Preview: ISTM5114 : Enterprise Network Analysis, Architecture, and Design

Syllabus

Course Overview

This course presents an engagement with a comprehensive network analysis and design methodology. You will develop skills required to analyze existing networks and design network solutions that support strategic business processes by deploying leading-edge network technologies. This course will provide you with the tools, theories, and knowledge to perform a high-level analysis of an enterprise's network in regards to performance, scalability, security, availability, adaptability, manageability, and affordability. You will be capable of assessing the current state of the network configuration, and will determine future network design requirements to support the core mission of an enterprise. You will also explore the latest network design trends with an emphasis on the analysis of emerging network architectures, including cloud computing. Cloud computing is exerting a profound influence on the network architectures of many enterprises, so please consider reading the optional textbook on cloud computing in addition to our required textbook on conventional network design.

To support your analysis of a diverse set of network design skills, you will develop a series of project-based unit assignments and activities that will help you to explore primary network analysis and design issues and challenges. Throughout the course, you will be asked to do some research on your own. In addition to consulting the resources provided to you by Capella, you should also explore what is available freely on commercial and nonprofit Web sites of interest.

This course focuses primarily on network analysis and skills, rather than on network engineering. However, you will find a few optional technical resources available to you throughout the course. While these optional resources typically do not directly align with the course topics and competencies, they are intended to provide an introduction of technical topics to learners who may be moving towards a new information technology career, and to provide learners who may be seasoned networking professionals with the opportunity to refresh some technical fundamentals. These optional materials are listed in the Course Materials section of the Syllabus.

Course Competencies

(Read Only)

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

1. Align network architectures to support strategic business processes.
2. Analyze emerging trends in network architecture and design.

3. Calculate cost-benefit comparisons of diverse network design solutions.
4. Apply network design skills in the context of a specific enterprise.

Course Prerequisites

Prerequisite(s): Completion of or concurrent registration in ISTM5110.

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

Oppenheimer, P. (2011). *Top-down network design* (3rd ed.). Indianapolis, IN: Cisco Press. ISBN: 9781587202834.

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.

- Lachance, D. (2015). CISSP: Network security and vulnerability management [Video]. Skillsoft Ireland.
- Violino, B. (2011). The real costs of cloud computing. *ComputerWorld, 45*(22), 22, 24, 26.

External Resource

Please note that URLs change frequently. While the URLs were current when this course was designed, some may no longer be valid. If you cannot access a specific link, contact your instructor for an alternative URL. Permissions for the following links have been either granted or deemed appropriate for educational use at the time of course publication.

- Ahronovitz, M., Amrhein, D., Anderson, P., de Andrade, A., Armstrong, J., Arasan B, E., Bartlett, J.,. . . Zappert, F. (2010). Cloud computing use cases (Version 4.0). Retrieved from http://cloudusecases.org/Cloud_Computing_Use_Cases_Whitepaper-4_0.odt
- Cisco Systems. (2012). Next generation networks: Business value for today and tomorrow. Retrieved from http://www.cisco.com/c/dam/en/us/solutions/collateral/service-provider/cloud-intelligent-network/cisco_ngn_itdm.pdf
- Pisello, T., & Quirk, B. (2004). How to quantify downtime. *Network World.* Retrieved from http://www.networkworld.com/careers/2004/0105man.html

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.

Integrated Materials

Book

Ison, P. K., & Holley, K. E. (2012). *Is your company ready for cloud?* Upper Saddle River, NJ: IBM Press. ISBN: 9780132599849.

Library

The following optional Skillsoft resources are available via the Capella University Library.

- Miller, W. (2015). Foundations of Android security: Analyzing network traffic using Wireshark [Video]. Skillsoft Ireland.
- Robinson, C. (2016). Universal Windows platform: Cloud design patterns [Video]. Skillsoft Ireland.
- Sampson, A. (2017). CompTIA Network+ N10-007: Configure advanced networking devices [Video]. Skillsoft Ireland.
- Skillsoft. (n.d.). Being an effective team member [Tutorial].
- Skillsoft. (n.d.). CompTIA A+ Exam 220-901: Introduction to networking [Tutorial].
- Skillsoft. (n.d.). CompTIA Network+ N10-006: Network architecture, part 1 [Tutorial].
- Skillsoft. (n.d.). CompTIA Network+ N10-006: Network security [Tutorial].
- Skillsoft. (n.d.). Leading teams: Fostering effective communication and collaboration [Tutorial].

External Resource

Please note that URLs change frequently. While the URLs were current when this course was designed, some may no longer be valid. If you cannot access a specific link, contact your instructor for an alternative URL. Permissions for the following links have been either granted or deemed appropriate for educational use at the time of course publication.

