

# **Project 21 - CCNP Route For A Global Health Network**

## **Project Plan**

Version 10.0

Date

1/11/2025

## Copyright

## Declaration

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgment has been made in the text.

I acknowledge that used Artificial intelligence (A.I) tools such as ChatGPT were used only for brainstorming and organizing ideas and content and using QuillBot for summarizing, grammar checking.

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**Name:** Husain Ali

**Date:** 20/10/2025

# Document control

This section includes the approvals on the document, change control, distribution list and change summary

## Document Change Control

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Table 1 Document Change Control

## Distribution List

This following list of people shall receive a copy of this document every time a new version of this document becomes available:

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Table 2 Distribution List

## Change Summary

The following table details changes made between versions of this document

Version	Date	Modifier	Description
1.0	24/9/2025	Husain Ali	Added Scope Management
2.0	7/10/2025	Husain Ali	Added Human Resource Management
3.0	9/10/2025	Husain Ali	Added Time Management
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6.0	16/10/2025	Husain Ali	Added Procurement Management
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9.0	23/10/2025	Husain Ali	Finalise Appendix
10.0	1/11/2025	Husain Ali	Finalise the Project Plan Document

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# Scope Management

## Introduction:

The scope management plan is a process that guarantees that a project product is precisely what is needed, nothing more and nothing less. It provides clear techniques and instructions for the gathering requirements, setting limits, and managing modifications for the agreed scope. It performs as a map for the project team, to support them in staying focus on the predetermined objectives and avoiding scope creep and pointless work. By following this structured the project manager can stay focused on critical deliverables that forward the project's goal by adhering to the plan.

## RACI

Responsible	Accountable	Consulted	Informed
Project Manager	Project Manager	Client, Supervisor	Sponsor, Client

Table 4 RACI- Scope Management Plan

## Approach:

For this project will take the scoop-in and scoop-out aspect.

The technique will establish the project's goals and parameters while keeping tasks in order.

The project's in-scope and out-of-scope are shown in the following table.

In-scoop	Out-scoop
Fully functional network	Assigned AS number
Implementing FTP, DNS, Webserver, DHCP and E-mail	Assigned Public IP
Implementing AAA server	Assigned Network bandwidth
Implementing DMVPN	
Implementing routing protocols EIGRP, OSPF, BGP and router reflector	
Segmenting the network into Vlans	
The network must have methods to Connect remotely	
Configure network devices and windows machine and PCs	

Table 5 In-scoop Out-scoop

## **Scope Definition:**

Defining the scope definition is completed by using multiple methods. The first method that helped to identify scope management are using the Ishikawa diagram since it make brainstorming and thinking of the main causes easier and more efficient. The second method is conducting an interview with the clients to identify their needs and requirements. Furthermore, the project charter document was very helpful since it talks about the client's current system, background, policies and procedures which will be a great addition to make the process of identifying the scope much easier in addition to the project purpose and description

## **Scope Statement:**

### **➤ Product Scope Description:**

The scope statement is to develop, build up, and validate an advance WAN routing system that offers enterprise-scale operations excellent performance, security, and dependability is the project's scope. The result will present documented and full functional network that can deal with real-world situations.

### **➤ Product Acceptance Criteria:**

For the network to be acceptance by the client it must have:

1. The network infrastructure and configured are completed and delivered by or before the deadline ends.
2. The security measures comply with international security standers such as ISO 27001.
3. The GHN fully functional and can be access across all users and sites.
4. The full project complies with the allocated budget.
5. The last setup has to achieve the main projects objectives which are secure, reliable and efficient.

➤ **Project Deliverables:**

The new network for Global health network that contains the following:

- Fully functional Network Infrastructure.
- Server Implementations (FTP, DNS, Web, E-mail, DHCP).
- Routing Protocol Deployment.
- BGP with Route Reflector.
- DMVPN Configuration.
- VLAN Segmentation.
- Remote Access Solutions.
- Network devices and Windows machines Configuration.

➤ **Project Exclusions:**

the thing that out-scoop of the project that contains the following:

- Assigning AS number.
- Assigning public IP.
- Assigning network bandwidth.

➤ **Project Constraints:**

The limitation in the project:

- Project duration and allocated budget is fixed.
- The speed of the network will be fixed by the ISP.
- Physical space and cabling infrastructure.
- Network downtime.

➤ **Project Assumptions:**

- All network devices and servers will have compatible hardware and software versions.
- The organization will provide required licenses for routers, switches, and security tools.

- All testing and simulations will be performed in a controlled environment before deployment.
- Adequate power supply and physical infrastructure.

## Work Breakdown Structure:

The below figure represents the Work breakdown structure (WBS) that is a visual representation for all the workload required to complete the project. The workload is divided to tasks and subtasks all for the project manager to effectively manage the project scope as all team member work.

Task Name	Duration	Start	Finish
« Global Health Network	78.63 days	Sun 14/09/25	Wed 31/12/25
▷ 1 Initiation	8 days	Sun 14/09/25	Tue 23/09/25
▷ 2 Planning	20.5 days	Wed 24/09/25	Wed 22/10/25
▷ 3 Execution	42 days	Wed 22/10/25	Sun 21/12/25
▷ 4 Monitoring And Controlling	5 days	Sun 21/12/25	Sun 28/12/25
▷ 5 Project Closure	3.13 days	Sun 28/12/25	Wed 31/12/25

Figure 1 WBS – Overview Project Distribution

Modi	Task Name	Duration	Start	Finish	Resource Names
↳	« Global Health Network	78.63 days	Sun 14/09/25	Wed 31/12/25	
↳	▷ 1 Initiation	8 days	Sun 14/09/25	Tue 23/09/25	
↳	1.1 Project Charter Creation	3 days	Sun 14/09/25	Tue 16/09/25	Project Manager
↳	1.2 Stakeholder Identification	1 day	Wed 17/09/25	Wed 17/09/25	Project Manager
↳	1.3 Initial Assessment For The Current System	2 days	Thu 18/09/25	Sun 21/09/25	Network Designer,Network Engineer, Security Specialist,System
↳	1.4 Define Objectives and Scope	5 hrs	Thu 18/09/25	Thu 18/09/25	Project Manager
↳	1.5 Search For Best Solution For Improving the Network	1 day	Mon 22/09/25	Mon 22/09/25	Network Designer,Network Engineer
↳	1.6 Approve From The Supervisor	1 day	Tue 23/09/25	Tue 23/09/25	Project Manager

Figure 2 WBS - Initiation phase

↳	« 2 Planning	20.5 days	Wed 24/09/25	Wed 22/10/25	
↳	▷ 2.1 Scope Management	9.5 days	Wed 24/09/25	Tue 07/10/25	
↳	▷ 2.2 Human Resource Management	2 days	Tue 07/10/25	Thu 09/10/25	
↳	▷ 2.3 Time Management	1.75 days	Thu 09/10/25	Mon 13/10/25	
↳	▷ 2.4 Cost Management	2.63 days	Mon 13/10/25	Wed 15/10/25	
↳	▷ 2.5 Communication Management	0.63 days	Wed 15/10/25	Thu 16/10/25	
↳	▷ 2.6 Procurement Management	1 day	Thu 16/10/25	Sun 19/10/25	
↳	▷ 2.7 Quality Management	1 day	Sun 19/10/25	Mon 20/10/25	
↳	▷ 2.8 Risk Management	2 days	Mon 20/10/25	Wed 22/10/25	

Figure 3 WBS - Planning phase overview

	↳ <b>2 Planning</b>	<b>20.5 days</b>	<b>Wed 24/09/25</b>	<b>Wed 22/10/25</b>	
	↳ <b>2.1 Scope Management</b>	<b>9.5 days</b>	<b>Wed 24/09/25</b>	<b>Tue 07/10/25</b>	
	2.1.1 Problem Analysis (Ishikawa)	4 hrs	Wed 24/09/25	Wed 24/09/25	Project Manager
	↳ <b>2.1.2 Requirements Gathering</b>	<b>5 days</b>	<b>Wed 24/09/25</b>	<b>Wed 01/10/25</b>	
	2.1.2.1 Interview Plan	3 hrs	Wed 24/09/25	Wed 24/09/25	Project Manager
	2.1.2.2 Research Plan	1 day	Wed 24/09/25	Thu 25/09/25	Project Manager
	2.1.2.3 A high-level topology	3 hrs	Wed 24/09/25	Wed 24/09/25	Project Manager
	2.1.2.4 Functional Requirements	5 hrs	Thu 25/09/25	Sun 28/09/25	Project Manager
	2.1.2.5 Non-Functional Requirements	5 hrs	Thu 25/09/25	Sun 28/09/25	Project Manager
	2.1.2.6 Design Requirements	3 days	Sun 28/09/25	Wed 01/10/25	Project Manager
	2.1.2.7 Write Scope Definition	1 day	Wed 24/09/25	Thu 25/09/25	Project Manager
	2.1.3 Write Scope Statement	2 days	Wed 01/10/25	Sun 05/10/25	Project Manager
	2.1.4 Create WBS	4 days	Wed 01/10/25	Tue 07/10/25	Project Manager
	2.1.5 Write Scope Verification	2 hrs	Wed 01/10/25	Wed 01/10/25	Project Manager
	2.1.6 Write Scope Control	2 days	Wed 01/10/25	Sun 05/10/25	Project Manager

**Figure 4 WBS - Scope Management Plan**

	↳ <b>2.2 Human Resource Management</b>	<b>2 days</b>	<b>Tue 07/10/25</b>	<b>Thu 09/10/25</b>	
	2.2.1 Set Responsibilities	1 day	Tue 07/10/25	Wed 08/10/25	Project Manager
	2.2.2 Create Responsibilities Assignat Matrix	1 day	Wed 08/10/25	Thu 09/10/25	Project Manager
	2.2.3 Resource Histogram	1 day	Tue 07/10/25	Wed 08/10/25	Project Manager
	2.2.4 Human Resource Management Submission	0 days	Thu 09/10/25	Thu 09/10/25	Project Manager

**Figure 5 WBS - Human Resources Management Plan**

	↳ <b>2.3 Time Management</b>	<b>1.75 days</b>	<b>Thu 09/10/25</b>	<b>Mon 13/10/25</b>	
	2.3.1 Plan Schedule Management	5 hrs	Thu 09/10/25	Sun 12/10/25	Project Analyst
	2.3.2 Define Activity	4 hrs	Sun 12/10/25	Sun 12/10/25	Project Analyst
	2.3.3 Sequence Activities	3 hrs	Thu 09/10/25	Thu 09/10/25	Project Analyst
	2.3.4 Estimate Activity Duration	5 hrs	Sun 12/10/25	Mon 13/10/25	Project Analyst
	2.3.5 Develop The Schedule	1 day	Sun 12/10/25	Mon 13/10/25	Project Analyst
	2.3.6 Schedule Management Submission	0 days	Mon 13/10/25	Mon 13/10/25	Project Analyst

**Figure 6 WBS - Time Management Plan**

	↳ <b>2.4 Cost Management</b>	<b>2.63 days</b>	<b>Mon 13/10/25</b>	<b>Wed 15/10/25</b>	
	2.4.1 Plan Cost Management	1 day	Mon 13/10/25	Tue 14/10/25	Project Manager
	2.4.2 Cost Estimation	5 hrs	Tue 14/10/25	Tue 14/10/25	Project Manager
	2.4.3 Budget Determination	1 day	Tue 14/10/25	Wed 15/10/25	Project Manager
	2.4.4 Cost Management Submission	0 days	Wed 15/10/25	Wed 15/10/25	Project Manager

**Figure 7 WBS - Cost Management Plan**

	↳ <b>2.5 Communication Management</b>	<b>0.63 days</b>	<b>Wed 15/10/25</b>	<b>Thu 16/10/25</b>	
	2.5.1 Stakeholders Communication Analysis	5 hrs	Wed 15/10/25	Thu 16/10/25	Project Manager
	2.5.2 Expectations Management Matrix	3 hrs	Wed 15/10/25	Thu 16/10/25	Project Manager
	2.5.3 Stakeholders Management Strategy And Influence Matrix	5 hrs	Wed 15/10/25	Thu 16/10/25	Project Manager
	2.5.4 Communication Management Submission	0 days	Thu 16/10/25	Thu 16/10/25	Project Manager

**Figure 8 WBS - Communication Management Plan**

	<b>2.6 Procurement Management</b>	<b>1 day</b>	<b>Thu 16/10/25</b>	<b>Sun 19/10/25</b>	
	2.6.1 Plan Procurement Management	1 day	Thu 16/10/25	Sun 19/10/25	Project Manager
	2.6.2 Conduct Procurements	5 hrs	Thu 16/10/25	Sun 19/10/25	Project Manager
	2.6.3 Procurement Management Submission	0 days	Sun 19/10/25	Sun 19/10/25	Project Manager

**Figure 9 WBS - Procurement Management Plan**

	<b>2.7 Quality Management</b>	<b>1 day</b>	<b>Sun 19/10/25</b>	<b>Mon 20/10/25</b>	
	<b>2.7.1 Plan Quality Management</b>	<b>1 day</b>	<b>Sun 19/10/25</b>	<b>Mon 20/10/25</b>	
	2.7.1.1 Quality Requirements Matrix	4 hrs	Sun 19/10/25	Sun 19/10/25	Quality officer
	<b>2.7.1.2 Perform Quality Assurance</b>	<b>1 day</b>	<b>Sun 19/10/25</b>	<b>Mon 20/10/25</b>	
	2.7.1.2.1 Quality Assurance Test	1 day	Sun 19/10/25	Mon 20/10/25	Quality officer
	2.7.1.3 Quality Management Submission	0 days	Mon 20/10/25	Mon 20/10/25	Quality officer

**Figure 10 WBS - Quality Management Plan**

	<b>2.8 Risk Management</b>	<b>2 days</b>	<b>Mon 20/10/25</b>	<b>Wed 22/10/25</b>	
	2.8.1 Plan Risk Management	1 day	Mon 20/10/25	Tue 21/10/25	Risk Officer
	2.8.2 Risk Report	1 day	Tue 21/10/25	Wed 22/10/25	Risk Officer
	2.8.3 Plan Risk Responses	1 day	Mon 20/10/25	Tue 21/10/25	Risk Officer
	2.8.4 Perform Risk Analysis	1 day	Tue 21/10/25	Wed 22/10/25	Risk Officer
	2.8.5 Risk Management Submission	0 days	Wed 22/10/25	Wed 22/10/25	Risk Officer

**Figure 11 WBS - Risk Management Plan**

Task Name	Duration	Start	Finish	Predecessors	Resource Names
3 Execution	42 days	Wed 10/22/25	Sun 12/21/25	8	Access switches [4 unit], Cables and SFP[1], Core switches[6 unit], End Devices [1], External backup storage or NAS[1], Monitors/keyboards/mice[1], Network interface cards[1], Patch panels[1], Printers and scanners[1], Rackmount[1], Routers[1 unit], Server hardware[1], UPS[2 unit], Windows server license[4 unit], Wireless access points[4 unit]
3.1 Network Design & Planning	10 days	Wed 10/22/25	Wed 11/5/25		
3.2 Network Implementation	12 days	Wed 11/5/25	Sun 11/23/25	62	
3.3 Security	7 days	Sun 11/23/25	Tue 12/2/25	68	
3.4 Servers & Services	7 days	Tue 12/2/25	Thu 12/11/25	62,68,74	
3.5 End-User Setup	3 days	Thu 12/11/25	Tue 12/16/25	62,68,74,79	
3.6 Testing & Validation	3 days	Tue 12/16/25	Sun 12/21/25	62,68,74,79,83	

**Figure 12 WBS - Execution overview Phases**

3.1 Network Design & Planning	<b>10 days</b>	<b>Wed 10/22/25</b>	<b>Wed 11/5/25</b>		
3.1.1 Design Network Topology	6 days	Wed 10/22/25	Thu 10/30/25		Network Designer,Network Engineer
3.1.2 Plan IP Addressing Scheme	4 days	Thu 10/30/25	Wed 11/5/25	63	Network Designer,Network Engineer
3.1.3 Determine Network Segmentation	2 days	Wed 10/22/25	Sun 10/26/25	63SS	Network Designer,Security Specialist
3.1.4 Plan Routing Protocols	4 days	Wed 10/22/25	Tue 10/28/25	63SF	Network Designer,Network Engineer
3.1.5 Plan High-Availability Design	6 days	Wed 10/22/25	Thu 10/30/25	63SS,65SS,66SS	Network Designer,Security Specialist

**Figure 13 WBS - Network Design & Planning phase**

3.2 Network Implementation	<b>12 days</b>	<b>Wed 11/5/25</b>	<b>Sun 11/23/25</b>	<b>62</b>	
3.2.1 Configure Routers For WAN Connectivity	12 days	Wed 11/5/25	Sun 11/23/25	63,64,66	Network Engineer
3.2.2 Configure Routers For Internal Routing Proto	6 days	Wed 11/5/25	Thu 11/13/25	66	Network Engineer
3.2.3 Configure Routers For BGP	7 days	Wed 11/5/25	Sun 11/16/25	64,66,67	Network Engineer
3.2.4 Configure Switches for VLAN Segmentation A	3 days	Wed 11/5/25	Mon 11/10/25	65	Network Engineer
3.2.5 Implement Redundancy Protocols (HSRP)	1 day	Thu 11/13/25	Sun 11/16/25	70	Network Engineer

**Figure 14 WBS - Network Implementation Phase**

<b>4.3 Security</b>	<b>7 days</b>	<b>Sun 11/23/25</b>	<b>Tue 12/2/25</b>	<b>68</b>	
3.3.1 Configure Routers For Role-Based Access	4 days	Sun 11/23/25	Thu 11/27/25	70	Security Specialist
3.3.2 Configure Switches For Layer 2 Security	3 days	Sun 11/23/25	Wed 11/26/25		Security Specialist
3.3.3 Configure DMVPN For Secure Remote Conne	5 days	Sun 11/23/25	Sun 11/30/25	69,70,71,73	Security Specialist
3.3.4 Configure Remote Access For Network Devic	4 days	Wed 11/26/25	Tue 12/2/25	76	Security Specialist

**Figure 15 WBS - Security Implementation Phase**

<b>4.4 Servers &amp; Services</b>	<b>7 days</b>	<b>Tue 12/2/25</b>	<b>Thu 12/11/25</b>	<b>62,68,74</b>	
3.4.1 Install And Configure Windows Servers	3 days	Tue 12/2/25	Sun 12/7/25	68	System Administrator
3.4.2 Configure DNS And Load Balancing	4 days	Sun 12/7/25	Thu 12/11/25	80	System Administrator
3.4.3 Configure Web, FTP, Email Servers	1 day	Sun 12/7/25	Mon 12/8/25	80,81SS	System Administrator

**Figure 16 WBS - Server & Service Implementation Phase**

<b>4.5 End-User Setup</b>	<b>3 days</b>	<b>Thu 12/11/25</b>	<b>Tue 12/16/25</b>	<b>62,68,74,79</b>	
3.5.1 Assign VLANs And IP Addresses To Endpoints	3 days	Thu 12/11/25	Tue 12/16/25	68,74,79	Network Engineer

**Figure 17 WBS - End User Setup Phase**

<b>4.6 Testing &amp; Validation</b>	<b>3 days</b>	<b>Tue 12/16/25</b>	<b>Sun 12/21/25</b>	<b>62,68,74,79,83</b>	
3.6.1 Test inter-VLAN and Inter-Site Connectivity	2 days	Tue 12/16/25	Thu 12/18/25	72	Tester
3.6.2 Test Ping, Traceroute, And End-To-End Applic	3 days	Tue 12/16/25	Sun 12/21/25	84	Tester
3.6.3 Test Remote Access	1 day	Tue 12/16/25	Wed 12/17/25	78	Tester
3.6.4 Perform Failover And Redundancy Testing.	1 day	Tue 12/16/25	Wed 12/17/25	68,74,79,83	Tester
3.6.5 Validate Security Configurations	1 day	Tue 12/16/25	Wed 12/17/25	74	Tester,Security Specialist

**Figure 18 WBS - Testing & Validation Phase**

<b>5 Monitoring And Controlling</b>	<b>5 days</b>	<b>Sun 21/12/25</b>	<b>Sun 28/12/25</b>	
4.1 Control Project Scope	1 day	Sun 21/12/25	Mon 22/12/25	Project Manager
4.2 Control Project Management And Risk	1 day	Mon 22/12/25	Tue 23/12/25	Project Manager
4.3 Monitor The Network	1 day	Tue 23/12/25	Wed 24/12/25	Project Manager
4.4 Perform Quality Control	1 day	Wed 24/12/25	Thu 25/12/25	Project Manager
4.5 Control Risk	1 day	Thu 25/12/25	Sun 28/12/25	Project Manager

**Figure 19 WBS - Monitoring and Controlling Overview Phase**

<b>6 Project Closure</b>	<b>3.13 days</b>	<b>Sun 28/12/25</b>	<b>Wed 31/12/25</b>	
5.1 Checklist The Accomplished Requirement	1 day	Sun 28/12/25	Mon 29/12/25	Project Manager
5.2 Notify The Client About Project Completion	1 day	Mon 29/12/25	Tue 30/12/25	Project Manager
5.3 Submit The Thesis Document	0 days	Tue 30/12/25	Tue 30/12/25	Project Manager
5.4 Project Demo With The Client	1 day	Tue 30/12/25	Wed 31/12/25	Project Manager
5.5 Submit The Final Demo Presentation	1 hr	Wed 31/12/25	Wed 31/12/25	Project Manager
5.6 Submit The Final Project	0 days	Wed 31/12/25	Wed 31/12/25	Project Manager

**Figure 20 WBS - Project Closure Overview Phase**

## **Scope Verification:**

The project deliverables must be fully functional network that contains VLAN, FTP, DNS, web DHCP and email services, BGP with route reflector, DMVPN, EIGRP and OSPF routing, and remote connectivity will be checked against the project requirements. For Each of the deliverable will be formally reviewed and signed off by the customer throughout the project lifecycle to ensure compliance and proper implementation.

## **Scope Control:**

To Continuously monitor the status of the project scope to confirm all planned deliverables such as network setup, VLAN, FTP, DNS, DHCP, web and email services, BGP, DMVPN, EIGRP, OSPF, and remote connectivity are being implemented as intended and functional. This section also defines the process for reviewing, approving, and documenting any changes to the scope baseline to prevent uncontrolled deviations.

# Human Resource Management Plan

## Introduction:

The selection, organization, and leadership of the project team are the main objectives of human resource management in order ensure effective task completion and goal achievement. All project participants are involved in preserving performance, accountability, and coordination.

## Human Resource Management Process:

To accomplish human resources management involve 4 main categories:

### **1. Plan Human Resource Management:**

In the planning phase it involved defines how project roles, responsibilities, and reporting relationships will be structured.

### **2. Assemble Project Team:**

The most suitable person for the project role is chosen at this phase. It involves allocating the appropriate individuals to the appropriate tasks by assessing team members according to their qualifications, experience, and availability for the role.

### **3. Develop Project Team:**

The main objective of this procedure is building competencies, fostering improved collaboration, and increasing performance are.

### **4. Manage the Project Team:**

Through this phase, team performance is tracked, disputes are settled to ensures continuous communication is maintained. The project manager oversees changes in responsibilities or assignments, assesses progress, and gives feedback.

## RACI

Responsible	Accountable	Consulted	Informed
Project Manager	Project Manager	Client, Supervisor	Sponsor, Client

Table 6 RACI - Human Resources Management Plan

## Human Management Approach:

### Responsibility Assignment Matrix (RAM):

This approach shows the task and Activities that are required for the execution phase of the project and shows the roles and responsibilities of the concern persons as well as training programs if required. This procedure can be done using Microsoft Excel tool.

