UTM UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF COMPUTING
UTM Johor Bahru

SECR1213-05

NETWORK COMMUNICATIONS

Semester 03, 2025/2026

TASK 2 | SURVIVOR

Lecturer:

MUHAMMAD ZAFRAN BIN MUHAMMAD ZALY SHAH

Group 02 Members:

No.	Name	Matric No
1	ABDURRAFIQ BIN ZAKARIA	A24CS0031
2	AHMAD MUNIF BIN BAHARUM	A24CS0038
3	NAJMUDDIN BIN KAMARUDIN	A24CS0145
4	DANIEL IMAN HAQIMIE BIN YUSOFF	A24CS0063

BRIEF EXPLANATION OF THE TASK

In Task 2, our group, Survivor, was assigned to carry out a preliminary analysis for the proposed new Faculty of Computing (FC) building. The main goal of this task is to understand the current and future network requirements needed to design a system that is efficient, scalable, and ready to support modern teaching and learning needs.

To complete this analysis, our group prepared a set of research and interview questions focusing on network requirements, device selection, bandwidth capacity, user demands, and sustainability. We conducted interviews with one lecturer, who represented the faculty's academic perspective, and one technician staff, who shared valuable insights from a technical and maintenance point of view. Additional information was gathered through online research to strengthen our findings.

After collecting and analysing all the information, we assessed the feasibility of the proposed network design based on several factors, including cost, practicality, technology compatibility, and room for future upgrades. This ensures that the proposed design is realistic, reliable, and aligned with the Faculty of Computing's mission to embrace digital transformation and the Fourth Industrial Revolution (4IR).

Through teamwork, discussion, and research, our group aims to develop a well-grounded preliminary analysis that will serve as a strong foundation for the next stage of the network planning and implementation process.

PRELIMINARY ANALYSIS

List of questions and answers

1. How do you currently use the existing labs or classrooms for teaching and learning?
    - Current labs are mainly used for face-to-face teaching and lab-based activities such as programming, networking, and project work.
    - Not all labs are hybrid yet, but the faculty is gradually transitioning toward hybrid setups to support both **physical and online learning**.
    - The future goal is to achieve **fully hybrid classrooms**, in line with modern university teaching trends and **4IR (Fourth Industrial Revolution)** education initiatives.
    - Source: **Lecturer Interview**

2. What are the main challenges or issues you face in the current labs or facilities?
    - The lecturer reported **network congestion** during peak hours, especially during final exams or assignment submissions when many users access the network simultaneously.
    - This high traffic causes **significant delays and reduced performance** for both staff and students.
    - Indicates a need for **bandwidth management**, **load balancing**, and possibly **upgraded switches and routers** that can handle concurrent connections efficiently.
    - Source: **Lecturer Interview**

3. How many students usually attend each lab session or class?
    - Each new lab is expected to accommodate **a maximum of 30 students**.
    - This aligns with the case study requirement and allows sufficient workspace and network capacity for group activities or equipment use.
    - Source: **Lecturer Interview, case study**

4. Do you think the current network and internet connection are sufficient for your teaching activities?
    - Current network performance is **adequate for normal operations**, but struggles during **sudden spikes in user traffic**.
    - Suggests that the new network should incorporate **redundancy, scalable bandwidth allocation**, and **traffic shaping** techniques to handle high-load scenarios.
    - Source: **Lecturer Interview**

5. What type of activities or learning tools (like online platforms, software, or virtual labs) do you often use during your classes?
    - The faculty primarily uses **Webex** for hybrid classes and video conferencing.
    - Some courses (e.g., computer graphics) require **high-bandwidth applications** such as rendering or simulation tools.
    - Future network design must support **consistent high throughput and low latency**, suitable for multimedia and real-time collaboration tools.
    - Source: **Lecturer Interview, online research**

