Graded Assignments

The following sections contain student copies of the assignments. These must be distributed to students prior to the due dates for the assignments. Online students will have access to these documents in PDF format, which will be available for downloading at any time during the course.

**Course Revision Table**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Change Date** | **Updated Section** | **Change Description** | **Change Rationale** | **Implementation Quarter** |
| 11/04/2011 | All | New Curriculum |  | December 2011 |
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# Graded Discussion/Assignment Requirements

Discussion or Assignment Requirements documents provided below must be printed and distributed to students for guidance on completing the discussions and assignments and submitting them for grading.

Instructors must remind students to retain all handouts and assignment documents issued in every unit, as well as student-prepared documentation and graded deliverables. Some or all these documents will be used repeatedly across different units.

## Unit 1 Assignment 1: Effects of Routing on Current Communication Methods Used by Organizations

**Learning Objectives and Outcomes**

* Explore the effects of routing on current communication methods used by organizations.

Assignment Requirements

The Johnson Company provides networking components and services. It sounds simple, but management knows it takes a lot of planning to get it right. Retail product and service businesses operate in a crowded market. There is intense competition for customers. Today's businesses have found that the pursuit and retention of customers is the primary goal and Johnson is concerned that their methods are too antiquated to keep them competitive. Currently, Johnson used analog phone lines and takes all customer orders by hand. Their advertising method is an ad in the yellow pages. As the IT consultant, management has asked you help improve Johnson’s visibility by suggesting methods that can be used reroute and improve the current methods of communication for:

* Reaching out to new customers
* Standing out from other businesses
* Meeting existing customer needs
* Keeping customers informed of news and updates

Research how Johnson can update their current communication methods then write a summary report that addresses the following:

* How can Johnson Company update its communication methods to reach out to new customers?
* What can Johnson do to stand out from other businesses?
* What communication methods can Johnson use to meet the needs of existing customers?
* Which communication solution do you recommended for Johnson to keep customers informed of news and updates?

Required Resources

* None

Submission Requirements

* Format: Microsoft Word
* Font: Arial, Size 12, Double-Space
* Citation Style: Chicago Manual of Style
* Length: 1–2 pages
* Due By: Unit 2

Self-Assessment Checklist

Use the following checklist to support your work on the assignment:

* I have researched how the current communication methods can be updated.
* I have described the methods that can be used to improve visibility.
* I have described the methods that can be used to meet the needs of existing customers.
* I have recommended a communication solution for Johnson based on my research.
* I have followed the submission requirements.

## Unit 2 Assignment 2: Evolution of Ethernet

**Learning Objectives and Outcomes**

* Differentiate between the Ethernet standards, specifications, and technologies that drive current LAN connectivity.

**Assignment Requirements**

Review details of the Ethernet family of protocols in the text sheet titled “IS3120: Unit 2 Assignment 1 Evolution of Ethernet.” Analyze the changes that have occurred over time in this family of related standards. Then write a report that answers the following questions:

* What impact will the continued evolution of the Ethernet standard have on data storage requirements, assuming capacity continues to follow the same pattern of progress?
* What network devices will be required for the configuration of a VLAN-enabled Ethernet network?
* What statement can be made about the rate of progression in data transfer capacity in Ethernet standards?
* If an organization decides to implement a medical imagery repository for radiological reviews, requiring 100Mbps connectivity for eight workstations operating at the same time, what is the minimum Ethernet standard to implement? Briefly explain the reasons behind your selection.

**Required Resources**

* Text sheet: IS3120: Unit 2 Assignment 2 Examining Ethernet Changes Through the Years

**Submission Requirements**

* Format: Microsoft Word
* Font: Arial, Size 12, Double-Space
* Citation Style: Chicago Manual of Style
* Length: 1–2 pages
* Due By:Unit 3

**Self-Assessment Checklist**

Use the following checklist to support your work on the assignment:

* I have described the impact continued Ethernet capacity expansion will have on data storage requirements.
* I have determined the types of network devices that will be required for a VLAN network.
* I have described my observations of the rate of change in Ethernet data transfer capacity.
* I have described the minimum standard required for the media image repository scenario and explained my reasoning for this selection.
* I have followed the submission requirements.

