Canterbury Institute of Management (CIM)
ASSESSMENT COVER SHEET

1. Personal Details

Student ID	Given Name(s)	Surname	Email Address
1. CIM12137	Ayesh	Jayasekara	cim12137@ciom.edu.au
2. CIM11489		Muskan	cim11489@ciom.edu.au
3. CIM10081	Ahmer	Haseeb	cim10081@ciom.edu.au
4. CIM10988	Shahaan Ali	Khan	cim10988@ciom.edu.au

Campus	Darwin
Course Title and Code	MBIS404 Networks and Communications
Assessment Title	AT2 Group Case Study, Implementation, Report and Presentation
Due Date & Time	Week 11

Course Lecturer/Tutor Name: Sharad Neupane	Assessment Word Count (if applicable): 3214

2. Student Declaration

By signing and submitting this coversheet, I/we declare that:

✓ This assessment submission is my/our own work unless otherwise acknowledged (including the use of generative AI tools) and is in accordance with the Institute's **Academic Integrity and Honesty Policy** available on the website.

✓ No part of this assessment has been submitted previously for advanced standing or academic credit in this or any other course.

✓ I/we certify that we have not given a copy or have shown a copy of this assessment item to another student enrolled in the course, other than members of this group.

✓ I/we are aware that the Lecturer/Tutor of this assessment may, for the purpose of assessing this assessment task communicate a copy of this assessment task to a plagiarism checking service to detect possible breaches of academic integrity, for example, plagiarism, recycling, cheating, contract cheating, or unauthorised use of generative AI (which may then retain a copy of the item on its database for the purpose of future investigation).

Signature:		Date:	07/12/24
Signature:		Date:	07/12/24
Signature:		Date:	07/12/24
Signature:		Date:	07/12/24

MBIS404 Networks and Communications
AT2 Group Case Study, Implementation - *Report*

Executive Summary

In the modern world, the networking infrastructure drives business organizations' capability to perform efficiently and in return achieve a sustainable competitive advantage among the rivals. This means businesses invest substantially in digital infrastructure and connectivity in general.

4JBM company is no exception in this regard; therefore, an extensive simulation was carried out on the proposed network architecture described in this technical documentation. The Report summary contains general network overview and detailed explanations on to every design decision was made. The document further documents configuration codes used for simulation with comments for comprehensive understanding. Security aspects were also discussed along with challenges and their respective alternatives.

Contents

Network Design - *Solution Overview*

The **4JBM** company has five branches spread across Australia. Each of these branch locations house three departments that needs to communicate across locations to carry out their daily tasks.

This proposed network architecture is designed with security & robust connectivity techniques would enable the company to function efficiently.
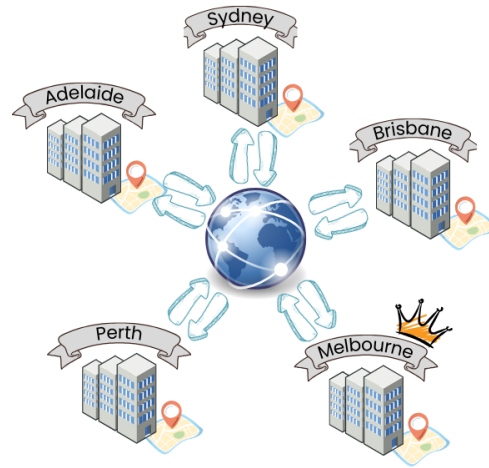
Branch Network

Since these locations are spread across multiple cities covering vast geographic area, a dedicated public Internet Protocol *(IP)* address should be obtained through Internet Service Provider *(ISP)*.

Figure 1: 4JBM Locations Setup

These IP addresses are usually obtained by entering into a contract with respective ISPs commonly referred as a leased line or static IP[1] . Since the data communication between two public IPs involves sending data over the internet, usually companies opt out to configure Virtual Private Network *(VPN)* so that the data packets are not exposed to *man-in-middle*[2] attacks.

---

[1]ISP will assign a static IP out of their pool of IPs to the interface that the company connects to their infrastructure

[2]A sophisticated penetration method utilized by hackers to impersonate or evasdrop data transmission

However, in this proposed solution additional complexities such as Network Address Translation *(NAT)* and VPN configuration is opted out and a simple point-to-point architecture is used instead.

Network Layout

4JBM is a multi-city company, therefore must use an appropriate ISP to obtain connectivity between cities. Below diagram illustrates how these cities are interconnected using an ISP (in this simulation, P2P connections are used to imitate functions of ISP).
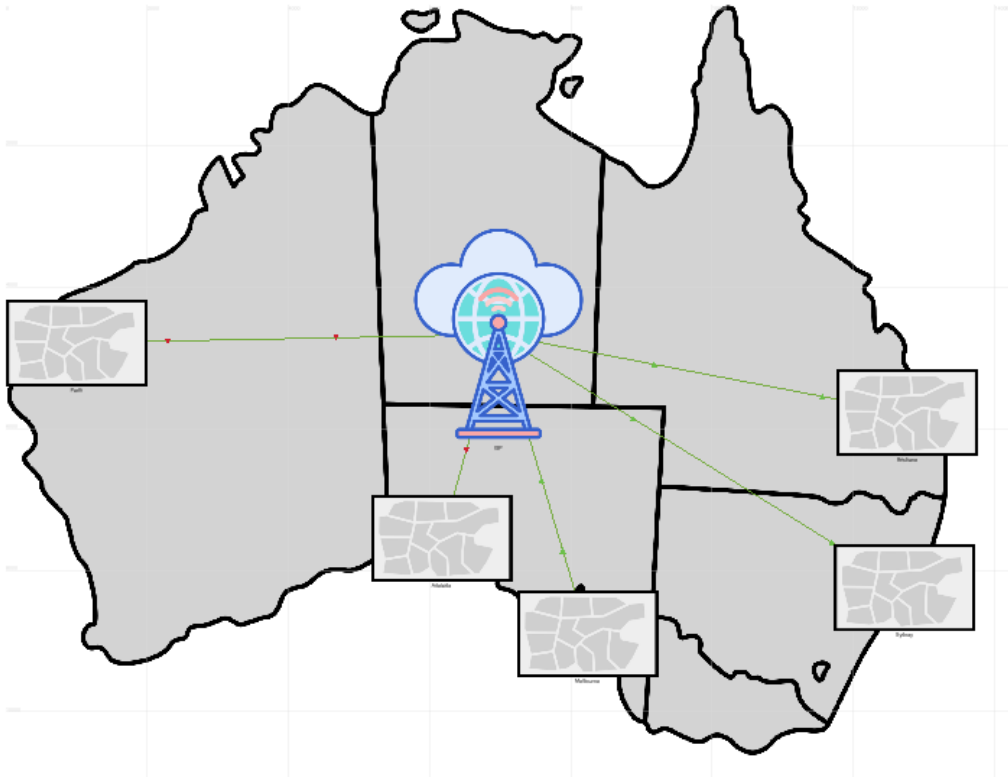
Figure 2: 4JBM Company Network Layout

Branch Location Network Layout

Each branch located in respective cities assumed to be of identical structure consisting of three departments namely Finance, Information Technology, Human Resources.

To keep the naming convention, some short codes were used as indicated below.

- Sydney - SYD

- Melbourne - MEL

- Brisbane - BRI

- Perth - PER

- Adelaide - ADE

- Information Technology Department - IT

- Human Resources Department - HR

- Finance Department - FIN

- Switch - SW

- Router - RT

- Printer - PR*[ID]*

- Computer - PC*[ID]*

Each location is individually configured and configuration scripts used are detailed in a later section of this report.

Figure 3: Sydney Network Layout

Technical Specification Overview

To ensure a robust, efficient & performance centric network design, following technologies & application techniques was utilized.
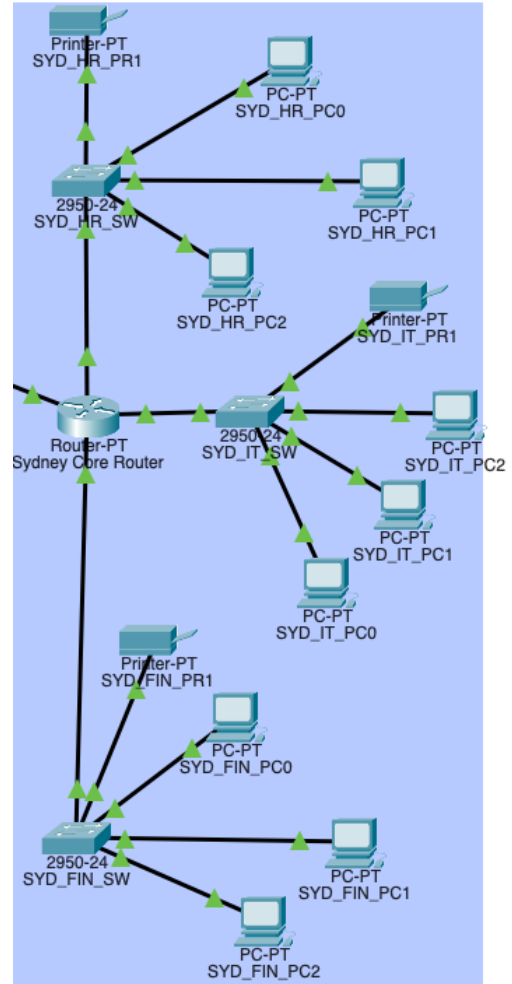
- **Variable Length Subnet Masking** *(VLSM)*: Ensure optimal usage of limited IP address series

- **Virtual Local Area Networks** *(VLAN)*: Achieve logical separation of terminal and transport data

- **Open Shortest Path Routing** *(OSPF)*: Achieve the fastest possible routing paths between branches

- **Access Control List** *(ACL)*: Fine grained control over transmission to achieve greater security

- **Dynamic Host Configuration Protocol** *(DHCP)*: Ensure autonomous IP address distribution for hosts

VLAN Allocation

Traffic isolation is achieved by using Virtual Local Area Network *(VLAN)*. VLANs are allocated as below for all branch locations respectively.

- Finance Department - VLAN 10

- IT Department - VLAN 20

- Human Resources - VLAN 30

- ✍ **Virtual Local Area Network:** A technology with the help of which logical separation of logical separation of terminal and transport data with in a physical network infrastructure is achieved in computer networking. In a VLAN, terminal data can be grouped together in a specific VLAN to optimize traffic handling as terminal data is originated from end user devices which often require secured or prioritized communication. On the other hand, transport data might not require high level of priority so they can be placed in a different VLAN to avoid congestion.

Subnet, IP & VLAN Plan

Variable Length Subnet Masks are generally used to optimize use of limited IP address ranges. In this instance *192.168.10.0/24* was provided by management to be distributed among a total of 125 hosts across 5 branch locations.

With a network of 255.255.255.0, total host accommodation can be at most 253. After careful evaluation the subnets were planned with expansion buffers for each location considered and further buffers for expansion to new branch in near future as well.

Branch Subnet Plan

Branch	*Department*	*Subnet address*	*Range of addresses*	*Hosts*
	Finance	192.168.10.0/27	192.168.10.0 - 192.168.10.31	30
Sydney	IT	192.168.10.32/28	192.168.10.32 - 192.168.10.47	14
	HR	192.168.10.48/28	192.168.10.48 - 192.168.10.63	14
	Finance	192.168.10.64/27	192.168.10.64 - 192.168.10.95	30
Melbourne	IT	192.168.10.96/28	192.168.10.96 - 192.168.10.111	14
	HR	192.168.10.112/28	192.168.10.112 - 192.168.10.127	14
	Finance	192.168.10.128/28	192.168.10.128 - 192.168.10.143	14
Perth	IT	192.168.10.144/29	192.168.10.144 - 192.168.10.151	6
	HR	192.168.10.152/29	192.168.10.152 - 192.168.10.159	6
	Finance	192.168.10.160/28	192.168.10.160 - 192.168.10.175	14
Brisbane	IT	192.168.10.176/29	192.168.10.176 - 192.168.10.183	6
	HR	192.168.10.184/29	192.168.10.184 - 192.168.10.191	6
	Finance	192.168.10.192/28	192.168.10.192 - 192.168.10.207	14
Adelaide	IT	192.168.10.208/29	192.168.10.208 - 192.168.10.215	6
	HR	192.168.10.216/29	192.168.10.216 - 192.168.10.223	6
Spare	Spare	192.168.10.224/27	192.168.10.224 - 192.168.10.255	30

Table 1: Subnet Plan for 4JBM Company

☞ Above subnet was planned with assumption of distribution of clients to each department is identical among branch locations, which may not be the case in real world scenarios. In that case adjustment is a required.

