#### Cover Sheet

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **UNIT**  **CODE:**  HSU202  **TITLE:** Project Management | | **STUDENT/PROJECT/TEAM NAME**  Man Fu Lei | | | |
| **NAME OF LECTURER**  Noal Atkinson | | | | **DUE DATE**  June 6, 2014 | |
| **TOPIC OF ASSIGNMENT**  Project Plan of Facilitating Telehealth Service | | | | | |
| **Group or tutorial**  *(if applicable)*  Group | **Course**  Associate Degree of Network Technology | | | **Campus**  Thornlie | |
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#### Peer Assessment Form

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item/Name** | **Man Fu Lei** | **Joeralph Dalisay** | **Siera Berdin** | **Andre Natal** |
| Attended group meeting regularly and on time. | 5 | 5 | 5 | 5 |
| Responded email (or other means of communication) in a timely and courteous manner | 5 | 5 | 5 | 5 |
| Contribute with a constructive input for the group work | 5 | 5 | 5 | 5 |
| Cooperated and encouraged team members to complete the task | 5 | 5 | 5 | 5 |
| Made a sincere effort in finalizing the tasks | 5 | 5 | 5 | 5 |

Student: Man Fu Lei

Student Number: 131306105

Unit Name: Project Management

Submission Date: May 30, 2014

**Facilitating Telehealth Services**

**An overall plan for implementing Telehealth services in Fiona Stanley Hospital**

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#### Synopsis

On Week 11 the author was recruited as a project manager to implement the Telehealth services in Fiona Stanley Hospital (FSH). Telehealth is a telecommunication service that can deliver the patient's information using remote access technologies to the doctor or nurse's site where the doctor can diagnose the patient remotely or the nurse can monitor the progress of the patient who is at home. It also provides remote diagnosis for patients in hospitals where not enough resources of doctors are there. It has five service components: clinical telehealth service provision; emergency telehealth; training and education; secure store and forward applications; and home monitoring. This report is about the planning of implementing the services in FSH focusing on the project's charter, scope, activities, human resource, budget, time management, risk management and estimated cost. Inside the report the author analyses the project in all aspects to provide an overall plan for the implementation and gives the reason why the project is recommended.

# Introduction



## The Authorization

On Week 11 South Metropolitan Health Service (SMHS) which is a member of Statewide Telehealth Advisory Group (STAG) assigned the author as the project manager to plan for the project of implementing Telehealth service in the opening Fiona Stanley Hospital.

Telehealth is a statewide health care service which provides remote diagnosis and monitoring using videoconferencing devices for patients who are at home or in hospital. It contains the following components:

* *Clinical telehealth service provision*: Offer direct clinical care to patients at a distance in other hospitals or clinics mainly located in rural areas; (Center for Health and Technology, n. d.)
* *Emergency telehealth*: provides remote emergency monitoring and first aid in emergency room of hospitals in rural areas where not enough professional doctors are there; (Cesta, 2012)
* *Training and education*: provides the training for how to use the equipment in Telehealth service to achieve the goal for doctors, nurses and patients;
* *Secure store and forward applications*: involves how to acquire and store the clinical information such as audio and video of the patients and how these will be forwarded to other hospitals; (Store-and-Forward Telehealth, n. d.)
* *Home monitoring*: the patients after diagnosis in the hospital can bring the monitoring devices home and take vital signs and customized surveys every day and the data will be transferred to the hospital where nurses can follow the progresses of the patients. (How Telehealth Works, n. d.)

FSH is a new hospital which will open in October 2014 located in south metropolitan area of Perth. This project is a plan for implementing Telehealth service in this new hospital as a member of SMHS. (Opening Schedule, n. d.)

## The Purpose

The project is to develop a plan, recruit members, procure devices, install the devices in the hospital, train the staff in the hospital and test the system with both staffs and patients.

## The Scope

The report contains an analysis in these aspects in project management:

*Integration management*: involves a project charter stating the purpose of the project;

*Scope management*: involves a scope statement, requirement analysis and Work Breakdown Structure (WBS) stating the scope and significance as well as the main activities of the project;

*Time management*: involves a Gantt chart, project network diagram, critical path analysis and Program Evaluation and Review Technique (PERT) stating the schedule, critical activities and slack time calculations;

*Cost management*: involves budget with tangible and intangible costs and cost baseline stating explicit and implicit costs and the cost schedule;

*Human resource management*: involves the chain of command, Responsibility Assignment Matrix (RAM) and the training of team members stating their responsibilities and the training;

*Risk management*: involves risk factors, Probability/Impact Matrix and risk mitigation strategies stating the possibilities of different risks and the mitigation methods.

## Terms of Reference

The project means the process of developing a plan for implementing the Telehealth service for FSH before the opening day. The main body of the report contains the deliverables of the plan which can be a reference for real implementation of the service. The plan was made upon the assumption of being funded with 100,000 dollars by SMHS to finish all the activities described in the plan which is represented by different areas of project management in this report.

## Acknowledgements

The author wants to thank these people who helped us a lot during the project:

Andre Natal, *Polytechnic West Australia*

Joeralph Dalisay, *Polytechnic West Australia*

Noal Atkinson, *Polytechnic West Australia*

Siera Berdin, *Polytechnic West Australia*

# Method



## Online Research

The author went through several webpages about the mechanism of Telehealth and the prices of devices.

## Group Discussion

The team members talked with one another in order to discover the major activities of the project.

## Questionnaire

A questionnaire is given to doctors, nurses and patients to discover the requirement of the new system. A sample questionnaire form is appended in the Appendix.

# Integration Management



## Project Charter

The project charter is a document stating the purpose and other concerns of the project such as methods in brief which must be signed by stakeholders before the project is permitted. The project charter is like following:

|  |  |  |  |
| --- | --- | --- | --- |
| **Project Title** | Implementing Telehealth Service in Fiona Stanley Hospital | | |
| **Start Date** | May 19, 2014 | **Finish Date** | October 15, 2014 |
| **Project Manager** | Man Fu Lei | **Email** | 131306105@polytechnicwest.wa.edu.au |
| **Key Schedule Milestones:**   * Project approved by June 5 * Device procurement completed by June 12 * Intermediate devices installation completed by June 24 * Terminal devices installation completed by July 1 * Secure server and terminal software installation completed by July 15 * Device configuration completed by July 22 * Staff training completed by August 5 * Test for staff usage completed by September 2 * Test for patient usage completed by September 30 | | | |
| **Budget Information**: The organization allocated 100,000 dollars for this project. Most of the costs will be for equipment and the other part of it is for salaries of the team members. Initial estimate of working hours is 40 hours a week. | | | |
| **Project Objectives**: Implement the Telehealth service in FSH and make sure the devices are working properly while the staffs and patients can easily understand how to use the equipment. Videoconferencing devices and monitors will make sure the clinic telehealth component provides patients in different medical center to receive diagnosis they need and patients in emergency rooms in rural areas can be treated in time through remote access. Home monitor component providing devices for patients at home will make sure the progress of the patients are followed in time by nurses using pre-installed software on the computers in the hospital. Training and educating must be enough for staffs in FSH to use the devices properly and IT department can troubleshoot frequently happening issues. Storage and forwarding of patient’s information is secured enough to prevent them from being stolen illegally. | | | |
| **Main Project Success Criteria**: The project can be finished before the opening of the hospital and stay within the budget. | | | |
| **Approach:**   * Develop a questionnaire to determine what needs to be achieved in the new Telehealth system in FSH and solicit input from doctors, nurses and patients; * Review the templates and examples of project management documents to develop a decent plan; * Research online to discover what Telehealth is all about and how it should be implemented in FSH; * Report to the board of the organization every week to get the feedback from the executives; * Design all kinds of methods to test the new system after it is finished. | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **ROLES AND RESPONSIBILITIES** | | | |
| **Name** | **Role** | **Position** | **Contact Information** |
| Josh Badmington | Sponsor | SMHS, CEO | Josh2014@smhs.com |
| Man Fu Lei | Project Manager | SMHS, Manager | Manful2014@smhs.com |
| Bobo Jocky | Advisor | SMHS, Expert | Bobo2014@smhs.com |
| Bungy Jumpings | Advisor | SMHS, Expert | Bungy2014@smhs.com |
| Clart Birk | Team Member | Cisco ltd, Network Expert | Clart2014@cisco.com |
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| Evel Zhu | Team Member | LTC ltd, Installer | [Evel2014@ltc.com](mailto:Evel2014@ltc.com) |
| Weiwei Zhang | Team Member | Tencent ltd, Installer | [Weiwei2014@qq.com](mailto:Weiwei2014@qq.com) |
| **Sign-off**: *Josh Badmington, Man Fu Lei, Bobo Jocky, Bungy Jumpings, Clart Birk, Pavet Alixander, Devib Jerusy, Yurou Tang, Evel Zhu, Weiwei Zhang* | | | |
| **Comments**: “I like your project very much so please join me into your team members. I can ask for less money than other members. Please.” ------- Bobo Jocky  “I am with Bobo so please join me into your team too.”------ Bungy Jumpings | | | |

Table - Project charter (Schwalbe, 2014, p. 98)

# Scope Management



## Requirement Analysis

Based on the spirit of the executives and the opinions of staffs from FSH and patients as well as the team members, the new system should have following functions:

* A network terminal connecting to any partner site of the plan: the plan's purpose is to establish a fully complete health care network covering every corner of the state so it is vital for the new system to connect to any other site inside the plan providing medical advices wherever people are;
* Fast connection speed: the speed required for videoconference is critical and it could be fatal if there is misunderstanding during the transmission of audio or video because doctors may diagnose wrong by the distorted image or voice so it is necessary to build and maintain enough bandwidth and stable connection during the diagnosis;
* Secure transmission of patient's information: patients may be concerned much that their information may be disclosed to illegal usage during the storage and forwarding of the information about their history of illness so it is necessary to use high-secure technologies to protect the data of patients from being accessed by unauthorized person;
* Complete training of staffs and patients: many patients don't know how to use the home monitor devices and many staffs are not familiar with the Telehealth devices and they don't prefer using these services which is a main reason why the service hasn’t been promoted largely. The project should give more energy in training the staffs in both teaching them the usage of the devices and telling them how to teach the patients about how to use the home monitor devices;
* Easy maintenance and high stability: there could be times when little problems may happen to devices. In order to maintain availability the project will use redundancy for network failover when there is problem and the IT department inside FSH will receive enough training for routine maintenance of the devices. Every patient in home monitoring should bring home with pair of devices of the same kind to have one backup in case the other isn't functioning. They should receive the devices for free in they are covered in Medicare but they need to return them after they are cured.

## Scope Statement

The scope statement includes the scope description, user acceptance criteria and detailed information on project deliverables. The scope statement is like following:

|  |  |
| --- | --- |
| **Project Title**: Implementing Telehealth Service in Fiona Stanley Hospital | |
| **Date**: May 19 | **Prepared by**: Man Fu Lei, Project Manager, Manful2014@smhc.com |
| **Project Summary and Justification:** Josh Badmington, CEO of South Metropolitan Health Service, requested this project to be in a part of the Statewide Telehealth Strategy Plan 2012- 2014 whose goal is to cover the whole West Australia with Telehealth service before the end of 2014. The new system that is going to be built in Fiona Stanley Hospital will be able to connect its own site with other partners inside the plan providing online diagnostic service for patients located in different places of medical center no matter it is a clinic or hospital. It will also be a part of the emergency telehealth providing professional opinions from doctors for emergency rooms in those hospitals located in countryside areas. It also provides home monitoring for post-surgery patients for nurses to follow up their progresses, complete training and educating services for the usage of the Telehealth service and secure transmission as well as storage of patient’s personal information. The budget for the project is $100,000 which is the total budget for the entire project however it is possible to collect money from FSH executives by providing training services to their staffs which is estimated to be $30,000 in total. No benefit will come from this project because it is a government-funded program for public benefits. It is important for the project to be completed without exceeding the budget in designated time. | |
| **Project Characteristics and Requirements:**   1. Clinical telehealth service provision: Patients in different clinics or hospitals can receive diagnosis from doctors located in other sites in case there is proper diagnosis in their own sites; 2. Emergency telehealth: Patients in rural areas can go to their nearby hospitals and receive the emergency diagnosis immediately before being transferred to better places; 3. Training and education Staffs in the hospital will receive complete training of how to use the system and how to teach patients about the usage; 4. Secure store and forward applications: The patient's information will be stored and forwarded securely without being easily attacked; 5. Home monitoring: Patients can report their vital signs regularly by monitoring devices so that nurses in hospital can track their progress; 6. Fast connection: High bandwidth enables the communication more swift; 7. Constant availability: Redundancy devices enable the service to be stable without failing easily and the devices are required to run 24 hours a day and 7 days a week. The maintenance can be done without stopping the service with the presence of failover devices. | |
| **Summary of Project Deliverables** | |
| **Project management-related deliverables:** Project charter, scope statement, requirement analysis, Work Breakdown Structure, chain of command, budget, Gantt chart, cost baseline, risk factors, Probability/Impact Matrix, risk mitigation strategies, critical path analysis and Program Evaluation and Review Technique. | |
| **Product-related deliverables:**   * 1. Questionnaire: A form for doctors, nurses and patients to help decide the requirement of the new system;   2. Secure servers: There will be two secure servers which protect the data sent from the home monitoring devices and provide user data authentication, encryption and integrity working 24 hours every day after the closing day of the project;   3. Videoconferencing terminal monitors: There will be six monitors performing remote diagnostic functions in clinics and two monitors in emergency rooms working 24 hours every day after the closing day of the project;   4. Telehealth network: The network consists of ten switches and four routers as well as several cables for intermediate devices providing packet switching and interconnecting remote networks working 24 hours every day after the closing day of the project;   5. Home monitoring devices: There will be 50 these devices for tracking the vital signs of patients working for them when they leave the hospital working after the end of the project. Patients are responsible for these devices.   All of the above items 2-4 are going to be installed only in FSH which holds full responsibility after the closing day of the project. | |
| **Project Success Criteria:** The goal of the project is to finish the above items before the opening of the FSH without exceeding the budget $100,000. The CEO Josh Badmington emphasized that it is important for the project to stay within the budget. To meet this financial goal it is important to choose devices that are economic however fast and secure. It is also necessary to persuade the executives of FSH to join the plan and support the project by funding the training course of the staffs. Postponement or financial exception is unacceptable and will make the project be viewed as failed. | |
| **Boundaries:** The purpose of the project is to merge the new network into their own instead of building a new forest network for FSH so only devices meeting this requirement are enough. The project only focuses on the implementation of the Telehealth services so the team isn't responsible for any issue other than this purpose. Once the network is properly set up and the training has been undertaken as planned, the support team will be the IT workers in FSH and no team member in the project will be one of the support team members. The FSH staffs are the clients of the project teams so in no circumstance should they be exploited by the team in purposes other than being trained with relevant knowledge of implementing Telehealth services. The training should focus on the infrastructure of the mechanism in maintaining the services every day and the means of both using the devices properly and teaching users to use them without irrelevant information disclosed. The system will only gather clinical information of the patients without intentionally collecting confidential and private information of the patients or doctors. All the team members are required to comply with the law all the time during the project. | |