## Unit 3 Assignment 3: Convergence of IP-Based Networks

**Learning Objectives and Outcomes**

* Understand the convergence of today’s IP-based networks.

Assignment Requirements

In this assignment, you will write a report detailing your observations on the transformation from early dial-up, on-demand networking to the modern always-on high-speed IP-based Internet. To complete this assignment, evaluate the ongoing convergence of IP-based network devices, including the impact of new mobile technologies, and internetworking that requires additional network addresses or the change to the newer IPv6 address system as it pertains to your personal experience.

Required Resources

* None

Submission Requirements

* Format: Microsoft Word
* Font: Arial, Size 12, Double-Space
* Citation Style: Chicago Manual of Style
* Length: 1–2 pages
* Due By: Unit 4

Self-Assessment Checklist

Use the following checklist to support your work on the assignment:

* I have evaluated the change from slower early technologies to modern high-speed networking.
* I have addressed the always-on nature of modern IP-based networking.
* I have addressed security concerns related to the convergence of networking.
* I have described the impact of new mobile technologies requiring additional network addresses or the change to the newer IPv6 address system.
* I have followed the submission requirements.

## Unit 4 Assignment 4: IP Address Schema Design for a Medium-Sized Business

**Learning Objectives and Outcomes**

* Translate IPv4 and IPv6 IP addressing schemas and perform logical IP addressing schema designs to support the given scenario.

**Assignment Requirements**

Read the business scenario given in the text sheet named “IS3120: Unit 4 Assignment 4 IP Address Schema Diagram” (IS3120.U4.TS3). Analyze the given business constraints in order to evaluate how to plan Pv4 and IPv6 network schemas. Then write a summary report containing a comparison table that answers the following questions for both IPv4 and IPv6:

* Will you use a private address scheme for internal addressing?
* Assuming all nodes and servers have only one interface, how many public IP addresses must be leased (excluding networking devices)?
* What is the largest prefix/mask size (in bits) that will support the stated subnet requirements and device count per subnet?

**Required Resources**

* Text sheet: IS3120: Unit 4 Assignment 4 IP Address Schema Diagram

**Submission Requirements**

* Format: Microsoft Word
* Font: Arial, Size 12, Double-Space
* Length: 1–2 pages
* Due By:Unit 5

**Self-Assessment Checklist**

Use the following checklist to support your work on the assignment; review each item for both IPv4 and IPv6 implementations:

* I have determined whether private network addressing is appropriate.
* I have determined the number of publically routed addresses that will be needed for IPv4
* I have determined the number of privately routed addresses that will be needed for IPv6.
* I have described the correct subnet mask (IPv4) and prefix length (IPv6) in bits.
* I have followed the submission requirements.

## Unit 5 Assignment 5: A WLAN Solution

**Learning Objectives and Outcomes**

* Solve a business challenge using WLAN technology.

Assignment Requirements

Highbrow Ed is a rapidly growing educational institution with over 3,000 students spread across five regional campuses. Most students live in off-campus housing. Highbrow’s CIO wants to incorporate electronic collaboration for students, staff, and faculty. The school’s current wireless network uses mainly 802.11b technology with hot spots located throughout the main campus, primarily in academic areas. Because of the technology and rapid growth, users have been experiencing a lot of connectivity issues and latency. The CIO knows that adding collaboration to the mix would only exacerbate the problems.

Research WLAN technologies that will resolve Highbrow Ed’s problems, then write a report that addresses the following goals:

* Provide indoor/outdoor campus-wide coverage
* Support voice, data, and video/collaboration
* Increase wireless reliability, connectivity, and security of information
* The report should include a simple diagram of the recommended solution.

Required Resources

* None
* You may use Microsoft Visio, Network Notepad (http://www.networknotepad.com/), or a similar program to draw your network design.