✎ **Variable Length Subnet Mask:** A technique that is used to create subnets with different sizes by applying subnet masks of varying lengths. This enables efficient use of IP addresses by allocating different subnet sizes. The allocation will be done according to the specific needs of each subnet of a network. By using VLSM, the wastage of unused IP addresses is reduced, as some subnets require more hosts than others. Using VLSM can help optimising the address allocation and managing the hierarchical structure of the networks.

Point-to-Point Subnet Plan

This network utilizes point to point connections to establish connection between locations. Following subnets are used for this type of connections.

Branch	Subnet address	Range of addresses	Hosts
Sydney	192.168.20.0/30	192.168.20.0 - 192.168.20.3	2
Melbourne	192.168.20.4/30	192.168.20.4 - 192.168.20.7	2
Brisbane	192.168.20.8/30	192.168.20.8 - 192.168.20.11	2
Perth	192.168.20.12/30	192.168.20.12 - 192.168.20.15	2
Adelaide	192.168.20.16/30	192.168.20.16 - 192.168.20.19	2
Spare	192.168.20.20/30	192.168.20.20 - 192.168.20.23	2
	192.168.20.24/29	192.168.20.24 - 192.168.20.31	6
	192.168.20.32/27	192.168.20.32 - 192.168.20.63	30
	192.168.20.64/26	192.168.20.64 - 192.168.20.127	62

Table 2: Subnet Plan for Point-to-Point Connections

Use of these point-to-point connections enables the traffic to be controlled between any given points. Advantages includes faster connectivity and tunneling for encrypting traffic which eliminates man-in-middle type of attacks.

IP Allocation Plan

Type	Branch	Device	Hostname	Port Allocation	VLAN Allocation	IP Address
	Sydney	Router	SYD_CORE_RT	Gig0/0		192.168.20.1/30
				Gig1/0	Encapsulated VLAN 10	192.168.10.1/27
				Gig2/0	Encapsulated VLAN 20	192.168.10.32/28
				Gig3/0	Encapsulated VLAN 30	192.168.10.48/28
	Melbourne	Router	MEL_CORE_RT	Gig0/0		192.168.20.5/30
				Gig1/0	Encapsulated VLAN 10	192.168.10.65/27
				Gig2/0	Encapsulated VLAN 20	192.168.10.97/28
				Gig3/0	Encapsulated VLAN 30	192.168.10.113/28
General Infrastructure	Brisbane	Router	BRI_CORE_RT	Gig0/0		192.168.20.9/30
				Gig1/0	Encapsulated VLAN 10	192.168.10.161/28
				Gig2/0	Encapsulated VLAN 20	192.168.10.177/29
				Gig3/0	Encapsulated VLAN 30	192.168.10.185/29
	Perth	Router	PER_CORE_RT	Gig0/0		192.168.20.13/30
				Gig1/0	Encapsulated VLAN 10	192.168.10.129/28
				Gig2/0	Encapsulated VLAN 20	192.168.10.145/29
				Gig3/0	Encapsulated VLAN 30	192.168.10.153/29
	Adelaide	Router	ADE_CORE_RT	Gig0/0		192.168.20.17/30
				Gig1/0	Encapsulated VLAN 10	192.168.10.193/28
				Gig2/0	Encapsulated VLAN 20	192.168.10.209/29
				Gig3/0	Encapsulated VLAN 30	192.168.10.217/29

Table 3: IP Allocation Plan for Routers

Considering dynamic nature of business scalability, Dynamic Host Configuration Protocol was used to distribute IP addresses for the hosts.

✎ **Dynamic Host Configuration Protocol (DHCP):** A network management protocol used to assign IP addresses automatically to devices that join a network. It reduces the manual work, DHCP works as a middlemen that make sure that devices can communicate on a network without configuring manually. DHCP ensures that each device has its own unique address.

When using the DHCP process, devices that are joined on a particular network, dynamically receive an IP address, subnet mask, default gateway, and other details without manual configuration. This automation helps to minimize IP address conflicts, and adapts to changing networks environments.

(Tsinovoi, 2024)

VLAN Plan

Branch	Department	Device	Hostname	Port Allocation	VLAN Allocation
	Finance	Switch	SYD_FIN_SW	Fa0/1-24	VLAN 10
Sydney	IT	Switch	SYD_IT_SW	Fa0/1-24	VLAN 20
	HR	Switch	SYD_HR_SW	Fa0/1-24	VLAN 30
	Finance	Switch	MEL_FIN_SW	Fa0/1-24	VLAN 10
Melbourne	IT	Switch	MEL_IT_SW	Fa0/1-24	VLAN 20
	HR	Switch	MEL_HR_SW	Fa0/1-24	VLAN 30
	Finance	Switch	BRI_FIN_SW	Fa0/1-24	VLAN 10
Brisbane	IT	Switch	BRI_IT_SW	Fa0/1-24	VLAN 20
	HR	Switch	BRI_HR_SW	Fa0/1-24	VLAN 30
	Finance	Switch	PER_FIN_SW	Fa0/1-24	VLAN 10
Perth	IT	Switch	PER_IT_SW	Fa0/1-24	VLAN 20
	HR	Switch	PER_HR_SW	Fa0/1-24	VLAN 30
	Finance	Switch	ADE_FIN_SW	Fa0/1-24	VLAN 10
Adelaide	IT	Switch	ADE_IT_SW	Fa0/1-24	VLAN 20
	HR	Switch	ADE_HR_SW	Fa0/1-24	VLAN 30

Table 4: VLAN Allocation Plan

☞ Above allocation shows all ports are being allocated to respective VLANs. This is a security threat as unused active ports will be available for intruders. All unused ports must be reallocated to different VLAN and shutdown once the network implementation is stabilized.

Configuration - *Routers*

Routers are configured using following script.

```
1  enable
2  config t
3  hostname SYD_CORE_RT ! # Set Hostname
4  ! # Turn on Ports
5  interface range gig0/0-3
6  no shutdown
7  exit
8  ! # Setup interface for finance department
9  interface gig1/0.10
10 encapsulation dot1q 10
11 ip address 192.168.10.1 255.255.255.224
12 no shutdown
13 exit
14 ip dhcp pool SYD_FIN_POOL ! # DHCP Pool for clients
15 network 192.168.10.0 255.255.255.224
16 default-router 192.168.10.1
17 dns-server 8.8.8.8
18 exit
19 ! # Setup interface for IT department
20 interface gig2/0.20
21 encapsulation dot1q 20
22 ip address 192.168.10.33 255.255.255.240
23 no shutdown
24 exit
25 ip dhcp pool SYD_IT_POOL ! # DHCP Pool for clients
26 network 192.168.10.32 255.255.255.240
27 default-router 192.168.10.33
28 dns-server 8.8.8.8
29 exit
30 ! # Setup interface for HR department
31 interface gig3/0.30
32 encapsulation dot1q 30
33 ip address 192.168.10.49 255.255.255.240
34 no shutdown
35 exit
36 ip dhcp pool SYD_HR_POOL ! # DHCP Pool for clients
```

```
37 network 192.168.10.48 255.255.255.240
38 default-router 192.168.10.49
39 dns-server 8.8.8.8
40 exit
41 ! # Setup interface for ISP P2P Connection
42 interface gig0/0
43 no shutdown
44 ip address 192.168.20.1 255.255.255.252
45 exit
46
```

Listing 1: Initial Router Configuration - Sydney

☞ Security configuration is explained in a separate section.

☞ Routing configuration is explained in a separate section.

✍ See Appendix A for full working example configuration code.

Configuration - *Switches*

Switches are configured using following script.

```
1  enable
2  config t
3  hostname SYD_FIN_SW ! # Set Hostname
4  ! # Initialize VLAN
5  vlan 10
6  name SYD_FIN
7  exit
8  ! # Assign Ports for terminal host access
9  interface range fa0/2-24
10 switchport mode access
11 switchport access vlan 10
12 exit
13 ! # Assign trunk port for connectivity with router
14 interface fa0/1
15 switchport mode trunk
16 switchport access vlan 10
17 exit
18 ! # Enable VLAN for active use
19 interface vlan 10
20 no shutdown
21 exit
22 exit
23 copy running-config startup-config ! # Save  initial
      configuration
24
```

Listing 2: Switch Configuration - Sydney Finance Department

In the network layout, a single switch is allocated per department to achieve better separation and scalability. This also helps granular control of end devices in instances where MAC based restrictions are to be implemented for example.

✎ See Listing C.2 for full working example configuration code.

Configuration - *Terminals*

The end devices simulated in this network sample are personal computers & printers. PC terminal are configured with DHCP protocol to automatically connect to the network and obtain IP addresses.

The printers are set up using static IP addresses to ensure these IP addresses will not change over time to ensure,

- Printer is visible to all hosts in same VLAN

- Access to resource can be controlled over Access Control Lists

- Cross branch access to printers is available

> ☞ Any host that potentially hosts cross branch accessible resources such as web servers, email servers, network storage devices must use static IPs to ensure availability and optimal control over access.

Any such static IP address, must be pre-decided and should be excluded from DHCP IP Pool to enforce DHCP agent *NOT* to allocate these IPs to dynamic hosts. See example below.

```
1  # Creating pool for Melbourne HR Department
2  ip dhcp pool MEL_HR_POOL
3  # Exclude IP of printer from pool
4  ip dhcp excluded-address 192.168.10.112 192.168.10.115
5  network 192.168.10.112 255.255.255.240
6  default-router 192.168.10.113
7  dns-server 8.8.8.8
8  exit
9
```

Listing 3: Excluding IPs from DHCP Pool

Configuration - *Inter–Branch Communication*

Each location would ideally get public IP address from ISP which the company must use for establishing point-to-point connections. This is simulated using IP ranges of *192.168.20.0/30*. (See detailed breakdown in Point-to-Point Subnet Plan section).

Once the connections are established, edge routers must be configured with appropriate routing protocol to enable discovery of other networks. For this simulation **Open Shortest Path First (OSPF)** algorithm was used. See below for example.

```
1 router ospf 1 # process id for OSPF instance
2 # list of networks connected to this router and logical area
      definition
3 network 192.168.20.12 0.0.0.3 area 0
4 network 192.168.10.128 0.0.0.15 area 0
5 network 192.168.10.144 0.0.0.7 area 0
6 network 192.168.10.152 0.0.0.7 area 0
7
```

Listing 4: OSPF Example Configuration

✍ **Open Shortest Path First:** A dynamic routing protocol which determine the most efficient route for data packets in IP networks. It uses the link-state routing method, which means each router in the network sends information about its connected neighbours to all other routers. This allows each router to create a map of the network and calculate the shortest path to each destination. It can break down large networks in areas, reducing the amount of data exchange which makes it suitable for large networks. OSPF ensuring efficient routing as it quickly adapts to changes in network topology.

Dual Home Configuration

Solely depending on one single ISP introduces a single point of failure to the network implementation. Any such external disturbances would mean inter-branch connectivity will be jeopardized and lead to operational losses.

To mitigate, companies usually opt in for secondary connection from either totally different ISP or sometimes diversified connectivity method such as secondary Fiber Optic connection, a satellite backup connection alike.