## Visual Report:

### Resource Work Summary Report and Resource Work availability:

This approach shows a report in visualise form for easy understanding the first one is Work Summary the report represents each person how much work they contribute to the project in hours. The secund report is Work availability in this report it highlights the work that has been done in the third and fourth quarter of the year 2025. All the report are exported from MS project.

## Reports:

### Responsibility Assignment Matrix:

The below table represent project tasks for the execution phase of the project. It also shows the skills required and the training if it required.

Task / Work Package / Activity	Skill required	Training Required	R	A	C	I
Design Network Topology and planning ip addressing	Network Design, IP Planning	yes	Network Designer	Project Manager	Network Engineer	Security Specialist
Determine Network Segmentation	VLANs, Subnetting, Security Policies	yes	Network Designer	Project Manager	Security Specialist	Network Engineer
Plan Routing Protocols	EIGRP, OSPFv3, BGP	no	Network Designer	Project Manager	Network Engineer	Security Specialist
Plan High-Availability Design	HSRP, Redundancy Concepts	yes	Network Designer	Project Manager	Network Engineer	Security Specialist
Configure Routers For WAN Connectivity and BGP.	WAN, BGP	no	Network Engineer	Project Manager	Network Designer	Security Specialist
Configure Routers For IGPs and Implement Redundancy Protocol (HSRP)	OSPFv3, HSRP, Route Redistribution	no	Network Engineer	Project Manager	Network Designer	Security Specialist
Configure Switches for VLAN Segmentation And Inter-VLAN Routing	VLAN, Trunking, Layer 3 Switching	no	Network Engineer	Project Manager	Network Designer	Security Specialist
Configure Routers For Role-Based Access and DMVPN For Secure Remote Connectivity	AAA, DMVPN, IPSec	yes	Security Specialist	Project Manager	Network Engineer	Network Designer
Configure Switches For Layer 2 Security	Port Security, BPDU Guard	yes	Security Specialist	Project Manager	Network Engineer	Network Designer
Configure Remote Access For Network Devices	SSH, telnet, AAA, RADIUS	no	Security Specialist	Project Manager	Network Engineer	Network Designer
Install And Configure Windows Servers	AD, DNS, DHCP, File Services	yes	System Administrator	Project Manager	Network Engineer	Security Specialist
Configure DNS with Load Balancing, Web, FTP, Email Servers, DHCP	DNS, Web Hosting	yes	System Administrator	Project Manager	Network Engineer	Security Specialist
Assign VLANs And IP Addresses To Endpoints	VLAN, DHCP	no	Network Engineer	Project Manager	System Administrator	Network Designer
Test inter-VLAN and Inter-Site Connectivity	Troubleshooting, Routing	no	Tester	Project Manager	Network Engineer	Security Specialist
Test Ping, Traceroute, And End-To-End Application Connectivity	End-to-End Troubleshooting	no	Tester	Project Manager	Network Engineer	Security Specialist
Test Remote Access	VPN, SSH, RDP Testing	no	Tester	Project Manager	Security Specialist	Network Engineer

Perform Failover And Redundancy Testing.	HSRP, Link Failure Scenarios	yes	Tester, Security Specialist	Project Manager	Network Engineer	Security Specialist
Validate Security Configurations	ACLs, Firewall, AAA	yes	Tester, Security Specialist	Project Manager	Network Engineer	System Administrator

**Table 7 Human Resources Management -Responsibility Assignment Matrix**

## Resource Work Summary Report:

The below figure represents the work summary progress and the available work of the project. This report is representing the project team members and show how much available work, remaining work and the actual work the has been done for the individuals team members.

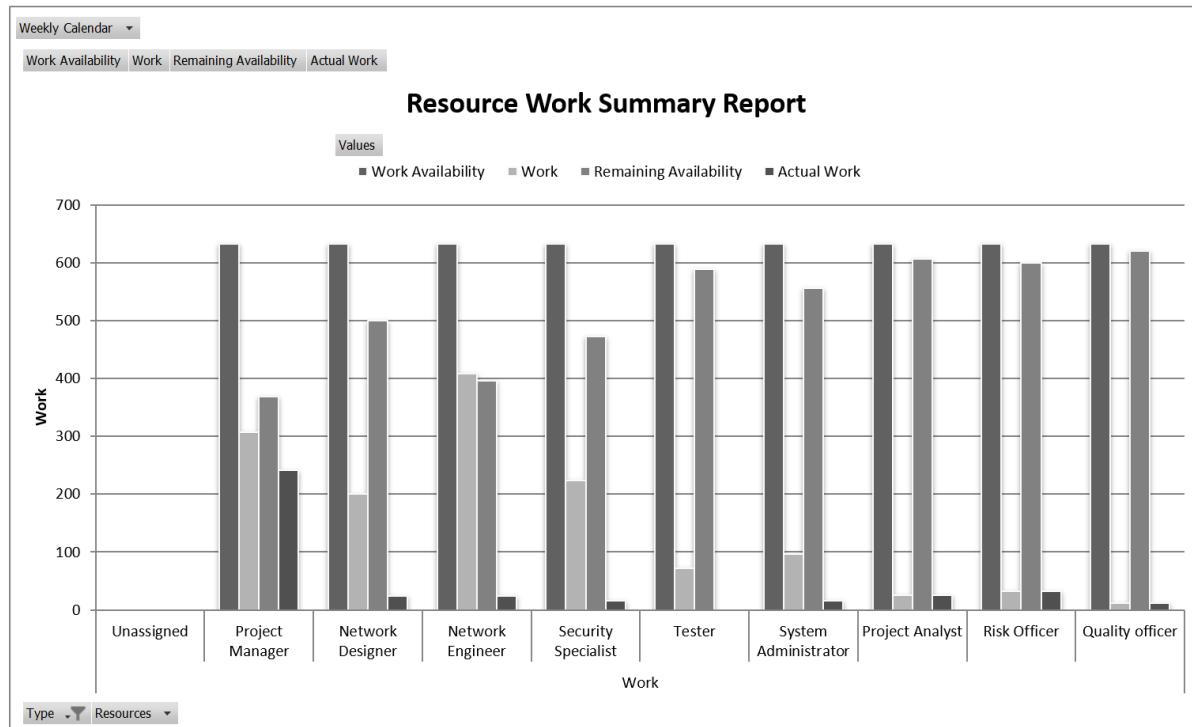


Figure 21 Human Resources Management - Resource Work Summary Report

## Resource Work availability Report:

the below figures show the resource availability it shows in two quarts the third and fourth of the year 2025 how much work available, how much remaining and how much work is done.

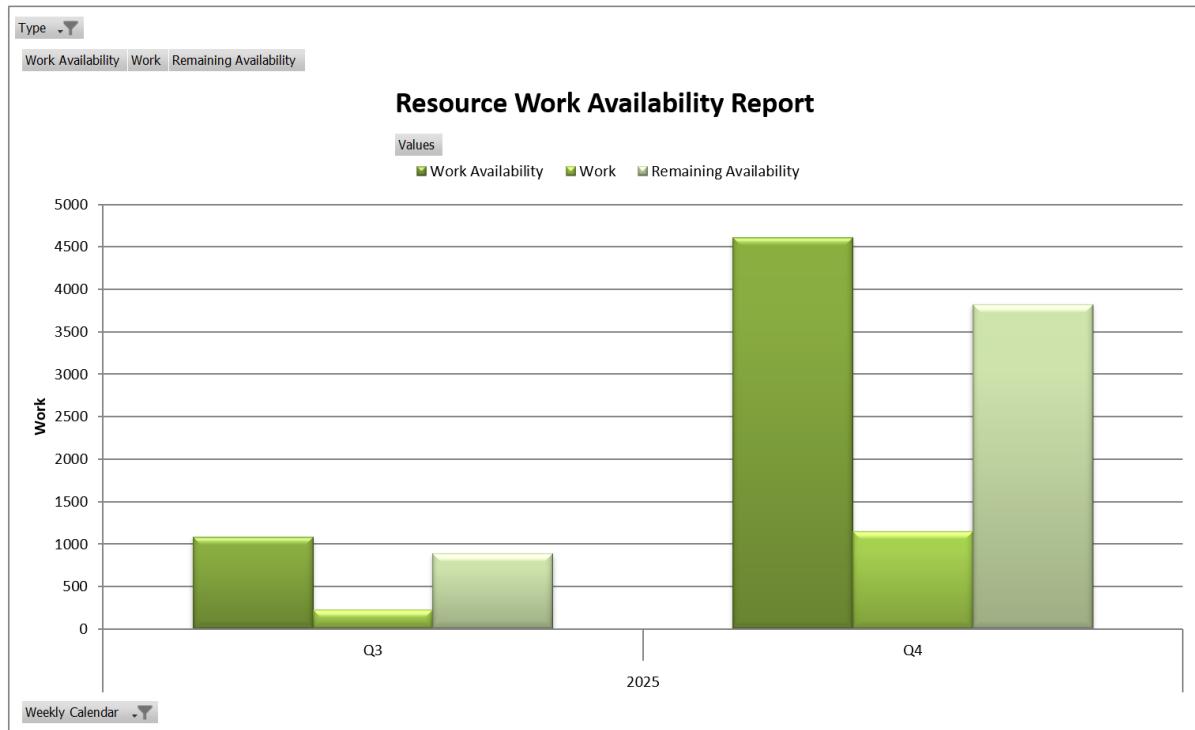


Figure 22 Human Resources Management - Resource Work availability Report

# Time Management:

## Introduction:

Project time Management or schedule management helps plan and control the time needed to finish GHN project task and deliver them on schedule. it includes creating timeline to list all the task with their duration and who is responsible for each. The plan also tracks the progress and sets actions if delay happens.

## Process:

Achieving the process of Time Management involves six main processes:

### **1. Plan Schedule Management:**

The goal is to create a schedule management plan that defines how project activities will be developed, managed, and controlled throughout the project.

### **2. Define Activities:**

Break down the main project work into smaller, tasks to make planning, tracking, and execution easier.

### **3. Sequence Activities:**

In this phase identifies the relationships and dependencies between project tasks to determine the project's critical path and available float time.

### **4. Estimate Activity Durations:**

Estimate how long each task will take to complete in count to any lag time that may occur during the project's implementation.

## **5. Develop Schedule:**

Create the project realistic timeline by combining task durations, dependencies, and resources.

## **6. Control Schedule:**

Monitoring the controlling any changes that may occur to the schedule, update the schedule, and take corrective actions when delays or changes occur

### RACI

Responsible	Accountable	Consulted	Informed
Project Manager	Project Manager	Client, Supervisor	Sponsor, Client

Table 8 RACI – Time Management Plan

## Schedule Management Approach:

To manage the project time the Microsoft tools below has been use:

- **Gantt Chart:**

it is a chart the display the task in hierachal order. The diagram can show task dependency, duration and any leading or lagging time.

- **Dependencies:**

There is deferent type of dependencies:

- I. Start-to-Start (SS)
- II. Start-to-Finish (SF)
- III. Finish-to-Start (FS)
- IV. Finish-to-Finish (FF)

it can be used to define predecessors and successors.

- **Network diagram:**

diagram that displays how tasks are connected.

## Changes:

To track GHN project progress at any time, Schedule Variance (SV) and Schedule Performance Index (SPI) are calculated during the schedule creation phase.

### 1. Schedule Variance (SV):

- ❖ When  $SV = 0$ , then the project is on schedule
- ❖ When  $SV > 1$ , then the project is ahead of schedule
- ❖ When  $SV < 1$ , then the project is behind schedule

### 2. Schedule Performance Index (SPI):

- ❖ When  $SPI = 1$ , then the project is on schedule
- ❖ When  $SPI \geq 1$ , then the project is ahead of schedule
- ❖ When  $SPI < 1$ , then the project is behind schedule

## Reports:

### Gantt chart:

The below Figures represent the Gantt chart for all the Phases of the Project with task the Start and Finish

The below Figure represent Gantt Chart of the initiation Phase

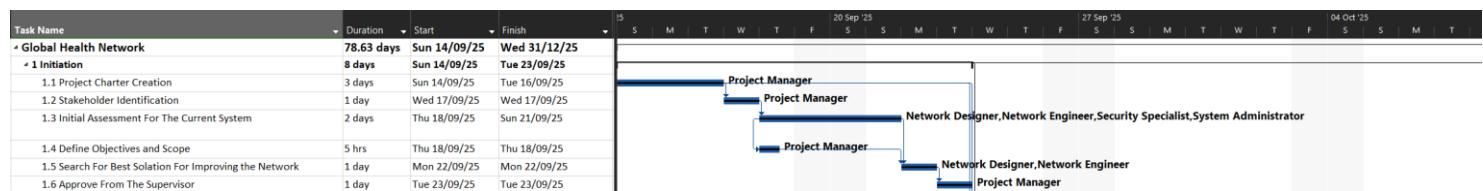


Figure 23 Gantt Chart - Initiation phase

The below Figure represent Gantt Chart of the Planning Phase Part 1

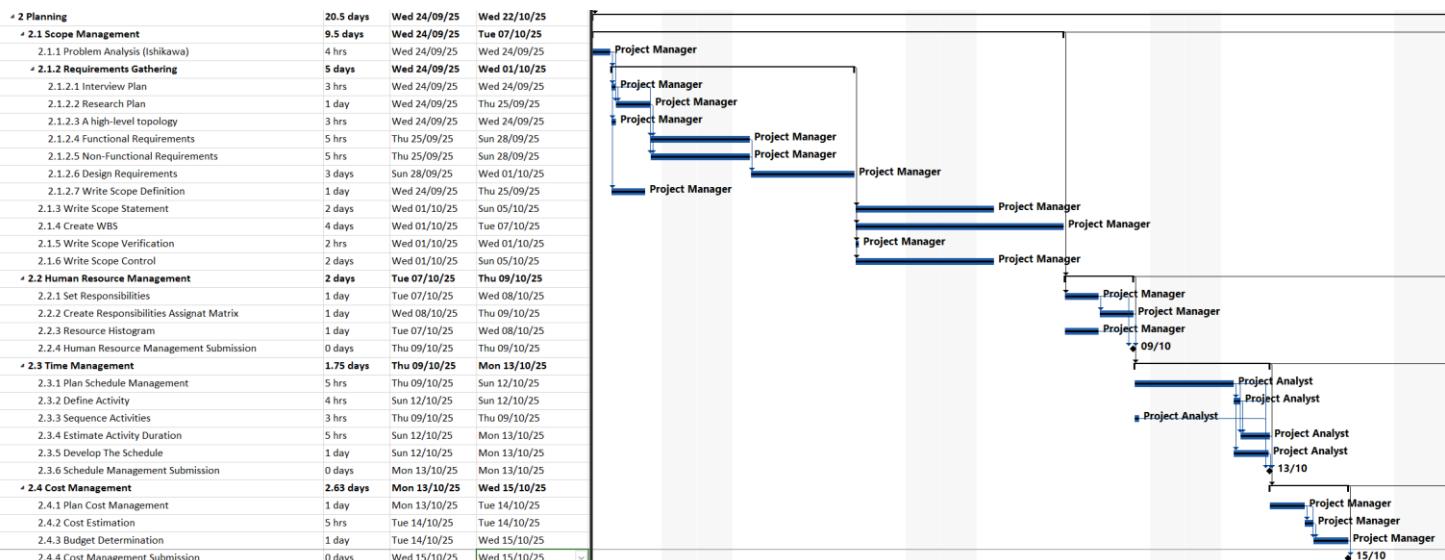


Figure 24 Gantt Chart - Planning phase Part 1

The below Figure represent Gantt Chart of the Planning Phase Part 2

<b>2.5 Communication Management</b>	<b>0.63 days</b>	<b>Wed 15/10/25</b>	<b>Thu 16/10/25</b>
2.5.1 Stakeholders Communication Analysis	5 hrs	Wed 15/10/25	Thu 16/10/25
2.5.2 Expectations Management Matrix	3 hrs	Wed 15/10/25	Thu 16/10/25
2.5.3 Stakeholders Management Strategy And Influence Matrix	5 hrs	Wed 15/10/25	Thu 16/10/25
2.5.4 Communication Management Submission	0 days	Thu 16/10/25	Thu 16/10/25
<b>2.6 Procurement Management</b>	<b>1 day</b>	<b>Thu 16/10/25</b>	<b>Sun 19/10/25</b>
2.6.1 Plan Procurement Management	1 day	Thu 16/10/25	Sun 19/10/25
2.6.2 Conduct Procurements	5 hrs	Thu 16/10/25	Sun 19/10/25
2.6.3 Procurement Management Submission	0 days	Sun 19/10/25	Sun 19/10/25
<b>2.7 Quality Management</b>	<b>1 day</b>	<b>Sun 19/10/25</b>	<b>Mon 20/10/25</b>
<b>2.7.1 Plan Quality Management</b>	<b>1 day</b>	<b>Sun 19/10/25</b>	<b>Mon 20/10/25</b>
2.7.1.1 Quality Requirements Matrix	4 hrs	Sun 19/10/25	Sun 19/10/25
<b>2.7.1.2 Perform Quality Assurance</b>	<b>1 day</b>	<b>Sun 19/10/25</b>	<b>Mon 20/10/25</b>
2.7.1.2.1 Quality Assurance Test	1 day	Sun 19/10/25	Mon 20/10/25
2.7.1.3 Quality Management Submission	0 days	Mon 20/10/25	Mon 20/10/25
<b>2.8 Risk Management</b>	<b>2 days</b>	<b>Mon 20/10/25</b>	<b>Wed 22/10/25</b>
2.8.1 Plan Risk Management	1 day	Mon 20/10/25	Tue 21/10/25
2.8.2 Risk Report	1 day	Tue 21/10/25	Wed 22/10/25
2.8.3 Plan Risk Responses	1 day	Mon 20/10/25	Tue 21/10/25
2.8.4 Perform Risk Analysis	3 days	Tue 21/10/25	Wed 12/11/25
2.8.5 Risk Management Submission	0 days	Wed 22/10/25	Wed 22/10/25

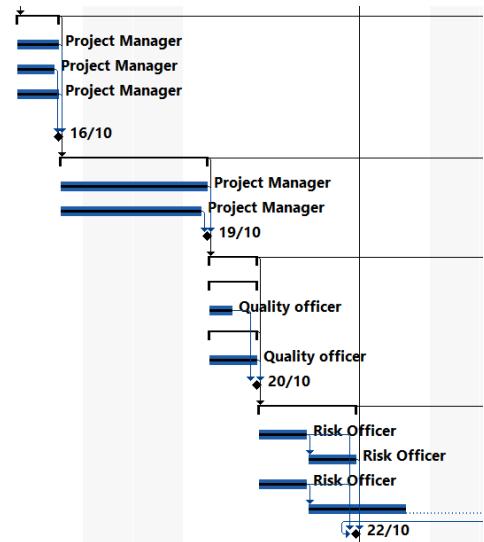


Figure 25 Gantt Chart - Planning Phase Part 2

The below Figure represent Gantt Chart of the Execution Phase Part 1

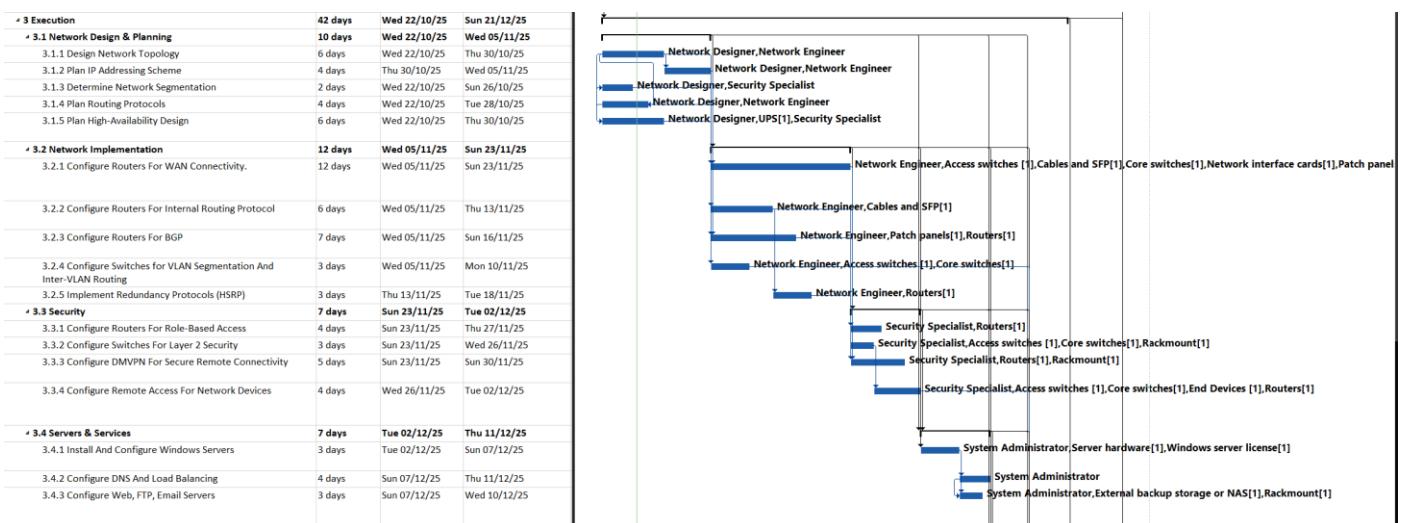
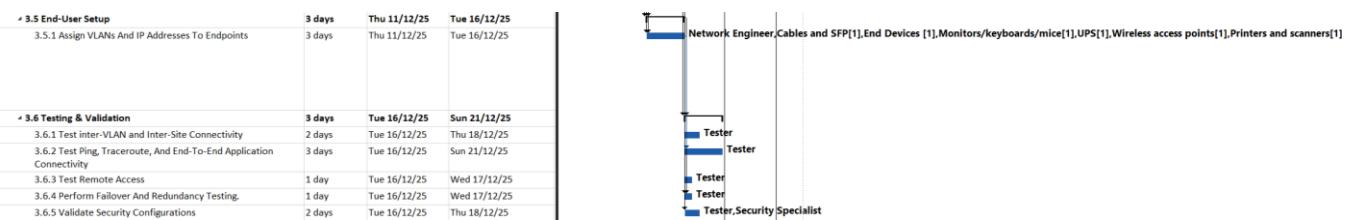


Figure 26 Gantt Chart - Execution Phase Part 1

The below Figure represent Gantt Chart of the Execution Phase Part 2



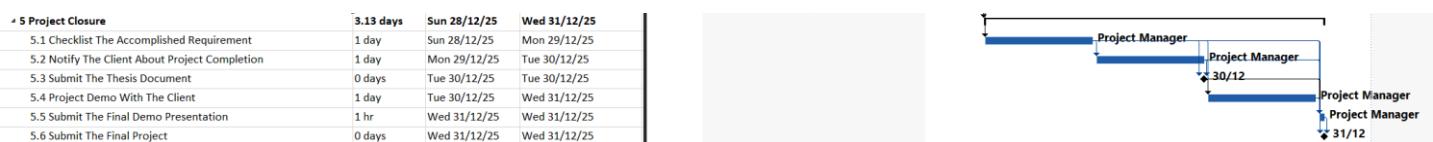
**Figure 28 Gantt Chart - Execution Phase Part 2**

The below Figure represent Gantt Chart of the Monitoring & Controlling Phase



**Figure 29 Gantt Chart - Monitoring and Controlling Phase**

The below Figure represent Gantt Chart of the Project Clouser Phase



**Figure 27 Gantt Chart - Project closure Phase**

## Network diagram:

Every task in the Gantt chart appears visually in the network diagram. It shows the time given for each work as well as the progress that has been assigned. Additionally, a milestone is accomplished at the conclusion of each crucial stage. Tasks are represented by a square, and milestones by a diamond. Red colored activities are incomplete, but blue colored jobs have been completed. Finding the project's critical path is the network diagram primary goal.

