screenshots or produce lab-related documents as part of graded activities. As you complete the lab, take notes as needed to help you meet all requirements.

Click the button below to access the hands-on lab.

For Practice Labs Technical support, refer to the Tools and Resources section of the courseroom.

Lab time: 60 minutes

u03s3 - Practice: Self-Paced Tutorial Video

It is recommended that you complete the self-paced tutorial videos throughout the course.

The following self-placed tutorial video is time-intensive, but it can be used as a supplement to prepare for the assignment.

- Go to the CompTIA Network+ N10-006: Network Operations Part 1 video. (Time: 1 hour, 38 minutes)
  - Complete all of the topics in all of the lessons on the page.

u03a1 - Campus and Data Center Strategy

Note: For this assignment, use the reading materials, the interactive scenarios, and any additional resources you find helpful to provide a data center strategy. Your data center strategy should involve at least two separate locations within the organization. Include a discussion of the strategies and techniques that you would apply in the design of the campus and data center, along with a network diagram of your newly proposed design.

Preparation

Before beginning work on this assignment, do the following:

- Complete the required weekly reading material.
- Review the interactive Practice Labs scenario for this week.
- Research this topic using articles, books, or Web sites to support your paper.
- Complete the self-paced tutorial.

Instructions

Complete the following for this campus and database strategy project component:

1. Plan a campus and data center strategy that is appropriate for the organization. Your strategy should correlate with the business and IT goals of your organization and it should match the design information that you provided in previous assignments.
2. Using the Cisco enterprise campus architecture view, create a basic enterprise campus infrastructure module that displays a structure for the organization and that includes information relative to building access, building distribution, campus core, and server farm. Your diagram should include components that are specific to the organization and appropriately meet the specific organizational goals.
3. Write an analysis of your enterprise campus infrastructure module that acts as rationale for your decision-making and supports your structure. Include a description of each layer (for example, building access, building distribution, campus core, and server farm) and an explanation of how your specific design supports scalability and security to meet the organizational goals.
4. Describe characteristics and concerns for your campus infrastructure design that are specific to your organization and are relevant to application, environment, and device. Include in your discussion considerations such as those related to peer-to-peer applications, client-local server applications, client-enterprise edge applications, intrabuilding structures, campus transmission media, device types, and remote building structures that are specific for your organization.
5. Using the Cisco enterprise campus architecture view, create a basic enterprise data center infrastructure network topology diagram that displays a structure for the organization and that includes information relative to storage network, applications, and front-end network components. Your diagram should include components that are specific to the organization and appropriately meet the specific organizational goals.
6. Write an analysis of your data center infrastructure topology that acts as rationale for your decision-making and supports your structure. Include a description and considerations for each layer (for example, data

center access layer, data center aggregation layer, data center core layer) of the data center and include an explanation of how your specific design supports the organizational goals.

7. Describe how your specific campus and data center infrastructure components will be deployed and managed. Address basic configuration and management tasks necessary to implement the network. How does your design support these tasks?

Deliverables

- Plan a campus and data center strategy that is appropriate for the organization.
- Using the Cisco enterprise campus architecture view, create a basic enterprise campus infrastructure module that displays a structure for the organization.
- Write a rationale of your enterprise campus infrastructure module that acts as rationale for your decision-making and supports your structure.
- Describe characteristics and concerns for your campus infrastructure design that are specific to the organization and are relevant to application, environment, and device.
- Using the Cisco enterprise campus architecture view, create a basic enterprise data center infrastructure network topology diagram that displays a structure for the organization.
- Write a rationale of your data center infrastructure topology that acts as a rationale for your decision-making and supports your structure.

Requirements

- **Written Communication:** Make sure that your paper is professionally written, structured, and free of errors.
- **APA Formatting:** Follow APA style and Formatting guidelines for citations.
- **Number of resources:** Include at least three references from authoritative articles, books, or Web sites.
- **Suggested length of proposal:** Use the IT-4160 Week 3 Template to complete this assignment. You may use screenshots from the Practice Labs if applicable.
- **Font and Font Size:** Arial, 12-point.
- **Submission Requirements:** Submit your proposal as a Word document in the assignment area.

Note: Your instructor may use the Writing Feedback Tool when grading this assignment. The Writing Feedback Tool is designed to provide you with guidance and resources to develop your writing based on five core skills. You will find writing feedback in the Scoring Guide for the assignment, once your work has been evaluated. Learn more about the Writing Feedback Tool on the course Tools and Resources page.

