CS310 – Computer Networks

Semester I, 2025

Mode: Face to Face & Online (Only Online Submission Required)

Assignment 2 - Category: Group Assignment [5 Members Only]

Due Date: Sunday 1st June 2025

Weight: 20%

Assignments Objectives

- This assignment tests the following course learning outcomes and the associated CBOK.

Attributes:

CLO 2: Examine the principles of reliable data transfer and multi-access control in both wired and wireless networked environments.
CLO3: Assess networked systems in terms of performance metrics such as throughput, latencies, and resource utilization

*Note: The attached marking rubric on pages 7-10 will be used to assess this assignment.

Prerequisites

Each student is expected to complete this assignment in groups of three.

Before you commence this assignment, you should have at least completed:

 Completed all required Moodle (Course) activities from Weeks 8 to 11.

*Note: The assignment will primarily look at the content covered from Weeks 8 to 11.

The Assignment Overview

MediConnect is a supermarket chain spread across Fiji. The MediConnect supermarket chain has supermarkets in both Viti Levu and Vanua Levu. The locations for the supermarket in Viti Levu in Suva, Nausori, Nadi, Lautoka, Ba, and Tavua whilst the locations in Vanualevu are Labasa only. The MediConnect Data Center is in Suva and all the transactions are registered on the Suva Supermarket Data Centre.

MediConnect strives for shopping with a difference. There is a continuous effort to change the customer experience with free WiFi, coffee Shops, free parking, and a toddler play area with continuous supervision.

The success of the MediConnect supermarket chain has been tremendous and the management has decided to open a new supermarket in Savusavu.

You are hired as the Network Design consultant to design, configure and implement the Savusavu MediConnect supermarket.

Requirements

The Savusavu MediConnect supermarket has been allocated the network 172.16.xx.0/23 whilst the Suva Data Center is on the IP space 172.16.200.0/24

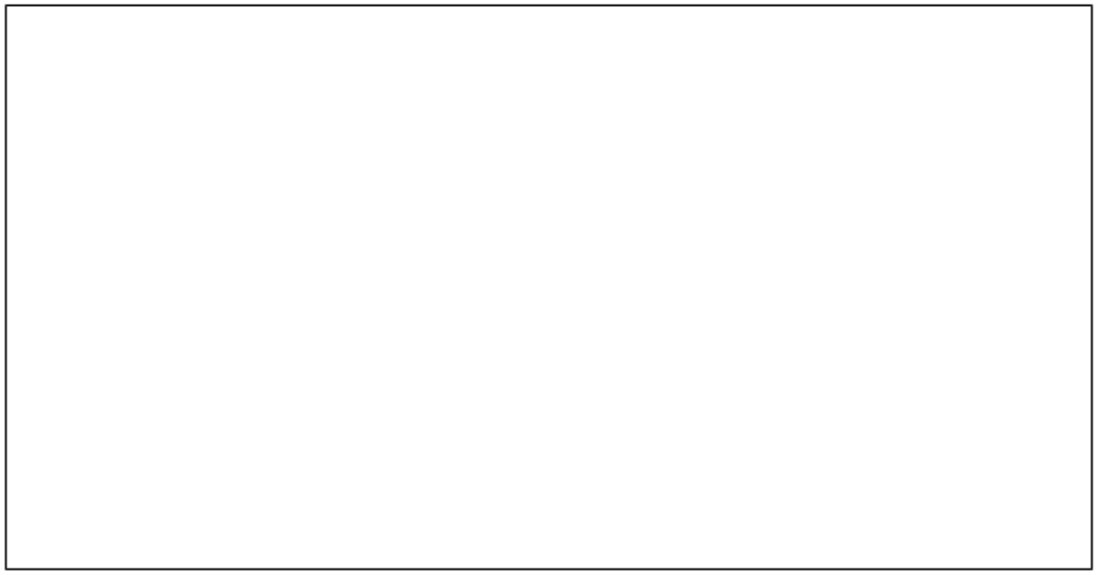
For the network, indicated as 172.16.xx.0/23 is the major network address. Ensure to follow the network address given in table 2 below. The network address is already assigned to each set based on the A1 grouping.

The table below provides the IP address for the Suva Servers as well as the requirements for the Savusavu supermarket.

Table 1: Provides the IP address for the Suva Servers and requirements for the Savusavu supermarket.