- Cisco Systems. (2007). IPv6 addressing at a glance. Retrieved from http://www.cisco.com/en/US/technologies/tk648/tk872/technologies_white_paper0900aecd8026003d.pdf
- Harrington, D., Presuhn, R., & Wijnen, B. (1999). RFC 2571: An architecture for describing SNMP management frameworks. Retrieved from http://www.ietf.org/rfc/rfc2571.txt

Projects

Project >> Network Architecture and Design

Project Overview

The requirements of this course go well beyond participation in the online discussions. To finish the course in the allotted 10 weeks, you should work steadily on the development of your course project. You must identify a potential project idea and create the expected deliverables. The project must synthesize the concepts in this course and show advanced learning outcomes. You are encouraged to be creative and emphasize the research and analysis aspects of design. You must get your instructor's approval before starting the project.

The purpose of this project is to allow you to apply the network design theories and processes covered in the course to a practical level. You will need to demonstrate your ability to apply network design concepts and principles to an actual network design or redesign. In this course, you will design a significant modification to an existing network that is a creative solution to a clearly defined business problem, either for your own organization or for a fictitious corporation.

You will first select an organization. This organization can be from a variety of sources—former employers, a current employer, or possibly a colleague's employer. If you select an organization other than your current employer, keep in mind that you want to select an organization that will give you enough access so that you can gather the information needed to complete this project. You may also choose a prepared case study scenario based in part on Driscoll Children's Hospital.

In today's business environment, you will typically need to present your recommendations to C-level executives who may not be technically inclined. Therefore, you are required to structure your final network report and construct your recommendations in terminology understandable to a nontechnical audience. Provide details about the added benefits your proposed changes would bring to the organization, and describe what current pitfalls your recommendations would solve.

Remember that your project is unique and therefore will probably not contain precisely the same documentation as the projects of other learners. The important point is to apply the design concepts discussed in our textbook as closely as possible to your own design solution in order to create a robust network solution.

The various assignments associated with this network design project, whether using your own setting or the one based on Driscoll Children's Hospital, are listed below. Specific instructions for each network design project component are provided in the units in which they are due.

Note: If you have previously designed a network for another course, please be aware you are not allowed to reuse work that you have completed in another course. Doing so is considered plagiarism. While you will build upon the knowledge gained in previous courses, you are expected to create a unique project for each course.

- **Written communication:** Written communication is free of errors that detract from the overall message.
- **APA formatting:** Resources and citations are formatted according to current APA Style and Format.
- **Length of paper:** Minimum of 20 typed double-spaced pages.
- **Font and font size:** Arial, 10 point.

Unit 1 >> Introduction to Network Architecture

Introduction

Welcome to Enterprise Network Analysis, Architecture, and Design. This week we will start by introducing ourselves to the rest of the class; it is important to make social connections with each other in our online learning community. We will explore basic network architecture and design concepts as we begin our course. You will need to start thinking about your course project right away, particularly regarding your selection of an enterprise. Please be sure to read the course project documents in the Syllabus. We will discuss next-generation networks and cloud computing, which is emerging as a trend that may require a fundamental rethinking of enterprise network architecture. Think about whether you will purchase the optional *Is Your Company Ready for Cloud?* text in addition to the required textbook.

Learning Activities

u01s1 - Studies

Readings

Use the Internet to complete the following:

- Read the 2012 Cisco Systems article "Next Generation Networks: Business Value for Today and Tomorrow."

- Read Section 2, "Definitions and Taxonomy," from the 2010 Ahronovitz et al. paper, Cloud Computing Use Cases (Version 4.0), pages 7–18.

Network Architecture and Design Project Preparation

Read the Network Architecture and Design course project description to learn the requirements for your course project.

Multimedia

View the Driscoll Children's Hospital Case Study if you are using it to complete the assignment in this unit.

Optional Skillsoft Resources

- Sampson, A. (2017). CompTIA Network+ N10-007: Configure advanced networking devices [Video]. Skillsoft Ireland.
- Skillsoft. (n.d.). CompTIA Network+ N10-006: Network architecture, part 1 [Tutorial].

u01s2 - Optional Microsoft Tutorials

This course requires you to complete assignments using Microsoft products. Capella University supplies optional tutorials for this software. Go to the Microsoft Tutorials page to access these resources.

u01d1 - Project Ideas

Discuss an example of a next generation network, as defined in this week's reading. Please recount a case from your own professional experience or from a case that you research online. Define and explain the concept of network architecture and explain why next generation capabilities may be influencing recent design trends in LAN, WAN, and WLAN networks.

Response Guidelines

Post a comment or question to at least two other learners to provide positive and constructive comments on their project idea, professional background, or technical skill set.

Course Resources

Graduate Discussion Participation Scoring Guide

u01d2 - Next Generation Networks

Discuss an example of a next generation network, as defined in this week's reading. Please recount a case from your own professional experience or from a case that you research online. Define and explain the concept of network architecture and explain why next generation capabilities may be influencing recent design trends in LAN, WAN, and WLAN networks.

Response Guidelines

Post a comment or question to at least two other learners based on comparing their findings and conclusions regarding next generation networks to yours.