Competencies Measured

By successfully completing this assignment, you will demonstrate your proficiency in the following course competencies:

- Competency 1: Plan a strategy for designing and modeling a variety of Cisco-based networks that solve business problems.
    - Plan a campus and data center strategy that is appropriate for an organization's business goals.

- Competency 2: Design a variety of Cisco-based networks and modules.
  - Create a basic enterprise campus infrastructure module that displays an effective structure for an organization and that includes information relative to building access, building distribution, campus core, and server farm.
  - Create a basic enterprise data center infrastructure network topology diagram that displays an effective structure for an organization and that includes information relative to storage network, applications, and front-end network components.
- Competency 3: Develop models of Cisco networks based on previously developed designs.
  - Create a basic enterprise campus infrastructure module that accurately represents a Cisco enterprise campus architecture.
- Competency 4: Manage Cisco services, protocols, and devices for a planned design.
  - Describe how organization-specific campus and data center infrastructure components are deployed and managed.
- Competency 5: Evaluate Cisco-based models and designs.
  - Describe characteristics and concerns for a campus infrastructure design that are specific to an organization and are relevant to application, environment, and device.
  - Write an analysis of a data center infrastructure topology that represents supportive rationale for a solution.
- Competency 6: Troubleshoot Cisco network models and designs.
  - Describe device configuration troubleshooting activities and explain the role that these activities play in finding a solution for an infrastructure.
- Competency 7: Apply security strategies to a Cisco-based network design.
  - Write an analysis of an enterprise campus infrastructure module that represents supportive rationale for a scalable and secure solution.
- Competency 8: Communicate effectively.
  - Follow APA style and formatting guidelines for resources and citations and create a document that is clearly written and generally free of grammatical errors.

Unit 4 >> Designing Remote Connectivity

Introduction

Remote Workers

EverGreen has many remote workers. As the consultant for Geekorologist, you will be tasked with designing the remote connectivity network. VPN technologies will be a large part of this design. Make sure you keep

EverGreen's technical operations manager, Albert in the loop since he is concerned with remote employees staying connected to the larger company.

This week, you will learn to design for remote connectivity on a Cisco-based network. The research and studies for this week describe WAN technology considerations and requirements and explore remote access network design for both the enterprise WAN and branch infrastructures.

The discussion centers around VPN connectivity strategies and the project component this week focuses on remote connectivity design for your organization's Cisco infrastructure design project.

To-do List:

- **Discussion:** Use the discussion to determine the best connectivity strategy for the organization.
- **Assignment:** Design a remote connectivity strategy for your Cisco-based infrastructure.
- **What You Need to Know:** Learn about WAN Technology.
- **Prepare:** Download any needed software such as Microsoft Visio and Microsoft PowerPoint.
- **Hands-On Lab:** Practice VPN Technologies and Services, implementing SSL VPN using ASA Device Manager, and work with Remote Connectivity.
- **Practice:** Self-Paced Tutorial Videos

Learning Activities

u04s1 - Activity Overview

Discussion Overview

In your discussion this week, you will determine the best connectivity strategy for EverGreen.

Assignment Overview

Complete all of this week's labs before beginning the assignment. You may be directed to save screenshots from the labs for submission with your assignment.

u04s2 - What You Need to Know

WAN Technology

The readings for this week describe WAN technology considerations and requirements.

Read the following in your *CCDA 200-310 Official Cert Guide* textbook:

- Chapter 6, "WAN Technologies and the Enterprise Edge," pages 215–244.
- Chapter 7, "WAN Design," pages 249–286.

Review the following Skillsoft video:

- Skillsoft (n.d.) *DESGN 3.0: Enterprise Network WAN and Edge* [Video]. 62 minutes

Remote Access

This week explores remote access network design for both the enterprise WAN and branch infrastructures.

View the following Skillsoft video:

- Skillsoft (n.d.) *CompTIA Network+ N10-007: Networking Monitoring and Remote Access Methods* [Video]. 104 minutes

Networking Devices

Review Types of Networking Devices.

- Skillsoft (n.d.). *CompTIA Network+ N10-007: Networking Devices* [Video]. 56 minutes

u04d1 - Write Your Discussion Post

VPN Connectivity Strategy

Joe, a new network engineer, is working on the redesign of EverGreen infrastructure. He has been approved to design a VPN infrastructure. He is trying to determine the best connectivity strategy for the organization. Can you help?

