UTM

UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF COMPUTING

SEMESTER 1/20222023

SECR1213 – NETWORK COMMUNICATION

SECTION 04

TASK 3 PROJECT

LECTURER: MS. RASHIDAH KADIR

GROUP NO: 2

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List of Devices Needed and Descriptions

Type	Function	Description	Qtty	Price/ Unit (RM)	Total (RM)
D-Link 48 Port Managed Switches 	Keep traffic between devices from getting in the way of other devices on the same network, increase LAN bandwidth and connect multiple PCs to the network.	**Switching Capacity** ● 104 Gbps **Transmission Method** ● Store-and-forward **Maximum 64 bytes packet forwarding rate** ● 77.4 Mbps **Packet Buffer Memory** ● 12 MB **AC Input** ● 100 to 240 VAC 50/60Hz internal universal power supply **Maximum Power Consumption** ● 34.85 watts **Heat Dissipation** ● 118.92 TU/hr **Storage Temperature** ● -4 ° to 158°F (-40° to 70°C) **Diagnostic LEDs** ● Link/Activity/Speed (Per 10/100/1000 Mbps port)	**8**	**2,300**	**18,400**

Asus RT-AX82U Router 	Allows internet access to reach the whole building and prevent dead spots where the internet can not be accessed.	**<u>WiFi Range</u>** ● up to 2000 sq ft & 30+ devices **<u>Data Rate</u>** ● WiFi 5 (802.11ac) (1024QAM) : up to 4333 Mbps ● WiFi 6 (802.11ax) (5GHz) : up to 4804 Mbps **<u>Antenna</u>** ● External antenna x 4 **<u>Firewall & Access Control</u>** ● Firewall: SPI intrusion detection, DoS protection ● Access control : Parental control, Network service filter, URL filter, Port filter **<u>Processor</u>** ● 1.5 GHz tri-core processor **<u>Ports</u>** ● RJ45 for 10/100/1000 BaseT for WAN x 1, RJ45 for 10/100/1000 BaseT for LAN x 4 ● USB 3.2 Gen 1 x 1 **<u>Wi-Fi Technology</u>** ● OFDMA ● Beamforming: standard-based and universal ● 1024-QAM high data rate ● 20/40/80/160 MHz bandwidth	**3**	**1,100**	**3,300**

D-Link DWL-8620AP Wireless Access Point 	Enable devices to connect to the internet without the existence of wired media.	**<u>Data Transfer</u>** ● 2.4GHz Up to 800 Mbps ● 5GHz Up to 1733 Mbps **<u>Wireless Frequency</u>** ● 5 GHz: Up to 5850 MHz ● 2.4 GHz: Up to 2483 MHz **<u>Wireless Functions</u>** ● Multiple SSIDs (Up to 16 SSIDs, 8 for each band) ● Enable/Disable Wireless Radio ● Automatic Channel Assignment ● Transmit Power Control (Adjust Transmit Power on dBm) **<u>Wireless Security</u>** ● WPA Personal/ Enterprise ● AES and TKIP **<u>Power Method</u>** ● Power Supply External power adapter: 12 V DC 2.5 A ● Supports 802.3at PoE PD on LAN 1 Port Power over Ethernet24.24 W **<u>LAN Interface</u>** ● 2 x 10/100/1000BASE-T LAN port **<u>SSID Security</u>** ● Up to 32 SSIDs, 16 per radio, 802.1Q VLAN, Station Isolation **<u>Features</u>** ● Beamforming technology ● Band Steering for efficient traffic management ● Dual Gigabit Ethernet LAN port	**6**	**2,900**	**17,400**