6. What new features or improvements would you like to have in the new labs or classrooms?
    - Improvements should focus on **handling anticipated network requirements** and **scalability**.
    - The lecturer emphasized the importance of **future-proofing** the network — meaning equipment and configurations should allow easy upgrades for newer technologies (e.g., Wi-Fi 6E, 10GbE switches).
    - Source: **Lecturer Interview**

7. How important is it for you to have wireless connectivity (Wi-Fi) in all areas such as labs, lounges, and classrooms?
    - Wi-Fi connectivity is **critical** for teaching and learning.
    - Each student typically connects **3 to 4 personal devices** (laptop, smartphone, tablet, etc.).
    - With an estimated **1,500 students**, the network must support at least **4,500–6,000 concurrent device connections**.
    - This requires **enterprise-grade access points (APs)** with high client density, proper **channel planning**, and **load balancing** across bands (2.4 GHz, 5 GHz, and possibly 6 GHz for Wi-Fi 6E).
    - Source: **Lecturer Interview, online research, case study**

8. What kind of environment do you think would help students learn and collaborate better in the new building?
    - Most collaborative student activities are held in the **student lounge**.
    - The lecturer suggested ensuring the **lounge area has strong, accessible Wi-Fi coverage** to encourage group discussions, project work, and peer learning.
    - The lounge should include sufficient **power outlets**, comfortable seating, and **access to cloud-based learning tools** via the network.
    - Source: **Lecturer Interview**

9. Do you have any suggestions on how the new hybrid classroom or video conferencing room should be set up?
    - The current setup is already functioning well but can be improved.
    - Possible enhancements include:
        - **Dual high-resolution displays or smartboards** for in-room and remote participants.
        - **High-quality PTZ (pan-tilt-zoom) cameras** and **noise-cancelling microphones** for clear audio and visuals.
        - **Dedicated network VLAN** for hybrid classroom equipment to ensure stable and prioritized connections.
    - Source: **Lecturer Interview, online research**

10. From a networking perspective, what improvements or features do you expect in the new building's network (e.g., faster internet, better coverage, reliable connections, or more ports)?
    - All networking features — **speed, coverage, reliability, and port availability** — are equally important and must be prioritized.
    - Lecturer emphasized that as network consultants, the team should focus on **advanced technology** integration such as:
        - Wi-Fi 6 or Wi-Fi 6E access points for high-density environments.
        - Gigabit or 10-Gigabit Ethernet backbone.
        - Network segmentation via **VLANs** for labs, staff, and students.
        - Centralized **network monitoring system (NMS)** for performance tracking and quick troubleshooting.
    - Source: **Lecturer Interview, online research**

11. What are the main problems or challenges that you often face in maintaining the existing lab network?
    - **Lack of real-time monitoring tools** – Current setup doesn't have a centralized system to monitor network performance, uptime, or device health, making troubleshooting slower.
    - **Power related problems** – Occasional power trips or unstable power supply affect switches and cause temporary disconnections.
    - Source: **Technician Interview**

12. What kind of additional support or facilities would help you manage and maintain the network more effectively in the future?
    - **Centralized network management system (NMS)** – A monitoring tool (like Cisco DNA Center or PRTG) to view all devices, detect faults, and manage bandwidth usage efficiently.
    - **Dedicated maintenance workstation** – A secure PC connected to all lab networks for quick testing, firmware updates, and configuration backups.
    - Source: **Technician Interview, online research**

Feasibility Analysis and Reasoning

Based on the preliminary analysis, interviews, and project constraints, the proposed network upgrade project is deemed **feasible**. This conclusion is supported by strong evidence across economic, technical, and operational dimensions.

1. Economic Feasibility

The project is economically viable, SURVIVOR has been given a significant budget of RM 0.9 Million. This budget is sufficient to acquire the high-end equipment required by the client, including Wi-Fi 6 or Wi-Fi 6E Access Points, Gigabit/10-Gigabit Ethernet backbone switches, and necessary software licensing for a Centralized Network Management System (NMS). After analysing the initial cost, this confirms that the required infrastructure can be implemented within our financial limits.

