A Dynamic Host Configuration Protocol (DHCP) server should be set up to manage the assignment of IP addresses. This will ensure that IP addresses are dynamically assigned to devices as they connect to the network, and will also simplify the management of IP addresses in the network. So, we set DHCP server at the head office and configured to assign IP addresses to devices at both the head office and branches.

Configure network routers and switches: Network routers and switches will need to be configured to route traffic between the head office and branches. This may involve setting up Virtual Private Network (VPN) connections, or using other routing protocols to ensure that data is transmitted securely between locations. So, we set a Firewall at the head office and configured to route traffic between the head office and branches using a VPN connection.

Monitor and manage IP addresses: Regular monitoring and management of IP addresses will be required to ensure that the network continues to operate efficiently. This may involve monitoring the usage of IP addresses and releasing IP addresses that are no longer in use, or adjusting the sub netting scheme as the network grows.

. IP and VLAN Plan for HEAD-OFFICE

Department	VLAN ID	Network ID	Subnet	Host IP Range	Broadcast ID
Administration	10	172.16.1.0	255.255.255.128/25	172.16.1.1- 172.16.1.126	172.16.1.127
HR	20	172.16.1.128	255.255.255.128/25	172.16.1.129- 172.16.1.254	172.16.1.255
Finance	30	172.16.2.0	255.255.255.128/25	172.16.2.1- 172.16.2.126	172.16.2.127
Engineering	40	172.16.2.128	255.255.255.128/25	172.16.2.129-	172.16.2.255

				172.16.2.254	
ICT	50	172.16.3.0	255.255.255.128/25	172.16.3.1- 172.16.3.126	172.16.3.127
SERVER POOL	-	172.16.6.24	255.255.255.248/29	172.16.6.25- 172.16.6.30	172.16.6.31

Table 3: IP and vlan plan for head office

Department	VLAN ID	Network ID	Subnet	Host IP Range	Broadcast ID
Administration	60	172.16.3.128	255.255.255.128/25	172.16.3.129- 172.16.3.254	172.16.3.255
HR	70	172.16.4.0	255.255.255.128/25	172.16.4.1- 172.16.1.126	172.16.4.127
Finance	80	172.16.4.128	255.255.255.128/25	172.16.4.129- 172.16.2.254	172.16.4.255
Engineering	90	172.16.5.0	255.255.255.128/25	172.16.5.1- 172.16.5.126	172.16.5.127
ICT	100	172.16.5.128	255.255.255.128/25	172.16.5.129- 172.16.5.254	172.16.5.255

Table 4: IP plan for branch office 1

IP and VLAN Plan for Branch-Office 2

Department	VLAN ID	Network ID	Subnet	Host IP Range	Broadcast ID
Administration	200	172.16.11.0	255.255.255.128/25	172.16.6.49-172.16.6.174	172.16.11.127
HR	300	172.16.11.128	255.255.255.128/25	172.16.6.177-172.16.7.46	172.16.11.255
Finance	400	172.16.12.0	255.255.255.128/25	172.16.7.49-172.16.7.174	172.16.12.127
Engineering	500	172.16.12.128	255.255.255.128/25	172.16.7.177-172.16.8.46	172.16.12.255
ICT	600	172.16.13.0	255.255.255.128/25	172.16.8.49-172.16.8.174	172.16.13.127

Table 5: IP and Vlan plan for branch office 1

Connection between Network Devices

Device	Network ID	Subnet	Host IP Range	Broadcast ID
(Head-OFF-MLSW-1)-(Head-OFF-R1)	172.16.6.0	255.255.255.252/30	172.16.6.1 172.16.6.2	172.16.6.3
(Head-OFF-MLSW-1)-(Head-OFF-R2)	172.16.6.4	255.255.255.252/30	172.16.6.5 172.16.6.6	172.16.6.7

(Head-OFF-MLSW-2)-(Head-OFF-R1)	172.16.6.8	255.255.255.252/30	172.16.6.9 172.16.6.10	172.16.6.11
(Head-OFF-MLSW-2)-(Head-OFF-R2)	172.16.6.12	255.255.255.252/30	172.16.6.13 172.16.6.14	172.16.6.15
(Head-OFF-R1)- (Head-OFF-Firewall)	172.16.6.16	255.255.255.252/30	172.16.6.17 172.16.6.18	172.16.6.19
(Head-OFF-R2)- (Head-OFF-Firewall)	172.16.6.20	255.255.255.252/30	172.16.6.21 172.16.6.22	172.16.6.23
(Head-OFF-Firewall)- (Head-OFF-R3)	172.16.6.32	255.255.255.252/30	172.16.6.33 172.16.6.34	172.16.6.35
(ISP)- (Branch-OFF-Firewall)	172.16.6.36	255.255.255.252/30	172.16.6.37 172.16.6.38	172.16.6.39
(Branch-MLSW-1)- (Branch-OFF-Firewall)	172.16.6.40	255.255.255.252/30	172.16.6.41 172.16.6.42	172.16.6.43
(Branch-MLSW-2)- (Branch-OFF-Firewall)	172.16.6.44	255.255.255.252/30	172.16.6.45 172.16.6.46	172.16.6.47
(Head-OFF-Firewall)- (ISP2)	10.10.10.160	255.255.255.252/30	10.10.10.161- 10.10.10.162	10.10.10.163
(BRANCH-OFF-R1)- (ISP)	10.10.10.164	255.255.255.252/30	10.10.10.165- 10.10.10.166	10.10.10.167
(OUTSIDE-R)- (ISP1)	10.10.10.168	255.255.255.252/30	10.10.10.169- 10.10.10.170	10.10.10.171
(OUTSIDE-R)- (ISP2)	10.10.10.172			

(Branch-OFF-2-Firewall)- (ISP2)	**10.10.10.180**			
(ISP2)- (Branch-OFF-Firewall)	**10.10.10.164**			
(Branch-OFF-2-Firewall)- (ISP)	**10.10.10.176**			
(Branch-2-MLSW-1)- (Branch-OFF-2-Firewall)	**172.16.8.176**			
(Branch-2-MLSW-2)- (Branch-OFF-2-Firewall)	**172.16.8.180**			

Table 6: network between devices

OUT-SIDE NETWORK

OUTSIDE NET	**192.168.1.0**	**255.255.255.0/24**

Table 7: public network ip plan