		• UL2043 certified chassis (Plenum-rated SKU)			
Lenovo ThinkSystem SR530 Rack Server (Xeon Silver 4110, 8GB, 600GB, 2x Integrated 1 GbE RJ-45 ports) **Height: 43mm x Width: 434mm x Depth: 498mm** Lenovo 	Hold and organize IT equipment, It will store the data provide access to data in each of the lab	**Server Model** • Lenovo ThinkSystem SR530 Rack Server **Server Processor** • Force feedback Intel Xeon Silver 4110 Processor • 2.1GHz, 11M Cache • Max Turbo Frequency 3.0GHz **Server Memory** • 8GB DDR4 RAM **Optical Drive** • External USB DVD RW Optical Disk Drive **Server Network Controller** • 2x Integrated 1 GbE RJ-45 ports (no 10/100 Mb support) • Onboard LOM slot for up to 4x 1/10 Gb Ethernet ports: • 2x 1 GbE RJ-45 ports (no 10/100 Mb support) • 2x 10 GbE RJ-45 ports (no 10/100 Mb support) • 2x 10 GbE SFP+ ports (no 10/100 Mb support) • Optional Mezzanine LOM (ML2) slot for dual-port 10 GbE cards with SFP+ or RJ-45 connectors. • 1x RJ-45 10/100/1000 Mb Ethernet systems management por	**4**	**10080**	**40320**

		Storage • 600GB 10K SAS 12Gb Hot Swap 512n HDD **Server Power Supply** • Up to two redundant hot-swap 450 W Platinum AC power supplies			
35ft (10.7m) Cat6 Snagless Unshielded (UTP) PVC CM Ethernet Network Patch Cable, Blue 	To provide an ideal solution to connect LAN network components and provide bigger bandwidth for internet connections for better internet and reliability in data transferring.	**Cable Type** • Cat6 Snagless **Cable Jacket** • PVC CM (Round) **Data Rate Support** • 1000 Base-T and Maximum to 10GBase - T **Conductor Type** • Stranded Pure Bare Copper **Gauge(AWG)** • 24 (7/0.20mm) **PoE Compatibility** • PoE/PoE+/PoE++ **Shielding Type** • Unshielded (U/UTP) **Length** • 35ft (10.7m) including plugs **Maximum Frequency** • 550 MHz **Connectors** • RJ45 (Male) **Wire Scheme** • T568B, Straight	**100**	**50**	**5000**

LC-LC OM3 Multi Mode Duplex Fiber Optic Patch Cord Cable Multimode MM 	To be used for communication over short distances such as within the building or on a campus also to provide bigger bandwidth for data transferring	**Color** • Aqua **Internal layer Diameter** • 50/125µm **Fiber type** • Duplex **Diameter** • 3mm/2mm **Length** • 1/2/3/5/10/20/50 meter(s) **Working Temperature** • -40°C ~ +75°C **Storage Temperature** • -50°C ~ +85°C **Return Loss** • ≥50dB **Repeat Insert Times** • 1000 Times	**10**	**32**	**320**
Jadaol High Speed Cat 6 Ethernet Cable 	To provide an ideal solution to connect LAN network components and provide bigger bandwidth for internet connections for better internet and reliability in data transferring.	**Cable Type** • Cat6 4-pair UTP **Outside diameter** • 5.8 ± 0.3 mm **Conductor type** • 100% Bare Copper **Conductor gauge** • 32 AWG **Shielding Type** • Unshielded (U/UTP) **Connector type**	**100**	**57.50**	**5750**

		• RJ45 (Male) **<u>Maximum Frequency</u>** • 250 MHz			
D-LINK NFP-0WHI21 Double Face Plate 	Giving protection for permanent LAN cable links for network extensions and improving the device's design and appearance	**<u>Module type</u>** • Keystone Jack • Tel type **<u>Lan category</u>** • Cat6a **<u>Size(mm)</u>** • 86 x 86 **<u>Material</u>** • Polycarbonate **<u>Manufacturer</u>** • D-Link	**60**	**8**	**480**
TRENDnet 48-Port Blank Keystone Shielded 2U HD Patch Panel 	Provides a way to keep large numbers of cables organized, enabling flexible connectivity into network hardware by interconnecting multiple devices together	**<u>Category</u>** • Cat6A shielded keystone jacks **<u>Material</u>** • SPCC steel construction • ABS plastics **<u>Dimension</u>** • 483 x 86 x 110mm **<u>Weight</u>** • 1.04kg **<u>Number labels</u>** **<u>Easily identifiable</u>**	**8**	**150**	**1200**

