



**UTM**  
UNIVERSITI TEKNOLOGI MALAYSIA

**FACULTY OF COMPUTING**  
UTM Johor Bahru

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**SEMESTER 1/20242025**

**SECR1213-07 NETWORK COMMUNICATIONS**

**PROJECT : PHASE 2**

**GROUP : Darksystem**

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LECTURER: Dr. Nurfazrina binti Mohd Zamry

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## Table of content

<b>1.0 List of Questions and Answers.....</b>	<b>2</b>
1.1 Interview with lecturer.....	2
1.2 Researches from the Internet.....	3
<b>2.0 Project Feasibility.....</b>	<b>5</b>
2.1 Technical Feasibility.....	5
2.2 Economic Feasibility.....	5
2.3 Operational Feasibility.....	5
<b>3.0 References.....</b>	<b>6</b>
<b>4.0 Meeting Minute.....</b>	<b>7</b>

## **1.0 List of Questions and Answers**

### **1.1 Interview with lecturer**

**1. Should we install security software on our computers to enhance protection?**

Yes, since currently the current setup includes security such as firewall and antivirus software.

**2. What are the device and network requirements for both the network laboratory and the Internet of Things (IoT) laboratory in the building?**

The minimum high performance bandwidth is 1 Gbps. As for devices in IoT/Embedded lab which are related to robotic hardware such as microcontroller for AI such as arduino and raspberry Pi, sensor related, testing tool hardware and software related such as python.

**3. What is the proposed network topology for the building?**

Hybrid is much better.

**4. What is the purpose of a server room, and is it essential to have one?**

Currently all the room is essential to have but if there is more budget, suggested adding a server room which also can be used for domain server or file FTP for document transfer.

**5. What are the recommended computer specifications for each laboratory?**

Firstly, we need to consider the programming purpose since it is for computing faculty. The recommended specification is 8 GB of RAM, i5/ryzen 5 processor, suggested to add mid-end graphic card and 512 ssd for storage.

**6. What security strategies should be implemented to prevent device theft?**

This is more for physical security which can consider installing closed-circuit television (CCTV) or either biometric or password door.

**7. Do we need a WIFI backup connection?Why?**

Yes, we need to back up switches and routers.

**8. What equipment is needed for each room?**

As for IT/embedded labs, we can consider any IoT device which is a circuit for microcontrollers such as arduino or raspberry since we are doing hands on IoT. For network configuration, we can consider more switches, router and rack to store the switches. As for hybrids, we have to consider how we perform the online setup such as webcam, 4K TV or anything related. As for the general purpose lab, it is something almost similar to the current computer lab in the university.

**9. Are there any specialized hardware?**

In terms of brand, the lab has to include Cisco hardware and the others are up to the budget.

**10. Latency and speed requirements for different areas of the network?**

In terms of speed, for Cisco lab and real-time purposes like conferencing or online/hybrid class can up the speed to more than 1 Gbps. Other areas can maintain the 1 Gbps.

## **1.2 Researches from the Internet**

### **1) What is network topology ?**

Network topology is the pattern or arrangement of the network of the devices in use with regard to the way they are connected and how they communicate. It is kind of like a map of the network, giving the location of every device and how they are connected. This means that the type of topology one selects in a network determines the overall performance, expansion capabilities, flexibility of expansion, and reliability needed in future while undertaking maintenance. Network topology can be classified into two primary categories: Physical Topology and Logical Topology. Physical topology defines the physical arrangement of nodes and cables in a network and largely determines installation, upgrade, and troubleshooting. Examples of physical topology are star, bus and mesh. Logical topology identifies routes through which data transmits, focusing on virtual pathways and communication protocols, regardless of the actual physical arrangement [1].

## **2) Which type of networking cable is best for connecting the computers, and why is it selected?**

Type of cable that is suitable for connecting computers in the labs is coaxial cables since it increases the reliability and efficiency of the transfer of data between different devices. Twisted pair cables effectively minimize crosstalk through the use of a reversal copper conductor at the center and a shield in order to deliver effective performance. They are the basis of the modern local area networks (LANs) and wide area networks (WANs), PC connectivity to routers, switches and modems. Coaxial cables are particularly suitable in handling data intensive activities such as transferring large files, playing network games and streaming videos since they do well where there is interference which is suitable for students to carry out their learning activities. Coaxial cables provide a strong connectivity that can support computer networks and are very reliable [2].

## **3) Wired or wireless connection is preferred for this building connectivity ?**

Wired connection is preferred for connectivity among the devices in the building because the data flow is faster with minimal chance of disruption for things such as file sharing or video calls. Wireless connections are convenient to implement, but often they are slower and can be subject to issues of signal strength in large buildings. Important devices ought to be connected through wired connections and wireless connections may cover other essential devices in areas that allow mobility of the device. At the end hybrid is preferable which is a mix of both to cover each other's functions [3].

## **4) Are there existing network components that can be used to save cost ?**

Yes, some of the current elements of the network can contribute to lower expenses without sacrificing efficiency. Firstly, to take advantage of current existing software and hardware licenses. Make sure the correct license is used for the suitable application and not overspending on unnecessary licenses. Other than that is use cloud based services for storage and data backup which minimize storage devices and its consequential costs such as maintenance costs [4].

