CP1402 Assessment Networking Case Study

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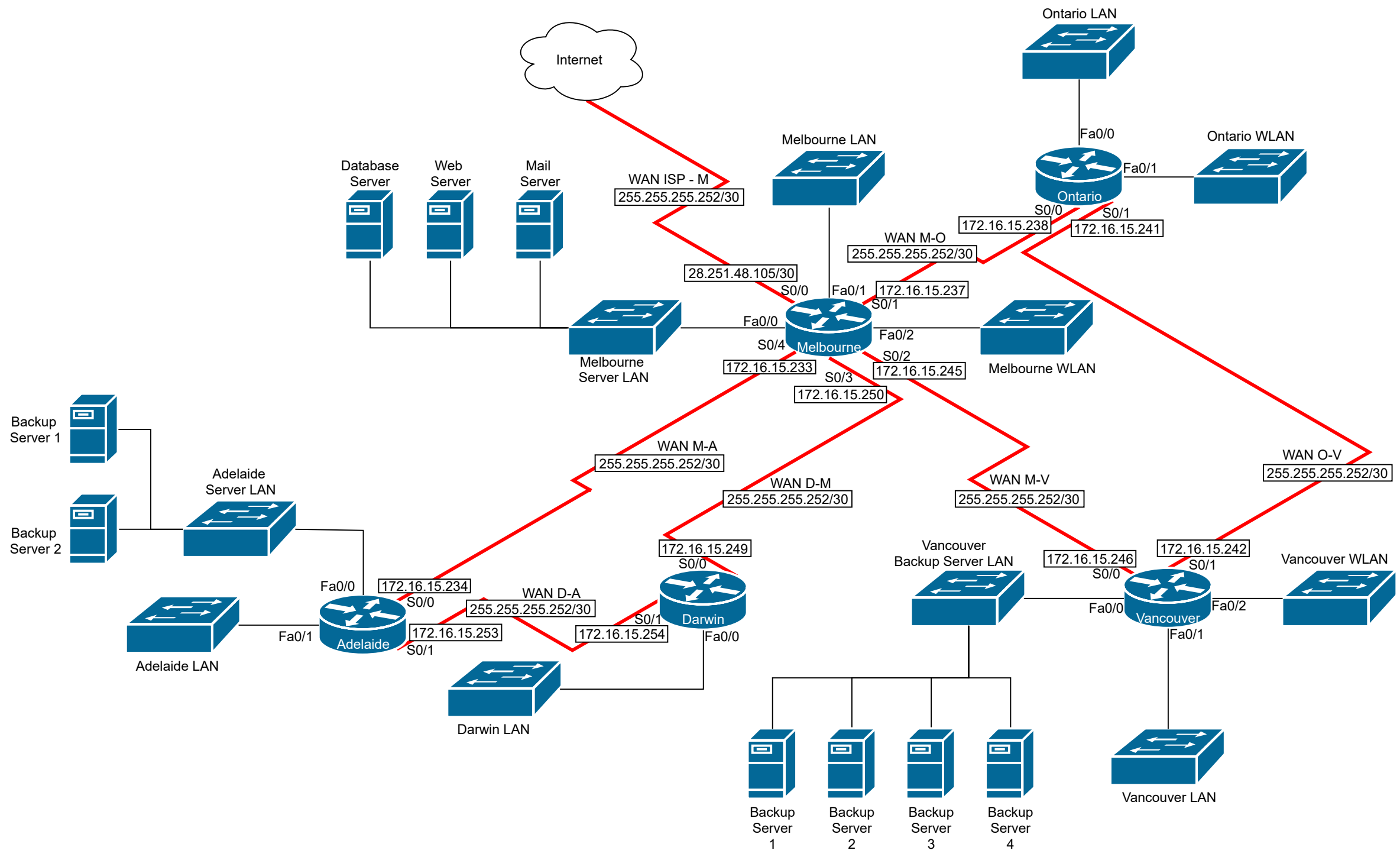
Part 1: Network Diagram

The following network diagram is a reprasentaion of how my*Data* Services Inc's is laying out their infrastructure and network:


Internet
Ontario LAN
Fa0/0
Ontario WLAN
Fa0/1
Ontario
S0/0
172.16.15.238
S0/1
172.16.15.241
Melbourne LAN
Database Server
Web Server
Mail Server
WAN ISP - M
255.255.255.252/30
WAN M-O
255.255.255.252/30
28.251.48.105/30
S0/0
Fa0/1
172.16.15.237
S0/1
Fa0/0
Melbourne
Fa0/2
S0/4
172.16.15.233
S0/2
172.16.15.245
S0/3
172.16.15.250
Melbourne Server LAN
Melbourne WLAN
Backup Server 1
Backup Server 2
Adelaide Server LAN
WAN M-A
255.255.255.252/30
WAN D-M
255.255.255.252/30
WAN M-V
255.255.255.252/30
WAN O-V
255.255.255.252/30
172.16.15.249
S0/0
Vancouver Backup Server LAN
172.16.15.246
S0/0
172.16.15.242
S0/1
Vancouver WLAN
Fa0/0
172.16.15.234
S0/0
WAN D-A
255.255.255.252/30
Darwin
Fa0/2
Vancouver
Fa0/1
Fa0/1
Adelaide
172.16.15.253
S0/1
S0/1
172.16.15.254
Fa0/0
Adelaide LAN
Darwin LAN
Backup Server 1
Backup Server 2
Backup Server 3
Backup Server 4
Vancouver LAN

Part 2: Subnetting

Subnets							
Subnet Name	Subnet Address	Subnet Mask	First Useable Address	Last Useable Address	Broadcast Address	Static Address Range	DHCP Address Range
Melbourne LAN	172.16.0.0/21	255.255.248.0/21	172.16.0.1	172.16.7.254	172.16.7.255	172.16.0.1	172.16.0.2 - 172.16.7.254
Vancouver LAN	172.16.8.0/22	255.255.252.0/22	172.16.8.1	172.16.11.254	172.16.11.255	172.16.8.1	172.16.8.2 - 172.16.11.254
Ontario LAN	172.16.12.0/24	255.255.255.0/24	172.16.12.1	172.16.12.254	172.16.12.255	172.16.12.1	172.16.12.2 - 172.16.12.254
Adelaide LAN	172.16.13.0/24	255.255.255.0/24	172.16.13.1	172.16.13.254	172.16.13.255	172.16.13.1	172.16.13.2 - 172.16.13.254
Darwin LAN	172.16.14.0/24	255.255.255.0/24	172.16.14.1	172.16.14.254	172.16.14.255	172.16.14.1	172.16.14.2 - 172.16.14.254
Vancouver WLAN	172.16.15.0/25	255.255.255.128/25	172.16.15.1	172.16.15.126	172.16.15.127	172.16.15.1	172.16.15.2 - 172.16.15.126
Melbourne WLAN	172.16.15.128/26	255.255.255.192/26	172.16.15.129	172.16.15.190	172.16.15.191	172.16.15.129	172.16.15.130 - 172.16.15.190
Ontario WLAN	172.16.15.192/28	255.255.255.240/28	172.16.15.193	172.16.15.206	172.16.15.207	172.16.15.193	172.16.15.194 - 172.16.15.206
Vancouver Server LAN	172.16.15.208/29	255.255.255.248/29	172.16.15.209	172.16.15.214	172.16.15.215	172.16.15.209 - 172.16.15.213	172.16.15.214
Melbourne Server LAN	172.16.15.216/29	255.255.255.248/29	172.16.15.217	172.16.15.222	172.16.15.223	172.16.15.217 - 172.16.15.220	172.16.15.221 - 172.16.15.222
Adelaide Server LAN	172.16.15.224/29	255.255.255.248/29	172.16.15.225	172.16.15.232	172.16.15.231	172.16.15.225 - 172.16.15.227	172.16.15.228 - 172.16.15.232
Melbourne - Adelaide WAN	172.16.15.232/30	255.255.255.252/30	172.16.15.233	172.16.15.234	172.16.15.235	172.16.15.233 - 172.16.15.234	N/A
Melbourne - Ontario WAN	172.16.15.236/30	255.255.255.252/30	172.16.15.237	172.16.15.238	172.16.15.239	172.16.15.237 - 172.16.15.238	N/A
Ontario - Vancouver WAN	172.16.15.240/30	255.255.255.252/30	172.16.15.241	172.16.15.242	172.16.15.243	172.16.15.241 - 172.16.15.242	N/A
Melbourne - Vancouver WAN	172.16.15.244/30	255.255.255.252/30	172.16.15.245	172.16.15.246	172.16.15.247	172.16.15.245 - 172.16.15.246	N/A
Darwin - Melbourne WAN	172.16.15.248/30	255.255.255.252/30	172.16.15.249	172.16.15.250	172.16.15.251	172.16.15.249 - 172.16.15.250	N/A
Adelaide - Darwin WAN	172.16.15.252/30	255.255.255.252/30	172.16.15.253	172.16.15.254	172.16.15.255	172.16.15.253 - 172.16.15.254	N/A