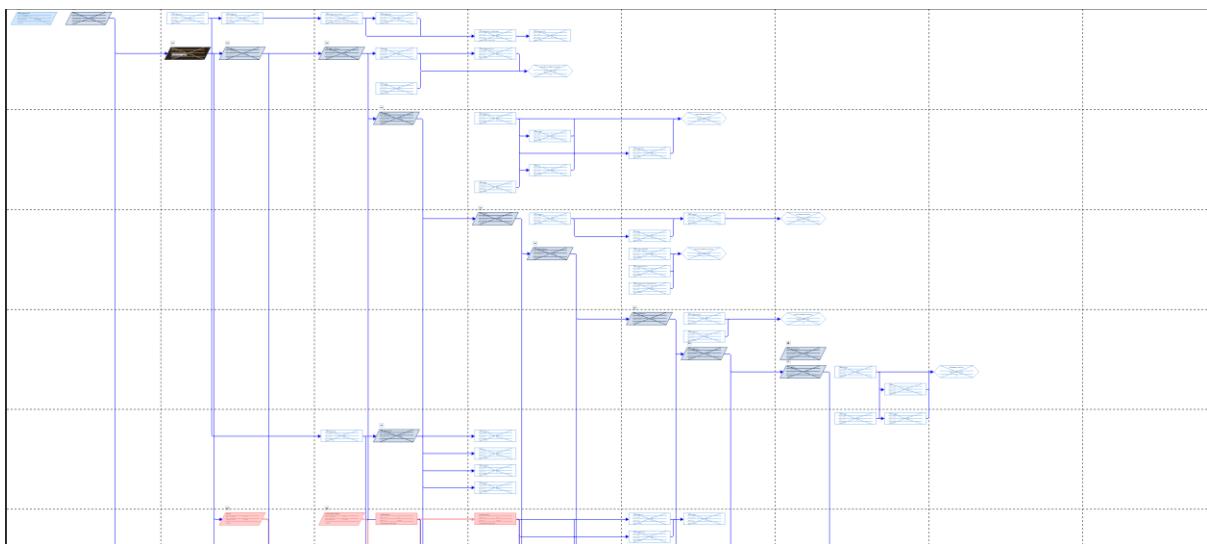


Figure 30 Network Diagram Overview Part 1



Figure 31 Network Diagram Overview Part 2

## Initiation Phase:

The figures below show the Initiation of the Project in Network Diagram

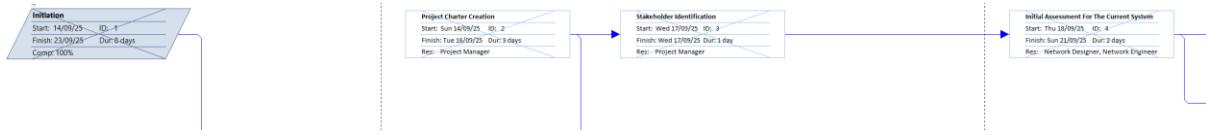


Figure 32 Network Diagram - Initiation Phase Part 1



Figure 33 Network Diagram - Initiation Phase Part 2

## Planning Phase:

The figures below show the Planning of the Project in Network Diagram

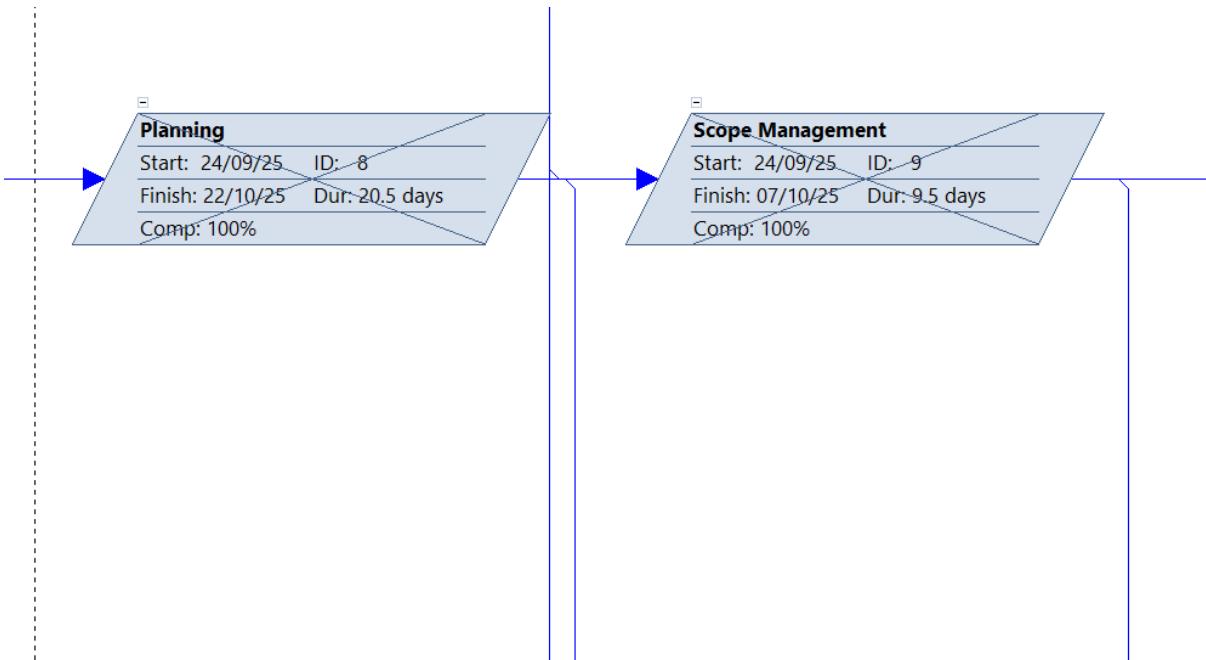


Figure 34 Network Diagram - Planning Scope Management Phase Part 1

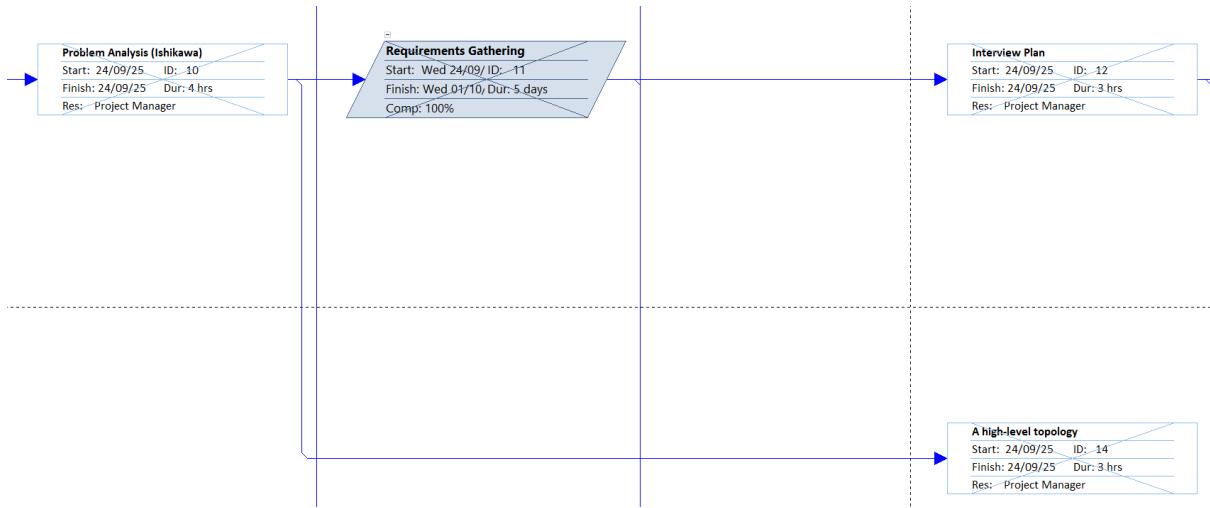


Figure 35 Network Diagram - Planning Scope Management Phase Part 2

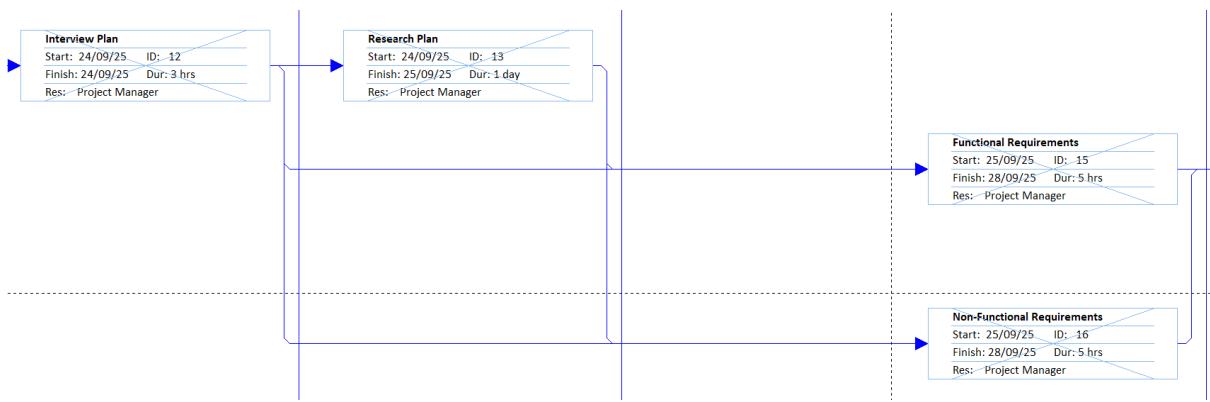


Figure 36 Network Diagram - Planning Scop Management Phase Part 3

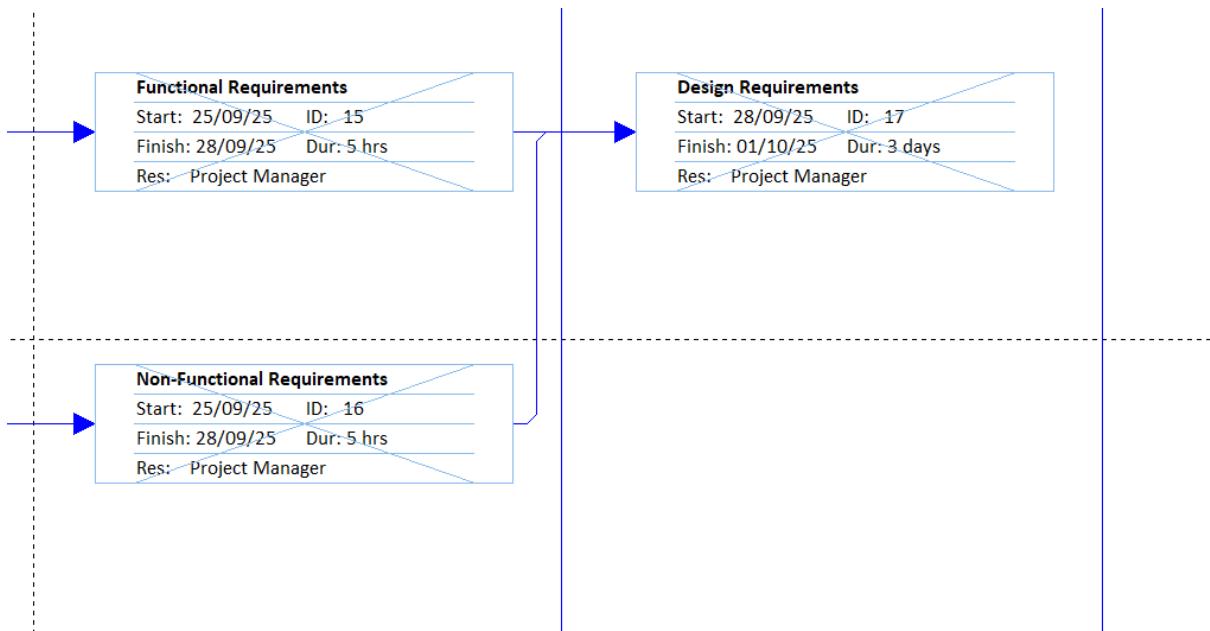


Figure 37 Network Diagram - Planning Scop Management Phase Part 4

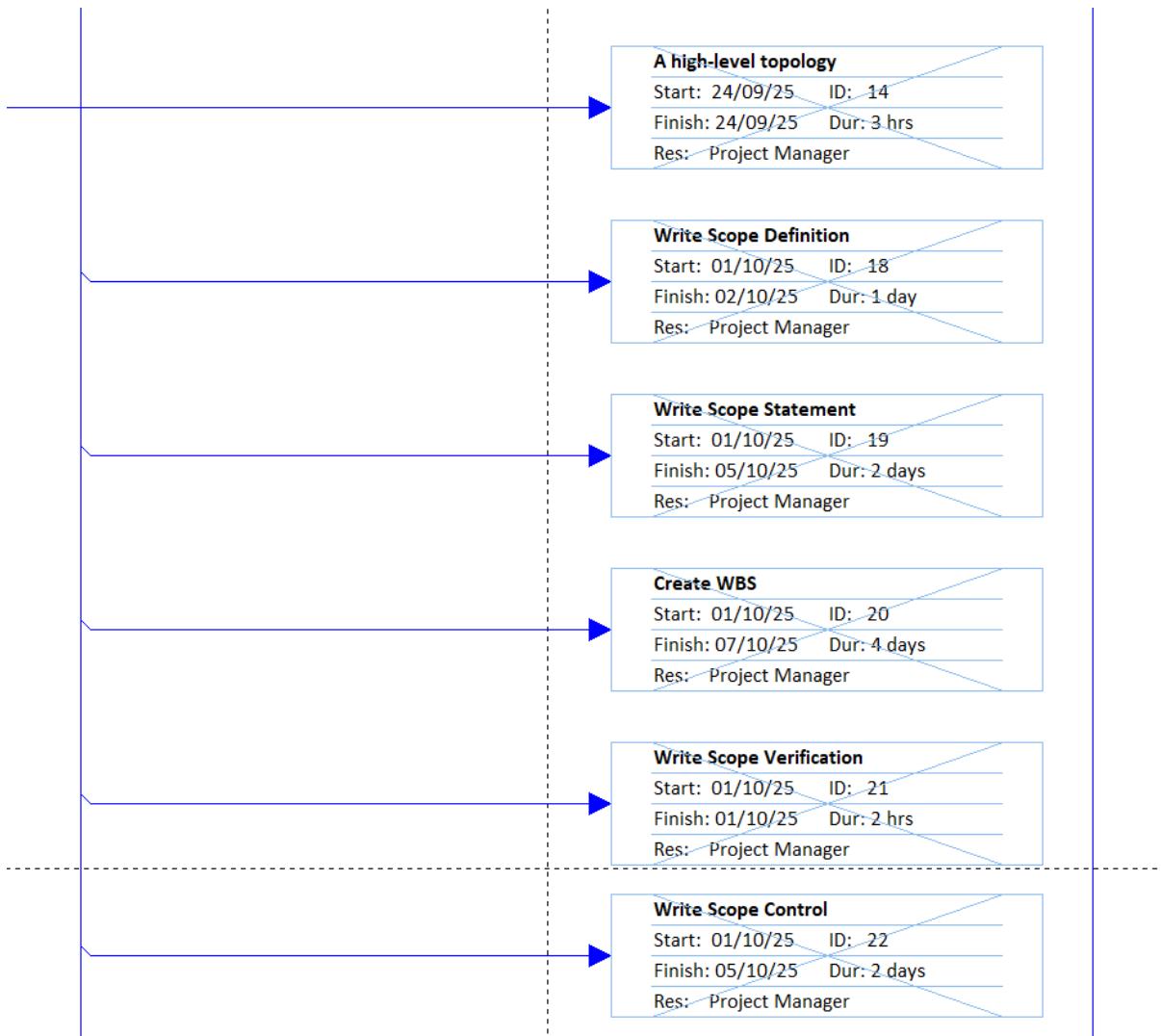


Figure 38 Network Diagram - Planning Scop Management Phase Part 5

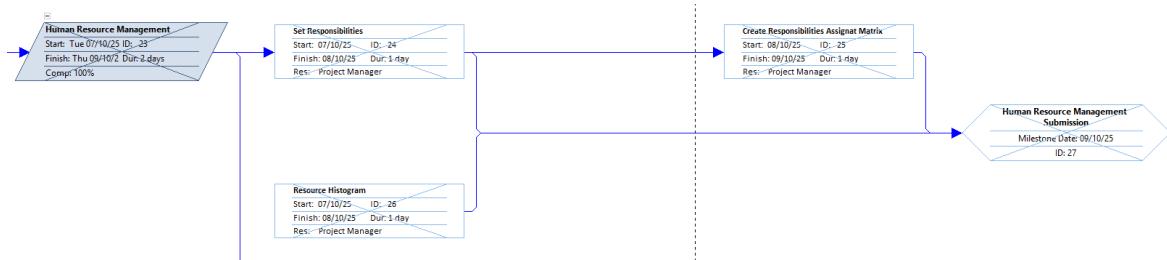


Figure 39 Network Diagram - Planning Human Resource Management Phase

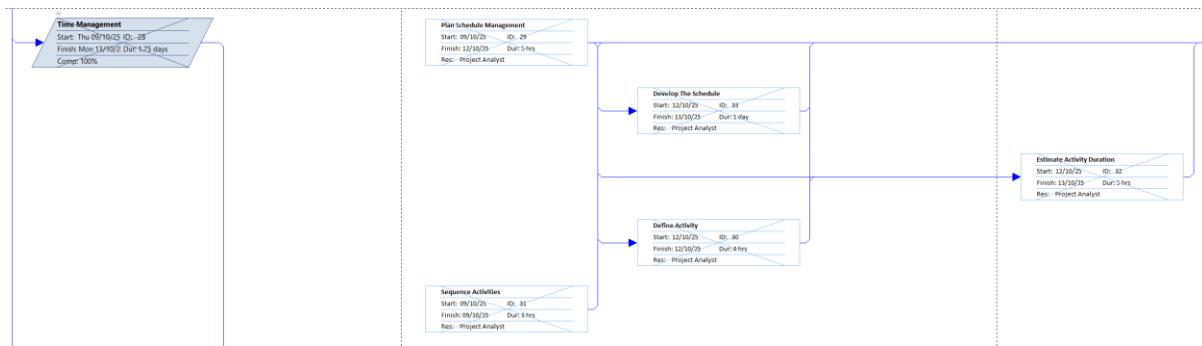


Figure 40 Network Diagram - Planning Time Management Phase Part 1

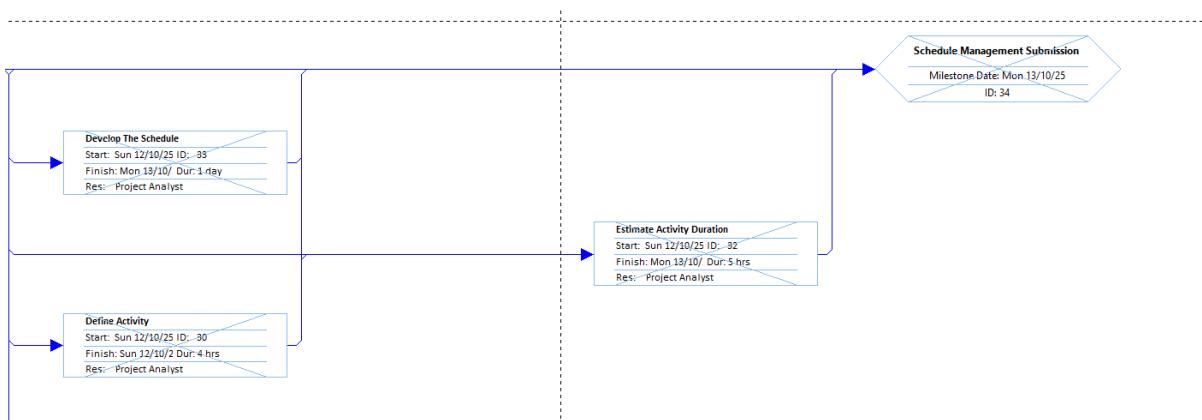


Figure 41 Network Diagram - Planning Time Management Phase Part 2



Figure 42 Network Diagram - Planning Cost Management part 1

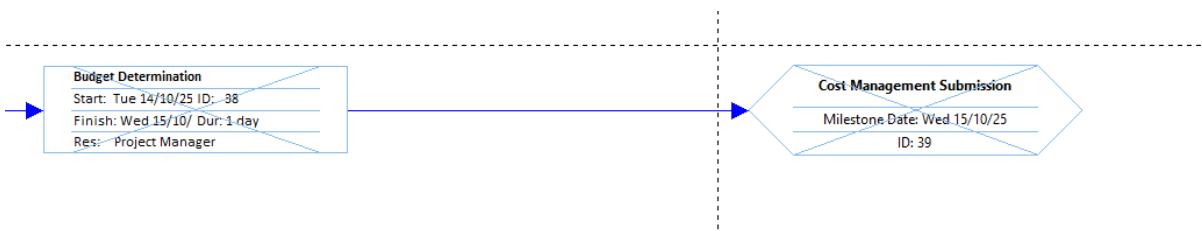


Figure 43 Network Diagram - Planning Cost Management Phase Part 2

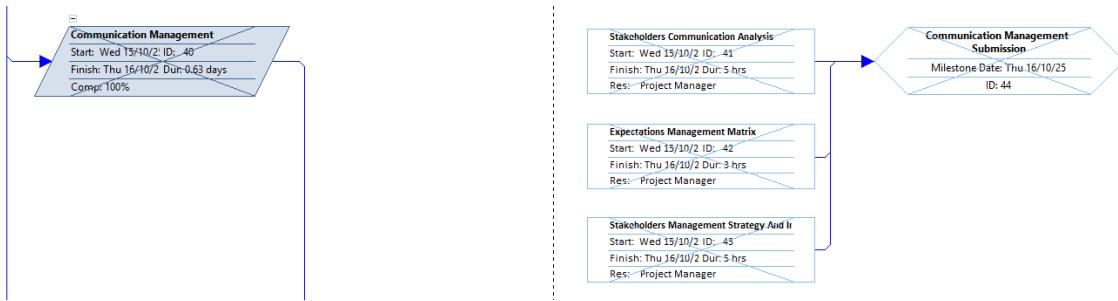


Figure 44 Network Diagram - Planning Communication Management Phase

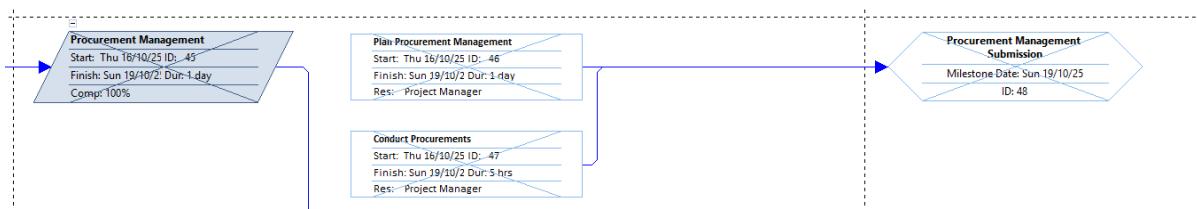


Figure 45 Network Diagram - Planning Procurement Phase

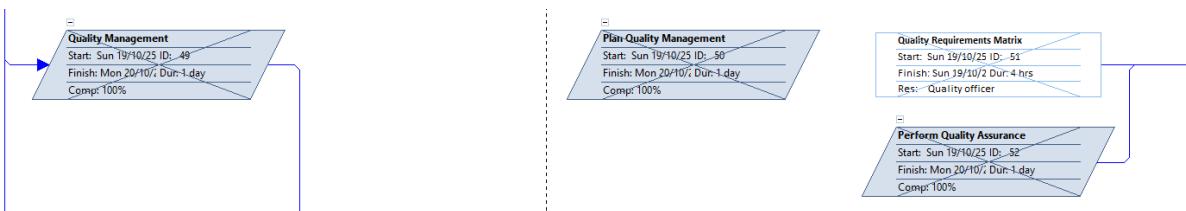


Figure 46 Network Diagram - Planning Quality Phase Part 1

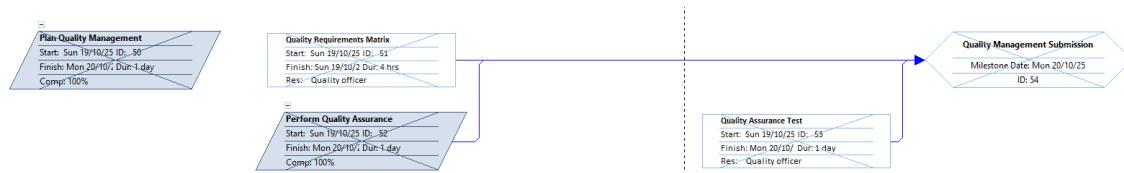
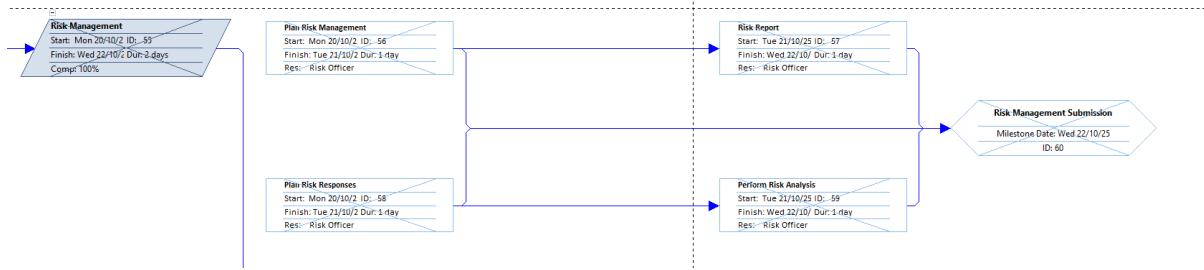