In this simulation, dual homing is implemented using a secondary ISP connection implemented as shown below.
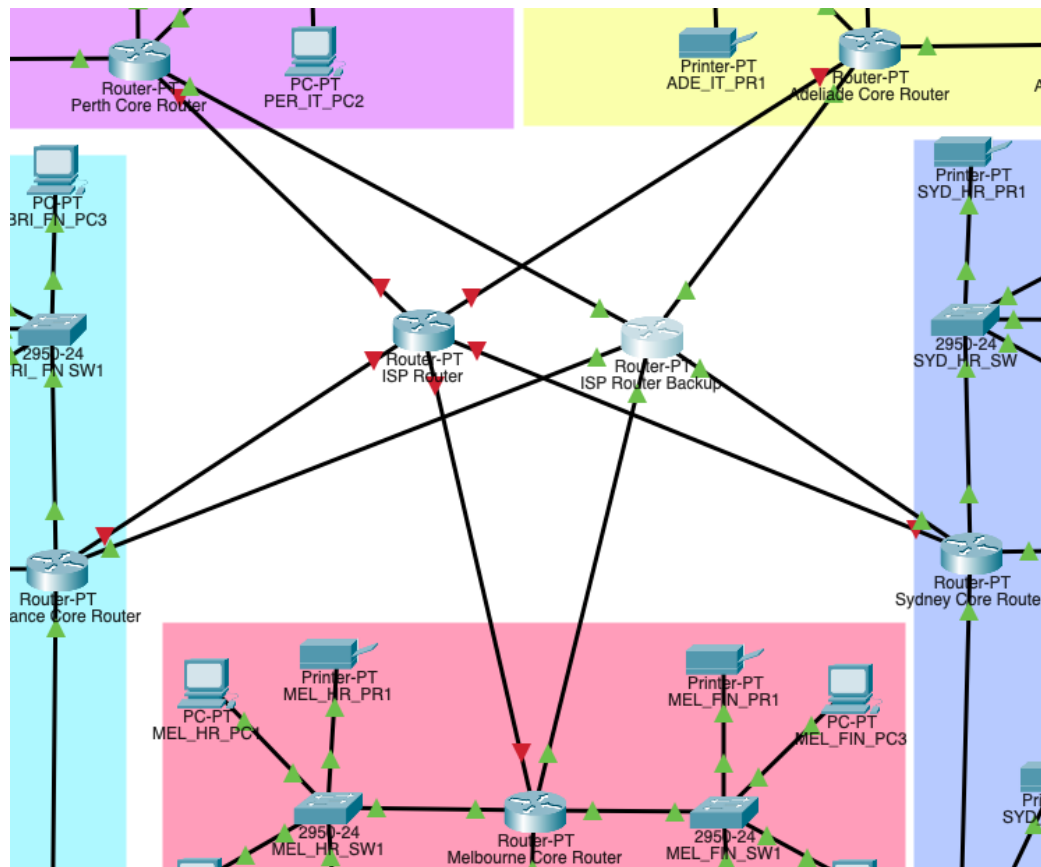
Figure 4: Dual Homing Implementation

☞ The dual homing setup configuration was isolated from main configuration scripts for brevity. Refer Appendix F for full configuration example.

Configuration - *Security*

According to (Fortinet, 2024), in a complex network, the network security is essential to ensure confidentiality, integrity & availability *(Often reffered to as CIA Triad)*.

There are number of ways to achieve this such as,

- Hardware Firewalls

- Software Firewalls

- Access Control Lists
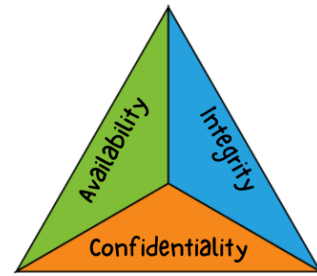
While hardware firewalls offers cutting edge protection to networks, this network simulation does not include proper use case to justify using hardware firewall such as publicly accessible web servers or file servers etc.

Software firewalls are available in all end personal computers depending on operating system and third party applications. Depending on each client requirements these firewall settings can be changed to allow or deny connections based on simple rules or IP addresses. Organizations usually use active directory domains to control these settings on medium to large enterprises.

After careful evaluation on options, Access Control Lists (ACL) was chosen to be implemented at edge routers to protect the data traffic of this network.

> **Access control lists have the ability to filter traffic primarily based on information in a frame or packet header. This includes source and destination addresses, protocols, and ports.**

(Carthern et al., 2021)

Access Control Lists

An ACL is a mechanism of network security that provide control over data transmission to allow or deny specific traffic ACLs work by enforcing specified rules to permit or restrict data. The rules are based on factors such as IP addresses, protocols, or ports.

ACL filters traffic at the network or device level to enhance network security, and manages bandwidth by controlling which data packets can pass through the device. ACLs can minimise threats and attacks by limiting or denying permissions to access sensitive files and networks.

See below for example configuration.

```
1  # create new ACL Group
2  ip access-list extended ALLOW-KNOWN-FIN-SUBNETS
3  permit udp any any eq 67 # Allow clients to access DHCP
       service
4  permit udp any any eq 68 # Allow clients to access DHCP
       service
5  # allow connections from and to network
6  permit ip 192.168.10.0 0.0.0.31 192.168.10.0 0.0.0.31
7  # deny any other connections regardless of origin
8  deny any any
9  exit
10
11 interface Gig2/0.20
12 ip access-group ALLOW-KNOWN-IT-SUBNETS in
13 exit
14
```

Listing 5: Sample ACL Configuration

✍ See Appendix A for full working example configuration code.

Figure 5: A quick evaluation of ACLs
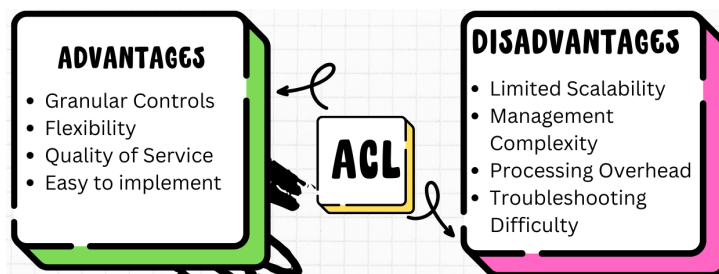
Challenges & Alternatives

As with any technical implementation, every design choice comes at a choice. A careful evaluation was conducted on both advantages and disadvantages of each decision as explained in early chapters. Following sums up some of those challenges, the implementors felt was critical for the successful implementation of the network.

Challenge 1 - Efficient Subnet and VLSM Implementation

IPV4 addresses are a limited resource. Therefore it is important to distribute these IP addresses efficiently to minimize under utilization and at the same time ensure there are healthy margins kept for future expansion without needing to completely overhaul subnet plan.

Solution: Calculated the subnet sizes based on the number of hosts that was needed by each branch, using Variable Length Subnet Masking.

Challenge 2 - Routing Implementation

Choosing optimal routing protocol is a challenge when there are multiple potential options available with its own pros and cons. On top of this, planning the network and implementing at remote locations (by colleagues) emphasized the need of centrally managed implementation plan. The lack of initial planning documentation lead to confusion on what IPs and protocols to be used.

Solution: Subnets tables in the Excel sheet to easily differentiate subnet addresses, net masks, range of addresses and usable IPs of all the departments of Sydney, Melbourne, Perth, Adelaide and Brisbane. The Excel sheet made it easy to select the correct addresses, IPs and net-masks.

Challenge 3 - VLAN Distribution and ACL Implementation

Each department was decided to be isolated to separate VLANs. With advance security requirements of these VLANs should not be able to cross communicate lead to the implementation of complex logic for ACL as described earlier in this document. The resulting ACLs configuration map is already complex and challenging to maintain and debug in initial stages.

Solution: Three departments were assigned uniform VLAN number across the branches and the ACL configuration map was unified to be applied on to any location without changes. This means a given branch router has a lengthy list of items in the ACL that are identical to other branches letting the administrators centrally manage the list. However, any further expansion, for example, a new branch location would mean the list would grow exponentially requiring a complete overhaul of security architecture sooner or later.

Bibliography

Carthern, C., Wilson, W., & Rivera, N. (2021). *Cisco Networks [Second Edition]* [https://www.perlego.com/book/4513826 (visited 2024-12-06)]. Apress.

Fortinet. (2024). CIA Triad [[Online; accessed 06-December-2024]]. https://www.fortinet.com/resources/cyberglossary/cia-triad

Tsinovoi, E. (2024). Dynamic Host Configuration Protocol [[Online; accessed 06-December-2024]]. https://www.ioriver.io/terms/dynamic-host-configuration-protocol

Appendix A

Sydney Branch Configuration

Refer below for full working configuration code for Sydney Branch networking devices