Course Resources

Graduate Discussion Participation Scoring Guide

Unit 2 >> Making the Business Case

Introduction

Aligning the business goals of the organization and the network design is paramount to the successful design of a truly functional network. In this unit, we will introduce ideas and concepts relevant to the rest of the course, particularly those related to network analysis and design. It may be fair to say that network analysis and design is as much art as it is science, because every business and business context within which we engineer technical solutions is unique. Obviously, we will be focusing on the science of network analysis and design—the intuitive art of design will develop over time as you work in the networking industry. While there are various network

design methodologies, we will focus on a systematic top-down design methodology that seeks to understand the role of the network in the larger context of core business processes that serve the mission of the organization.

Learning Activities

u02s1 - Studies

Reading

Use your *Top-Down Network Design* text to read the following:

- Chapter 1, "Analyzing Business Goals and Constraints," pages 3–24.

Optional Reading

Use the *Is Your Company Ready for Cloud?* text to read the following:

- Chapter 1, "Business Value of a Cloud Adoption Strategy," pages 1–24.

Multimedia

- Review the Driscoll Children's Hospital Case Study if you are using it to complete the assignment in this unit.

u02a1 - Business Goal Analysis

For this assignment, begin your Network Architecture and Design project by completing the following activities:

1. Analyze an enterprise and identify an opportunity to create a strategic business advantage, or respond to a competitive threat, by redesigning the enterprise's data communications network. Be sure to research the enterprise's mission, industry, and competition.
2. Explain the primary and secondary business goals of your proposed network redesign. Your explanation needs to focus exclusively on business goals; do not include any technical considerations or technical jargon. Evaluate how the design goals support core business processes.
3. Explain the primary and secondary business constraints of your proposed network redesign. Your explanation needs to focus exclusively on business constraints; do not include any technical considerations or technical jargon.

4. Design a robust analysis of the possible ramifications to the enterprise if your proposed project were to succeed.
5. Write your analysis from a strategic perspective. Imagine you are writing it for the C-level executive team that will decide to approve or deny the project. Be sure to describe how your network design solution best serves the business goals of the enterprise.
6. Your assignment submission must be a minimum of three pages long (excluding cover page and reference page), free of spelling and grammatical errors, and APA formatted.

Other Requirements

- **Written communication:** Written communication is free of errors that detract from the overall message.
- **APA formatting:** Your paper should be formatted according to current APA style and formatting guidelines.
- **Font and font size:** Arial, 10 point.
- **Length of paper:** Your paper should be three pages long, excluding cover and reference pages.

If you are using the Driscoll case, review the *Driscoll Children's Hospital Case Study* scenario to review information about the current network and business requirements.

Please refer to the Business Goal Analysis Scoring Guide to ensure you meet the grading criteria for this assignment.

Note: Your instructor may also use the Writing Feedback Tool to provide feedback on your writing. In the tool, click the linked resources for helpful writing information.

Course Resources
APA Style and Format
Driscoll Children's Hospital Case Study | Transcript
Writing Feedback Tool

u02d1 - Organizational Assessment

Why is it important to explore divisional and group structures of an enterprise when starting a network design project? What are some potential political challenges that a network manager may need to overcome to achieve a positive network design outcome? Please describe an example of internal politics influencing an IT project from your own professional experience or from a case that you research online.

Response Guidelines

Post a comment or question to at least two other learners based on your reactions to—and insights drawn from—their anecdotes.

Course Resources
Graduate Discussion Participation Scoring Guide

Unit 3 >> Making the Technical Case

Introduction

Aligning the business goals of the organization and the network design is paramount to the successful design of a truly functional network. This week we will explore ideas and concepts regarding the determination of network requirements, particularly those related to current and new end-user applications, performance characteristics of specific devices, network management and information assurance, as well as those related to cost and affordability. You will study common network metrics, including availability, uptime, downtime, mean time between failure, and mean time to repair.

It is important to understand that it is the business requirements that ultimately drive the technical requirements. Unfortunately, some technically oriented people make the common mistake of deploying technology for technology's sake, and often end up having a disastrous impact on the organization's core business processes. Therefore, we must always keep in mind the goals of the business when we are defining the requirements of a network design. Networks that do not meet the fundamental requirements of the business may end up going unused. Our studies in this unit will make sure you are able to determine appropriate business and technical goals for a network design project.

Learning Activities

u03s1 - Studies

Readings

Use your *Top-Down Network Design* text and the Internet to complete the following:

- Read Chapter 2, "Analyzing Technical Goals and Constraints," pages 25–58.
- Read Pisello and Quirk's 2004 article, "How to Quantify Downtime," from the *NetworkWorld* website.

Optional Reading

- Read Chapter 2, "Business Value of Incorporating Cloud into Your EA," on pages 25–44 of the *Is Your Company Ready for Cloud?* text.

Multimedia

- Review Driscoll Children's Hospital Case Study if you are using it to complete the assignment in this unit.