Router Interface			
Location	Interface	IP Address	Subnet Mask
Melbourne	WAN	172.16.15.233	255.255.255.252/30
Melbourne	WAN	172.16.15.237	255.255.255.252/30
Melbourne	WAN	172.16.15.245	255.255.255.252/30
Melbourne	WAN	172.16.15.250	255.255.255.252/30
Melbourne	ISP WAN	28.251.48.105/30	255.255.255.252/30
Melbourne	WLAN	172.16.15.129	255.255.255.192/26
Melbourne	LAN	172.16.0.1	255.255.248.0/21
Melbourne	LAN	172.16.15.217	255.255.255.248/29
Vancouver	WAN	172.16.15.242	255.255.255.252/30
Vancouver	WAN	172.16.15.246	255.255.255.252/30
Vancouver	WLAN	172.16.15.1	255.255.255.128/25
Vancouver	LAN	172.16.8.1	255.255.252.0/22
Vancouver	LAN	172.16.15.209	255.255.255.248/29
Ontario	WAN	172.16.15.238	255.255.255.252/30
Ontario	WAN	172.16.15.241	255.255.255.252/30
Ontario	WLAN	172.16.15.193	255.255.255.240/28
Ontario	LAN	172.16.12.1	255.255.255.0/24
Adelaide	WAN	172.16.15.234	255.255.255.252/30
Adelaide	WAN	172.16.15.253	255.255.255.252/30
Adelaide	LAN	172.16.13.1	255.255.255.0/24
Adelaide	LAN	172.16.15.225	255.255.255.248/29
Darwin	WAN	172.16.15.249	255.255.255.252/30
Darwin	WAN	172.16.15.254	255.255.255.252/30
Darwin	LAN	172.16.14.1	255.255.255.0/24

Servers			
Location	Server Name	IP Address	Subnet Mask
Melbourne	Database Server	172.16.15.218	255.255.255.248
Melbourne	Web Server	172.16.15.219	255.255.255.248
Melbourne	Mail Server	172.16.15.220	255.255.255.248
Vancouver	Backup Server 1	172.16.15.210	255.255.255.248
Vancouver	Backup Server 2	172.16.15.211	255.255.255.248
Vancouver	Backup Server 3	172.16.15.212	255.255.255.248
Vancouver	Backup Server 4	172.16.15.213	255.255.255.248
Adelaide	Backup Server 1	172.16.15.226	255.255.255.248
Adelaide	Backup Server 2	172.16.15.227	255.255.255.248

Part 3: Research and source appropriate devices

Budget $4000

Devices Needed:

- Router
- Switch/s
- Wireless Access point

0	The requirement does not apply to this scenario
1	The requirement is not very important
3	The requirement should be met
5	The requirement is critical

0	The Requirement isn't met at all
2	The Requirement is partially met, but not completely
4	The Requirement has been met
6	The item exceeds the requirement

Router

Requirements table:

Router		
Requirements	Description	
Cost	Under 1000	5
Speed	Has the capability to handle the throughput	5
Expandability	Having extra capability then what we need it to do now	1
Size	Size of the unit (Smaller Better)	1
Ports	Has the required number of ports	5
Extra Features	e.g., Having a built-in switch	3

Weighted Decision Matrix:

Routers							
Requirement	Cost	Speed	Expandability	Size	Ports	Extra Features	Total Weighted Score
Weight	5	5	1	1	5	3	
Cisco RV340	6	2	0	6	4	0	76
HPE FlexNetwork MSR1003 8 AC Router	2	6	6	6	6	6	130
Juniper CTP150	0	6	6	6	6	6	120
Cisco ISR4331/KD	0	6	6	6	6	6	120

The most obvious part was to try and stay udder budget, so I assigned a $1000 budget which is fair for the size of this branch, that is why this was placed at priority 5. Along with this speed and ports were placed at 5 as well. This is because if the speed was not at a decent stranded it would lead to many frustrations and ultimately a fall of efficiency for anyone working at this office. Ports were placed at priority 5 as without the required ports to connect to the WAN, LAN and WLAN they would not have access to the my*Data* Services Inc's network nor internet, that's why it was critical reequipment.