Core Router Configuration

```
1  enable
2  config t
3  hostname SYD_CORE_RT
4
5  banner motd #
6  ***WARNING: NO UNAUTHORISED ACCESS***
7  #
8
9
10 interface range gig0/0-3
11 no shutdown
12 exit
13
14 interface gig1/0.10
15 encapsulation dot1q 10
16 ip address 192.168.10.1 255.255.255.224
17 no shutdown
18 exit
19 ip dhcp pool SYD_FIN_POOL
20 network 192.168.10.0 255.255.255.224
21 default-router 192.168.10.1
22 dns-server 8.8.8.8
23 exit
24
25 interface gig2/0.20
26 encapsulation dot1q 20
27 ip address 192.168.10.33 255.255.255.240
```

```
28 no shutdown
29 exit
30 ip dhcp pool SYD_IT_POOL
31 network 192.168.10.32 255.255.255.240
32 default-router 192.168.10.33
33 dns-server 8.8.8.8
34 exit
35
36 interface gig3/0.30
37 encapsulation dot1q 30
38 ip address 192.168.10.49 255.255.255.240
39 no shutdown
40 exit
41 ip dhcp pool SYD_HR_POOL
42 network 192.168.10.48 255.255.255.240
43 default-router 192.168.10.49
44 dns-server 8.8.8.8
45 exit
46
47
48 interface gig0/0
49 no shutdown
50 ip address 192.168.20.1 255.255.255.252
51 exit
52
53 router ospf 1
54 network 192.168.20.0 0.0.0.3 area 0
55 network 192.168.10.32 0.0.0.15 area 0
56 network 192.168.10.0 0.0.0.31 area 0
57 network 192.168.10.48 0.0.0.15 area 0
58 exit
59
60 ip access-list extended ALLOW-KNOWN-FIN-SUBNETS
61 permit udp any any eq 67
62 permit udp any any eq 68
63 permit ip 192.168.10.0 0.0.0.31 192.168.10.0 0.0.0.31
64 permit ip 192.168.10.0 0.0.0.31 192.168.10.64 0.0.0.31
65 permit ip 192.168.10.0 0.0.0.31 192.168.10.128 0.0.0.15
66 permit ip 192.168.10.0 0.0.0.31 192.168.10.160 0.0.0.15
67 permit ip 192.168.10.0 0.0.0.31 192.168.10.192 0.0.0.15
68 permit ip 192.168.10.64 0.0.0.31 192.168.10.0 0.0.0.31
69 permit ip 192.168.10.64 0.0.0.31 192.168.10.64 0.0.0.31
70 permit ip 192.168.10.64 0.0.0.31 192.168.10.128 0.0.0.15
71 permit ip 192.168.10.64 0.0.0.31 192.168.10.160 0.0.0.15
72 permit ip 192.168.10.64 0.0.0.31 192.168.10.192 0.0.0.15
73 permit ip 192.168.10.128 0.0.0.15 192.168.10.0 0.0.0.31
74 permit ip 192.168.10.128 0.0.0.15 192.168.10.64 0.0.0.31
75 permit ip 192.168.10.128 0.0.0.15 192.168.10.128 0.0.0.15
76 permit ip 192.168.10.128 0.0.0.15 192.168.10.160 0.0.0.15
```

```
77  permit ip 192.168.10.128 0.0.0.15 192.168.10.192 0.0.0.15
78  permit ip 192.168.10.160 0.0.0.15 192.168.10.0 0.0.0.31
79  permit ip 192.168.10.160 0.0.0.15 192.168.10.64 0.0.0.31
80  permit ip 192.168.10.160 0.0.0.15 192.168.10.128 0.0.0.15
81  permit ip 192.168.10.160 0.0.0.15 192.168.10.160 0.0.0.15
82  permit ip 192.168.10.160 0.0.0.15 192.168.10.192 0.0.0.15
83  permit ip 192.168.10.192 0.0.0.15 192.168.10.0 0.0.0.31
84  permit ip 192.168.10.192 0.0.0.15 192.168.10.64 0.0.0.31
85  permit ip 192.168.10.192 0.0.0.15 192.168.10.128 0.0.0.15
86  permit ip 192.168.10.192 0.0.0.15 192.168.10.160 0.0.0.15
87  permit ip 192.168.10.192 0.0.0.15 192.168.10.192 0.0.0.15
88  deny ip any any
89  exit
90
91  interface Gig1/0.10
92  ip access-group ALLOW-KNOWN-FIN-SUBNETS in
93  exit
94
95  ip access-list extended ALLOW-KNOWN-IT-SUBNETS
96  permit udp any any eq 67
97  permit udp any any eq 68
98  permit ip 192.168.10.32 0.0.0.15 192.168.10.32 0.0.0.15
99  permit ip 192.168.10.32 0.0.0.15 192.168.10.96 0.0.0.15
100 permit ip 192.168.10.32 0.0.0.15 192.168.10.144 0.0.0.7
101 permit ip 192.168.10.32 0.0.0.15 192.168.10.176 0.0.0.7
102 permit ip 192.168.10.32 0.0.0.15 192.168.10.208 0.0.0.7
103 permit ip 192.168.10.96 0.0.0.15 192.168.10.32 0.0.0.15
104 permit ip 192.168.10.96 0.0.0.15 192.168.10.96 0.0.0.15
105 permit ip 192.168.10.96 0.0.0.15 192.168.10.144 0.0.0.7
106 permit ip 192.168.10.96 0.0.0.15 192.168.10.176 0.0.0.7
107 permit ip 192.168.10.96 0.0.0.15 192.168.10.208 0.0.0.7
108 permit ip 192.168.10.144 0.0.0.7 192.168.10.32 0.0.0.15
109 permit ip 192.168.10.144 0.0.0.7 192.168.10.96 0.0.0.15
110 permit ip 192.168.10.144 0.0.0.7 192.168.10.144 0.0.0.7
111 permit ip 192.168.10.144 0.0.0.7 192.168.10.176 0.0.0.7
112 permit ip 192.168.10.144 0.0.0.7 192.168.10.208 0.0.0.7
113 permit ip 192.168.10.176 0.0.0.7 192.168.10.32 0.0.0.15
114 permit ip 192.168.10.176 0.0.0.7 192.168.10.96 0.0.0.15
115 permit ip 192.168.10.176 0.0.0.7 192.168.10.144 0.0.0.7
116 permit ip 192.168.10.176 0.0.0.7 192.168.10.176 0.0.0.7
117 permit ip 192.168.10.176 0.0.0.7 192.168.10.208 0.0.0.7
118 permit ip 192.168.10.208 0.0.0.7 192.168.10.32 0.0.0.15
119 permit ip 192.168.10.208 0.0.0.7 192.168.10.96 0.0.0.15
120 permit ip 192.168.10.208 0.0.0.7 192.168.10.144 0.0.0.7
121 permit ip 192.168.10.208 0.0.0.7 192.168.10.176 0.0.0.7
122 permit ip 192.168.10.208 0.0.0.7 192.168.10.208 0.0.0.7
123 deny ip any any
124 exit
125
```

```
126 interface Gig2/0.20
127 ip access-group ALLOW-KNOWN-IT-SUBNETS in
128 exit
129
130 ip access-list extended ALLOW-KNOWN-HR-SUBNETS
131 permit udp any any eq 67
132 permit udp any any eq 68
133 permit ip 192.168.10.48 0.0.0.15 192.168.10.48 0.0.0.15
134 permit ip 192.168.10.48 0.0.0.15 192.168.10.112 0.0.0.15
135 permit ip 192.168.10.48 0.0.0.15 192.168.10.152 0.0.0.7
136 permit ip 192.168.10.48 0.0.0.15 192.168.10.184 0.0.0.7
137 permit ip 192.168.10.48 0.0.0.15 192.168.10.216 0.0.0.7
138 permit ip 192.168.10.112 0.0.0.15 192.168.10.48 0.0.0.15
139 permit ip 192.168.10.112 0.0.0.15 192.168.10.112 0.0.0.15
140 permit ip 192.168.10.112 0.0.0.15 192.168.10.152 0.0.0.7
141 permit ip 192.168.10.112 0.0.0.15 192.168.10.184 0.0.0.7
142 permit ip 192.168.10.112 0.0.0.15 192.168.10.216 0.0.0.7
143 permit ip 192.168.10.152 0.0.0.7 192.168.10.48 0.0.0.15
144 permit ip 192.168.10.152 0.0.0.7 192.168.10.112 0.0.0.15
145 permit ip 192.168.10.152 0.0.0.7 192.168.10.152 0.0.0.7
146 permit ip 192.168.10.152 0.0.0.7 192.168.10.184 0.0.0.7
147 permit ip 192.168.10.152 0.0.0.7 192.168.10.216 0.0.0.7
148 permit ip 192.168.10.184 0.0.0.7 192.168.10.48 0.0.0.15
149 permit ip 192.168.10.184 0.0.0.7 192.168.10.112 0.0.0.15
150 permit ip 192.168.10.184 0.0.0.7 192.168.10.152 0.0.0.7
151 permit ip 192.168.10.184 0.0.0.7 192.168.10.184 0.0.0.7
152 permit ip 192.168.10.184 0.0.0.7 192.168.10.216 0.0.0.7
153 permit ip 192.168.10.216 0.0.0.7 192.168.10.48 0.0.0.15
154 permit ip 192.168.10.216 0.0.0.7 192.168.10.112 0.0.0.15
155 permit ip 192.168.10.216 0.0.0.7 192.168.10.152 0.0.0.7
156 permit ip 192.168.10.216 0.0.0.7 192.168.10.184 0.0.0.7
157 permit ip 192.168.10.216 0.0.0.7 192.168.10.216 0.0.0.7
158 deny ip any any
159 exit
160
161 interface Gig3/0.30
162 ip access-group ALLOW-KNOWN-HR-SUBNETS in
163 exit
164 exit
165 copy running-config startup-config
166
167
168
```

Listing A.1: Sydney Core Router Configuration

Finance Switch Configuration

```
1  enable
2  config t
3  hostname SYD_FIN_SW
4
5  banner motd #
6  ***WARNING: NO UNAUTHORISED ACCESS***
7  #
8
9  vlan 10
10 name SYD_FIN
11 exit
12
13 interface range fa0/2-24
14 switchport mode access
15 switchport access vlan 10
16 exit
17
18 interface fa0/1
19 switchport mode trunk
20 switchport access vlan 10
21 exit
22
23 interface vlan 10
24 no shutdown
25 exit
26 exit
27 copy running-config startup-config
28
29
30
```

Listing A.2: Sydney Finance Switch Configuration

IT Switch Configuration

```
1  enable
2  config t
3  hostname SYD_IT_SW
4
5  banner motd #
6  ***WARNING: NO UNAUTHORISED ACCESS***
7  #
8
9  vlan 20
10 name SYD_IT
```

```
11 exit
12
13 interface range fa0/2-24
14 switchport mode access
15 switchport access vlan 20
16 exit
17
18 interface fa0/1
19 switchport mode trunk
20 switchport access vlan 20
21 exit
22
23 interface vlan 20
24 no shutdown
25 exit
26 exit
27 copy running-config startup-config
28
29
30
```

Listing A.3: Sydney IT Switch Configuration

HR Switch Configuration

```
1 enable
2 config t
3 hostname SYD_HR_SW
4
5 banner motd #
6 ***WARNING: NO UNAUTHORISED ACCESS***
7 #
8
9 vlan 30
10 name SYD_HR
11 exit
12
13 interface range fa0/2-24
14 switchport mode access
15 switchport access vlan 30
16 exit
17
18 interface fa0/1
19 switchport mode trunk
20 switchport access vlan 30
21 exit
22
```

```
23 interface vlan 30
24 no shutdown
25 exit
26 exit
27 copy running - config startup - config
28
```

Listing A.4: Sydney HR Switch Configuration

Appendix B

Melbourne Branch Configuration

Refer below for full working configuration code for Melbourne Branch networking devices