Dell OptiPlex 7000SF-I7708G-1TB-W11 SFF Desktop PC 	Desktop PCs contain the physical hardware that makes a computer run and connects to input devices such as the monitor, keyboard and mouse users interact with.	**Operating System** ● Windows 11 Pro **Processor** ● 12th Gen Intel® Core™ i5-12500 (18 MB cache, 6 cores, 12 threads, 3.00 GHz to 4.60 GHz Turbo, 65 W) **Memory** ● 8GB DDR4 3200MHz RAM **Storage** ● 1TB 3.5 inch 7200rpm HDD **Hard Drive** ● 512 GB, M.2 2230, PCIe NVMe, SSD, Class 35 **Keyboard** ● Dell Wired Keyboard KB216 Black **Mouse** ● Dell USB Optical Mouse-MS116 (EPEAT)	**120**	**4,500**	**540,000**
Dell 27 4K UHD USB-C Monitor - S2722QC 	For learning purpose, students can surf the internet and use any software during the lessons in class	**PC Model** ● DELL 27 4K UHD USB-C Monitor **Display Type** ● LED-backlit LCD monitor / TFT active matrix **Native Resolution** ● 4K 3840 x 2160 at 60 Hz **Input Voltage** ● AC 100-240 V (50/60 Hz) **Diagonal Size**	**120**	**1829**	**219480**

		• 27" **<u>Pixel per Inch</u>** • 163			
	A plug for mounting low-voltage electrical components. Very useful in data communication.For instance, Local Area Networks (LANs).	**<u>LAN Category</u>** • Cat6a **<u>Modular Connector Type</u>** • RJ45 Jack **<u>Manufacturer</u>** • roline **<u>Shielding Types</u>** • Unshielded	**8**	**34.50**	**276**
Fortinet Fortigate FG-100F Firewall Hardware 	Perform inspection of both inbound and outbound network traffic and enforce access controls and other security policies.	• Firewall Throughput : 20 Gbps • NGFW Throughput : 1.6 Gbps • Threat Protection Throughput : 1Gbps • IPS Throughput : 2.6 Gbps • SSL/VPN Throughput : 1 Gbps • 2x WAN ports • 1x DMZ port • 1x MGMT port • 2x HA port • 16x switch ports with 4 SFP port shared media	**1**	**12900**	**12900**
				TOTAL	**864,829**

Budget Provided **= RM 2,500,000.00**
Total cost **= RM 864,829.00**
Remaining Budget **= RM 1,635,171.00**

Reflection

1. **Are you surprised by the prices? How were you surprised?**

   As this is the first time for us to implement a project that actually building the network architecture, we didn't have any specific expectations on the price, Hence, we always make sure that we did not over spent the budget that already provided and choose the affordable and reasonable equipments on the market in order to build our own network building. Other than that, we do think that some of the equipment is expensive because of its functions. The equipment's price is actually based on the brands and their functionality, some of them are more reliable than the cheaper one because of the memory size, the speed to get the work done and so on.

2. **Have you ever considered cost as a factor for choosing networking devices?**

   Yes, we considered cost as a factor of choosing everything that is needed on this network building. Our group was provided with a budget of RM2.5 million and we don't want to waste the money on purchasing high price equipment. It is because we also care about the cost that is needed to install the equipment on the building and that process needs a lot of money as we have to pay for the workers and others. Other than that, there are many things that need to be included in the process of building the network, such as we need to install Wifi connection with a high-speed internet connection to make sure all the users in the building can access the network without having any problems. We also care about the maintenance cost that is needed to be paid in the future.