Address the following in your initial response:

- What VPN design considerations must be addressed?
- What VPN connectivity options are available?
- Include the benefits of each connectivity option.

Complete your initial post by midweek.

Response Guidelines

Read the posts and respond to at least two peers. Provide support for or respectfully challenge the ideas of your fellow learners and provide additional context.

Course Resources

Undergraduate Discussion Participation Scoring Guide

u04v1 - Hands-On Lab: VPN Technologies and Services

Read the requirements for all related course activities this week before completing this lab. Follow the lab instructions carefully, because you may be required to take screenshots or produce lab-related documents as part of graded activities. As you complete the lab, take notes as needed to help you meet all requirements.

Click the button below to access the hands-on lab.

For Practice Labs Technical support, refer to the Tools and Resources section of the courseroom.

Lab time: 60 minutes

u04v2 - Hands-On Lab: Implement SSL VPN using ASA Device Manager

Read the requirements for all related course activities this week before completing this lab. Follow the lab instructions carefully, because you may be required to take screenshots or produce lab-related documents as part of graded activities. As you complete the lab, take notes as needed to help you meet all requirements.

Click the button below to access the hands-on lab.

For Practice Labs Technical support, refer to the Tools and Resources section of the courseroom.

Lab time: 60 minutes

u04v3 - Hands-On Lab: Work with Remote Connectivity

Read the requirements for all related course activities this week before completing this lab. Follow the lab instructions carefully, because you may be required to take screenshots or produce lab-related documents as part of graded activities. As you complete the lab, take notes as needed to help you meet all requirements.

Click the button below to access the hands-on lab.

For Practice Labs Technical support, refer to the Tools and Resources section of the courseroom.

Lab time: 60 minutes

u04s3 - Practice: Self-Paced Tutorial Videos

It is recommended that you complete the self-paced tutorial videos throughout the course.

The following self-placed tutorial video is time-intensive, but they can be used as a supplement to prepare for the assignment.

- Go to the CompTIA Network+ N10-006: Network Operations Part 2 video. (Time: 1 hour, 45 minutes)
  - Complete all of the topics in all of the lessons on the page.
- Go to the CompTIA Network+ N10-007: Networking Monitoring and Remote Access Methods video. (Time: 1 hour, 44 minutes)
  - Complete all of the topics in all of the lessons on the page.

u04a1 - Remote Connectivity Design

Note: For this assignment, use the reading materials, the interactive scenarios, and any additional resources you find helpful to design a remote connectivity strategy for your Cisco-based infrastructure. You are required to provide a written description and a diagram that describes your chosen topology.

EverGreen has asked you to design a remote connectivity network. The hands-on labs this week allow you to practice VPN technologies and services, implement SSL VPN using ASA Device Manager, and work with

remote connectivity. This should help you articulate the strategies you will lay out in your proposal for designing and deploying your remote connectivity strategy.

Preparation

Before beginning work on your assignment, do the following:

- Complete the required weekly reading material.
- Review the interactive Practice Labs scenario for this week and the following video:
  - CompTIA Network+ N10-007: Networking Devices. (Time 56 minutes)
    - Section: Types of Networking Devices
- Research this topic using articles, books, or Web sites to support your paper.
- Complete the self-paced tutorials.

Instructions

Complete the following for this project component:

1. Plan a remote connectivity strategy that is appropriate for the organization. Your strategy should correlate with the business and IT goals of the organization, and it should match the design information that you provided on previous assignments.
2. Using the Cisco enterprise campus architecture view, create a basic enterprise edge module diagram that displays a structure for the organization including the e-commerce module, Internet connectivity module, remote access and VPN module, and WAN and MAN and site-to-site VPN Module. Your diagram should include components that are specific to the organization and appropriately meet the specific organizational goals.
3. Write an analysis of your enterprise edge module that acts as rationale for your decision-making and supports your structure. Include a description of each module included within (for example, e-commerce module, Internet connectivity module, remote access and VPN module, and WAN and MAN and site-to-site VPN module) and an explanation of how your specific design supports security and scalability as part of the organizational goals.
4. Design a WAN infrastructure network topology diagram that displays a structure for the organization and that includes information relative to storage network, applications, and front-end network components. Your diagram should include components that are specific to the organization and appropriately meet the specific organizational goals.
5. Write an analysis of your WAN infrastructure topology that acts as rationale for your decision-making and supports your structure. Include a description and considerations for your topology (for example, star, hub-and-spoke, full mesh, and partially meshed). Discuss transmission type, pricing, contacts, device, application requirements, traffic, operational complexity, and video and voice support. Include in your discussion considerations for a comparison of ASDL, data and voice of cable, SONET, DWDM, dark fiber, and wireless.
6. Describe how your specific WAN infrastructure design supports the management and scalability of its components.