Table - Scope statement (Schwalbe, 2014, p. 107)

## Work Breakdown Structure



|  |
| --- |
| 1.0 Initiating  1.1 Appoint project manager  1.2 Scope management  1.2.1 Define requirements  1.2.2 Develop preliminary scope statement  1.2.3 Develop project charter  1.2.4 Charter signed  1.2.5 Define scope  1.2.6 Create work breakdown structure  2.0 Analysis  2.1 Risk management  2.1.1 Identify risks  2.1.2 Perform qualitative risk analysis  2.1.3 Perform quantitative risk analysis  2.1.4 Planning risk response  2.2 Human resource management  2.2.1 Develop the human resource plan  3.0 Planning  3.1 Cost management  3.1.1 Estimate costs  3.1.2 Determine the budget  3.2 Stakeholder management  3.2.1 Identify stakeholders  3.2.2 Manage stakeholder  3.3 Develop project plans  3.4 Project plans approved  4.0 Executing  4.1 Human resource management  4.1.1 Acquire the project team  4.1.2 Develop the project team  4.2 Design  4.2.1 Draw SWOT diagram  4.2.2 Draw concept map  4.2.3 Draw use-case diagram  4.2.4 Draw class diagram  4.2.5 Draw sequence diagram  4.3 Implementation  4.3.1 Procurement management  4.3.1.1 Conduct procurement  4.3.1.2 Close procurement  4.3.2 Install and configure devices  4.3.2.1 Install intermediate devices  4.3.2.2 Install terminal devices  4.3.2.3 Install and configure secure server  4.3.2.4 Install management software on computers in FSH  4.3.3 Integrate new devices into FSH forest network  4.3.4 Train the FSH staffs  4.3.5 Test for staff usage  4.3.6 Test for patient usage  5.0 Controlling  5.1 Validate scope  5.2 Review project plan  5.3 Status Report  5.4 Report performance  5.5 Control changes  6.0 Closing  6.1 Finalize financial& personnel issues  6.2 Dispose of materials& equipment  6.3 Archive documentations  6.4 Prepare final project report  6.5 Present final project  6.6 Project completed |