Optional Skillsoft Resource

- Robinson, C. (2016). Universal Windows platform: Cloud design patterns [Video]. Skillsoft Ireland.

u03a1 - Technical Goal Analysis

For this assignment, continue your Network Architecture and Design project by completing the following activities:

1. Analyze the primary and secondary technical goals of your proposed network redesign. Your analysis needs to focus on how the business goals that you identified in Unit 2 directly drive the technical goals of your design project.
2. Evaluate the primary and secondary technical constraints of your proposed network redesign. Your analysis needs to focus on why the enterprise's culture and business context limit the scope of your technical solutions.
3. Create a robust analysis of the possible ramifications to the enterprise if your proposed project were to fail.

Other Requirements

- **Written communication:** Written communication is free of errors that detract from the overall message.
- **APA formatting:** Your paper should be formatted according to current APA style and formatting guidelines.
- **Font and font size:** Arial, 10 point.
- **Length of paper:** Your paper should be three pages long, excluding cover and reference pages.

If you are using the Driscoll case, review the *Driscoll Children's Hospital Case Study* scenario to review information about the current network and business requirements.

Please refer to the Technical Goal Analysis Scoring Guide to ensure you meet all the grading criteria for this assignment.

Note: Your instructor may also use the Writing Feedback Tool to provide feedback on your writing. In the tool, click the linked resources for helpful writing information.

Course Resources
APA Style and Format
Driscoll Children's Hospital Case Study | Transcript
Writing Feedback Tool

u03d1 - Cost of Downtime

Why is it important for a network designer to be able to quantify and communicate the cost of network downtime to executives prior to beginning a network design project? Calculate the cost of network downtime for your project, and write a justification explaining your calculation method and your results.

Response Guidelines

Respond to at least two other learners with a helpful review of their cost of downtime calculations. Explain why you accept or reject the result of their calculations.

Course Resources
Graduate Discussion Participation Scoring Guide

Unit 4 >> Analyzing Existing Networks

Introduction

Our focus this week is on characterizing the existing network and traffic flows on the network. We will learn how to understand traffic flow patterns, and to design them in a way that meets our performance requirements. You will predict how traffic flows may need modification to meet specific technical objectives, and how changes in

traffic flow patterns may affect other parts of the larger information system. We will explore how the deployment of a new application may have a serious impact on traffic flows and drive the need for quality of service (QoS) implementation. You will learn how to develop service metrics based on the analysis of requirements and measurement of current performance characteristics. At this point in your course project, you need to analyze your project network and consider the metrics that you think may be crucial in providing the data needed to make informed decisions regarding changes to the organization's existing network.

Learning Activities

u04s1 - Studies

Readings

Use your *Top-Down Network Design* to read the following:

- Chapter 3, "Characterizing the Existing Internetwork," pages 59–86.
- Chapter 4, "Characterizing Network Traffic," pages 87–116.

Multimedia

- Review Driscoll Children's Hospital Case Study if you are using it to complete the assignment in this unit.

Optional Skillsoft Resources

- Miller, W. (2015). Foundations of Android security: Analyzing network traffic using Wireshark [Video]. Skillsoft Ireland.

u04a1 - Existing Network Analysis

For this assignment, continue your Network Architecture and Design project by completing the following activities:

1. Analyze the primary design characteristics of the enterprise's existing network. Your analysis needs to focus on describing the logical architecture, the physical media, and the availability of wireless connectivity.
2. Describe the primary performance characteristics of the enterprise's existing network. Your analysis needs to focus on describing baseline network performance, network availability, network utilization, and network delay and response time.

3. Characterize the Quality of Service (QoS) requirements for each of the enterprise's mission critical applications. Discuss the challenges associate with implementing end-to-end QoS.

Other Requirements

- **Written communication:** Written communication is free of errors that detract from the overall message.
- **APA formatting:** Your paper should be formatted according to APA sixth edition style and formatting guidelines.
- **Font and font size:** Arial, 10 point.
- **Length of paper:** Your paper should be three pages long, excluding cover and reference pages.

If you are using the Driscoll case, review the *Driscoll Children's Hospital Case Study* scenario to review information about the current network and business requirements.

Please refer to the Existing Network Analysis Scoring Guide to ensure you meet all the grading criteria for this assignment.

Note: Your instructor may also use the Writing Feedback Tool to provide feedback on your writing. In the tool, click the linked resources for helpful writing information.

Course Resources
APA Style and Format
Driscoll Children's Hospital Case Study | Transcript
Writing Feedback Tool

u04d1 - Cloud Traffic Flow

Do some online research regarding cloud computing. Explore the concept of network architecture and discuss how cloud computing does or does not change this basic concept. Does cloud computing fit into the types of traffic flow discussed in Chapter 4 of our Oppenheimer textbook (terminal-host, client-server, peer-to-peer, server-server, and distributed computing), or is it a new type of traffic flow? Support your answer with evidence cited from your research.

Response Guidelines

Post a comment or question to at least two other learners, comparing their conclusion regarding cloud traffic flows to yours.