7. Describe how your configuration and troubleshooting activities and experiences support your plan. How did the labs and tutorials influence your decisions? What did you learn from this week's labs and tutorials?

Deliverables

- Describe how the remote connectivity design strategy correlates with business and IT goals.
- Enterprise Edge module diagram.
- Rationale for the Enterprise Edge module of your design decision.
- Description of each module.
- WAN topology diagram (see above to see what needs to be included).
- Rationale for the WAN of your design decision.
- Description of how WAN design supports the management and scalability of its components.
- Describe how the configuration and troubleshooting activities and experience support the plan.

Requirements

- **Written Communication:** Make sure that your paper is professionally written, structured, and free of errors.
- **APA Formatting:** Follow APA style and Formatting guidelines for citations.
- **Number of resources:** Include at least three references from authoritative articles, books, or Web sites.
- **Suggested length of proposal:** Use the IT-4160 Week 4 Template to complete this assignment. You may use screenshots from the Practice Labs if applicable.
- **Font and Font Size:** Arial, 12-point.
- **Submission Requirements:** Submit your proposal as a Word document in the assignment area.

Note: Your instructor may use the Writing Feedback Tool when grading this assignment. The Writing Feedback Tool is designed to provide you with guidance and resources to develop your writing based on five core skills. You will find writing feedback in the Scoring Guide for the assignment, once your work has been evaluated. Learn more about the Writing Feedback Tool on the course Tools and Resources page.

Competencies Measured

By successfully completing this assignment, you will demonstrate your proficiency in the following course competencies:

- Competency 1: Plan a strategy for designing and modeling a variety of Cisco-based networks that solve business problems.
  - Plan a remote connectivity strategy that is appropriate for an organization's business goals.
- Competency 2: Design a variety of Cisco-based networks and modules.
  - Create a basic enterprise edge module diagram that displays an effective structure for an organization and includes information relative to the enterprise campus, the enterprise edge, and the service provider modules.
  - Design a WAN infrastructure network topology diagram that displays an effective structure for an organization and that includes information relative to storage network, applications, and front-end

network components.

- Competency 3: Develop models of Cisco networks based on previously developed designs.
  - Create a basic enterprise edge module diagram that accurately represents a Cisco enterprise campus architecture.
- Competency 4: Manage Cisco services, protocols, and devices for a planned design.
  - Describe how a WAN infrastructure design supports the management and scalability of its components.
- Competency 5: Evaluate Cisco-based models and designs.
  - Write an analysis of a WAN infrastructure topology that represents supportive rationale for a solution.
- Competency 6: Troubleshoot Cisco network models and designs.
  - Describe device configuration troubleshooting activities and explain the role that these activities play in finding a solution for an infrastructure.
- Competency 7: Apply security strategies to a Cisco-based network design.
  - Write an analysis of an enterprise edge module that represents supportive rationale for a scalable and secure solution.
- Competency 8: Communicate effectively.
  - Follow APA style and formatting guidelines for resources and citations and create a document that is clearly written and generally free of grammatical errors.

Unit 5 >> Designing Voice and Video Networks

Introduction

Voice and Video Networking

One of the last areas of the network you will design for EverGreen is the voice and video network. As the consultant for Geekorologist, you will be tasked with designing and obtaining approval for the voice and video network. The company will use the network quite a bit and it is important to have a reliable and stable network. William, EverGreen's building manager, will certainly have something to say about your design. Remember, Surbhi can help you if you need help with William.

This week will offer information related to designing voice and video networks. Through the studies this week, you will learn about the requirements and considerations for integrating and deploying voice and video architectures. This week also explores services and technologies for voice and video networks as well as the concerns related to video and voice data, such as network delay, jitter, echo, bandwidth, and QoS.

This week, you will finalize your Infrastructure design project. You will compile and refine the project components from the first four weeks, as well as design a strategy for Cisco-based services and technologies to include in the final version of your proposal.