Submission Requirements

* Format: Microsoft Word
* Font: Arial, Size 12, Double-Space
* Citation Style: Chicago Manual of Style
* Length: 1–2 pages
* Due By: Unit 6

Self-Assessment Checklist

Use the following checklist to support your work on the assignment:

* I have researched WLAN technologies.
* I have described technologies that provide indoor/outdoor campus-wide coverage for voice, video, and data.
* I have described technologies that will increase wireless reliability and connectivity.
* I have recommended a solution for Highbrow Ed based on my research.
* I have included a simple diagram of the WLAN solution in my report.
* I have followed the submission requirements.

## Unit 6 Assignment 6: Cisco’s Layer 2 Resiliency Compared to HP’s IRF Layer 2 Resiliency

**Learning Objectives and Outcomes**

* Compare the resiliency of Cisco Layer 2 with HP Intelligent Resilient Framework (IRF).

Assignment Requirements

Senior management of The Marketing Company Inc. is purchasing ChoiceInfo, a data aggregation company. The Marketing Company uses mainly Cisco networking equipment; however, ChoiceInfo uses Cisco and HP networking equipment. The Marketing Company wants to choose the best Layer 2 network resiliency solution for use in both companies. As a networking specialist for The Marketing Company, your manager has asked you to research Layer 2 network resiliency by focusing on Cisco solutions and HP Intelligent Resilient Framework (IRF). You are to report on the primary differences between the Cisco and HP network resiliency solutions, the advantages and disadvantages of each, and recommend which solution to use going forward.

Research Cisco resilience solutions and HP IRF, then write a summary report that addresses the following:

* What are three primary differences between Cisco Layer 2 network resiliency and HP IRF resiliency?
* What are two or three advantages of each company’s Layer 2 network resilience solutions?
* What are two or three disadvantages of each company’s Layer 2 network resilience solutions?
* Which solution do you recommended for The Marketing Company and why?

Recommended Resources

* Solomon, Fundamentals of Communications and Networking: Chapter 8
* Cisco Resilient Ethernet Protocol  
  http://www.cisco.com/en/US/prod/collateral/switches/ps6568/ps6580/prod\_white\_paper0900aecd806ec6fa.pdf
* Resilient Services Solution for Campus Network  
  http://www.cisco.com/en/US/netsol/ns340/ns394/ns147/ns17/index.html
* Data Center Design—IP Network Infrastructure, http://www.cisco.com/en/US/docs/solutions/Enterprise/Data\_Center/DC\_3\_0/DC-3\_0\_IPInfra.html#wp1037297
* Reducing network complexity, boosting performance with HP IRF technology white paper, http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA2-9402ENW.pdf

Submission Requirements

* Format: Microsoft Word
* Font: Arial, Size 12, Double-Space
* Citation Style: Chicago Manual of Style
* Length: 1–2 pages
* Due By: Unit 7

Self-Assessment Checklist

Use the following checklist to support your work on the assignment:

* I have researched Cisco resiliency solutions and HP IRF.
* I have described the primary differences between the solutions.
* I have described at least two advantages and two disadvantages of each.
* I have recommended a solution for The Marketing Company based on my research.
* I have followed the submission requirements.

## Unit 7 Assignment 7: Solving a Business Challenge Using SIP Technology

**Learning Objectives and Outcomes**

* Solve a business challenge using SIP technology.

Assignment Requirements

Fifth Main Bank is a multi-service financial institution with over 400 banking locations in six states, spanning various time zones, along with regional call centers. The call center agents need to be able to route calls quickly to appropriate bank personnel, and see if the receiving caller is available before handing off the call, when possible. The bank has an aging circuit-switched telephone system that is expensive to maintain. Senior management wants to cut overhead while improving the performance and communication of the bank’s call centers. The long range goal is to provide seamless and efficient customer service regardless of location, reduce phone costs, increase technological flexibility, and enable presence/availability .

Address the following in a professional report:

* Which SIP-based technology(s) will meet Fifth Main Bank’s goals?
* What are at least three networking and technological concerns for implementing this solution?
* How can the networking and technological concerns be overcome?
* What kinds of security issues will the bank need to address?