Course Resources

Graduate Discussion Participation Scoring Guide

Unit 5 >> Designing a Network Topology

Introduction

This week, we will explore ways to determine network requirements in light of the Cisco hierarchical network design model. Our readings include an overview of the three-tiered hierarchical model comprised of the core, distribution, and access layers. This model provides a conceptual framework that defines our approach to determining the type of network design, the scope of the design, and the placement of network components in our architecture. You will develop and demonstrate your ability to create logical physical network diagrams for your project network.

Learning Activities

u05s1 - Studies

Reading

Use your *Top-Down Network Design* to read the following:

- Chapter 5, "Designing a Network Topology," pages 119–166.

Optional Reading

- Chapter 4, "Identifying Cloud Candidates," on pages 89–132 of the *Is Your Company Ready for Cloud?* text.

Multimedia

- Review Driscoll Children's Hospital Case Study if you are using it to complete the assignment in this unit.

Optional Skillsoft Resource

- Skillsoft. (n.d.). CompTIA Network+ N10-006: Network architecture, part 1 [Tutorial].

u05a1 - Logical and Physical Network Diagrams

For this assignment, continue your Network Architecture and Design project by completing the following activities:

- Use Microsoft Visio (or another drawing tool) to create high-level, logical diagrams of the organization's current network and datacenter. You need to show location information for datacenters, core routers and switches, telecommunications closets, and wireless access points.

Your assignment document needs to include:

- Major data stores and the user communities for each data store.
- Major network traffic flows.
- A logical WAN diagram showing all the major enterprise locations.
- A physical LAN diagram showing the core- and distribution-layer routers and switches.
- A physical WLAN diagram showing all major wireless access points.
- Core, distribution, and access layers.
- Division into distinct modules.

Please submit your assignment as a single PDF file attachment.

Other Requirements

- **Written communication:** Written communication is free of errors that detract from the overall message.
- **APA formatting:** Your paper should be formatted according to current APA style and formatting guidelines.
- **Font and font size:** Arial, 10 point.
- **Length of paper:** Your paper should be three pages long, excluding cover and reference pages.

If you are using the Driscoll case, review the *Driscoll Children's Hospital Case Study* scenario to review information about the current network and business requirements.

Please refer to the Logical and Physical Network Diagrams Scoring Guide to ensure you meet all the grading criteria for this assignment.

Note: Your instructor may also use the Writing Feedback Tool to provide feedback on your writing. In the tool, click the linked resources for helpful writing information.

Course Resources

APA Style and Format

Driscoll Children's Hospital Case Study | Transcript

Writing Feedback Tool

u05d1 - Managing Physical Security

What does physical security mean in terms of network design? What are some of facets of physical security? What criteria typically drive management decisions regarding the deployment of physical security measures? How can managers measure the effectiveness of investment in physical security for the network? Insights based on your personal professional experience in an enterprise environment, or based on a case you researched online, are welcome.

Response Guidelines

Develop a comment or question for at least two other learners based on your reactions to the physical security measures they describe.

Course Resources

Graduate Discussion Participation Scoring Guide

Unit 6 >> Network Names, Addresses, and Protocol Design

Introduction

This week, we will explore network addressing and protocol selection issues. Selecting the correct switching and routing protocols is necessary in order to design a high-performing network. In this unit, you will examine many switching and routing protocols and determine which protocols may work best for your project

organization's LANs, WANs, and VLANs. We will discover how addressing and routing designs provide the hierarchy we need for scalability, and the adaptability necessary to integrate a diverse set of architectural components. We will learn about issues related to integrating IPv6 and IPv4 into a dual stack environment.

Learning Activities

u06s1 - Studies

Readings

Use your *Top-Down Network Design* text to complete the following:

- Read Chapter 6, "Designing Models for Addressing and Numbering," pages 167–198.
- Read Chapter 7, "Selecting Switching and Routing Protocols," pages 199–232.

Optional Readings

- Read the Cisco Systems IPv6 Addressing at a Glance white paper.
- Read Chapter 5, "What About Governance?" from Isom and Holley's *Is Your Company Ready for Cloud?* text, pages 104–132.

Multimedia

- Review Driscoll Children's Hospital Case Study if you are using it to complete the assignment in this unit.

Optional Skillsoft Resource

- Skillsoft. (n.d.). CompTIA A+ Exam 220-901: Introduction to networking [Tutorial].

u06a1 - Network Addressing and Protocol Designs

For this assignment, you will create a proposed IP addressing design for your project enterprise's network.

1. Propose a suitable IP addressing plan that takes advantage of good summarization techniques for the network, including campus, WAN and backup WAN links, and remote sites. Determine whether you will recommend using IPv4 or IPv6, and write a robust narrative explanation of the rationale for your choice in light of the enterprise's particular context.

2. Propose possible methods for IP address assignment, including whether you will recommend using private, public, or a hybrid IP address strategy.
3. Present your recommendations for address blocks for the core layer and the distribution layer. Access layer detail is not required.
4. Create an updated network diagram that explicitly details your proposed addressing scheme.
5. Justify your selection of switching and routing protocols for your core and distributions layers.

