CS215 – Data Communications and Management

Semester 2, 2024

Mode: Face to Face

Assignment 1 – Network Design

Due Date: 4th September 2024

Weight: 15%

Group Assignment - Proposal for HealthPlus Pharmacy Network Design

Assignments Objectives:

Case Scenario: – LAN/WAN setup for the HealthPlus Pharmacy Group – HealthPlus Pharmacy Chain

- This assignment tests the following course learning outcomes and the associated CBOK Attributes: CLO 4 – Build a secure LAN and WAN topology.

Core Body of Knowledge		**CS215**	**Assignment 1**
	Complex Computing		
ICT Professional Knowledge	Ethics		
	Professional expectations		
	Teamwork concepts/issues	M	✓
	Communication	M	✓

	Societal Issues/Legal issues/Privacy		
	Understanding the ICT profession		
ICT Problem Solving:	Abstraction	M	
	Design	M	✓
Technology Resources	Hardware and Software Fundamentals		
	Data and Information Management		
	Networking	M	✓
Technology Building	Human Factors		
	Programming		
	Systems Development / Acquisition		
ICT Management	IT Governance and organizational issues		
	IT Project management		
	Service management		

	Security management		

*Note: The attached marking rubric on pages 7-8 will be used to assess this assignment.

Introduction:

HealthPlus is a new and rapidly growing chain of pharmacies in Fiji. With the aim of providing accessible healthcare products and services, HealthPlus is establishing 8 outlets across the country. The management has entrusted CS215 students with the task of designing the LAN/WAN infrastructure to support the business operations across these locations.

You have the task of designing the network so that it can cater to the following requirements:

Site	Current Requirement	Max Future Requirements	Description
Suva (Head Office)	15 Wired Devices	Additional 25 devices	Computers, Printers, Camera, and Phones.
	6 Servers	Additional 5 Servers	• Pharmacy Database Server • Inventory Management Server • Website Server • CCTV Server • Phone System Server • Advertisements Server
Nausori	10 Wired Devices	Additional 25 devices	Computers, Printers, Camera and Phones.
Sigatoka	12 Wired Devices	Additional 20 devices	Computers, Printers, Camera and Phones.
Nadi	10 Wired Devices	Additional 18 devices	Computers, Printers, Camera and Phones.

Lautoka	10 Wired Devices	Additional 30 devices	Computers, Printers, Camera and Phones.
Labasa	7 Wired Devices	Additional 20 devices	Computers, Printers, Camera and Phones.
Savusavu	5 Wired Devices	Additional 10 devices	Computers, Printers, Camera and Phones.

Each location should have the facilities to offer the following services:

1. Printing, phone services, camera, Pharmacy Database Server, inventory management server, access to the company website, and advertisements.
2. Seamless addition of devices based on projected growth.
3. Server
    A. Update the Pharmacy Database Server, Inventory management server in Suva.
    B. All CCTV recordings will be hosted in Suva from all the sites.
    C. All IP Phones at the sites will register to the Central phone system in Suva.
    D. All advertisements will be hosted off the Suva advertisement server.

Note:

1. To ensure security, the Suva Servers should be in a separate subnet from the devices.
2. The HealthPlus Pharmacy Group Chairman advised that there will currently be no Wireless devices. It is further recommended that in the future, there will be wireless devices such as Tablets for the employees. It is also important to note that in future Pharmacy outlets will offer free WIFI to customers for 15 mins only.

Physical Design

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You have been assigned this project to **create a Proposal for HealthPlus Pharmacy Group Network Design.**

Your proposal should include the following:

1. Network design consists of the Interconnecting devices such as Routers, and Switches, End devices such as Printers, Cameras, Servers, Computers, VoIP

Phones, and finally WAN Providers such as Telecom Fiji, Vodafone Fiji or Digicel Fiji Limited.

2. Interconnecting devices and their specifications such as capacity, reliability, and cost
3. WAN Transmission media and their specifications such as capacity, reliability, and cost.

Logical Design

Design the above network using a packet tracer.

In a Packet Tracer file and associated submissions, include the following:

i The table displays the various subnets and IP address ranges, Subnet, and Broadcast addresses for each subnet.

ii Choice of the Routing Protocol.

iii IP address labels for each device in the network.

iv End to End Connectivity tests between the remote site and Suva Server subnet.

You're Write UP

1. You must word process your assignment. This document should include:
   A. Design for the proposed network. **(10 marks)**
   B. Screenshots of all PDU ping scenarios **(5 marks)**
   C. Justification for the choice of design **(10 marks)**

      This should include your manual calculation of the usage of IPs and reserved IPs for future growth. You can use any method, but your justification must be reflected in your work for each subnet. The individual calculation for each subnet and range of IPs, network address, and broadcast address.

   D. Justification for the choice of interconnecting devices (Capacity, Reliability, Cost) **(5 marks)**

      Proper research for online costs is acceptable, but referencing in APA style is needed. Local vendors are preferred.

E. Justification for the choice of transmission media (Capacity, Reliability, Cost) **(5 marks)**

F. Discussion on how your design caters to the requirements of each branch i.e. Services that each branch is required to offer. **(10 marks)**

Normal text to be in Calibri font with size 12.

Students are free to use any relevant schematic tool.

G. Format document with a **(5 marks)**.

- Table of Contents, Introduction, Conclusion/Discussion, and so on.
- Title page
- Page numbers
- Any added formatting that you may wish to include.

Submission Requirements

- Submit a soft copy of your writeup in MS word format and packet tracer file through Moodle.
- Do the assignment in pairs only.
- The filename should read [SXXXXXXX_SXXXXXX_CS215_A1] for both files. Replace the XXX with student id numbers.
- Incorrect submissions will result in a loss of marks or simply a mark of zero.

LATE SUBMISSION = ZERO (0) Plagiarism

- No two groups should submit the same or similar assignment.

Queries

- Maintain contact through Moodle discussion forum named *Assignment Discussion Forum*.
- Feel free to consult the Lecturer/Course Coordinator during the online consultation hour or tutorial hours for queries.

Assessment Mapping to CBOK

Question	CBOK	Unsatisfactory (0 – 49%)	Satisfactory (50 75%)	Good (76 – 100%)
Write up (a, b)	Design	X. Inappropriate design of network XI. Plagiarism	VI. Appropriate choice of architecture and design	I. All satisfactory And II. Some form of creativity or innovation in architecture and design
Write up (c,d,e,f)	Communication	I. Poor presentation/ communication skills (hard to understand) II. Does not follow the given standard template III. Poor report writing (ill structured, ideas and design not well communicated, and/or poorly	III. Good presentation/ communication skills (clear and loud) IV. Able to follow the given standard template V. Effective report writing (well structured, ideas and design effectively communicated, and well formatted)	. VI. All satisfactory

Logical design	Networking	I. Unable to describe most of the fundamental concepts of networking and data communication with limited supervision II. Unable to identify most of the network principles or protocols or standards and how they can be applied to loosely-coupled problems in the discipline	I. Can describe most of the fundamental concepts of networking and data communication with limited supervision II. Can identify most of the network principles or protocols or standards and how they can be applied too loosely- coupled problems in the discipline	I. Can describe all of the fundamental concepts of networking and data communication with limited supervision II. Can identify all of the network principles or protocols or standards and how they can be applied too loosely- coupled problems in the discipline
		III. Unable to apply most of the fundamental mid-level aspects of this Graduate Attribute when provided with occasional guidance	III. Can apply most of the fundamental midlevel aspects of this Graduate Attribute when provided with occasional guidance	III. Can apply all of the fundamental midlevel aspects of this Graduate Attribute when provided with occasional guidance