Table - Work Breakdown Structure

## Detailed Work Breakdown Structure

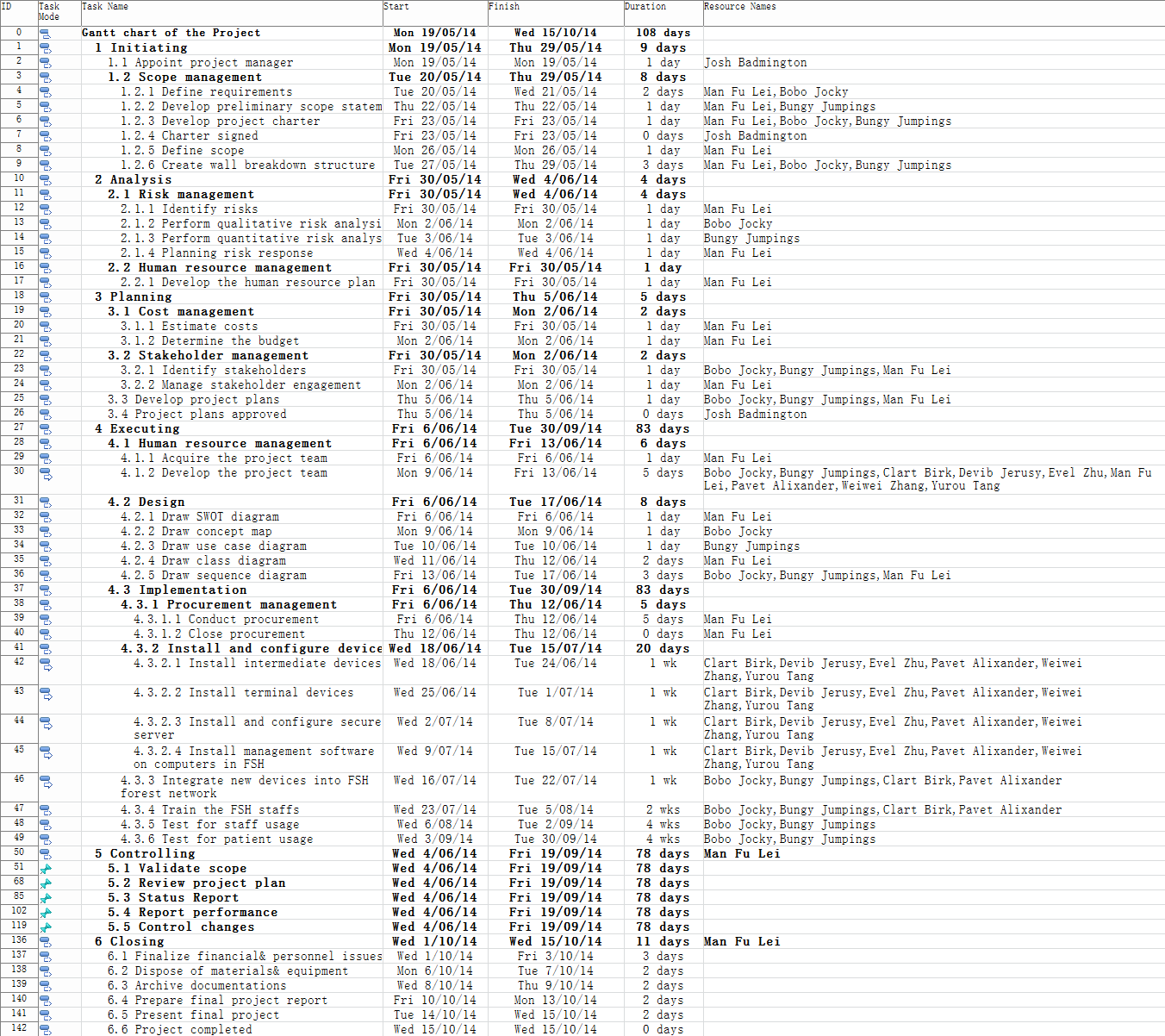


Figure - Detailed WBS Structure

The project started on May 19 and will finish on October 15. The titles of the employees can be referred to section 7.1 “Chain of Command” where the positions of the employees shown above will be explained in detail. In activity 4.1.2 all team members will be together discussing how the project should be undertaken. In activity 4.3.4 the two network technicians Clart and Pavet will be there for only one week and after that they will leave the project.

# Time Management



## Gantt chart

The activities 1.2.4, 3.4, 4.3.1.2 are milestones which only last for no more than one day. Activities under 5.0 are iterative during the whole project and they will be executed regularly on Wednesday every week. They start on June 11th because the project plan will be approved on June 5th on Thursday. They will finish on October 1st because the project will enter closing state after that day. The days inside are workdays and on Saturday and Sunday all members are in rest. Everyone will be required to work for eight hours on the project before it finishes.

The following is the Gantt chart:

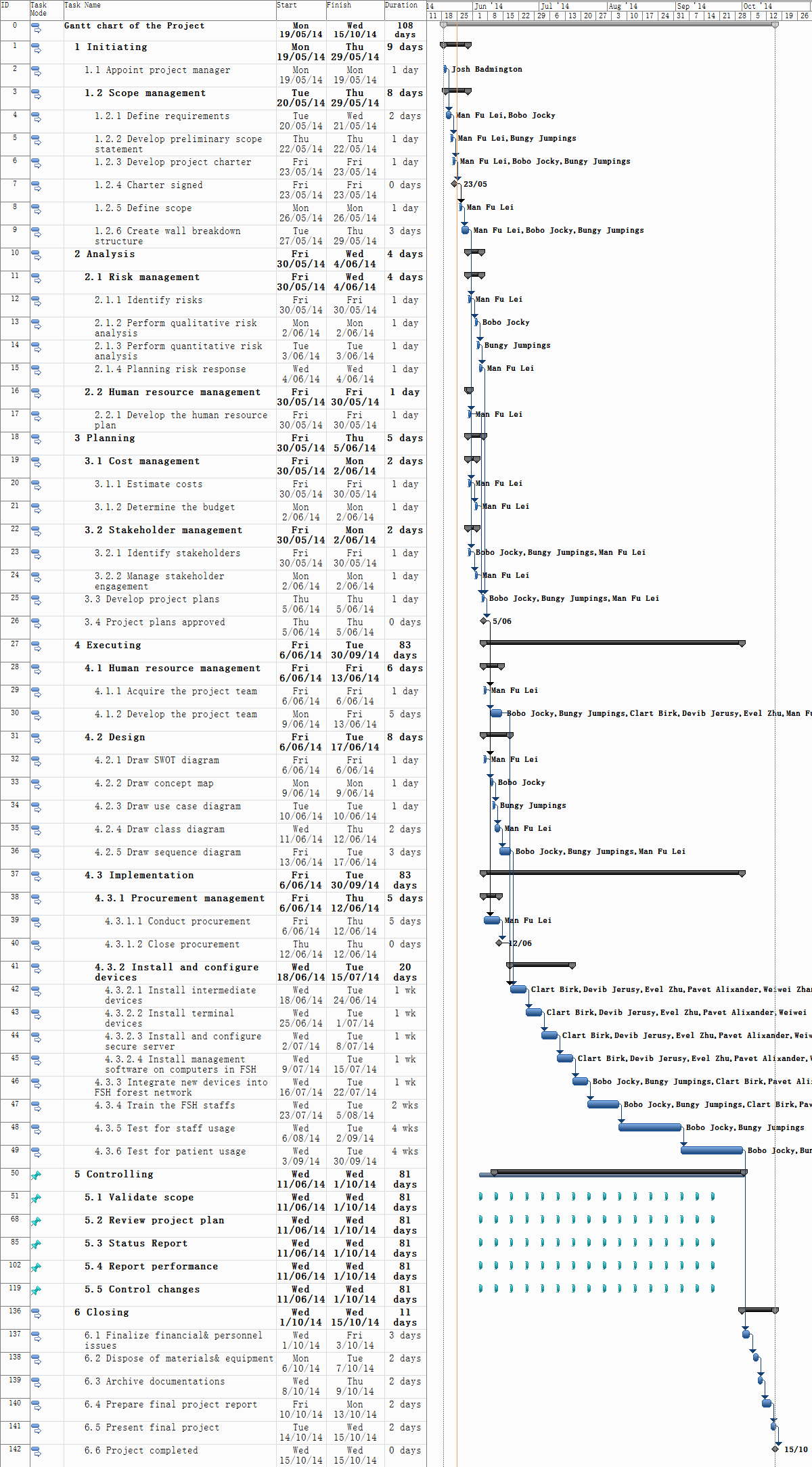


Figure - Gantt chart

## Critical Path Analysis

The activities and their symbols are listed as following. Those under Controlling are iterative so they are not included in the critical path analysis. Duration is calculated with workday:

|  |  |  |  |
| --- | --- | --- | --- |
| **Activity** | **Symbol** | **Duration** | **Predecessor** |
| 1.1 Appoint project manager | a | 1 | N/A |
| 1.2.1 Define requirements | b | 2 | a |
| 1.2.2 Develop preliminary scope statement | c | 1 | b |
| 1.2.3 Develop project charter | d | 1 | c |
| 1.2.4 Charter signed | e | 0 | d |
| 1.2.5 Define scope | f | 1 | e |
| 1.2.6 Create work breakdown structure | g | 3 | f |
| 2.1.1 Identify risks | h | 1 | g |
| 2.1.2 Perform qualitative risk analysis | i | 1 | h |
| 2.1.3 Perform quantitative risk analysis | j | 1 | i |
| 2.1.4 Planning risk response | k | 1 | j |
| 2.2.1 Develop the human resource plan | l | 1 | g |
| 3.1.1 Estimate costs | m | 1 | g |
| 3.1.2 Determine the budget | n | 1 | m |
| 3.2.1 Identify stakeholders | o | 1 | g |
| 3.2.2 Manage stakeholder | p | 1 | o |
| 3.3 Develop project plans | q | 1 | k, l, n, p |
| 3.4 Project plans approved | r | 0 | q |
| 4.1.1 Acquire the project team | s | 1 | r |
| 4.1.2 Develop the project team | t | 5 | s |
| 4.2.1 Draw SWOT diagram | u | 1 | r |
| 4.2.2 Draw concept map | v | 1 | u |
| 4.2.3 Draw use-case diagram | w | 1 | v |
| 4.2.4 Draw class diagram | x | 2 | w |
| 4.2.5 Draw sequence diagram | y | 3 | x |
| 4.3.1.1 Conduct procurement | z | 5 | s |
| 4.3.1.2 Close procurement | A | 0 | z |
| 4.3.2.1 Install intermediate devices | B | 5 | t, y, A |
| 4.3.2.2 Install terminal devices | C | 5 | B |
| 4.3.2.3 Install and configure secure server | D | 5 | C |
| 4.3.2.4 Install management software on computers in FSH | E | 5 | D |
| 4.3.3 Integrate new devices into FSH forest network | F | 5 | E |
| 4.3.4 Train the FSH staffs | G | 10 | F |
| 4.3.5 Test for staff usage | H | 20 | G |
| 4.3.6 Test for patient usage | I | 20 | H |
| 6.1 Finalize financial& personnel issues | J | 3 | I |
| 6.2 Dispose of materials& equipment | K | 2 | J |
| 6.3 Archive documentations | L | 2 | K |
| 6.4 Prepare final project report | M | 2 | L |
| 6.5 Present final project | N | 2 | M |
| 6.6 Project completed | O | 0 | N |

Table - Activity symbols

The network diagram for the activities is like following:



Figure - Network diagram

The paths diversify on g where the longest path is: g-h-i-j-k-q whose length is: 3+1+1+1+1=7 days. From r to B, the longest path is: r-u-v-w-x-y-B whose length is: 0+1+1+1+2+3=8 days. So the critical path is: a-b-c-d-e-f-g-h-i-j-k-q- r-u-v-w-x-y-B-C-D-E-F-G-H-I-J-K-L-M-N-O whose length is: 1+2+1+1+0+1+3+1+1+1+1+1+0+1+1+1+2+3+5+5+5+5+5+10+20+20+3+2+2+2+2+0=108 days. For those which are in the critical path, they have neither free slack time nor total slack time. Only activities l, m, n, o, p, s, t, z, A have total slack time because they are not in the critical path. From g to q, the critical path is: g-h-i-j-k-q = 3+1+1+1+1=7 days. The path which l lies is: g-l-q = 3 +1=4 days so l has total slack time 7-4=3 days. Both m and n are in path: g-m-n-q = 3+1+1=5 days so they have the same total slack time 7-5=2 days. For the same reason o and p have total slack time 2 days too. From r to B, the critical path is: r-u-v-w-x-y-B = 0+1+1+1+2+3=8 days. Activities s and t lie in path: r-s-t-B =0+1+5=6 days so their total slack time is 8-6=2 days. And z and A have total slack time 3 days because 8-5=3 days. The following table indicates their indices:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Symbol** | **Duration** | **Predecessor** | **Successor** | **Early Start** | **Early Finish** | **Late Start** | **Late Finish** | **Free Slack Time** | **Total Slack Time** |
| a | 1 | N/A | b | 0 | 1 | 0 | 1 | 0 | 0 |
| b | 2 | a | c | 1 | 3 | 1 | 3 | 0 | 0 |
| c | 1 | b | d | 3 | 4 | 3 | 4 | 0 | 0 |
| d | 1 | c | e | 4 | 5 | 4 | 5 | 0 | 0 |
| e | 0 | d | f | 5 | 5 | 5 | 5 | 0 | 0 |
| f | 1 | e | g | 5 | 6 | 5 | 6 | 0 | 0 |
| g | 3 | f | h, l, m, o | 6 | 9 | 6 | 9 | 0 | 0 |
| h | 1 | g | i | 9 | 10 | 9 | 10 | 0 | 0 |
| i | 1 | h | j | 10 | 11 | 10 | 11 | 0 | 0 |
| j | 1 | i | k | 11 | 12 | 11 | 12 | 0 | 0 |
| k | 1 | j | q | 12 | 13 | 12 | 13 | 0 | 0 |
| l | 1 | g | q | 9 | 10 | 12 | 13 | 3 | 3 |
| m | 1 | g | n | 9 | 10 | 9 | 10 | 0 | 2 |
| n | 1 | m | q | 10 | 11 | 12 | 13 | 2 | 2 |
| o | 1 | g | p | 9 | 10 | 9 | 10 | 0 | 2 |
| p | 1 | o | q | 10 | 11 | 12 | 13 | 2 | 2 |
| q | 1 | k, l, n, p | r | 13 | 14 | 13 | 14 | 0 | 0 |
| r | 0 | q | s, u, z | 14 | 14 | 14 | 14 | 0 | 0 |
| s | 1 | r | t | 14 | 15 | 14 | 15 | 0 | 2 |
| t | 5 | s | B | 15 | 20 | 17 | 22 | 2 | 2 |
| u | 1 | r | v | 14 | 15 | 14 | 15 | 0 | 0 |
| v | 1 | u | w | 15 | 16 | 15 | 16 | 0 | 0 |
| w | 1 | v | x | 16 | 17 | 16 | 17 | 0 | 0 |
| x | 2 | w | y | 17 | 19 | 17 | 19 | 0 | 0 |
| y | 3 | x | z | 19 | 22 | 19 | 22 | 0 | 0 |
| z | 5 | s | A | 15 | 20 | 15 | 20 | 0 | 3 |
| A | 0 | z | B | 20 | 20 | 22 | 22 | 2 | 3 |
| B | 5 | t, y, A | C | 22 | 27 | 22 | 27 | 0 | 0 |
| C | 5 | B | D | 27 | 32 | 27 | 32 | 0 | 0 |
| D | 5 | C | E | 32 | 37 | 32 | 37 | 0 | 0 |
| E | 5 | D | F | 37 | 42 | 37 | 42 | 0 | 0 |
| F | 5 | E | G | 42 | 47 | 42 | 47 | 0 | 0 |
| G | 10 | F | H | 47 | 57 | 47 | 57 | 0 | 0 |
| H | 20 | G | I | 57 | 77 | 57 | 77 | 0 | 0 |
| I | 20 | H | J | 77 | 97 | 77 | 97 | 0 | 0 |
| J | 3 | I | K | 97 | 100 | 97 | 100 | 0 | 0 |
| K | 2 | J | L | 100 | 102 | 100 | 102 | 0 | 0 |
| L | 2 | K | M | 102 | 104 | 102 | 104 | 0 | 0 |
| M | 2 | L | N | 104 | 106 | 104 | 106 | 0 | 0 |
| N | 2 | M | O | 106 | 108 | 106 | 108 | 0 | 0 |
| O | 0 | N | N/A | 108 | 108 | 108 | 108 | 0 | 0 |