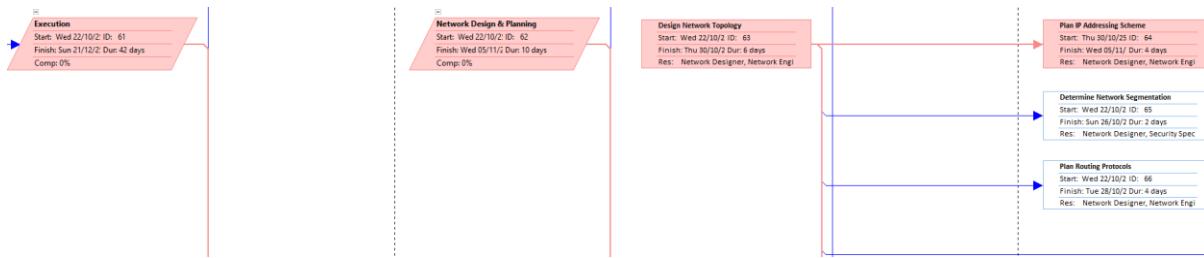
Figure 47 Network Diagram - Planning Quality Phase Part 2



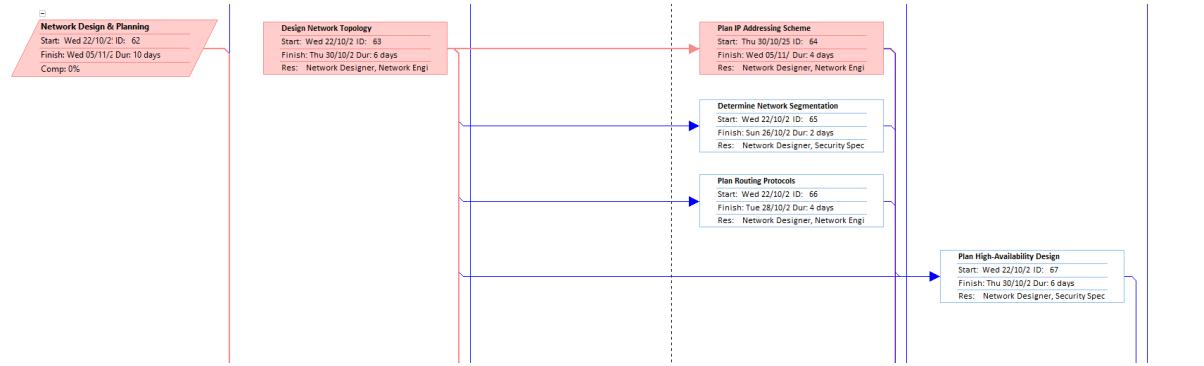
**Figure 48 Network Diagram - Planning Risk Management Phase**

## Execution Phase:

The figures below show the Execution of the Project in Network Diagram



**Figure 49 Network Diagram - Execution Network Design & Planning Part Phase 1**



**Figure 50 Network Diagram - Execution Network Design & Planning Phase Part 2**

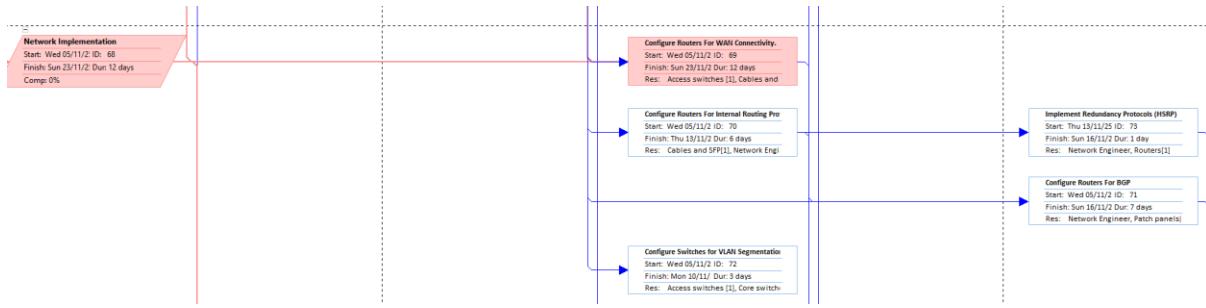


Figure 51 Network Diagram - Network Implementation Execution Phase

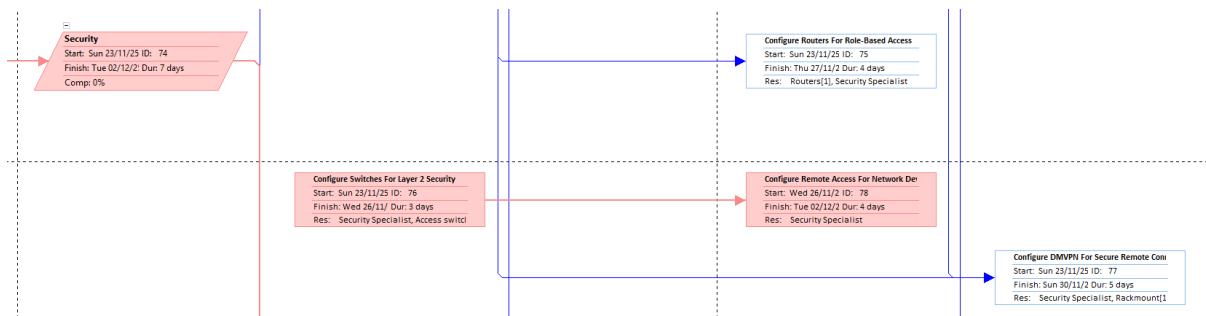


Figure 52 Network Diagram – Execution Security Phase

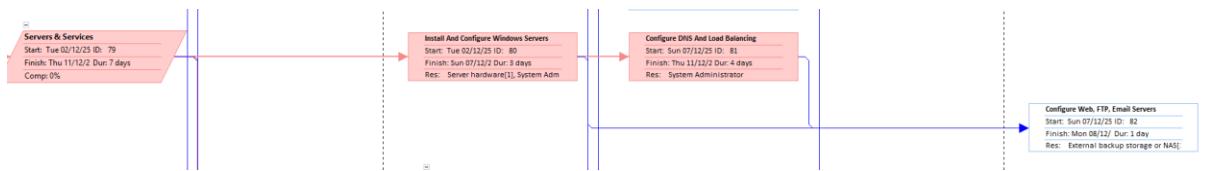


Figure 53 Network Diagram - Execution Phase - Server & Services

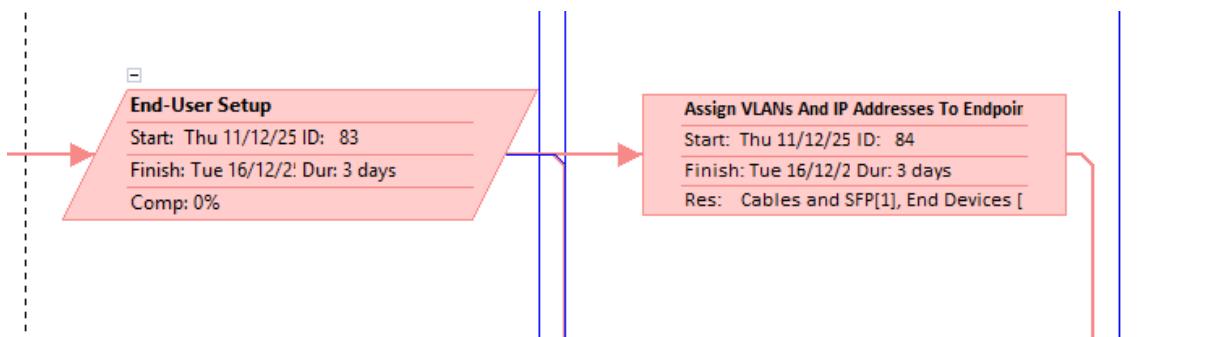


Figure 54 Network Diagram - Excitation End User Setup Phase

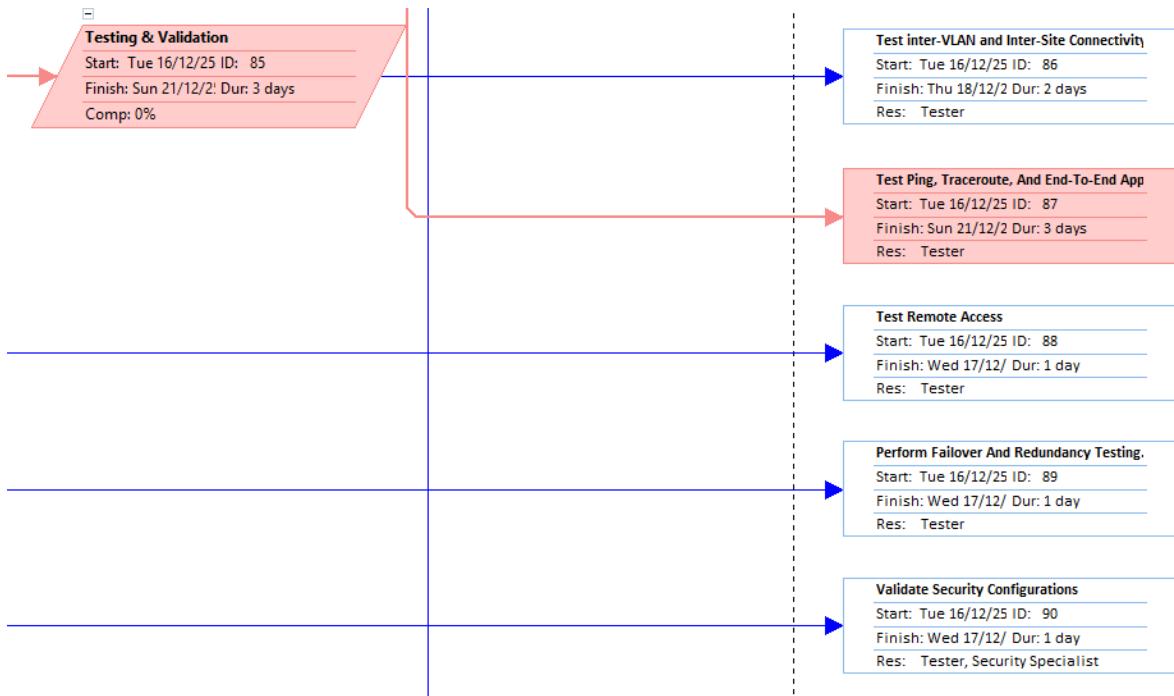


Figure 55 Network Diagram - Execution Test & Validations Phase

### Monitoring & Planning Phase:

The figures below show the Monitoring & Planning of the Project in Network Diagram



Figure 56 Network Diagram - Monitoring & Planning Phase Part 1

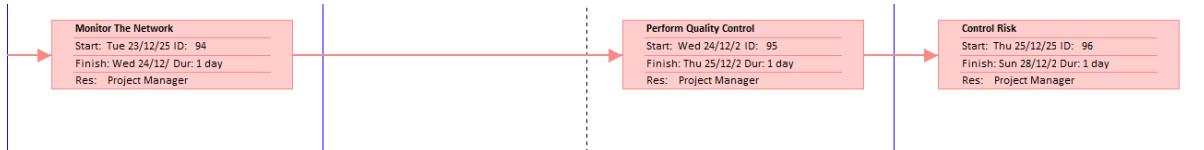


Figure 57 Network Diagram - Monitoring & Planning Phase Part 2

### Project Closure Phase:

The figures below show the Project Closure of the Project in Network Diagram

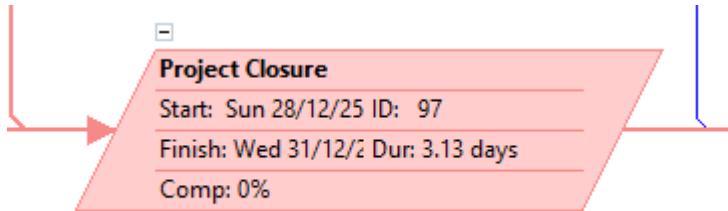


Figure 58 Network Diagram - Project Closure Phase Part 1

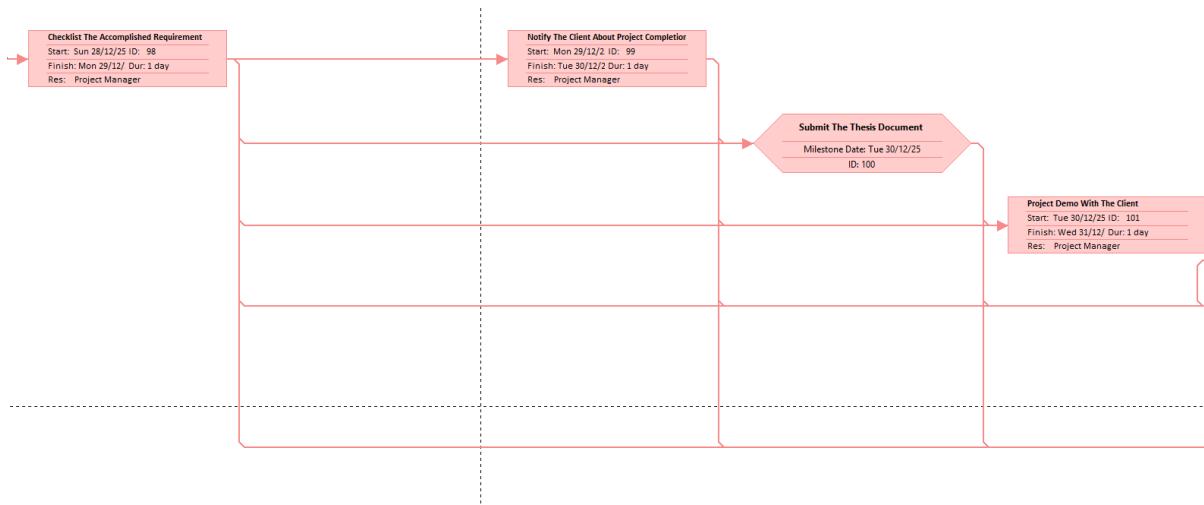


Figure 59 Network Diagram - Project Closure Phase Part 2

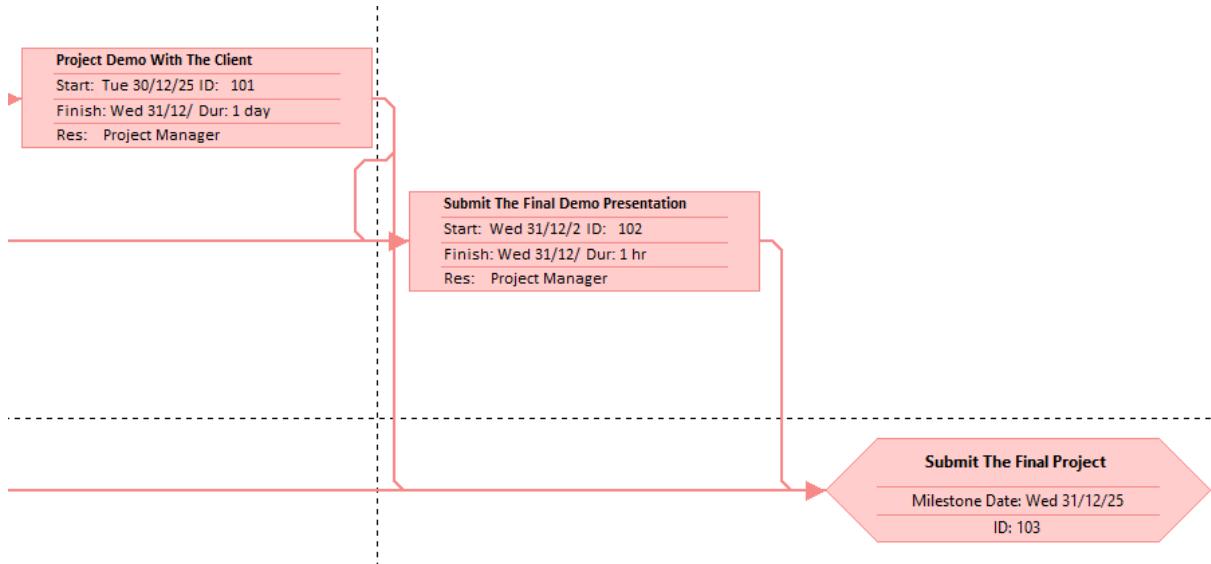


Figure 60 Network Diagram - Project Closure Phase Part 3

## Baseline Report:

The diagram below of a baseline report. It shows the overall cost of each baseline in the project's work breakdown structure (WBS) and shows the work and baseline structure of the five processes. As a result, this report is helpful in managing and moderating the project's work scheduling process while keeping an eye on changes to the baseline cost.

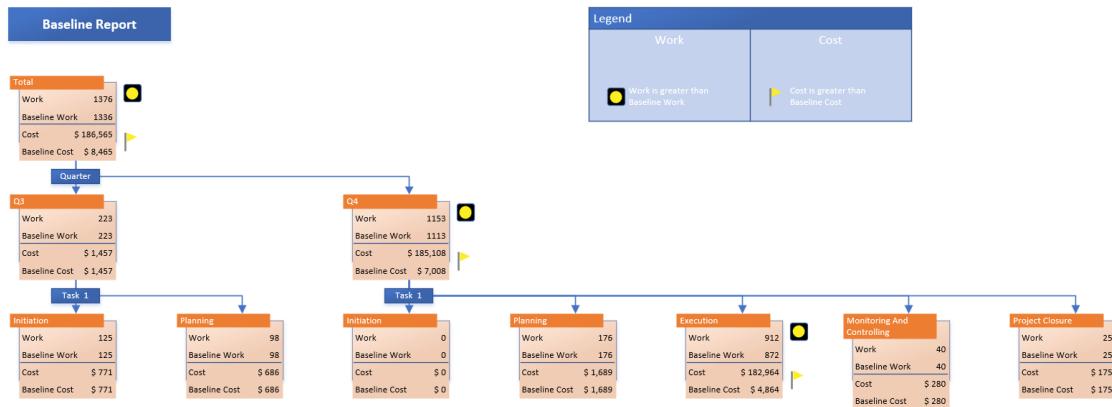


Figure 61 Baseline Report

## Critical Task Status Report:

The diagram below of Critical Task Status Report. This report shows the critical tasks status of the main five processes of the project is gives the work progress and the remaining work for the project activities. Furthermore, the Report shows separate tasks into critical and non-critical tasks. This report helps the project manager to focuses on knowing the cortical tasks that need to be completed without and delay.

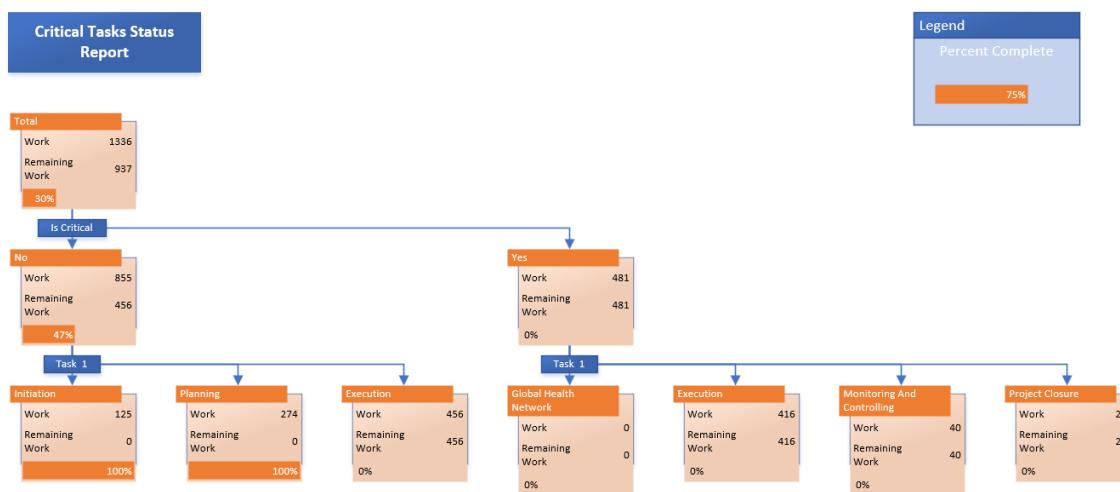


Figure 62 Critical Task Status Report

## Schedule Performance Index and Schedule Variance report:

the below figure included two columns SV (Schedule Variance) and SPI (Scheduled Performance Index). These columns help in representing changes in the activities progress as they define late or early schedule progress.