2. Technical Feasibility

The technical requirements gathered, specifically the need to support more than 4,500 or less than 6,000 concurrent devices, around that range, and the use of technologies like VLANs for network segmentation, QoS for real-time traffic, and a 10GbE backbone, are all based on *modern, commercially available, and proven* networking standards. Since these technologies are fully compatible with existing university standards and readily available from major vendors, the project poses no difficult and dragging technical challenges.

3. Operational Feasibility

Operationally, the project is highly feasible because the new design directly resolves existing challenges, problems and mishaps faced by the faculty and technical staff. The implementation of a new network that includes a centralized NMS and dedicated maintenance workstations will eliminate issues like network congestion and the lack of real-time monitoring, leading to easier maintenance, quicker troubleshooting, and overall improved network reliability and uptime for teaching and learning activities.

APPENDIX

Meeting Minutes Bil.01

DATE / TIME	25 October 2025, 8:30 P.M
LOCATION	WA2, KDSE
AGENDAS	1. Discussion on task requirements and deliverables 2. Identifying sources for research on current and future requirements 3. Planning interview questions for technicians and lecturers 4. Task distribution
Meeting MC	AHMAD MUNIF BIN BAHARUM

ATTENDANCE		
NAME	**TIME**	**REASON FOR ABSENCE**
ABDURRAFIQ BIN ZAKARIA	20:30	
AHMAD MUNIF BIN BAHARUM	20:30	
NAJMUDDIN BIN KAMARUDIN	20:30	
DANIEL IMAN HAQIMIE BIN YUSUFF	20:30	

MINUTES			
NO.	**ITEM DISCUSSED**	**OUTCOME**	**PERSON IN CHARGE**
1	Opening	- Rafiq starts the meeting with Surah Al-Fatihah and explain the agendas	Rafiq
2	Task requirements & deliverables	- All members read and understood that Task 2 focuses on preliminary analysis (requirements & devices)	All members
3	Sources for research on current and future requirements	- Members gather information from relevant sources to support the preliminary analysis - Sources included: - **Case study**	Najmuddin & Daniel

		provided by the lecturer - **Educational articles** related to network infrastructure and 4IR labs - **UTM official resources** (faculty facilities and lab informations)	
4	Interview questions	- Prepare 2 sets of questions: 1 for lecturers**(client)** and 1 for lab technicians - For **lecturers**, questions will focus on current and future requirements, user experience, network expectations, and needs for hybrid classrooms and Wi-Fi coverage - For **technicians**, questions will cover current network infrastructure, common technical issues, security implementation, and improvement suggestions.	Munif & Rafiq
5	Next meeting	- Next meeting on 28 October 2025 to review all works including interview questions and research progresses	Najmuddin
6	Meeting ended	- Rafiq ends this meeting with tasbeeh kifarah and surah al-asr - The meeting ends at 11:15 P.M	Rafiq

Meeting Minutes Bil.02

DATE / TIME	28 October 2025, 9:00 P.M
LOCATION	Discord
AGENDA	1. Questions draft review 2. Interview planning finalization 3. Research progress updates
Meeting MC	DANIEL IMAN HAQIMIE BIN YUSOFF

ATTENDANCE		
NAME	**TIME**	**REASON FOR ABSENCE**
ABDURRAFIQ BIN ZAKARIA	21:00	
AHMAD MUNIF BIN BAHARUM	21:00	
NAJMUDDIN BIN KAMARUDIN	21:00	
DANIEL IMAN HAQIMIE BIN YUSUFF	21:00	