Table - Critical path analysis

The free slack time indicates how long an activity can be delayed without delaying the scheduled start day of its immediate following activities. Those activities which have slack times have been shaded with color. The free slack time will always be less than or equal to total slack time. The days shown here are workdays so 108 days are not really 108 normal days but they are 105 x 7/5 = 145 + 3 =148 days ≈ 5 months which are the same as the estimated time shown in Gantt chart.

# Cost Management



## Budget

The following is a table for tangible and intangible cost comparison:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Classification** | **Category** | **Item** | **Number** | **Unit Price** | **Total Price** |
| **Tangible Costs** | **Intermediate Devices** | Cisco SG200-50 Switch | 10 | $480 (Cisco SG200-50 Switch 48 10/100/1000 Ports, Gigabit Ethernet Smart Switch, 2 Combo Mini-GBIC Ports, Warranty, One Year Tech Support - SLM2048TNA, n. d.) | $4,800 |
| CISCO RV325 Router | 4 | $375 (Cisco, n. d.) | $1,500 |
| **Terminal Devices** | Clinical videoconferencing device | 5 | $2,000 | $10,000 |
| Emergency room videoconferencing device | 2 | $1,500 | $3,000 |
| **Home monitoring devices** | A set of devices | 50 | $800 | $4,000 |
| **High-capacity Servers** | Intel Core i7 32GB Home Office PC Computer | 2 | $940 (Intel Core i7 2600K 32GB DDR3 RAM 2TB Hard Drive DVDRW Home Office PC Computer, n. d.) | $1,880 |
| 16TB External Hard Drive | 2 | $1,500 (LaCie, n. d.) | $3,000 |
| **Software licensing** | Windows Server 2012 R2 datacenter | 1 | $ 6,160 (Foley, 2013) | $6,160 |
| **Miscellaneous** |  | | | $4,000 |
| **Total** |  | | | $38,340 |
| **Intangible Costs** | **Relationship Cost** | Stimulate team members whenever they became lazy or sad; | | | |
| Persuade team members whenever they argue with one another; | | | |
| Discuss with team members when there is conflict; | | | |
| **Human Resource Cost** | Find someone who can solve the problem if encountering difficult obstacles; | | | |
| The project is delayed when someone is sick before critical meeting; | | | |
| **Organizational Cost** | May require overtime working if assignments sometimes are too much; | | | |
| When some member is needed by other department the process is slowed. | | | |

Table - Budget

Devices are bought for more than enough to build redundancy network in case of failure. Costs of cables are included in Miscellaneous. Intangible costs are those which are hard to be measured by money such as efforts for maintaining the team members. The number of switches is estimated on the assumption of approximately there will be five floors in FSH where each floor has less than 100 devices connecting to the switches because each switch in the above model has 48 ports. The same Windows Server license can be used on both computers each of which can use multiple instances of virtual machines to implement the secure server network.

## Cost Baseline

The cost baseline is like following:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **WBS Items** | **5** | **6** | **7** | **8** | **9** | **10** | **Totals** |
| 1. **Project Management** |  |  |  |  |  |  |  |
| **1.1 Project Manager** | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 36,000 |
| **1.2 Telehealth Advisors** | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |  | 15,000 |
| **1.3 Project team members** |  |  |  |  |  |  |  |
| **1.3.1 Network Technician** |  | 6,000 | 10,000 |  |  |  | 16,000 |
| **1.3.2 Installer** |  | 12,000 | 8,000 |  |  |  | 20,000 |
| 1. **Hardware** |  |  |  |  |  |  |  |
| **2.1 Intermediate devices** |  | 6,300 |  |  |  |  | 6,300 |
| **2.2 Terminal devices** |  | 13,000 |  |  |  |  | 13,000 |
| **2.3 Home monitoring devices** |  | 4,000 |  |  |  |  | 4,000 |
| **2.4 High-capacity Servers** |  | 4,900 |  |  |  |  | 4,900 |
| 1. **Software Licensing** |  |  | 6,160 |  |  |  | 6,160 |
| 1. **Testing** |  |  |  |  |  |  |  |
| 1. **Training and Support** |  |  |  |  |  |  |  |
| **5.1 Team member training** |  | 2,500 |  |  |  |  | 1,000 |
| **5.2 Training of FSH staffs** |  |  | (15,000) | (15,000) |  |  | (30,000) |
| 1. **Miscellaneous** | 200 | 2,400 | 500 | 300 | 300 | 300 | 3,700 |
| **Totals** | 9,200 | 58,600 | 18,660 | (5,700) | 9,300 | 9,300 | 98,560 |

Table - Cost baseline

The advisors are employees of SMHS so only $1,500 for each during the project is enough. The network technicians and installers are needed only when installing and configuring the devices so they are paid pro rata. In days of training employees will get fully paid as they are in workdays and the additional 2,500 dollars are for materials such as demonstrating equipment which should be included in Miscellaneous. The testing costs no money because the hospital staffs are voluntary to help the team members test the devices and the patients will get the home monitoring devices for free to test the devices so they are not paid. When training the FSH staffs, there will be 20 people taking the training course which lasts for two weeks equal to ten days. For every person the average cost is 150 dollars per day. They will be studying for eight hours every day. Their costs are almost the same as that of courses for international students in Polytechnic West Australia.