The below Figure represent SV and SPI of the initiation Phase

Task Name	Baseline Start	Baseline Finish	SPI	SV
Global Health Network	Sun 9/14/25	Wed 12/31/25	0.27	(\$8,520.00)
1 Initiation	Sun 9/14/25	Tue 9/23/25	1	\$0.00
1.1 Project Charter Creation	Sun 9/14/25	Tue 9/16/25	1	\$0.00
1.2 Stakeholder Identification	Wed 9/17/25	Wed 9/17/25	1	\$0.00
1.3 Initial Assessment For The Current System	Thu 9/18/25	Sun 9/21/25	1	\$0.00
1.4 Define Objectives and Scope	Thu 9/18/25	Thu 9/18/25	1	\$0.00
1.5 Search For Best Solution For Improving the Network	Mon 9/22/25	Mon 9/22/25	1	\$0.00
1.6 Approve From The Supervisor	Tue 9/23/25	Tue 9/23/25	1	\$0.00

Figure 63 Baseline Schedule - Initiation Phase

The below Figure represent SV and SPI of the Planning Phase Part 1

Task Name	Baseline Start	Baseline Finish	SPI	SV
<b>2 Planning</b>	<b>Wed 9/24/25</b>	<b>Wed 10/22/25</b>	<b>1</b>	<b>\$0.00</b>
<b>2.1 Scope Management</b>	<b>Wed 9/24/25</b>	<b>Tue 10/7/25</b>	<b>1</b>	<b>\$0.00</b>
2.1.1 Problem Analysis (Ishikawa)	Wed 9/24/25	Wed 9/24/25	1	\$0.00
<b>2.1.2 Requirements Gathering</b>	<b>Wed 9/24/25</b>	<b>Wed 10/1/25</b>	<b>1</b>	<b>\$0.00</b>
2.1.2.1 Interview Plan	Wed 9/24/25	Wed 9/24/25	1	\$0.00
2.1.2.2 Research Plan	Wed 9/24/25	Thu 9/25/25	1	\$0.00
2.1.2.3 A high-level topology	Wed 9/24/25	Wed 9/24/25	1	\$0.00
2.1.2.4 Functional Requirements	Thu 9/25/25	Sun 9/28/25	1	\$0.00
2.1.2.5 Non-Functional Requirements	Thu 9/25/25	Sun 9/28/25	1	\$0.00
2.1.2.6 Design Requirements	Sun 9/28/25	Wed 10/1/25	1	\$0.00
2.1.3 Write Scope Definition	Wed 10/1/25	Thu 10/2/25	1	\$0.00
2.1.4 Write Scope Statement	Wed 10/1/25	Sun 10/5/25	1	\$0.00
2.1.5 Create WBS	Wed 10/1/25	Tue 10/7/25	1	\$0.00
2.1.6 Write Scope Verification	Wed 10/1/25	Wed 10/1/25	1	\$0.00
2.1.7 Write Scope Control	Wed 10/1/25	Sun 10/5/25	1	\$0.00
<b>2.2 Human Resource Management</b>	<b>Tue 10/7/25</b>	<b>Thu 10/9/25</b>	<b>1</b>	<b>\$0.00</b>
2.2.1 Set Responsibilities	Tue 10/7/25	Wed 10/8/25	1	\$0.00
2.2.2 Create Responsibilities Assignat Matrix	Wed 10/8/25	Thu 10/9/25	1	\$0.00
2.2.3 Resource Histogram	Tue 10/7/25	Wed 10/8/25	1	\$0.00
2.2.4 Human Resource Management Submission	Thu 10/9/25	Thu 10/9/25	0	\$0.00
<b>2.3 Time Management</b>	<b>Thu 10/9/25</b>	<b>Mon 10/13/25</b>	<b>1</b>	<b>\$0.00</b>
2.3.1 Plan Schedule Management	Thu 10/9/25	Sun 10/12/25	1	\$0.00
2.3.2 Define Activity	Sun 10/12/25	Sun 10/12/25	1	\$0.00
2.3.3 Sequence Activities	Thu 10/9/25	Thu 10/9/25	1	\$0.00
2.3.4 Estimate Activity Duration	Sun 10/12/25	Mon 10/13/25	1	\$0.00
2.3.5 Develop The Schedule	Sun 10/12/25	Mon 10/13/25	1	\$0.00
2.3.6 Schedule Management Submission	Thu 10/9/25	Thu 10/9/25	0	\$0.00
<b>2.4 Cost Management</b>	<b>Mon 10/13/25</b>	<b>Wed 10/15/25</b>	<b>1</b>	<b>\$0.00</b>
2.4.1 Plan Cost Management	Mon 10/13/25	Tue 10/14/25	1	\$0.00
2.4.2 Cost Estimation	Tue 10/14/25	Tue 10/14/25	1	\$0.00
2.4.3 Budget Determination	Tue 10/14/25	Wed 10/15/25	1	\$0.00
2.4.4 Cost Management Submission	Wed 10/15/25	Wed 10/15/25	0	\$0.00
<b>2.5 Communication Management</b>	<b>Wed 10/15/25</b>	<b>Thu 10/16/25</b>	<b>1</b>	<b>\$0.00</b>
2.5.1 Stakeholders Communication Analysis	Wed 10/15/25	Thu 10/16/25	1	\$0.00
2.5.2 Expectations Management Matrix	Wed 10/15/25	Thu 10/16/25	1	\$0.00
2.5.3 Stakeholders Management Strategy And Influence Ma	Wed 10/15/25	Thu 10/16/25	1	\$0.00
2.5.4 Communication Management Submission	Thu 10/16/25	Thu 10/16/25	0	\$0.00
<b>2.6 Procurement Management</b>	<b>Thu 10/16/25</b>	<b>Sun 10/19/25</b>	<b>1</b>	<b>\$0.00</b>
2.6.1 Plan Procurement Management	Thu 10/16/25	Sun 10/19/25	1	\$0.00
2.6.2 Conduct Procurements	Thu 10/16/25	Sun 10/19/25	1	\$0.00
2.6.3 Procurement Management Submission	Sun 10/19/25	Sun 10/19/25	0	\$0.00

**Figure 64 Baseline Schedule - Planning Phase Part 1**

The below Figure represent SV and SPI of the Planning Phase Part 2

↳ <b>2.7 Quality Management</b>	<b>Sun 10/19/25</b>	<b>Mon 10/20/25</b>	<b>1</b>	<b>\$0.00</b>
↳ <b>2.7.1 Plan Quality Management</b>	<b>Sun 10/19/25</b>	<b>Sun 10/19/25</b>	<b>1</b>	<b>\$0.00</b>
2.7.1.1 Quality Requirements Matrix	Sun 10/19/25	Sun 10/19/25	1	\$0.00
↳ <b>2.7.2 Perform Quality Assurance</b>	<b>Sun 10/19/25</b>	<b>Mon 10/20/25</b>	<b>1</b>	<b>\$0.00</b>
2.7.2.1 Quality Assurance Test	Sun 10/19/25	Mon 10/20/25	1	\$0.00
2.7.3 Quality Management Submission	Mon 10/20/25	Mon 10/20/25	0	\$0.00
↳ <b>2.8 Risk Management</b>	<b>Mon 10/20/25</b>	<b>Wed 10/22/25</b>	<b>1</b>	<b>\$0.00</b>
2.8.1 Plan Risk Management	Mon 10/20/25	Tue 10/21/25	1	\$0.00
2.8.2 Risk Report	Tue 10/21/25	Wed 10/22/25	1	\$0.00
2.8.3 Plan Risk Responses	Mon 10/20/25	Tue 10/21/25	1	\$0.00
2.8.4 Perform Risk Analysis	Tue 10/21/25	Wed 10/22/25	1	\$0.00
2.8.5 Risk Management Submission	Wed 10/22/25	Wed 10/22/25	0	\$0.00

Figure 65 Baseline Schedule - Planning Phase Part 2

The below Figure represent SV and SPI of the Execution Phase

Task Name	Baseline Start	Baseline Finish	SPI	SV
↳ <b>3 Execution</b>	<b>Wed 10/22/25</b>	<b>Sun 12/21/25</b>	<b>0</b>	<b>(\$8,520.00)</b>
↳ <b>3.1 Network Design &amp; Planning</b>	<b>Wed 10/22/25</b>	<b>Wed 11/5/25</b>	<b>0</b>	<b>(\$8,520.00)</b>
3.1.1 Design Network Topology	Wed 10/22/25	Thu 10/30/25	0	(\$396.00)
3.1.2 Plan IP Addressing Scheme	Thu 10/30/25	Wed 11/5/25	0	\$0.00
3.1.3 Determine Network Segmentation	Wed 10/22/25	Sun 10/26/25	0	(\$176.00)
3.1.4 Plan Routing Protocols	Wed 10/22/25	Tue 10/28/25	0	(\$352.00)
3.1.5 Plan High-Availability Design	Wed 10/22/25	Thu 10/30/25	0	(\$7,596.00)
↳ <b>3.2 Network Implementation</b>	<b>Wed 11/5/25</b>	<b>Sun 11/23/25</b>	<b>0</b>	<b>\$0.00</b>
3.2.1 Configure Routers For WAN Connectivity.	Wed 11/5/25	Sun 11/23/25	0	\$0.00
3.2.2 Configure Routers For Internal Routing Protocol	Wed 11/5/25	Thu 11/13/25	0	\$0.00
3.2.3 Configure Routers For BGP	Wed 11/5/25	Sun 11/16/25	0	\$0.00
3.2.4 Configure Switches For VLAN Segmentation And Inter-VLAN Routing	Wed 11/5/25	Mon 11/10/25	0	\$0.00
3.2.5 Implement Redundancy Protocols (HSRP)	Thu 11/13/25	Sun 11/16/25	0	\$0.00
↳ <b>3.3 Security</b>	<b>Sun 11/23/25</b>	<b>Tue 12/2/25</b>	<b>0</b>	<b>\$0.00</b>
3.3.1 Configure Routers For Role-Based Access	Sun 11/23/25	Thu 11/27/25	0	\$0.00
3.3.2 Configure Switches For Layer 2 Security	Sun 11/23/25	Wed 11/26/25	0	\$0.00
3.3.3 Configure DMVPN For Secure Remote Connectivity	Sun 11/23/25	Sun 11/30/25	0	\$0.00
3.3.4 Configure Remote Access For Network Devices	Wed 11/26/25	Tue 12/2/25	0	\$0.00
↳ <b>3.4 Servers &amp; Services</b>	<b>Tue 12/2/25</b>	<b>Thu 12/11/25</b>	<b>0</b>	<b>\$0.00</b>
3.4.1 Install And Configure Windows Servers	Tue 12/2/25	Sun 12/7/25	0	\$0.00
3.4.2 Configure DNS And Load Balancing	Sun 12/7/25	Thu 12/11/25	0	\$0.00
3.4.3 Configure Web, FTP, Email Servers	Sun 12/7/25	Mon 12/8/25	0	\$0.00
↳ <b>3.5 End-User Setup</b>	<b>Thu 12/11/25</b>	<b>Tue 12/16/25</b>	<b>0</b>	<b>\$0.00</b>
3.5.1 Assign VLANs And IP Addresses To Endpoints	Thu 12/11/25	Tue 12/16/25	0	\$0.00
↳ <b>3.6 Testing &amp; Validation</b>	<b>Tue 12/16/25</b>	<b>Sun 12/21/25</b>	<b>0</b>	<b>\$0.00</b>
3.6.1 Test inter-VLAN and Inter-Site Connectivity	Tue 12/16/25	Thu 12/18/25	0	\$0.00
3.6.2 Test Ping, Traceroute, And End-To-End Application Connectivity	Tue 12/16/25	Sun 12/21/25	0	\$0.00
3.6.3 Test Remote Access	Tue 12/16/25	Wed 12/17/25	0	\$0.00
3.6.4 Perform Failover And Redundancy Testing.	Tue 12/16/25	Wed 12/17/25	0	\$0.00
3.6.5 Validate Security Configurations	Tue 12/16/25	Wed 12/17/25	0	\$0.00

Figure 66 Baseline Schedule - Execution Phase

The below Figure represent SV and SPI of the Monitoring and Controlling Phase

4 Monitoring And Controlling	Sun 12/21/25	Sun 12/28/25	0	\$0.00
4.1 Control Project Scope	Sun 12/21/25	Mon 12/22/25	0	\$0.00
4.2 Control Project Management And Risk	Mon 12/22/25	Tue 12/23/25	0	\$0.00
4.3 Monitor The Network	Tue 12/23/25	Wed 12/24/25	0	\$0.00
4.4 Perform Quality Control	Wed 12/24/25	Thu 12/25/25	0	\$0.00
4.5 Control Risk	Thu 12/25/25	Sun 12/28/25	0	\$0.00

**Figure 67 Baseline Schedule - Monitoring & Controlling Phase**

The below Figure represent SV and SPI of the Project Clouser Phase

5 Project Closure	Sun 12/28/25	Wed 12/31/25	0	\$0.00
5.1 Checklist The Accomplished Requirement	Sun 12/28/25	Mon 12/29/25	0	\$0.00
5.2 Notify The Client About Project Completion	Mon 12/29/25	Tue 12/30/25	0	\$0.00
5.3 Submit The Thesis Document	Tue 12/30/25	Tue 12/30/25	0	\$0.00
5.4 Project Demo With The Client	Tue 12/30/25	Wed 12/31/25	0	\$0.00
5.5 Submit The Final Demo Presentation	Wed 12/31/25	Wed 12/31/25	0	\$0.00
5.6 Submit The Final Project	Wed 12/31/25	Wed 12/31/25	0	\$0.00

**Figure 68 Baseline Schedule - Project Closure Phase**

# **Cost Management:**

## **Introduction:**

Project time management focuses on all the project tasks and deliverables to be within the determined budget. It has planning, estimating, and controlling the project cost to make sure the project is alien with the project budget.

## **Process:**

Achieving the process of Cost Management involves four main processes:

### **1. Plan Cost Management:**

The goal is to create a cost management plan that defines how project task will be estimated, budgeted, managed, monitored, and controlled throughout the project.

### **2. Estimate Costs:**

This proses involved calculating financial resources needed for each project activity. It involved labour, network equipment and other related costs.

### **3. Determine Budget:**

In this phase creates a feasible cost baseline by combining the projected expenses of several tasks or tasks. It outlines the amount of money needed and offers a baseline for evaluating the accomplishment of the project.

### **4. Cost control:**

This procedure continually keeps watch on project expenses to make certain they stay within the approved expense limit. It entails monitoring cost performance, spotting errors, and controlling modifications to the cost baseline.

## RACI

Responsible	Accountable	Consulted	Informed
Project Manager, Project Analyst	Project Manager	Client, Supervisor	Sponsor, Client

Table 9 RACI - Cost Management Plan

## Cost Management Approach:

To manage the project time the Microsoft tools below has been use:

✓ **Microsoft Project Resource sheet:**

Microsoft Project has been utilized to create the project's resource sheet which document all the required resources required to finish the project. In addition, the resources sheet calculates the cost of each resource based on the rate, type of the resource and the time each resource has been working

✓ **Microsoft Excel Cost Benefit Analysis:**

The approximate payback period and the breakeven period are calculated by the cost-benefit analysis based on the net present value.

## Changes:

To track GHN project progress at any time, Cost Variance (CV) and Cost Performance Index (CPI) are calculated during the cost creation phase.

3. Cost Variance (SV):

- ❖ When  $CV = 0$ , then the project is on schedule
- ❖ When  $CV > 1$ , then the project is ahead of schedule
- ❖ When  $CV < 1$ , then the project is behind schedule

4. Cost Performance Index (CPI):

- ❖ When  $CPI = 1$ , then the project is on schedule

- ❖ When CPI > 1, then the project is ahead of schedule
- ❖ When CPI < 1, then the project is behind schedule

## Report:

### Resource sheet - Entry View:

The figure below represents the Resource sheet entry views where all the resources and the material have been given cost estimation

Resource Name	Type	Material	Initials	Group	Max.	Std. Rate	Ovt. Rate	Cost/Use	Accrue	Base
Project Manager	Work		P		100%	\$7.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
Network Designer	Work		N		100%	\$5.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
Network Engineer	Work		N		100%	\$6.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
Security Specialist	Work		S		100%	\$6.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
Tester	Work		T		100%	\$3.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
System Administrator	Work		S		100%	\$6.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
Project Analyst	Work		P		100%	\$20.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
Risk Officer	Work		R		100%	\$10.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
Quality officer	Work		Q		100%	\$10.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
Routers	Material	unit	R			\$3,000.00		\$0.00	Prorated	
Core switches	Material	unit	C			\$2,000.00		\$0.00	Prorated	
Access switches	Material	unit	A			\$1,500.00		\$0.00	Prorated	
Windows server license	Material	unit	W			\$1,100.00		\$0.00	Prorated	
Rackmount	Material		R			\$5,000.00		\$0.00	Prorated	
UPS	Material	unit	U			\$4,500.00		\$0.00	Prorated	
Cables and SFP	Material		C			\$75,000.00		\$0.00	Prorated	
Server hardware	Material		S			\$16,000.00		\$0.00	Prorated	
End Devices	Material		E			\$10,000.00		\$0.00	Prorated	
Monitors/keyboards/mice	Material		M			\$1,500.00		\$0.00	Prorated	
Wireless access points	Material	unit	W			\$100.00		\$0.00	Prorated	
External backup storage or NAS	Material		E			\$4,000.00		\$0.00	Prorated	
Patch panels	Material		P			\$600.00		\$0.00	Prorated	
Network interface cards	Material		N			\$350.00		\$0.00	Prorated	
Printers and scanners	Material		P			\$850.00		\$0.00	Prorated	

Figure 69 Resource sheet - Entry View

## Resource Sheet – Cost View

The Figure below represent the Cost view in the Resource sheet. It shows all the material and the people will cost for the project.

Resource Name	Cost	Baseline	Variance	Actual Cost	Remaining
Project Manager	\$2,205.00	\$0.00	\$2,205.00	\$1,750.00	\$455.00
<b>Network Designer</b>	<b>\$1,000.00</b>	<b>\$0.00</b>	<b>\$1,000.00</b>	<b>\$120.00</b>	<b>\$880.00</b>
<b>Network Engineer</b>	<b>\$2,352.00</b>	<b>\$0.00</b>	<b>\$2,352.00</b>	<b>\$144.00</b>	<b>\$2,208.00</b>
<b>Security Specialist</b>	<b>\$1,296.00</b>	<b>\$0.00</b>	<b>\$1,296.00</b>	<b>\$96.00</b>	<b>\$1,200.00</b>
<b>Tester</b>	<b>\$192.00</b>	<b>\$0.00</b>	<b>\$192.00</b>	<b>\$0.00</b>	<b>\$192.00</b>
<b>System Administrator</b>	<b>\$480.00</b>	<b>\$0.00</b>	<b>\$480.00</b>	<b>\$96.00</b>	<b>\$384.00</b>
Project Analyst	\$500.00	\$0.00	\$500.00	\$500.00	\$0.00
Risk Officer	\$320.00	\$0.00	\$320.00	\$320.00	\$0.00
Quality officer	\$120.00	\$0.00	\$120.00	\$120.00	\$0.00
Routers	\$33,000.00	\$0.00	\$33,000.00	\$0.00	\$33,000.00
Core switches	\$12,000.00	\$0.00	\$12,000.00	\$0.00	\$12,000.00
Access switches	\$6,000.00	\$0.00	\$6,000.00	\$0.00	\$6,000.00
Windows server license	\$4,400.00	\$0.00	\$4,400.00	\$0.00	\$4,400.00
Rackmount	\$5,000.00	\$0.00	\$5,000.00	\$0.00	\$5,000.00
UPS	\$9,000.00	\$0.00	\$9,000.00	\$0.00	\$9,000.00
Cables and SFP	\$75,000.00	\$0.00	\$75,000.00	\$0.00	\$75,000.00
Server hardware	\$16,000.00	\$0.00	\$16,000.00	\$0.00	\$16,000.00
End Devices	\$10,000.00	\$0.00	\$10,000.00	\$0.00	\$10,000.00
Monitors/keyboards/mice	\$1,500.00	\$0.00	\$1,500.00	\$0.00	\$1,500.00
Wireless access points	\$400.00	\$0.00	\$400.00	\$0.00	\$400.00
External backup storage or NAS	\$4,000.00	\$0.00	\$4,000.00	\$0.00	\$4,000.00
Patch panels	\$600.00	\$0.00	\$600.00	\$0.00	\$600.00
Network interface cards	\$350.00	\$0.00	\$350.00	\$0.00	\$350.00
Printers and scanners	\$850.00	\$0.00	\$850.00	\$0.00	\$850.00

Figure 70 Resource Sheet – Cost View

## Cost Variance and Cost Performance Index

The figures below show CV (Cost Variance) and CPI (Cost Performance Index). These help in representing cost changes in the activities as they define overrunning or maintaining within the budget.

The following figure displays the cost of the project in initiation phase

Task Name	Baseline Start	Baseline Finish	Duration	CV	CPI
Global Health Network	Sun 9/14/25	Wed 12/31/25 78.63 days		\$56.00	1.02
1 Initiation	Sun 9/14/25	Tue 9/23/25 8 days		\$0.00	1
1.1 Project Charter Creation	Sun 9/14/25	Tue 9/16/25 3 days		\$0.00	1
1.2 Stakeholder Identification	Wed 9/17/25	Wed 9/17/25 1 day		\$0.00	1
1.3 Initial Assessment For The Current System	Thu 9/18/25	Sun 9/21/25 2 days		\$0.00	1
1.4 Define Objectives and Scope	Thu 9/18/25	Thu 9/18/25 5 hrs		\$0.00	1
1.5 Search For Best Solution For Improving the Network	Mon 9/22/25	Mon 9/22/25 1 day		\$0.00	1

Figure 71 Baseline Cost - Initiation Phase

The following figure displays the cost of the project in planning phase Part 1

2 Planning	Wed 9/24/25	Wed 10/22/25 20.5 days	\$56.00	1.02
2.1 Scope Management	Wed 9/24/25	Tue 10/7/25 9.5 days	\$0.00	1
2.1.1 Problem Analysis (Ishikawa)	Wed 9/24/25	Wed 9/24/25 4 hrs	\$0.00	1
2.1.2 Requirements Gathering	Wed 9/24/25	Wed 10/1/25 5 days	\$0.00	1
2.1.2.1 Interview Plan	Wed 9/24/25	Wed 9/24/25 3 hrs	\$0.00	1
2.1.2.2 Research Plan	Wed 9/24/25	Thu 9/25/25 1 day	\$0.00	1
2.1.2.3 A high-level topology	Wed 9/24/25	Wed 9/24/25 3 hrs	\$0.00	1
2.1.2.4 Functional Requirements	Thu 9/25/25	Sun 9/28/25 5 hrs	\$0.00	1
2.1.2.5 Non-Functional Requirements	Thu 9/25/25	Sun 9/28/25 5 hrs	\$0.00	1
2.1.2.6 Design Requirements	Sun 9/28/25	Wed 10/1/25 3 days	\$0.00	1
2.1.3 Write Scope Definition	Wed 10/1/25	Thu 10/2/25 1 day	\$0.00	1
2.1.4 Write Scope Statement	Wed 10/1/25	Sun 10/5/25 2 days	\$0.00	1
2.1.5 Create WBS	Wed 10/1/25	Tue 10/7/25 4 days	\$0.00	1
2.1.6 Write Scope Verification	Wed 10/1/25	Wed 10/1/25 2 hrs	\$0.00	1
2.1.7 Write Scope Control	Wed 10/1/25	Sun 10/5/25 2 days	\$0.00	1
2.2 Human Resource Management	Tue 10/7/25	Thu 10/9/25 2 days	\$0.00	1
2.2.1 Set Responsibilities	Tue 10/7/25	Wed 10/8/25 1 day	\$0.00	1
2.2.2 Create Responsibilities Assignat Matrix	Wed 10/8/25	Thu 10/9/25 1 day	\$0.00	1
2.2.3 Resource Histogram	Tue 10/7/25	Wed 10/8/25 1 day	\$0.00	1
2.2.4 Human Resource Management Submission	Thu 10/9/25	Thu 10/9/25 0 days	\$0.00	0
2.3 Time Management	Thu 10/9/25	Mon 10/13/25 1.75 days	\$0.00	1
2.3.1 Plan Schedule Management	Thu 10/9/25	Sun 10/12/25 5 hrs	\$0.00	1
2.3.2 Define Activity	Sun 10/12/25	Sun 10/12/25 4 hrs	\$0.00	1
2.3.3 Sequence Activities	Thu 10/9/25	Thu 10/9/25 3 hrs	\$0.00	1
2.3.4 Estimate Activity Duration	Sun 10/12/25	Mon 10/13/25 5 hrs	\$0.00	1
2.3.5 Develop The Schedule	Sun 10/12/25	Mon 10/13/25 1 day	\$0.00	1
2.3.6 Schedule Management Submission	Thu 10/9/25	Thu 10/9/25 0 days	\$0.00	0

