JAMES COOK UNIVERSITY SINGAPORE

INDIVIDUAL TASK COVER SHEET

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SUBJECT CODE	CP1802: Internet Fundamentals	
STUDENT FAMILY NAME	**Student Given Name**	**JCU Student Number**
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ASSESSMENT TITLE	Case Study	
DUE DATE	21/January/2020	
LECTURER NAME	Jaikishin Lakhyani	
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Student Signature

Kaung Khant Naing **Submission date 24/1/ 2020**

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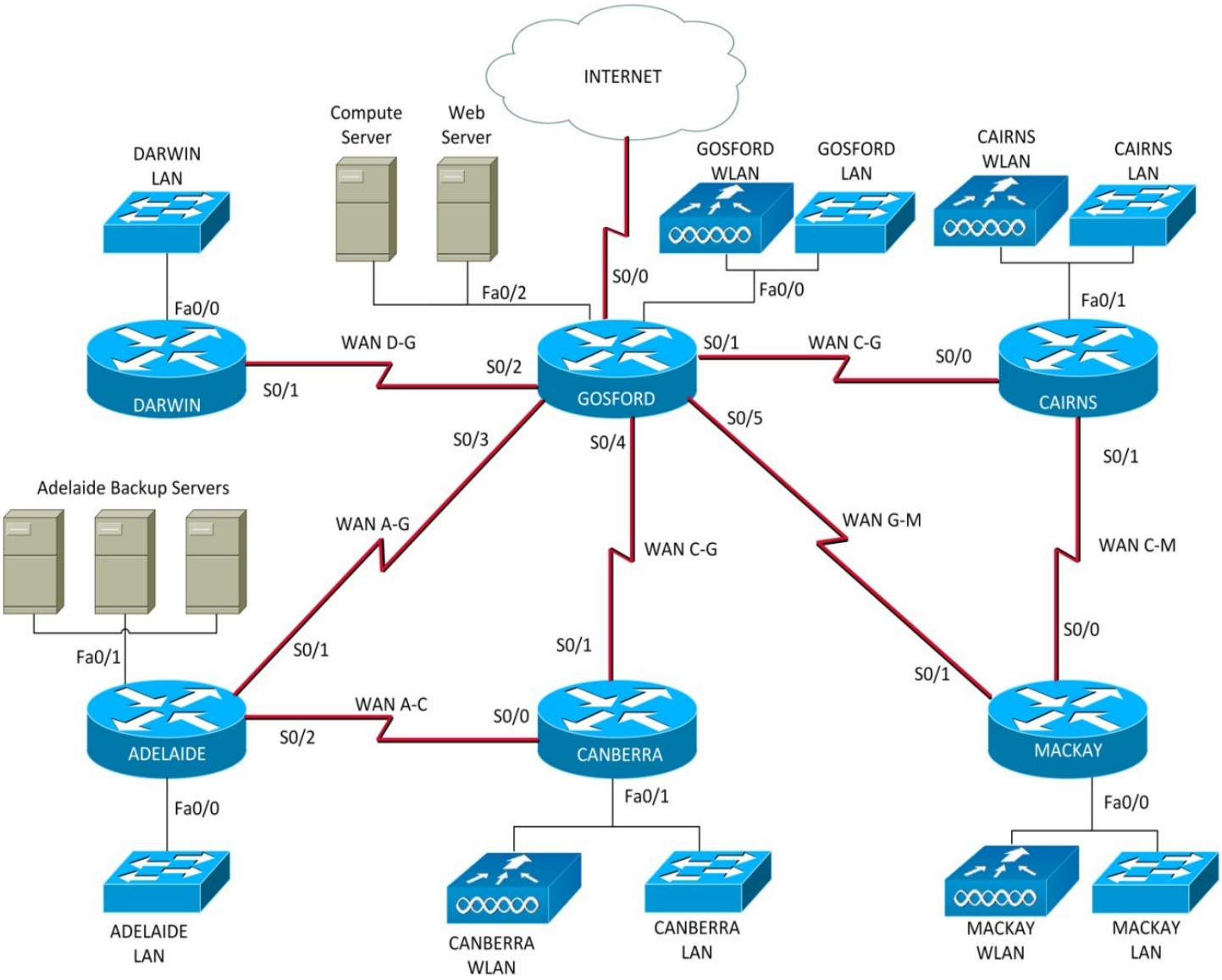
PART 1