3. **What are the major differences between the same devices from different brands? For example, Cisco and Huawei Routers.**

The major differences between devices can not be distinguished directly as the devices are doing the same work eventually. With the rapid development of technology nowadays, a lot of brands are trying to catch up with the latest technology by manipulating them to build new devices. Thus, a lot of brands are having the same devices with minor differences. To find one difference, it may be the different preferences of the targeted customer. For example, a lot of home users prefer Huawei router rather than Cisco router because they are familiar with the brand Huawei on a daily basis such as their mobile phones, laptops and wearables. Meanwhile, the big companies prefer Cisco to Huawei because Cisco is famous amongst corporate users and it is also majoring in networking products such as switches and wireless routers.

Appendix

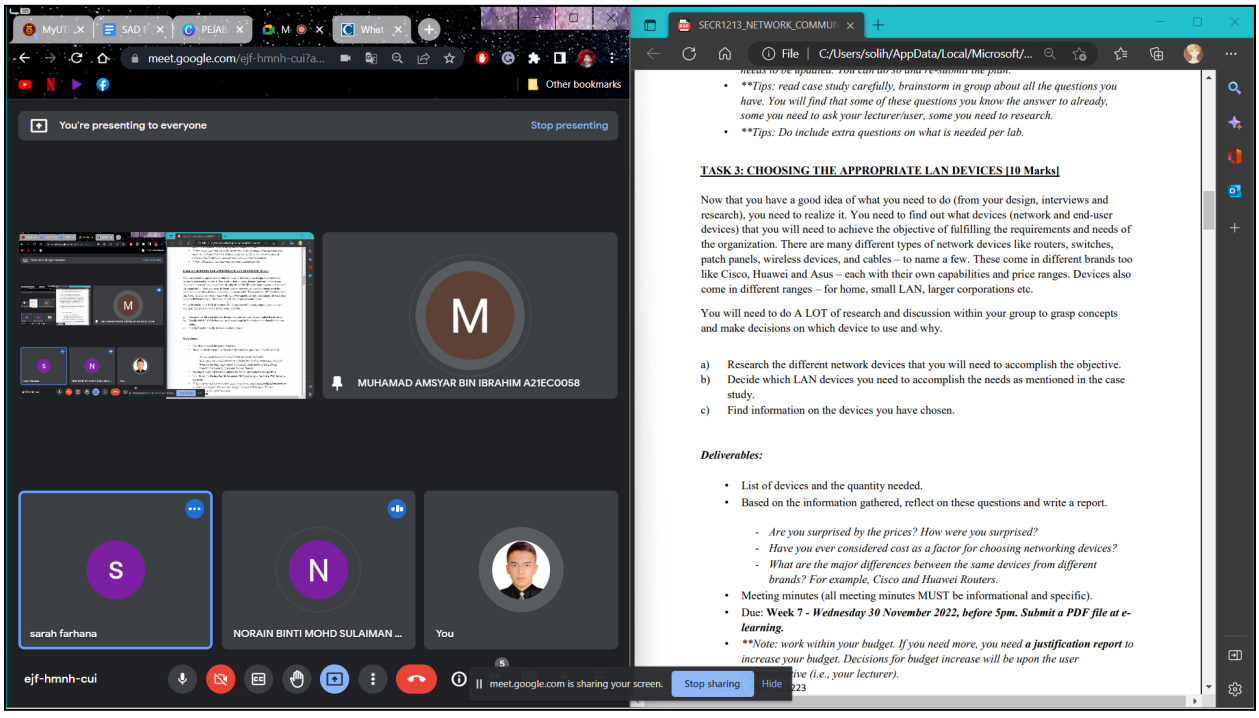
DATE : 4TH DECEMBER 2022
TIME : 9.00 PM - 10.30 PM
LOCATION : GOOGLE MEET

ATTENDANCES

1. MUHAMMAD NUR SOLIHIN BIN MALIK RADZUAN A21EC0089
2. MUHAMAD AMSYAR BIN IBRAHIM A21EC0058
3. SARAH FARHANA BINTI SALLEH A21EC0226
4. NORAIN BINTI MOHD SULAIMAN A21EC0106

OBJECTIVES

- Divide each of the group members with a specific devices to be research
- Make sure all of the group members understand the need of the case study and look for a specific devices that are need to be included in the network building
- Research some of the network devices that are used in many places



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