Core Router Configuration

```
1  enable
2  config t
3  hostname MEL_CORE_RT
4
5  banner motd #
6  ***WARNING: NO UNAUTHORISED ACCESS***
7  #
8
9  interface gig0/0
10 no shutdown
11 exit
12 interface gig1/0
13 no shutdown
14 exit
15 interface gig2/0
16 no shutdown
17 exit
18 interface gig3/0
19 no shutdown
20 exit
21
22
23 interface gig1/0.10
24 encapsulation dot1q 10
25 ip address 192.168.10.65 255.255.255.224
26 no shutdown
27 exit
```

```
28  ip dhcp pool MEL_FIN_POOL
29  network 192.168.10.64 255.255.255.224
30  default-router 192.168.10.65
31  dns-server 8.8.8.8
32  exit
33
34  interface gig2/0.20
35  encapsulation dot1q 20
36  ip address 192.168.10.97 255.255.255.240
37  no shutdown
38  exit
39  ip dhcp pool MEL_IT_POOL
40  network 192.168.10.96 255.255.255.240
41  default-router 192.168.10.97
42  dns-server 8.8.8.8
43  exit
44
45  interface gig3/0.30
46  encapsulation dot1q 30
47  ip address 192.168.10.113 255.255.255.240
48  no shutdown
49  exit
50  ip dhcp excluded-address 192.168.10.112 192.168.10.115
51  ip dhcp pool MEL_HR_POOL
52  network 192.168.10.112 255.255.255.240
53  default-router 192.168.10.113
54  dns-server 8.8.8.8
55  exit
56
57
58  interface gig0/0
59  no shutdown
60  ip address 192.168.20.5 255.255.255.252
61  exit
62
63
64  router ospf 1
65  network 192.168.10.64 0.0.0.31 area 0
66  network 192.168.20.4 0.0.0.3 area 0
67  network 192.168.10.96 0.0.0.15 area 0
68  network 192.168.10.112 0.0.0.15 area 0
69  exit
70
71
72  ip access-list extended ALLOW-KNOWN-FIN-SUBNETS
73  permit udp any any eq 67
74  permit udp any any eq 68
75  permit ip 192.168.10.0 0.0.0.31 192.168.10.0 0.0.0.31
76  permit ip 192.168.10.0 0.0.0.31 192.168.10.64 0.0.0.31
```

```
77  permit ip 192.168.10.0 0.0.0.31 192.168.10.128 0.0.0.15
78  permit ip 192.168.10.0 0.0.0.31 192.168.10.160 0.0.0.15
79  permit ip 192.168.10.0 0.0.0.31 192.168.10.192 0.0.0.15
80  permit ip 192.168.10.64 0.0.0.31 192.168.10.0 0.0.0.31
81  permit ip 192.168.10.64 0.0.0.31 192.168.10.64 0.0.0.31
82  permit ip 192.168.10.64 0.0.0.31 192.168.10.128 0.0.0.15
83  permit ip 192.168.10.64 0.0.0.31 192.168.10.160 0.0.0.15
84  permit ip 192.168.10.64 0.0.0.31 192.168.10.192 0.0.0.15
85  permit ip 192.168.10.128 0.0.0.15 192.168.10.0 0.0.0.31
86  permit ip 192.168.10.128 0.0.0.15 192.168.10.64 0.0.0.31
87  permit ip 192.168.10.128 0.0.0.15 192.168.10.128 0.0.0.15
88  permit ip 192.168.10.128 0.0.0.15 192.168.10.160 0.0.0.15
89  permit ip 192.168.10.128 0.0.0.15 192.168.10.192 0.0.0.15
90  permit ip 192.168.10.160 0.0.0.15 192.168.10.0 0.0.0.31
91  permit ip 192.168.10.160 0.0.0.15 192.168.10.64 0.0.0.31
92  permit ip 192.168.10.160 0.0.0.15 192.168.10.128 0.0.0.15
93  permit ip 192.168.10.160 0.0.0.15 192.168.10.160 0.0.0.15
94  permit ip 192.168.10.160 0.0.0.15 192.168.10.192 0.0.0.15
95  permit ip 192.168.10.192 0.0.0.15 192.168.10.0 0.0.0.31
96  permit ip 192.168.10.192 0.0.0.15 192.168.10.64 0.0.0.31
97  permit ip 192.168.10.192 0.0.0.15 192.168.10.128 0.0.0.15
98  permit ip 192.168.10.192 0.0.0.15 192.168.10.160 0.0.0.15
99  permit ip 192.168.10.192 0.0.0.15 192.168.10.192 0.0.0.15
100 deny ip any any
101 exit
102
103 interface Gig1/0.10
104 ip access-group ALLOW-KNOWN-FIN-SUBNETS in
105 exit
106
107 ip access-list extended ALLOW-KNOWN-IT-SUBNETS
108 permit udp any any eq 67
109 permit udp any any eq 68
110 permit ip 192.168.10.32 0.0.0.15 192.168.10.32 0.0.0.15
111 permit ip 192.168.10.32 0.0.0.15 192.168.10.96 0.0.0.15
112 permit ip 192.168.10.32 0.0.0.15 192.168.10.144 0.0.0.7
113 permit ip 192.168.10.32 0.0.0.15 192.168.10.176 0.0.0.7
114 permit ip 192.168.10.32 0.0.0.15 192.168.10.208 0.0.0.7
115 permit ip 192.168.10.96 0.0.0.15 192.168.10.32 0.0.0.15
116 permit ip 192.168.10.96 0.0.0.15 192.168.10.96 0.0.0.15
117 permit ip 192.168.10.96 0.0.0.15 192.168.10.144 0.0.0.7
118 permit ip 192.168.10.96 0.0.0.15 192.168.10.176 0.0.0.7
119 permit ip 192.168.10.96 0.0.0.15 192.168.10.208 0.0.0.7
120 permit ip 192.168.10.144 0.0.0.7 192.168.10.32 0.0.0.15
121 permit ip 192.168.10.144 0.0.0.7 192.168.10.96 0.0.0.15
122 permit ip 192.168.10.144 0.0.0.7 192.168.10.144 0.0.0.7
123 permit ip 192.168.10.144 0.0.0.7 192.168.10.176 0.0.0.7
124 permit ip 192.168.10.144 0.0.0.7 192.168.10.208 0.0.0.7
125 permit ip 192.168.10.176 0.0.0.7 192.168.10.32 0.0.0.15
```

```
126 permit ip 192.168.10.176 0.0.0.7 192.168.10.96 0.0.0.15
127 permit ip 192.168.10.176 0.0.0.7 192.168.10.144 0.0.0.7
128 permit ip 192.168.10.176 0.0.0.7 192.168.10.176 0.0.0.7
129 permit ip 192.168.10.176 0.0.0.7 192.168.10.208 0.0.0.7
130 permit ip 192.168.10.208 0.0.0.7 192.168.10.32 0.0.0.15
131 permit ip 192.168.10.208 0.0.0.7 192.168.10.96 0.0.0.15
132 permit ip 192.168.10.208 0.0.0.7 192.168.10.144 0.0.0.7
133 permit ip 192.168.10.208 0.0.0.7 192.168.10.176 0.0.0.7
134 permit ip 192.168.10.208 0.0.0.7 192.168.10.208 0.0.0.7
135 deny ip any any
136 exit
137
138 interface Gig2/0.20
139 ip access-group ALLOW-KNOWN-IT-SUBNETS in
140 exit
141
142 ip access-list extended ALLOW-KNOWN-HR-SUBNETS
143 permit udp any any eq 67
144 permit udp any any eq 68
145 permit ip 192.168.10.48 0.0.0.15 192.168.10.48 0.0.0.15
146 permit ip 192.168.10.48 0.0.0.15 192.168.10.112 0.0.0.15
147 permit ip 192.168.10.48 0.0.0.15 192.168.10.152 0.0.0.7
148 permit ip 192.168.10.48 0.0.0.15 192.168.10.184 0.0.0.7
149 permit ip 192.168.10.48 0.0.0.15 192.168.10.216 0.0.0.7
150 permit ip 192.168.10.112 0.0.0.15 192.168.10.48 0.0.0.15
151 permit ip 192.168.10.112 0.0.0.15 192.168.10.112 0.0.0.15
152 permit ip 192.168.10.112 0.0.0.15 192.168.10.152 0.0.0.7
153 permit ip 192.168.10.112 0.0.0.15 192.168.10.184 0.0.0.7
154 permit ip 192.168.10.112 0.0.0.15 192.168.10.216 0.0.0.7
155 permit ip 192.168.10.152 0.0.0.7 192.168.10.48 0.0.0.15
156 permit ip 192.168.10.152 0.0.0.7 192.168.10.112 0.0.0.15
157 permit ip 192.168.10.152 0.0.0.7 192.168.10.152 0.0.0.7
158 permit ip 192.168.10.152 0.0.0.7 192.168.10.184 0.0.0.7
159 permit ip 192.168.10.152 0.0.0.7 192.168.10.216 0.0.0.7
160 permit ip 192.168.10.184 0.0.0.7 192.168.10.48 0.0.0.15
161 permit ip 192.168.10.184 0.0.0.7 192.168.10.112 0.0.0.15
162 permit ip 192.168.10.184 0.0.0.7 192.168.10.152 0.0.0.7
163 permit ip 192.168.10.184 0.0.0.7 192.168.10.184 0.0.0.7
164 permit ip 192.168.10.184 0.0.0.7 192.168.10.216 0.0.0.7
165 permit ip 192.168.10.216 0.0.0.7 192.168.10.48 0.0.0.15
166 permit ip 192.168.10.216 0.0.0.7 192.168.10.112 0.0.0.15
167 permit ip 192.168.10.216 0.0.0.7 192.168.10.152 0.0.0.7
168 permit ip 192.168.10.216 0.0.0.7 192.168.10.184 0.0.0.7
169 permit ip 192.168.10.216 0.0.0.7 192.168.10.216 0.0.0.7
170 deny ip any any
171 exit
172
173 interface Gig3/0.30
174 ip access-group ALLOW-KNOWN-HR-SUBNETS in
```

```
175  exit
176  exit
177  copy running-config startup-config
178
```

Listing B.1: Melbourne Core Router Configuration

Finance Switch Configuration

```
1   enable
2   config t
3   hostname MEL_FIN_SW
4
5   banner motd #
6   ***WARNING: NO UNAUTHORISED ACCESS***
7   #
8
9   vlan 10
10  name MEL_FIN
11  exit
12
13  interface range fa0/2-24
14  switchport mode access
15  switchport access vlan 10
16  exit
17
18  interface fa0/1
19  switchport mode trunk
20  switchport access vlan 10
21  exit
22
23  interface vlan 10
24  no shutdown
25  exit
26  exit
27  copy running-config startup-config
28
```

Listing B.2: Melbourne Finance Switch Configuration

IT Switch Configuration

```
1           enable
2   config t
3   hostname MEL_IT_SW
```

```
 4
 5 banner motd #
 6 ***WARNING: NO UNAUTHORISED ACCESS***
 7 #
 8
 9 vlan 20
10 name MEL_IT
11 exit
12
13 interface range fa0/2-24
14 switchport mode access
15 switchport access vlan 20
16 exit
17
18 interface fa0/1
19 switchport mode trunk
20 switchport access vlan 20
21 exit
22
23 interface vlan 20
24 no shutdown
25 exit
26 exit
27 copy running-config startup-config
28
```

Listing B.3: Melbourne IT Switch Configuration

HR Switch Configuration

```
 1 enable
 2 config t
 3 hostname MEL_HR_SW
 4
 5 banner motd #
 6 ***WARNING: NO UNAUTHORISED ACCESS***
 7 #
 8
 9 vlan 30
10 name MEL_HR
11 exit
12
13 interface range fa0/2-24
14 switchport mode access
15 switchport access vlan 30
16 exit
17
```

```
18  interface fa0/1
19  switchport mode trunk
20  switchport access vlan 30
21  exit
22
23  interface vlan 30
24  no shutdown
25  exit
26  exit
27  copy running-config startup-config
28
29
30
```

Listing B.4: Melbourne HR Switch Configuration

Appendix C

Brisbane Branch Configuration

Refer below for full working configuration code for Brisbane Branch networking devices