To-do List:

- **Discussion:** Participate in a discussion about your course reflections.
- **Assignment:** Write a paper evaluating existing infrastructure and recommend improvements you believe are appropriate to improve the cost and efficiency of managing the network.
- **What You Need to Know:** Learn about voice and video data technologies and services.
- **Prepare:** Download any needed software such as Microsoft Visio and Microsoft PowerPoint.
- **Hands-On Lab:** Practice configuring and verifying DHCP and DNS.
- **Plan:** Explore industry certification resources.

Learning Activities

u05s1 - Activity Overview

Discussion Overview

In your discussion this week, you will discuss your experience in this course.

Assignment Overview

Complete all of this week's labs before beginning the assignment. You may be directed to save screenshots from the labs for submission with your assignment.

u05s2 - What You Need to Know

Voice and Video Data

This week's reading identifies the requirements and considerations for integrating and deploying voice and video architectures. The reading also explores services and technologies for voice and video networks. The reading addresses concerns related to video and voice data such as network delay, jitter, echo, bandwidth, and QoS, and explores voice and video technologies and services.

Read the following in your *CCDA 200-310 Official Cert Guide* textbook:

- Chapter 14, "Voice and Video Design," pages 557–605.

View the following Skillsoft video:

- Skillsoft (n.d.) *DESGN 3.0: Voice and Video Design Considerations* [Video]. 54 minutes

Networking Devices

Review Advanced Networking.

- Skillsoft (n.d.). *CompTIA Network+ N10-007: Networking Devices* [Video]. 60 minutes

u05d1 - Write Your Discussion Post

Course Reflections

Discuss your experience in this course by answering the following questions:

- What you have learned in this course?
- How might the information benefit you in the future?
- How would you rate your experience using the interactive Practice Labs scenarios and labs offered in this course?

Complete your initial post by midweek.

Response Guidelines

Respond to two other learners. Compare and contrast your experiences with theirs.

Course Resources
Undergraduate Discussion Participation Scoring Guide

u05v1 - Hands-On Lab: Configure and Verify DHCP and DNS

Read the requirements for all related course activities this week before completing this lab. Follow the lab instructions carefully, because you may be required to take screenshots or produce lab-related documents as

part of graded activities. As you complete the lab, take notes as needed to help you meet all requirements.

Click the button below to access the hands-on lab.

For Practice Labs Technical support, refer to the Tools and Resources section of the courseroom.

Lab time: 60 minutes

u05s3 - Practice: Self-Paced Tutorial Videos

It is recommended that you complete the self-paced tutorial videos throughout the course.

The following self-placed tutorial videos are time-intensive, but they can be used as a supplement to prepare for the assignment.

- Go to the CompTIA Network+ N10-006: Troubleshooting Part 1 video. (Time: 1 hour, 50 minutes)
  - Complete all of the topics in all of the lessons on the page.
- Go to the CompTIA Network+ N10-006: Troubleshooting Part 2 video. (Time: 1 hour, 26 minutes)
  - Complete all of the topics in all of the lessons on the page.

u05a1 - Final Design Proposal

Note: For this assignment, your goal is to compile all of your previous assignments into one final design proposal.

The project organization presents several challenges. As part of this redesign, you are asked to evaluate the existing infrastructure and make all improvements you believe are appropriate to improve the cost and efficiency of managing the network.

Preparation

Before beginning work on this assignment, do the following:

- Review all previous work and make necessary revisions based on your instructor's feedback.
- Complete the required weekly reading material.

- Review the interactive Practice Labs scenario for this week and the following video:
  - CompTIA Network+ N10-007: Networking Devices. (Time: 60 minutes)
    - Section: Advanced Networking
- Research this topic using articles, books, or Web sites to support your paper.
- Complete the self-paced tutorials.

Instructions

Complete the following for your final infrastructure proposal:

1. Create a project summary that details appropriate business requirements, IT goals, and drives and challenges for the given scenario.
2. Design a network-structuring plan that is accurately represented using the design diagrams and a comprehensive written analysis that appropriately meets the organization's needs.
3. Design a campus and data center strategy that is accurately represented using the design diagrams and a comprehensive written analysis that appropriately meets the organization's needs.
4. Design a remote connectivity strategy that is accurately represented using the design diagrams and a comprehensive written analysis that appropriately meets the organization's needs.
5. Create a voice network deployment strategy that is accurately represented using a written analysis that is comprehensive and appropriately meets the organization's needs. For your voice network strategy, complete the following:
   - Describe voice-enabling technology, including the connectivity and components needed to design a voice solution. Describe different types of voice implementations and discuss the modules of an enterprise network that are involved in a voice solution. Include a discussion of the main components of IP telephony with a description of each. Describe voice signaling and routing exchange.
   - Using the Cisco enterprise campus architecture view, create a high-level voice network solution diagram that displays a voice structure for your organization including the components at the campus infrastructure, server farms, and enterprise edges. Review the self-paced tutorial in Week 1 for an example of this diagram. Your diagram should include components that are specific to your organization and appropriately meet the specific organizational goals.
   - Write an analysis of your voice network solution diagram that acts as a rationale for your decision-making and supports your structure. Include a description of the voice communication that occurs between the campus infrastructure, server farm, and enterprise edge. Also include an explanation of how your specific design supports your organizational goals.
   - Describe the voice quality considerations and concerns in designing an effective voice infrastructure. Include information relevant to jitter, packet loss, echo, and delay.