# Human Resource Management



## Chain of Command



Figure - Chain of command

There is more than one person in the same title to prevent human resource shortage in case some of them are sick during the project. The CEO sits on top of the hierarchy and listens to the report from manager. The manager delegates the advisors to dictate the network technicians to be responsible for installers when their roles are activated. If the installers have problem they can either report to the network technicians or report the problem directly to the manager or CEO. In general the superior is in charge of its subordinates in the chain of command.

## Responsibility Assignment Matrix

The responsibilities of team members to WBS items are represented in the following table:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | | | | |
|  | **Project Manager** | **Telehealth Advisors** | **Network Technicians** | **Installers** |
| **1.0** | R P | P |  |  |
| **2.0** | R P | P |  |  |
| **3.0** | R P | P |  |  |
| **4.1.1** | R P |  |  |  |
| **4.1.2** | R P | P | P | P |
|  | **4.2** | R P | P |  |  |
| **4.3.1** | R P |  |  |  |
| **4.3.2.1** |  |  | R | P |
| **4.3.2.2** |  |  | R | P |
| **4.3.2.3** |  |  | R | P |
| **4.3.2.4** |  |  | R | P |
| **4.3.3** |  | R | P |  |
| **4.3.4** |  | R P | P |  |
| **4.3.5** |  | R P |  |  |
| **4.3.6** |  | R P |  |  |
| **5.0** | R P |  |  |  |
| **6.0** | R P |  |  |  |

Table - Responsibility assignment matrix

In activities 1.0, 2.0 and 3.0, the advisors will be helping the project manager in these activities who is responsible. Both advisors and network technicians will be teaching staffs from FSH which contain both workers from IT department and doctors as well as nurses. However the network technicians will leave the project after the first week for training FSH staffs. The advisors will continue teaching the staffs in the second week focusing on the use of devices for staffs.

## Training

The training will take place in June for the network technicians and installers for one week. The train will be undertaken by the advisors who will teach them the scope of the project and infrastructure of Telehealth service so that the team members can be ready for the work coming in July. After the facilities are installed and configured, the network technicians will teach the workers from IT department of FSH to make sure they can handle routine maintenance. At the same time the advisors will teach the doctors and nurses on how to use the devices. The training course for IT workers will last one week and that for workers in the hospital will last two weeks.

There will be three IT workers taking the course. Two department managers, five doctors and 15 nurses will take the course for using the devices. After the courses complete, the advisors will help the workers from FSH teach the patients to test the system. The voluntary patients will get the home monitoring devices for free and test the devices at home. There will be 20 patients from preliminary estimate.

# Risk Management



## Risk Factors

The following are the risk factors in the project:

1. There may be not enough user involvement during the project leading to unsatisfying of users towards the implementation of the service;
2. There may be not enough executive management support such as that the CEO doubts if the project goes well and suspends some financial supports;
3. The statement of requirements may not be clear enough for the team members to follow and go into the right direction;
4. The planning may not be detailed enough to cope with emergencies that may be encountered during the project;
5. The Telehealth service may not be as well as predicted even if implemented properly;
6. The milestones set on the project may not be small enough for team members to feel they are making progress;
7. The team members may not be competent enough to succeed the tasks assigned;
8. The team members may be sloppy and delaying their assigned tasks;
9. The team members may not cooperate with each other;
10. Management level of FSH may delay the transaction of funds;
11. The doctors, nurses or patients may not accept the service after the installation;
12. Management level of FSH may not want to implement the service honestly;
13. The company may not have enough funds to support our project;
14. The project may prove non-feasible at the first stage of estimate;
15. Additional costs may be needed during the project;
16. The procured equipment may not function as expected;
17. The test may not be complete enough to cover possible circumstances in the future;
18. The service may have been out of date at the completion of the project;
19. The training for the IT workers may not be well enough to handle routine maintenance;
20. The training for users may not be enough for them to use them properly.

## Probability/Impact Matrix

The Probability/Impact Matrix is like following:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Probability** | High | Risk 6 | Risk 3  Risk 4  Risk 15 | Risk 1 | |
| Medium | Risk 9  Risk 19 | Risk 8  Risk 17 | Risk 14 | |
| Low | Risk 16  Risk 18 | Risk 5  Risk 20 | Risk 2  Risk 7  Risk 10  Risk 11  Risk 12  Risk 13 | |
|  |  | Low | Medium | High | |
|  |  | **Impact** | | |  |

Figure - Probability/Impact matrix

## Risk Mitigation Strategies

The mitigation strategies are listed in the following and the numbers on the left corresponds to the risks listed in section 8.1:

1. Hold regular meetings for gathering users’ information on the project progress
2. Report the progress regularly in detail
3. Have regular meeting with team members and explain the specification clearly
4. Plan the project as detailed as possible considering all possible situation
5. Reflect the situation to management level and discuss the precaution measure
6. Set the milestones as small as possible
7. Use the experienced members; train the team members thoroughly
8. Use more diligent members; use Gantt chart to assign tasks
9. Build a good team work environment during the project
10. Report the progress of the project to the management level of FSH regularly
11. Train them properly by telling how much the service can do
12. Write a detailed proposal featuring the abilities of the services
13. Do a thorough financial analysis before beginning the project
14. Produce a detailed feasible project plan before having it signed for approving
15. Prepare a detailed cost plan and control the cost systematically
16. Buy the equipment from the most renowned providers
17. Invite more users to test the system
18. Keep track of the trend of related technologies
19. Test if IT workers can work along before closing the project
20. Give the users as much training as possible

# Conclusions

The report analyzed the project in different knowledge areas of project management including integration, scope, time, cost, human resource and risk. The project charter describes the three essential elements: scope, time and cost concisely providing a rough view on the process of the project. Then the author analyzed the requirement of the project featuring the advantage of the new system and in the scope statement the author clarifies the content and boundary of the project. In WBS the author split the project into small activities and assigned human resources to them. In time management the author specified the schedule of the project and identified those activities that can be delayed. In cost management the author stated the explicit and potential costs of the project and gave a baseline of the cost. In human resource management the author depicted the chain of command in the project team and stated their responsibility as well as the investment on them. In risk management the author listed all possible risk factors and developed mitigation strategies.

# Recommendation

The budget is a little tight because most of the equipment is very expensive. The project manager needs to negotiate with the FSH management level to reduce the cost. The main concern is to implement the service ensuring the devices work properly and the staffs and patients understand how to use them. The five components representing different functions of the system and the most important part of these is training and educating which can ensure the other four parts function as expected. It is also very important to control the cost and report the progress to management level and FSH management because the support from executive is crucial to the project. The second is to train the users completely to make sure they understand how much the system can achieve. To ensure the success of the project maintaining high morale and controlling the scope are necessary.

# Appendices

## Sample Questionnaire Form



Answer the following questions by ticking or writing.