Core Router Configuration

```
1  enable
2  config t
3  hostname BRI_CORE_RT
4
5  interface gig0/0
6  no shutdown
7  exit
8  interface gig1/0
9  no shutdown
10 exit
11 interface gig2/0
12 no shutdown
13 exit
14 interface gig3/0
15 no shutdown
16 exit
17
18 interface gig1/0.10
19 encapsulation dot1q 10
20 ip address 192.168.10.161 255.255.255.240
21 no shutdown
22 exit
23 ip dhcp pool BRI_FIN_POOL
24 network 192.168.10.160 255.255.255.240
25 default-router 192.168.10.161
26 dns-server 8.8.8.8
27 exit
```

```
28
29 interface gig2/0.20
30 encapsulation dot1q 20
31 ip address 192.168.10.177 255.255.255.248
32 no shutdown
33 exit
34 ip dhcp pool BRI_IT_POOL
35 network 192.168.10.176 255.255.255.248
36 default-router 192.168.10.177
37 dns-server 8.8.8.8
38 exit
39
40 interface gig3/0.30
41 encapsulation dot1q 30
42 ip address 192.168.10.185 255.255.255.248
43 no shutdown
44 exit
45 ip dhcp pool BRI_HR_POOL
46 network 192.168.10.184 255.255.255.248
47 default-router 192.168.10.185
48 dns-server 8.8.8.8
49 exit
50
51
52 interface gig0/0
53 no shutdown
54 ip address 192.168.20.9 255.255.255.252
55 exit
56
57 router ospf 1
58 network 192.168.20.8 0.0.0.3 area 0
59 network 192.168.10.160 0.0.0.15 area 0
60 network 192.168.10.176 0.0.0.7 area 0
61 network 192.168.10.184 0.0.0.7 area 0
62 exit
63
64 ip access-list extended ALLOW-KNOWN-FIN-SUBNETS
65 permit udp any any eq 67
66 permit udp any any eq 68
67 permit ip 192.168.10.0 0.0.0.31 192.168.10.0 0.0.0.31
68 permit ip 192.168.10.0 0.0.0.31 192.168.10.64 0.0.0.31
69 permit ip 192.168.10.0 0.0.0.31 192.168.10.128 0.0.0.15
70 permit ip 192.168.10.0 0.0.0.31 192.168.10.160 0.0.0.15
71 permit ip 192.168.10.0 0.0.0.31 192.168.10.192 0.0.0.15
72 permit ip 192.168.10.64 0.0.0.31 192.168.10.0 0.0.0.31
73 permit ip 192.168.10.64 0.0.0.31 192.168.10.64 0.0.0.31
74 permit ip 192.168.10.64 0.0.0.31 192.168.10.128 0.0.0.15
75 permit ip 192.168.10.64 0.0.0.31 192.168.10.160 0.0.0.15
76 permit ip 192.168.10.64 0.0.0.31 192.168.10.192 0.0.0.15
```

```
77  permit ip 192.168.10.128 0.0.0.15 192.168.10.0 0.0.0.31
78  permit ip 192.168.10.128 0.0.0.15 192.168.10.64 0.0.0.31
79  permit ip 192.168.10.128 0.0.0.15 192.168.10.128 0.0.0.15
80  permit ip 192.168.10.128 0.0.0.15 192.168.10.160 0.0.0.15
81  permit ip 192.168.10.128 0.0.0.15 192.168.10.192 0.0.0.15
82  permit ip 192.168.10.160 0.0.0.15 192.168.10.0 0.0.0.31
83  permit ip 192.168.10.160 0.0.0.15 192.168.10.64 0.0.0.31
84  permit ip 192.168.10.160 0.0.0.15 192.168.10.128 0.0.0.15
85  permit ip 192.168.10.160 0.0.0.15 192.168.10.160 0.0.0.15
86  permit ip 192.168.10.160 0.0.0.15 192.168.10.192 0.0.0.15
87  permit ip 192.168.10.192 0.0.0.15 192.168.10.0 0.0.0.31
88  permit ip 192.168.10.192 0.0.0.15 192.168.10.64 0.0.0.31
89  permit ip 192.168.10.192 0.0.0.15 192.168.10.128 0.0.0.15
90  permit ip 192.168.10.192 0.0.0.15 192.168.10.160 0.0.0.15
91  permit ip 192.168.10.192 0.0.0.15 192.168.10.192 0.0.0.15
92  deny ip any any
93  exit
94
95  interface Gig1/0.10
96  ip access-group ALLOW-KNOWN-FIN-SUBNETS in
97  exit
98
99  ip access-list extended ALLOW-KNOWN-IT-SUBNETS
100 permit udp any any eq 67
101 permit udp any any eq 68
102 permit ip 192.168.10.32 0.0.0.15 192.168.10.32 0.0.0.15
103 permit ip 192.168.10.32 0.0.0.15 192.168.10.96 0.0.0.15
104 permit ip 192.168.10.32 0.0.0.15 192.168.10.144 0.0.0.7
105 permit ip 192.168.10.32 0.0.0.15 192.168.10.176 0.0.0.7
106 permit ip 192.168.10.32 0.0.0.15 192.168.10.208 0.0.0.7
107 permit ip 192.168.10.96 0.0.0.15 192.168.10.32 0.0.0.15
108 permit ip 192.168.10.96 0.0.0.15 192.168.10.96 0.0.0.15
109 permit ip 192.168.10.96 0.0.0.15 192.168.10.144 0.0.0.7
110 permit ip 192.168.10.96 0.0.0.15 192.168.10.176 0.0.0.7
111 permit ip 192.168.10.96 0.0.0.15 192.168.10.208 0.0.0.7
112 permit ip 192.168.10.144 0.0.0.7 192.168.10.32 0.0.0.15
113 permit ip 192.168.10.144 0.0.0.7 192.168.10.96 0.0.0.15
114 permit ip 192.168.10.144 0.0.0.7 192.168.10.144 0.0.0.7
115 permit ip 192.168.10.144 0.0.0.7 192.168.10.176 0.0.0.7
116 permit ip 192.168.10.144 0.0.0.7 192.168.10.208 0.0.0.7
117 permit ip 192.168.10.176 0.0.0.7 192.168.10.32 0.0.0.15
118 permit ip 192.168.10.176 0.0.0.7 192.168.10.96 0.0.0.15
119 permit ip 192.168.10.176 0.0.0.7 192.168.10.144 0.0.0.7
120 permit ip 192.168.10.176 0.0.0.7 192.168.10.176 0.0.0.7
121 permit ip 192.168.10.176 0.0.0.7 192.168.10.208 0.0.0.7
122 permit ip 192.168.10.208 0.0.0.7 192.168.10.32 0.0.0.15
123 permit ip 192.168.10.208 0.0.0.7 192.168.10.96 0.0.0.15
124 permit ip 192.168.10.208 0.0.0.7 192.168.10.144 0.0.0.7
125 permit ip 192.168.10.208 0.0.0.7 192.168.10.176 0.0.0.7
```

```
126 permit ip 192.168.10.208 0.0.0.7 192.168.10.208 0.0.0.7
127 deny ip any any
128 exit
129
130 interface Gig2/0.20
131 ip access-group ALLOW-KNOWN-IT-SUBNETS in
132 exit
133
134 ip access-list extended ALLOW-KNOWN-HR-SUBNETS
135 permit udp any any eq 67
136 permit udp any any eq 68
137 permit ip 192.168.10.48 0.0.0.15 192.168.10.48 0.0.0.15
138 permit ip 192.168.10.48 0.0.0.15 192.168.10.112 0.0.0.15
139 permit ip 192.168.10.48 0.0.0.15 192.168.10.152 0.0.0.7
140 permit ip 192.168.10.48 0.0.0.15 192.168.10.184 0.0.0.7
141 permit ip 192.168.10.48 0.0.0.15 192.168.10.216 0.0.0.7
142 permit ip 192.168.10.112 0.0.0.15 192.168.10.48 0.0.0.15
143 permit ip 192.168.10.112 0.0.0.15 192.168.10.112 0.0.0.15
144 permit ip 192.168.10.112 0.0.0.15 192.168.10.152 0.0.0.7
145 permit ip 192.168.10.112 0.0.0.15 192.168.10.184 0.0.0.7
146 permit ip 192.168.10.112 0.0.0.15 192.168.10.216 0.0.0.7
147 permit ip 192.168.10.152 0.0.0.7 192.168.10.48 0.0.0.15
148 permit ip 192.168.10.152 0.0.0.7 192.168.10.112 0.0.0.15
149 permit ip 192.168.10.152 0.0.0.7 192.168.10.152 0.0.0.7
150 permit ip 192.168.10.152 0.0.0.7 192.168.10.184 0.0.0.7
151 permit ip 192.168.10.152 0.0.0.7 192.168.10.216 0.0.0.7
152 permit ip 192.168.10.184 0.0.0.7 192.168.10.48 0.0.0.15
153 permit ip 192.168.10.184 0.0.0.7 192.168.10.112 0.0.0.15
154 permit ip 192.168.10.184 0.0.0.7 192.168.10.152 0.0.0.7
155 permit ip 192.168.10.184 0.0.0.7 192.168.10.184 0.0.0.7
156 permit ip 192.168.10.184 0.0.0.7 192.168.10.216 0.0.0.7
157 permit ip 192.168.10.216 0.0.0.7 192.168.10.48 0.0.0.15
158 permit ip 192.168.10.216 0.0.0.7 192.168.10.112 0.0.0.15
159 permit ip 192.168.10.216 0.0.0.7 192.168.10.152 0.0.0.7
160 permit ip 192.168.10.216 0.0.0.7 192.168.10.184 0.0.0.7
161 permit ip 192.168.10.216 0.0.0.7 192.168.10.216 0.0.0.7
162 deny ip any any
163 exit
164
165 interface Gig3/0.30
166 ip access-group ALLOW-KNOWN-HR-SUBNETS in
167 exit
168 exit
169 copy running-config startup-config
170
```

Listing C.1: Melbourne Core Router Configuration

Finance Switch Configuration

```
1  enable
2  config t
3  hostname BRI_FIN_SW
4
5  banner motd #
6  ***WARNING: NO UNAUTHORISED ACCESS***
7  #
8
9  vlan 10
10 name BRI_FIN
11 exit
12
13 interface range fa0/2-24
14 switchport mode access
15 switchport access vlan 10
16 exit
17
18 interface fa0/1
19 switchport mode trunk
20 switchport access vlan 10
21 exit
22
23 interface vlan 10
24 no shutdown
25 exit
26 exit
27 copy running-config startup-config
28
```

Listing C.2: Melbourne Finance Switch Configuration

IT Switch Configuration

```
1  enable
2  config t
3  hostname BRI_IT_SW
4
5  banner motd #
6  ***WARNING: NO UNAUTHORISED ACCESS***
7  #
8
9  vlan 20
10 name BRI_IT
11 exit
12
```

```
13 interface range fa0/2-24
14 switchport mode access
15 switchport access vlan 20
16 exit
17
18 interface fa0/1
19 switchport mode trunk
20 switchport access vlan 20
21 exit
22
23 interface vlan 20
24 no shutdown
25 exit
26 exit
27 copy running-config startup-config
28
```

Listing C.3: Melbourne IT Switch Configuration

HR Switch Configuration

```
1 enable
2 config t
3 hostname BRI_HR_SW
4
5 banner motd #
6 ***WARNING: NO UNAUTHORISED ACCESS***
7 #
8
9 vlan 30
10 name BRI_HR
11 exit
12
13 interface range fa0/2-24
14 switchport mode access
15 switchport access vlan 30
16 exit
17
18 interface fa0/1
19 switchport mode trunk
20 switchport access vlan 30
21 exit
22
23 interface vlan 30
24 no shutdown
25 exit
26 exit
```

```
27  copy running - config startup - config
28
```

Listing C.4: Melbourne HR Switch Configuration

Appendix D

Perth Branch Configuration

Refer below for full working configuration code for Perth Branch networking devices