Having extra features like a strong management tool and inbuilt switch would be nice to have but not a critical reequipment that's why it's a priority 3.

Expandability and size where barely considered a factor as this facility would have a dedicated room which would be plenty of size for the level of hardware we needed for this branch and its unlikely that this site would need to expand like this in the close future.

Switch/s

Requirements table:

Switch LAN		
Requirements	Description	
Cost	Under 2500	5
Speed	Has the capability to handle the throughput	5
Expandability	Having extra capability then what we need it to do now	3
Size	Size of the unit (Smaller Better)	1
Ports	Has the required number of ports	5
Extra Features	e.g., Having a POE	3

Weighted Decision Matrix:

Switches							
Requirement	Cost	Speed	Expandability	Size	Ports	Extra Features	Total Weighted Score
Weight	5	5	3	1	5	3	
NETGEAR SOHO Unmanaged Switch - 48-Port (GS348) + Netgear GS105 Prosafe 5-Port Gigabit Switch	2	4	4	4	4	4	90
D-link 24-Port Gigabit Unmanaged Switch (Metal Housing)	0	6	4	2	6	2	102
Cisco CBS110-24T	0	6	4	2	6	2	102
S2800S-48T4F, 48-Port Gigabit Ethernet L2+ Smart Managed Switch, 48 x Gigabit RJ45, with 4 x 1Gb SFP Uplinks + Netgear GS105 Prosafe 5-Port Gigabit Switch	6	4	4	4	4	4	110

Switches were given a $2500 budget, and this was because the required number of plugged-in workstations is 250, this this section has a combination of multiple and many of the same type of switch. The switches chosen was 5 48 port switches coupled with 2 5 port switches to reach the required 250 workstation requirements. Therefore, it was set at priority 5 along with cost. The speed needs to be high enough to no experience substantial delay.

Expandability and extra features were set to 3 as it is very possible that more workstations could be added and that having extra features such at Power over Ethernet would make powering extra devises such at security systems a lot easier.

Size again barely matters as the space required for the level of gear is not enough to this about.

Wireless Access Point

Requirements table:

Wireless Access Point		
Requirements	Description	
Cost	Under 1000	5
Speed	Has the capability to handle the throughput	5
Expandability	Having extra capability then what we need it to do now	3
Size	Size of the unit (Smaller Better)	1
Ports	Can Handel the number of users	5
Extra Features	e.g., Wi-Fi 6	1

Weighted Decision Matrix:

Wireless Access Point							
Requirement	Cost	Speed	Expandability	Size	Ports	Extra Features	Total Weighted Score
Weight	5	5	3	1	5	1	
D-Link Wireless AC1750 Wave 2 Concurrent Dual-Band PoE Access Point	6	4	4	6	4	4	112
Cisco Aironet 1852	6	6	6	6	6	6	150
NETGEAR Insight Managed WiFi 6 AX3600 Dual-Band Access Point (WAX620)	6	6	6	6	4	4	134
NETGEAR WiFi 6 AX1800 Dual-Band PoE Wireless Access Point (WAX214)	6	6	2	6	4	2	124

The wireless access point was the cheapest item on the list as the number of uses it needed to handle at a given time is comparatively low and thus all stayed well under the $1000 budget. The cost, speed and ports (number of uses at a time) were still most important at priority 5 like the other items.

The Number of uses at one time is very likely to go up over time and thus expandability was necessary but not essential, that is why it is at priority 3.

The size and extra features was put at priority 1, is because of the lack of need for them. Wireless Access Point don't take up much room and can be placed almost anywhere like on the ceiling thus size was barely conceded. While extra features would be nice is was far from a necessity, Wi-Fi 6 or longer range was not necessary for this application with the limited users.