MINUTES			
NO.	**ITEM DISCUSSED**	**OUTCOME**	**PERSON IN CHARGE & DATE**
1	Interview questions draft review	- The group reviewed both drafts for lecturer and technician interviews. Members discussed question clarity and relevance to Task 2 - Minor adjustments were made to ensure the questions cover both current and future requirements	Munif & Rafiq
2	Research updates	- findings on current network infrastructure were presented - The group agreed to include information about scalability and 4IR readiness	Najmuddin & Daniel
3	Planning interview schedule	- The team discussed when and who to interview - Decided to approach one	All members

		lecturer (client) and one technician (technical staff) from the faculty's existing lab - Each member will take turns leading the interview.	
4	Final check	- The group discussed the expected responses from both interviews - For **lecturer** interview: expect answers related to current network limitations, teaching tools used, Wi-Fi coverage needs, and future improvements - • For **technician** interview: expect input on current device types, maintenance process, technical challenges, and recommended upgrades - Agreed that after collecting the answers, members will summarize the outcomes and analyze project feasibility based on the results.	All members
5	Next meeting	- Next meeting on 31 October 2025 to compile interview results and finalize report	Munif
6	Meeting ended	- Rafiq ends this meeting with tasbeeh kifarah and surah al-asr. - The meeting ends at 10:45 p.m	Rafiq

Meeting Minutes Bil.03

DATE / TIME	31 October 2025, 9:00 P.M
LOCATION	WA2, KDSE
AGENDA	1. Interview results review and compilation 2. Report formatting and review
Meeting MC	NAJMUDDIN BIN KAMARUDIN

ATTENDANCE		
NAME	**TIME**	**REASON FOR ABSENCE**
ABDURRAFIQ BIN ZAKARIA	21:00	
AHMAD MUNIF BIN BAHARUM	21:00	
NAJMUDDIN BIN KAMARUDIN	21:00	
DANIEL IMAN HAQIMIE BIN YUSUFF	21:00	

MINUTES			
NO.	**ITEM DISCUSSED**	**OUTCOME**	**PERSON IN CHARGE & DATE**
1	Compilation of interview results	- Members combined lecturer and technician responses into a single summary - The lecturer's interview provided user requirements and future expectations, while the technician's interview focused on network maintenance and infrastructure issues	Najmuddin
2	Review connection between the findings	- Group compared both interviews and identified several consistent points: - Both highlighted **network congestion during peak hours** and the need for better bandwidth management - Lecturer emphasized scalability for future hybrid learning, while the	Munif & Rafiq

		technician mentioned limited ports and aging equipment which shows a direct link - Both agreed on the importance of **reliable Wi-Fi connectivity** to support multiple devices per user	
3	Analysis and report formatting	- Formatting will follow the standard layout by using consistent fonts, labeled tables, and organized sections for clarity and professionalism	Daniel
4	Final check	- The group agreed to perform final proofreading, citation check, and ensure file naming follows submission guidelines - The finalized Task 2 report should be ready for submission by 1st of November 2025	All members
5	Meeting ended	- Rafiq ends this meeting with tasbeeh kifarah and surah al-asr - The meeting ends at 10:15 P.M	Rafiq

Interview

Figure 1

Figure 2

Figure 1 and Figure 2 shows *post interview session with Mr. Firdaus, lab technician at Faculty of Computing*

Task Distributions

Member	Task/Responsibilities	Works completed
AHMAD MUNIF BIN BAHARUM	- Interview questions preparation - Documentation	- Drafted and refined interview questions for both lecturer and technician to ensure relevance with objectives - Assisted in editing and structuring the final interview question list - Helped document meeting minutes and compiled interview notes into appendix
ABDURRAFIQ BIN ZAKARIA	- Interview(Technician) - Documentation	- Conducted the interview session with the technician to gather information about current network infrastructure and maintenance issues. - Recorded responses accurately and summarized findings into bullet points.
DANIEL IMAN HAQIMIE BIN YUSOFF	- Interview(Lecturer) - Research & analysis	- Conducted the interview session with the lecturer (client) to identify user requirements, challenges, and expectations for the new building - Carried out research on modern networking technologies, scalability solutions, and 4IR-ready infrastructure.
NAJMUDDIN BIN KAMARUDIN	- Report compilation & formatting - Research & analysis	- Compiled all findings, analysis, and research into a complete report - Conducted additional research on network devices, Wi-Fi requirements, and hybrid classroom setup - Reviewed and proofread the final report for consistency and correct formats for submission