Core Router Configuration

```
1  enable
2  config t
3  hostname PER_CORE_RT
4
5  interface gig0/0
6  no shutdown
7  exit
8  interface gig1/0
9  no shutdown
10 exit
11 interface gig2/0
12 no shutdown
13 exit
14 interface gig3/0
15 no shutdown
16 exit
17
18 interface gig1/0.10
19 encapsulation dot1q 10
20 ip address 192.168.10.129 255.255.255.240
21 no shutdown
22 exit
23 ip dhcp pool PER_FIN_POOL
24 network 192.168.10.128 255.255.255.240
25 default-router 192.168.10.129
26 dns-server 8.8.8.8
27 exit
```

```
28
29 interface gig2/0.20
30 encapsulation dot1q 20
31 ip address 192.168.10.145 255.255.255.248
32 no shutdown
33 exit
34 ip dhcp pool PER_IT_POOL
35 network 192.168.10.144 255.255.255.248
36 default-router 192.168.10.145
37 dns-server 8.8.8.8
38 exit
39
40 interface gig3/0.30
41 encapsulation dot1q 30
42 ip address 192.168.10.153 255.255.255.248
43 no shutdown
44 exit
45 ip dhcp pool PER_HR_POOL
46 network 192.168.10.152 255.255.255.248
47 default-router 192.168.10.153
48 dns-server 8.8.8.8
49 exit
50
51
52 interface gig0/0
53 no shutdown
54 ip address 192.168.20.13 255.255.255.252
55 exit
56
57 router ospf 1
58 network 192.168.20.12 0.0.0.3 area 0
59 network 192.168.10.128 0.0.0.15 area 0
60 network 192.168.10.144 0.0.0.7 area 0
61 network 192.168.10.152 0.0.0.7 area 0
62 exit
63
64
65 ip access-list extended ALLOW-KNOWN-FIN-SUBNETS
66 permit udp any any eq 67
67 permit udp any any eq 68
68 permit ip 192.168.10.0 0.0.0.31 192.168.10.0 0.0.0.31
69 permit ip 192.168.10.0 0.0.0.31 192.168.10.64 0.0.0.31
70 permit ip 192.168.10.0 0.0.0.31 192.168.10.128 0.0.0.15
71 permit ip 192.168.10.0 0.0.0.31 192.168.10.160 0.0.0.15
72 permit ip 192.168.10.0 0.0.0.31 192.168.10.192 0.0.0.15
73 permit ip 192.168.10.64 0.0.0.31 192.168.10.0 0.0.0.31
74 permit ip 192.168.10.64 0.0.0.31 192.168.10.64 0.0.0.31
75 permit ip 192.168.10.64 0.0.0.31 192.168.10.128 0.0.0.15
76 permit ip 192.168.10.64 0.0.0.31 192.168.10.160 0.0.0.15
```

```
77  permit ip 192.168.10.64 0.0.0.31 192.168.10.192 0.0.0.15
78  permit ip 192.168.10.128 0.0.0.15 192.168.10.0 0.0.0.31
79  permit ip 192.168.10.128 0.0.0.15 192.168.10.64 0.0.0.31
80  permit ip 192.168.10.128 0.0.0.15 192.168.10.128 0.0.0.15
81  permit ip 192.168.10.128 0.0.0.15 192.168.10.160 0.0.0.15
82  permit ip 192.168.10.128 0.0.0.15 192.168.10.192 0.0.0.15
83  permit ip 192.168.10.160 0.0.0.15 192.168.10.0 0.0.0.31
84  permit ip 192.168.10.160 0.0.0.15 192.168.10.64 0.0.0.31
85  permit ip 192.168.10.160 0.0.0.15 192.168.10.128 0.0.0.15
86  permit ip 192.168.10.160 0.0.0.15 192.168.10.160 0.0.0.15
87  permit ip 192.168.10.160 0.0.0.15 192.168.10.192 0.0.0.15
88  permit ip 192.168.10.192 0.0.0.15 192.168.10.0 0.0.0.31
89  permit ip 192.168.10.192 0.0.0.15 192.168.10.64 0.0.0.31
90  permit ip 192.168.10.192 0.0.0.15 192.168.10.128 0.0.0.15
91  permit ip 192.168.10.192 0.0.0.15 192.168.10.160 0.0.0.15
92  permit ip 192.168.10.192 0.0.0.15 192.168.10.192 0.0.0.15
93  deny ip any any
94  exit
95
96  interface Gig1/0.10
97  ip access-group ALLOW-KNOWN-FIN-SUBNETS in
98  exit
99
100 ip access-list extended ALLOW-KNOWN-IT-SUBNETS
101 permit udp any any eq 67
102 permit udp any any eq 68
103 permit ip 192.168.10.32 0.0.0.15 192.168.10.32 0.0.0.15
104 permit ip 192.168.10.32 0.0.0.15 192.168.10.96 0.0.0.15
105 permit ip 192.168.10.32 0.0.0.15 192.168.10.144 0.0.0.7
106 permit ip 192.168.10.32 0.0.0.15 192.168.10.176 0.0.0.7
107 permit ip 192.168.10.32 0.0.0.15 192.168.10.208 0.0.0.7
108 permit ip 192.168.10.96 0.0.0.15 192.168.10.32 0.0.0.15
109 permit ip 192.168.10.96 0.0.0.15 192.168.10.96 0.0.0.15
110 permit ip 192.168.10.96 0.0.0.15 192.168.10.144 0.0.0.7
111 permit ip 192.168.10.96 0.0.0.15 192.168.10.176 0.0.0.7
112 permit ip 192.168.10.96 0.0.0.15 192.168.10.208 0.0.0.7
113 permit ip 192.168.10.144 0.0.0.7 192.168.10.32 0.0.0.15
114 permit ip 192.168.10.144 0.0.0.7 192.168.10.96 0.0.0.15
115 permit ip 192.168.10.144 0.0.0.7 192.168.10.144 0.0.0.7
116 permit ip 192.168.10.144 0.0.0.7 192.168.10.176 0.0.0.7
117 permit ip 192.168.10.144 0.0.0.7 192.168.10.208 0.0.0.7
118 permit ip 192.168.10.176 0.0.0.7 192.168.10.32 0.0.0.15
119 permit ip 192.168.10.176 0.0.0.7 192.168.10.96 0.0.0.15
120 permit ip 192.168.10.176 0.0.0.7 192.168.10.144 0.0.0.7
121 permit ip 192.168.10.176 0.0.0.7 192.168.10.176 0.0.0.7
122 permit ip 192.168.10.176 0.0.0.7 192.168.10.208 0.0.0.7
123 permit ip 192.168.10.208 0.0.0.7 192.168.10.32 0.0.0.15
124 permit ip 192.168.10.208 0.0.0.7 192.168.10.96 0.0.0.15
125 permit ip 192.168.10.208 0.0.0.7 192.168.10.144 0.0.0.7
```

```
126 permit ip 192.168.10.208 0.0.0.7 192.168.10.176 0.0.0.7
127 permit ip 192.168.10.208 0.0.0.7 192.168.10.208 0.0.0.7
128 deny ip any any
129 exit
130
131 interface Gig2/0.20
132 ip access-group ALLOW-KNOWN-IT-SUBNETS in
133 exit
134
135 ip access-list extended ALLOW-KNOWN-HR-SUBNETS
136 permit udp any any eq 67
137 permit udp any any eq 68
138 permit ip 192.168.10.48 0.0.0.15 192.168.10.48 0.0.0.15
139 permit ip 192.168.10.48 0.0.0.15 192.168.10.112 0.0.0.15
140 permit ip 192.168.10.48 0.0.0.15 192.168.10.152 0.0.0.7
141 permit ip 192.168.10.48 0.0.0.15 192.168.10.184 0.0.0.7
142 permit ip 192.168.10.48 0.0.0.15 192.168.10.216 0.0.0.7
143 permit ip 192.168.10.112 0.0.0.15 192.168.10.48 0.0.0.15
144 permit ip 192.168.10.112 0.0.0.15 192.168.10.112 0.0.0.15
145 permit ip 192.168.10.112 0.0.0.15 192.168.10.152 0.0.0.7
146 permit ip 192.168.10.112 0.0.0.15 192.168.10.184 0.0.0.7
147 permit ip 192.168.10.112 0.0.0.15 192.168.10.216 0.0.0.7
148 permit ip 192.168.10.152 0.0.0.7 192.168.10.48 0.0.0.15
149 permit ip 192.168.10.152 0.0.0.7 192.168.10.112 0.0.0.15
150 permit ip 192.168.10.152 0.0.0.7 192.168.10.152 0.0.0.7
151 permit ip 192.168.10.152 0.0.0.7 192.168.10.184 0.0.0.7
152 permit ip 192.168.10.152 0.0.0.7 192.168.10.216 0.0.0.7
153 permit ip 192.168.10.184 0.0.0.7 192.168.10.48 0.0.0.15
154 permit ip 192.168.10.184 0.0.0.7 192.168.10.112 0.0.0.15
155 permit ip 192.168.10.184 0.0.0.7 192.168.10.152 0.0.0.7
156 permit ip 192.168.10.184 0.0.0.7 192.168.10.184 0.0.0.7
157 permit ip 192.168.10.184 0.0.0.7 192.168.10.216 0.0.0.7
158 permit ip 192.168.10.216 0.0.0.7 192.168.10.48 0.0.0.15
159 permit ip 192.168.10.216 0.0.0.7 192.168.10.112 0.0.0.15
160 permit ip 192.168.10.216 0.0.0.7 192.168.10.152 0.0.0.7
161 permit ip 192.168.10.216 0.0.0.7 192.168.10.184 0.0.0.7
162 permit ip 192.168.10.216 0.0.0.7 192.168.10.216 0.0.0.7
163 deny ip any any
164 exit
165
166 interface Gig3/0.30
167 ip access-group ALLOW-KNOWN-HR-SUBNETS in
168 exit
169 exit
170 copy running-config startup-config
171
172
```

```
173
```

Listing D.1: Perth Core Router Configuration

Finance Switch Configuration

```
1
2  enable
3  config t
4  hostname PER_FIN_SW
5
6  banner motd #
7  ***WARNING: NO UNAUTHORISED ACCESS***
8  #
9
10  vlan 10
11  name PER_FIN
12  exit
13
14  interface range fa0/2-24
15  switchport mode access
16  switchport access vlan 10
17  exit
18
19  interface fa0/1
20  switchport mode trunk
21  switchport access vlan 10
22  exit
23
24  interface vlan 10
25  no shutdown
26  exit
27  exit
28  copy running-config startup-config
29
30
31
```

Listing D.2: Perth Finance Switch Configuration

IT Switch Configuration

```
1
2  enable
3  config t
```

```
 4 hostname PER_IT_SW
 5
 6 banner motd #
 7 ***WARNING: NO UNAUTHORISED ACCESS***
 8 #
 9
10 vlan 20
11 name PER_IT
12 exit
13
14 interface range fa0/2-24
15 switchport mode access
16 switchport access vlan 20
17 exit
18
19 interface fa0/1
20 switchport mode trunk
21 switchport access vlan 20
22 exit
23
24 interface vlan 20
25 no shutdown
26 exit
27 exit
28 copy running-config startup-config
29
30
31
```

Listing D.3: Perth IT Switch Configuration

HR Switch Configuration

```
 1
 2 enable
 3 config t
 4 hostname PER_HR_SW
 5
 6 banner motd #
 7 ***WARNING: NO UNAUTHORISED ACCESS***
 8 #
 9
10 vlan 30
11 name PER_HR
12 exit
13
14 interface range fa0/2-24
```

```
15 switchport mode access
16 switchport access vlan 30
17 exit
18
19 interface fa0/1
20 switchport mode trunk
21 switchport access vlan 30
22 exit
23
24 interface vlan 30
25 no shutdown
26 exit
27 exit
28 copy running-config startup-config
29
30
31
```

Listing D.4: Perth HR Switch Configuration

Appendix E

Adelaide Branch Configuration

Refer below for full working configuration code for Adelaide Branch networking devices

Core Router Configuration

```
 1  enable
 2  config t
 3  hostname BRI_CORE_RT
 4
 5  interface gig0/0
 6  no shutdown
 7  exit
 8  interface gig1/0
 9  no shutdown
10  exit
11  interface gig2/0
12  no shutdown
13  exit
14  interface gig3/0
15  no shutdown
16  exit
17
18  interface gig1/0.10
19  encapsulation dot1q 10
20  ip address 192.168.10.193 255.255.255.240
21  no shutdown
22  exit
23  ip dhcp pool ADE_FIN_POOL
24  network 192.168.10.192 255.255.255.240
25  default-router 192.168.10.193
26  dns-server 8.8.8.8
27  exit
```

```
28
29 interface gig2/0.20
30 encapsulation dot1q 20
31 ip address 192.168.10.209 255.255.255.248
32 no shutdown
33 exit
34 ip dhcp pool ADE_IT_POOL
35 network 192.168.10.208 255.255.255.248
36 default-router 192.168.10.209
37 dns-server 8.8.8.8
38 exit
39
40 interface gig3/0.30
41 encapsulation dot1q 30
42 ip address 192.168.10.217 255.255.255.248
43 no shutdown
44 exit
45 ip dhcp pool ADE_HR_POOL
46 network 192.168.10.216 255.255.255.248
47 default-router 192.168.10.217
48 dns-server 8.8.8.8
49 exit
50
51
52 interface gig0/0
53 no shutdown
54 ip address 192.168.20.17 255.255.255.252
55 exit
56
57 router ospf 1
58 network 192.168.20.16 0.0.0.3 area 0
59 network 192.168.10.192 0.0.0.15 area 0
60 network 192.168.10.208 0.0.0.7 area 0
61 network 192.168.10.216 0.0.0.7 area 0
62 exit
63
64
65 ip access-list extended ALLOW-KNOWN-FIN-SUBNETS
66 permit udp any any eq 67
67 permit udp any any eq 68
68 permit ip 192.168.10.0 0.0.0.31 192.168.10.0 0.0.0.31
69 permit ip 192.168.10.0 0.0.0.31 192.168.10.64 0.0.0.31
70 permit ip 192.168.10.0 0.0.0.31 192.168.10.128 0.0.0.15
71 permit ip 192.168.10.0 0.0.0.31 192.168.10.160 0.0.0.15
72 permit ip 192.168.10.0 0.0.0.31 192.168.10.192 0.0.0.15
73 permit ip 192.168.10.64 0.0.0.31 192.168.10.0 0.0.0.31
74 permit ip 192.168.10.64 0.0.0.31 192.168.10.64 0.0.0.31
75 permit ip 192.168.10.64 0.0.0.31 192.168.10.128 0.0.0.15
76 permit ip 192.168.10.64 0.0.0.31 192.168.10.160 0.0.0.15
```

```
77  permit ip 192.168.10.64 0.0.0.31 192.168.10.192 0.0.0.15
78  permit ip 192.168.10.128 0.0.0.15 192.168.10.0 0.0.0.31
79  permit ip 192.168.10.128 0.0.0.15 192.168.10.64 0.0.0.31
80  permit ip 192.168.10.128 0.0.0.15 192.168.10.128 0.0.0.15
81  permit ip 192.168.10.128 0.0.0.15 192.168.10.160 0.0.0.15
82  permit ip 192.168.10.128 0.0.0.15 192.168.10.192 0.0.0.15
83  permit ip 192.168.10.160 0.0.0.15 192.168.10.0 0.0.0.31
84  permit ip 192.168.10.160 0.0.0.15 192.168.10.64 0.0.0.31
85  permit ip 192.168.10.160 0.0.0.15 192.168.10.128 0.0.0.15
86  permit ip 192.168.10.160 0.0.0.15 192.168.10.160 0.0.0.15
87  permit ip 192.168.10.160 0.0.0.15 192.168.10.192 0.0.0.15
88  permit ip 192.168.10.192 0.0.0.15 192.168.10.0 0.0.0.31
89  permit ip 192.168.10.192 0.0.0.15 192.168.10.64 0.0.0.31
90  permit ip 192.168.10.192 0.0.0.15 192.168.10.128 0.0.0.15
91  permit ip 192.168.10.192 0.0.0.15 192.168.10.160 0.0.0.15
92  permit ip 192.168.10.192 0.0.0.15 192.168.10.192 0.0.0.15
93  deny ip any any
94  exit
95
96  interface Gig1/0.10
97  ip access-group ALLOW-KNOWN-FIN-SUBNETS in
98  exit
99
100 ip access-list extended ALLOW-KNOWN-IT-SUBNETS
101 permit udp any any eq 67
102 permit udp any any eq 68
103 permit ip 192.168.10.32 0.0.0.15 192.168.10.32 0.0.0.15
104 permit ip 192.168.10.32 0.0.0.15 192.168.10.96 0.0.0.15
105 permit ip 192.168.10.32 0.0.0.15 192.168.10.144 0.0.0.7
106 permit ip 192.168.10.32 0.0.0.15 192.168.10.176 0.0.0.7
107 permit ip 192.168.10.32 0.0.0.15 192.168.10.208 0.0.0.7
108 permit ip 192.168.10.96 0.0.0.15 192.168.10.32 0.0.0.15
109 permit ip 192.168.10.96 0.0.0.15 192.168.10.96 0.0.0.15
110 permit ip 192.168.10.96 0.0.0.15 192.168.10.144 0.0.0.7
111 permit ip 192.168.10.96 0.0.0.15 192.168.10.176 0.0.0.7
112 permit ip 192.168.10.96 0.0.0.15 192.168.10.208 0.0.0.7
113 permit ip 192.168.10.144 0.0.0.7 192.168.10.32 0.0.0.15
114 permit ip 192.168.10.144 0.0.0.7 192.168.10.96 0.0.0.15
115 permit ip 192.168.10.144 0.0.0.7 192.168.10.144 0.0.0.7
116 permit ip 192.168.10.144 0.0.0.7 192.168.10.176 0.0.0.7
117 permit ip 192.168.10.144 0.0.0.7 192.168.10.208 0.0.0.7
118 permit ip 192.168.10.176 0.0.0.7 192.168.10.32 0.0.0.15
119 permit ip 192.168.10.176 0.0.0.7 192.168.10.96 0.0.0.15
120 permit ip 192.168.10.176 0.0.0.7 192.168.10.144 0.0.0.7
121 permit ip 192.168.10.176 0.0.0.7 192.168.10.176 0.0.0.7
122 permit ip 192.168.10.176 0.0.0.7 192.168.10.208 0.0.0.7
123 permit ip 192.168.10.208 0.0.0.7 192.168.10.32 0.0.0.15
124 permit ip 192.168.10.208 0.0.0.7 192.168.10.96 0.0.0.15
125 permit ip 192.168.10.208 0.0.0.7 192.168.10.144 0.0.0.7
```

```
126 permit ip 192.168.10.208 0.0.0.7 192.168.10.176 0.0.0.7
127 permit ip 192.168.10.208 0.0.0.7 192.168.10.208 0.0.0.7
128 deny ip any any
129 exit
130
131 interface Gig2/0.20
132 ip access-group ALLOW-KNOWN-IT-SUBNETS in
133 exit
134
135 ip access-list extended ALLOW-KNOWN-HR-SUBNETS
136 permit udp any any eq 67
137 permit udp any any eq 68
138 permit ip 192.168.10.48 0.0.0.15 192.168.10.48 0.0.0.15
139 permit ip 192.168.10.48 0.0.0.15 192.168.10.112 0.0.0.15
140 permit ip 192.168.10.48 0.0.0.15 192.168.10.152 0.0.0.7
141 permit ip 192.168.10.48 0.0.0.15 192.168.10.184 0.0.0.7
142 permit ip 192.168.10.48 0.0.0.15 192.168.10.216 0.0.0.7
143 permit ip 192.168.10.112 0.0.0.15 192.168.10.48 0.0.0.15
144 permit ip 192.168.10.112 0.0.0.15 192.168.10.112 0.0.0.15
145 permit ip 192.168.10.112 0.0.0.15 192.168.10.152 0.0.0.7
146 permit ip 192.168.10.112 0.0.0.15 192.168.10.184 0.0.0.7
147 permit ip 192.168.10.112 0.0.0.15 192.168.10.216 0.0.0.7
148 permit ip 192.168.10.152 0.0.0.7 192.168.10.48 0.0.0.15
149 permit ip 192.168.10.152 0.0.0.7 192.168.10.112 0.0.0.15
150 permit ip 192.168.10.152 0.0.0.7 192.168.10.152 0.0.0.7
151 permit ip 192.168.10.152 0.0.0.7 192.168.10.184 0.0.0.7
152 permit ip 192.168.10.152 0.0.0.7 192.168.10.216 0.0.0.7
153 permit ip 192.168.10.184 0.0.0.7 192.168.10.48 0.0.0.15
154 permit ip 192.168.10.184 0.0.0.7 192.168.10.112 0.0.0.15
155 permit ip 192.168.10.184 0.0.0.7 192.168.10.152 0.0.0.7
156 permit ip 192.168.10.184 0.0.0.7 192.168.10.184 0.0.0.7
157 permit ip 192.168.10.184 0.0.0.7 192.168.10.216 0.0.0.7
158 permit ip 192.168.10.216 0.0.0.7 192.168.10.48 0.0.0.15
159 permit ip 192.168.10.216 0.0.0.7 192.168.10.112 0.0.0.15
160 permit ip 192.168.10.216 0.0.0.7 192.168.10.152 0.0.0.7
161 permit ip 192.168.10.216 0.0.0.7 192.168.10.184 0.0.0.7
162 permit ip 192.168.10.216 0.0.0.7 192.168.10.216 0.0.0.7
163 deny ip any any
164 exit
165
166 interface Gig3/0.30
167 ip access-group ALLOW-KNOWN-HR-SUBNETS in
168 exit
169 exit
170 copy running-config startup-config
171
172
```

```
173
```

