



UNIVERSITI TEKNOLOGI MALAYSIA, JOHOR BAHRU

SCHOOL OF COMPUTING,

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GROUP PROJECT

GROUP NAME: M&N

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List of Questions and Answers

1. Which access network do you want to use for this network plan?

The access network that needs to be used is '**Enterprise Access**'. Since this new 2-storey building needs to hold thousands of people under the School of Computing in an institution, end systems need to be connected to edge routers via Local Area Network (LAN). Ethernet is by far the most prevalent LAN access technology in large areas such as universities and companies..

2. Which physical media do you want to use for this network plan?

We will use both, guided and unguided media.

- Guided media or generally being called a **wired connection** is being used to access networks using ethernet cables. Ethernet connection provides greater reliability and security as it is fast. Generally, Ethernet could provide speeds as high as 10 Gbps and more. In terms of security, it is safer as data is being transferred physically by cable which is connected between devices. The cable, which is 'Twisted-Pair Copper Wire' is also not too expensive as it is commonly being used and usually, 'Unshielded Twisted Pair (UTP)' is the one.
- Unguided media or generally being called as **wireless network** or WiFi is being used as it is convenient. Users could move freely from different workstations as it provides seamless access anywhere as long as the device is connected to the internet. Hence, transferring files could be easier.

3. What is the best Internet Service Provider (ISP) that you want to use?

™ Unifi is good broadband in Malaysia as it has the widest coverage in the entire country. It could also speeds of up to 800Mbps with no real bandwidth cap. Hence, the devices inside the building, students and staff could access the internet easily.

4. Which operating system will you use for all laboratories?

It depends on the types of equipments or computers used, there are 3 types well-known operating system such as:-

- Linux OS
- Microsoft Windows
- Apple OS X

Microsoft Windows, which is known as one of the popular options for others. Same goes for Linux, known as a free open source operating system that is usually used for a budget computer lab that we will use too.

5. What devices are needed to build the network?

We will use switches , routers

- Switches and Hubs
 - Used to connect all the computers in each lab in order to be able to communicate with each other. The switches which work on the data link layer will overcome the limitations of the hubs that work on the physical layer.
- Routers
 - Used for Internet connection and to connect to the switches.

6. What should be done to prevent unauthorized devices in the network?

There are a few ways to prevent this from happening. It can be listed as shown below:-

- Password Management as a protection barrier for the network from unauthorized devices. This can be powerful if it is regularly checked and updated as it would be harder for the unauthorized users to access the network.
- Use IEEE 802.1X to secure the network authentication. When using LAN ports in confidential areas, without IEEE 802.1X authentication, any device can gain access to the network. By using the IEEE 802.1X authentication, only verified users that are recognized by RADIUS Server can access the network.

7. What kind of network topology is used?

The network topology that will be used is star topology as all devices are connected to a central switch. With this star topology, it is easy to add/remove nodes without having to take the network offline and administer it as the entire network can be managed from one location. Besides, it provides a high speed of data transfer which is the crucial thing for students and the staff to be able to complete their work.

8. Type of network protocol that will be used?

For network protocol, there are 3 main types that need to be known which are network management protocol, network communication protocol and network security protocol.

- Network communication protocols
 - This protocol is essential for computer networks to function. It defines the regulations for transmission of data, messages between computers, identification and error detection and others. Two most popular protocols are HTTP and TCP. HyperText Transfer Protocol (HTTP) allows the communication between browsers and servers. For TCP, it separates the data into packets that will be sent to other devices.
- Network management protocols
 - This protocol specifies the policies and steps which will be used to manage, maintain the computer network, and also help the needs to communicate across the network to make sure the communications are stable and the performances are optimal. One of the protocols is Simple Network Management Protocol (SNMP), which allows the administrator to view and monitor the network.
- Network security protocols
 - This protocol ensures the safety and security of data in transit across connections of networks. It also can protect data from unauthorized parties to inspect or extract the data, so all services or devices will be safe from unauthorized users. The protocol that we will use is Secure Hypertext Transfer Protocol (HTTPS) which is the secure version of HTTP. All of the data that is sent between the browsers and servers will be encrypted to ensure protection and safety.

9. What are the compulsory softwares required in each lab?

In general each lab needs to have documentation softwares, browsing softwares, pdf filing purposes software and basic coding software. These are the universal softwares that should be in each workstation in every lab.

- Documentation Softwares - Microsoft Office 2019 (includes Word, Powerpoint, Excel, and so on)
- Browsing Softwares - Google Chrome, Mozilla Firefox, Microsoft Edge
- Pdf Filing - Adobe Acrobat Reader DC
- Basic Coding Software - Dev-C++

For Network Computer Lab there is one additional software that should be included which is Wireshark.

Computer Security Lab should have CrypTool 2.0, Ophcrack 3.0, Wireshark and Google Gruyere Application (optional).

The Internet of Things (IoT) Lab should have more coding softwares from various languages. It can have Sublime Text, JavaScript, Python and more.

10. What are the minimum hardware specifications for every workstation?

- **Processor:** Intel Core i5/ i7 or higher
- **Operating System:** Windows 10, 64 bits
- **Memory:** 16 GB RAM
- **Storage:** 500 GB
- **Monitor/Display:** 14" LCD monitor or higher, resolution of 1600 x 900 or higher

11. What is the antivirus software installed on each PC?

TotalAV - Total Security

Feasibility Study

Today, technology has revolutionized our daily life, becoming easier and faster. As the Internet has become a necessity all over the world, therefore this paper proposed an overview of the requirements to develop a network plan for a new building that is about to be established in the School of Computing, UTM Skudai. The objectives of this project are to see whether it is possible for us to develop this project within the budget besides prioritizing the security, scalability, information processing, integration and updates.

Security is the most crucial thing especially for large organizations like the School of Computing, so that their confidentiality can be ensured and their clients will be assured to use the service. The security that we plan to provide includes the installation of a trusted security application, thus it can prevent unauthorized users from accessing it. Besides, we also plan to use antivirus protection software to keep the PC's safe from any malware and online threats.

Next, we are aiming to have an improved way of processing all sorts of forms of information in the building suitable according to the use of the labs as well as the conference room. Information processing should be accurate and efficient since the target clients are expected to be in a large number as they might access the network at the same time simultaneously. In order to avoid any losing situation to the clients, the network should be able to recover, process, save and store all the information including all the text, audio, graphics and many more in any devices that are connected with the same network.

Every system and networking need to be maintained. Maintenance is an important key to an efficient and excellent network system. The maintenance should cover all components from the slightest to the biggest components because each one of them are related to each other. In order to avoid any network interruption, the maintenance is supposed to be performed once a year because the usability capacity is high all year long. The maintenance can include some updates if needed according to the newest specifications on that certain time. Maintenance can ensure the users that the network is reliable and can be functioning properly almost all the time.

Last but not least, the design of the building and the arrangement of each equipment also play an important role to build a new building especially for the School of Computing. As for computer laboratories, they must be thoughtfully designed, constructed and serve the reason for which they were created. The layout of a computer lab determines the effectiveness and enhances user's pleasure which justifies the lab's cost and aids in the future. Every design and layout has their own advantages and disadvantages. For example, traditional computer lab architecture gives a great exposure for the students since all of the students can easily take a look at the lecturer and the slides in front of them.

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