Required Resources

* None

Submission Requirements

* Format: Microsoft Word
* Font: Arial, Size 12, Double-Space
* Citation Style: Chicago Manual of Style
* Length: 1–2 pages
* Due By: Unit 8

Self-Assessment Checklist

Use the following checklist to support your work on the assignment:

* I have determined SIP-based technology(s) that will meet the goals of Fifth Main Bank.
* I have described at least three networking and technological concerns for implementing this solution.
* I have recommended techniques for overcoming the possible networking and technological barriers.
* I have identified at least two security issues the bank will need to address to implement the solution securely.

## Unit 8 Assignment 8: Solving a Business Challenge Using Distance Vector IP Routing

**Learning Objectives and Outcomes**

* Design and configure a multi-location network using a distance vector routing protocol.

Assignment Requirements

The scenario for this assignment is based on the Acme Distribution Center, a fictitious company. You are Sam, the one person IT department. A small company, Acme is expanding its operations by opening two new warehouses. The database server that collects and distributes orders will continue to be housed at the original location, but personnel at the two new warehouses need to be able to enter inventory, receive orders that are to be shipped from their location, and check the inventory level of the other warehouses. Acme also wants to route intra-company phone calls over the network to save on long-distance charges.

Your goal is ensure that you can introduce two new networks to your existing network that will allow each warehouse to talk to the others.

After drawing the network scheme, answer the following questions:

* Which routing protocol did you choose and why?
* Based on your network design, explain what happens to the connectivity between the two new warehouses if the original warehouse goes down. Also explain what happens to the connectivity between the original warehouse and one of the new warehouses if the second new warehouse goes down.

Required Resources

None

You may use Visio or Network Notepad (http://www.networknotepad.com/) to draw your network design.

Submission Requirements

* Format: Microsoft Word, Adobe Acrobat PDF, or printed
* Font: Arial, Size 12, Double-Space
* Citation Style: Chicago Manual of Style
* Length: 1–2 pages
* Due By: Unit 9

Self-Assessment Checklist

Use the following checklist to support your work on the assignment:

* I chose an appropriate distance vector routing protocol while designing my network and explained my choice.
* I have properly implemented the concepts of split horizon.
* I have followed the submission requirements.

## Unit 9 Assignment 9: VLSM Redesign for a Medium-Sized Business

**Learning Objectives and Outcomes**

* Design a subnetting schema using VLSM for a medium-sized business.

Assignment Requirements

You are a network specialist for White & Samuel, a medium-size company that supplies pre-packaged gourmet gift items. You have been asked to redesign the network for White & Samuel. Currently the company uses a classful routing protocol and addressing. Due to the limitation with this type of design, the company would like to use classless routing and VLSM. Prepare a 10- to 15-slide electronic presentation on using VSLM covering the following points:

* Definition of VLSM
* How VLSM relates to classless and classful routing protocols
* How to design a subnetting schema using VLSM
* What happens when there are overlapping VLSM subnets
* How to add a new subnet to an existing design

Required Resources

* None

Submission Requirements

* Format: Microsoft PowerPoint
* Citation Style: Chicago Manual of Style (include citations, if any, in the Notes section of your electronic presentation)
* Length: 10 to 15 slides
* Due By: Unit 10

Self-Assessment Checklist

Use the following checklist to support your work on the assignment:

* I have defined VLSM and its relationship to classless and classful routing protocols.
* I have explained how to design a VLSM subnetting schema.
* I have described what happens when there are overlapping VLSM subnets.
* I have described how to add a new subnet to an existing design.
* I have followed the submission requirements.

## Unit 10 Assignment 10: Network Management Plan

**Learning Objectives and Outcomes**

* Create a network management plan.

Assignment Requirements

The Marketing Company is an average mid-size company of 250 employees. The IT infrastructure consists of 250 workstations with 25 servers that are interconnected by 10 network devices, through firewalls, switches, and routers.

For this assignment, create a network management plan based on FCAPS principles. You may research comprehensive products such as the one found here: http://www.sintrex.com/prodsol.htm as well as open source products that include Nagios and Request Tracker.