Other Requirements

- **Written communication:** Written communication is free of errors that detract from the overall message.
- **APA formatting:** Your paper should be formatted according to current APA style and formatting guidelines.
- **Font and font size:** Arial, 10 point.
- **Length of paper:** Your paper should be three pages long, excluding cover and reference pages.

If you are using the Driscoll case, review the *Driscoll Children's Hospital Case Study* scenario to review information about the current network and business requirements.

Please review the Network Addressing and Protocol Designs Scoring Guide to ensure you meet the grading criteria for this assignment.

Note: Your instructor may also use the Writing Feedback Tool to provide feedback on your writing. In the tool, click the linked resources for helpful writing information.

Course Resources
APA Style and Format
Driscoll Children's Hospital Case Study | Transcript
Writing Feedback Tool

u06d1 - Internet Protocol Version 6 (IPv6)

IPv6 provides capabilities much broader in scope than IPv4. However, deployment of the newer protocol is not without problems. Choose one of the following issues—mobility, multicast, QoS, or NAT. Discuss the problems relative to IPv6 deployment, and the potential solutions to those problems.

Response Guidelines

Post a comment or question to at least two other learners critiquing their analyses of IPv6 issues.

Course Resources

Graduate Discussion Participation Scoring Guide

Unit 7 >> Network Security and Manageability Design

Introduction

Designing security for a network requires a balance between performance and ease of use with verification and less user-friendly security measures. Network security issues include risk management, security policies, security procedures, and information classification. A good network security design enable security audits and addresses security risks, security policies, network authentication, physical security of network assets, remote access security, wireless security, and encryption. Network management strategies help to ensure quality performance and response by the network to resolve network-user issues. Taking a proactive approach can mitigate issues before they become serious network problems. Using good monitoring tools, taking performance benchmarks, and getting user feedback on network performance are a few of the strategies you will explore in this unit.

Learning Activities

u07s1 - Studies

Readings

Use your *Top-Down Network Design* text to complete the following:

- Read Chapter 8, "Developing Network Security Strategies," pages 232–262.
- Read Chapter 9, "Developing Network Management Strategies," pages 263–279.

Optional Readings

- Read Harrington, Presuhn, and Wijnen's 1999 Request for Comments memo, "RFC 2571: An Architecture for Describing SNMP Management Frameworks," from The Internet Engineering Task Force website.
- Read IBM's 2009 white paper, "IBM Point of View: Security and Cloud Computing."

- Read Chapter 6, "Mitigating Risk," from Isom and Holley's *Is Your Company Ready for Cloud*? text, pages 133–160.

Multimedia

- Review Driscoll Children's Hospital Case Study if you are using it to complete the assignment in this unit.

Optional Skillsoft Resource

- Lachance, D. (2015). CISSP: Network security and vulnerability management [Video]. Skillsoft Ireland.

u07a1 - Network Security and Manageability Designs

In this project assignment, you will identify key business security requirements, risks, or threats, and prepare a network security design.

Create four one-sentence security policy statements based on your analysis of your project enterprise's business needs. Create one statement for each of the following policy areas:

1. Network access control.
2. Acceptable use of network.
3. Data confidentiality.
4. Security management.

Update your design diagrams to illustrate your proposed network security and network management solutions to enforce the four policy statements you identified. Imagine that the policy requirements are such that you must achieve a very high degree of data confidentiality and data integrity, and that affordability is not a major concern. Regarding security manageability, suppose that you are required to deploy an out-of-band management solution that will enable the enterprise's security team to regain administrative control of a production network under attack.

Other Requirements

- **Written communication:** Written communication is free of errors that detract from the overall message.
- **APA formatting:** Your paper should be formatted according to current APA style and formatting guidelines.
- **Font and font size:** Arial, 10 point.
- **Length of paper:** Your paper should be three pages long, excluding cover and reference pages.

If you are using the Driscoll case, you may want to use the *Driscoll Children's Hospital Case Study* scenario to review information about the current network and business requirements.

Please review the Network Security and Manageability Designs Scoring Guide to ensure you meet the grading criteria for this assignment.

Note: Your instructor may also use the Writing Feedback Tool to provide feedback on your writing. In the tool, click the linked resources for helpful writing information.

Course Resources
APA Style and Format
Driscoll Children's Hospital Case Study | Transcript
Writing Feedback Tool

u07d1 - Security and Privacy Tradeoffs

Achieving information security in a large organization may come at the expense of individual employee privacy. Discuss a specific case, based on either your own professional experience or your research, where the need to assure information security affected the privacy of individual employees. Describe the security mechanisms deployed and the impact these security measures had on individual privacy. What rationale might senior managers have had for trading off employee privacy for enterprise information security?

Response Guidelines

When responding to two peers' posts, provide your perspective, taking the position of an employee privacy advocate.