INTRODUCTION

In Mackay, Ausdata Service Inc is planning to open a new branch. But their IP addresses are completed and are not sufficient enough for new development so that I need to redesign their network structures by using class B network IP addresses. To redesign this network structure, I have to find new IP addresses, subnet, LAN, WAN links and servers. Also, I have to manage the correct networks, budget switches, routers and wireless access points. Subnetting is important for this project because subnetting can help networking professionals to help relieve network congestion. I create a new network diagram with new port numbers because it shows the components that make up a network and how they interact, including for routers, hubs firewalls, LAN and WAN links. Furthermore, a well-designed network diagram is important for network administrators because it can help them when the hardware system got trouble and can be fixed easily or designing new data structures, offers large network topology maps, IP address reserves, media types and main device names. Given budget is only $7,500 so I have to search for routers, switches and wireless access points that will be enough within $7500 for the new Mackay branch. Routers are networking devices that transmit data packs between computer networks and WAN links. They can also connect to two or more data lines from the different data networks. Switches are machines that accept incoming data from one port and direct it over a single LAN to another port using ethernet cables including data transferring over LAN and printers. I have to factorize all required equipment for this company so I will use the WDM method for all the requirements.

PART 2

Network Structure



PART 3

Table 1 - Subnets

Location	Subnet Address	Subnet Mask	First Usable Address	Last Usable Address	Broadcast address	Static address range	DHCP address range
Gosford LAN & WLAN	135.53.0.0/21	/21	130.10.0.1/21	135.53.7.254/21	135.53.7.255/21	135.53.0.1/21 - 135.53.0.5/21	135.53.0.6/21 – 135.53.7.254/21
Canberra LAN & WLAN	135.53.8.0/22	/22	135.53.8.1/22	135.53.11.254/22	135.53.11.255/22	135.53.8.1/22- 135.53.8.5/22	135.53.8.6/22 – 135.53.11.254/22
Cairns LAN & WLAN	135.53.12.0/22	/23	135.53.12.1/23	135.53.13.254/23	135.53.13.255/23	135.53.12.1/23- 135.53.12.5/23	135.53.12.6/23- 135.53.13.254/23
Mackay LAN & WLAN	135.53.14.0/24	/24	135.53.14.1/24	135.53.14.254/24	135.53.14.255/24	135.53.14.1/24- 135.53.14.5/24	135.53.14.6/24- 135.53.14.254/24
Darwin LAN	135.53.15.0/25	/25	135.53.15.1/25	135.53.15.126/25	135.53.15.127/25	135.53.15.1/25- 135.53.15.5/25	135.53.15.6/25- 135.53.15.126/25
Adelaide LAN	135.53.15.128/25	/25	135.53.15.129/25	135.53.15.254/25	135.53.15.255/25	135.53.15.129/25- 135.53.15.133/25	135.53.15.133/25- 135.53.15.254/25
Adelaide Server	135.53.16.0/29	/29	135.53.16.1/29	135.53.16.6/29	135.53.16.7/29		
Gosford Server	135.53.16.8/29	/29	135.53.16.9/29	135.53.16.14/29	135.53.16.15/29		
Gosford-Darwin WAN	135.53.16.16/30	/30	135.53.16.17/30	135.53.16.18/30	135.53.16.19/30		
Gosford-Cairns WAN	135.53.16.20/30	/30	135.53.16.21/30	135.53.16.22/30	135.53.16.23/30		
Gosford-Mackay WAN	135.53.16.24/30	/30	135.53.16.25/30	135.53.16.26/30	135.53.16.27/30		
Cairns-Mackay WAN	135.53.16.28/30	/30	135.53.16.29/30	135.53.16.30/30	135.53.16.31/30		
Gosford-Canberra WAN	135.53.16.32/30	/30	135.53.16.33/30	135.53.16.34/30	135.53.16.35/30		
Canberra-Adelaide WAN	135.53.16.36/30	/30	135.53.16.37/30	135.53.16.38/30	135.53.16.39/30		
Gosford-Adelaide WAN	135.53.16.40/30	/30	135.53.16.41/30	135.53.16.42/30	135.53.16.43/30		

Table 2 – Router Interfaces

Location	Interface	IP address	Subnet mask (slash format)
Gosford-Darwin WAN	S0/2	135.53.16.17/30	/30
Gosford-Adelaide WAN	S0/3	135.53.16.41/30	/30
Gosford-Canberra WAN	S0/4	135.53.16.33/30	/30
Gosford-Mackay WAN	S0/5	135.53.16.25/30	/30
Gosford-Cairns WAN	S0/1	135.53.16.21/30	/30
Gosford LAN & WLAN	Fa0/0	135.53.0.1/21	/21
Darwin-Gosford WAN	S0/1	135.53.16.18/30	/30
Darwin LAN	Fa0/0	135.53.15.1/25	/25
Cairns-Gosford WAN	S0/0	135.53.16.22/30	/30
Cairns-Mackay WAN	S0/1	135.53.16.29/30	/30
Cairns LAN & WLAN	Fa0/1	135.53.12.1/23	/23
Mackay-Gosford WAN	S0/1	135.53.16.26/30	/30
Mackay-Cairns WAN	S0/0	135.53.16.30/30	/30
Mackay LAN & WLAN	Fa0/0	135.53.14.1/24	/24
Canberra-Gosford WAN	S0/1	135.53.16.34/30	/30
Canberra-Adelaide WAN	S0/0	135.53.16.37/30	/30
Canberra LAN & WLAN	Fa0/1	135.53.8.1/22	/22
Adelaide-Gosford WAN	S0/1	135.53.16.42/30	/30
Adelaide-Canberra WAN	S0/2	135.53.16.38/30	/30
Adelaide LAN	Fa0/0	135.53.15.129/25	/25