Listing E.1: Adelaide Core Router Configuration

Finance Switch Configuration

```
1
2 enable
3 config t
4 hostname ADE_FIN_SW
5
6 banner motd #
7 ***WARNING: NO UNAUTHORISED ACCESS***
8 #
9
10 vlan 10
11 name ADE_FIN
12 exit
13
14 interface range fa0/2-24
15 switchport mode access
16 switchport access vlan 10
17 exit
18
19 interface fa0/1
20 switchport mode trunk
21 switchport access vlan 10
22 exit
23
24 interface vlan 10
25 no shutdown
26 exit
27 exit
28 copy running-config startup-config
29
30
31
```

Listing E.2: Adelaide Finance Switch Configuration

IT Switch Configuration

```
1
2 enable
3 config t
```

```
4  hostname ADE_IT_SW
5
6  banner motd #
7  ***WARNING: NO UNAUTHORISED ACCESS***
8  #
9
10 vlan 20
11 name ADE_IT
12 exit
13
14 interface range fa0/2-24
15 switchport mode access
16 switchport access vlan 20
17 exit
18
19 interface fa0/1
20 switchport mode trunk
21 switchport access vlan 20
22 exit
23
24 interface vlan 20
25 no shutdown
26 exit
27 exit
28 copy running-config startup-config
29
30
31
```

Listing E.3: Adelaide IT Switch Configuration

HR Switch Configuration

```
1  enable
2  config t
3  hostname ADE_HR_SW
4
5  banner motd #
6  ***WARNING: NO UNAUTHORISED ACCESS***
7  #
8
9  vlan 30
10 name ADE_HR
11 exit
12
13 interface range fa0/2-24
14 switchport mode access
```

```
15  switchport access vlan 30
16  exit
17
18  interface fa0/1
19  switchport mode trunk
20  switchport access vlan 30
21  exit
22
23  interface vlan 30
24  no shutdown
25  exit
26  exit
27  copy running-config startup-config
28
29
30
```

Listing E.4: Adelaide HR Switch Configuration

Appendix F

Inter-Branch Connectivity & Dual Homing

See below for dual home implementation changes made to each router to update routing and port assignment.

Update Scripts for 5 Cities

```
1  # Sydney Core Router Update
2  enable
3  conf t
4  interface gig9/0
5  no shutdown
6  ip address 192.168.20.21 255.255.255.252
7  exit
8
9  router ospf 1
10 network 192.168.20.0 0.0.0.3 area 0
11 network 192.168.20.20 0.0.0.3 area 0
12 network 192.168.10.32 0.0.0.15 area 0
13 network 192.168.10.0 0.0.0.31 area 0
14 network 192.168.10.48 0.0.0.15 area 0
15 exit
16 exit
17 copy running-config startup-config
18
19
20 # Melbourne Core Router Update
21 enable
22 conf t
23 interface gig9/0
24 no shutdown
```

```
25  ip address 192.168.20.25 255.255.255.252
26  exit
27
28
29  router ospf 1
30  network 192.168.10.64 0.0.0.31 area 0
31  network 192.168.20.4 0.0.0.3 area 0
32  network 192.168.20.24 0.0.0.3 area 0
33  network 192.168.10.96 0.0.0.15 area 0
34  network 192.168.10.112 0.0.0.15 area 0
35  exit
36  exit
37  copy running-config startup-config
38
39
40  # Brisbane Core Router Update
41  enable
42  conf t
43  interface gig9/0
44  no shutdown
45  ip address 192.168.20.29 255.255.255.252
46  exit
47
48  router ospf 1
49  network 192.168.20.8 0.0.0.3 area 0
50  network 192.168.20.28 0.0.0.3 area 0
51  network 192.168.10.160 0.0.0.15 area 0
52  network 192.168.10.176 0.0.0.7 area 0
53  network 192.168.10.184 0.0.0.7 area 0
54  exit
55  exit
56  copy running-config startup-config
57
58
59  # Perth Core Router Update
60  enable
61  conf t
62  interface gig9/0
63  no shutdown
64  ip address 192.168.20.33 255.255.255.252
65  exit
66
67  router ospf 1
68  network 192.168.20.12 0.0.0.3 area 0
69  network 192.168.20.32 0.0.0.3 area 0
70  network 192.168.10.128 0.0.0.15 area 0
71  network 192.168.10.144 0.0.0.7 area 0
72  network 192.168.10.152 0.0.0.7 area 0
73  exit
```

```
74 exit
75 copy running-config startup-config
76
77
78 # Adelaide Core Router Update
79 enable
80 conf t
81 interface gig9/0
82 no shutdown
83 ip address 192.168.20.37 255.255.255.252
84 exit
85
86 router ospf 1
87 network 192.168.20.16 0.0.0.3 area 0
88 network 192.168.20.36 0.0.0.3 area 0
89 network 192.168.10.192 0.0.0.15 area 0
90 network 192.168.10.208 0.0.0.7 area 0
91 network 192.168.10.216 0.0.0.7 area 0
92 exit
93 exit
94 copy running-config startup-config
95
96
```

Listing F.1: Modifications for each city core router

Miscellaneous - ISP Router

```
1 enable
2 config t
3 hostname ISP_RT
4
5 interface Gig0/0
6 no shutdown
7 ip address 192.168.20.2 255.255.255.252
8 exit
9
10 interface Gig1/0
11 no shutdown
12 ip address 192.168.20.6 255.255.255.252
13 exit
14
15 interface Gig2/0
16 no shutdown
17 ip address 192.168.20.10 255.255.255.252
18 exit
19
```

```
20 interface Gig3/0
21 no shutdown
22 ip address 192.168.20.18 255.255.255.252
23 exit
24
25 interface Gig4/0
26 no shutdown
27 ip address 192.168.20.14 255.255.255.252
28 exit
29
30 router ospf 1
31 network 192.168.20.0 0.0.0.3 area 0
32 network 192.168.20.4 0.0.0.3 area 0
33 network 192.168.20.8 0.0.0.3 area 0
34 network 192.168.20.18 0.0.0.3 area 0
35 network 192.168.20.14 0.0.0.3 area 0
36 exit
37
38 exit
39 copy running-config startup-config
40
41
42
```

Listing F.2: ISP Router Sample Configuration

Miscellaneous - ISP Backup Router

```
1 enable
2 config t
3 hostname ISP_RT
4
5 interface Gig0/0
6 no shutdown
7 ip address 192.168.20.22 255.255.255.252
8 exit
9
10 interface Gig1/0
11 no shutdown
12 ip address 192.168.20.26 255.255.255.252
13 exit
14
15 interface Gig2/0
16 no shutdown
17 ip address 192.168.20.30 255.255.255.252
18 exit
19
```

```
20 interface Gig3/0
21 no shutdown
22 ip address 192.168.20.34 255.255.255.252
23 exit
24
25 interface Gig4/0
26 no shutdown
27 ip address 192.168.20.38 255.255.255.252
28 exit
29
30 router ospf 1
31 network 192.168.20.20 0.0.0.3 area 0
32 network 192.168.20.24 0.0.0.3 area 0
33 network 192.168.20.28 0.0.0.3 area 0
34 network 192.168.20.32 0.0.0.3 area 0
35 network 192.168.20.36 0.0.0.3 area 0
36 exit
37
38 exit
39 copy running-config startup-config
40
41
42
```

Listing F.3: ISP Router Backup Sample Configuration