Figure 72 Baseline Cost - Planning Phase Part 1

The following figure displays the cost of the Project in Planning phase Part 2

↳ <b>2.4 Cost Management</b>	<b>Mon 10/13/25</b>	<b>Wed 10/15/25 2.63 days</b>	<b>\$0.00</b>	<b>1</b>
2.4.1 Plan Cost Management	Mon 10/13/25	Tue 10/14/25 1 day	\$0.00	1
2.4.2 Cost Estimation	Tue 10/14/25	Tue 10/14/25 5 hrs	\$0.00	1
2.4.3 Budget Determination	Tue 10/14/25	Wed 10/15/25 1 day	\$0.00	1
2.4.4 Cost Management Submission	Wed 10/15/25	Wed 10/15/25 0 days	\$0.00	0
↳ <b>2.5 Communication Management</b>	<b>Wed 10/15/25</b>	<b>Thu 10/16/25 0.63 days</b>	<b>\$0.00</b>	<b>1</b>
2.5.1 Stakeholders Communication Analysis	Wed 10/15/25	Thu 10/16/25 5 hrs	\$0.00	1
2.5.2 Expectations Management Matrix	Wed 10/15/25	Thu 10/16/25 3 hrs	\$0.00	1
2.5.3 Stakeholders Management Strategy And Influence Matrix	Wed 10/15/25	Thu 10/16/25 5 hrs	\$0.00	1
2.5.4 Communication Management Submission	Thu 10/16/25	Thu 10/16/25 0 days	\$0.00	0
↳ <b>2.6 Procurement Management</b>	<b>Thu 10/16/25</b>	<b>Sun 10/19/25 1 day</b>	<b>\$0.00</b>	<b>1</b>
2.6.1 Plan Procurement Management	Thu 10/16/25	Sun 10/19/25 1 day	\$0.00	1
2.6.2 Conduct Procurements	Thu 10/16/25	Sun 10/19/25 5 hrs	\$0.00	1
2.6.3 Procurement Management Submission	Sun 10/19/25	Sun 10/19/25 0 days	\$0.00	0
↳ <b>2.7 Quality Management</b>	<b>Sun 10/19/25</b>	<b>Mon 10/20/25 1 day</b>	<b>\$56.00</b>	<b>1.47</b>
↳ <b>2.7.1 Plan Quality Management</b>	<b>Sun 10/19/25</b>	<b>Sun 10/19/25 1 day</b>	<b>\$0.00</b>	<b>1</b>
2.7.1.1 Quality Requirements Matrix	Sun 10/19/25	Sun 10/19/25 4 hrs	\$0.00	1
↳ <b>2.7.1.2 Perform Quality Assurance</b>	<b>Sun 10/19/25</b>	<b>Mon 10/20/25 1 day</b>	<b>\$0.00</b>	<b>1</b>
2.7.1.2.1 Quality Assurance Test	Sun 10/19/25	Mon 10/20/25 1 day	\$0.00	1
2.7.2 Quality Management Submission	Mon 10/20/25	Mon 10/20/25 0 days	\$0.00	0
↳ <b>2.8 Risk Management</b>	<b>Mon 10/20/25</b>	<b>Wed 10/22/25 2 days</b>	<b>\$0.00</b>	<b>1</b>
2.8.1 Plan Risk Management	Mon 10/20/25	Tue 10/21/25 1 day	\$0.00	1
2.8.2 Risk Report	Tue 10/21/25	Wed 10/22/25 1 day	\$0.00	1
2.8.3 Plan Risk Responses	Mon 10/20/25	Tue 10/21/25 1 day	\$0.00	1
2.8.4 Perform Risk Analysis	Tue 10/21/25	Wed 10/22/25 1 day	\$0.00	1
2.8.5 Risk Management Submission	Wed 10/22/25	Wed 10/22/25 0 days	\$0.00	0

Figure 73 Baseline Cost - Planning Phase Part 2

The following figure displays the cost of the project in Execution phase part 1

↳ <b>3 Execution</b>	<b>Wed 10/22/25</b>	<b>Sun 12/21/25 42 days</b>	<b>\$0.00</b>	<b>0</b>
↳ <b>3.1 Network Design &amp; Planning</b>	<b>Wed 10/22/25</b>	<b>Wed 11/5/25 10 days</b>	<b>\$0.00</b>	<b>0</b>
3.1.1 Design Network Topology	Wed 10/22/25	Thu 10/30/25 6 days	\$0.00	0
3.1.2 Plan IP Addressing Scheme	Thu 10/30/25	Wed 11/5/25 4 days	\$0.00	0
3.1.3 Determine Network Segmentation	Wed 10/22/25	Sun 10/26/25 2 days	\$0.00	0
3.1.4 Plan Routing Protocols	Wed 10/22/25	Tue 10/28/25 4 days	\$0.00	0
3.1.5 Plan High-Availability Design	Wed 10/22/25	Thu 10/30/25 6 days	\$0.00	0
↳ <b>3.2 Network Implementation</b>	<b>Wed 11/5/25</b>	<b>Sun 11/23/25 12 days</b>	<b>\$0.00</b>	<b>0</b>
3.2.1 Configure Routers For WAN Connectivity.	Wed 11/5/25	Sun 11/23/25 12 days	\$0.00	0
3.2.2 Configure Routers For Internal Routing Protocol	Wed 11/5/25	Thu 11/13/25 6 days	\$0.00	0
3.2.3 Configure Routers For BGP	Wed 11/5/25	Sun 11/16/25 7 days	\$0.00	0
3.2.4 Configure Switches For VLAN Segmentation And Inter-VLAN Routing	Wed 11/5/25	Mon 11/10/25 3 days	\$0.00	0
3.2.5 Implement Redundancy Protocols (HSRP)	Thu 11/13/25	Sun 11/16/25 1 day	\$0.00	0
↳ <b>3.3 Security</b>	<b>Sun 11/23/25</b>	<b>Tue 12/2/25 7 days</b>	<b>\$0.00</b>	<b>0</b>
3.3.1 Configure Routers For Role-Based Access	Sun 11/23/25	Thu 11/27/25 4 days	\$0.00	0
3.3.2 Configure Switches For Layer 2 Security	Sun 11/23/25	Wed 11/26/25 3 days	\$0.00	0
3.3.3 Configure DMVPN For Secure Remote Connectivity	Sun 11/23/25	Sun 11/30/25 5 days	\$0.00	0
3.3.4 Configure Remote Access For Network Devices	Wed 11/26/25	Tue 12/2/25 4 days	\$0.00	0
↳ <b>3.4 Servers &amp; Services</b>	<b>Tue 12/2/25</b>	<b>Thu 12/11/25 7 days</b>	<b>\$0.00</b>	<b>0</b>
3.4.1 Install And Configure Windows Servers	Tue 12/2/25	Sun 12/7/25 3 days	\$0.00	0
3.4.2 Configure DNS And Load Balancing	Sun 12/7/25	Thu 12/11/25 4 days	\$0.00	0
3.4.3 Configure Web, FTP, Email Servers	Sun 12/7/25	Mon 12/8/25 1 day	\$0.00	0

Figure 74 Baseline Cost - Execution Phase Part 1

The following figure displays the cost of the project in Execution phase part 2

<b>3.5 End-User Setup</b>	<b>Thu 12/11/25</b>	<b>Tue 12/16/25 3 days</b>	<b>\$0.00</b>	<b>0</b>
3.5.1 Assign VLANs And IP Addresses To Endpoints	Thu 12/11/25	Tue 12/16/25 3 days	\$0.00	0
<b>3.6 Testing &amp; Validation</b>	<b>Tue 12/16/25</b>	<b>Sun 12/21/25 3 days</b>	<b>\$0.00</b>	<b>0</b>
3.6.1 Test inter-VLAN and Inter-Site Connectivity	Tue 12/16/25	Thu 12/18/25 2 days	\$0.00	0
3.6.2 Test Ping, Traceroute, And End-To-End Application Connectivity	Tue 12/16/25	Sun 12/21/25 3 days	\$0.00	0
3.6.3 Test Remote Access	Tue 12/16/25	Wed 12/17/25 1 day	\$0.00	0
3.6.4 Perform Failover And Redundancy Testing.	Tue 12/16/25	Wed 12/17/25 1 day	\$0.00	0
3.6.5 Validate Security Configurations	Tue 12/16/25	Wed 12/17/25 1 day	\$0.00	0

**Figure 75 Baseline Cost - Execution Phase part 2**

The following figure displays the cost of the project in Monitoring and controlling phase

<b>4 Monitoring And Controlling</b>	<b>Sun 12/21/25</b>	<b>Sun 12/28/25 5 days</b>	<b>\$0.00</b>	<b>0</b>
4.1 Control Project Scope	Sun 12/21/25	Mon 12/22/25 1 day	\$0.00	0
4.2 Control Project Management And Risk	Mon 12/22/25	Tue 12/23/25 1 day	\$0.00	0
4.3 Monitor The Network	Tue 12/23/25	Wed 12/24/25 1 day	\$0.00	0
4.4 Perform Quality Control	Wed 12/24/25	Thu 12/25/25 1 day	\$0.00	0
4.5 Control Risk	Thu 12/25/25	Sun 12/28/25 1 day	\$0.00	0

**Figure 76 Baseline Cost - Monitoring and controlling Phase**

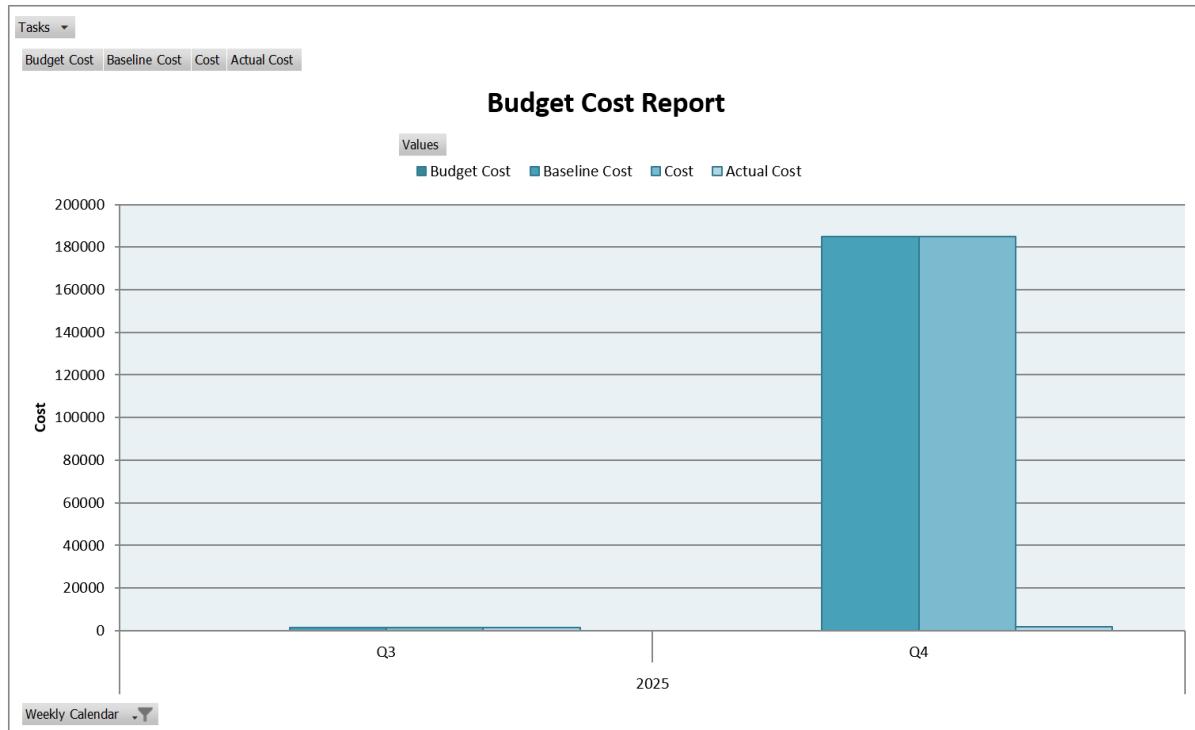
The following figure displays the cost of the project in Project Clouser phase

<b>5 Project Closure</b>	<b>Sun 12/28/25</b>	<b>Wed 12/31/25 3.13 days</b>	<b>\$0.00</b>	<b>0</b>
5.1 Checklist The Accomplished Requirement	Sun 12/28/25	Mon 12/29/25 1 day	\$0.00	0
5.2 Notify The Client About Project Completion	Mon 12/29/25	Tue 12/30/25 1 day	\$0.00	0
5.3 Submit The Thesis Document	Tue 12/30/25	Tue 12/30/25 0 days	\$0.00	0
5.4 Project Demo With The Client	Tue 12/30/25	Wed 12/31/25 1 day	\$0.00	0
5.5 Submit The Final Demo Presentation	Wed 12/31/25	Wed 12/31/25 1 hr	\$0.00	0
5.6 Submit The Final Project	Wed 12/31/25	Wed 12/31/25 0 days	\$0.00	0

**Figure 77 Baseline Cost - Project Clouser Phase**

## Budget Cost Report:

The following figure includes a bar chart that shows the used budget for the entire project life cycle. Because of the many project tasks that took place in the fourth quarter of 2025, it shows from the bar chart that the cost has increased in comparison to other quarters. Furthermore, this report helps the project manager in visualizing the baseline cost and actual cost.



**Figure 78 Budget Cost Report**

## Baseline Cost Report:

The below figure show the Baseline cost report this figure show the baseline and the actual cost of the process that helps the project manager visualize how the project budget is used through the project implementation phase.

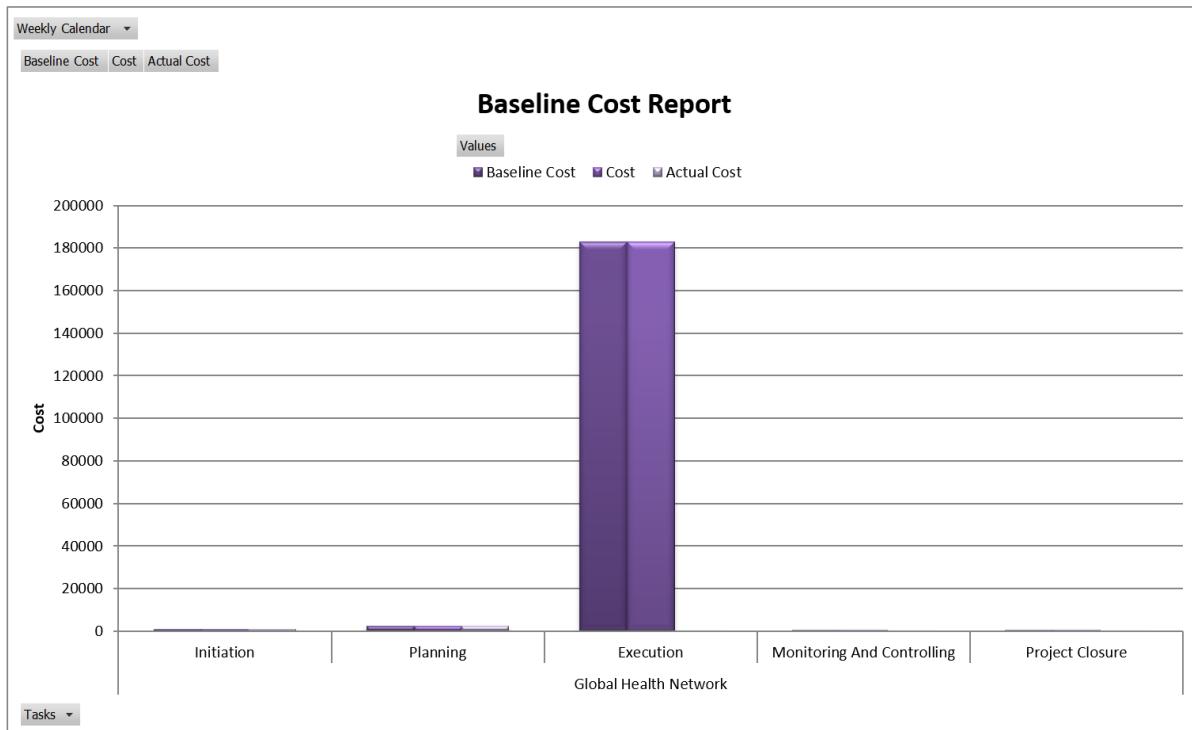


Figure 79 Baseline Cost Report

## Cost-Benefit Analysis Report:

The below figure shows the calculation of the net present value (NPV) of the project in 6 years. This report include determine the project cost and financial outcomes to calculate the total benefit and the payback period that can be estimated from the NPV.

Cost-Benefit Analysis							
Cash Flow Description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Costs</b>							
Development Costs : Estimated in MS Project Resource Sheet	-8465.00						
Operational and Maintenance Costs		-3500.00	-3500.00	-3500.00	-3500.00	-3500.00	-3500.00
Hardware : Estimated in MS Project Resource Sheet	-178100.00						
Software License	-5000.00						
DMVPN	-30000.00	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00
<b>Total Costs</b>	<b>-221565.00</b>	<b>-4500.00</b>	<b>-4500.00</b>	<b>-4500.00</b>	<b>-4500.00</b>	<b>-4500.00</b>	<b>-4500.00</b>
<b>Benefits</b>							
Savings in staff salary for temporary staff	20000.00	20000.00	20000.00	20000.00	20000.00	20000.00	20000.00
Reduce down time cost	10000.00	10000.00	10000.00	10000.00	10000.00	10000.00	10000.00
Savings in overtime hours	50000.00	50000.00	50000.00	50000.00	50000.00	50000.00	50000.00
DMVPN Scalability	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
Improve Security	10000.00	10000.00	10000.00	10000.00	10000.00	10000.00	10000.00
United patient information	100000.00	100000.00	100000.00	100000.00	100000.00	100000.00	100000.00
<b>Total Benefits</b>	<b>191000.00</b>	<b>191000.00</b>	<b>191000.00</b>	<b>191000.00</b>	<b>191000.00</b>	<b>191000.00</b>	<b>191000.00</b>
Profit before tax	-221565.00	186500.00	186500.00	186500.00	186500.00	186500.00	186500.00
Profit After Tax (10%)	-221565.00	167850.00	167850.00	167850.00	167850.00	167850.00	167850.00
Discount factors for 12%	1.0000	0.8929	0.7972	0.7118	0.6355	0.5674	0.5066
Profit Present Values	-221565.00	149866.07	133808.99	119472.31	106671.71	95242.60	85038.03
<b>Accumulated Profit</b>	<b>-221565.00</b>	<b>-71698.93</b>	<b>62110.06</b>	<b>181582.38</b>	<b>288254.09</b>	<b>383496.69</b>	<b>468534.72</b>
<b>Internal Rate of Return</b>	<b>72.9231972%</b>	Calculated by Excel. Scroll down to see how to do it manually.					
<b>ROI</b>							

Figure 80 Cost-Benefit Analysis

## Payback Period

The below figure shows the steps to how to calculate the payback period of the project using the NPV. The payback period is the period where all the project outcome cost starts to bay itself and the client benefit from it.

### Calculation of the Payback Period

We see that the accumulated NPV changes sign between years 2 and 3, which means that somewhere in that interval NPV function must be equal to 0. Recall that NPV represents the profit, and when the profit is 0, we have got the break-even. Determining the point of intersection, we actually determine the payback period. Let's see how to do that.

Firstly, we determine the absolute value of NPV change in the interval [2, 3]. At the end of year 2, the value of NPV is -71698.93 and at the end of year 3 it is 62110.06. The absolute value is

$$|-71698.93| + 62110.06 = 71698.93 + 62110.06 = 133808.06 \quad <-- \text{ change per year}$$

Secondly, we devide the obtained NPV value by 12 to see the change per month in that particular interval [2, 3].

$$133808.06 / 12 = 11150.67167 \quad <-- \text{ change per month}$$

Thirdly, we devide 71698.93 by 11150.67167 to see after how many months will that value become equal to 0.

$$71698.93 / 11150.67167 = 6.430$$

Therefore, the payback period is 2 years and 6.430 months. See the chart below.

Figure 81 Cost-Benefit Analysis - Payback Period

The below figure shows the payback Period in graph format for easily understanding

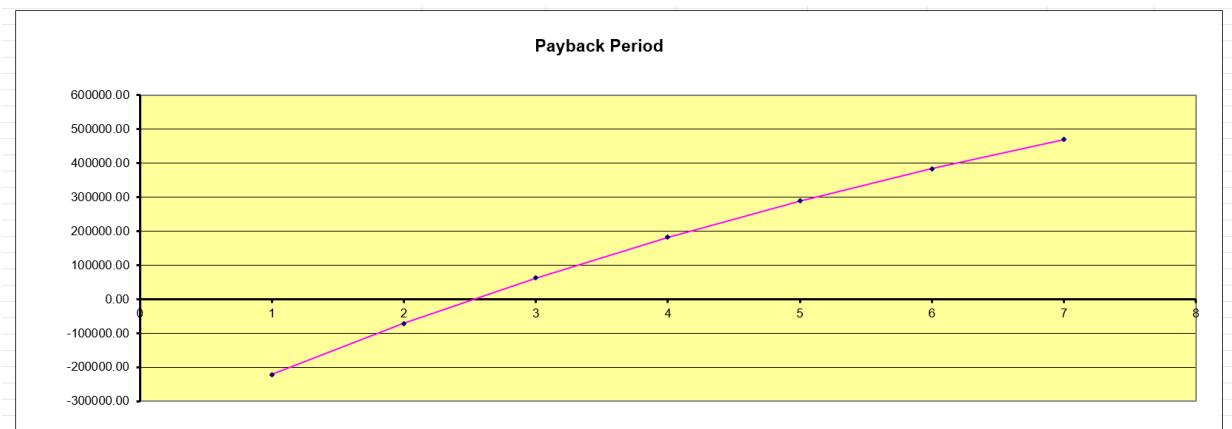


Figure 82 Cost-Benefit Analysis - Payback Period Graph

# **Communication Management:**

## **Introduction**

Communication management are the group of techniques used to check project data if it has been planned, created, supervised, and sent to team members and stakeholders in a detailed and relevant manner. To ensure alignment, collaboration, and well reasoned decision making throughout the project lifecycle, effective communication management establishes a clear conduit between stakeholders from deferent departments, positions, and organizational backgrounds.

## **Processes:**

Achieving the objectives of Communication Management involves five main processes:

### **1. Bringing Stakeholders Together:**

Encourage cooperation between deferent department like management, security, and IT departments.

### **2. Talking About Problems:**

The difficulties in the project are brought up as soon as possible.

### **3. Information Reception and Transmission:**

Share updates on project status, security protocols, and network configurations.

### **4. Control and Manage Communication Techniques:**

Keep the right networks open for documentation, notifications, and reporting.

## 5. Assure Team Members' Effectiveness:

Make sure that everyone on the team know of their roles, duties, and deadlines.

### RACI

Responsible	Accountable	Consulted	Informed
Project Manager	Project Manager	Client, Supervisor	Sponsor, Client

Figure 83 RACI - Communication Management Plan

## Communication Approach:

To execute a successful Communication Management Plan for the GHN project, a number of techniques were used:

### 1. Stakeholder Communications Analysis:

This strategy offers an organized way to handle project communications. It makes sure every person involved including the project team, management, and outside partners is informed on the details essential to their jobs and duties. It assists in determining which communication method each stakeholder prefers, how often they need information, and what kind of information they need.

### 2. Expectations Management Matrix:

Stakeholder expectations about project deliverables, network performance, security requirements, timetable fulfilment, and financial restrictions are identified and documented using this approach. To minimize errors and improve stakeholder satisfaction, these expectations are ranked in a matrix to guarantee that the most important criteria are fulfilled first.

### 3. Stakeholders Management Strategy and Influence Matrix:

This method finds important stakeholders and assesses their degree of interest and impact on the GHN project. The project team may modify communication tactics to

successfully engage important stakeholders and guarantee that their issues are swiftly addressed stakeholders effectively and ensure their concerns are addressed promptly.

## Reports:

### Stakeholder Communication Analysis:

The table which follows provides a reliable examination of stakeholder and project manager communication. The necessary parties are guaranteed to be aware of problems and fields of interest. The who, what, and when are displayed in the table below.