Suva		**Savusavu**	
Network	172.16.200.0/24	Network	172.16.xx.0/23
Email Server IP	172.16.200.100/24	Point of Sale Machines	10 IP Addresses
POS Server IP	172.16.200.105/24	Customer WiFi	250 IP Addresses
Default Gateway	172.16.200.254/24	CCTV Services	15 IP addresses
Suva to Savusavu Point to Point Link is provided by Telecom Fiji. The Point to Point network between Suva and Savusavu is on the network 172.16.240.0/30			

1. **Topology: Design The Network in Packet Tracer First**



2. **Design Requirements**

Design the IP addressing plan for the Savusavu Supermarket ensuring that the Point of Sale, Customer WiFi, and CCTV services are accommodated.

Hint – Use Variable Length Subnet Masking (VLSM)

***Ensure to have the same password for all the routers! Failure to follow the guide will result in a heavy penalty!**

The password is "PASSWORD"

3. **Configuration – Part 1**

Suva

1. Implement the topology on Packet Tracer.
2. Configure the Suva Router
    a. Router Name
    b. Enable Password
    c. Console Password
    d. Configure the IP address on the respective interfaces.

e. Configure the Interface descriptions

3. Implement static IP addressing on the Suva Servers – Email and POS Server

Savusavu

1. Configure the Savusavu Router
    a. Router Name
    b. Enable password
    c. Console password
    d. Configure the IP address on the respective interfaces
    e. Configure the interface descriptions
2. Implement IP addressing as per the requirements below
    a. Point of Sale PC – statically assign First Usable IP address
    b. Customer WiFi devices
        i. Implement the DHCP Server in the Router
    c. CCTV Laptop – statically assign First Usable IP address

Configuration Part 2

a. Implement RIP v2 routing protocol on the Suva and the Savusavu Router
    i. Hint use
        1. Use no auto-summary in the RIP v2 implementation.
b. Test connectivity between the following devices
    i. Ping
        1. Point of Sale PC to POS Server in PC – Should be successful
        2. Customer Tablet on Wifi to the Email Server – Should be successful
        3. CCTV Laptop to the email server – Should be successful

Configuration Part 3

There are new network security requirements. The requirements are as follows:

1. The Customer WiFi devices should not be able to access the following:
    a. Email Server
    b. POS Server
    c. POS Clients in Savusavu
    d. CCTV Clients in Savusavu

Implement Access Control List on the Routers to achieve the above.

Check List

Use the following checklist to check your configuration

Part 1 and Part 2

Check List	Status
Suva Router Pings Email Server.	
Suva Router pings POS Server Server.	
Savusavu POS PC should be able to ping the Savusavu Router.	
Savusavu WiFi devices should be able to ping the Savusavu Router.	
Savusavu CCTV Laptop should be able to ping the Savusavu Router.	
Savusavu POS PC should be able to ping the Email Server and the POS Server.	
Savusavu WiFi devices should be able to ping the Email Server and the POS Server.	
Savusavu CCTV Laptop should be able to ping the Email Server and the POS Server.	
Tablet and Smart Phone should be able to ping each other.	
Tablet and Smart Phone should be able to ping the POS PC and CCTV laptop at Savusavu.	

Check List Part 3

Requirements	Status
Savusavu WiFi devices should **NOT** be able to ping the Email Server and the POS Server	
Tablet and Smart Phone should be able to ping each other.	
Tablet and Smart Phone should NOT be able to ping the POS PC and CCTV laptop at Savusavu.	

Savusavu Point of Sale PC should be able to ping the Suva Email Server and the POS Server.	

Network Address Assignment- Based on Grouping

***Note: Please book your network address.**

- If your ID does not appear in the listing below urgently consult the CC.
- Or any changes in the grouping urgently inform the CC.