Deliverables

- Create a project summary.
- Design a network-structuring plan that is accurately represented using the design diagrams and a comprehensive written analysis that appropriately meets the organization's needs.

- Design a campus and data center strategy that is accurately represented using the design diagrams and a comprehensive written analysis that appropriately meets the organization's needs.
- Design a remote connectivity strategy that is accurately represented using the design diagrams and a comprehensive written analysis that appropriately meets the organization's needs.
- Create a voice network deployment strategy that is accurately represented using a written analysis that is comprehensive and appropriately meets the organization's needs. Describe the voice quality considerations and concerns in designing an effective voice infrastructure. Include information relevant to jitter, packet loss, echo, and delay.

Requirements

- **Written Communication:** Make sure that your paper is professionally written, structured, and free of errors.
- **APA Formatting:** Paper, resources, and citations should be formatted according to current APA style and Formatting.
- **Number of resources:** Include at least three references from authoritative articles, books, or Web sites.
- **Suggested length of proposal:** Use the IT-4160 Week 5 Template to complete this assignment. You may use screenshots from the Practice Labs if applicable.
- **Font and Font Size:** Arial, 12-point.
- **Submission Requirements:** Submit your proposal as a Word document in the assignment area.

Note: Your instructor may use the Writing Feedback Tool when grading this assignment. The Writing Feedback Tool is designed to provide you with guidance and resources to develop your writing based on five core skills. You will find writing feedback in the Scoring Guide for the assignment, once your work has been evaluated. Learn more about the Writing Feedback Tool on the course Tools and Resources page.

Competencies Measured

By successfully completing this assignment, you will demonstrate your proficiency in the following course competencies:

- Competency 1: Plan a strategy for designing and modeling a variety of Cisco-based networks that solve business problems.
  - Create a project summary that details appropriate business requirements, IT goals, and drives and challenges for the given scenario.
- Competency 2: Design a variety of Cisco-based networks and modules.
  - Design a network-structuring plan that is accurately represented using the design diagrams and a comprehensive written analysis that appropriately meets the organization's needs.
  - Design a campus and data center strategy that is accurately represented using the design diagrams and a comprehensive written analysis that appropriately meets the organization's needs.
  - Design a remote connectivity strategy that is accurately represented using the design diagrams and a comprehensive written analysis that appropriately meets the organization's needs.
  - Create a high-level voice network solution diagram that displays an effective voice structure for an organization and that includes the components at the campus infrastructure, server farms, and

enterprise edges.

- Competency 3: Develop models of Cisco networks based on previously developed designs.
  - Create a high-level voice network solution diagram that accurately represents a Cisco enterprise campus architecture.
- Competency 4: Manage Cisco services, protocols, and devices for a planned design.
  - Describe the voice quality considerations and concerns relevant to designing an effective voice infrastructure.
- Competency 5: Evaluate Cisco-based models and designs.
  - Describe voice-enabling technology and include the connectivity concerns and components necessary for a voice design solution.
  - Write an analysis of a voice network solution diagram that represents a supportive rationale for a solution.
- Competency 8: Communicate effectively.
  - Follow APA style and formatting guidelines for resources and citations and create a document that is clearly written and generally free of grammatical errors.

u05s4 - Plan: Industry Certification

After you complete several Capella courses, you may choose to pursue industry certification. Capella provides access to industry-recognized, certification exam preparation materials. Courses like this one contain certification-related content, and completing the course is the first step toward preparing for a corresponding certification exam.

For a list of certification exams and related courses, visit the Industry Certifications page. Here, you can also learn more about qualifications, the process, how to prepare for the exam, and how to earn a free exam voucher.