Stakeholder	What need to be communicated	Format/method	Due
Supervisor, Client	Weekly Meetings	Meeting via Microsoft teams	Every week, Wednesday from 12:30-1:00 PM
Supervisor, client	Charter	Submission via Bahrain Polytechnic Moodle, the submission is in PDF format.	November 4 <sup>th</sup> Final plan document summation
Supervisor, client	Plan	Submission via Bahrain Polytechnic Moodle, the submission is in PDF format.	November 4 <sup>th</sup> Final plan document summation
Supervisor, client	Design Document	Submission via Bahrain Polytechnic Moodle, the submission is in PDF format.	Week 8 Design Document summation
Supervisor, client	Thesis Document	Submission via Bahrain Polytechnic Moodle, the submission is in PDF format.	December 28 <sup>th</sup> Final Thesis document summation
Supervisor, client	Product	Submission via Bahrain Polytechnic Moodle, the submission is in Zip format.	December 28 <sup>th</sup> Final product summation
Supervisor, client	Demonstration	The demonstration will be conducted physically (face- face)	December 28 <sup>th</sup> Final Demonstration

Table 10 Stakeholder Communication Analysis

## Expectations Management Matrix

The requirements of stakeholders on several aspects of project success measurement, including time, budget, quality, customer acceptability, and project scope, are shown in the table below. From that, these measures are prioritized according to the project's constraints, and the level of stakeholder need where 1 is the lowest and 5 is the highest.

Measure of Success	Priority (1-5)	Stakeholders Expectations
Time	3	Submission of the final product before on time.
Budget	4	All the project development within the budget that has been set.
Quality	4	The client demands very High quality result to meet the quality and industry standards.
Scope	4	The project must meet all the scope requirement to satisfy the client
Customer Acceptance	4	How the product and work progresses must satisfy the client.

Table 11 Expectations Management Matrix

## Stakeholders Management Strategy and Influence Matrix

A list of important individuals with an interest in the project is shown in the table below. It also demonstrates the possible impact and input different stakeholders might have given to the project.

Stakeholder	Role	Internal	Level of Interest HML	Potential Management Strategy
Dr. Ayman Alani	Supervisor	Internal	H	Provide supervision and advice via conducting weekly meetings and emails.
Husain Ali	Project Manager, Network Designer/Architect, Network Engineer, Security Specialist, Tester, System Administrator, Project Analyst, Risk Officer, Quality officer	Internal	H	Manage and supervise all project phases based on the information received from client and supervisor.

Table 12 Stakeholders Management Strategy and Influence Matrix

# Procurement Management:

## Introduction

Procurement management are the procedures needed to obtain the products and services from outside suppliers within the determined budget.

## Processes

Achieving the objectives of procurement Management involves four main processes:

### **1. Plan Procurement Management**

This process entails determining whether products or services need to be acquired from sources outside of the company. It involves selecting the contract type, creating specifications, and specifying procurement needs. Making ensuring that every procurement activity complies with project goals and budget constraints is the main purpose.

### **2. Conducting Procurements**

This phase is focused on getting offers or proposals from the suppliers, assessing them, and choosing the most suitable one. It includes drafting, settling on terms, and giving out contracts.

### **3. Monitoring and Controlling Procurements**

This procedure guarantees that everyone fulfills their responsibilities. It involves tracking vendor performance, handling changes or problems, and confirming that deliverables satisfy deadline and quality standards.

### **4. Closing Procurements**

Contracts are formally completed and finalized during this last step. It entails confirming receipt of all deliverables, payment settlement, and documentation of assessments of performance.

## RACI

Responsible	Accountable	Consulted	Informed
Project Manager, Project analyst	Project Manager	Client, Supervisor	Sponsor, Client

Table 13 RACI - Procurement Management Plan

## Procurement approach

To execute a successful Procurement Management for the GHN project, structured approach was used:

1. **Budgeting:** calculating out the project's overall budget, selecting the products and services that require purchase, and creating the requisite.
2. **Maintaining lists of Items and Suppliers:** create a list of the suppliers and the item they offer.
3. **Requesting for Quotation:** submit the order for approval
4. **Place Order:** placing the order and approving the purchase.

# **Quality Management:**

## **Introduction:**

Quality management plan is the process to ensure that all the project deliverables meet the standards, requirements and stakeholder expectations. It creates a structure for keeping efficiency, dependability, and consistency across the duration of the project. Error prevention, early problem detection, and ongoing process and result quality improvement are the primary objectives of the plan.

## **Processes:**

Achieving the process of Quality Management involves three main processes:

### **1. Plan Quality Management:**

To create a quality management plan that defines standards and quality measures that the project must meet. Also identify the tools, methods, and metrics that will be used to measure quality.

### **2. Quality Assurance:**

Responsible for verifying that the specific quality standards and satisfy the needs of the clients by auditing and analysing the quality requirements and quality control measurements.

### **3. Quality control:**

Responsible for monitoring and controlling project results to make sure that they meet with industry standards.

## RACI

Responsible	Accountable	Consulted	Informed
Project Manager, Quality officer	Project Manager	Client, Supervisor	Sponsor, Client

Table 14 RACI - Quality Management Plan

## Quality Management Approach:

### Approach:

Several approaches used throughout project to follow the quality management strategy

#### 1. PIECES Framework:

It is a framework used to analyze and improve business processes. It helps to identify problems and areas for enhancement by focusing on six key dimensions:

- **Performance:** Analyze the efficiency of the existing operation or system.
- **Information:** Analyze the information's timeliness, accuracy, and relevance.
- **Economy:** Analyze how cost-effective the procedure or system are.
- **Control:** Analyze the effectiveness of internal controls, security, and compliance.
- **Efficiency:** Pay close attention to the efficient use of resources (staff, money, and time).
- **Service:** Analyze how well stakeholders are supported by the system or procedure.

## **2. Quality Assurance:**

Involves verifying that the specific quality standards and satisfy the needs of the clients to deliver hight quality product.

## **3. Quality Control:**

Monitoring and controlling tasks to meet the required stander and Performing test on the system during the development process to ensure industry standards.

### **Test case:**

The below table represent the list of cases scheduled for future testing to measure and maintain the standards of the project quality.

No.	Function Tested	Test Case Description	EXPECTED RESULTS	ACTUAL RESULTS	PASS /FAIL
1	FTP server	The user can use the FTP server to upload and download files from the shard folder	The FTP Server works by allowing users to upload and download over the internet.	-	Not Tested
2	DNS load balancing	The user should not be affected if the DNS server goes down	When the primary DNS server goes down, the backup DNS server takes over control.	-	Not Tested
3	Communication between deferent	Each department is isolated in its own VLAN. For departments to communicate with each other, inter-VLAN routing must be enabled.	Devices from deferent department can communicate with each other	-	Not Tested
4	Web server	The web server must be up and running at all times.	The web server is working	-	Not Tested
5	DMVPN	Each site communicates with the others using a VPN to enhance security	The DMVPN is operational at every site.	-	Not Tested

6	Remote access to the network	The network must have remote access enabled	SSH/Telnet is operational in the network.	-	Not Tested
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Table 15 Quality - Test Case

## Report

### Quality Requirement Matrix

The below table lists qualities and metrics requirements that follow PIECES approach, along with their sources. This list shows that the requirements are being followed and carried out during the execution phase to guarantee that the final product satisfies client and industry standards.

No.	Standard Source	Requirements including Standard and metric(s)	Achieved / Not Achieved
1	Brief	The network must support stable HD video calls with latency below 150 ms	Not achieved
2	Research	The network configurations must follow standardized template for naming device for simple maintenance	Not achieved
3	Client	The DMVPN design must encrypt to protect data across WAN tunnels.	Not achieved
4	Research	The network must support adding new sites with minimum configuration changes and disturbance to the network.	Not achieved
5	Client	The network must have remote access services enabled using ssh and telnet	Not achieved
6	Brief	The network must host FTP server.	Not achieved
7	Brief	The network must host DNS.	Not achieved
8	Brief	The network must host web server	Not achieved
9	Brief	The network must have Power saving features to reduce energy use during off peak hours.	Not achieved
10	Research	The network must have Summarization to reduce unnecessary advertisements across WAN	Not achieved
11	Research	The network must have role based access to limit configuration privileges on network devices	Not achieved

12	Brief	The network must have redundancy for minimal down time	Not achieved
13	client	The network must have protective measures for vlan security and other attacks	Not achieved
14	Client	The network must have redundancy default gateway for less down time	Not achieved
15	Brief	The network uptime must be at 95% availability	Not achieved

**Table 16 Quality Requirement Matrix**

# Risk Management:

## Introduction:

Risk management planning is the process of analyzing and responding to potential risks throughout the project lifecycle that may affect the project deliverables. Its goal is to minimize potential threats and take advantage of opportunities.

## Process:

Achieving the process of risk management involves four main processes:

### **1. Plan Risk Management:**

To produce an organized plan for recognizing, monitoring, and mitigating risks. This procedure explains the strategies, resources, including roles for risk management during the project.

### **2. Identify Risks:**

To pinpoint possible external and internal vulnerabilities that can compromise the project's goals. This involves getting insight from stakeholders and team members in order to create an extensive risk registry.

### **3. Perform Risk Analysis:**

To rate each learned risk's effect and potential. This stage aids in prioritizing which threats may be tracked over time as well as which need to be corrected right away.

### **4. Plan Risk Responses:**

To establish plans to act and strategies to deal with any major danger. Depending on risk potential, possible responses include acknowledging, transferring, avoiding, or mitigating it.

### **5. Monitor and Control Risk:**

To keep eye on risks that have been recognized, identify unexpected ones, and assess how well mitigation strategies are working. As the project expands, changes are made to ensure that risks are kept under control.

## RACI

Responsible	Accountable	Consulted	Informed
Project Manager, Risk officer	Project Manager	Client, Supervisor	Sponsor, Client

Table 17 RACI - Risk Management

## Risk Management Approach:

### Approach:

Several approaches used throughout project to follow the risk management strategy:

#### 1. PESTEL framework:

The PESTEL framework is broken down into six factors Political, Economic, Social, Technological, Environmental, and Legal factors. It's used to analyze the external environment that can impact a project or organization

#### 2. PPMMEE Framework:

The PPMMEE framework is broken down into six factors People, Process, Money, Materials, Equipment, and Environment. It's used to analyze internal factors that affect project performance

## Risk Register:

### Report

The below table shows the potential risks in the project keep in mind the potential issues that might affect the project success. This list gathers different types of potential risks and presents their possibility of occurrence and impacts as well as provide a mitigation procedure with the person who is responsible as a way of handling these issues.

No.	Responsible	Risk	Category	Probability (HML)	Impact (HML)	Level P*I	Mitigation	Status
1	Security Specialist	The VPN does not encrypt the traffic between sites	Functional	H	H	H	Check the source of the problem and resolve it.	Open
2	Security Specialist	any user has privilege level 15 access	Functional	L	H	M	Check Role-based access control configuration	Open
3	Network Designer	Long down time due to link or device failure	nonfunctional	M	H	H	Conduct a meeting with the network designer to fully resolve the issue.	Open
4	Network Designer	the network does not meet the client design requirement	Technical	L	M	M	Conduct a meeting with the client to redesign the network to meet the requirement	Open
5	Project manager	Fail to deliver the project on time	Technical	M	H	H	Create a detailed time schedule to track the progress of tasks effectively.	Open
6	System Administrator	Can't send or receive any document between sites	Functional	M	H	H	Check the FTP server for any issues and resolve it.	Open
7	System Administrator	There is no automatic backup for the data.	Nonfunctional	M	H	H	Check the configuration for the cloud backup servers and NAS	Open
8	Project manager	Exceeding the budget	Technical	M	H	H	Document the estimated time for each task, including potential extensions if needed.	Open
9	Network engineer, Security Specialist	The network does not meet industry standards	Legal	L	H	M	construct a plan that details how the network will incorporate industry standards and follow them	Open

10	Network engineer	The departments cannot communicate with each other	Functional	M	M	M	Check the inter-vlan configuration	Open
11	System Administrator	Can not access the web server using the DNS name	Functional, Technical	M	H	H	Check the load balancing for the DNS server to ensure that the backup DNS is working	Open
12	Security Specialist	The network could be attacked at layer 2	Functional	M	H	H	The network specialist must implement security at layer 2	Open
13	Project manager	Potential for legal issue	legal	M	H	H	The project manager must have knowledge about rules and regulations	Open
14	Tester	The email server is not working	Functional	M	H	H	The tester must check all the servers to insure they are working	Open
15	Network engineer, tester	Failure to access the network remotely.	Functional	M	H	H	The network engineer must implement remote access for outside workers, and it must be tested multiple times	Open

**Table 18 Risk Register Report**

# **Integration Management Plan and Closing Plan:**

## **Introduction:**

Integration management plan is the process to ensure coordination and keep everything connected. It ensures that scope, schedule, cost, quality, communication, risks, and resources don't operate separately but are managed as one unified project.

## **Approach:**

Achieving the process of risk management involves six main processes:

### **1. Develop the Project Charter:**

This process involves defining objectives that contain the overview and guidelines of the system that approves project initiation.

### **2. Develop Project Management Plan:**

This process involves developing an organized and robust project management strategy by coordinating all management planning steps.

### **3. Direct and manage project:**

In this process concluding the project according to schedule. To develop the deliverables, the project manager is responsible for organizing tasks, personnel, and resources.

### **4. Monitor and control the project:**

Managing the company on an everyday basis, ensuring quality requirements are fulfilled, and fixing any problems that arise during operation. Frequent monitoring ensures that goals are reached while preserving control over the project's duration, cost, and scope.

## 5. Perform Integrated Change Control

This phase verifies that every change request has been thoroughly examined, assessed, and approved. By stopping unauthorized modifications, it preserves the stability of the project. Modifications that have been approved are shared and reflected in the updated in project plan.

## 6. Close Project:

At this stage, all tasks associated with the project are officially finished. Deliverables are checked, approved, and given to the sponsor or client. The project team makes sure that all contracts are properly closed, releases resources, and completes reports.

### RACI

Responsible	Accountable	Consulted	Informed
Project Manager, Project analyst	Project Manager	Client, Supervisor	Sponsor, Client

Table 19 RACI - Integration Management Plan and Closing Plan

### Reports:

The below table represent the project manager list to ensure the project meet the client expectation and requirement.

No.	Criteria	Achieved
1	Functional and nonfunctional requirement have been achieved	Y / N
2	Fully functional network for GHN	Y / N
3	client and supervisor has been met	Y / N
4	project documents such as project charter, project plan, thesis, network design are submitted	Y / N
5	close the project by submitting project closure checklist.	Y / N

Table 20 Integration Management Report

# Legal, Ethical, Social and Professional Issues (LESPI)

## Potential Legal Issues

According to Bahrain's Personal Data Protection Law No. (30) of 2018, Global Health Network must not disclose any patient's personal data to the public and must comply with strict legal frameworks such as HIPAA and GDPR to maintain patient confidentiality. Therefore, as the Project Manager for Global Health Network, I will ensure that the project strictly adheres to data protection best practices, implementing robust security controls and privacy measures to safeguard all patient information.

## Potential Ethical Issues

The project must protect sensitive patient data and ensure the IT system is used only for its intended healthcare purpose and not to train any kind of Artificial intelligence.

## Potential Social Issues

The introduction of a new network infrastructure may object to the upgrading to a new network because they are unfamiliar with it and the process of training the staff may temporarily disrupt the workflow.

## Potential Professional Issues

From the professional standpoint the project must adhere to ICT best practice, commitment to information security standards and obligation to provide a solution that improves the healthcare rather than causes disruption with them.

## Approval Signatures

The signatures of the people below document acceptance and approval of the formal project charter. The sponsor representative must have the authority to commit the client's resources to the project. The project manager is empowered by this charter to proceed with the project as outlined in the charter.

Position/Title	Signature	Date
Project Manager	Husain Ali	1/11/2025
Project manager office		

**Table 21 Approval Signatures**

# Appendices

## Appendix 1: Problem Analysis

### Ishikawa diagram:

The Ishikawa diagram shows the main reasons why GHN WAN infrastructure isn't reliable. It helps find problems in four areas: People, Processes, Technology, and Environment. This diagram also shows what problem needs to be solved and how to show it to the people who need to know about it.

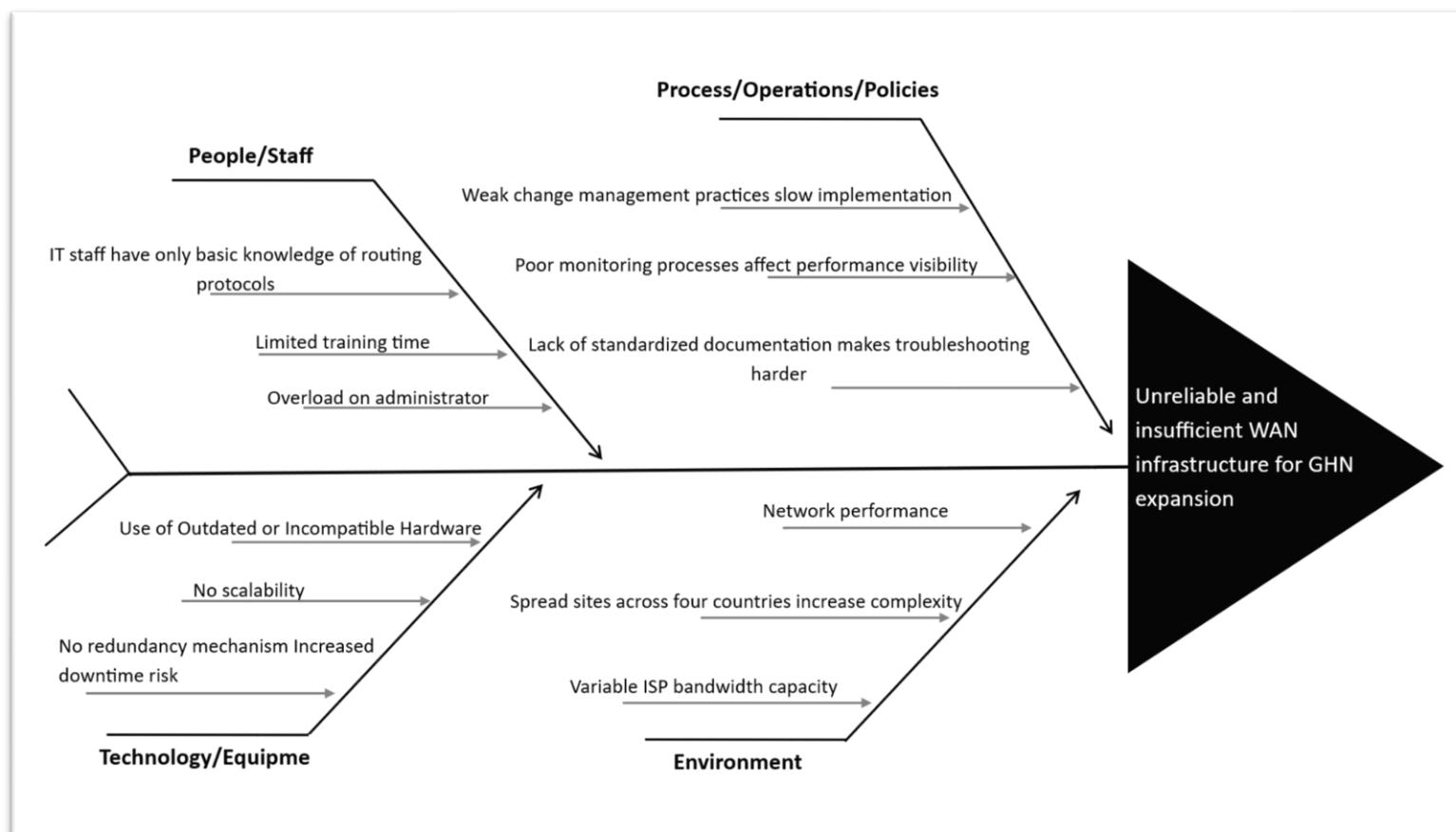


Figure 84 Appendix 1 - Ishikawa diagram

## Appendix 2: Requirements Gathering & Analysis

### Interview Plan

An interview took place with the client. The table below shows the questions and answers from the interview analysis, as well as the results.

<b>PROJECT No. and Title:</b> Project 21 - CCNP Route For a Global Health Network	<b>PROJECT MANAGER:</b> Husain Ali
<b>DATE CREATED:</b> 5/10/2025	<b>DATE LAST UPDATED:</b> 1/11/2025
<b>Interview Date and Time:</b> 8/10/2025 - 12:30 PM	<b>Interviewee:</b> Dr. Ayman Alani

Question	Answer	Requirement
What type of routing protocols does the new network implement?	Must implement OSPF and EIGRP	Implement OSPF & EIGRP
How will sensitive health data be protected during transmission?	Use DMVPN VPN to ensure encryption and scalability	Implement DMVPN phase 3
How will external and remote users get access to the network?	Use telnet or SSH for remote access	Configure telnet or SSH in devices
What is the most secure method for sending and receiving files between sites?	Use SFTP or FTP to make sure both end-users can send and receive files	Configure SFTP or FTP
What security measures the network will have in place	Make sure you have layer2 security measure and for different type of attacks like vlan spoofing	Implement layer 2 security

<p>what should be done about resources being overused</p> <p>follow -up:</p> <p>how to conserve power to minimize costs?</p>	<p>Make sure that if there are no heavy users on the network the routers enable power saving feature</p>	<p>Turen off unused interface and turn off POE ports unused</p>
<p>How many DNS server dose the GHN need</p>	<p>It must have at least one active and one stand by</p>	<p>Must implement load balancing for the DNS</p>

Table 22 Appendix 2 - Interview Plan

## Research Plan

Performing research plan to gather information and help with the client need and requirement. The below table represent the requirement to the project with the references.