## **5) How will network performance be monitored and maintained overtime ?**

To monitor networking performance we need to use Network Performance Monitoring Tools [5] , for example the SolarWinds [6], as monitoring tools that will help organizations understand how well the network is performing and where the problems are located. Observation, and checking logs are ways of ensuring that problems are detected in good time. Maintaining the current system update ensures that all components run efficiently and smoothly. Another way is to maintain proper procedures for problem solving and asking the users for feedback which may be valuable as well.

## **2.0 Project Feasibility**

After gathering information by interviewing and answering the provided questions, We have determined the feasibility of the project from different aspects which are technical feasibility, economic feasibility, and operational feasibility.

### **2.1 Technical Feasibility:**

Based on the information gathered, this project seems to be technically feasible. The network requirements, combination of high-speed networking, and cutting- edge technologies such as SDN and edge computing align with faculty's growth educational and projectional. Moreover,by implementing security protocols, it ensures the system is secure and can protect against any potential threads. Therefore, both current and future are met efficiently and cost-effectively.

### **2.2 Economic Feasibility:**

The budget obtained for this project is RM 1.5 million, which can be considered adequate but not excessive. Therefore, we need to be prudent in our spending. Many upgrades are required, such as the purchase of fiber optic cables, routers, and so on. Thus, we have decided to reduce Wi-Fi costs by utilizing the existing Wi-Fi speed available at the Faculty of Computing, with the possibility of a slight speed increase if necessary.

### **2.3 Operational Feasibility:**

From an operational standpoint, this project also shows strong feasibility. Thoughtful planning has gone into designing a reliable network infrastructure, including server rooms, backup systems, and redundancy measures to safeguard data integrity and accessibility. Key strategies like fault management, performance optimization, and configuration management have been outlined to keep the network running smoothly. By implementing these proactive measures, we aim to make monitoring and maintenance more efficient. Furthermore, we recognize the importance of real-time tools for network management to ensure consistent high availability and optimal performance throughout.

### 3.0 References

- [1] Wikipedia.(n.d.).Network Topology.[https://en.m.wikipedia.org/wiki/Network\\_topology](https://en.m.wikipedia.org/wiki/Network_topology)
- [2] ETWORKDROPS.(n.d.).The Different types of network cable.  
<https://networkdrops.com/blog/the-different-types-of-network-cabling/#:~:text=Coaxial%20cables%20are%20essential%20to,shield%20to%20ensure%20reliable%20performance.>
- [3] Matrix-NDI .(24 June 2021). Wired vs Wireless Network: Which is Better?  
<https://www.matrix-ndi.com/resources/wired-vs-wireless-internet/#:~:text=Speed%3A%20Wired%20networks%20are%20generally,much%20faster%20and%20more%20reliable>
- [4]Infraon, Deepak Gupta. (20 February 2023). 10 Ways to reduce your IT cost.  
<https://infraon.io/blog/it-cost-reduction/>
- [5] Obkio, Alyssa Lamberti.(19 June 2024). How to monitor Network Performance: A Simple Guide. <https://obkio.com/blog/how-to-monitor-network-performance/>
- [6] Solarwinds.(n.d.).  
<https://www.solarwinds.com/network-performance-monitor/use-cases/network-monitoring-software>

#### 4.0 Meeting Minute

DATE/TIME		26/10/2024 ( 2pm - 4pm)	
LOCATION		Online (Google Meet)	
AGENDA		1) Analyze Task 2 2) Suggest and select questions for Task 2 3) Choose suitable questions for interview 4) Distribute the tasks to all members	
MEETING MC		IZZAT FAKHRULLAH	
ATTENDANCE			
NAME		TIME	REASON FOR ABSENCE
IZZAT FAKHRULLAH		2pm	-
THAYAALLAN		2pm	-
DANIAL		2pm	-
MINUTES			
NO	ITEM DISCUSSED	IDEAS/SUGGESTIONS AND PERSON GIVING IT	PERSON IN CHARGE & DATE
1	Analyze Task 2	<ul style="list-style-type: none"><li>- Izzat Fakhruallah shared the information about Task 2 and its rubric</li><li>- All member read and analyze the task carefully</li><li>- Each member shared their understanding and how to solve the problem.</li></ul>	Izzat
2	Suggestion for questions	<ul style="list-style-type: none"><li>- All member discussed the possible questions</li><li>- All member shared all the questions</li></ul>	All member



3	Choose suitable questions for interview	<ul style="list-style-type: none"> <li>- All member discussed suitable questions for interview</li> <li>- All member chose questions for interview from previous questions listed</li> </ul>	<b>All member</b>
4	Task distribution	<ul style="list-style-type: none"> <li>- Thayaallan will be responsible to interview Dr Nurfazrina</li> <li>- Danial was assigned to do research to find a solution for some of selected questions</li> <li>- Izzat was assigned to complete the feasibility</li> <li>- Izzat was assigned to prepare for meeting minutes</li> </ul>	<b>Thayaallan and Danial</b>