Table 3 – Servers

Location	Server Name	IP address	Subnet Mask (in slash format)
Adelaide	Backup Server 1	135.53.16.1/29	/29
Adelaide	Backup Server 2	135.53.16.2/29	/29
Adelaide	Backup Server 3	135.53.16.3/29	/29
Gosford	Web server	135.53.16.9/29	/29
Gosford	Computing server	135.53.16.10/29	/29

PART 4

Weighted Decision Making – hardware resource requirements analysis Routers

The main purpose of the router is that have to support both wireless or wired so that every modern mobiles, laptops, tablets and computers can use it together at the same time. Also, WPA enterprise is important because WPA enterprise primarily use the Advanced Encryption Standard and network security system is also essential for the company because that system makes security system more secure. Cost is least important because cost per router is less than $1000.

Requirements	Cost	Speed	Wireless	LAN	Gigabit WAN	WPA Enterprise	Total Weighted Score
Description	<500	1000Mbit	Yes/No	Yes/No	Yes/No	Yes/No	
Weight	1	5	5	5	3	5	
Score – ASUS GT-AX11000	0	6	6	4	4	6	122
Score - TP Link ArcherC5400	6	2	4	4	4	4	88
Score - Netgear RBK50-100AUS	6	4	4	4	4	2	88
Score – Netegear RBW30	6	6	2	4	4	4	98
Score – TP Link Archer600	6	4	4	2	2	2	72

Using WDM Method, ASUS GT-AX11000 is the best option. This router is world first 10G router and it has three years warranty and save the company budget. This router can give high speed if need be. It has security measures built in and customizable which is safer is the company. It has external eight antennae and network speed can be boost up to 4804 Mbps. Also, VPN is already built-in in this router. This router is expensive, but features are useful and futureproof for the future.

Switches

In switches, the main priority is port numbers because employers are opening a new branch office and many computers will connect to switches with LAN and WAN cables through RJ-45 ports. Manageable switches are important because it has some major security benefits such as the ability to control the network to shut down active threats, protection for data, control and management plan. Price is the least important.

Requirements	Cost 1	Speed	Min ports	SFP	Managed	Total Weighted Score
Description	<500	1000Mbit	48	Yes/No	Yes/No	
Weight	1	3	5	3	5	
Score – Netgear GS716T V3	6	4	2	2	2	44
Score – Netgear GS724T-400	6	4	2	4	4	60
Score – Netgear GS752TX	0	4	4	4	4	64
Score – TP Link TL-SG1048	6	4	4	4	4	70
Score – TP Link SG-1016	6	4	2	2	2	44

Using WDM Method, TP-Link TL-SG1048 is the best option to choose because the price is reasonable, can save power consumption and it has 3 years warranty which has future prove.

Wireless Access Points

First priority for WAP is 802.11n because it can support network speed up to 35Mbps, use the newest security system and its ready for next generation multimedia. Both 2.5GHz and 5GHz are second priority because in these days only 2.5GHz are still using in most of the companies and electronic devices. Price is still last priority.

Requirements	Cost	2.4 & 5 GHz	802.11n	Gbit support	Manageable	Total Weighted Score
Description	<500	Yes/No	Yes/No	Yes/No	Yes/No	
Weight	1	3	5	3	3	
Score – Ubiquiti Unifi AP AC	6	4	6	4	6	78
Score – TP Link AC1200	6	6	4	2	4	60
Score – Netgear WAC540	6	4	4	0	2	44
Score – HP JZ074A	6	2	4	4	2	56
Score – TP link EAP115	6	4	4	2	4	56

Using WDM method, I will choose Ubiquiti Unifi AP AC wireless access point because that WAP support 802.11ac and that 802.11ac is main purpose for WAP and it got 2 years warranty. It got external duel antenna which can be adjustable and also support both WEP, WPA-PSK, WPA- Enterprise. Price is also reliable for the company. Price budget does not increase the given. It should be more than fine.

Budget

Item	Router	Switch	Wireless Access Points	
Price	468	282	294	
Quantity	4	6	6	
Costs	1872	1692	1764	
Total				5328

For this company, I will choose www.umart.com to buy all the requirements because that website is legit website and not only famous in Australia but also famous in world-wide. I have explained why I buy these routers, switches and wireless access points (WAP). Budget is also justified above.