Course Resources
Graduate Discussion Participation Scoring Guide

u07d2 - Cloud Security

Discuss a specific case, based on your own professional experience or your research, in which a breach of cloud security created a loss of data confidentiality, loss of data integrity, or a denial of service. What policies and procedures could senior network managers implement to avoid a similar situation in the future?

Response Guidelines

In your responses to two peers, assume the role of an information security consultant. What policies and procedures would you recommend to senior network managers to prevent a recurrence of this type of cloud security incident?

Course Resources
Graduate Discussion Participation Scoring Guide

Unit 8 >> Network Design Implementation

Introduction

This week, we are focusing our attention specifically on understanding issues related to network design implementation. In order to ensure the success of a production network, network managers need to select appropriate network infrastructure devices for LAN, WAN, and WLAN deployment based on an enterprise's technical goals and constraints. Network managers need to understand current trends in the development of network hardware and keep one eye on the horizon for perspectives on emerging trends in device development. Additionally, network managers need to be able to identify criteria for selecting WAN service providers who will best meet the technical requirements of the enterprise.

Learning Activities

u08s1 - Studies

Readings

Use your *Top-Down Network Design* text to complete the following:

- Read Chapter 10, "Selecting Technologies and Devices for Campus Networks," pages 283–317.

- Read Chapter 11, "Selecting Technologies and Devices for Enterprise Networks," pages 319–350.

Optional Reading

- Read Chapter 7, "Planning the Transition," from Isom and Holley's *Is Your Company Ready for Cloud?* text, pages 161–184.

Multimedia

- Review Driscoll Children's Hospital Case Study if you are using it to complete the assignment in this unit.

Optional Skillsoft Resource

- Skillsoft. (n.d.). Leading teams: Fostering effective communication and collaboration [Tutorial].

u08a1 - Network Device Selection and Deployment Plan

For this assignment, continue your Network Architecture and Design project by completing the following activities:

1. Compare and contrast *core* layer switches from three different manufacturers.
2. Recommend the best core layer switch, or switches, given the business context of your project enterprise. Explain your rationale for this choice.
3. Compare and contrast *access* layer switches from three different manufacturers.
4. Recommend the best access layer switch, or switches, given the business context of your project enterprise. Explain your rationale for this choice. (If you are using the Driscoll case, this should include a core layer port count by location for each of the three campuses—Corpus Christi, McAllen, and Harlingen, rather than the building layers).
5. Determine the transmission media types for your network. Explain your rationale for your selections.
6. Revise your physical network diagrams to indicate your switch selections and the type of physical cabling infrastructure you recommend.

Other Requirements

- **Written communication:** Written communication is free of errors that detract from the overall message.
- APA formatting: Your paper should be formatted according to current APA style and formatting guidelines.
- **Font and font size:** Arial, 10 point.
- **Length of paper:** Your paper should be three pages long, excluding cover and reference pages.

Please review the Network Device Selection and Deployment Plan Scoring Guide to ensure you meet the grading criteria for this assignment.

Note: Your instructor may also use the Writing Feedback Tool to provide feedback on your writing. In the tool, click the linked resources for helpful writing information.

Course Resources
APA Style and Format
Writing Feedback Tool

u08d1 - Choosing a Service Provider

What are the most important criteria for selecting a WAN service provider? What are the functions of service level agreements (SLAs) in monitoring the performance of the service? Relate a story, based on your professional experience or your online research, which demonstrates how the success or failure of a service provider may have serious consequences for a network manager or the enterprise.

Response Guidelines

Post a comment or question to at least two other learners based on your reaction to the cases they analyze.

Course Resources
Graduate Discussion Participation Scoring Guide

Unit 9 >> Network Design Optimization

Introduction

It is important to create and implement an effective testing strategy prior to the deployment of the new network or network modification. This week, we will explore methods for testing and optimizing a network design that

enable network designers to accurately predict the performance of the network in production. Because every network is unique, the creation of an effective testing strategy is often quite challenging; selecting the rights tests and tools will be dependent on the specific context of the enterprise. We will also explore strategies for network optimization, which is a critical step of the top-down network design process.

Learning Activities

u09s1 - Studies

Readings

Use your *Top-Down Network Design* text to complete the following:

- Read Chapter 12, "Testing Your Network Design," pages 353–366.
- Read Chapter 13, "Optimizing Your Network Design," pages 367–392.

Use the Capella library to complete the following:

- Read Violino's 2011 article, "The Real Costs of Cloud Computing," from *ComputerWorld*, issue 45, pages 22, 24, and 26.

Optional Readings

- Read Section 4, "Customer Scenarios," from the 2010 Ahronovitz et al. Cloud Computing Use Cases (Version 4.0) white paper, pages 34–40.
- Read Chapter 8, "Financial Considerations," from Isom and Holley's *Is Your Company Ready for Cloud?* text, pages 185–204.

Multimedia

- Review Driscoll Children's Hospital Case Study if you are using it to complete the assignment in this unit.
- Complete Myths and Mysteries of ROI. This media piece:
  1. Discusses the status of ROI as a tool in organizations.
  2. Considers who is implementing the ROI process.
  3. Explores the myths and mysteries of ROI.
  4. Identifies and outlines the issues, the steps, and the standards of use in the process.
  5. Examines what is involved in implementation.