Assigned Network Address	Group Number	Student ID	Comments
172.16.0.0/23	G1		
172.16.2.0/23	G2		
172.16.4.0/23	G3		
172.16.6.0/23	G4		
172.16.8.0/23	G5		
172.16.10.0/23	G6		
172.16.12.0/23	G7		
172.16.14.0/23	G8		
172.16.16.0/23	G9		
172.16.18.0/23	G10		
172.16.20.0/23	G11		
172.16.22.0/23	G12		
172.16.24.0/23	G13		
172.16.26.0/23	G14		
172.16.28.0/23	G15		
172.16.30.0/23	G16		
172.16.32.0/23	G17		
172.16.34.0/23	G18		
172.16.36.0/23	G19		
172.16.38.0/23	G20		
172.16.40.0/23	G21		

172.16.42.0/23	G22		
172.16.44.0/23	G23		
172.16.46.0/23	G24		
172.16.48.0/23	G25		
172.16.50.0/23	G26		
172.16.52.0/23	G27		
172.16.54.0/23	G28		
172.16.56.0/23	G29		
172.16.58.0/23	G30		
172.16.60.0/23	G31		
172.16.62.0/23	G32		
172.16.64.0/23	G33		
172.18.66.0/23	G34		
172.18.68.0/23	G35		
172.11.70.0/23	G36		
172.16.72.0/23	G37		

Submission Guidelines:

- Submit on Moodle, and upload the solutions in the A2 drop-box provided.
- For Example: [Submit a total of 2 files]

  File: The Xs represent your Group Number.

  - **Packet Tracer File: File1**_GroupX_A2_ID's
  - **PDF File (Subnetting Calculations): File2**_GroupX_A2_ID's **LATE SUBMISSION = ZERO (0)**

Plagiarism

- Incorrect submissions will result in loss of marks or simply a grade of zero being awarded.
- Late Submission = Grade of Zero (0) for Assignment 2.

Zero for any penalty cases thus no two assignment submissions should produce the same results. Any such case will be dealt with severely, with actions including awarding a mark of zero, forwarding the case to the Head of School, and reporting the matter to the Student Disciplinary Committee.

Assignment Queries

- Maintain contact through Moodle discussion forum named Assignment 2 Discussion Forum.
- Feel free to make an appointment via email with the Course Coordinator for any urgent matters regarding Assignment 2.

***Ensure to Fill This: Mandatory!** Student Contribution Award

This award recognizes students who have significantly made a difference in their actions, whether it is within their specific cohort, in CS310. Failure to submit will result in a group penalty.

Please complete and return the following form together with A1 Report and Coding File:

Student Name	Contribution	Justification	Signature

Group Name: _____

Date: _____

Assignment 2 Assessment Rubric

Marking Rubric Components	Poor	Satisfactory		Excellent	Additional Comments
Network Address	No network address chosen *0 Points*	The incorrect address was chosen from the list provided. *1 Points*		The correct address was chosen from the list provided. *3 Points*	
Subnetting the Major Network	Incorrect subnetting *0 Points*	Few subnetting calculations are correct *5 Points*	More than half of subnetting is correct subnetting. *10 Points*	The entire calculation for subnetting is correct. *20 Points*	
Setting Password	Incorrect password (Unable to login) *0 Point*	The different passwords were assigned. *3 Points*	Only a few routers were assigned with the correct password. *5 Points*	All password assignment is correct on all routers. *10 Points*	
Usable IP Address And Subnet Mask	Incorrect IP or subnet mask assigned *0 Point*	Partially correct assigned IP and Subnet mask. *5 Points*		Correct assignment of IP address and subnet mask. *10 Points*	
Statically Assignment Of First Usable IP Address To Devices	No assignment of First Usable IP address *0 Point*	Limited assignment of First Usable IP address *5 Points*		Correct assignment of First Usable IP address *10 Points*	
Suva Router Ping Status	Ping Failed *0 Point*		Ping Successful *5 Points*		

Savusavu Router Ping Status	Ping Failed *0 Point*		Ping Successful *5 Points*		
Tablet, Smart Phone, POS PC and CCTV laptop etc. Ping Status	Ping Failed *0 Point*		Ping Successful *5 Points*		
Implement RIP V2 Routing Protocol On The Suva and The Savusavu Router	Not implemented *0 Point*	Limited implementation *5 Points*	Partially implemented *8 Points*	Successfully implemented *12 Points*	
Implement Access Control List On The Routers	Not implemented *0 Point*	Limited implementation *5 Points*	Partially implemented *8 Points*	Successfully implemented *12 Points*	
Design/Topology [Packet Tracer]	Not implemented *0 Point*	Limited implementation *2 Points*	Partially implemented *4 Points*	Successfully implemented *8 Points*	

The End.

Note: You are provided the added opportunity to form groups of up to five members for this assignment. Please ensure that tasks are distributed equitably among all members to maintain efficiency and avoid placing an undue workload on any one individual.