Recommended Resources

* http://www.sintrex.com/prodsol.htm

Submission Requirements

* Format: Microsoft Word
* Font: Arial, Size 12, Double-Space
* Citation Style: Chicago Manual of Style
* Length: 1–2 pages
* Due By: Unit 11

Self-Assessment Checklist

Use the following checklist to support your work on the assignment:

* I have researched FCAPS principles.
* I have described the methods that can be used to manage all devices
* I have researched products that can be used to meet the needs of the organization.
* I have formulated a network management plan based on my research.
* I have followed the submission requirements.

## Project: Network Design Proposal

**Purpose**

Unified communications and e-commerce have introduced new ways to conduct business. You will design a comprehensive networking design incorporating all of the concepts learned in this course.

Your ability to execute the tasks and present them will be evaluated against the learning objectives as identified and described in previous units of instruction for this course.

**Learning Objectives and Outcomes**

Successful completion of this project will ensure that you are capable of creating and presenting a network design plan for an organization. To be able to do so, you need to be able to do the following:

* Transform business requirements into communication and networking solutions.
* Differentiate between the Ethernet standards, specifications, and technologies that drive current LAN connectivity.
* Address how IP is used to support voice, video, data, and Internet communications.
* Translate IPv4 and IPv6 IP addressing schemas and perform logical IP addressing schema designs.
* Apply wireless standards and security methodologies to increase business productivity.
* Analyze how Layer 2 and Layer 3 networking technology is used for end-point connectivity and developing resiliency solutions.
* Design and configure routing protocols to meet business needs
* Apply network management and security techniques using the FCAPS process.

**Required Source Information and Tools**

You will require the following resources to complete this project:

* A computer with:
* Access to the ITT Tech Virtual Library
* Access to the Internet
* Microsoft (MS) Office Suite—MS Word, MS PowerPoint, and MS Visio or any other comparable editing, presentation, and drawing software
* Note-taking systems, such as pens, paper, and printers

**Project Logistics and Deliverables**

Deliverables will be as follows:

Unit 2 – Choice of business entity. The business entity must contain the following elements:

* 225,000 employees in five countries
* Corporate office and 18 district offices
* Include server, switches, routers, desktops, mobile computers, and wireless devices

You should select a business entity that you are interested in. Some suggestions include: computer manufacturer, automotive parts manufacturer, restaurant franchising, software development, and network consulting.

Each week you will add a layer to the network project. The following are ungraded checkpoints for the project that must be submitted to your instructor at the beginning of class for approval.

|  |  |
| --- | --- |
| **Due** | **Project Component** |
| Unit 2 | Entity selection |
| Unit 3 | IEEE standards networking design and protocols |
| Unit 4 | Communication methods |
| Unit 5 | Choice of IPv4 or IPv6 and addressing schema identified |
| Unit 6 | Wireless standards and design selected |
| Unit 7 | Departmental VLANs identified and designed |
| Unit 8 | Layer 3 routing designed |
| Unit 9 | Distance vector routing protocols for unified communications identified |
| Unit 10 | Link-state routing protocols for unified communications identified |

The final submission must include:

1. A description of the business entity
2. The communication methods used by the organization
3. A detailed network drawing with all protocols, devices, and IP subnets marked appropriately
4. VLAN and WLAN configurations that meet business requirements
5. Unified communications selected and the appropriate routing protocols identified
6. A best practices document for network security, management, and monitoring
7. A 15-minute electronic presentation to be presented to the chief information officer (CIO) and selected technology staff that describes the overall scope of the project and identifies and addresses all design issues.

Self-Assessment Checklist

Use the following checklist to support your work on the course project:

* I have provided a description of the business entity and the communication methods used.
* I have defined the communication methods used by the organization.
* I have developed a detailed network drawing with all protocols, devices, and IP subnets marked appropriately.
* I have designed VLAN and WLAN configurations to meet business requirements.
* I have selected unified communications methods and identified the appropriate routing protocols.
* I have developed a best practices document for network security, management, and monitoring.
* I have followed the submission requirements and necessary details for writing the report and have prepared a 15-minute presentation for management on the overall scope of the project.