Optional Skillsoft Resources

- Skillsoft. (n.d.). CompTIA Network+ N10-006: Network security [Tutorial].
- Lachance, D. (2015). CISSP: Network security and vulnerability management [Video]. Skillsoft Ireland.
- Skillsoft. (n.d.). Being an effective team member [Tutorial].

u09a1 - Cost-Benefit Analysis

For this assignment, continue your Network Architecture and Design project by completing a cost-benefit analysis.

Your assignment should include:

1. A quantitative analysis examining the likely positive outcomes of your proposed network design.
2. A quantitative analysis examining the likely negative outcomes of your proposed network design.
3. Defend your rationale for your identification of positive and negative outcomes. A very important consideration of your cost benefit analysis is making sure that you include all the costs and all the benefits of your network design and properly quantify them.
4. Based on your calculations, determine whether deployment of your proposed network design is advisable given the context of the particular enterprise you are working with. Write an in-depth justification of your recommendation.

Other Requirements

- **Written communication:** Written communication is free of errors that detract from the overall message.
- **APA formatting:** Your paper should be formatted according to current APA style and formatting guidelines.
- **Font and font size**: Arial, 10 point.
- **Length of paper:** Your paper should be three pages long, excluding cover and reference pages.

Note: Your instructor may also use the Writing Feedback Tool to provide feedback on your writing. In the tool, click the linked resources for helpful writing information.

Course Resources
APA Style and Format
Writing Feedback Tool

u09d1 - Critical Metrics

Describe the testing strategies for network design discussed in your textbook. Explain your rationale for choosing three metrics that you think may be the most critical to test to optimize your design project.

Response Guidelines

Read the posts of your peers and respond to at least one other learner. Compare your peer's selected metrics with your own. Discuss why the metrics you selected are most important, or provide additional support for the other learner's selected metrics.

Course Resources
Graduate Discussion Participation Scoring Guide

u09d2 - Analysis of Cloud Adoption

Cloud computing may enable scalability, adaptability, better performance, and cost savings. Is your project organization in a position to take advantage of these benefits? Based on your analysis of your project enterprise's business goals and constraints, discuss one idea for migrating a service to a cloud solution.

Response Guidelines

In your response to two posts, take the role of a cloud computing consultant. Explain why you agree or disagree with the rationale for migration to the cloud.

Course Resources
Graduate Discussion Participation Scoring Guide

Unit 10 >> Network Design Documentation

Introduction

We conclude the course by focusing on optimization of our network design. Given that today's business, social, and educational institutions are all wholly dependent upon computer networks, it may be crucial that design optimization has a high priority in our network design methodology.

It is also time to reflect on your course experience. I hope that you found this course to be challenging, engaging, and positively influential on your professional life. In wrapping up the course, please reflect on how you have developed as a graduate student. You participated in self-assessment of specific academic skills, participated in our discussions, and are now finalizing your course project. Please identify three things that you learned in this course that you view as valuable to your continuing professional or personal development. Last, but not least, please complete the course evaluation. This information is used by the university to assist with course revision and to provide instructors with feedback about the learning experience.

Learning Activities

u10a1 - Network Architecture and Design

You have received feedback on your project deliverables throughout the course. Use that feedback to revise all previous submissions and assemble those into your final project document. Be sure to include all graphic displays, as well as a robust narrative that strongly conveys the business rationale for your design decisions. Your design document should reflect the best practices of design document creation as articulated in this week's reading.

Please review the Network Architecture and Design Scoring Guide to ensure you meet the grading criteria for this assignment.

Other Requirements

- **Written communication:** Written communication is free of errors that detract from the overall message.
- **APA formatting:** Your paper should be formatted according to current APA style and formatting guidelines.
- **Font and font size:** Arial, 10 point.
- **Length of paper:** Your paper should be a minimum of 20 pages long, excluding title and reference pages.

Note: Your instructor may also use the Writing Feedback Tool to provide feedback on your writing. In the tool, click the linked resources for helpful writing information.

Course Resources
APA Style and Format

Writing Feedback Tool

u10s1 - Studies

Reading

Use your *Top-Down Network Design* text to complete the following:

- Read Chapter 14, "Documenting Your Network Design," pages 393–406.

Multimedia

- Review the Driscoll Children's Hospital Case Study if you are using it to complete the assignment in this unit.
- View the On-Premise vs. Cloud-Based illustration to get a better understanding of the differences between cloud computing traffic flow and other types of traffic flow.

u10d1 - Lessons Learned

Reflect on your experiences in this course, and post a brief narrative describing three concepts that you feel may be helpful in your career or in your understanding of networks from a design perspective.

Response Guidelines

Post a comment or question to at least two other learners comparing and contrasting their lessons learned to yours.

Course Resources
Graduate Discussion Participation Scoring Guide