1. How much do you know about Telehealth?

* Very familiar
* Familiar
* Medium
* Heard of it
* Never heard of it

1. How long have you been working in this industry?

* More than two years
* More than one year
* Less than one year

1. What is your occupation?

* Doctor
* Nurse
* Clerk
* Other (Please specify) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Do you think the medical service provided in your workplace is enough for the patients?

* Yes
* No (Please specify the reason): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Has there been patient dead in emergency room because of insufficient professional surgeon in your workplace before?

* Yes
* No

1. How do you track the progress of the patients after surgery?

* By telephone
* Online
* Home visit
* Other (Please specify) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. If the Telehealth which provides interconnected medical network service is installed in your hospital, are you happy with that?

* Very happy
* Not at all
* Am not sure
* Other (Please specify) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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# Glossary

**Authentication:** The act of confirming the truth of an attribute of a single piece of data (datum) or entity

**Chain of command:** An official hierarchy of authority that dictates who is in charge of whom and of whom permission must be asked

**Class diagram**: A type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects

**Concept map:** A diagram that depicts suggested relationships between concepts. It is a graphical tool that designers, engineers, technical writers, and others use to organize and structure knowledge

**Cost baseline:** A time-phased budget that project managers use to measure and monitor cost performance

**Critical path**: The series of activities in a network diagram that determines the earliest completion of the project; it is the longest path through the network diagram and has the least amount of slack or float

**Deliverable:** A product or service, such as a technical report, a training session, a piece of hardware, or a segment of software code, produced or provided as part of a project

**Early finish date**: The earliest possible time an activity can finish based on the project network logic

**Early start date**: The earliest possible time an activity can start based on the project network logic

**Encryption:** The process of encoding messages or information in such a way that only authorized parties can read it

**Free slack or free float**: The amount of time an activity can be delayed without delaying the early start date of any immediately following activities

**Gantt chart**: A standard format for displaying project schedule information by listing project activities and their corresponding start and finish dates in calendar form

**Gigabyte (GB):** A measure of computer data storage capacity and is "roughly" a billion bytes

**Hard disk drive (HDD):** A data storage device used for storing and retrieving digital information using rapidly rotating disks (platters) coated with magnetic material

**Intangible costs or benefits:** Costs or benefits that is difficult to measure in monetary terms

**Integrity:** Maintaining and assuring the accuracy and consistency of data over its entire life-cycle, and is a critical aspect to the design, implementation and usage of any system which stores, processes, or retrieves data

**Intel Core**: A brand name that Intel uses for various mid-ranges to high-end consumer and business microprocessors

**Interface management:** Identifying and managing the points of interaction between various elements of a project

**Intermediary devices**: Connect the individual hosts to the network and can connect multiple individual networks to form an internetwork

**Late finish date**: The latest possible time an activity can be completed without delaying the project finish date

**Late start date**: The latest possible time an activity might begin without delaying the project finish date

**Milestone:** A significant event that normally has no duration on a project; serves as a marker to help in identifying necessary activities, setting schedule goals, and monitoring progress

**Network diagram**: A schematic display of the logical relationships or sequencing of project activities

**Packet switching:** Delivery of variable bitrate data streams (sequences of packets) over a shared network which allocates transmission resources as needed using statistical multiplexing or dynamic bandwidth allocation techniques

**Probability/impact matrix or chart:** A matrix or chart that shows the relative probability of a risk occurring and the relative impact of the risk

**Program Evaluation and Review Technique** **(PERT):** A project network analysis technique used to estimate project duration when there is a high degree of uncertainty about the individual activity duration estimates

**Project charter:** A document that formally recognizes the existence of a project and provides direction on the project’s objectives and management

**Project management:** The process and activity of planning, organizing, motivating, and controlling resources, procedures and protocols to achieve specific goals in scientific or daily problems

**Project:** A temporary endeavor designed to produce a unique product, service or result with a defined beginning and end (usually time-constrained, and often constrained by funding or deliverables), undertaken to meet unique goals and objectives, typically to bring about beneficial change or added value

**Qualitative risk analysis**: Concerned with discovering the probability of a risk event occurring & the impact the risk will have if it does occur

**Quantitative risk analysis**: A formalized specialist method for calculating individual, environmental, employee and public risk levels for comparison with regulatory risk criteria

**Remote Access:** Connection to a data-processing system from a remote location

**Requirement Analysis**: In systems engineering and software engineering, encompasses those tasks that go into determining the needs or conditions to meet for a new or altered product

**Responsibility assignment matrix:** Describes the participation by various roles in completing tasks or deliverables for a project or business process

**Risk factors:** Numbers that represent the overall risk of specific events, given their probability of occurring and the consequence to the project if they do occur

**Risk mitigation:** Reducing the impact of a risk event by reducing the probability of its occurrence

**Risk response:** Appropriate steps taken or procedures implemented upon discovery of an unacceptably high degree of exposure to one or more risks. Also called risk treatment

**Router:** A device that forwards data packets between computer networks

**Scope:** All the work involved in creating the products of the project and the processes used to create them

**Sequence diagram:** An interaction diagram that shows how processes operate with one another and in what order

**Slack:** The amount of time a project activity may be delayed without delaying a succeeding activity or the project finish date; also called float

**Stakeholders:** People involved in or affected by project activities

**Switch:** A computer networking device that is used to connect devices together on a computer network by performing a form of packet switching

**SWOT analysis:** Analyzing Strengths, Weaknesses, Opportunities, and Threats; used to aid in strategic planning

**Tangible costs or benefits:** Costs or benefits that can be easily measured in dollars

**Telecommunication:** Communication at a distance by technological means, particularly through electrical signals or electromagnetic waves

**Telehealth:** The delivery of health-related services and information via telecommunications technologies

**Terabyte (TB):** A multiple of the unit byte for digital information. The prefix tera represents the fourth power of 1000

**Terminal device**: a device which ends a telecommunications link and is the point at which a signal enters and/or leaves a network

**Total slack or total float**: The amount of time an activity can be delayed from its early start without delaying the planned project finish date

**Use-Case diagram:** A representation of a user's interaction with the system and depicting the specifications of a use case

**Videoconferencing**: The conduct of a videoconference (also known as a video conference or video teleconference) by a set of telecommunication technologies which allow two or more locations to communicate by simultaneous two-way video and audio transmissions

**Vital sign:** Measures of various physiological statistics, often taken by health professionals, in order to assess the most basic body functions

**Windows Server 2012:** Codenamed "Windows Server 8" is the sixth release of Windows Server

**Work Breakdown Structure (WBS):** A key project deliverable that organizes the team's work into manageable sections

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