<b>PROJECT No. and Title:</b> Project 21 - CCNP Route For A Global Health Network	<b>PROJECT MANAGER:</b> Husain Ali
<b>DATE CREATED:</b> 10/10/2025	<b>DATE LAST UPDATED:</b> 1/11/2025

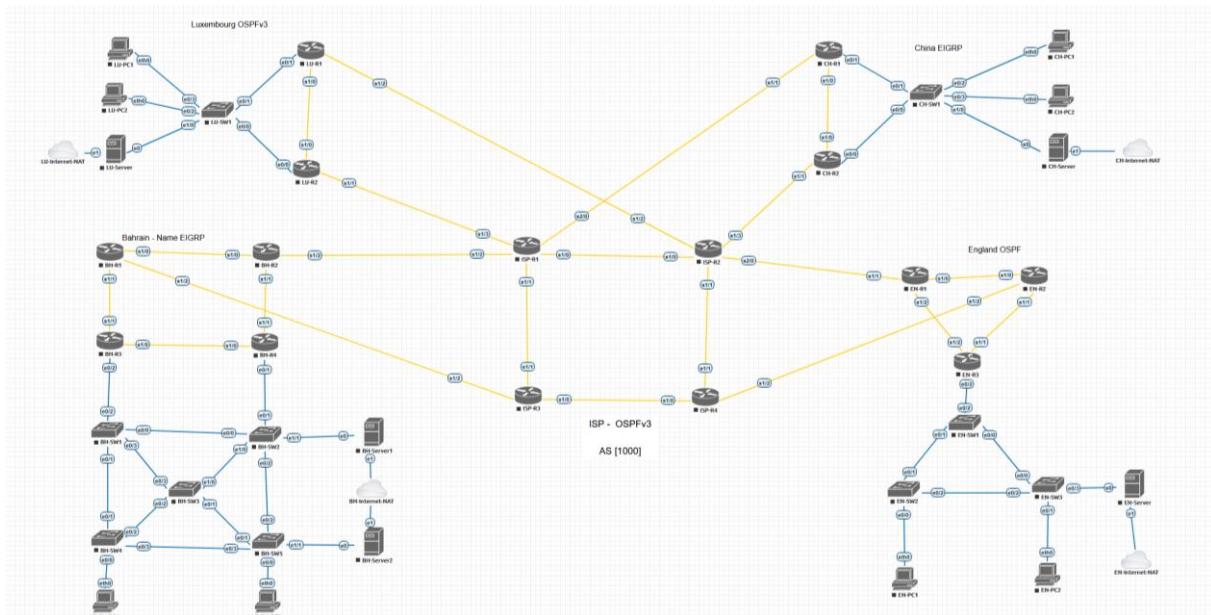
Research Topic	Findings and Reference (APA)	Requirement
Technology (What are the expected integration requirements with current system?)		
What is the best network topology for this solution?	Deferent types of topology design  (GeeksforGeeks, 2017)	Choose the best network topology that will work for now and for future upgrade
why choose BGP to manage routing between international sites and using best Practices in Route Redistribution?	BGP overview and route redistribution explanation (Staff, 2024) (Molenaar, 2013) (PyNet Labs, 2023)	Using BGP and Route Redistribution for communication between deferent routing protocols
HD video requirement over WAN	latency should be $\leq$ 150 ms and bandwidth requirement 720p HD ~1.2-2.5 Mbps, for 1080p HD ~3-4 Mbps upstream/downstream per stream  (aonmeetings,2025)	The latency should be less than 150 and high bandwidth
Role based for deferent type of users	Cisco has its own Role-Based CLI Access  (Cisco, n.d.)	Implement cisco Role-Based CLI Access
the reason for using route summarization	reduces routing tables and minimizes routing update message volume between routers.  (jumpcloud, 2025)	Implementing route summarization where it needs to be

What type of VPN will be used	DMVPN passe 3 is the best choice for the network requirement  (cisco, 2019)	Implementing DMVPN phase 3
Operational Analysis (How day to day operations will be handled)		
Best practice for handling backup?	Follow the rule 3 2 2 (Arcserve, 2020)	Back up the data off site
Naming Device Naming Conventions	How Device Naming Conventions Work and the benefit of it (Davis, n.d.)	follow standardized template for naming device

Table 23 Appendix 2 - Research Plan

## A high-level topology

The below diagram shows draft of network topology that will be implemented for Global health network



**Figure 85 Appendix 2 - A high-level topology**

## Functional Requirements

The Table below is a list for the functional requirements essential to fulfill the project scope and objectives. The specifications are produced using data from the client, project brief, and research.

No.	Source Brief/Client /Research	Requirement Description	Data	Process	Communication	Priority H/M/L	Status
Req1	Brief	The network must host FTP server.	✓	-	✓	H	-
Req2	Brief	The network must host DNS.	✓	-	-	H	-
Req3	Research	The WAN must use BGP to manage routing between international sites	-	-	✓	H	-
Req4	Client	The network must implement advance routing protocols using EIGRP and OSPF	-	-	✓	H	-
Req5	Research	The network must allow route redistribution between different routing protocols and BGP where is required	-	-	✓	H	-
Req6	Brief	The network must host Web server.	✓	-	-	H	-
Req7	Client	The network must establish secure WAN between branches using DMVPN phase 3	✓	✓	-	H	-
Req8	Research	Role based access must be implemented to limit configuration privileges on network devices	✓	✓	-	H	-
Req9	Brief	The WAN design must include redundancy to prevent service disruption.	-	✓	✓	H	-
Req10	Client	The network must use DHCP server	✓	-	-	H	-
Req11	client	The network must use hierarchical and scalable IP addressing scheme for GNH growing	-	-	✓	M	-
Req12	Client	The vlan segmentation ensured secure and safe environment any attack happened	-	✓	-	H	-
Req13	Research	Summarization must be configured to reduce unnecessary advertisements across WAN	-	✓	-	M	-

Req14	Client	IT administrators must be able to securely access remote routers and services using ssh and telnet	-	✓	-	M	-
Req15	Client	The system must use AAA for centre username authentication	-	✓	-	M	-

**Table 24 Appendix 2 - Functional Requirements**

## Behaviour / Non-Functional Requirements

The Table below is a list for the non-functional requirements essential to fulfil the project scope and objectives.

The specifications are produced using data from the client, project brief, and research.

No.	Source Brief/Client/Res earch	Requirement Description	Performance	Information	Economics	Control/security	Efficiency	Services	Priority	Status
Req1	Brief/Research	The network must support stable HD video calls with latency below 150 ms.	✓	-	-	-	-	✓	H	-
Req2	Client	The DMVPN design must use AES-256 encryption to protect data across WAN tunnels.	-	✓	-	✓	-	✓	H	-
Req3	Research	The network must support adding new sites with minimum configuration changes and disturbance to the network.	✓	✓	✓	-	✓	✓	H	-
Req4	Brief	The network uptime must be at 99% up time.	✓	-	-	✓	✓	✓	H	-
Req5	Client	Routing redundancy must ensure reliable connectivity during link or device failure.	✓	-	-	✓	✓	✓	H	-
Req6	Research	Configurations must follow standardized template for naming device for simple maintenance.	-	✓	-	✓	✓	-	M	-
Req7	Client	The network must have protective measures for vlan security and other attacks	-	-	-	✓	-	-	H	
Req8	Research	Network interfaces and dashboard must be user-friendly for administrators.	-	✓	-	-	✓	✓	M	-
Req9	Client	The solution must interoperate with existing GHN services.	✓	✓	-	✓	✓	✓	M	-
Req10	Client	All network diagrams, IP address and configuration must be documented.	-	✓	-	-	✓	✓	H	-
Req12	Brief	IT staff must receive training for the new infrastructure.	-	✓	✓	-	✓	✓	M	-
Req13	Research	Automatic configuration for backup and secure off site storage.	✓	✓	-	✓	✓	✓	H	-
Req14	Client	The infrastructure must adapt easily and fast for future IPv6 and cloud integration.	✓	✓	-	-	✓	✓	H	-
Req15	Brief	Power saving features to reduce energy use during off peak hours.	-	-	✓	-	✓	-	L	-

Table 25 Appendix 2 - Non-Functional Requirements

## Design Requirements

Design requirements are the way the final product will be presented. The specifications are produced using data from the client, project brief, and research

No.	Source Brief/Client /Research	Requirement Description	Performance	Information	Economics	Control/security	Efficiency	Services	Priority	Status
Req1	Brief	The network must host DNS, FTP, E-mail and web server.	✓	-	-	-	-	✓	H	-
Req2	Brief	The system must support HD video calls.	✓	-	-	-	-	✓	H	-
Req3	Client	The network must use DMVPN with encryption.	✓	-	-	✓	-	✓	H	-
Req4	Brief	The network will use advance routing protocols.	✓	-	-	-	-	-	H	-
Req5	Research	The network will use BGP for WAN	✓	-	-	-	-	-	H	-
Req6	Research	The network will use vlans to ensure separate traffic of the department and enhance security.	✓	✓	-	✓	-	-	H	-
Req7	Research	The network will use inter-Vlan for different vlan communication.	✓	✓	-	✓	-	-	H	-
Req8	Research	The system must have multiple backups for the data.	-	✓	-	✓	✓	✓	H	-
Req9	Research	The network must support HSRP for gateway redundancy.	✓	-	-	-	✓	-	H	-
Req10	Brief/Client	The network and IP addresses must support scalable for future upgrade.	✓	-	-	-	-	-	M	-
Req11	Research	The network must use hierarchical model topology for future upgrade and improve scalability and management.	✓	-	-	✓	✓	-	H	-
Req12	Client	The network must implement DHCP	-	✓	-	-	✓	-	M	-
Req13	Client	The DNS server must have backup in case one field.	✓	-	-	-	✓	✓	H	-
Req14	Client	The network must support secure remote access.	✓	-	-	✓	✓	✓	H	-
Req15	Research	The Network must AAA for centre username Authentication	✓	-	-	✓	✓	✓	H	-

Table 26 Appendix 2 - Design Requirements

## Appendix 3: Decision Analysis

### COTS Matrix Overview

The Commercial of the Shelf (COTS) Matrix has products that are similar to the ones in the current project. Making this matrix gives the project manager an improved overview of the technologies that are currently available.

Characteristics \ Candidate	Candidate 1: Global Health Network	Candidate 2: Centre for Addiction and Mental Health	Candidate 3: Melbourne Health Services
Benefits	The GHN network project will provide a secure, scalable, and high-performance infrastructure to support all business operations. It improves communication between sites, enables remote connectivity, strong security measures to protect sensitive data using VPN, and ensures high availability of services such as DNS, web, FTP, and email. The design also supports future growth.	The Centre for Addiction and Mental Health network refresh project upgraded the hospital's infrastructure to a high-capacity, video conferencing, data archiving. The redesign improved redundancy and reliability by increasing redundancy. It was also future proofed with a scalable, centrally manageable design to accommodate growth	Melbourne Health Services network refresh project provides a high-performance, scalable, and reliable network infrastructure to support all hospital operations. It improves communication across departments and ensures strong security through VLAN segmentation.
Servers and Workstations	Enterprise routers and switches, Windows server for FTP, DNS, Web, E-mail, full network	Core Routers, switches and Multilayer Switches	Core Routers, Multilayer Switches, Servers for DHCP, DNS, WEB
Software Tools Needed	Eve-ng to build the topology	Cisco Packet Tracer to design the topology	Cisco Packet Tracer to design the topology
Application Software	Webserver (IIS), FTP (FTP server), DNS (Windows DNS), E-mail (hmail server), DHCP server	Network Configuration for Vlan segmentation. Security implementation for RADIUS authentication for secure network access.	DHCP Server, DNS Server, Web Server
Method of Data Processing	Real- time processing like video conference	Support for real-time applications like video conferencing and VoIP	Real-Time Processing: For critical applications requiring immediate data access.

<b>Output Devices and Implications</b>	Fully functional topology, that has window server for E-mail, DNS, Web and FTP	Network Devices: High-speed switches and routers to handle increased data throughput.  Management Interfaces: Centralized management consoles for network monitoring and configuration.	Monitors, Printers, Networked Devices
<b>Input Devices and Implications</b>	Keyboards, mice, and network consoles. Remote access via SSH, RDP, and VPN. Inputs depend on user role and timing of network activity.	Workstations, VoIP phones, and wireless access points	Keyboards, Scanners, mice
<b>Storage Devices and Implications</b>	Local SSD/HDD storage on servers for data, logs, and applications. Backup drives and cloud storage for redundancy. Organized by service type.	Integration with existing storage solutions for data archiving and backup	Server Storage, Backup Solutions, Cloud Storage

Table 27 Appendix 3 - COTS Matrix Overview

## COTS Weighted Score

The table shows that each of the proposed alternatives is put up in opposition to important feasibility factors, such as technical, economic, operational, and schedule aspects, to find the best solution.

Feasibility Criteria	Wt.	Candidate 1: Global Health Network	Candidate 2: Centre for Addiction and Mental Health	Candidate 3: Melbourne Health Services
<b>Operational Feasibility</b> An assessment of how well the solution meets the identified system requirements to solve the problems and take advantage of the opportunities envisioned for the system.	20%	GNH network supports all branches functions, remote access, high reliability	CAMH's existing systems may require major upgrades	Open-source solution flexible but may need custom integration
Score:		90%	75%	70%
<b>Cultural/Political Feasibility</b> An assessment of how well the solution will be accepted in a given organizational climate.	10%	Aligns with the international standards and HIPAA	Change management may be harder in a healthcare institution	Open-source adoption may face resistance from staff used to proprietary tools
Score:		100%	70%	60%
<b>Technical Feasibility</b> An assessment of the practicality of the solution and the availability of technical resources and expertise to implement and maintain it.	25%	Cisco-based infrastructure, proven reliability, skilled engineers available	Staff may need training on new hardware/software	Technical expertise required to customize and maintain
Score:		90%	80%	75%
<b>Economic Feasibility</b> An assessment of the cost-effectiveness of a project or solution.	25%	Deployment costs are sufficient to finish the project within the allocated budget.	Lower cost because of the exciting system but harder in upgrade	Cost effective because of the open-source system but

<b>Cost to develop:</b>				implementation risk may increase cost.
<b>Payback period (discounted):</b>				
<b>Net present value:</b>				Least Cost-effective compared to other candidates because of the customization for the system.
<b>Score:</b>		<b>95%</b>	<b>80%</b>	<b>75%</b>
<b>Schedule Feasibility</b> An assessment of how long the solution will take to design and implement.	<b>10%</b>	Can be done with the time period that has been set	It will take more time to upgrade the current system	Customization and testing required; slower deployment.
<b>Score:</b>		<b>100%</b>	<b>70%</b>	<b>60%</b>
<b>Legal Feasibility</b> An assessment of how well the solution can be implemented within existing legal and contractual obligations.	<b>10%</b>	Compliant with healthcare regulations and security.	Compliant but needs careful handling of privacy laws.	Open-source licensing may require legal review
<b>Score:</b>		<b>90%</b>	<b>75%</b>	<b>60%</b>
<b>Total Score:</b>	<b>100%</b>	<b>93.25%</b>	<b>76.5%</b>	<b>69.5%</b>

Table 28 Appendix 3 - COTS Weighted Score

## Decision Statement

To sum up a decision statement can be justified based on the result of the two previous tables. It can be seen that Global Heath Network (GHN) product covers all the essential requirements that are stated by the client and scored the highs in feasibility comparing the other alternatives. It is essential to cover all the client needs and fulfil their satisfaction.

Therefore, as a final decision, the project implementation will proceed with GHN product to achieve the project deliverables.

## A Feasibility Analysis:

### Resource sheet - Entry View:

The figure below represents the Resource sheet entry views where all the resources and the material have been given cost estimation

Resource Name	Type	Material	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue	Base
Project Manager	Work		P		100%	\$7.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
Network Designer	Work		N		100%	\$5.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
Network Engineer	Work		N		100%	\$6.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
Security Specialist	Work		S		100%	\$6.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
Tester	Work		T		100%	\$3.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
System Administrator	Work		S		100%	\$6.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
Project Analyst	Work		P		100%	\$20.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
Risk Officer	Work				100%	\$10.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
Quality officer	Work				100%	\$10.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
Routers	Material		R			\$33,000.00		\$0.00	Prorated	
Core switches	Material		C			\$24,000.00		\$0.00	Prorated	
Access switches	Material		A			\$2,100.00		\$0.00	Prorated	
Windows server license	Material		W			\$4,400.00		\$0.00	Prorated	
Rackmount	Material		R			\$8,000.00		\$0.00	Prorated	
UPS	Material		U			\$9,600.00		\$0.00	Prorated	
Cables and SFP	Material		C			\$300,000.00		\$0.00	Prorated	
Server hardware	Material		S			\$16,000.00		\$0.00	Prorated	
End Devices	Material		E			\$40,000.00		\$0.00	Prorated	
Monitors/keyboards/mice	Material		M			\$7,500.00		\$0.00	Prorated	
Wireless access points	Material		W			\$1,500.00		\$0.00	Prorated	
External backup storage or NAS	Material		E			\$4,000.00		\$0.00	Prorated	
Patch panels	Material		P			\$600.00		\$0.00	Prorated	
Network interface cards	Material		N			\$600.00		\$0.00	Prorated	
Printers and scanners	Material		P			\$600.00		\$0.00	Prorated	

Figure 86 Appendix 3 - Resource sheet - Entry View

## Resource Sheet – Cost View

The Figure below represent the Cost view in the Resource sheet. It shows all the material and the people will cost for the project.

Resource Name	Cost	Baseline Cost	Variance	Actual Cost	Remaining
Project Manager	\$2,205.00	\$2,205.00	\$0.00	\$1,750.00	\$455.00
<b>Network Designer</b>	<b>\$1,000.00</b>	<b>\$1,000.00</b>	<b>\$0.00</b>	<b>\$120.00</b>	<b>\$880.00</b>
<b>Network Engineer</b>	<b>\$2,352.00</b>	<b>\$2,352.00</b>	<b>\$0.00</b>	<b>\$144.00</b>	<b>\$2,208.00</b>
<b>Security Specialist</b>	<b>\$1,296.00</b>	<b>\$1,296.00</b>	<b>\$0.00</b>	<b>\$96.00</b>	<b>\$1,200.00</b>
<b>Tester</b>	<b>\$192.00</b>	<b>\$192.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$192.00</b>
<b>System Administrator</b>	<b>\$480.00</b>	<b>\$480.00</b>	<b>\$0.00</b>	<b>\$96.00</b>	<b>\$384.00</b>
Project Analyst	\$500.00	\$500.00	\$0.00	\$500.00	\$0.00
Risk Officer	\$320.00	\$320.00	\$0.00	\$320.00	\$0.00
Quality officer	\$120.00	\$120.00	\$0.00	\$120.00	\$0.00
Routers	\$165,000.00	\$132,000.00	\$33,000.00	\$0.00	\$165,000.00
Core switches	\$96,000.00	\$72,000.00	\$24,000.00	\$0.00	\$96,000.00
Access switches	\$8,400.00	\$6,300.00	\$2,100.00	\$0.00	\$8,400.00
Windows server license	\$4,400.00	\$4,400.00	\$0.00	\$0.00	\$4,400.00
Rackmount	\$16,000.00	\$16,000.00	\$0.00	\$0.00	\$16,000.00
UPS	\$19,200.00	\$9,600.00	\$9,600.00	\$0.00	\$19,200.00
Cables and SFP	\$900,000.00	\$900,000.00	\$0.00	\$0.00	\$900,000.00
Server hardware	\$16,000.00	\$16,000.00	\$0.00	\$0.00	\$16,000.00
End Devices	\$80,000.00	\$40,000.00	\$40,000.00	\$0.00	\$80,000.00
Monitors/keyboards/mice	\$7,500.00	\$7,500.00	\$0.00	\$0.00	\$7,500.00
Wireless access points	\$1,500.00	\$1,500.00	\$0.00	\$0.00	\$1,500.00
External backup storage or NAS	\$4,000.00	\$4,000.00	\$0.00	\$0.00	\$4,000.00
Patch panels	\$600.00	\$600.00	\$0.00	\$0.00	\$600.00
Network interface cards	\$600.00	\$600.00	\$0.00	\$0.00	\$600.00
Printers and scanners	\$600.00	\$600.00	\$0.00	\$0.00	\$600.00

Figure 87 Appendix 3 - Resource Sheet - Cost View

## Cost-Benefit Analysis:

The below figure shows the calculation of the net present value (NPV) of the project in 6 years. This report include determine the project cost and financial outcomes to calculate the total benefit and the payback period that can be estimated from the NPV.

Cost-Benefit Analysis							
Cash Flow Description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Costs</b>							
Development Costs : Estimated in MS Project Resource Sheet	-8465.00						
Operational and Maintenance Costs		-3500.00	-3500.00	-3500.00	-3500.00	-3500.00	-3500.00
Hardware Estimated in MS Project Resource Sheet	-178100.00						
Software license	-5000.00						
DMVPN	-30000.00	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00
<b>Total Costs</b>	<b>-221565.00</b>	<b>-4500.00</b>	<b>-4500.00</b>	<b>-4500.00</b>	<b>-4500.00</b>	<b>-4500.00</b>	<b>-4500.00</b>
<b>Benefits</b>							
Savings in staff salary for temporary staff	20000.00	20000.00	20000.00	20000.00	20000.00	20000.00	20000.00
Reduce down time cost	10000.00	10000.00	10000.00	10000.00	10000.00	10000.00	10000.00
Savings in overtime hours	50000.00	50000.00	50000.00	50000.00	50000.00	50000.00	50000.00
DMVPN Scalability	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
Improve Security	10000.00	10000.00	10000.00	10000.00	10000.00	10000.00	10000.00
United patient information	100000.00	100000.00	100000.00	100000.00	100000.00	100000.00	100000.00
<b>Total Benefits</b>	<b>191000.00</b>	<b>191000.00</b>	<b>191000.00</b>	<b>191000.00</b>	<b>191000.00</b>	<b>191000.00</b>	<b>191000.00</b>
Profit before tax	-221565.00	186500.00	186500.00	186500.00	186500.00	186500.00	186500.00
Profit After Tax (10%)	-221565.00	167850.00	167850.00	167850.00	167850.00	167850.00	167850.00
Discount factors for 12%	1.0000	0.8929	0.7972	0.7118	0.6355	0.5674	0.5066
Profit Present Values	-221565.00	149866.07	133808.99	119472.31	106671.71	95242.60	85038.03
<b>Accumulated Profit</b>	<b>-221565.00</b>	<b>-71698.93</b>	<b>62110.06</b>	<b>181582.38</b>	<b>288254.09</b>	<b>383496.69</b>	<b>468534.72</b>
Internal Rate of Return	<b>72.9231972%</b>						
ROI							

Figure 88 Appendix 3 - Cost-Benefit Analysis

## Payback Period

The below figure shows the steps to how to calculate the payback period of the project using the NPV. The payback period is the period where all the project outcome cost starts to pay itself and the client benefit from it.

Calculation of the Payback Period	
We see that the accumulated NPV changes sign between years 2 and 3, which means that somewhere in that interval NPV function must be equal to 0. Recall that NPV represents the profit, and when the profit is 0, we have got the break-even. Determining the point of intersection, we actually determine the payback period. Let's see how to do that.	
Firstly, we determine the absolute value of NPV change in the interval [2, 3]. At the end of year 2, the value of NPV is -71698.93 and at the end of year 3 it is 62110.06. The absolute value is	
$ -71698.93  + 62110.06 = 71698.93 + 62110.06 = 133808.06$	<--- change per year
Secondly, we devide the obtained NPV value by 12 to see the change per month in that particular interval [2, 3].	
$133808.06 / 12 = 11150.67167$	<--- change per month
Thirdly, we devide 71698.93 by 11150.67167 to see after how many months will that value become equal to 0.	
$71698.93 / 11150.67167 = 6.430$	
Therefore, the payback period is 2 years and 6.430 months. See the chart below.	

Figure 89 Appendix 3 - Payback Period

The below figure shows the payback Period in graph format for easily understanding

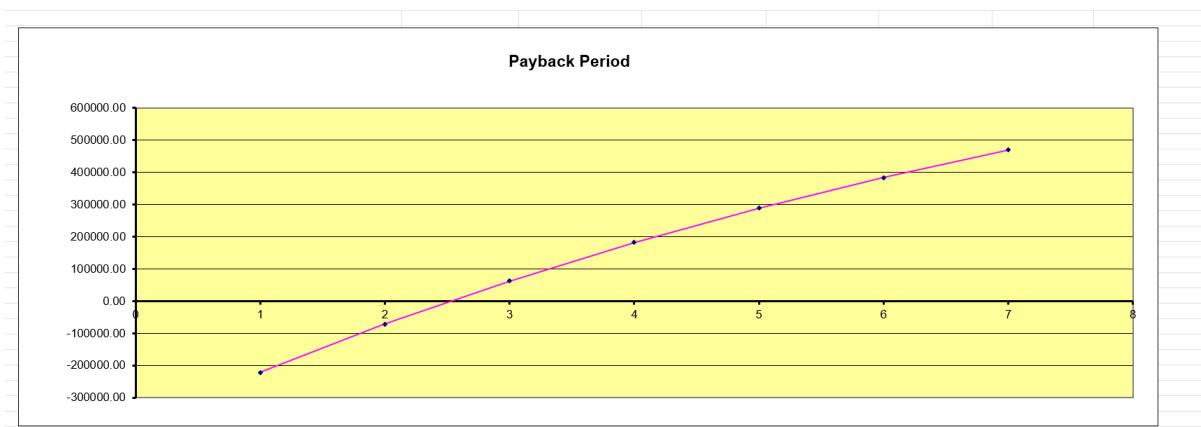


Figure 90 Appendix 3 - Payback Period graph

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